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Preface

It is with great pleasure that we present the Book of Abstracts of the 5th International Congress on Exercise, Biomechanics and Nutrition (EBN 2026), which was held on 5–6 June 2026 at the School of Education of the Polytechnic Institute of Setúbal, Portugal.

Over the past five editions, the International Congress on Exercise, Biomechanics and Nutrition has established itself as a recognized platform for scientific dissemination, knowledge exchange, and international collaboration in the fields of exercise science, biomechanics, nutrition, health, and sport performance. Organized by the Polytechnic Institute of Setúbal, the congress reflects the institution's commitment to academic excellence, scientific innovation, and the promotion of evidence-based practice within the sport and health sciences.

The fifth edition of EBN continued this mission by bringing together researchers, academics, practitioners, and students from different countries and scientific backgrounds. The congress provided a multidisciplinary environment in which the latest developments in exercise physiology, biomechanics, strength and conditioning, sport nutrition, health promotion, and human performance were discussed and shared. Through keynote lectures delivered by internationally recognized experts, oral communications, and scientific discussions, participants were offered valuable opportunities to disseminate research findings, establish collaborations, and explore emerging trends in the field.

EBN 2026 marked a significant milestone in the history of the congress, with more than 218 scientific contributions submitted by authors from a wide range of countries and institutions worldwide. The diversity and quality of the submissions reflected the increasing international recognition of EBN as a scientific meeting point for researchers working in exercise science, biomechanics, nutrition, health, and human performance. The growing number of contributions received over the years demonstrates the consolidation of the congress as one of the leading scientific events in these fields within Portugal and an increasingly relevant platform at the international level.

A defining characteristic of EBN has always been its commitment to supporting young researchers while simultaneously attracting established international scholars. This unique combination created a stimulating scientific environment where undergraduate and postgraduate students presented their work alongside experienced researchers and leading experts. Such interaction contributed significantly to the development of future generations of scientists and professionals in sport and health sciences.

The abstracts published in this volume represent the scientific contributions accepted for presentation at EBN 2026. They reflect a wide range of research topics, methodological approaches, and practical applications, demonstrating the dynamic and interdisciplinary nature of contemporary research in exercise, biomechanics, and nutrition. Collectively, these contributions provide valuable insights that contribute to advancing scientific knowledge and improving professional practice.

On behalf of the Organizing Committee, we would like to express our sincere gratitude to all authors who submitted their work, to the Scientific Committee for ensuring a rigorous review process, to the invited speakers for sharing their expertise, and to all participants whose enthusiasm and commitment continue to strengthen this congress year after year. We also acknowledge the support of the Polytechnic Institute of Setúbal and all partner institutions whose collaboration contributed to the success of this fifth edition. We hope that the scientific contributions presented in this Book of Abstracts will inspire new ideas, foster future collaborations, and contribute to the continued advancement of sport and exercise sciences worldwide.

Thank you for being part of EBN 2026 and for contributing to the growth of this international scientific community.

Luis Leitão, PhD

Chair of the Organizing Committee

5th International Congress on Exercise, Biomechanics and Nutrition

School of Education, Polytechnic Institute of Setúbal, Portugal

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Congress Committees

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Congress Program

June 5, Friday

10:00 – Opening Session – ESE Auditorium

Angela Lemos | President of the Polytechnic Institute of Setúbal

João Pires | Dean of ESE-IP Setúbal

Luis Leitao | Professor at the Science and Technology Department of ESE-IP Setúbal

Teresa Figueiredo | Head of Sports Science Area of ESE-IP Setúbal

10:30 – Physical Activity, Exercise and Nutrition – ESE Auditorium

Sport and AI: A Journey to the Future – **PhD Ana Pereira, University of Beira Interior, Portugal**

11:15 – Optimizing Strength and Hypertrophy in Bench Press – **PhD Luis Rodiles-Guerrero, University of Huelva, Spain**

12:00 – Sex Differences in Resistance Training – **PhD Beatriz Bachero-Mena, University of Seville, Spain**

13:30 – Lunch Break

14:30 – WORKSHOP: Velocity-Based Resistance Training: Specific Considerations for Men and Women – Part 1

15:30 – WORKSHOP: Velocity-Based Resistance Training: Specific Considerations for Men and Women – Part 2

17:00 – 21:00 – Abstract/Video Oral Presentations I

June 6, Saturday

8:00 – Abstract/Video Oral Presentations II

13:30 – Lunch Break

14:00 – Strength Training for Oncology Patients – **PhD Arkaitz Castañeda, University of Deusto, Spain**

15:00 – *Congress Closing Session*

Luis Leitão | Professor of Science and Technology Department at ESE-IP Setúbal

Raúl Dominguez | Professor in Sports at University of Seville

Abstracts

Lecture: SEX DIFFERENCES IN RESISTANCE TRAINING

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Abstract

Despite the growing participation of women in sports, female athletes remain underrepresented in exercise science research. Consequently, much of the current knowledge regarding resistance training has been extrapolated from studies conducted primarily in men. This presentation reviews the current evidence on sex differences in resistance training responses and discusses findings from recent investigations conducted by our research group. First, the biological and physiological factors underlying performance differences between women and men are examined, including muscle mass distribution, strength characteristics, and potential differences in muscle fiber composition. Current evidence suggests that women generally exhibit greater fatigue resistance than men during isometric tasks performed to failure. However, sex differences appear smaller and less consistent during dynamic resistance exercise. A major challenge in the field is the lack of standardized and objective criteria to quantify training intensity, volume, effort, and fatigue. This methodological limitation may explain the conflicting findings regarding sex differences in repetitions performed to failure and training adaptations. Recent evidence indicates that when relative strength and effort are appropriately matched, mechanical fatigue responses are largely similar between sexes, although women may perform a greater number of repetitions and exhibit greater metabolic fatigue. Finally, current data suggest that both women and men achieve substantial improvements in strength and muscle hypertrophy when training variables are appropriately controlled, although some sex-specific responses may exist depending on the training protocol and outcome assessed. Overall, this presentation highlights the importance of improving methodological rigor in resistance training research and emphasizes the need for more studies specifically designed to investigate female athletes and sex-based physiological responses.

Lecture: Optimizing strength and hypertrophy in bench press

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Abstract

This presentation examines how strength and hypertrophy adaptations in the bench press can be optimized through Velocity-Based Training (VBT). The rationale is that training adaptations are primarily determined by exercise intensity, volume, and exercise selection. However, traditional methods often fail to quantify these variables accurately, limiting the precision of training prescription.

VBT addresses this limitation by using movement velocity to monitor and control both intensity and volume. Specifically, movement velocity provides an accurate estimation of relative load (%1RM), while velocity loss (VL) within a set serves as an objective indicator of mechanical and metabolic fatigue. Research has shown that a given VL threshold produces a similar degree of fatigue and reflects a specific proximity to muscular failure, allowing coaches to standardize the training stimulus more effectively. The presentation reviews the findings of four longitudinal studies conducted in the bench press exercise. These studies compared different VL thresholds (0%, 15%, 25%, and 50%) across various loading ranges (40–85% 1RM) to investigate their effects on strength gains, neuromuscular adaptations, and muscle hypertrophy.

Overall, the evidence suggests that controlling training intensity and volume through movement velocity is an effective strategy for individualizing resistance training and optimizing performance outcomes. By precisely quantifying both the training stimulus and its physiological effects, VBT provides practitioners with a more reliable framework for designing strength-training programs aimed at maximizing strength development and muscle hypertrophy while avoiding unnecessary fatigue.

Workshop: Velocity-based resistance training: specific considerations for men and women

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Abstract

This workshop focuses on the application of Velocity-Based Training and the specific considerations that should be taken into account when prescribing resistance training for men and women. The workshop begins by presenting the scientific foundations of velocity-Based Training, highlighting movement velocity as a precise and objective tool for monitoring training intensity (expressed as a percentage of one-repetition maximum [%1RM]).

Current evidence regarding the load–velocity relationship is reviewed. Research demonstrates that velocity-based metrics allow practitioners to prescribe and monitor resistance training more accurately than traditional methods based solely on percentages of 1RM.

A central focus of the workshop is the analysis of sex-related differences in these relationships. Existing evidence suggests that women typically display lower movement velocities than men at the same relative load. This finding raises important questions regarding whether identical velocity targets represent the same physiological stimulus in both sexes.

To address these issues, participants complete a practical case study involving incremental load testing in men and women. The results are used to compare individual load–velocity relationships between sexes. Overall, the workshop emphasizes the need for sex-specific adjustments when prescribing velocity targets to ensure equivalent training stimuli and optimize resistance-training outcomes.

In- and Out-of-Possession Running and Technical-Tactical Performance in Soccer

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Abstract

Introduction

This study derived composite indices of attacking and defensive team performance, quantified how in-possession (IP) and out-of-possession (OP) running metrics related to these indices, and assessed contextual effects.

Methods

1,346 team-match observations from male teams competing in the Danish Superliga, Denmark's top-tier professional football league, across 3.5 seasons were analyzed using Second Spectrum tracking and Wyscout event data. Principal component analysis generated Attacking and Defensive Performance Indices. Linear mixed-effects models tested associations between phase-specific running metrics and the indices, with team as a random intercept and match result and location as covariates. XGBoost models with SHAP assessed feature importance.

Results and Conclusions

Results: Attacking performance was most strongly associated with IP total distance. After adjustment for IP movement volume, IP high-speed running and IP sprint distance showed conditional associations. OP total distance was negatively associated with both indices. Defensive performance was positively associated with OP high-speed running and IP high-intensity run count but negatively associated with IP sprint distance and OP total distance. An OP sprint distance x location interaction indicated that higher OP sprint distance related to lower defensive performance mainly in away matches. Match result showed small independent effects. XGBoost showed strong predictive accuracy for attacking (held-out $R^2 = 0.765$) and moderate predictive accuracy for defensive performance (held-out $R^2 = 0.399$), with SHAP confirming IP and OP total distance as dominant predictors. Conclusion(s): Team performance is closely linked to phase-specific running behavior. Movement volume during possession was the clearest correlate of attacking output, whereas defensive performance reflected lower OP workload and greater high-speed defensive activity.

Keywords: Ball possession, match analysis, contextual factors, physical demands

Supervised Treadmill-Based Gait Rehabilitation Improves Mobility and Fatigue in Adults with Multiple Sclerosis: Findings from a 12-Week Pilot Study

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Abstract

Introduction

Walking impairment and fatigue are among the most disabling symptoms in people with multiple sclerosis (MS), contributing to reduced physical function and quality of life (QoL). Treadmill walking training (TWT) has emerged as a promising rehabilitation strategy to improve gait performance and functional capacity in neurological populations. However, evidence regarding its feasibility, safety, and effects on multidimensional outcomes in people with MS remains limited. Therefore, this pilot study aimed to evaluate the feasibility, safety, and pre-post changes associated with a 12-week supervised TWT programme on walking performance, physical function, fatigue, and QoL in adults with MS.

Methods

A single-arm pilot study with pre-post assessments (T1–T2) was conducted at the Complejo Asistencial Universitario de Soria (Spain). Eleven adults diagnosed with MS (Expanded Disability Status Scale [EDSS] ≤ 6) completed a supervised 12-week TWT programme consisting of two 25-minute sessions per week. Outcomes included QoL assessed with the SF-36 questionnaire, functional mobility evaluated using the Timed Up and Go test (TUG), 4 m gait speed, physical function assessed with the Short Physical Performance Battery (SPPB), and fatigue assessed with the Modified Fatigue Impact Scale (MFIS). Pre-post differences were analysed using paired t-tests or Wilcoxon signed-rank tests as appropriate.

Results and Conclusions

The total SF-36 score did not change significantly ($p = 0.160$), although significant improvements were observed in the general health ($p = 0.039$) and vitality ($p = 0.043$) domains. Walking performance improved significantly, with reductions in TUG time ($p = 0.007$) and increases in 4 m gait speed ($p < 0.001$). Physical function assessed with the SPPB also improved significantly ($p = 0.003$). Fatigue impact decreased following the intervention, including the MFIS total score ($p = 0.015$), physical subscale ($p = 0.007$), and psychosocial subscale ($p = 0.026$), whereas no significant changes were observed in the cognitive subscale ($p = 0.094$). Adherence to the programme was 91.7%, and no adverse events were reported. These findings suggest that supervised TWT is feasible and safe and may improve mobility, physical function, and fatigue in adults with MS. However, given the exploratory single-arm design and small sample size, the results should be interpreted cautiously and confirmed in adequately powered randomised controlled trials.

Keywords: multiple sclerosis; treadmill walking training; gait speed; Timed Up and Go; Short Physical Performance Battery; fatigue; quality of life; pilot study

Dose-Dependent Effects of Aerobic Exercise on Immune Responses During Herpes Simplex Virus Infection

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Abstract

Introduction

Aerobic exercise is increasingly recognized as a biologically active stimulus capable of modulating antiviral immune function. However, its effects on latent herpesvirus infections, particularly herpes simplex virus (HSV), remain incompletely understood and appear to depend on exercise intensity and physiological stress. Understanding how exercise influences antiviral immunity may help optimize exercise prescription and reduce vulnerability to viral reactivation.

Methods

A structured narrative review with qualitative and semi-quantitative synthesis was conducted to analyze experimental and human studies published between 1993 and 2026 evaluating the interaction between aerobic exercise and immune responses during HSV infection. Evidence was organized according to exercise intensity, immune mechanisms, neuroendocrine regulation, and virus-specific characteristics.

Results and Conclusions

Moderate-intensity aerobic exercise was consistently associated with enhanced antiviral immune responses, including improved macrophage antiviral resistance, preserved natural killer cell cytotoxicity, optimized interferon signaling, and favorable T helper type 1 cytokine profiles. These adaptations were linked to reduced viral burden and improved clinical outcomes in experimental models. In contrast, prolonged or high-intensity exercise was associated with transient immune dysfunction characterized by impaired innate and adaptive immune responses, altered cytokine production, reduced antiviral surveillance, and increased susceptibility to infection and viral reactivation. Overall, aerobic exercise exerts dose-dependent effects on antiviral immunity during HSV infection. Moderate-intensity exercise appears to be a safe and potentially effective strategy to support immune function and antiviral defense, whereas excessive exercise loads may compromise immune homeostasis and increase vulnerability to HSV-related pathology.

Keywords: Exercise; Herpes Simplex; Immune System; Antiviral Immunity; Natural Killer Cells; Physiological Stress

Dry or Humid Heat? Thermoregulatory Differences and Exercise Tolerance in Athletes Under Constant WBGT (28°C)

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Abstract

Introduction

Exercise in hot environments increases core body temperature (T_{core}) and compromises thermal stability, negatively affecting performance and increasing the risk of heat-related illness. Physiological responses may differ according to environmental conditions (dry vs humid heat) and sex, although evidence under constant integrated heat stress conditions (WBGT) remains limited. This pilot study aimed to analyse thermoregulatory responses in trained athletes exercising under dry and humid heat conditions with an equivalent WBGT of 28°C.

Methods

A cross-over factorial study was conducted in a climate chamber (NCT07307191). Six trained athletes (3 men and 3 women) completed four randomized conditions: high humid heat (31°C, 70% RH), high dry heat (40°C, 20% RH), low humid heat, and low dry heat, maintaining a constant WBGT (~28°C). Participants performed continuous exercise at 6 and 12 km/h until exhaustion or a maximum of 70 min. T_{core} , skin temperature (T_{skin}), body temperature (T_{body}), heart rate (HR), oxygen consumption, metabolic rate, sweat rate, and perceptual responses were recorded.

Results and Conclusions

Exposure time was shorter during intense dry heat (36±11.4 min) compared with intense humid heat (48±16.8 min). Significant differences between conditions were observed for T_{core} , T_{skin} , T_{body} , and HR ($p<0.001$), indicating a faster rise in thermal strain under dry heat conditions. Exploratory analyses suggested differential patterns between men and women, with a trend toward lower tolerance in men during intense dry heat. No relevant differences were observed in VO_2 or metabolic rate. In this controlled experimental setting, trained athletes were able to maintain moderate exercise for approximately 40 min without exceeding a T_{core} of 38.5°C. These preliminary findings suggest that environmental heat type and sex may influence exercise tolerance under equivalent thermal stress, supporting the need for larger future studies.

Keywords: WBGT; heat stress; thermoregulation; exercise in the heat; sex differences; athletes; pilot study.

Exercise-Based Prehabilitation and Postoperative Physical Recovery: Preliminary Results from a Prospective Clinical Trial

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Abstract

Introduction

Prehabilitation strategies based on supervised exercise may improve postoperative recovery in patients undergoing abdominal wall surgery; however, evidence regarding their effects on physical function remains limited.

Methods

To evaluate the effects of a preoperative supervised training intervention on physical performance and strength-related variables at 3 months after surgery compared with a control group.

Results and Conclusions

Results: Significant baseline differences were observed between groups in most strength-related variables, with IS presenting higher initial values. The only variable showing a significant group $\times$ time interaction after Bonferroni correction was the CST 30s ($p < 0.001$). The IS group improved from 15.2 ± 3.8 to 22.1 ± 7.6 repetitions (+45%), whereas the CG remained stable (15.9 ± 5.2 to 15.2 ± 6.2 repetitions). A large effect size was observed at T4 (Cohen's $d = 1.00$). No significant interaction effects were found for abdominal strength, RFD, handgrip strength, or gait speed ($p > 0.05$). Conclusions: Preoperative supervised exercise significantly improved lower-body functional performance at 3 months after surgery, as reflected by the CST 30s. However, no differential effects were observed in abdominal strength, rate of force development, handgrip strength, or gait speed. These findings should be interpreted cautiously due to baseline group differences and the limited sample size.

Keywords: Prehabilitation Supervised exercise; Abdominal wall surgery; Functional recovery; Muscle strength; Linear mixed models; Physical performance; Postoperative rehabilitation

Chronic Effects of Combined Quercetin and Cocoa Flavanols Supplementation on Cognitive Processing Speed and Visual-Spatial Function in Elite Young Footballers

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Abstract

Introduction

Cognitive processing speed and visual scanning performance are important determinants of elite football performance. Polyphenolic compounds such as Quercetin and Cocoa Flavanols have been proposed to enhance neurocognitive efficiency. This study examined the effects of a 60-day supplementation period with Quercetin (Q), Cocoa Flavanols (CF), and their combination (Q+CF) on cognitive processing speed in young footballers.

Methods

Fifty elite male footballers (18–21 years) were randomized into five groups (n = 10 per group): Quercetin (Q), Cocoa Flavanols (CF), combined supplementation (Q+CF; 500 mg/day each), Placebo (P), and Control (C). Cognitive performance was assessed using the Trail Making Test Part A (TMT-A) at baseline and after the 60-day intervention period. A mixed-model ANOVA was conducted to evaluate group x time interactions. Change scores (dTMT = Post – Baseline) were calculated to quantify performance changes over time.

Results and Conclusions

Results: A significant group x time interaction was observed ($p < 0.01$). All supplementation groups demonstrated reductions in TMT-A completion time after 60 days, indicating improved cognitive processing speed and visual scanning performance. The Q+CF group showed the greatest improvement compared with the Placebo group (Mean difference in dTMT: -11.8 ± 4.2 s; $p < 0.01$, Cohen's $d = 1.12$). Additionally, the combined supplementation group demonstrated numerically greater improvements than the single-supplement groups (Q and CF), although superiority over the single-supplement groups was not statistically confirmed. Conclusion: Chronic co-supplementation with Quercetin and Cocoa Flavanols over 60 days significantly improved cognitive processing speed and visual scanning performance in young footballers. These findings suggest that polyphenol-based nutritional strategies may support cognitive performance in high-intensity athletic contexts

Keywords: Football, Quercetin, Cocoa Flavanols, Cognitive Processing Speed, Visual Scanning, Polyphenols

Differences in body composition and physical fitness among older adults based on physical activity level and sex

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Abstract

Introduction

Rising life expectancy has made quality of life and functional independence key indicators of health among older adults (Marcos-Pardo et al., 2023). Body composition is a key aspect of this well-being, as a decline in muscle mass combined with an increase in body fat raises the risk of developing noncommunicable diseases and losing physical function (Prado et al., 2024). At the same time, maintaining optimal physical fitness, including adequate levels of strength, cardiorespiratory fitness, and balance, is essential for preserving daily independence and reducing hospitalization and mortality rates (El Assar et al., 2022). However, the decline in physical activity observed in this population, particularly among women and in institutional settings, accelerates the deterioration of both factors (Rúa-Alonso et al., 2023). Although the benefits of physical activity are well known, few studies have compared differences in body composition and physical fitness among older adults based on sex and physical activity level. For this reason, the objective of this study was to analyze differences in body composition and physical fitness among older adults based on sex and physical activity level.

Methods

A cross-sectional study was conducted with 505 older adults (367 women and 138 men; mean age: 74.9 ± 8.4 years). The sample consisted of older adults living in nursing homes (institutionalized: $n = 74$) and those living in the community (non-institutionalized: $n = 431$). Using the International Physical Activity Questionnaire Adapted to the Elderly (IPAQ-E), older adults were classified into four physical activity groups: institutionalized (74), inactive (103), moderately active (178), and very active (150). Body composition was assessed using anthropometry and bioimpedance (body mass, height, body fat, skeletal muscle mass, and waist circumference). Physical fitness was also evaluated using handgrip strength, sprint (4, 6, and 10 m), the Timed Up and Go (TUG), and isometric strength tests of the upper and lower limbs.

Results and Conclusions

Institutionalized men had greater height ($p < 0.001$), body mass ($p = 0.036$), fat-free mass ($p < 0.001$), skeletal muscle mass ($p < 0.001$), and waist circumference ($p = 0.042$), as well as better performance in handgrip strength ($p \leq 0.038$), sprint ($p \leq 0.019$), TUG ($p < 0.001$), and upper body IS ($p = 0.002$) than women. Compared to inactive and moderately active non-institutionalized men, they exhibited greater height ($p < 0.001$), fat-free mass ($p < 0.001$), skeletal muscle mass ($p < 0.001$), waist girth ($p \leq 0.014$), as well as higher performance in handgrip strength ($p < 0.001$), upper body IS ($p < 0.001$), and lower body IS ($p \leq 0.050$), and lower fat mass ($p = 0.001$) than women. And, regarding very active older

adults, men showed greater height ($p<0.001$), fat-free mass ($p<0.001$), skeletal muscle mass ($p<0.001$), waist circumference ($p<0.001$), as well as greater handgrip strength ($p<0.001$), and upper ($p<0.001$) and lower ($p<0.001$) body IS. In conclusion, older men generally had better physical fitness and body composition values than women, regardless of physical activity level.

Keywords: Physical activity; Older adults; Body composition; Physical fitness; Gender

The effect of a minimal-equipment resistance priming protocol on 24-hour neuromuscular performance in U19 male soccer players: a randomized crossover trial.

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Abstract

Introduction

Resistance priming sessions have been proposed as a practical and time-efficient strategy for increasing exposure to neuromuscular stimuli without adding an excessive training load. As a result, they have received growing attention in the scientific literature as a tool for acutely improving neuromuscular performance. Resistance priming can be defined as a strength or power based stimulus involving low volumes, typically performed at moderate-to-high intensity within 0-48 hours before competition. This expanded timeframe allows practitioners to integrate priming exercises within the competitive microcycle (e.g., on match day –1 or –2 or even on match day) without disrupting tactical or technical sessions. Depending on the stimulus [e.g., strength, sprinting, and ballistic exercises], the load [e.g., heavy vs. light vs. optimal power] and timing (i.e., the moment of application) of the conditioning activity, priming exercises may acutely enhance neuromuscular performance while minimising the accumulation of fatigue. For example, González-García et al. (15) demonstrated that heavy back-squat sets at > 80 % one repetition maximum (1RM) enhanced jump height by approximately 6.5% (+3.4–9.5 cm) six hours post-exercise. Likewise, Loturco et al. (25) found that jump height increased by +5.6% and +4.0% six hours after performing jump squat at 40% and 80% 1RM, respectively. In addition, delayed or next-day effects (i.e., 24–48 hours post-stimulus) show promising trends under specific conditions.

Methods

thirteen male soccer players (age: 18.78 ± 1.48 years; height: 1.76 ± 0.07 m; body mass: 72.38 ± 7.10 kg) from a U-19 second division Spanish team—tier 3 based on McKay et al. — were included. A randomised crossover and counterbalanced design were used to investigate the delayed potentiation effects of a resistance priming session on physical performance. Baseline testing, which included the CMJ, 20-m sprint, short recovery stress scale (SRSS), and visual analogue scale (VAS) assessments, was conducted 24 hours before match day (MD-1). In the priming condition, players completed five sets comprising four vertical drop jumps (VDJ), horizontal drop jumps (HDJ) from a 50-cm box, followed by a single sprint 20-meters, with 3 minutes of rest between sets. Descriptive statistics, relative and absolute reliability measures (ICC, CV, SEM), and the

SWC were calculated to identify individual responses. Differences between conditions and time points were analysed using repeated-measures ANOVA, with Bonferroni post-hoc tests and effect sizes.

Results and Conclusions

All analysed variables showed moderate-to-excellent relative reliability, while absolute reliability was acceptable. For sprint performance, no significant differences were observed for time, condition, or the condition $\times$ time interaction. The post hoc analysis also revealed no significant differences between conditions at 24 hours or between baseline and the priming condition. Nevertheless, a favourable moderate effect was observed in the reduction of sprint time after the priming condition. Regarding the CMJ, jump momentum decreased significantly 24 hours after the priming condition. In contrast, in the control condition, significant decrements were observed in peak propulsive force and peak braking force immediately after the field-based training session. Regarding the individual response analysis for sprint performance, in the priming condition 24 hours after the intervention, 0 of 13 players increased their sprint time, 8 of 13 maintained similar values, and 5 of 13 reduced their sprint time, being classified as positive responders. Regarding the individual responses in CMJ, in the priming condition 24 hours after the intervention, 0 of 13 players increased jump height, 4 of 13 decreased jump height, and 9 of 13 maintained similar values. In the control condition, 3 of 13 players increased jump height, 9 of 13 maintained similar values, and 1 of 13 decreased jump height. For the perceptual scales, no significant differences were observed in any of the analysed variables. The main conclusions of the study were as follows: The priming protocol did not produce a clear group-level benefit 24 hours after its implementation. Nevertheless, it may have contributed to attenuating the immediate neuromuscular impairment after field-based training, as the control condition showed decreases in some CMJ variables, whereas these changes were not observed in the priming condition. The individual analysis showed that 5 of 13 players improved their sprint performance 24 hours after the intervention, reinforcing the importance of analysing player-by-player responses. The absence of clear improvements in CMJ performance may be related to the use of a relatively high box height of 50 cm, which may have generated excessive eccentric demands in some players. Therefore, strength and conditioning coaches should adjust box height, protocol volume, and players' previous experience with this type of stimulus before applying priming strategies on MD-1.

Keywords: Delayed Potentiation, Strength, Soccer, Ballistic Exercise, Athletic Performance, Power.

Respiratory Adaptation, Hematological Responses, and Performance Recovery in CrossFit® Athletes Using Respiratory Resistance Training Following SARS-CoV-2 Infection

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Abstract

Introduction

Post-SARS-CoV-2 infection may negatively affect respiratory function and exercise performance, particularly in high-intensity athletes returning to training. The Elevation Training Mask 2.0 (ETM) has been proposed as a respiratory resistance device capable of enhancing respiratory muscle function during exercise. However, evidence regarding its physiological and performance-related effects in post-COVID-19 athletes remains limited.

Methods

A single-blind randomized clinical trial following CONSORT guidelines was conducted in 20 trained male CrossFit® athletes one month after resolution of SARS-CoV-2 symptoms. Participants were randomly assigned to an experimental group (EG; n = 10) using a configured ETM 2.0 device or a control group (CG; n = 10) using a sham ETM device. Both groups completed a 12-week CrossFit® training program (36 sessions). Pre- and post-intervention assessments included spirometry parameters, respiratory muscle strength, hematological biomarkers, and sports performance tests, including CrossFit® Total and Fran WOD.

Results and Conclusions

No significant between-group differences ($p > 0.05$) were observed for spirometry variables, hematological biomarkers, or overall sports performance outcomes. However, significant group-by-time interaction effects were found for maximum voluntary ventilation (MVV), maximum inspiratory pressure (MIP), CrossFit® Total, and Fran WOD performance ($p < 0.05$). Significant improvements in MVV and MIP were observed exclusively in the EG after the intervention. Both groups improved exercise performance over time, although pre-SARS-CoV-2 performance levels were not fully recovered. Overall, ETM use during CrossFit® training may provide modest benefits for respiratory muscle adaptation during post-COVID-19 recovery, although it does not appear to function as a true altitude simulator under the present experimental conditions.

Keywords: CrossFit®; SARS-CoV-2; respiratory muscle training; Elevation Training Mask; exercise performance; spirometry; hematological biomarkers; post-COVID recovery.

Influence of competitive anxiety in athletes of the Honduras men's national volleyball team 2025

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Abstract

Introduction

Competitive anxiety is recognized as a central psychological variable in sports performance, particularly in high-demand contexts such as official and international competitions. Several studies have indicated that this phenomenon is directly associated with a decline in athletic performance, affecting the physical, technical, and tactical dimensions of athletes (Pozo, 2007; Tendero, 2019). In team sports such as volleyball, where decisions must be made within fractions of a second, athletes' ability to manage emotions and control anticipatory thoughts becomes decisive in distinguishing optimal performance from limited outcomes. Martens et al. (1990) conceptualized competitive anxiety as a multidimensional emotional response, composed of three essential components: cognitive anxiety, somatic anxiety, and self-confidence. This model has been widely employed to understand how athletes interpret and cope with competitive demands. Cognitive anxiety refers to negative thoughts, excessive worry, and doubts about one's ability to perform effectively. According to Weinberg and Gould (2010), this dimension is closely linked to fear of failure, self-criticism, and loss of concentration—factors that significantly reduce performance quality. Moreover, high levels of cognitive anxiety are often associated with diminished self-confidence, as athletes perceive competition more as a threat than as a challenge (Vealey, 1986). Somatic anxiety encompasses the physiological responses triggered by competitive stress, such as muscle tension, increased heart rate, sweating, or tremors. Although these reactions are part of the body's normal activation, elevated levels may interfere with fine and gross motor coordination, thereby affecting key movements such as jumping or defending (Martens et al., 1990). In high-performance volleyball, where bodily synchronization is crucial, controlling physiological activation is essential to sustain tactical effectiveness. Self-confidence, in turn, functions as a protective factor against competitive anxiety. Vealey (1986) defines it as the athlete's belief in their ability to perform successfully under pressure. Bandura (1997) further asserts that self-confidence allows athletes to interpret physiological activation as functional energy rather than as a threat, thereby reducing maladaptive anxious responses. Recent research highlights that self-confidence fosters resilience, emotional regulation, and persistence—key elements for coping with highly demanding environments (Gucciardi, 2017). The literature confirms the interaction among these dimensions. Olmedilla et al. (2016) demonstrated that athletes with higher self-confidence exhibit lower levels of cognitive and somatic anxiety, enabling better emotional control under pressure. Similarly, Moreno-Murcia et al. (2010) found that young athletes with greater perceived competence experience less anxiety and greater enjoyment in sport. In summary, competitive anxiety is a decisive psychological phenomenon for volleyball performance, particularly in international contexts where

pressure is heightened. Understanding Martens et al.'s (1990) model helps explain how thoughts, physiological responses, and competence beliefs interact in shaping the precompetitive emotional state. Within this framework, the Honduran Men's National Volleyball Team has exhibited marked instability in its competitive performance in recent years. This situation has generated interest in examining the influence of competitive anxiety on its athletes in preparation for the 2025 Central American Games. Diagnosing this phenomenon seeks to contribute to causal knowledge and support timely decisions aimed at strengthening the team's psychological resilience, thereby enhancing its athletic and competitive performance.

Methods

Design. This study is framed within the research line of Disciplinary Studies and the thematic area of Comprehensive Health, as it analyzes psychological variables that directly influence athletes' emotional well-being and performance. The study adopted a quantitative approach, with a non-experimental, cross-sectional, and descriptive-correlational design, since no variables were manipulated and data were collected at a single point in time. **Sample.** The study population consisted of the Honduran Men's National Volleyball Team. A sample of 12 athletes was selected through convenience sampling, with the inclusion criterion being active membership in the first team. Participants' ages ranged from 22 to 28 years. Regarding height, most athletes were between 1.90 and 1.94 meters, except for two players who measured 1.86 meters. **Instruments.** Data collection was carried out using the Competitive State Anxiety Inventory-2 (CSAI-2), developed by Martens et al. (1990). This instrument comprises 27 items distributed across three dimensions: cognitive anxiety, somatic anxiety, and self-confidence. The questionnaire was administered on the day of arrival of the delegations at the host country of the XII Central American Games, Guatemala 2025. A digital form created in Google Forms was used, and the administration was conducted by a member of the national team. **Statistical Analysis.** Data were tabulated and analyzed using Microsoft Excel. Processing was performed through absolute and relative frequency analysis, which allowed for the establishment of groupings and identification of general trends characterizing the athletes' psychological state prior to competition.

Results and Conclusions

The findings reveal a clear pattern in the dimensions assessed regarding competitive anxiety and self-confidence among players of the Honduran Men's National Volleyball Team. First, cognitive anxiety emerged as the most predominant dimension, with 59.25% of participants reporting concerns or anticipatory thoughts prior to competition. This result aligns with the literature, which identifies cognitive anxiety as a recurrent factor in high-demand sporting contexts, where athletes anticipate possible performance scenarios and outcomes (Martens et al., 1990). Although expected, this type of anxiety may have both positive and negative implications: on the one hand, it can encourage more careful preparation; on the other, if intensified, it may impair concentration and decision-making (Craft et al., 2003). In contrast, somatic anxiety showed a predominantly low trend, with 53.75% of players reporting no physiological symptoms. This finding suggests effective regulation of bodily responses, consistent with studies indicating that experienced athletes develop coping strategies that reduce the somatic manifestation of anxiety (Weinberg & Gould, 2019). However, 46.25% reported moderate levels, highlighting that a portion of the sample still experiences nervousness or tension, which could affect competitive performance (Jones, 1995). Results regarding self-confidence reflect a highly favorable outlook: 93.5% of athletes reported feeling capable, secure, and in control of their

performance. This is significant, as self-confidence has been identified as a key predictor of sports performance (Bandura, 1997; Vealey, 2001). A strong perception of personal efficacy acts as a protective factor against anxiety, fostering psychological resilience and readiness to face competitive pressure (Woodman & Hardy, 2003). Nonetheless, the presence of a small group with low self-confidence underscores individual differences that warrant attention, as they may represent a risk in situations of high psychological demand. In summary, the results suggest that although cognitive anxiety is present in most players, it is not accompanied by elevated levels of somatic anxiety, indicating a balance between mental activation and physiological regulation. Moreover, the high level of self-confidence observed constitutes a fundamental psychological resource that can mitigate the effects of anxiety, foster resilience in the face of errors, and enhance both individual and collective motivation, thereby contributing to improved competitive performance. These findings emphasize the importance of implementing psychological training programs focused on managing cognitive anxiety and strengthening self-confidence, with the aim of optimizing athletes' performance and well-being in high-pressure contexts.

Keywords: Competitive anxiety, cognitive anxiety, somatic anxiety, self-confidence.

Effects of Post-Exercise Protein Timing on Lower-Body Adaptations Following Resistance Training in Trained Women

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Abstract

Introduction

The importance of protein timing in resistance training adaptations remains debated, particularly when total daily protein intake is sufficient. This study investigated whether immediate versus delayed protein ingestion following exercise influences changes in lower-body morphology and performance in trained women.

Methods

Twenty-four resistance-trained women (23.2 ± 2.6 years) were randomly assigned to two groups: Immediate Protein (IP, $n = 12$; 25 g protein immediately post-exercise) and Delayed Protein (DP, $n = 12$; 25 g protein 3 hours post-exercise). Both groups completed an 8-week lower-body resistance training program (3 sessions/week) emphasizing multi-joint exercises (hip thrusts, Bulgarian split squats, and deadlifts). Outcomes included gluteal circumference (cm) and vertical jump height (Sargent test), assessed at baseline and post-intervention. Between-group differences in change scores were analyzed using independent t-tests.

Results and Conclusions

Results : Both groups improved following the 8-week intervention, with only small between-group differences observed. The Immediate Protein group showed slightly greater increases in gluteal circumference compared with the Delayed Protein group (Δ : $+1.6 \pm 0.5$ cm vs. $+1.2 \pm 0.4$ cm; $p = 0.044$). A similar pattern was observed for vertical jump performance, with a marginal between-group difference favoring the Immediate Protein group ($p = 0.049$). Between-group differences were small in magnitude. **Conclusion :** Immediate protein ingestion after resistance training may provide a small advantage over delayed intake in lower-body adaptations in trained women when total protein intake and training load are controlled. However, the magnitude of this effect appears limited, suggesting that protein timing likely plays a secondary role relative to overall training stimulus and total protein intake.

Keywords: Lower-body resistance training, protein timing, trained women, muscle hypertrophy

Effects of a Multicomponent Exercise on Cognitive and Physical Function in Women with Fibromyalgia: A Randomized Controlled Trial Protocol

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Abstract

Introduction

Falls affect individuals with fibromyalgia, due to rheumatologic symptoms that impair performance in activities of daily living. Reduced dual-task performance increases fall risk, highlighting the need for a multicomponent exercise program combining strength and creative dance. Objective: to evaluate the effect of 6-week multicomponent exercise program (combining strength and creative dance exercise) on cognitive, motor, brain functions and cardiac autonomic modulation.

Methods

Methods: This cluster randomized controlled trial, will be divided in exercise group (n=22) and control group (n=22) in women with fibromyalgia. The 6-week intervention include 2 session per week of 60- min (30-min strength training and 30-min divergent training). Primary outcome is changes in fibromyalgia symptoms (FIQ-R) and physical fitness (upper body strength, lower body strength, mobility, balance and agility gait test in single-task and dual-task). Secondary outcomes include brain electric activity (through an electroencephalogram), autonomic nervous system (as heart rate variability), event-file coding will be evaluated through a stimulus-response paradigm, physical activity level (IPAQ-SV), fear of falling (FES-I) and health-related quality of life (EQ-5D-5L). Comparisons between groups at baseline will be performed using the chi-squared test, t-test and Mann Whitney (U) test. Changes in groups over time (group*time interaction) will be model using a linear mixed-model regression.

Results and Conclusions

Conclusion: A multicomponent exercise program combining strength and divergent tasks may enhance physical and cognitive function, support fall prevention, and help preserve independence in women with fibromyalgia.

Keywords: BRAC; chronic pain; EEG; HRV; improvised danza; muscle strength.

Do playing positions respond differently to acute:chronic workload ratio? Evidence from elite soccer players

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Abstract

Introduction

The acute:chronic workload ratio (A:C ratio) has been widely investigated in relation to injury risk in soccer. However, its relationship with match running performance remains unclear, particularly across different playing positions. Given the distinct physical demands associated with positional roles, understanding position-specific responses to workload fluctuations may improve individualized load monitoring and performance management in elite soccer.

Methods

This longitudinal observational study analysed data collected over two competitive seasons (2022–2023 and 2023–2024) from elite U-19 ($n = 45$) and reserve team (B-team; $n = 30$) soccer players from a club competing in the highest Czech professional league. A total of 770 full-match observations (≥ 90 min) were included. Data were normalized for 90 minutes. External load was monitored using GPS technology and included total distance (TD), high-speed running distance with absolute (>19.8 km/h; HSR19) and relative thresholds ($>70\%$; HSR70), sprint distance (>25.2 km·h⁻¹; SPR), accelerations (ACC24; ACC4), and decelerations (DEC24; DEC4). The acute:chronic workload ratio (A:C ratio) was calculated using coupled exponentially weighted average of acute (7-day) and chronic (28-day) workloads. Linear mixed-effects models were used to examine whether the association between A:C ratio and match running performance differed by playing position, with player included as a random intercept. Significant A:C ratio $\times$ playing position interactions were followed by simple slope analyses. Effect sizes were interpreted using Hedges' g . The study was approved by the Ethics Committee of the Faculty of Physical Education and Sport, Charles University, and conducted in accordance with the Declaration of Helsinki.

Results and Conclusions

Significant A:C ratio $\times$ playing position interactions were observed for HSR70 and SPR ($p < 0.05$). Follow-up simple slope analyses indicated position-specific associations: higher A:C ratios were associated with higher HSR70 and SPR in full-backs, whereas inverse associations were observed in wingers. However, the magnitude of these effects was trivial-to-small ($g \approx 0.24$), suggesting limited practical relevance. A:C ratio alone may not represent a sufficiently reliable tool for load management in elite soccer and observed associations may partly reflect statistical artefacts rather than practically meaningful effects.

Keywords: soccer, acute:chronic workload ratio, playing position, GPS monitoring, match running performance

Exercise-Induced Myokines Attenuate Brain Insulin Resistance: Uncovering Muscle–Central Nervous System Metabolic Communication

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Abstract

Introduction

Brain insulin resistance (BIR) is increasingly recognized as a critical contributor to neurodegenerative disorders, including Alzheimer's disease, by impairing synaptic plasticity, cognition, and neuronal metabolism. While regular exercise training enhances peripheral insulin sensitivity, the mechanisms linking muscle contraction to improved brain insulin signaling remain incompletely understood. This review tests the hypothesis that myokines—cytokines and peptides secreted by contracting skeletal muscle—serve as essential endocrine mediators that cross or signal at the blood–brain barrier to directly enhance brain insulin sensitivity and metabolic function.

Methods

We conducted a comprehensive narrative synthesis of peer-reviewed literature (2010–2025) focusing on: (1) molecular mechanisms of BIR, (2) exercise-induced myokine secretion across aerobic, resistance, and high-intensity interval training (HIIT) modalities, and (3) direct and indirect effects of key myokines (irisin, BDNF, cathepsin B, IL-6, FGF21) on central insulin signaling pathways, neuroinflammation, and synaptic plasticity.

Results and Conclusions

Evidence demonstrates that exercise training robustly enhances the release of multiple myokines. Irisin (cleaved from FNDC5) crosses the blood–brain barrier, upregulates hippocampal BDNF via CREB signaling, and activates AKT/ERK pathways, improving neuronal insulin sensitivity. Cathepsin B, elevated by aerobic exercise, promotes adult hippocampal neurogenesis and reduces NLRP3 inflammasome-mediated neuroinflammation. IL-6, despite dual roles, acutely enhances hypothalamic insulin signaling and glucose uptake. FGF21 improves synaptic plasticity and mitochondrial function in insulin-resistant states. Importantly, an 8-week supervised aerobic intervention restored brain insulin responsiveness to levels of normal-weight individuals, with myokine secretion identified as a plausible mediator. Modality-specific effects were observed: aerobic training preferentially elevates IL-6 and irisin, while resistance training potently increases IGF-1 and BDNF. Regular exercise training—particularly structured aerobic, resistance, or combined regimens—enhances the release of neuroprotective myokines, which improve brain insulin sensitivity, reduce neuroinflammation, and promote synaptic and cognitive health. These findings establish myokine-mediated muscle–CNS cross-talk as a central mechanism underlying the neuroprotective effects of

exercise. Optimizing exercise type, intensity, and duration to maximize beneficial myokine secretion represents a promising non-pharmacological strategy to prevent and mitigate BIR-associated neurodegeneration.

Keywords: Brain · CNS metabolic disorders · Exercise training · Insulin resistance · Myokine

Validity between Dual-Energy X-Ray Absorptiometry and Bioelectrical Impedance for segmental Fat analysis, and Anthropometric predictive models in young adult males

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Abstract

Introduction

Accurate assessment of segmental fat distribution is essential for managing cardiovascular disease and metabolic disorders. Dual-Energy X-ray Absorptiometry (DXA) is the reference method for this purpose, but its high cost and limited accessibility restrict its widespread use. Bioelectrical Impedance Analysis (BIA) represents a portable and affordable alternative, yet its validity against DXA at the segmental level in males remains insufficiently studied. Anthropometry, standardized through the ISAK protocol, offers a further cost-effective option, but its application to segmental fat estimation in male populations presents notable methodological limitations in existing literature. So, the objectives of this study were: (a) To analyze the differences between DXA and BIA in measuring segmental fat mass in young adult males, and to determine the influence of BMI and hydration status on those differences. (b) To develop anthropometric multivariate regression models for predicting segmental fat mass in kg across body segments (right and left upper limbs, trunk, right and left lower limbs), validated against DXA in a male sample.

Methods

Cross-sectional study including 16¹ young adult males (mean age 23.04 ± 5.6^1 years; BMI 24.77 ± 3.18 kg/m²). Segmental fat mass was assessed using DXA (Hologic Horizon) and BIA (TANITA MC-780-MA). A complete bilateral ISAK anthropometric profile (45 variables) was collected following standardized protocols. Agreement between DXA and BIA was assessed using repeated-measures ANOVA/ANCOVA and Bland-Altman analysis, with BMI and hydration status as covariates. Multivariate stepwise regression was used to develop predictive models, with multicollinearity controlled via the Variance Inflation Factor ($VIF \leq 5$).

Results and Conclusions

Significant differences between DXA and BIA were found in all body segments in the male sample, for both kilograms and percentage of fat mass ($p < 0.001$; effect size: small to large). Bland-Altman analysis revealed consistent BIA overestimation in all limb segments (mean difference: 0.06–1.50 kg) and underestimation of trunk fat (mean difference: -0.78 kg; limits of agreement: -3.86 to 2.28 kg), with wide limits of agreement throughout. Neither BMI nor hydration status significantly influenced the inter-method differences. Anthropometric multivariate regression models achieved strong

predictive accuracy for all segments ($R^2 = 0.758\text{--}0.887$; $p < 0.001$), requiring only 10 key variables: body mass, triceps and biceps skinfolds (upper limbs), supraspinale and subscapular skinfolds (trunk), waist girth (trunk), thigh and calf skinfolds (lower limbs), arm relaxed girth, and thigh 1cm gluteal girth. Estimated assessment time: approximately 6 minutes. DXA and BIA are not interchangeable for segmental fat mass estimation in young adult males. The anthropometric regression models developed offer a validated, accessible, and cost-effective alternative for estimating segmental fat mass in clinical and public health settings where DXA is unavailable, with high predictive capacity achieved in under 10 minutes using standard ISAK measurements.

Keywords: Body composition · Segmental fat mass · DXA · Bioelectrical impedance · Anthropometry · ISAK · Skinfolds

EFFECT OF A PHYSICAL ACTIVITY PROGRAM ON NEUROMUSCULAR RESPONSES AND RISK FACTORS FOR FALLS IN OLDER ADULTS: A NON-RANDOMIZED PRE-POST STUDY

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Abstract

Introduction

The aging population in Brazil is relatively high compared to other developing countries. Falls can lead to serious consequences, such as traumatic brain injuries and fractures, as the aging process involves neuromuscular and biopsychosocial changes.

Methods

Older adults of both sexes were recruited from either the Amarina Motta School Clinic (physiotherapy service) or the University of the Third Age at UNISUAM. The Timed Up & Go test (TUG) was used to measure agility. To evaluate balance, posturography was employed, in which participants were instructed to stand barefoot with their arms at their sides under three different conditions on a force platform. The neuromuscular evaluation was conducted alongside posturography, with sEMG signals collected from the Gastrocnemius Medialis and Tibialis Anterior muscles bilaterally to assess muscle synergism between the dominant and non-dominant lower limbs. To evaluate muscle strength, handgrip maximum voluntary isometric contraction (MVIC) was used.

Results and Conclusions

A clinically important reduction ($p=0.077$) was observed in TUG performance, which decreased from 19.15 s to 13.38 s, indicating better functional performance, even though participants remained in the moderate fall risk category. Regarding balance, there was a reduction in the mean anteroposterior velocity in the right tandem posture, while analyses of muscle strength and tibialis anterior activation did not remain statistically significant after correction. The intervention produced clinically reduced in TUG; however, this improvement was not sufficient to reclassify participants into a lower fall-risk category. Given the absence of significant changes in maximal strength and postural control, the observed gains are likely attributable to neuromotor adaptations. From a practical perspective, mobility-focused protocols appear promising; however, future studies should investigate higher-intensity interventions and incorporate kinematic analyses to better elucidate the underlying mechanisms.

Keywords: electromyography, rehabilitation, physical therapy, aging, neuromuscular function, TUG test, fall risk.

Does Rest-Interval Order Matter During High-Intensity Interval Training (HIIT) in Male Soccer Players?

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Abstract

Introduction

Background Soccer is a demanding intermittent sport that requires repeated sprints, accelerations, changes of direction, and explosive actions with limited recovery. Short-interval HIIT is often used to improve soccer-specific performance, but the effect of different rest-time structures, especially variable rest models, is still not well understood in male soccer players. Objective This study aimed to compare the effects of ascending, descending, and constant rest-time strategies during short HIIT on physical performance in male soccer players.

Methods

Methods Twenty-four semi-professional male soccer players were randomly assigned to ascending rest-time HIIT (A-HIIT; $n = 8$), descending rest-time HIIT (D-HIIT; $n = 8$), or constant rest-time HIIT (C-HIIT; $n = 8$). The intervention included eight pre-season HIIT sessions, performed twice weekly. Each session consisted of two sets of seven 30-s shuttle-running bouts at 95% VIFT. Rest intervals were 15–90 s in A-HIIT, 90–15 s in D-HIIT, and 52.5 s in C-HIIT, with total rest equated across groups. Physical performance was assessed before and after using CMJ, 30-m sprint, 5-0-5 COD, and Wingate tests.

Results and Conclusions

Results The three HIIT rest-time strategies led to small and inconsistent changes in physical performance. CMJ improved only in the D-HIIT group ($p = 0.042$), while sprint, COD, and Wingate outcomes showed no clear improvement. There were also no significant differences between groups for any outcome ($p > 0.05$). Conclusion Overall, the different rest-time strategies only led to small changes in the selected performance outcomes. Slightly better support for jump performance was shown by the descending rest model, but a clear overall advantage was not shown by any single strategy.

Keywords: HIIT; soccer; rest intervals; physical performance; countermovement jump

Age-Related Differences in Countermovement and Horizontal Jump Asymmetry Among Female Football Players

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Abstract

Introduction

Lower-limb asymmetry is an important factor influencing physical performance and injury risk in soccer players (1). Despite the rapid growth of women's football, limited evidence exists regarding how asymmetry differs across age categories (2-4). The aim of this study was to investigate countermovement jump (CMJ) and horizontal jump (HJ) asymmetry in female football players

Methods

76 Female soccer players from four age categories (U14 / U16 / U18 / >18) participated in the study. Bilateral asymmetry was assessed using CMJ and HJ tests, recording the performance of each limb. Differences between age categories and the relationship between asymmetry and physical performance were analysed.

Results and Conclusions

Results= The results indicated that CMJ asymmetry differed significantly among age groups ($p < 0,001$), with the greatest asymmetry found in the U14 category and the lowest values observed in the +18 group. Conversely, HJ asymmetry remained low and relatively stable across all age categories ($p = 0,113$). No significant relationship was identified between CMJ and HJ asymmetry. Furthermore, CMJ asymmetry levels were significantly related to age ($p = 0,003$), whereas no significant association was detected for HJ. **Conclusions=** These findings suggest that maturation and training may contribute to reducing lower limb asymmetries in female football players. Coaches and strength and conditioning professionals should implement specific strength and neuromuscular training programmes to minimise asymmetries and optimise performance.

Keywords: female football players, inter-limb asymmetry, countermovement jump, horizontal jump test, neuromuscular performance.

Analysis of perceived barriers in fixed-bench rowing

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Abstract

Introduction

Fixed-bench rowing, or *trainera* rowing, is a highly demanding technical and collective discipline deeply rooted in the Cantabrian coastline. Despite its cultural relevance, research into the factors hindering the continuity of its practice remains scarce. The recently validated Perceived Barriers in Fixed-Bench Rowing Scale (EBPR-BF-16) encompasses five dimensions: Social Context, Technical Climate, Psychological, Resources and Motivation. However, it remains unknown how these barriers differ according to gender and age, nor what their relationship is with athletes' psychological resources. This study aims to analyse gender and age differences in perceived barriers to fixed-bench rowing practice, as well as to explore their relationship with Psychological Capital and Team Cohesion.

Methods

A total of 423 rowers belonging to the rowing federations of the Basque Country, Cantabria, Asturias and Galicia participated (258 men, 61.0%; 165 women, 39.0%; $M = 25.06$ years, $SD = 8.89$). Data were collected using the EBPR-BF-16, the Sport Psychological Capital Questionnaire and the Team Cohesion subscale of the CPRD. Statistical analyses included Student's t-tests, one-way ANOVA, Pearson correlations, gender-differentiated confirmatory factor analyses and hierarchical regressions, aimed at examining the incremental predictive capacity of Psychological Capital over perceived barriers, controlling for gender and age.

Results and Conclusions

Female rowers reported significantly higher levels of Psychological Barriers than male rowers, with a moderate effect size. Age-group analysis revealed significant differences in Psychological Barriers, Technical Climate and Resources, with psychological barriers decreasing as age and accumulated experience increased. Psychological Capital showed negative associations with four of the five factors assessed and incrementally predicted perceived barriers after controlling for gender and age. Team Cohesion was negatively related to all dimensions, although the insufficient reliability of the instrument used limits these findings to an exploratory nature. Psychological Capital emerges as a protective factor against perceived barriers in fixed-bench rowers, with an effect independent of gender and age. Data regarding Team Cohesion point in a theoretically coherent direction, albeit with an exploratory character. These findings have practical implications for the design of sport retention programmes aimed at strengthening individual and collective psychological resources in this discipline.

Keywords: *trainera* rowing, perceived barriers, psychological capital, individual differences, sport adherence

Leisure, values and barriers in university students' sport participation: an exploratory approach in the context of Jesuit institutions

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Abstract

Introduction

University sport represents a leisure space with high potential for students' wellbeing and values development. Jesuit higher education institutions organise this practice around interinstitutional tournaments framed within an educational model based on awareness, competence and compassion. However, the university stage entails specific constraints, particularly the difficulty of balancing physical activity with academic demands, that act as barriers to sporting continuity. To analyse the values perceived by university students participating in interinstitutional tournaments and to identify the main barriers conditioning their everyday physical-sport practice.

Methods

A quantitative, exploratory and cross-sectional study was conducted. The sample comprised 133 students from the Jesuit institutions community, primarily from the University of Deusto, with representation from other universities and residential colleges belonging to the UNIJES network, (63 women, 70 men; $M = 20.36$ years, $SD = 3.10$), recruited across three tournaments held during the 2025-2026 academic year: the XXVI UNIJES Sports Tournament, the Basque Country University Sports Championship, and the III UNIJES Residential Colleges Tournament. A self-administered questionnaire via Google Forms was used, integrating sociodemographic variables and two Likert scales (1 to 5): a self-developed values scale (10 items) assessing the perception of values and Ignatian identity, and an adaptation of the EBPR-BF-16 (16 items) to the university context. Descriptive statistics were calculated for all variables.

Results and Conclusions

Preliminary results indicate that students perceive the interinstitutional tournaments as spaces that promote community and values, with high scores on the dimensions of mutual care and sense of belonging. Regarding everyday barriers, the temporal and motivational dimensions emerge as the most relevant, with the difficulty of balancing sport practice with academic demands being the main obstacle identified. Interinstitutional tournaments in Jesuit contexts emerge as leisure spaces with formative value, perceived by university students as promoters of community and values. Temporal and motivational barriers specifically condition everyday practice, pointing to the need for institutional strategies that facilitate the integration of physical activity into academic life. These results provide an exploratory basis for designing interventions aimed at promoting physical-sport activity in higher education institutions.

Keywords: university sport, values, perceived barriers, Jesuit institutions, leisure

Nutritional Optimization in the Rehabilitation of Musculoskeletal Injuries in Female Athletes

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Abstract

Introduction

Musculoskeletal injuries are highly prevalent among female athletes due to anatomical, hormonal, genetic, biomechanical, and environmental factors. Nutritional strategies have emerged as an important tool in injury prevention and rehabilitation processes. This study aimed to analyze the relationship between the most frequent musculoskeletal injuries in female athletes and nutritional rehabilitation in prevention and recovery, through a multidisciplinary approach based on physiotherapy, physical readaptation, and sports nutrition.

Methods

A literature review was conducted using Web of Science, Scopus, and PubMed databases. Search terms included sports injuries, rehabilitation, nutrition, and female athletes. Studies focused on women athletes, nutritional interventions, and rehabilitation strategies were included.

Results and Conclusions

Adequate energy availability, protein intake, complex carbohydrates, healthy fats, and micronutrients such as calcium, iron, magnesium, and vitamin D were identified as key factors in recovery and injury prevention. Nutritional timing and individualized dietary strategies may improve tissue repair, muscle maintenance, and functional recovery. Integrating nutritional rehabilitation with physiotherapy and physical readaptation optimizes recovery and helps prevent musculoskeletal injuries in female athletes, promoting safer sports practice and improved performance.

Keywords: Female athletes; Sports nutrition; Musculoskeletal injuries; Rehabilitation; Injury prevention

Mental Health and Eating Disorders in Athletes

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Abstract

Introduction

Eating disorders (ED) and disordered eating (DE) represent severe behavioral conditions characterized by persistent disturbances in eating and distressing concerns regarding weight and body image, presenting amplified risks within the competitive sports environment.

Methods

This study has the purpose to analyze, through a narrative literature review, the prevalence of ED among athletes in weight-sensitive modalities and the mediating role of emotion regulation processes in this scenario, while also discussing the potential benefits of integrated physical activity and nutrition. For the methodological foundation, a bibliographic search was conducted in the PubMed/MEDLINE, BMC Nutrition, and MDPI (Healthcare) databases, focusing on systematic reviews and meta-analyses published between 2025 and 2026.

Results and Conclusions

The results indicate a significant disparity in athlete vulnerability depending on the sport practiced: aquatic sports face severe aesthetic pressures and body exposure (with an estimated ED prevalence of 27.56%), while combat sports such as wrestling are characterized by hazardous rapid weight loss (RWL) methods for weight class compliance. Additionally, it was found that the impact of these exogenous pressures is mediated by the individual's emotion regulation, where dysfunctional strategies (such as expressive suppression) act as triggers for pathological behaviors, whereas adaptive strategies (such as cognitive reappraisal) offer psychological protection. It is concluded that structured sport and science-based nutritional support operate as robust biological and mental protective factors. Therefore, the implementation of standardized screening protocols and the mandatory involvement of multidisciplinary teams (coaches, nutritionists, and psychologists) are imperative to ensure systemic health and the sustainability of athletes' careers.

Keywords: Eating Disorders; Athletes; Emotion Regulation; Body Composition; Sports Nutrition.

Motor Competence and Fitness in Portuguese Children: The Role of Sex, Age, and Socioeconomic Status in a Portuguese Sample

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Abstract

Introduction

Physical literacy has emerged as a central construct in contemporary sport and health sciences, encompassing the motivation, confidence, physical competence and understanding necessary to value and sustain physical activity across the life course (Whitehead, 2010). Two foundational and partially overlapping constructs underlie physical literacy: motor competence (MC), defined as the ability to perform a wide range of movement skills with efficiency and control, and physical fitness (PF), defined as the capacity to perform musculoskeletal and cardiorespiratory tasks at levels sufficient to support everyday functioning and active living. The primary school years (6–10 years of age) represent a developmentally sensitive period during which fundamental movement skills consolidate and habitual physical activity patterns are established, making the simultaneous monitoring of MC and PF a public health priority. The theoretical relationship between MC and PF is most influentially framed in the developmental model of Stodden et al. (2008), which posits that MC is a proximal enabler of physical activity and, through this pathway, promotes PF. The model further predicts that MC–PF associations strengthen across childhood, a trajectory empirically supported by Barnett, Morgan, et al. (2008a), Barnett, Van Beurden, et al. (2008b, 2009) and confirmed meta-analytically by Utesch et al. (2019; $r \approx .45$ across the lifespan). Robinson et al. (2015) extended this model by demonstrating that MC also follows positive developmental trajectories of its own, independent of activity participation. More recently, Barnett et al. (2022) systematically reviewed longitudinal evidence confirming that the MC–PF relationship is bidirectional and strengthens across development. Beyond the core MC–PF association, three demographic variables warrant specific attention. First, sex differences in MC are well documented: boys typically outperform girls in object-control skills (throwing, kicking), while girls show advantages in stability and balance tasks (Barnett et al., 2016; Lubans et al., 2010). Sex differences in PF are generally smaller during the primary school years but become more pronounced after puberty. Second, age is a primary determinant of both MC and PF during childhood, reflecting neuromotor maturation and accumulated practice; however, because norm-referenced percentile scores account for age, residual age effects in percentile-based data are theoretically meaningful and potentially under-explored. Third, SES is associated with differential access to physical activity opportunities, quality of physical education (PE) instruction

and environmental affordances, potentially amplifying or attenuating MC and PF development (Goodway et al., 2019; Rodrigues et al., 2016). The MCA battery (Luz et al., 2016; Rodrigues et al., 2019, 2022) is a Portuguese product-oriented instrument comprising three subdomains: Stability, Locomotor and Manipulative, with normative data from 3 to 23 years of age and excellent test–retest reliability ($ICC \geq .95$). The PréFitescola programme (DGE, 2023), developed by the Faculty of Human Kinetics in partnership with the Directorate-General for Education, assesses four PF components in first-cycle children: cardiorespiratory endurance (Shuttle run 4×10), speed/agility (Agility 4×10 m), lower-limb power (Standing Long Jump, SLJ) and dynamic balance (Lateral Transfers), standardised to national age- and sex-referenced percentiles. Despite the availability of both batteries in Portuguese schools, no study has simultaneously deployed the MCA and PréFitescola while accounting for sex, age and SES as covariates. The present study addresses this gap with four aims, each linked to specific hypotheses: (a) to describe MC and PF by sex, age group and SES (descriptive aim, no formal hypothesis); (b) to test sex, age-group and SES differences in MC and PF, hypothesising that (H1) boys will show higher Manipulative% and girls higher Stability%

Methods

Study Design and Setting A cross-sectional observational study was conducted during the 2024–2025 academic year in partner primary schools in the district of Leiria, central Portugal, as part of a regional motor competence monitoring programme. The present study was designed, conducted and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement for cross-sectional studies (von Elm et al., 2007); the corresponding checklist is provided as Supplementary Material. All assessments took place during regular physical education classes under standardised conditions, with the same research team applying identical protocols across schools.

Participants The initial sample comprised 164 children from grades 1–4. Twelve cases were excluded due to missing data ($n = 8$ missing Shuttle run 4×10 scores; $n = 2$ missing SES data; $n = 2$ incomplete MCA administration), yielding an analytic sample of 152 children (84 boys, 68 girls; mean age = 8.62 ± 1.03 years; range: 6.7–10.4). Children were distributed across three age groups: 6–7 years ($n = 36$, 23.7%), 8–9 years ($n = 93$, 61.2%) and ≥ 10 years ($n = 23$, 15.1%). SES was classified into three tiers: Low ($n = 47$, 30.9%), Medium ($n = 73$, 48.0%) and High ($n = 32$, 21.1%), using the three-tier administrative records of the Directorate-General for Education (DGE, 2023).

Ethical Procedures The study was conducted in accordance with the ethical principles for research involving human participants set out in the Declaration of Helsinki (World Medical Association, 2013) and was approved by the Ethics Committee of the University of Extremadura. Institutional authorisation was additionally obtained from the participating school boards and from the DGE within the framework of the regional motor competence monitoring programme. Written informed consent was obtained from all parents or legal guardians prior to data collection; verbal assent was additionally obtained from each child immediately before testing. All data were anonymised at the point of collection and treated as strictly confidential in accordance with the General Data Protection Regulation (Regulation [EU] 2016/679). No financial or material incentives were offered.

Sociodemographic and Anthropometric Variables Sex was recorded as registered in the school enrolment system (boys = 84; girls = 68). Chronological age (in years, to one decimal place) was computed from the difference between the date of testing and the participant's date of birth, and was used both as a continuous variable and categorised into three age groups (6–7 years, 8–9 years and ≥ 10 years). Body mass index (BMI; $\text{kg} \cdot \text{m}^{-2}$) was classified according to the International Obesity Task Force age- and

sex-specific cut-offs for children (Cole & Lobstein, 2012). SES was classified into three tiers (Low, Medium, High) using the school administrative records of the DGE (2023), based on the level of school social support attributed to each family. Instruments Motor Competence Assessment (MCA). MC was assessed using six product-oriented tests: Shifting Platforms and Lateral Jumps (Stability subdomain); Shuttle Run 4×10 m and Standing Long Jump (Locomotor subdomain); Ball Kicking Velocity and Ball Throwing Velocity (Manipulative subdomain). Age- and sex-referenced percentile conversion tables (Rodrigues et al., 2019) yielded Stability%, Locomotor%, Manipulative% and a Total MCA% composite score (0–100 scale). The MCA demonstrates excellent test–retest reliability (ICC range: .95–.99; Rodrigues et al., 2022) and a confirmed three-factor structure across age groups and sex. PréFitescola Battery. PF was assessed using four tests from the PréFitescola programme: 20 m shuttle run (cardiorespiratory endurance), Agility 4×10 m run (speed/agility), Standing Long Jump (lower-limb explosive power) and Lateral Transfers on platforms (dynamic balance and coordination, 20 s count). Raw scores were converted to national age- and sex-specific percent

Results and Conclusions

Overall Descriptive Statistics Table 1 presents overall descriptive statistics. Children achieved a mean Total MCA% of 62.53 (SD = 17.11), with Locomotor being the strongest subdomain (M = 73.17, SD = 21.00) and Stability the weakest (M = 54.98, SD = 18.76). Among PF components, cardiorespiratory endurance (Shuttle run 4×10 percentile: M = 46.22, SD = 28.59) was the weakest dimension relative to national norms, while agility (M = 72.77) and lower-limb power (M = 67.84) were comparatively higher. Table 1 Descriptive Statistics for Motor Competence and Physical Fitness Variables, Overall and by Sex (N = 152)

Variable	Total M (SD)	Boys M (SD)	Girls M (SD)	U	p
Motor Competence (MCA Battery)					
Total MCA %	62.53 (17.11)	64.18 (15.59)	60.50 (18.75)	3126	.319
Stability %	54.98 (18.76)	53.82 (19.30)	56.42 (18.10)	2658	.463
Locomotor %	73.17 (21.00)	76.30 (16.97)	69.31 (24.68)	3184	.224
Manipulative %	59.48 (25.63)	62.45 (25.52)	55.82 (25.47)	3318	.087
Physical Fitness — Percentiles (PréFitescola)					
Percentile Shuttle run 4×10	46.22 (28.59)	45.18 (29.98)	47.51 (26.95)	2652	.452
Percentile Agility 4×10 m	72.77 (18.29)	73.78 (17.76)	71.52 (18.98)	3088	.392
Percentile SLJ	67.84 (23.42)	71.51 (19.99)	63.31 (26.52)	3176	.236
Percentile Lateral Transfers	62.91 (20.56)	59.58 (21.19)	67.02 (19.10)	2254	.026*

Note. U = Mann–Whitney U statistic; SLJ = Standing Long Jump. Boys n = 84; girls n = 68. * p < .05. Differences by Sex Boys scored numerically higher than girls in Total MCA% (64.18 vs. 60.50), Locomotor% (76.30 vs. 69.31) and Manipulative% (62.45 vs. 55.82), but none of these differences reached statistical significance (all p > .05), partially contradicting H1. The only significant sex difference was found for Percentile Lateral Transfers, where girls outperformed boys (67.02 vs. 59.58; U = 2254, p = .026, r = .211), consistent with the predicted female advantage in stability tasks. Differences by Age Group Table 2 presents descriptive statistics and Kruskal–Wallis tests by age group. No significant age-group differences were found for any MC variable (all p > .06). The exception was the Shuttle run 4×10 percentile (H = 12.44, p = .002). Post-hoc Mann–Whitney tests with Bonferroni correction revealed that 6–7-year-old children scored significantly lower than both 8–9-year-olds (p = .001, r = .372) and ≥10-year-olds (p = .005, r = .437). Despite age-group Kruskal–Wallis tests not reaching significance for Locomotor% (H = 5.59, p = .061), Spearman correlations revealed a significant negative relationship between continuous age and Locomotor% (p = −.260, p = .001). Age was also negatively correlated with the SLJ percentile (p = −.235,

$p = .004$) and positively with the Shuttle run 4×10 percentile ($p = .211$, $p = .009$). Table 2 Descriptive Statistics and Age-Group Differences in Motor Competence and Physical Fitness

Variable	6–7 yr (n = 36)	8–9 yr (n = 93)	≥ 10 yr (n = 23)
Total MCA %	63.73 (14.25)	62.10 (18.49)	62.42 (15.94)
Stability %	56.39 (18.94)	53.19 (18.58)	60.00 (18.92)
Locomotor %	71.96 (23.62)	67.05 (19.28)	55.59 (11.04)
Manipulative %	60.40 (21.35)	54.93 (24.36)	61.02 (27.06)
Physical Fitness — Percentiles (PréFitescola)			
Percentile Shuttle run 4×10	33.47 (24.20)	49.30 (29.06)	53.76 (27.99)
Percentile Agility 4×10 m	73.46 (16.74)	71.84 (19.93)	75.45 (13.33)
Percentile SLJ	75.70 (9.55)	67.23 (25.52)	58.00 (26.28)
Percentile Lateral Transfers	58.92 (20.26)	63.32 (20.96)	67.47 (19.00)

Note. Values are M (SD). H = Kruskal–Wallis statistic (df = 2). Post-hoc Bonferroni-corrected Mann–Whitney significant ($\alpha = .017$): Percentile Shuttle run 4×10 — 6–7 yr vs. 8–9 yr ($p = .001$) and 6–7 yr vs. ≥ 10 yr ($p = .005$). Spearman correlations with continuous age: Locomotor% $\rho = -.260^{**}$; Percentile Shuttle run 4×10 $\rho = .211^{**}$; Percentile SLJ $\rho = -.235^{**}$. $^{**} p < .01$. Differences by Socioeconomic Status Kruskal–Wallis tests

Keywords: motor competence; physical fitness; sex differences; age effects; socioeconomic status; MCA battery; PréFitescola; primary education

Nutritional intake in Middle-Distance Duathlon

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Abstract

Introduction

Nutritional intake during prolonged endurance events is a key determinant of performance in middle-distance duathlon. Current recommendations suggest an intake of 90 g/h of carbohydrates (CHO), 400–800 mL/h of fluids, and 300–600 mg/h of sodium to maintain energy availability, delay fatigue, and prevent dehydration. However, limited evidence exists regarding the nutritional strategies specifically employed by duathletes during competition.

Methods

A descriptive cross-sectional study was conducted involving 88 duathletes participating in ZuliaDu 2024 (Spain), a middle-distance event consisting of a 15 km run, 70 km cycling segment, and a final 7 km run. Nutritional intake during competition was assessed using the validated Nutritional Intake Questionnaire for Endurance Competitions (NIQEC), which recorded the consumption of foods, beverages, and supplements throughout the event. Variables analyzed included fluid, energy, CHO, sodium, protein, fat, and caffeine intake.

Results and Conclusions

Duathletes consumed an average of 578.6 ± 271.26 mL/h of fluids, within established recommendations, with 54.5% reporting an intake between 400–800 mL/h. CHO intake averaged 48.26 ± 20.54 g/h, below current recommendations, with the most frequent intake range being 30–60 g/h (53.4%). Solid foods represented the primary source of CHO. Sodium intake was insufficient (191.85 ± 135.20 mg/h), with 81.8% of participants consuming less than 300 mg/h. Furthermore, higher intra-competition energy intake was significantly associated with faster finishing times. In conclusion, Duathletes demonstrated adequate fluid replacement but insufficient CHO and sodium intake during competition. These findings highlight the need for individualized nutritional strategies to optimize performance in middle-distance duathlon.

Keywords: Duathlon; hydration; carbohydrates; sodium; sport nutrition

Prácticas de nutrición, hidratación y suplementación en nadadores de aguas abiertas: análisis transversal.

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Abstract

Introduction

Open-water swimming is an endurance discipline with high energetic demands and logistical constraints that can hinder the practical implementation of sports nutrition recommendations. However, specific evidence on real-world intake strategies in this context remains limited.

Methods

A cross-sectional study was conducted in 73 swimmers (69.9% men; age 46.8 ± 12.5 years) who took part in three open-water events in Spain (distances from 1,000 to 10,000 m). Information on nutrition intake and gastrointestinal symptoms was collected using the NIQEC questionnaire, distinguishing pre-competition, in-competition and immediate post-competition phases. Intakes of fluids, energy, macronutrients, sodium and caffeine were estimated, and participants were classified according to their compliance with international endurance-sports nutrition guidelines. Descriptive analyses, sex- and distance-based comparisons and regression models were used to identify predictors of finishing time.

Results and Conclusions

Most swimmers reported some intake in the hour before (95.9%) and after (90.4%) competition, but carbohydrate intake was often below recommendations (73.9% consumed less than 1 g/kg before the event and 80.8% less than 0.8 g/kg in the first recovery hour). During competition, more than half of the sample did not ingest fluids or carbohydrates; 94.5% consumed less than 30 g/h of carbohydrates and 98.7% less than 300 mg/h of sodium, with more active patterns only in the 9–10 km distances. The prevalence of gastrointestinal symptoms was relatively low (26.0% any symptom; 5.5% moderate or severe). In multivariable models, finishing time was mainly explained by distance, age, federation status and in-competition carbohydrate intake; each additional gram per hour of carbohydrates was associated with an approximate 0.3–0.4-minute reduction in total time.

Keywords: Open water swimming; endurance sports; sports nutrition; hydration; sports supplements; gastrointestinal symptoms.

Nutrition, hydration and supplementation practices in open-water swimmers: a cross-sectional analysis

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Keywords: Open water swimming; endurance sports; sports nutrition; hydration; sports supplements; gastrointestinal symptoms.

How can nutrition contribute to athletic performance in pubertal athletes-Diogo Gouveia, Diogo Dias João Tiago Santos e Miguel Rojão

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Abstract

Introduction

Nutrition plays a crucial role in the sports performance of pubertal athletes, directly influencing the physiological, metabolic, and hormonal processes associated with growth, maturation, and adaptation to physical exercise. During puberty, the body undergoes a phase of accelerated development characterized by significant changes in body composition, increased energy demands, and elevated functional requirements. In this context, adequate nutrition becomes essential not only for optimizing sports performance but also for promoting health, growth, and healthy development in young athletes.

Methods

The main aim of this study was to analyze the influence of nutrition on sports performance in pubertal athletes, identifying the primary nutritional factors involved in physical performance, muscle recovery, and training adaptation. A narrative review of the scientific literature was conducted using the PubMed, Google Scholar, ScienceDirect, Web of Science, and SciELO databases, including scientific articles, systematic reviews, and consensus statements related to sports nutrition and adolescent athletes.

Results and Conclusions

The findings demonstrate that adequate energy availability is essential for maintaining physiological balance, supporting healthy growth, and preventing Relative Energy Deficiency in Sport (RED-S). Carbohydrates were identified as playing a central role in energy production and glycogen restoration, while proteins are fundamental for muscle protein synthesis, recovery, and lean mass development. Additionally, dietary fats contribute to important hormonal and metabolic functions associated with pubertal development. The results further revealed that micronutrients such as iron, calcium, and vitamin D are indispensable for bone health, muscle function, oxygen transport, and aerobic capacity. Adequate hydration also showed a significant impact on thermoregulation, cognitive function, and physical performance. In conclusion, nutrition should be considered a fundamental component of sports performance in pubertal athletes, highlighting the importance of individualized nutritional strategies adjusted to training demands, growth, and biological maturation, and supported by scientific evidence.

Keywords: sports nutrition; pubertal athletes; sports performance; energy availability; hydration

Effect of Caffeine Supplementation on Physical Performance and Fatigue

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Abstract

Introduction

Caffeine is one of the most widely consumed psychoactive substances worldwide and is commonly found in products such as coffee, tea, energy drinks, and nutritional supplements. In the sports context, caffeine is extensively used as an ergogenic aid due to its potential to enhance physical performance, reduce fatigue, and improve exercise capacity. The main aim of this study was to critically review and analyze the available scientific evidence regarding the effects of acute caffeine supplementation on physical performance and fatigue in athletes and physically active adults.

Methods

A systematic review of the literature was conducted according to the PRISMA 2020 guidelines using the PubMed, Web of Science, B-on, Google Scholar, SciELO, ResearchGate and ScienceDirect databases. Fourteen scientific studies published between 2016 and 2026 investigating the effects of acute caffeine supplementation in different exercise modalities and sports contexts were included.

Results and Conclusions

The findings demonstrated positive and consistent ergogenic effects of caffeine on both aerobic and anaerobic performance. Regarding anaerobic performance, significant improvements were observed in peak power, mean power, maximal strength, and explosive force production. In aerobic performance, caffeine supplementation increased time to exhaustion, improved tolerance to prolonged exercise and enhanced the ability to maintain exercise intensity. Additionally, caffeine intake was associated with reduced ratings of perceived exertion and improved neuromuscular recovery following high intensity exercise. However, the analyzed studies also revealed considerable interindividual variability in caffeine response, influenced by factors such as training status, habitual caffeine intake, individual tolerance and genetic characteristics related to caffeine metabolism. In conclusion, acute caffeine supplementation, in doses ranging from 3 to 6 mg·kg⁻¹ consumed approximately 60 minutes before exercise, represents an effective nutritional strategy to optimize sports performance, although its application should be individualized according to the physiological and contextual characteristics of each athlete.

Keywords: Caffeine; Physical Performance; Fatigue; Ergogenic; Supplementation.

VELOCITY-BASED TRAINING (VBT): Fundamentals, Methodology, and Application in Strength Training

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Abstract

Introduction

Velocity Based Training (VBT) has emerged as one of the most innovative methodologies in strength training, relying on real-time monitoring of movement velocity as an objective indicator of training intensity and neuromuscular fatigue. The scientific basis of VBT is founded on the highly consistent inverse relationship between mean concentric velocity and relative load expressed as a percentage of one-repetition maximum (1RM), first described by González-Badillo and Sánchez-Medina. The aim of this study was to systematically review the available scientific evidence regarding VBT, focusing on its theoretical foundations, prescription methodologies, monitoring technologies, and effects on neuromuscular adaptations and physical performance.

Methods

A narrative review of the scientific literature was conducted using original articles, systematic reviews, and meta-analyses indexed in the PubMed and Scopus databases. The analyzed evidence demonstrates that VBT enables a more individualized and dynamic prescription of training loads, allowing immediate adjustments according to the athlete's neuromuscular status. Findings from recent systematic reviews and meta-analyses indicate that this methodology produces significant improvements in maximal strength, muscular power, vertical jump performance, and sprint speed. Furthermore, VBT presents important advantages over traditional percentage-based training models, particularly regarding fatigue management, autoregulation of training volume, and optimization of the stimulus-recovery relationship.

Results and Conclusions

The findings also suggest that the use of velocity loss thresholds represents an effective strategy for modulating training-induced fatigue, enabling the targeting of specific adaptations related to strength, power, or muscle hypertrophy. In conclusion, VBT represents a valid, reliable, and scientifically supported methodology with substantial practical applications in sports training, physical conditioning, and neuromuscular performance monitoring.

Keywords: Keywords: Velocity Based Training; strength training; movement velocity; auto-regulation; load-velocity profile; velocity loss threshold.

Effects of Fasted vs. Fed Training on Physical Performance, Perceived Exertion, Fatigue, and Exercise Tolerance in CrossFit Practitioners

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Abstract

Introduction

To analyze the effects of pre-exercise nutritional status (fasted vs. fed state) on physical performance, rating of perceived exertion, subjective fatigue, exercise tolerance, and associated symptoms in CrossFit practitioners.

Methods

Eleven recreational CrossFit practitioners (6 women and 5 men; age: 35.3 ± 6.7 years; BMI: $25.3 \pm 1.8 \text{ kg}\cdot\text{m}^{-2}$; training experience: 6.4 ± 3.4 years) participated in a counterbalanced crossover study involving two experimental sessions: one performed in a fasted state (≥ 8 h fasting; 11.1 ± 2.0 h; water allowed, no caffeine) and another in a fed state (standardized meal consumed 1–2 h before exercise consisting of bread, cheese, eggs, and fruit; 1.8 ± 0.7 h; no caffeine). The experimental protocol consisted of a 15-minute AMRAP (“as many rounds as possible”) including 10 Wall Balls, 8 Box Jumps, and 6 Burpees, preceded by a standardized 10-minute warm-up. Outcome measures included total repetitions, completed rounds, performance across 5-minute intervals, unplanned rest breaks, rating of perceived exertion (RPE), post-exercise fatigue, pre-exercise energy and hunger perception, and post-exercise adverse symptoms. Comparisons between conditions were performed using the Wilcoxon signed-rank test ($\alpha = 0.05$).

Results and Conclusions

No statistically significant differences were observed between conditions for total repetitions completed (Fasted: 229.3 ± 25.7 vs. Fed: 237.6 ± 28.5 ; $p = 0.232$), completed rounds (9.1 ± 0.9 vs. 9.4 ± 1.1 ; $p = 0.375$), or post-exercise RPE (7.5 ± 1.1 vs. 7.1 ± 1.0 ; $p = 0.359$). However, the fasted condition resulted in significantly greater post-exercise fatigue (7.2 ± 1.7 vs. 6.0 ± 1.5 ; $p = 0.043$), lower pre-exercise energy perception (4.9 ± 2.0 vs. 7.2 ± 1.5 ; $p = 0.012$), and higher hunger perception (5.5 ± 3.5 vs. 1.1 ± 0.3 ; $p = 0.002$). Symptoms of energy crashes and weakness were reported exclusively during the fasted condition. Pre-exercise fasting did not impair objective physical performance during a short-duration AMRAP protocol in CrossFit practitioners. However, it was associated with greater subjective fatigue, lower perceived energy, and a higher prevalence of adverse symptoms, suggesting a negative impact on perceived well-being and exercise tolerance. These findings reinforce the importance of individualized nutritional strategies in the context of high-intensity functional training.

Keywords: Keywords: fasting; CrossFit; physical performance; fatigue; RPE; pre-exercise nutrition; AMRAP; high-intensity exercise.

Analysis of the Reliability of K-AI Devices (K-Sport®) for Monitoring Total Distance and Maximum Speed during Training and Competition in Football

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Abstract

Introduction

Monitoring technology is widely used in football to assess external load during training and competition. However, despite the increasing use of these systems, each new device must demonstrate adequate reliability before being implemented in applied practice. Currently, limited scientific evidence is available regarding the reliability of K-AI devices. Therefore, the aim of this study was to analyze the between-unit and between-session reliability of K-AI devices (K-Sport®) during football small-sided games performed across different pitch dimensions.

Methods

Twenty-four football players performed repeated 3vs3 small-sided games on 10x10 m, 20x20 m and 30x30 m pitches while simultaneously wearing two K-AI devices (K-SPORT WORLD S.R.L., Pesaro, Italy), operating at 50 Hz DGNSS and equipped with microsenors. Total distance (TD) and maximum speed (SpeedMAX) were selected as representative distance- and speed-based variables. Between-unit and between-session reliability were assessed using intraclass correlation coefficients (ICC) and coefficients of variation (CV).

Results and Conclusions

TD demonstrated excellent between-unit and between-session reliability when measured using K-AI devices (K-Sport®). (ICC = 0.99–1.00; CV < 1%) across all pitch dimensions analyzed. SpeedMAX also showed excellent reliability (ICC = 0.97–0.99; CV = 1.4–2.3%). These findings indicate that K-AI devices (K-Sport®) show excellent between-unit and between-session reliability for measuring total distance and maximum speed during football small-sided games. Furthermore, these findings suggest that K-AI devices (K-Sport®) could be used in football training and competition settings.

Keywords: GPS; GNSS; EPTS; reliability; team sports; small-sided games.

Phase angle is associated with adaptive postural control strategies and neuromuscular performance in military personnel

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Abstract

Introduction

In military operational contexts, physiological readiness can be determined by the interaction of body composition, hydration status, nutritional factors, and sleep. Phase angle (PhA) has been proposed as an integrative biomarker reflecting cellular health, membrane integrity, and muscle quality, linking these dimensions to functional stability and performance. In the Portuguese Air Force, search and rescue crews are composed of pilots, co-pilots, rescue saviours, and system operators, whose roles involve distinct onboard demands, ranging from fine motor control to more physically demanding tasks, which may lead to different physiological and neuromuscular characteristics. Given that the relationship between PhA, neuromuscular output, and postural control remain insufficiently understood, this study aimed to explore the associations between PhA, neuromuscular performance, and biomechanical indicators of postural control in military personnel.

Methods

Body composition, total and compartmental body water (assessed by bioelectrical impedance), nutritional profile (assessed by dietary reports), and sleep patterns (assessed by accelerometry) were collected in 43 search and rescue military men. Neuromuscular performance was assessed using handgrip strength, isometric mid-thigh pull (IMTP), and knee extensor maximal voluntary contraction (MVC), while postural control was evaluated using center of pressure (COP) derived metrics under different sensory conditions (eyes-open vs. eyes-closed). Correlation analyses were performed for the whole sample and stratified by role (pilots vs. non-pilots).

Results and Conclusions

In the whole sample, PhA showed direct low-to-moderate associations with neuromuscular and biomechanical variables, including knee extensor MVC and COP-derived measures (path length, velocity, and acceleration, and ellipse area), particularly under eyes-closed conditions. When stratified by role, non-pilots exhibited stronger associations between PhA, neuromuscular performance (direct), and postural control (inverse). These included relationships with knee extensor MVC and COP-derived

parameters such as ellipse area and ellipse angle under both eyes-open and eyes-closed conditions, without a consistent pattern of visual dependency. In contrast, pilots demonstrated moderate associations with selected postural control metrics, mainly under eyes-open conditions, including COP peak acceleration and ellipse angle, suggesting a more task-specific and possibly more automated postural control strategy. These findings suggest that PhA is linked to neuromuscular and postural performance, however, the direction of associations indicates that higher PhA does not necessarily reflect greater postural stability. Instead, it may represent more dynamic and adaptable motor control strategies, particularly under increased sensory constraints. The stronger associations observed in non-pilots further suggest that reliance on physiological status may be modulated by experience and task-specific training. PhA appears to be a relevant integrative marker of physiological readiness, associated with neuromuscular function and adaptive postural control, supporting its application in monitoring military performance.

Keywords: phase angle, postural control strategies, center of pressure, neuromuscular function, military physiology

External Load Demands During Official Competition in Youth Padel: Implications for Training Prescription

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Abstract

Introduction

The growing popularity and professionalization of padel have increased the need to better understand the physical demands of competition, particularly during developmental stages. While several studies have investigated match demands in adult players, limited information is available regarding youth athletes. Furthermore, potential sex-related differences in competitive demands remain largely unexplored. Therefore, the aim of this study was to describe the external load experienced during official competition and to analyze sex differences in highly trained U18 padel players.

Methods

Eighteen highly trained U18 padel players (9 males and 9 females) competing in the Spanish National Regional Team Championship participated in this study. External load variables were monitored during official matches using wearable inertial measurement units (OLIVER™, Barcelona, Spain). Variables analyzed included playing time, total distance covered, high-intensity accelerations, high-intensity decelerations, changes of direction, high metabolic power distance, session volume, session intensity, and maximum speed. Linear mixed models were used to examine differences between sexes, with statistical significance set at $p < 0.05$.

Results and Conclusions

Male players exhibited significantly greater external load values than female players in several performance-related variables. Specifically, males showed higher playing time, total distance covered, high-intensity accelerations, high-intensity decelerations, changes of direction, high metabolic power distance, session volume, and session intensity ($p < 0.05$). No significant differences were observed for maximum speed between sexes ($p > 0.05$). These findings indicate that male U18 padel players experience greater overall external demands during competition than their female counterparts. Official competition in youth padel imposes substantial external load demands, with significant differences observed between sexes. The greater competitive demands identified in male players suggest that training prescription and load management strategies should consider sex-specific competition requirements. These findings provide valuable information for coaches and practitioners seeking to optimize performance development and improve the individualization of training programs in youth padel players.

Keywords: Padel, youth athletes, external load, inertial measurement units, sports performance, sex differences

Interlimb Asymmetry Across Playing Positions in Elite Youth Male Futsal Players

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Abstract

Introduction

Interlimb asymmetry has been linked to impaired physical performance and a potential increase in injury risk in athletes. In futsal, the specific demands of each playing position may influence unilateral performance and the presence of functional imbalances, particularly in youth players. Therefore, this study aimed to analyse positional differences in interlimb asymmetry and unilateral functional performance among elite youth male futsal players.

Methods

Eighty-three elite youth male futsal players (age: 17.2 ± 0.8 years) were assessed according to playing position: right winger, left winger, pivot, and defender. Players performed unilateral countermovement jump (CMJ), horizontal jump (HJ), and 505 change-of-direction (COD 505) tests. Interlimb asymmetry was calculated for each test. One-way analysis of variance was used to compare asymmetry values between positions. Pearson's correlations were calculated to explore relationships between test-specific asymmetries. Players were also classified as having high ($\geq 10\%$) or low ($< 10\%$) asymmetry, and Chi-square tests were used to examine associations with playing position.

Results and Conclusions

No significant positional differences were observed in interlimb asymmetry for CMJ ($p = 0.61$), HJ ($p = 0.13$), or COD 505 ($p = 0.26$), although HJ showed greater between-position variability ($\eta^2 = 0.07$). A significant correlation was found between CMJ and HJ asymmetries ($r = 0.31$; $p < 0.01$), suggesting partially shared neuromuscular demands between both jumping tasks. No significant association was found between asymmetry category and playing position in any test. However, 38.9% of pivots and 40.7% of right wingers exceeded the 10% asymmetry threshold in the CMJ. Interlimb asymmetries did not significantly differ across playing positions in elite youth male futsal players. Nevertheless, the presence of asymmetry values $\geq 10\%$ in a relevant proportion of players highlights the importance of individualised monitoring. These findings support the inclusion of unilateral functional assessments within injury prevention and performance monitoring strategies in youth futsal.

Keywords: futsal; interlimb asymmetry; injury prevention; unilateral performance; youth athletes.

Wearable accelerometry for monitoring osteogenic impact loading in postmenopausal women

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Abstract

Introduction

High-impact exercise is considered an important strategy for osteoporosis prevention, as bone adaptation requires mechanical loading above a minimum osteogenic threshold. However, the quantification of impact loading is usually limited to laboratory settings, which makes its application in clinical and community-based exercise programs difficult. Wearable accelerometers may provide a practical alternative for monitoring bone-stimulating exercise outside the laboratory. Therefore, this study aimed to examine whether a wrist-worn accelerometer can estimate ground reaction-based impact loading during countermovement jumps in postmenopausal women.

Methods

Thirty-six postmenopausal women performed 12¹valid countermovement jumps on a force platform while wearing a wrist-mounted accelerometer. Peak vertical acceleration derived from the force platform was used as the criterion measure. Wrist vector-magnitude acceleration and anthropometric variables were used to predict platform-derived acceleration through multivariable regression. Agreement between observed and estimated values was assessed using paired comparisons and Bland–Altman analysis. Estimated accelerations were also classified into clinically relevant osteogenic intensity categories: <2 g, 2–<3 g, 3–<3.9 g and ≥3.9 g.

Results and Conclusions

Wrist acceleration explained a substantial proportion of the variance in peak platform acceleration, with an adjusted R² of 0.584 and negligible mean bias. Classification accuracy across osteogenic intensity categories was 0.61, with better performance in low-to moderate-intensity ranges commonly used for initiating and progressing impact exercise. Misclassifications occurred mainly near higher-intensity thresholds. These findings suggest that wrist-worn accelerometry may be a feasible tool for estimating and categorizing osteogenic loading during high-impact tasks. Although it cannot replace laboratory-grade force platforms, it may support exercise prescription, adherence monitoring and safe progression in osteoporosis-prevention programs.

Keywords: wearable sensors; osteogenic loading; osteoporosis prevention; accelerometry; postmenopausal women

Spatiotemporal Stability Analysis Based on Amplitude in Professional Football: A Study in LaLigaTM EA Sports

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Abstract

Introduction

Modern football is characterised by a more demanding pace, increasing tactical complexity and increasingly balanced competition, making a more detailed analysis of the game essential to enable coaches to gain an advanced understanding and utilise this information. The aim of this study was to analyse spatial occupation based on the average width of LaLigaTM teams in offensive and defensive phases, broken down by stages of the match and final league position at the end of the season.

Methods

The study was conducted by tracking all players and the 20 teams across 760 football matches during the 2024–2025 season in the Spanish men's first division (age range: 17–39 years). The football matches were monitored using the official LaLigaTM system (Mediacoach®, Madrid, Spain). In this study, the average offensive and defensive range was recorded in both halves of the matches. The data were also organised according to the final league table (teams qualifying for European competitions, mid-table teams and relegated teams). The study was conducted in accordance with the ethical guidelines of the Declaration of Helsinki. Data analysis was performed using IBM SPSS STATISTICS v.27.

Results and Conclusions

The average width of LaLigaTM teams in attack was 48.60 ± 3.82 m during the first half, falling to 46.68 ± 4.20 m in the second half. In the defensive phase, the average width was 37.13 ± 1.99 m in the first half and 36.54 ± 2.06 m in the second half. The results indicate the existence of a collective spatial adjustment based on width between the two halves, in both the offensive and defensive phases. In this regard, there is a tendency towards a narrowing of the block, both in the offensive phase ($\Delta = -1.92$ m; $p < .001$; $d = 0.537$) and the defensive phase ($\Delta = -0.59$ m; $p < .001$; $d = 0.331$). In the comparison by competitive level (European, Mid-table and Relegation), significant differences were found in offensive width in the first half for teams qualified for European competition and mid-table teams compared to relegation teams ($p < .001$). In the second half, significant differences in attacking width were only observed between teams qualifying for European competitions and those in the relegation zone ($p < .001$). The higher-ranked teams showed greater average width in the attacking phase than the lower-ranked teams. In the case of defensive width, no significant differences were found between any of the competitive-level groups in the first and second halves of the match, which could indicate greater stability in the defensive phase and suggest the existence of a 'defensive standard'

in LaLigaTM. These results highlight the need to investigate spatio-temporal stability in professional football, particularly in relation to collective adjustments arising from the competitive context and the progression of the match.

Keywords: Reach; Monitoring; Competition; Match; LaLigaTM; Mediacoach®.

Relationship between Eating Disorders behavioural risk and the development of Relative Energy Deficiency in sport (REDs) symptoms in female Spanish climbing athletes.

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Abstract

Introduction

The competitive pressure of climbing and the potential benefits of low body weight can lead female climbers to develop eating behaviours that put them at risk of eating disorders (ED) and precede the adverse effects on health and athletic performance resulting from low energy availability (LEA) and relative energy deficiency in sport (REDs). Due to the lack of research on female climbers, this study aimed to analyse the relationship between ED behavioural risk and the development of physiological symptoms characteristic of REDs in female Spanish climbing athletes.

Methods

One hundred Spanish female climbers (aged 18–58) were recruited to complete an anonymous survey including the Eating Attitudes Test (EAT-26) and the Low Energy Availability in Female Questionnaire (LEAF-Q). Participants were classified as symptomatic of ED and LEA if they scored ≥ 1 on the EAT-26 and ≥ 8 on the LEAF-Q, respectively.

Results and Conclusions

Among the participating athletes, 43% ($n = 43$) were classified as being at risk for ED and 39% ($n = 39$) as being at risk for LEA/REDs. Climbers at risk of ED showed 3.54-fold higher odds of REDs risk compared to climbers not at risk of ED. Of the LEAF-Q components, gastrointestinal function and menstrual function showed statistically significant positive associations with the risk of ED. This study showed that female climbing athletes at risk of ED had a higher probability of REDs/LEA risk than climbers with a lower risk of ED. Appropriate multidisciplinary educational initiatives are required to prevent the adverse effects of these clinical conditions in female climbing athletes.

Keywords: “Relative Energy Deficiency in Sport”; “Eating Disorders”; “Sport Climbing”; “Bouldering”; “Feeding Behavior”; “Low Energy Availability”

Design and expert consensus validation of a water rescue knowledge questionnaire

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Abstract

Introduction

Scientific literature indicates that water safety education and specific rescue training contribute to reducing risky behaviors and improving responses to aquatic emergencies (Luo et al., 2024; Turgut and Turgut, 2012). However, various studies warn of insufficient preparation in water safety and rescue techniques, even among individuals connected to aquatic environments (Barcala-Furelos et al., 2021; Petrass and Blitvich, 2018). This situation increases the risk of accidents and contributes to inappropriate actions during interventions. Water familiarity and swimming ability do not guarantee effective action in a water emergency (Quan et al., 2015; Stallman et al., 2017). Several studies show limitations in identifying dangerous situations, selecting appropriate rescue techniques, or intervening safely and effectively (Langendorfer & Bruya, 1995; Petrass & Blitvich, 2018). As with first aid, theoretical knowledge is insufficient without specific practical skills (García-Blaya et al., 2022). Furthermore, there is a lack of uniformity in training programs and limited preparation in prevention and rescue techniques, essential aspects for reducing the number of drownings (Abrales & Agras, 2010; Agras & Abrales, 2013). Recent research has developed instruments to assess preventive aquatic competence and safety in aquatic environments (Castañón-Rubio et al., 2022; Ortiz & Moreno-Murcia, 2022). However, the scientific literature continues to show a scarcity of specific tools designed to evaluate technical knowledge in aquatic rescue. This limitation makes it difficult to objectively assess the knowledge necessary to intervene safely and effectively in a water emergency. Therefore, the design of a specific questionnaire is proposed to determine the level of knowledge in aquatic rescue and to provide a valid, up-to-date instrument adapted to the real needs of intervention in aquatic environments.

Methods

A methodological study was conducted to design and validate the content of a questionnaire to assess knowledge levels in aquatic rescue. The validation process was carried out through expert judgment and consensus, following methodological recommendations for the validation of scientific instruments (Escobar-Pérez & Cuervo-Martínez, 2008; Polit & Beck, 2006). The procedure was structured in different phases: initial item development, expert review, questionnaire reformulation, and final verification of the degree of agreement. Initially, a bank of 30 questions related to specific aquatic rescue content was developed. The items were structured into four dimensions: phases of action by the lifeguard, use or absence of rescue equipment, type of victim, and the environment where the intervention takes place. All questions presented four response options. After an initial internal review of wording, clarity, and content distribution, 20 final items were selected, ensuring a balanced representation of all the proposed subscales. Expert selection was conducted using purposive or convenience sampling.

Sixteen experts were initially invited, and twelve ultimately completed the entire validation process. Inclusion criteria included holding a doctoral degree or a Higher Sports Technician qualification, as well as demonstrating a minimum of ten years of experience as a lifeguard at beaches and/or swimming pools. Each expert assessed the importance of the items using a 1-to-4 Likert scale. The percentage of experts who considered the clarity and relevance of each question in the questionnaire to be appropriate was also calculated. This same procedure was used to verify the correspondence of each item with the different subscales: phase of action, use of equipment, type of space, and type of victim. In addition, individual assessments of each of the four response options were requested, and an open-ended observations section was included to gather suggestions related to the clarity, comprehension, and technical appropriateness of the questions and answers. Following the initial assessment, a descriptive analysis was performed using means, modes, and percentages of agreement. The score assigned to each response option was established based on the mode indicated by the experts and, in the absence of consensus, using the average value obtained. Subsequently, all qualitative observations were reviewed, and items and responses exhibiting comprehension problems, ambiguity, or low agreement were reformulated. After making the necessary modifications, a second version of the questionnaire was developed. This revised version, along with the changes and the agreement levels obtained in the initial assessment, was sent back to the experts. Following this second review, the responses were re-analyzed, and agreement of 75% or higher was verified across the various items and dimensions evaluated. Finally, the definitive version of the aquatic rescue knowledge questionnaire was created.

Results and Conclusions

The results showed a high level of agreement among the experts participating in the questionnaire validation process. All items achieved 100% agreement regarding their relevance within the instrument. Regarding unambiguity, the agreement percentages ranged from 83.3% to 100%, indicating that the experts considered the questions to be clearly, precisely, and easily understandable. Concerning the importance of the items, the average scores ranged from 3.25 to 3.83 points out of a maximum of 4, with an overall average of 3.5 points. These results reflect a high assessment of the relevance of the content included in the questionnaire. Furthermore, a consensus of over 80% was obtained in assigning values to the different response options for all items. Based on this agreement, a scoring scale of -¹to 2 points was established for all responses, where 2 corresponded to the ideal option, ¹to the appropriate option, 0 to the neutral option, and -¹to the most inappropriate option. Regarding the lifeguard's action phases, the experts identified a balanced distribution of items across the different operational stages of aquatic rescue. Items 1, 2, 3, 4, and 5 were associated with the prevention and surveillance phases. Items 6, 7, 8, 9, and 10 were related to the water entry and approach phases. Items 11, 12, 13, 14, 15, and 20 were linked to the control and transfer of the victim. Finally, items 16, 17, 18, and 19 were associated with the extraction and evacuation phases. Regarding the use of rescue equipment, the experts classified items 8, 10, 11, 13, and 18 as interventions carried out without equipment, while items 6, 9, 12, 15, 16, 17, 19, and 20 were identified as actions performed with rescue equipment. With respect to the intervention environment, items 1, 3, 6, 8, 9, 12, 13, 15, 17, and 20 were linked to natural aquatic environments, while items 2, 4, 5, 7, 10, 11, 14, 16, 18, and 19 were associated with aquatic facilities. Regarding the type of victim, the experts identified five items related to conscious victims (items 5, 9, 10, 12, and 15), four linked to unconscious victims (items 7, 11, 14, and 17), and four associated with victims with spinal cord injury

(items 13, 16, 18, and 19). All thematic blocks achieved agreement levels above 75%, a criterion previously established for the final acceptance of items within each subscale.

Conclusions The designed questionnaire demonstrates adequate levels of content validity and expert consensus for assessing knowledge in aquatic rescue. The high percentages of agreement obtained regarding relevance, unambiguity, and importance show that the instrument possesses adequate clarity, relevance, and coherence with the content it intends to evaluate. The balanced distribution of items according to the phases of action, the use of rescue equipment, the aquatic environment, and the type of victim allows for a structured and specific assessment of theoretical knowledge related to intervention in aquatic emergencies. Furthermore, the review and reformulation process developed through expert consensus improved the comprehension and technical appropriateness of the questions and answers included in the questionnaire. Overall, the developed instrument constitutes a specific, up-to-date tool applicable to the educational, training, and professional fields of aquatic rescue. Its use can facilitate the objective evaluation of knowledge, the identification of training needs, and the development of programs aimed at improving aquatic safety and drowning prevention.

Keywords: aquatic rescue; aquatic safety; aquatic rescue; content validation; questionnaire; expert judgment; drowning prevention; lifeguard training.

Keyword analysis in the scientific literature on basketball injuries

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Abstract

Introduction

Research on basketball injuries has increased in recent years, although it remains conceptually and methodologically diverse. Studies use different terms to describe injury types, risk factors, injury mechanisms, workload monitoring, prevention strategies and return-to-play processes. Therefore, keyword analysis provides a useful approach to identify the main conceptual focuses of the field and to organize the available evidence from an integrated perspective.

Methods

A review of scientific articles on basketball injuries was conducted. The author keywords reported in the included studies were extracted and terminologically normalized to unify equivalent terms and reduce duplication. An open and axial thematic coding process was then applied, grouping the keywords into functional categories related to the competitive context, etiological processes, the injury event, evaluation, monitoring and applied intervention

Results and Conclusions

The analysis showed that the keywords were organized into a five-level hierarchical structure: structural and contextual determinants, etiological processes, injury event, evaluation and monitoring, and applied intervention. The injury event was the core of the model, with a clear predominance of terms related to lower-limb injuries, especially ankle and knee injuries. However, the field is moving towards a broader perspective that incorporates competitive load, biomechanics, functional assessment, injury prevention, rehabilitation and return to play. In conclusion, keyword analysis allows basketball injury research to be understood as a multidimensional system. This approach helps organize the available knowledge and highlights the need to integrate competition planning, workload monitoring, individualized assessment and interdisciplinary intervention to improve injury prevention and management.

Keywords: basketball; sports injuries; keywords; conceptual analysis; injury prevention; return to play

Influence of exogenous factors related to nutritional, hydration and climatological aspects on the fatigue in endurance sports: systematic review with meta-analysis.

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Abstract

Introduction

The aim of this systematic review with meta-analysis is to examine the influence of exogenous factors related to fatigue in endurance events lasting between 45 minutes and 3 hours.

Methods

. A search was conducted in four databases until 15 June 2022: PubMed, Web of Science, Sport Discus and EBSCO. A total of 5103 articles were reviewed and 34 were included in the meta-analysis. The review was registered in PROSPERO (CRD4202222232327203) and adhered to the PRISMA guideline. https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022327203. Study quality was assessed according to the PEDro score, and evaluated with Rosenthal's N to fail-safe. Several exogenous agents are mentioned in this article, but the focus in this abstract will be on carbohydrates (CHO) as it impacts on Rate of Perceived Exertion (RPE) and heart rate (HR). After application of the different inclusion and exclusion criteria, a total of 11 articles were detected, 3 articles measuring RPE and 3 articles measuring HR.

Results and Conclusions

Comparing the changes found in the experimental group with respect to the control group, it was found that CHO intake during exercise decreased or maintained the increase in HR during the test (95%CI: -1.07 to -0.09, $p = 0.018$), during exercise decreased or maintained the increase in RPE ($p = 0.959$). The results revealed that carbohydrate administration during sport provides an improvement by mitigating the increase in HR and RPE during the test.

Keywords: fatigue; endurance; exogenous factors; extreme conditions; nutrition; sport

Literature review on preventing the impact of fibromyalgia in physically active women and sedentary women

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Abstract

Introduction

Fibromyalgia is a chronic musculoskeletal syndrome, primarily affecting adult women, characterized by widespread pain, fatigue, sleep disturbances, and it may be accompanied by psychological disorders. Exercise or physical activity is associated with improvements in symptoms related to this disease. To identify whether physically active women with fibromyalgia experience a lower impact of the disease on their daily lives compared to sedentary women.

Methods

This study was designed as a descriptive systematic review, following the guidelines established by the PRISMA statement. Scientific articles from the databases PubMed, Scopus, and Web of Science from the last 10 years were included, except for some studies that were incorporated due to their high clinical relevance. A search strategy was conducted using the terms “fibromyalgia,” “risk reduction,” “disease management,” “women,” “female,” “physical activity,” “exercise,” “active lifestyle,” “sedentary lifestyle,” “sedentary behavior,” and “physical inactivity,” combined using AND/OR. A total of 133 articles were identified, of which 19 were selected for analysis after the screening process.

Results and Conclusions

Fibromyalgia represents a highly relevant condition in adult women. Aerobic training was shown to be effective in improving working memory, motor function, and depressive symptoms, however, these benefits tend to decrease if the practice is not maintained over time. Strength training proved effective in reducing fatigue and widespread pain. Overall, physical activity emerges as a fundamental strategy in the management of fibromyalgia, also contributing to the reduction of its socio-health impact

Keywords: Fibromyalgia, women, physical activity, sedentary lifestyle, disease management.

Repetitions to Failure Across Three Relative Intensities in the Chest Press Exercise in Female Breast Cancer Survivors

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Abstract

Introduction

Resistance training is recommended for female breast cancer survivors. However, the prescription of training intensity and volume remains challenging due to interindividual variability in performance and tolerance to effort. Understanding how the number repetitions to failure varies across different relative loads may support safer and more individualized resistance training prescription. This study aims to compare the number of repetitions to failure across three relative intensities in the chest press exercise in female breast cancer survivors.

Methods

Eleven female breast cancer survivors (57.0 ± 6.7 years; range: 44–67 years), enrolled in the MAMA_MOVE® supervised exercise program, completed a within-subject assessment in the chest press using the Matrix Fitness Versa Converging Chest Press, VS-S13. After an initial incremental protocol used to determine individual load-velocity and load-power profiles, participants performed one set to mechanical failure at three intensities: 50% of one-repetition maximum (1RM), individual optimal load, and 90% 1RM. The individual optimal load corresponded to the relative intensity associated with maximal mechanical power. The number of completed repetitions was recorded. Differences between conditions were analyzed using repeated-measures ANOVA with Bonferroni pairwise comparisons.

Results and Conclusions

The number of repetitions to failure differed significantly between intensities ($p < 0.001$; $\eta^2 = 0.904$), decreasing from 36 ± 8 repetitions at 50% 1RM to 26 ± 7 at the optimal load and 7 ± 2 at 90% 1RM. Bonferroni pairwise comparisons confirmed significant differences between all conditions: 50% 1RM vs. optimal load ($p = 0.004$), 50% 1RM vs. 90% 1RM ($p < 0.001$), and optimal load vs. 90% 1RM ($p < 0.001$). The number of repetitions to failure decreased progressively as relative intensity increased in the chest press exercise. These findings highlight the importance of considering intensity-specific repetition responses when prescribing resistance training volume in female breast cancer survivors.

Keywords: Breast cancer survivors; resistance training; repetitions to failure; relative intensity; chest press.

Dietary supplement and medication use in professional and pre-professional dancers: widespread use but limited evidence of benefit – a systematic review

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Abstract

Introduction

Dietary supplements are widely used by dancers, mirroring trends in athlete populations. Dancers report supplement use for health maintenance, immune support, fatigue reduction, energy enhancement, and injury prevention. Despite these rationales, high rates of nutrient deficiencies (particularly vitamin D and low serum ferritin) have been described in dancers. However, the relationship between supplement/medication use, nutritional status, and performance outcomes remains unclear. Therefore, this systematic review aimed to examine the prevalence of dietary supplement and medication utilization among professional and pre-professional dancers and to synthesize evidence on their effects on performance, health outcomes, and dance-related pathologies.

Methods

This systematic review followed PRISMA 2020 guidelines and was registered in PROSPERO (CRD420251000872). PubMed, Scopus, Web of Science, and Cochrane Library were searched from inception to April 2025. Eligible studies included professional or pre-professional dancers using dietary supplements or medications with potential therapeutic or ergogenic effects. Two independent reviewers performed data extraction and risk-of-bias assessment using RoB 2 (RCTs), ROBINS-I (non-randomized interventions), and JBI tools (observational studies). A narrative synthesis was conducted; meta-analysis was not performed due to substantial clinical and methodological heterogeneity.

Results and Conclusions

Results: Twenty-two studies were included (12 observational, 6 randomized controlled, and 4 non-randomized interventions) involving 740 dancers (654 females and 86 males) from various disciplines. Observational studies reported a prevalence of dietary supplement use ranging from 21-42% among professional dancers and 11-54% among pre-professional dancers. Analgesics and non-steroidal anti-inflammatory medication use were reported by up to 90 % of dancers. Commonly consumed supplements included whey protein, creatine, caffeine, multivitamins, vitamin B complex, and vitamin C. However, intervention studies examining whey protein and creatine reported inconsistent findings, including increased lean mass without ergogenic effects. Conversely, vitamin D supplementation demonstrated improved isometric strength, jump performance and reduced injury incidence in ballet dancers with vitamin D insufficiency. Conclusions:

This systematic review reveals heterogeneous prevalence of supplements across studies. Despite widespread use, clinically relevant nutritional deficiencies seem to remain common in dancer populations, alongside limited and inconsistent evidence supporting ergogenic benefits of commonly used supplements. Further research is needed to determine if supplementation practices are optimally aligned with individual needs or underlying contributors. Consequently, a more targeted approach to supplementation strategies in dancers may be beneficial, guided by screening and biochemical assessment and the specific physiological demands of dance training, which may minimize unnecessary intake, reduce masking unresolved health issues and enhance the effectiveness of interventions intended to restore or maintain health.

Keywords: dancers, dietary supplements, ergogenic substances, analgesic agents, physical performance, musculoskeletal pain.

Biological maturation affects kicking velocity but not kinematic organisation in academy footballers

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Abstract

Introduction

Purpose: Biological maturation is known to influence ball-speed outcomes during the soccer instep kick in youth players, but whether it also reorganises the kinematic structure of the kicking movement or only scales the velocity output of an already-consolidated motor pattern has not been formally disentangled. We examined whether maturation affects (i) the magnitude of velocity output produced by the instep kick, (ii) the kinematic organisation underlying that output, or both.

Methods

Methods: Sixty male academy footballers (Under-13 to Under-19) performed three maximal-effort instep shots while three-dimensional kinematics were captured with a validated markerless motion-capture system (OpenCap; two iPads at 240 Hz). Eight kinematic variables (peak foot velocity, peak knee extension angular velocity, joint angles at ball contact, trunk lateral lean, pelvic rotation, and the proximal-to-distal sequencing index) were averaged across trials. Biological maturity was estimated through three converging indicators (Mirwald offset, percentage of predicted adult height, stature Z-score). Age-cohort and maturity-group differences were tested by ANOVA; Pearson and partial correlations quantified the maturity-age-kinematics-ball-speed associations; a three-block hierarchical regression evaluated the unique predictive value of biomechanics on ball speed beyond biological maturation and body size.

Results and Conclusions

Results: Only peak foot velocity differed substantially across age cohorts ($F = 5.83$; $p = .002$; $\eta^2(2) = 0.24$) and across maturity groups ($F = 7.82$; $p = .001$; $\eta^2(2) = 0.22$), and only peak foot velocity correlated significantly with maturity offset ($r = +0.40$; $p = .002$). The age-velocity association was fully accounted for by maturation: the partial correlation between age and peak foot velocity, controlling for maturity offset, fell to non-significance ($r = +0.09$; $p = .487$). Joint angles, pelvic rotation, peak knee extension velocity, and the proximal-to-distal sequencing index were statistically indistinguishable across age cohorts and maturity groups (all $p \geq .08$; all $\eta^2(2) \leq 0.11$). Hierarchical regression confirmed this dissociation: maturity and body size explained 73.1% of the variance in ball speed, with the addition of kinematic variables producing no significant increment ($\Delta R(2) = 0.009$; $p = .957$). Conclusion: Biological maturation acts on the magnitude of velocity output produced by the instep kick but does not reorganise its kinematic structure. The kinematic organisation of the kick appears to be largely consolidated before academy entry, with subsequent maturation enhancing physical scaling rather than coordinative refinement. Ball-speed assessments used in youth talent

identification predominantly index physical maturation rather than maturation-independent technical skill.

Keywords: Keywords: instep kick; soccer biomechanics; biological maturation; markerless motion capture; talent identification; youth football; proximal-to-distal sequencing

Lower-body isometric force-time characteristics discriminate team ranking in U18 basketball players better than jump performance

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Abstract

Introduction

This study examined differences in neuromuscular performance among U18 male basketball players from teams with different competitive rankings (top-, mid-, and bottom-ranked).

Methods

Thirty-one players completed countermovement jump (CMJ), isometric mid-thigh pull (IMTP), and 20-m sprint testing. CMJ force-time variables were classified according to the Person–Outcome–Driver–Strategy framework. Significant group effects were observed for CMJ variables, including modified reactive strength index (mRSI), braking phase metrics, and time-metrics ($p \leq 0.05$), as well as for IMTP peak force, relative peak force, and 20-m sprint time ($p \leq 0.05$).

Results and Conclusions

The top-ranked team demonstrated greater maximal force production, higher braking phase force and impulse, and shorter time to takeoff compared with lower-ranked teams. In contrast, no significant differences were found in CMJ jump height. The mid-ranked team consistently displayed less favourable neuromuscular profiles, particularly in time-dependent variables. These findings indicate that neuromuscular characteristics related to maximal force production and rapid force application are more sensitive discriminators of team ranking than traditional outcome measures. Assessment of force-time metrics may provide greater insight into performance differences in youth basketball players.

Keywords: maximum strength; reactive strength index; countermovement jump; neuromuscular; power; athlete development

Acute Effects of Caffeine Gum Use on Volleyball Performance: A Randomized, Placebo-Controlled Crossover Trial Comparing Single and Partial-Dose Administration

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Abstract

Introduction

Caffeinated gum may provide a practical strategy for rapid caffeine delivery in volleyball, but its effects on sport-specific skill performance and whether partial-dose administration offers additional benefits remain unclear.

Methods

Eleven national-level female volleyball players (mean±SD age: 28±4 y, BMI: 21±1 kg·m⁻²; all habitual caffeine consumers) participated in three 2-hour testing sessions, chewing for 5 minutes a single dose (3 pieces of gum=300 mg of caffeine), a partial dose (100 mg of caffeine gumx3 at 30-minute intervals), or a placebo gum (3 pieces) in randomized order. VJ and RPE before and after the testing sessions, HR during the testing sessions, and the efficiency (%) of attacking, blocking, and defensive skills during a 30-minute volleyball-specific skill game within the sessions were compared between the conditions.

Results and Conclusions

Block efficiency was significantly lower with partial dose caffeine gum than with placebo ($p=0.031$; $d=-1.17$), and attack efficiency was significantly higher with partial dose caffeine gum than with placebo ($p=0.044$; $d=1.47$). Although the differences were not statistically significant, there was an increase in RPE ($d=0.060$) and a decrease in VJ ($d=0.106$) during the placebo gum condition compared to the other conditions. Caffeinated gum, at the tested dose and protocol, did not have a significant ergogenic effect on RPE, VJ, HR, and defense efficiency. However, caffeinated gum affected attack efficiency positively, but adversely affected block efficiency in trained female volleyball players. It is recommended that caffeinated gum be used in volleyball, particularly for skills, with caution, depending on the position and individual response.

Keywords: Caffeinated Gum, Volleyball Performance, Partial-Dose

Effects of two advanced footwear technology shoes on durability in trained male runners

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Abstract

Introduction

This intervention aimed to investigate the physiological and performance changes during a 1-hour effort and their influence on the subsequent graded exercise test (GXT) to exhaustion, comparing two advanced footwear technology (AFT) shoes in trained male runners.

Methods

Twelve male trained runners (World Athletics [WA] score: 820.8 ± 107.3 points) performed, in a randomized-counterbalanced design, a GXT until VT¹ speed determination, followed by a 1-hour effort at +10% VT¹ speed, and lastly a GXT until exhaustion on two different visits separated by 7-10 days with different AFT shoes (Cloudbloom Strike [CS] and Cloudbloom Echo 3 [CE]). Metabolic and auto-perceived parameters were monitored throughout.

Results and Conclusions

No shoe*time interaction effect was found during the 1-hour effort test, however participants exhibited an increase in heart rate ($p < 0.001$), RPE ($p < 0.001$), and a reduction in respiratory exchange ratio (RER) ($p < 0.01$), carbon dioxide production ($p < 0.05$), and a shift in substrate utilization from carbohydrate oxidation to fat oxidation ($p < 0.05$), irrespective of the shoe model. During the GXT, participants using CS condition achieved higher peak speed ($p < 0.05$) and higher VT² speed ($p < 0.05$) compared to the CE, also less RER was achieved at VT² with CS ($p < 0.05$). Conclusions: a 1-hour effort at +10% VT¹ speed increases cardiovascular strain and RPE, with an increase in fat oxidation without influence of the shoes used. During the GXT test, participants had higher peak velocity and higher VT² velocity when using CS than using CE.

Keywords: Marathon, endurance performance, durability

The Relationship Between Oromotor Profile and Mealtime Behavior in Children with Autism Spectrum Disorder

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Abstract

Introduction

Children with autism spectrum disorder (ASD) frequently experience mealtime behavior problems, often linked to underlying oromotor dysfunction. These challenges may negatively affect nutritional intake, growth, and family routines. Clarifying the relationship between oromotor function and nutrition habits may support more effective clinical interventions. This study presents preliminary data examining the relationship between oromotor profiles and mealtime behaviors in children with ASD.

Methods

A gender-balanced sample of 64 children with ASD (32 male, 32 female), aged 3 to 8 years (4.70 ± 1.14 years), was evaluated using the Brief Autism Mealtime Behavior Inventory (BAMBI) and the Oral Motor Assessment Scale (OMAS). Descriptive statistics, Pearson correlations, and linear regression were performed.

Results and Conclusions

The mean BAMBI score was 43.3 ± 10.6 , and the mean OMAS score was 45.8 ± 10.5 . Average weight was 17.30 ± 3.94 kg, and height was 107 ± 8.01 cm. No significant gender differences were found in age, height, weight, or OMAS scores. However, BAMBI scores were significantly higher in females than males ($p < .01$, Cohen's $d = -1.08$), indicating more pronounced mealtime difficulties among girls. BAMBI scores were negatively correlated with OMAS ($r = -0.256$, $p = .041$), age ($r = -0.354$, $p = .004$), weight ($r = -0.372$, $p = .002$), and height ($r = -0.269$, $p = .031$). Simple linear regression showed that OMAS scores significantly predicted BAMBI scores, $F(1, 62) = 4.33$, $p = .041$, explaining 6.6% of the variance ($R^2 = 0.065$). The negative regression coefficient ($\beta = -0.256$) indicates that better oromotor function is modestly associated with fewer problematic mealtime behaviors. Preliminary findings suggest that lower oromotor function and younger age are associated with more problematic mealtime behaviors in children with ASD. These findings highlight the importance of including oromotor assessments in feeding evaluations and interventions for this population.

Keywords: Autism Spectrum Disorder, Oromotor Function, Nutritional Status, Biomechanics

Effects of *Miconia albicans* supplementation on biomechanical variables and body temperature in Paralympic powerlifting athletes

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Abstract

Introduction

Paralympic powerlifting requires high levels of neuromuscular performance and recovery capacity, increasing interest in nutritional strategies with ergogenic potential. This study investigated the effects of acute supplementation with *Miconia albicans* on biomechanical variables and skin temperature in Paralympic powerlifting athletes.

Methods

Thirteen nationally ranked Paralympic athletes participated in a randomized, crossover, and counterbalanced design, comparing placebo and supplementation with *Miconia albicans* (10 mg/kg). Dynamic strength performance was assessed using an encoder during bench press protocols with loads of 80% and 45% of one-repetition maximum (1RM), while skin temperature was evaluated by infrared thermography before, immediately after, and during recovery periods.

Results and Conclusions

No significant differences were observed for mean propulsive velocity or power at 80% of 1RM; however, maximum velocity showed a significant improvement during the second set after supplementation. At 45% of 1RM, no significant differences were found in biomechanical variables, although mean propulsive velocity showed a trend toward significance. Thermal analysis revealed a significant increase in temperature only in the sternal chest region, especially after 48 hours. Acute supplementation with *Miconia albicans* promoted localized ergogenic effects on neuromuscular performance and altered thermal responses, suggesting potential physiological modulation during recovery, although the effects were not sustained across all outcomes evaluated.

Keywords: Para-athletes; Melastomataceae; Substances for Performance Enhancement; Thermography

Effects of *Miconia albicans* supplementation on biomechanical variables and body temperature in Paralympic powerlifting athletes

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Abstract

Introduction

Paralympic powerlifting requires high levels of neuromuscular performance and recovery capacity, increasing interest in nutritional strategies with potential ergogenic effects. This study investigated the effects of acute supplementation with *Miconia albicans* on biomechanical variables and skin temperature in Paralympic powerlifting athletes.

Methods

Thirteen nationally ranked Paralympic athletes participated in a randomized, crossover, and counterbalanced design, comparing placebo and *Miconia albicans* supplementation (10 mg/kg). Dynamic strength performance was assessed using an encoder system during bench press protocols at 80% and 45% of one-repetition maximum (1RM), while skin temperature was evaluated by infrared thermography before, immediately after, and during the recovery periods.

Results and Conclusions

No significant differences were observed in propulsion speed or average power at 80% 1RM; however, maximum speed showed a significant improvement during the second set after supplementation. At 45% of 1RM, no significant differences were found in biomechanical variables, although average propulsion speed showed a tendency toward significance. Analysis of skin temperature revealed significant increases only in the sternal chest region after supplementation, especially after 48 hours. Acute supplementation with *Miconia albicans* promoted localized ergogenic effects on neuromuscular performance and altered thermal responses, suggesting possible physiological modulation during recovery, although the effects were not sustained across all evaluated outcomes.

Keywords: Para-athletes; Melastomataceae; Substances for Performance Enhancement; Thermography

Interoception, Nutrition, and Physical Activity: A Dynamic Feedback Loop

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Abstract

Introduction

Interoception is the process by which the nervous system perceives and interprets physiological signals from within the body, such as hunger, satiety, and heartbeat, to maintain homeostasis. Based on this concept, this study aims to synthesize the interactions between interoception, physical activity (PA), and nutrition.

Methods

This review was conducted by searching PubMed and Google Scholar databases. Keywords included "Interoception," "Physical Activity," "Exercise," "Nutrition," "Diet," "Intuitive Eating," and "Homeostasis." The analysis focused on original research, randomized controlled trials, critical reviews, systematic reviews, and meta-analyses published in the last 10 years (2015–2025). How exercise intensity, fasting protocols, and specific dietary habits modulate interoceptive accuracy and metabolic awareness was evaluated.

Results and Conclusions

Physical activity functions within a dynamic feedback loop that modulates interoception at both acute and chronic levels. Exercise increases the intensity of visceral signals, such as heart rate and dyspnea, allowing these physiological data to be perceived more sensitively and clearly by the interoceptive system. However, while theoretical models predict that exercise will increase cardiac interoceptive accuracy, there are significant contradictions in the literature. It is suggested that the underlying reasons for these inconsistencies are the variety of methodologies used in studies, the types of interoceptive tasks, and the demographic characteristics of participant groups. Regarding nutrition, it has been determined that time-restricted feeding increases heart rate variability and objective interoceptive accuracy; the Mediterranean diet supports high cognitive awareness, while Western-style diets rapidly impair interoceptive sensitivity. In this context, the development of interoceptive sensitivity may be a clinical intervention strategy that strengthens metabolic homeostasis and supports psychological well-being. Future experimental studies in this field will contribute to personalized treatment protocols in preventive medicine, healthy aging, and athlete health.

Keywords: Interoception, Diet, Exercise, Nutrition, Physical Activity.

Influence of Plantaris Muscle Morphology on Plantar Flexor Muscle Strength

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Abstract

Introduction

The plantaris is a small muscle of the posterior leg compartment, present in 80–93% of the adult population, with notable morphological variability between individuals. Anatomically, it shares its distal insertion at the calcaneus with the Achilles tendon, in close relation to the soleus and gastrocnemius. Whether its belly size relates to plantar flexor strength has not been previously quantified.

Methods

Cross-sectional exploratory study with 49 adults (29 women, 20 men; mean age 32.0 ± 12.5 years) confirmed to have a plantaris muscle present. Muscle belly thickness and CSA were measured via ultrasound (V-scan Air CL, GE HealthCare) in transverse plane at the upper third of the leg. Maximum isometric plantar flexion strength was assessed bilaterally using an Active Force 2 dynamometer, with knee extended for the gastrocnemius and knee flexed for the soleus. Pearson correlations were calculated ($\alpha = 0.05$).

Results and Conclusions

Mean plantaris thickness was 1.21mm and mean CSA was 2.16 cm^2 . Mean maximum strength was 229 N for the gastrocnemius and 204 N for the soleus. Plantaris belly size correlated significantly with soleus strength ($r = 0.45$ for thickness; $r = 0.42$ for CSA; $p < 0.01$), but not with gastrocnemius strength ($r = 0.18$ and $r = 0.16$, respectively). Conclusions: A larger plantaris muscle belly is significantly associated with greater soleus isometric strength, but not with gastrocnemius strength, suggesting a muscle-specific functional link. The plantaris does not appear functionally inert — its morphology may reflect a selective contribution to postural plantar flexion alongside the soleus.

Keywords: plantaris muscle, ultrasound, plantar flexion, isometric strength, muscle morphology.

Impact of the menstrual cycle phases in the metabolic rate in physically active women

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Abstract

Introduction

Obesity is an important health problem in the population because it is related to illness and reduced in the life expectancy and quality of life in adults and older people even in paediatric and adolescent populations. Obesity is defined as an excess of fat mass which reflects a higher energy ingestion than daily energy expenditure (EE). The main factor of the daily EE is the basal metabolic rate. Physical activity is proposed as an effective preventive factor for developing obesity because increases EE and increase basal metabolic rate. However it is considered that men present an increased metabolic rate in comparison with women, it has not been studied so much the impact of the different phases of the menstrual cycle (PMC) in the metabolic rate. Therefore, this study is going to analyse the impact of the PMC in the metabolic rate in a group of physically active women.

Methods

14 physically active female in a range from 20 to 26 years old attended to the Sports Sciences Laboratory of the University of Seville 6 times including one experimental session during the follicular, ovulatory and luteal phases over 2 consecutive menstrual cycles. In each experimental session using a calibrated gas exchange analyser (ENDO Medical, Palo Alto, CA) was performed a metabolic rate test of a duration of 15 minutes. It was extracted the mean of the last 5 minutes of the next variables: VO₂, VCO₂, VE, VE/VO₂, VE/VCO₂, RER, EE, and MET. A repeated measures analysis of variances (RM-ANOVA) was performed including the intra-subject factors PMC (follicular vs ovulatory vs luteal phases), Cycle (1st vs 2nd cycle) and the interaction PMC·Cycle. Post-Hoc Bonferroni adjustment was performed. Statistical differences were fixed up as $p < 0.05$.

Results and Conclusions

PMC reflected to a trend to statistical effect to VO₂ ($p = 0.08$) including an increased value over the ovulatory phase in comparison to the follicular phase ($p = 0.03$). Also, Post-Hoc showed an increased RER over luteal phase vs follicular phase ($p = 0.04$). Additionally, it was detected a significant effect for Cycle in the outcomes VCO₂ ($p < 0.01$), VE ($p = 0.04$), VE/VO₂ ($p = 0.04$), RER ($p < 0.01$), and EE ($p = 0.04$). The results of the present study reflected that PMC impact in the metabolic rate including a reduced EE during the follicular phase in comparison to the ovulatory phase and a reduced RER in comparison with the luteal phase that means a preference to fat contribution to metabolic rate and a reduced contribution of carbohydrate in the follicular phase. Nevertheless, another important finding of this study is that exists an important effect of the Cycle that should

be interpreted as a variation of the metabolic rate during different menstrual cycles. Therefore, each menstrual cycle could induce to different EE and metabolic contributions reflecting a high heterogeneity in different menstrual cycle in a same woman. Therefore, it should be cautelous and avoid a standardization of EE and metabolic demands in the adolescent and adult female population.

Keywords: Energy Expenditure; Female Athlete; Metabolism; Physical Activity; Obesity.

Chronic Effects of Ischemic Preconditioning on Performance: A Systematic Review

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Abstract

Introduction

Chronic application of ischemic preconditioning (IPC) appears to enhance a late protective window with long-term adaptive effects on vascular function and muscle recovery (Bo et al., 2025), positively impacting performance. Purpose: To identify the effects of chronic IPC application on performance.

Methods

This systematic review followed the PRISMA guidelines (Page et al., 2021) and was registered on the PROSPERO platform (CRD420251139477). Searches were conducted in October 2025 in the PubMed, Scopus, Web of Science, Embase, and SportDiscus databases, with the search led by researchers NRR and JVSM. The search strategy was developed using a combination of the keywords (“ischemic preconditioning”) AND (“resistance training” OR “sports” OR “sham treatment” OR “control”) AND (“muscle strength” OR “neuromuscular adaptation” OR “power output” OR “performance”). After the selection process conducted using Rayyan software, 18 articles comprised the review.

Results and Conclusions

Results and discussion: In general, studies found increases in VO₂max, maximum and average power, a reduction in the fatigue index, and superior gains in 1RM. Evidence of positive effects on the performance of swimming and running athletes. However, there were variations in IPC protocols. In the application of IPC with 3, 4, and 5 ischemia/reperfusion cycles, the cuff pressure varied from 50 mmHg above systolic blood pressure (SBP), to 220 and 250 mmHg. Regarding the number of sessions, it varied from 3, 7, and 10 consecutive days of applications to applications twice a week for 2, 4, or 6 weeks and applications three times a week for 8 weeks. Conclusion: Chronic IPC appears to induce positive adaptations for performance, as well as in endothelial function, mitochondrial oxidative capacity, and modulation of the inflammatory response, resulting in greater training volume and protection against fatigue.

Keywords: Fatigue recovery, anti-inflammatory, VO₂ max, performance

Acute effect of ischemic preconditioning on Fran performance time and hemodynamic responses in cross-training practitioners.

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Abstract

Introduction

Objective: To investigate the acute effect of ischemic preconditioning on Fran performance time, heart rate, systolic blood pressure, and diastolic blood pressure.

Methods

Twelve men participated in 3 visits. One was a familiarization visit, followed by two randomized sessions: a) IPC (3 x 5 min. 220 mmHg) + 30 min. interval + Fran; b) SHAM (3 x 5 min. 20 mmHg) + 30 min. + Fran. Heart rate (HR), systolic blood pressure (SBP), and diastolic blood pressure (DBP) were measured at rest and at the 1st, 5th, and 10th min. of recovery using ambulatory blood pressure monitoring. Fran is a crosstraining workout consisting of completing 21-15-9 Reps For Time of thrusters (95 lb) and pull-ups in the shortest possible time. Two-way ANOVA was used. A p-value ≤ 0.05 was adopted.

Results and Conclusions

Results: A reduction in heart rate (HR) was observed at all three recovery time points, with no significant difference between IPC/SHAM. Systolic blood pressure (SBP) was reduced in IPC at the 1st minute of recovery. Diastolic blood pressure (DBP) was reduced in IPC at the 5th minute of recovery. No statistically significant difference was found in Fran performance time. Conclusion: Despite not showing a statistically significant difference in Fran performance time, the IPC group showed more efficient hemodynamic responses (HR, SBP, and DBP). In practical terms, its main benefit would not be an immediate improvement in performance, but rather the promotion of faster cardiovascular recovery with less hemodynamic overload. This finding encourages the use of IPC in multi-stage training and competitions, where more efficient recovery between workouts can contribute to maintaining performance and reducing the risk of accumulated cardiovascular fatigue.

Keywords: Performance, Hemodynamics, Vascular Occlusion

ANTHROPOMETRIC CHARACTERISTICS AND RACE SPEED IN A 16-KM OFF-ROAD RUNNING RACE

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Abstract

Introduction

Off-road running (ORR) performance is influenced by physiological, biomechanical, technical, tactical, and terrain-related factors. Although performance cannot be explained by isolated characteristics, anthropometric variables may provide useful information in short-distance events, in which body dimensions may be related to running speed. This study aimed to analyze the associations between body mass, height, body mass index (BMI), and race speed in a 16-km ORR race, considering the total sample and sex-specific subgroups.

Methods

Fifty runners who completed a 16-km ORR race were included. The race was held on a 16-km loop course, with the start and finish at the same location, totaling 307 m of elevation gain and 307 m of elevation loss. The sample was analyzed as a total group and stratified by sex: men ($n = 37$) and women ($n = 13$). Race speed was expressed as average speed over the 16-km course ($\text{km} \cdot \text{h}^{-1}$). Anthropometric variables included body mass (kg), height (m), and BMI ($\text{kg} \cdot \text{m}^{-2}$). Data normality was assessed using the Shapiro-Wilk test, and associations were analyzed using two-tailed Spearman's rank correlation coefficients.

Results and Conclusions

In the total sample, average race speed was negatively correlated with BMI ($\rho = -0.381$; $p = 0.006$), but not with body mass ($\rho = -0.081$; $p = 0.576$) or height ($\rho = 0.155$; $p = 0.284$). Among men, race speed was negatively correlated with body mass ($\rho = -0.556$; $p < 0.001$) and BMI ($\rho = -0.553$; $p < 0.001$), while no significant association was observed with height ($\rho = -0.218$; $p = 0.194$). Among women, race speed was positively correlated with height ($\rho = 0.655$; $p = 0.018$) and negatively correlated with BMI ($\rho = -0.703$; $p = 0.009$), whereas body mass was not significantly associated with race speed ($\rho = -0.157$; $p = 0.606$). BMI was the anthropometric variable most consistently associated with 16-km ORR race speed, showing negative correlations in the total sample and both sex-specific subgroups. These findings suggest that anthropometric characteristics may be related to short-distance ORR performance in a sex-specific manner. However, they should be interpreted cautiously, particularly in women, due to the smaller sample size and exploratory nature of the analysis.

Keywords: athletic performance; body mass index; endurance running; sex differences.

Influence of Match Location on Technical-Tactical Performance in La Liga Santander (2022–2023)

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Abstract

Introduction

Introduction. Playing at home and having the support of the fans creates a feeling of territoriality in players, which allows them to perform more intense efforts and achieve more shots (Medina et al., 2019). It has also been shown that it affects referees' decisions, favoring the Home team rather than the Away team (Wühr et al., 2025). Therefore, understanding the effect of Home Advantage on soccer performance helps identify social factors that coaching staff should pay attention to. Thus, the aim of this study was to analyze the influence of match location on Performance Indicators (PI) during a Spanish La Liga season.

Methods

Methodology. A total of 380 matches from the Spanish first division during the 38 matchdays of the 2022/23 season were analyzed, resulting in 760 cases. This soccer league includes 20 teams competing in a double round-robin format. Match Location (Home or Away) was used as the independent variable, while the PI were used as the dependent variables. The data were obtained from different websites (<https://es.besoccer.com/>, <https://www.sofascore.com/es/>, <https://www.flashscore.es/>). A Mixed Linear Model (MLM) was performed controlling for the random effect of the participating teams using Jamovi 2.4.7 software (R Core Team, 2022; The Jamovi Project, 2023).

Results and Conclusions

Results and Discussion. The MLM results for the random factor Team and the fixed factor Match Location were statistically significant in nine PI ($p < .05$), with an AIC ranging from 2337 to 9386. Effect sizes ranged from .14, indicating a moderate effect for throw-ins, to .69, indicating a large effect for shots (moderate effect= one variable; large effect= nine variables). The adjusted model for the random factor was statistically significant in the nine variables that showed significant differences. These variables presented a marginal R^2 between .01 and .10, a conditional R^2 between .08 and .47, and an ICC between .07 and .49 ($p < .05$), indicating that the individual response of the teams was different. The results of this study showed that Home teams performed more attacking actions than Away teams in most of the PI analyzed, except for goals conceded. Fernández-Cortés et al. (2020) also found that Home teams tried to maintain the offensive initiative against their opponents, increasing the possibility of achieving a favorable result. Specifically, it has been shown that forwards and midfielders perform better when playing at home, while defenders commit more fouls when playing away (Chacón-Fernández et al., 2025). These findings confirm that Home teams have an advantage that allows them to better develop their

offensive play and control the pace of the match. In addition, it is evident that other factors, such as specific playing positions, could also influence sports performance. Conclusions. The findings of this study allow us to conclude that, during the 38 matchdays of the 2022/23 La Liga Santander season, Home teams maintained a more offensive playing style than Away teams. These results are consistent with previous research on Home Advantage in different high-level men's soccer competitions. Finally, it is recommended that future studies continue this line of research by including variables such as playing positions, final ranking, and match outcome.

Keywords: europe, soccer, match location

Influence of the menstrual cycle in the metabolic and cardiorespiratory response to submaximal exercise in physically active women

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Abstract

Introduction

Over the phases of the menstrual cycle (PMC) fluctuates neuroendocrine response at rest and response to exercise. During follicular phase estrogens, progesterone and relaxine level are small increasing their level 3 days before ovulation. At the 36-48 hours post-ovulation is reached the peak of follicle-stimulating hormone (FSH) and luteinizing hormone (LH). Over the luteal phase progesterone is progressively increased and FSH and LH decreased. For example, strogens are related with an increased glycogen repletion and lipid oxidation while progesterone presents antiestrogens effects. Considering that an incremental gradual exercise test cycling and running is considered the gold standard test for assessing cardiorespiratory and metabolic response to exercise; the aim of the present study was to analyse the effect of the 3 PMC in the main cardiorespiratory and metabolic outcomes in a progressive incremental test in cycle ergometer in a sample formed by physically active women.

Methods

14 physically active women (age: from 20 to 26 years) performed progressive incremental test in cycle ergometer test (increasing 15 W per minute until exhaustion) monitored by a heart rate and gas exchange analyser 6 times: during the follicular, ovulatory and luteal phase in 2 consecutives menstrual cycles. For the analyses were used the medium of all the outcomes assessed during each minute of work from 15 W until 105 W which was the maximum workload reached by all the participants. The outcomes assessed were the next: VO_2 , VCO_2 , VE, VE/VO_2 , VE/VCO_2 , RER, EE, MET, hear rate (HR) and rate of perceived exertion (RPE). An intra-subject repeated measures analysis of variances (RM-ANOVA) for the next 3 factors: PMC (follicular vs ovulatory vs luteal phases), Cycle (1st vs 2nd cycle) and Workload (15 W – 30 W – 45 W – 60 W – 75 W – 90 W – 105 W) as the interaction PMC·Cycle·Workload. For the pairwise comparison was performed Bonferroni adjustment. Significant differences were fixed up as $p < 0.05$.

Results and Conclusions

PMC induced to a statistically significant difference in VCO_2 ($p < 0.05$), VE ($p < 0.05$) and RER ($p = 0.01$) with lower levels during ovulatory phase in comparison with follicular phase in VCO_2 ($p = 0.01$), VE ($p < 0.01$) and RER ($p = 0.01$). Also, it was detected significant differences in VE/VO_2 for MCP with lower levels in the ovulatory phase in comparison with the follicular ($p < 0.01$) and luteal phase ($p < 0.01$). Additionally, it was detected a significant effect for the factor Cycle in VCO_2 ($p = 0.04$) and RER ($p < 0.05$)

while it was detected statistical differences for all the outcomes assessed for the factor Workload ($p < 0.01$). According to the results, the conclusions of this study are the next: i) ovulatory phase is characterized by a reduced RER, VCO₂ and VE in comparison with follicular phase which reflect a higher contribution of the lipid metabolism and reduced ventilatory demands; ii) ventilatory efficiency is increased during ovulatory phase in comparison with follicular and luteal phases; iii) cardiorespiratory and metabolic demands could be different in each menstrual cycle.

Keywords: Economy; Endurance; Exercise Physiology; Female Athlete; Sport.

The Potential Role of D-Ribose as an Athlete Supplement in the Management of Fibromyalgia

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Abstract

Introduction

Fibromyalgia (FM) is a complex syndrome characterized by widespread musculoskeletal pain, chronic fatigue, and cognitive dysfunction, in which mitochondrial dysfunction and impairments in cellular energy metabolism play a fundamental role in its etiology. D-ribose, known as an ergogenic support in sports nutrition, is a five-carbon monosaccharide that forms the structural basis of energy-carrying molecules such as ATP, NAD⁺, and FAD. The aim of this study is to evaluate the biochemical effects of D-ribose on mitochondrial ATP synthesis and its potential therapeutic role in the management of fibromyalgia symptoms in light of current literature.

Methods

The PubMed, Google Scholar, Web of Science, and Scopus databases were searched using the keywords "D-ribose," "fibromyalgia," "mitochondrial dysfunction," and "ATP synthesis." The data obtained were analyzed in terms of the molecule's metabolic pathways, clinical efficacy, safety profile, and interaction with complementary therapies.

Results and Conclusions

It is observed that after entering the cell, D-ribose is phosphorylated to ribose-5-phosphate (R-5-P) via the ribokinase enzyme and activates nucleotide salvage pathways by accelerating phosphoribosyl pyrophosphate (PRPP) synthesis. Metabolomic analyses performed in FM patients confirm low ATP levels; it is reported that D-ribose supplementation closes this energy gap, providing significant improvement in energy levels and quality of life. From an ergogenic perspective, it is observed that it supports aerobic capacity by increasing ATP concentration in cardiomyocytes and reduces lactic acid accumulation after exercise. Regarding the safety profile, it is stated that daily intakes within certain ranges are considered safe by EFSA, but excessive intakes may pose a risk of temporary hypoglycemia. D-ribose stands out as a rational metabolic agent in FM management with its mechanism of directly supporting mitochondrial function. Its positive effects on exercise intolerance and chronic muscle fatigue in particular indicate that this supplement can offer an integrated treatment approach with sports nutrition principles.

Keywords: ATP Synthesis, D-ribose, Fibromyalgia, Supplements.

Bone mineral density and associated factors in physically active adults with Down syndrome.

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Abstract

Introduction

Down syndrome (DS) is a genetic condition caused by trisomy of chromosome 21, which is associated with reduced muscle mass and changes in bone mineral density, thereby increasing the risk of osteoporosis. However, there is limited evidence regarding bone health in physically active adults with DS. The objective of this study was to determine the prevalence of osteoporosis and osteopenia, as well as to analyze the factors associated with femoral neck bone mineral density (BMD-FN).

Methods

A cross-sectional study was conducted in 50 physically active adults with Down syndrome aged 20 years or older. Dual-energy X-ray absorptiometry (DXA) was performed to determine BMD-CF and total lean mass. Osteoporosis was defined as a BMD-CF T-score ≤ -2.5 and osteopenia as a T-score between -1.0 and -2.5 , according to World Health Organization criteria. Descriptive analyses and comparisons by sex were performed, as well as a multiple linear regression with BMD-CF as the dependent variable and age, sex, and total lean mass as independent variables.

Results and Conclusions

The study population had a mean age of 30.68 (7.42) years, a total lean body mass of 40.82 (7.53) kg, and a T-score for BMD-CF of -1.28 (1.24). The prevalence of osteoporosis was 14.0% and that of osteopenia was 40.0%, with no significant differences observed by sex in the diagnostic categories. However, the BMD-CF T-score was significantly lower in men [-1.512 (1.046)] than in women [-0.900 (1.455)] ($p = 0.019$). In the multivariate analysis, DMO-CF was significantly associated with age, sex, and total lean body mass ($R = 0.521$; $R^2 = 0.271$; adjusted $R^2 = 0.224$; $p = 0.002$). Age showed a negative association with BMD-CF ($B = -0.006$; $\beta = -0.292$; $p = 0.027$), whereas sex ($B = 0.108$; $p = 0.028$) and total lean mass ($B = 1.177 \times 10^{-5}$; $\beta = 0.587$; $p < 0.001$) were positively associated with BMD, with total lean mass being the model's strongest predictor. Physically active adults with Down syndrome have a high prevalence of bone health disorders. Male gender was associated with lower BMD-CF, while higher total lean mass was associated with higher BMD-CF values. These findings underscore the importance of designing specific physical exercise interventions aimed at maintaining or increasing muscle mass, in order to promote bone and musculoskeletal health in this population.

Keywords: Down syndrome; bone mineral density; osteoporosis; osteopenia; body composition; muscle mass.

Ergogenic Supplementation in Female Soccer Players: A Scoping Review of Caffeine, Creatine, and Beta-Alanine.

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Abstract

Introduction

The professionalization of women’s soccer has increased the physical and physiological demands placed on players, highlighting the potential role of ergogenic aids such as caffeine, creatine, and beta-alanine. However, the extent, quality, and female-specific applicability of the available evidence in female soccer players remain unclear.

Methods

A scoping review was conducted following Joanna Briggs Institute guidance and PRISMA-ScR recommendations. PubMed, Scopus, and Web of Science were systematically searched in March 2026. Experimental and quasi-experimental studies involving female soccer players and assessing performance or physiological outcomes related to caffeine, creatine, or beta-alanine supplementation were included. Data were descriptively synthesized, and methodological quality was critically appraised using JBI tools.

Results and Conclusions

Ten studies were included (caffeine n=3; creatine n=4; beta-alanine n=3). Evidence was limited and heterogeneous, with small samples, varied protocols, diverse outcomes and frequent co-interventions. Methodological quality was generally low due to small samples, inconsistent blinding and poor control of female-specific variables. Caffeine showed some acute benefits in high-intensity performance, though often within multi-ingredient supplements. Creatine appeared promising for repeated high-intensity performance and strength, especially with training, and showed good safety. Beta-alanine results were inconsistent. Female-specific factors, such as menstrual cycle phase or contraceptive use, were rarely reported.

Keywords: Female soccer; ergogenic aids; caffeine; creatine; beta-alanine; sports nutrition.

Effects of Isolated L-Leucine Supplementation on Strength and Power Outcomes in Physically Active Adults: A Systematic Review and Meta-Analysis

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Abstract

Introduction

L-leucine is a key regulator of muscle protein synthesis through activation of the mTORC1 pathway. Although acute anabolic signaling responses to leucine supplementation are well established, its isolated effects on functional performance outcomes in healthy and physically active adults remain unclear. Previous studies have reported inconsistent findings, particularly when dietary protein intake is already adequate. Therefore, this systematic review and meta-analysis aimed to determine whether chronic isolated L-leucine supplementation improves strength- and power-/sprint-related performance outcomes in physically active adults and athletes.

Methods

A systematic review and meta-analysis were conducted according to PRISMA 2020 guidelines. Five electronic databases (PubMed, Web of Science, Scopus, CENTRAL, and SPORTDiscus) were searched from inception to November 2025. Randomized controlled trials investigating isolated L-leucine supplementation for at least four weeks in healthy, physically active adults were included. Outcomes related to muscular strength, anaerobic power, and sprint performance were extracted. Risk of bias was assessed using the RoB 2 tool, and pooled effect sizes were calculated using random-effects models (Hedges' g).

Results and Conclusions

Eight randomized controlled trials involving 214 participants met the inclusion criteria. Pooled analyses revealed small but statistically significant effects favoring L-leucine supplementation for strength-related outcomes ($g = 0.23$; 95% CI: 0.05–0.41) and power-/sprint-related outcomes ($g = 0.31$; 95% CI: 0.05–0.57). Effects were more evident in untrained or recreationally active individuals and during longer supplementation protocols, whereas trained athletes generally showed trivial benefits. Overall, isolated L-leucine supplementation appears to produce modest and context-dependent ergogenic effects, with limited practical relevance when protein intake and training are already optimized.

Keywords: L-leucine; amino acid supplementation; muscle strength; sprint performance; resistance training; sports nutrition; ergogenic aids; meta-analysis.

“Correlational Analysis between Lower Limb Power, Speed and Agility in Sports Students”

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Abstract

Introduction

This study aims to analyze the relationship between lower limb power, speed and agility in 3rd year Sports students. Given that sporting performance requires explosive actions, such as jumps, accelerations and sudden changes of direction, it is essential to understand to what extent the ability to produce explosive force influences motor performance in this sample.

Methods

This is a Descriptive-Correlational study, involving a sample of 23 male students with an average age of 21.43 ± 3.96 years, an average height of 176.15 ± 5.42 cm and an average weight of 74.15 ± 10.66 kg. 20-meter speed tests, agility tests using the T-Test and power tests using the Countermovement Jump (CMJ) and Squat Jump (SJ) were applied.

Results and Conclusions

The most important results revealed a strong positive correlation between the CMJ and the SJ ($r=0.954$), a strong negative correlation between the SJ and the 20-meter speed test ($r=-0.670$), and a strong negative correlation between the 20-meter and the T-Test ($r=-0.669$). It is concluded that there is a common neuromuscular basis for muscular power, that concentric strength is decisive for overcoming inertia in initial acceleration and that linear speed functions as a fundamental prerequisite for agility performance.

Keywords: Power, Agility, Speed, Correlation, Students.

Analysing the impact of the menstrual cycle in a gradual incremental test in physically active women

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Abstract

Introduction

Today exists a gender gap in the study of the response and adaption to exercise. This gap is explained by a reduced number of women as sample of the randomized clinical trials that have been the basis of the meta-analysis which support exercise recommendations by international institutions in Sports Medicine and Sport Sciences. For reducing this gap, guidelines propose: i) to reproduce studies focuses on men in samples formed by women; ii) to include futures studies samples formed by men and women making a comparison based on sex; iii) to include research teams formed by men and women; iv) to analyse the impact of menstrual cycle phases (MPC). In this context, in the assessment of endurance performance, the gradual incremental test is the gold standard methodology because that text detects the three more important physiological milestones: first and second ventilatory thresholds (VT¹ and VT²) and maximal oxygen consumption (VO₂max). Therefore, the aim of this study is to analyse the effect of the 3 PMC in VT¹, VT² and VO₂max in a gradual incremental test in cycle ergometer in a sample in a sample of physically active women.

Methods

16 physically active women went 6 times to the Sport Sciences Laboratory of the University of Seville for performing a gradual incremental test in cycle ergometer consisting of increasing 15 W every minute until exhaustion. During the test was monitored gas exchange using a gas analyser for detecting VT¹, VT² and VO₂max. Before the gradual incremental test, body composition was determined using an electric bioimpedance. Additionally, in a urine sample extracted in basal condition and post-exercise were determine luteinizing hormone (LH). A repeated measures analysis of variances (RM-ANOVA) with the intra-subject factor PMC (follicular vs ovulatory vs luteal phases) was determined. Also, it was calculated Bonferroni post-hoc. Statistical differences were fixed up as $p < 0.05$.

Results and Conclusions

It was identified statistical differences in LH levels ($p < 0.01$; $\eta^2 p = 0.49$) with higher levels in the ovulatory phase vs follicular ($p = 0.04$) and luteal phase ($p = 0.04$). Body composition was not different between the 3 PMC ($p > 0.05$). Regarding to the maximal endurance performance, it was not detected any effect in VO₂max ($p = 0.89$; $\eta^2 p < 0.01$) and time to exhaustion ($p = 0.80$; $\eta^2 p < 0.01$). In the submaximal endurance performance, it was not identified any difference in VT¹ ($p = 0.46$; $\eta^2 p = 0.05$); however, VT² was modulated by PMC ($p = 0.04$; $\eta^2 p = 0.20$) with a higher %VO₂max in the ovulatory vs luteal phase ($87.3 \pm 5.9\%$ vs $81.7 \pm 8.6\%$; $p = 0.03$). Although VO₂max is considered the most important

endurance performance marker for qualifying athletes of a same level of competency, VT¹ and VT² led to detect differences between athletes of a same group of level competency. Therefore, the results of this study present important practical applications because during ovulatory phase female athletes could be more competitive in endurance competitions and support higher demands in their endurance training sessions.

Keywords: Cycling; Endurance; Female Athlete; Sport Performance; VO₂max.

Hormonal impact on anterior cruciate ligament injury risk in female athletes: biochemical mechanisms, current evidence and clinical perspectives

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Abstract

Introduction

Female athletes face a 2 to 10 times higher risk of anterior cruciate ligament (ACL) rupture than their male counterparts in the same sport. Although anatomical and biomechanical factors are well documented, the role of menstrual cycle hormonal fluctuations as a modulator of injury risk remains understudied and lacks clinical consensus. Relaxin and estrogen have emerged as the primary hormonal candidates involved in the cyclical ligamentous vulnerability of the female athlete.

Methods

A narrative review with a systematized literature search was conducted in PubMed and Web of Science using the terms: relaxin, ACL injury, menstrual cycle, female athlete, estrogen, knee laxity, among others, combined with Boolean operators AND and OR. Systematic reviews, meta-analyses, scoping reviews and cohort studies published between 2014 and 2026 were included, provided full text was available and they analyzed the relationship between hormones, menstrual cycle and ACL injuries.

Results and Conclusions

The evidence identifies a two-phase hormonal sequence. During days 12–14, the estrogen peak inhibits collagen cross-linking by reducing lysyl oxidase activity and increases the expression of relaxin receptors in the ACL (Birt & McCarthy, 2023). Between days 21–24, the relaxin peak activates MMP-1 and MMP-13, degrading type I collagen and suppressing its synthesis (Parker et al., 2024; Berger et al., 2023). Athletes with serum relaxin above 6.0 pg/mL face a 4.4-fold higher rupture risk (Dragoo et al., 2011), and knee hyperextension increases significantly during the ovulatory phase alongside a decline in active neuromuscular control (Shagawa et al., 2021). Regarding oral contraceptives (OCs), studies prior to 2020 suggested a 20% risk reduction, but White et al. (2023), drawing on data from 5 million women, concluded that there is no high-quality evidence supporting their preventive use, as OCs only address passive laxity without correcting underlying neuromuscular deficits. The main limitation of the field remains the absence of analytical hormonal confirmation in most studies (Dos'Santos et al., 2023; MacMillan et al., 2024).

Keywords: Anterior cruciate ligament · Menstrual cycle · Relaxin · Estrogen · Female athlete · Joint laxity · Injury prevention · Sports physiotherapy

Assessment of Psychosocial Indicators Related to Gender in Paralympic Powerlifting Athletes

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Abstract

Introduction

Paralympic Powerlifting (PP) is a sport that, in addition to demanding high levels of physical performance, also requires psychosocial stability from its participants.

Methods

: This is a cross- sectional study. Forty Paralympic powerlifting athletes of both sexes were selected . Data collection took place before a national-level competition organized by the Brazilian Paralympic Committee (CPB). The questionnaires used were: SF-36 (quality of life), BDI-II (depressives), STAI (state-trait anxiety), POMS (mood profile), and CSAI-2 (pre -competitive anxiety).

Results and Conclusions

Results: No significant differences were found in the Beck Depression Inventory. Using the POMS (Mood Profile) instrument, a slight increase in mood levels was observed among female athletes (men 101.67 ± 1.62 and women 103.21 ± 2.61 , $p = 0.035$, Cohen's $d = 0.720$, moderate effect). In Pre -Competitive Anxiety (CSAI-2 questionnaire), a difference was observed between men (28.68 ± 5.82) and women (23.61 ± 6.50 , $p = 0.037$, Cohen's $d = 0.712$, moderate effect) only in Self-Confidence, with male athletes showing greater self-confidence. Conclusion : The data demonstrated that women showed a higher mood profile compared to men. In contrast, men exhibited greater self-confidence and emotional stability in the competitive setting. Broadly speaking, participation in Paralympic powerlifting proved beneficial for the mental health and quality of life of the athletes. These results highlight the importance of ongoing psychological support in high-performance Paralympic sport.

Keywords: Paralympic powerlifting; athletes; mental health.

The influence of the menstrual cycle on fatigability during a full squat resistance-training protocol.

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Abstract

Introduction

Hormonal fluctuations which are related to the development of strength, such as luteinizing hormone (LH), follicle-stimulating (FSH), progesterone and oestrogens, throughout the different phases of the menstrual cycle (MC), could affect the development of fatigue originated in women. Knowledge of the impact of menstrual cycle on the fatigability of resistance training in females athletes is very important, since it could determine the response and neuromuscular adaptation of the training stimulus. The aim of this research was to analyse the influence of the menstrual cycle on the fatigability produced by a full squat resistance training protocol with 60% of a maximum repetition in physically active women.

Methods

Seven eumenorrheic women (age: $21,7 \pm 4.3$ years, height: 162 ± 6.4 cm, body mass: $63,05 \pm 7,36$ kg) participated and completed three sessions of one set of ten repetitions at 60% of one-repetition maximum (1RM), distributed across each phase of their MC: Early follicular phase, ovulatory phase and luteal phase. The protocol consisted of performing 10 continuous repetitions during which the mean propulsive velocity of each repetition (MPV-10), velocity loss (VL-10) and the slope of the regression line were recorded.

Results and Conclusions

No statistically significant differences were found between the different phase of the MC in relation to MPV-10, VL-10, or the linear regression slope used to estimate fatigability ($p > 0,05$). Nevertheless, a tendency toward higher MPV-10 was observed during the luteal phase (luteal phase MPV-10 = $0,68 \text{ m}\cdot\text{s}^{-1}$), compared to the ovulatory phase (ovulatory phase MPV-10 = $0,67 \text{ m}\cdot\text{s}^{-1}$) and the follicular phase (follicular phase MPV-10 = $0,65 \text{ m}\cdot\text{s}^{-1}$). In conclusion, hormonal fluctuations do not appear to significantly affect fatigability in submaximal resistance protocols.

Keywords: Menstrual Cycle, fatigue, Mean propulsive velocity, squat and women.

Influencia del ciclo menstrual en la fuerza isométrica máxima y la tasa de desarrollo de la fuerza tras una sesión de entrenamiento de sentadillas en mujeres jóvenes

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Abstract

Introduction

Las fluctuaciones hormonales a lo largo del CM pueden afectar la producción de fuerza y las respuestas neuromusculares. La fuerza isométrica máxima (FIM) y la tasa de desarrollo de la fuerza (RFD) son indicadores clave de la función neuromuscular y el rendimiento deportivo. Por lo tanto, comprender su comportamiento en las diferentes fases del CM puede contribuir a optimizar la prescripción del entrenamiento y el seguimiento del rendimiento en mujeres.

Methods

Siete mujeres jóvenes físicamente activas participaron voluntariamente en el estudio. Las participantes completaron tres sesiones de evaluación correspondientes a las fases folicular, ovulatoria y lútea de un ciclo menstrual completo. El seguimiento del ciclo menstrual se realizó individualmente mediante una aplicación de seguimiento menstrual. Las variables MIF y tasa de desarrollo de la fuerza RFD se evaluaron antes y después de la intervención utilizando plataformas de fuerza Kinvent Delta durante una prueba isométrica de media sentadilla.

Results and Conclusions

No se observaron efectos principales significativos del tiempo ni de la fase del ciclo menstrual para la (FIM) ni para tasa de desarrollo de la fuerza (RFD) ($p > 0,05$). Sin embargo, se encontró una interacción significativa entre fase y tiempo para la FIM ($p = 0,02$), con diferencias significativas entre el pre y el post-intervención durante la fase ovulatoria y diferencias significativas entre las fases ovulatoria y lútea en los valores posteriores al ejercicio. Se identificaron incrementos intrafase significativos durante la fase ovulatoria, junto con diferencias posteriores al ejercicio entre las fases ovulatoria y lútea. Estos hallazgos sugieren que el ciclo menstrual no ejerce una influencia uniforme sobre el rendimiento neuromuscular, si bien la fase ovulatoria podría representar un periodo fisiológico más favorable para la expresión de la fuerza isométrica máxima y la producción rápida de fuerza tras el ejercicio de resistencia.

Keywords: Ciclo menstrual, fase ovulatoria, fase folicular, fase lútea, fuerza isométrica máxima y tasa de desarrollo de la fuerza

Maturation explains ball speed but not accuracy in youth football: implications for talent identification

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Abstract

Introduction

Purpose: Talent identification in youth football is widely confounded by biological maturation. We tested whether ball speed and shooting accuracy share the same maturational, biomechanical, and visual determinants, or whether they represent dissociable dimensions of shooting skill with different implications for talent assessment.

Methods

Methods: Sixty male academy players from four age groups (U13, U15, U17, U19) completed a standardised instep-shooting protocol. Ball speed was recorded via Doppler radar, and accuracy as six-region congruence between intended (eye-tracker-defined) and actual ball location. Biological maturity was estimated using three complementary indicators (Mirwald offset, percentage of predicted adult height, stature Z-score). Visual search was recorded with mobile eye-tracking (Tobii Pro Glasses 3), kicking kinematics with markerless 3D motion capture (OpenCap), and lower-limb power with the countermovement jump. Hierarchical regression tested the unique contributions of each domain to ball speed and accuracy.

Results and Conclusions

Results: Maturity and body size explained 73% of variance in ball speed ($R(2) = 0.731$, $p < .001$). Adding biomechanical ($\Delta R(2) = 0.010$, $p = .616$) or visual variables ($\Delta R(2) = 0.018$, $p = .374$) produced no significant improvement. By contrast, no predictor block explained accuracy (full model $R(2) = 0.119$, $p > .25$). When classified by maturity status, early-maturing players showed a large advantage in ball speed ($F = 54.05$, $p < .001$, $\eta^2(2) = 0.68$) but no advantage in accuracy ($F = 0.72$, $p = .489$, $\eta^2(2) = 0.03$). Conclusion: Ball speed in adolescent footballers is overwhelmingly a maturation-related outcome, whereas shooting accuracy represents an independent, maturation-unrelated dimension of skill. Talent assessment based solely on ball speed selects for maturational timing rather than genuine ability. Incorporating accuracy alongside speed offers a more equitable basis for identifying and developing young footballers.

Keywords: Keywords: talent identification; biological maturation; shooting performance; ball velocity; shooting accuracy; bio-banding; youth football; multimodal assessment

Kinematic analysis of the Squat Snatch in CrossFit: experienced athletes versus inexperienced individuals analysis

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Abstract

Introduction

CrossFit has expanded globally as a high-intensity training methodology that integrates functional movements from gymnastics, cardiovascular conditioning, and core stability. The primary purpose of this study was to conduct a detailed biomechanical analysis of the Squat Snatch, comparing execution patterns between experienced athletes (with professional coaching) and inexperienced individuals (who only watched an instructional video of the technique).

Methods

Two-dimensional videometry in the sagittal plane was utilized, assisted by Kinovea software, to map trajectories and calculate the ranges of motion and angles of seven critical joints across all phases of execution. The sample consisted of 10 participants, divided into 4 experienced athletes from the CrossFit Caramela Box and 6 individuals with no prior contact with the modality.

Results and Conclusions

The gathered data showed more rectilinear trajectories, efficient and explosive joint extensions (triple extension), and stable catches in a deep squat (overhead squat) within the experienced group. Conversely, the inexperienced group demonstrated recurrent technical errors, such as premature elbow flexion, mobility deficits in the knees, and instability during the catch phase. Conclusions: The kinematic deviations identified in inexperienced practitioners result in scattered barbell trajectories that limit performance and significantly increase injury potential. This study reinforces the necessity of qualified technical instruction and continuous professional supervision to ensure safety, mechanical efficiency, and longevity in CrossFit practice.

Keywords: Kinematics; Squat Snatch; CrossFit; Kinovea; Injury prevention

The Impact of Ramadan on Muslim Athletes in the Sports Context and Strategies to Minimize Performance Loss

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Abstract

Introduction

Ramadan is one of the pillars of Islam and requires complete abstinence from food and fluids between sunrise and sunset for approximately 30 days. For Muslim athletes, this period often overlaps with demanding competitive phases, raising questions about its effects on sports performance. This work consists of a literature review aimed at understanding how the intermittent fasting of Ramadan affects different physical capacities, comparing its impact across individual, team and combat sports.

Methods

The analysis was based on the article by Ghaffar et al. (2025), supplemented by other relevant studies in the field.

Results and Conclusions

The results suggest that the impact of Ramadan varies considerably between athletes and sports, being more evident in repeated anaerobic efforts and in team sports. Conversely, athletes who adjust their training, nutrition and sleep to the new routine are often able to maintain satisfactory competitive levels. It is concluded that Ramadan should be regarded as a period of adaptation requiring individualised planning, rather than simply as a limitation on performance.

Keywords: Ramadan; intermittent fasting; sports performance; nutrition; hydration; recovery.

The impact of sodium supplementation and regulation on endurance athletes

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Abstract

Introduction

In endurance and ultra-endurance sports—a category that includes marathons, long-distance triathlons (e.g., Ironman), multi-stage road cycling events, and ultratrail running races—the maintenance of hydroelectrolytic homeostasis represents one of the greatest biological challenges imposed on the human body. During prolonged and continuous physical exertion, energy metabolism increases exponentially, generating a substantial amount of endogenous heat that must be dissipated. The primary thermoregulatory mechanism in humans is the evaporation of sweat from the skin surface. However, this adaptive physiological response aimed at preventing hyperthermia is accompanied by a simultaneous loss of water and ionic solutes from the internal environment (Baker, 2017). Sodium (Na^+) is the principal cation of the extracellular fluid (ECF) and plays a fundamental role in determining plasma osmotic pressure. It regulates fluid balance between the intracellular and extracellular compartments and is essential for the transmission of action potentials in muscle and nerve cells through the sodium–potassium pump. When athletes engage in training sessions or competitions lasting longer than two to three hours under thermal stress, sweat losses can reach considerable levels. In the absence of a rigorous and individualized nutrition and hydration strategy, the cumulative loss of sodium may lead to a reduction in effective circulating volume, resulting in acute cardiovascular and neuromuscular dysfunctions (McCubbin & Costa, 2018). The consequences of these ionic and fluid losses directly affect both athletic performance and health. Contemporary evidence suggests that disturbances in electrolyte gradients across axonal membranes constitute a critical factor in neuromuscular hyperexcitability, challenging the traditional view that muscle cramps and premature fatigue are caused exclusively by lactate accumulation or glycogen depletion (Maughan & Shirreffs, 2019). Furthermore, when athletes consume excessive amounts of water or highly hypotonic solutions, severe dilution of the remaining plasma sodium may occur, leading to a condition known as Exercise-Associated Hyponatremia (EAH). This disorder can progress to acute cerebral edema and potentially fatal outcomes if immediate medical intervention is not provided (Hew-Butler et al., 2017).

1.2 Objectives of the Study

To synthesize the available scientific evidence and propose practical field-based applications, this study was structured around the following objectives: (a) To evaluate the ergogenic and physiological effects of targeted sodium supplementation on hemodynamic stability and time to exhaustion in endurance sports; (b) To analyze the molecular and cellular mechanisms of ion transport and reabsorption within eccrine sweat glands during thermal stress; (c) To clarify the multifactorial etiology of Exercise-Associated Hyponatremia (EAH), mapping its neurological risks and identifying its primary causes; (d) To provide a practical and reproducible protocol for determining individual sweat rate and developing personalized electrolyte replacement strategies.

Methods

The present study adopts the format of a structured narrative review rather than a systematic review with meta-analysis. This methodological choice is justified by the heterogeneity of study designs available in the literature, which include clinical trials, observational studies, narrative reviews, and mathematical modeling studies; by the absence of sufficiently homogeneous primary data for formal statistical aggregation; and by the academic scope of the project, in accordance with the recommendations of Greenhalgh et al. (2018) regarding narrative evidence synthesis in contexts where meta-analysis is not methodologically appropriate. The objective is therefore not to produce a pooled effect estimate, but rather to map, systematize, and critically analyze the current state of knowledge regarding sodium regulation in endurance athletes. A structured electronic search was conducted using the PubMed, Scopus, Web of Science, and Google Scholar databases. The search period was restricted to publications between 2017 and 2023, ensuring the inclusion of the most recent guidelines and international consensus statements. Boolean operators (AND, OR) and validated MeSH terms were used in the following combinations: "sodium supplementation" AND "endurance athletes" "exercise-associated hyponatremia" OR "sweat rate" "SGLT¹ intestinal absorption exercise" "renin-angiotensin-aldosterone system exercise". The search process was conducted independently by two authors, with an initial screening based on titles and abstracts, followed by a full-text review of the selected articles.

3.2 Inclusion and Exclusion Criteria The inclusion criteria were predefined before the commencement of the search. Eligible studies included randomized controlled trials (RCTs), narrative and systematic reviews, mathematical modeling studies, and clinical consensus statements published by sports organizations. Participants were required to be healthy adult humans (aged ≥ 18 years), of either sex, classified as endurance or ultra-endurance athletes (recreational or elite). Studies were excluded if they were based on animal models or in vitro simulations, published outside the predefined time frame, presented as isolated case reports, letters to the editor, or conference abstracts without peer review. Following the application of these criteria, ten articles were selected for full-text review and evidence extraction.

3.3 Methodological Limitations The present review has several limitations inherent to its design that should be considered when interpreting the findings. First, restricting the search to publications written in English may have resulted in the exclusion of relevant studies published in other languages. Second, the heterogeneity of the included studies—which comprise narrative reviews, randomized controlled trials, and mathematical modeling studies—precludes the assignment of a uniform level of evidence to the conclusions presented. Specifically, four of the ten included articles are narrative reviews, representing a lower level of evidence than primary experimental studies. Third, the majority of the studies analyzed were conducted using predominantly male samples and under laboratory or controlled race conditions, limiting the generalizability of the findings to female populations and real-world competitive settings with uncontrolled environmental variables. Finally, the absence of formal data extraction by two independent reviewers with calculation of inter-rater agreement (e.g., Cohen's Kappa coefficient) constitutes a procedural limitation when compared with the methodological rigor expected of a formal systematic review.

Results and Conclusions

The analysis of the ten included studies demonstrated that sodium plays a fundamental role in maintaining fluid homeostasis, neuromuscular function, and athletic performance in endurance athletes. The evidence suggests that adequate sodium supplementation

enhances the intestinal absorption of water and glucose, contributes to the maintenance of plasma volume, and reduces the impact of cardiovascular drift during prolonged exercise, thereby delaying the onset of fatigue. Regarding Exercise-Associated Hyponatremia (EAH), the studies reviewed indicate that its primary cause is not excessive sodium loss through sweat, but rather the excessive consumption of water or hypotonic beverages, combined with fluid retention mediated by antidiuretic hormone. This condition may lead to cerebral edema and severe neurological complications, highlighting the importance of hydration strategies based on thirst perception and the individual needs of each athlete. The findings also revealed substantial interindividual variability in sweat rates and sweat sodium concentrations. Athletes classified as heavy sweaters or salty sweaters experience significantly greater sodium losses, making a personalized approach to electrolyte replacement essential. Heat acclimatization was identified as an important factor in reducing sodium losses by improving the reabsorptive capacity of the sweat glands. Finally, the comparison of different electrolyte replacement strategies showed that no universal solution is applicable to all athletes. The effectiveness of supplementation depends on factors such as exercise duration and intensity, environmental conditions, sweat rate, and individual physiological characteristics, emphasizing the importance of personalized hydration and supplementation plans.

6. Conclusion This review concluded that sodium plays a crucial role in maintaining fluid homeostasis, neuromuscular function, and athletic performance in endurance and ultra-endurance athletes. The scientific evidence indicates that adequate sodium supplementation contributes to the preservation of plasma volume, reduces cardiovascular drift, and helps delay the onset of fatigue during prolonged exercise. The findings also show that sweat composition is strongly influenced by sodium reabsorption mechanisms within the sweat glands, explaining the considerable interindividual variability observed among athletes. Regarding Exercise-Associated Hyponatremia (EAH), the review confirms that its primary cause is dilutional overhydration, exacerbated by vasopressin-mediated fluid retention, rather than excessive sodium loss through sweat. The review further highlights the importance of individualized hydration and electrolyte replacement strategies based on sweat rate and the specific characteristics of each athlete. The sweat rate assessment protocol presented represents a practical tool to support this process. Finally, several priorities for future research were identified, including the study of female physiology in relation to hydration and electrolyte balance, the influence of genetic factors on sweat sodium losses, and the development of real-time electrolyte monitoring technologies capable of improving the personalization of hydration strategies in competitive settings.

Keywords: sodium, endurance sports, sweat rate, exercise-associated hyponatremia, RAAS, SGLT1, electrolyte replacement.

Comparative analysis of defensive performance between two 2-1-3 tactical systems in developmental women's volleyball

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Abstract

Introduction

The defensive system has gained considerable scientific relevance in recent years, becoming established as a determining factor for success in competition. In developmental women's volleyball, the choice of an appropriate tactical system is key to optimising the team's collective response. The aim of this study was to compare two defensive systems (2-1-3 with diagonal shifting versus 2-1-3 with line shifting) to determine which of them enables better performance in game actions.

Methods

The sample consisted of 15 youth and senior category players (17.87 ± 2.50 years). A total of 387 defensive actions were analysed in real 6 vs. 6 game situations. Sony cameras were used for recording, and performance was assessed using the FIVB observation system, based on an efficacy scale from 0 (error) to 3 (excellent defence). Statistical analysis was performed using SPSS software, employing contingency tables, Pearson's chi-square test, and Cramer's V coefficient.

Results and Conclusions

Statistically significant differences in performance were found between the two defensive systems ($p = 0.018$; $V = 0.190$). The system with line shifting, corresponding to experimental situation 2, showed a positive association with maximum efficacy, reaching 73.3% perfect defences compared with 26.7% obtained by the system with diagonal shifting. Defensive performance is conditioned by the tactical system employed. The results show that the 2-1-3 system with line shifting offers superior performance to the 2-1-3 system with diagonal shifting, as it is associated with a higher percentage of excellent defences.

Keywords: Observational methodology, dig efficacy, formative stages

Relationship between healthy habits and physical exercise in young people: A literature review.

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Abstract

Introduction

A atividade física está associada a diversos benefícios para a saúde. Níveis insuficientes de atividade física podem resultar em danos à saúde e ao bem-estar do indivíduo, aumentando o risco de doenças cardiovasculares, hipertensão, diabetes, alguns tipos de cancro, obesidade e mortalidade precoce. (Chaput et al., 2020) Estudos anteriores sugerem que programas de atividade física via dispositivos móveis que oferecem apenas acompanhamento semanal ou diário por mensagem de texto apresentam eficácia limitada na promoção da atividade física em adolescentes com sobrepeso ou obesidade. É possível que incentivos, combinados com acompanhamento de saúde e feedback diário sobre o alcance das metas, possam aumentar a eficácia do programa; no entanto, tais programas ainda não foram testados com adolescentes com sobrepeso e obesidade. (Chen et al., 2024) Nas últimas décadas, a obesidade infantil e juvenil aumentou significativamente em diversos países, tornando-se um problema preocupante para a saúde pública. A adoção de estilos de vida sedentários, associada a hábitos alimentares pouco saudáveis, contribui para o aumento do excesso de peso entre crianças e adolescentes. (Biddle et al., 2017) Artigo/article O excesso de peso tem múltiplas causas, e sabe-se que estas estão intimamente correlacionadas com o aumento do consumo de alimentos hipercalóricos ricos em açúcares e gorduras, baixos níveis de atividade física e envolvimento excessivo em comportamentos sedentários. Comportamentos sedentários são atividades com baixo gasto energético ($< 1,5$ equivalentes metabólicos), realizadas enquanto acordado, sentado ou reclinado. Estes incluem assistir televisão, usar o computador, ficar sentado durante o trajeto para o trabalho, jogar videogames, usar dispositivos móveis e tablets, entre outros. (Marques et al., 2016) Presume-se que adolescentes que passam mais tempo em atividades com ecrãs tenham uma dieta de pior qualidade, com maior consumo de lanches com alta densidade energética e baixo valor nutricional, e que o consumo desses alimentos e o tempo gasto em frente às telas atuem sinergicamente e estejam diretamente associados ao sobrepeso. (Biddle et al., 2017). Os Índices ou Pontuações de Qualidade da Dieta (IQDs) são ferramentas que visam avaliar a dieta geral de um indivíduo e categorizá-lo de acordo com o grau em que seus hábitos alimentares são saudáveis. As três principais categorias de IQDs são baseadas em nutrientes, em frequências/grupos alimentares ou em uma combinação de ambos. Além disso, alguns IQDs são projetados para países ou faixas etárias específicas e podem não ser aplicáveis a outras populações. (Biddle et al., 2017). O conceito de qualidade da dieta tem recebido crescente atenção na investigação científica. A qualidade da dieta descreve o grau de adesão às recomendações alimentares e aos padrões nutricionais saudáveis, refletindo uma ingestão alimentar equilibrada e adequada às necessidades do organismo (Chaput et al., 2020). Assim, o presente estudo teve como objetivo analisar, através de uma revisão da literatura, a

relação entre atividade física, comportamentos sedentários, qualidade da dieta e sobrepeso em adolescentes.

Methods

O presente trabalho caracteriza-se como uma revisão da literatura de natureza qualitativa. Foram analisados artigos científicos relacionados com atividade física, comportamentos sedentários, qualidade da dieta e obesidade em adolescentes. A pesquisa bibliográfica foi realizada em bases de dados científicas como PubMed, Google Scholar e ScienceDirect, utilizando descritores como physical activity, sedentary behavior, diet quality, adolescent obesity e overweight. Foram selecionados artigos publicados em português e inglês relacionados com adolescentes e jovens. Os artigos analisados permitiram identificar que níveis insuficientes de atividade física estão associados a diversos riscos para a saúde, incluindo doenças cardiovasculares, hipertensão, diabetes, obesidade e mortalidade precoce (Chaput et al., 2020). Artigo/article Além disso, alguns estudos analisaram programas de promoção da atividade física realizados através de dispositivos móveis, demonstrando que intervenções com acompanhamento diário, feedback sobre metas e incentivos podem melhorar a adesão à prática de atividade física em adolescentes com sobrepeso e obesidade (Chen et al., 2024). De acordo com os conteúdos analisados, verificou-se ainda que o aumento da obesidade infantil e juvenil nas últimas décadas está fortemente relacionado com estilos de vida sedentários e hábitos alimentares inadequados (Marques et al., 2016). Os estudos incluídos abordaram os comportamentos sedentários como atividades de baixo gasto energético realizadas em posição sentada ou reclinada, tais como assistir televisão, utilizar computadores, jogar videojogos e utilizar dispositivos móveis (Biddle et al., 2017). Segundo os artigos analisados, o tempo excessivo em frente aos ecrãs encontra-se associado a padrões alimentares menos saudáveis, caracterizados pelo maior consumo de alimentos hipercalóricos e de baixo valor nutricional, contribuindo para o aumento do sobrepeso em adolescentes (Marques et al., 2016). Relativamente à alimentação, os artigos enfatizaram o conceito de qualidade da dieta como o grau de adesão às recomendações nutricionais e aos padrões alimentares saudáveis (Chaput et al., 2020). Foi ainda possível destacar a utilização dos Índices de Qualidade da Dieta como instrumentos de avaliação dos hábitos alimentares, permitindo classificar os indivíduos de acordo com a qualidade nutricional da alimentação (Biddle et al., 2017). Assim, a metodologia deste trabalho consistiu na análise comparativa e interpretativa dos diferentes artigos científicos selecionados, permitindo relacionar os principais fatores associados ao sedentarismo, à qualidade da dieta e ao excesso de peso em adolescentes.

Results and Conclusions

Os estudos analisados demonstram uma forte relação entre baixos níveis de atividade física e o aumento da obesidade em crianças e adolescentes. O sedentarismo, frequentemente associado ao uso excessivo de tecnologias, reduz o gasto energético diário e favorece o aumento do peso corporal. (Marques et al., 2016) O artigo Physical activity and obesity in children destaca que crianças fisicamente ativas apresentam menor probabilidade de desenvolver obesidade e doenças associadas, como diabetes tipo 2 e problemas cardiovasculares. A prática regular de exercício melhora o metabolismo e ajuda no equilíbrio energético. (Chaput et al., 2020) No estudo Physical activity in children and adolescents, os autores referem que a atividade física é essencial para o crescimento saudável, desenvolvimento muscular e Artigo/article fortalecimento ósseo. Além disso, o exercício físico melhora o desempenho escolar e o bem-estar psicológico. (Chaput et al., 2020). A meta-análise Effect of physical activity on anxiety, depression

and obesity index in children and adolescents with obesity concluiu que a prática regular de atividade física reduz significativamente os níveis de ansiedade e depressão em jovens com obesidade. Os resultados mostraram também melhorias no índice de massa corporal (IMC) e na saúde emocional. (Chen et al., 2024) Por sua vez, o estudo Effects of physical activity on quality of life in overweight and obese children demonstrou que crianças com excesso de peso que praticam exercício físico regularmente apresentam melhor qualidade de vida, maior autoestima e melhor interação social. (Aguilar-Cordero et al., 2021) Os resultados reforçam a importância da implementação de programas de atividade física em escolas e comunidades, incentivando hábitos saudáveis desde cedo. A participação da família também é fundamental para promover estilos de vida mais ativos e equilibrados (Chaput et al., 2020).

Keywords: physical activity; sedentary behavior; adolescent obesity; diet quality; adolescents.

Physiological changes following a supervised exercise programme in cardiac patients: a retrospective observational study

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Abstract

Introduction

Exercise-based cardiac rehabilitation (CR) is a well-established secondary prevention strategy, yet its physiological impact in real clinical settings is not always well documented. This study aimed to compare cardiopulmonary exercise testing (CPET) parameters between a baseline cohort (PRE group) and a cohort that had completed a supervised exercise programme (POST group) in patients with ischaemic heart disease.

Methods

Retrospective observational study with two independent groups: PRE (n = 19) and POST (n = 16), both from Hospital Universitario Ramón y Cajal (Madrid, Spain). The supervised programme consisted of three weekly 60-minute sessions combining aerobic exercise at 70% of maximum heart rate and resistance training. Variables analysed: peak VO₂, ventilatory thresholds (VT₁ and VT₂), maximum respiratory quotient (RQ), maximum heart rate and total exercise time. Normality was assessed with Shapiro-Wilk; group comparisons used independent-samples t-test or Mann-Whitney U; effect size was estimated with Cohen's d ($\alpha = 0.05$; IBM SPSS Statistics v26.0).

Results and Conclusions

Peak VO₂ increased significantly by 25.4% in the POST group (21.5 ± 3.8 vs. 27.0 ± 6.5 ml/kg/min; $p = .004$; $d = 1.03$). VO₂ at VT₂ increased by 28.5% ($p = .004$; $d = 0.96$). Maximum RQ decreased significantly (1.11 ± 0.08 vs. 1.03 ± 0.04 ; $p = .001$; $d = -1.24$). All three effects were large according to Cohen's criteria. No significant differences were found in maximum heart rate or total exercise time, attributable to beta-blocker use (87.5% of POST subjects). Haemodynamic response was normal in 100% of POST subjects. Conclusions. The supervised CR programme produced large and clinically relevant improvements in aerobic capacity and metabolic efficiency. Peak VO₂ and VT₂ are more sensitive indicators of cardiovascular adaptation than maximum heart rate in beta-blocker-treated populations.

Keywords: cardiac rehabilitation; peak VO₂; ventilatory thresholds; respiratory quotient; ischaemic heart disease.

Effects of a multicomponent training program on functional capacity in older adults over 70 years old.

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Abstract

Introduction

The Spanish population continues its aging process; according to the INE projection (2020-2068), cited by Pérez Díaz, J., et al. (2020), by 2068 there could be over 14 million older people, with this age group representing almost 30% of the population. This means that a considerable portion would be classified as older adults or seniors (+65 years), and this trend will continue to increase. The WHO, in its report on Guidelines on physical activity and sedentary behaviour (2020), recommends regular physical activity for people over 65 years of age. This population segment should accumulate a weekly minimum of 150 to 300 minutes of moderate-intensity aerobic physical activity, or a minimum of 75 to 150 minutes of vigorous-intensity aerobic physical activity, or a combination of both, in order to achieve notable health benefits. Regarding the frequency and type of activity to perform, the World Health Organization recommends at least 2 days a week for strength activities, thereby working major muscle groups. Furthermore, it recommends dedicating at least 3 days a week to practicing multicomponent physical activities, where functional balance predominates, providing benefits such as improved functional capacity and the prevention of falls.

Methods

The participating sample consists of 35 older adults (over 70 years old) who are part-time residents in a nursing home in the province of Seville. The mean age of the participants is 74.2 years, comprising 21 women and 14 men. This is a particularly vulnerable population, but at the same time, they possess a high enough functional level and cognitive capacity to allow them to perform the scheduled exercise intervention. In this regard, a signed informed consent was requested for participation in the intervention. The study was governed by the principles of the Declaration of Helsinki. The following inclusion criteria were established: being 70 years of age or older, being in a part-time residential care regime, and providing informed consent. Likewise, the following exclusion criteria were established: suffering from any type of pathology that would limit participation, and failing to attend at least 90% of the sessions. The intervention was scheduled as 3 weekly sessions (Monday, Wednesday, and Friday) lasting 30 minutes each, over the course of 8 weeks. Compliance with the exercise intervention program was documented in a weekly log. The exercises that make up the intervention are an adaptation of the Vivifrail multicomponent exercise program designed to prevent frailty and falls (Izquierdo M. et al., 2017). This multicomponent program focused on a strategic combination of endurance, coordination, strength, and balance exercises, specifically adapted to the individual capacities of older adults. The intervention sought a direct transfer to activities of daily living, using everyday and adapted materials to progressively stimulate basic motor skills. To determine the effectiveness of the program, the primary

study variable was the evolution of the participants' functional capacity between the initial and final evaluations. This measurement was carried out using the Short Physical Performance Battery (SPPB), a tool that jointly assesses three key parameters: balance, gait speed, and lower limb strength through the Gait Speed Test, the Balance Test, and the Chair Stand Test.

Results and Conclusions

The data presented in Table 1 reflect a highly significant overall improvement in the functional capacity of the sample following the intervention ($p < .001$). This overall progression becomes particularly evident when observing the median of the total score, which rises from 6.50 points at the baseline assessment to 8.50 points at the final measurement. This advancement is primarily driven by statistically significant improvements in gait speed ($p = .015$) and in the lower limb strength test ("Chair Stand", $p = .011$). In both tests, a notable shift of participants from the lower performance levels toward the maximum level (Level 4) is observed. For example, the percentage of subjects capable of achieving the maximum score in gait speed jumped from 15.6% to 40.0%, while in the action of standing up from a chair, it grew from a mere 6.67% initially to 28.9%. On the other hand, the results of the balance test did not show statistically significant differences between the baseline and final phases ($p = .360$). Although a positive clinical trend is noted with an increase in the individuals who achieved Level 4, going from 33.3% to 42.2%, this variation is not sufficient to attribute it directly to the intervention while ruling out the effect of chance. Overall, these findings suggest that the program was highly effective in promoting explosive leg strength and dynamic mobility (gait), whereas static stability or balance might require a more prolonged or specific approach to achieve statistically conclusive changes. In conclusion, the implementation of an adapted multicomponent training program has proven to be highly effective in improving the overall functional capacity of older adults. This intervention generated substantial and statistically significant improvements in both lower limb strength and gait speed, key factors that translate into greater independence for activities of daily living and a direct reduction in the risk of falls. However, although balance showed a positive clinical trend, the lack of statistical significance in the simulated tests suggests that static stability in this population might require a greater training volume or a more prolonged timeframe. Ultimately, these findings confirm that structured physical exercise routines, such as the one proposed through the Vivifrail methodology, are fundamental to combat frailty, promote autonomy, and significantly enhance the quality of life in the elderly.

Keywords: Older adults, physical activity, movement quality, functional capacity, multicomponent training.

A comparison of control versus explicit instruction in inspiratory training

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Abstract

Introduction

During inspiratory muscle training (IMT), cervical compensation and scapular elevation frequently occur, associated with increased activation of the accessory muscles. Although most protocols focus on the respiratory load applied, there is little evidence regarding the effect of technical instructions on the quality of the respiratory motor pattern. Explicit instruction could improve biomechanical control during inspiratory tasks, reducing compensatory cervical activation and excessive scapular movement. The aim of this study was to compare the effects of a control condition and explicit instruction on cervical electromyographic activation and vertical displacement of the acromion during an inspiratory training task

Methods

Twenty-two physically active healthy young adults took part. All participants performed an inspiratory training task under two experimental conditions: a control condition (CNT) and an explicit instruction condition (EXP). Surface electromyographic (sEMG) activity of the sternocleidomastoid and scalene muscles was recorded, expressed as a percentage of maximum voluntary contraction (%MVC). Furthermore, vertical displacement of the acromion was analysed using kinematic recording. Differences between conditions were analysed using repeated measures analysis of variance, with a significance level set at $p < 0.05$.

Results and Conclusions

The EXP condition showed lower activation of the sternocleidomastoid muscle compared with CNT (19.0 ± 4.85 vs 27.6 ± 8.62 %MVC). Similarly, the vertical displacement of the acromion was considerably lower in EXP than in CNT (0.85 ± 0.17 cm vs 2.33 ± 0.28 cm). The results indicate that explicit instruction reduces cervical and scapular compensations during inspiratory training, promoting a more biomechanically efficient breathing pattern. These findings suggest that instructional strategies should be considered a relevant component within inspiratory muscle training programmes.

Keywords: Inspiratory training; electromyography; sternocleidomastoid muscle; motor control; respiratory biomechanics

Does a 10-Day Detraining Period Affect Stretch-Shortening Cycle Performance in Elite Female Volleyball Players?

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Abstract

Introduction

Monitoring neuromuscular performance across the season may help practitioners identify performance fluctuations associated with the stress–recovery balance and periods of reduced training stimulus. However, evidence on detraining in volleyball is scarce and mainly limited to young athlete and longer detraining periods (>8 weeks). Therefore, evidence on the effects of short-term detraining in elite female volleyball players remains scarce. Thus, the aim of the present study was to examine the effects of a short-term detraining period on slow and fast stretch-shortening cycle performance in elite female volleyball players using the countermovement jump (CMJ) and countermovement jump rebound (CMJ-RE).

Methods

Eleven professional female volleyball players competing in the Spanish First Division volunteered to participate in this study (age: 23.55 ± 4.97 years; height: 1.76 ± 0.09 m; body mass: 71.16 ± 9.85 kg). Participants completed three testing sessions. The first two sessions were separated by 24 h and were used to assess test–retest reliability, while the third session was performed after a 10-day mid-season winter break to evaluate pre–post detraining changes. In each session, players performed three CMJ and three CMJ-RE trials using portable dual force plates sampling at 1000 Hz. Force–time metrics were classified using the Person–Outcome–Driver–Strategy framework. Reliability was assessed using intraclass correlation coefficients, coefficient of variation, standard error of measurement, and smallest detectable difference. Pre–post differences were examined using paired t-tests or Wilcoxon signed-rank tests, and Hedges' g effect sizes were calculated.

Results and Conclusions

No significant changes were observed in CMJ force–time metrics after the detraining period. However, CMJ-RE concentric impulse showed a statistically significant but trivial reduction ($p = 0.046$; ES = 0.11), while mRSI decreased non-significantly ($p = 0.088$; ES = 0.23) and eccentric impulse increased non-significantly ($p = 0.095$; ES = 0.34). Individual response analysis revealed that only a limited number of players exceeded the smallest detectable difference, with responders identified in CMJ-RE concentric impulse, eccentric impulse, and mRSI. These findings suggest that a 10-day detraining period minimally affects slow stretch-shortening cycle performance in elite female volleyball players, whereas rebound-specific metrics may be more sensitive to subtle neuromuscular changes after short in-season breaks.

Keywords: detraining; volleyball; countermovement jump; countermovement jump rebound; force plates; neuromuscular performance

Relative Handgrip Strength Is Associated with Physical Function and Physical Health in Community-Dwelling Older Adults

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Abstract

Introduction

Relative handgrip strength (rHGS) has emerged as a potentially more informative indicator of functional status than absolute handgrip strength in older adults. However, evidence regarding its association with both objective measures of physical function and health-related quality of life remains limited. The aim was to investigate the associations between rHGS, physical function, and physical health-related quality of life in community-dwelling older adults.

Methods

A cross-sectional study was conducted in 56 community-dwelling older adults (65.5 ± 4.7 years; 71.4% women). Handgrip strength was assessed using a digital dynamometer and rHGS was calculated relative to body mass. Physical function was evaluated using the Short Physical Performance Battery (SPPB), Timed Up and Go (TUG), and the 4-m gait test. Physical health-related quality of life was assessed using the physical domains of the SF-36 questionnaire. Spearman correlations and linear regression analyses adjusted for age and sex were performed.

Results and Conclusions

Higher rHGS was significantly associated with better performance in the TUG ($\rho = -0.33$, $p = 0.012$), 4-m gait test ($\rho = -0.39$, $p = 0.003$), and SPPB ($\rho = 0.35$, $p = 0.009$). Significant positive associations were also observed for SF-36 physical functioning ($\rho = 0.40$, $p = 0.003$) and bodily pain scores ($\rho = 0.35$, $p = 0.008$). After adjustment for age and sex, rHGS remained significantly associated with TUG performance ($\beta = -2.61$, $p = 0.007$), SPPB score ($\beta = 2.31$, $p = 0.047$), physical functioning ($\beta = 40.72$, $p = 0.003$), and bodily pain ($\beta = 39.29$, $p = 0.046$). The association with gait performance was attenuated and did not remain statistically significant after adjustment. In conclusion, Relative handgrip strength was independently associated with objective measures of physical function and self-reported physical health in community-dwelling older adults. These findings support the potential value of rHGS as a simple and clinically relevant marker of functional status during aging. Future longitudinal studies are needed to determine its predictive value for functional decline and disability.

Keywords: aging; handgrip strength; physical function; health-related quality of life; sarcopenia; older adults

Acute changes in regional bioelectrical impedance after foam rolling: A randomized controlled trial

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Abstract

Introduction

Introduction: Previous evidence has shown that foam rolling (FR) may induce localized increases in bioelectrical impedance, potentially reflecting transient fluid displacement or water loss within the treated tissues [1]. However, whether these responses are specifically related to self-myofascial release or to movement execution itself remains unclear. Therefore, the aim of this study was to investigate the acute effects of a FR protocol performed on the dominant lower limb (DLL) on raw regional bioelectrical impedance parameters across different body segments.

Methods

Methods: A randomized controlled trial was conducted including a foam rolling intervention group (FR) and a control group (CON). Twenty-seven healthy participants (24.63 ± 2.55 years; 40.74% female) were enrolled: 16 participants were assigned to the FR group (25.31 ± 2.87 years) and 11 to the CON group (23.64 ± 1.63 years). The FR protocol consisted of three consecutive 60-second sets targeting the plantar fascia, calf muscles, tibialis anterior, peroneals, quadriceps, hamstrings, adductors, iliotibial band, and gluteal muscles of the DLL. The CON group performed the same movement pattern using a skateboard in order to reproduce the exercise without applying meaningful myofascial pressure or massage stimulus. Resistance (Rz) and reactance (Xc) were assessed using regional bioelectrical impedance analysis (BIA 10¹ Anniversary, Akern, Italy) at baseline, immediately after the intervention, 15 minutes post-intervention, and 30 minutes post-intervention, according to manufacturer guidelines. Separate 2 x 4 repeated-measures ANOVAs (group x time) were performed for each body segment to analyze changes in Rz and Xc over time.

Results and Conclusions

Results: Significant time effects were detected in all body segments except the trunk. For Rz, significant changes were observed in the dominant upper limb (DUL) ($F = 5.44$, $p = 0.02$), non-dominant upper limb (NDUL) ($F = 10.32$, $p < .001$), upper body (UB) ($F = 10.92$, $p < .001$), lower body (LB) ($F = 52.38$, $p < .001$), dominant lower limb (DLL) ($F = 40.10$, $p < .001$), and non-dominant lower limb (NDLL) ($F = 59.86$, $p < .001$). Similarly, significant temporal effects for Xc were found in the DUL ($F = 10.67$, $p = 0.002$), NDUL ($F = 14.30$, $p < .001$), UB ($F = 23.23$, $p < .001$), LB ($F = 52.74$, $p < .001$), DLL ($F = 50.45$, $p < .001$), and NDLL ($F = 22.86$, $p < .001$). Following the protocol, Rz and Xc decreased in both upper limbs and in the UB up to 15 minutes post-intervention, followed by a subsequent increase at 30 minutes. In contrast, both variables progressively increased in

the lower limbs and LB throughout all post-intervention assessments. No significant group effects or group x time interactions were observed. Conclusions: The interpretation of the present findings remains uncertain. On one hand, the observed bioelectrical variations may indicate a redistribution of body fluids induced by the execution of movement, independently of the mechanical effects of foam rolling. On the other hand, the prolonged supine position adopted during impedance measurements may have contributed substantially to the detected changes, potentially influencing fluid shifts more than the intervention itself. Reference 1. <https://doi.org/10.1016/j.jbmt.2021.02.012>

Keywords: Self-Myofascial release; Foam rolling; Bioelectrical impedance vector analysis; BIVA; Body fluid distribution

Differences between vegan and omnivorous diets in athletes: impact on performance, recovery, and body composition.

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Abstract

Introduction

In recent years, there has been a significant increase in adherence to vegetarian and vegan diets, including among professional and recreational athletes. This growth is associated with ethical, environmental, and health promotion factors. At the same time, there has been increased scientific interest in understanding the effects of these diets on athletic performance, muscle recovery, and body composition. The omnivorous diet continues to be the most widely used dietary pattern in the sports context, mainly due to the ease of meeting energy and protein needs through the consumption of animal-based foods. In contrast, the vegan diet completely excludes animal products, requiring greater attention to nutritional planning to ensure adequate intake of essential nutrients. According to Rogerson (2017), vegan athletes can achieve physical performance similar to that of omnivorous athletes when the diet is properly planned. However, some nutrients important for athletic performance are at greater risk of inadequacy in exclusively plant-based diets, namely vitamin B12, iron, calcium, zinc, creatine, and omega-3 fatty acids. Protein also represents a central point in the comparison between both dietary patterns. According to Thomas, Erdman, and Burke (2016), athletes need approximately 1.2 to 2.0 g/kg/day of protein, depending on the intensity and type of sport practiced. Although vegan diets can meet these recommendations, they often require greater dietary variety and attention to protein quality. Therefore, it becomes relevant to analyze the differences between vegan and omnivorous diets in athletes, evaluating benefits, limitations, and possible impacts on physical performance.

Methods

This work consists of a narrative review of the scientific literature. The bibliographic search was carried out in the PubMed, Google Scholar and SciELO databases, using the descriptors "vegan diet", "omnivorous diet", "athletes", "sports nutrition" and "exercise performance". Articles published between 2015 and 2025, studies conducted in humans and works related to athletes or physically active individuals were included. Review articles, observational studies and clinical trials that addressed the effects of vegan and omnivorous diets on sports performance, muscle recovery and nutritional health were selected. Studies conducted exclusively in clinical populations, duplicate articles and works without a direct relationship to sports nutrition were excluded.

Results and Conclusions

It can be concluded that both vegan and omnivorous diets can be compatible with adequate athletic performance, provided they are properly planned and adjusted to the individual needs of the athlete. The vegan diet offers benefits related to the high consumption of plant-based foods rich in antioxidants and fiber, which can promote

muscle recovery and cardiovascular health. However, it requires greater attention to the intake of critical nutrients such as vitamin B12, iron, protein, creatine, and omega-3. The omnivorous diet facilitates the acquisition of high biological value proteins and micronutrients important for physical performance, although it also requires balance and nutritional quality. Therefore, individualized nutritional monitoring is essential to ensure health, recovery, and athletic performance regardless of the dietary pattern adopted.

Keywords: Sports nutrition; vegan diet; omnivorous diet; athletes; physical performance.

The influence of eccentric velocity in the load-velocity profile in the Bench Press exercise

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Abstract

Introduction

Actual devices, such as the T-Force system, enable precise monitoring of repetition velocity during resistance training. (González-Badillo et al., 2017). However, the control of eccentric velocity within a defined range and its influence on concentric performance has not yet been investigated using technology. Therefore, the purpose of this study was to examine the effects of different eccentric phase velocities on concentric velocity during the bench press exercise.

Methods

23 males volunteered participate in this study (20 ± 1.2 years; 1.77 ± 0.07 m; 72.4 ± 6.8 kg). Participants completed two bench press testing protocols under distinct eccentric velocity conditions (slow: -0.25 to -0.35 m·s⁻¹; fast: -0.65 to -0.75 m·s⁻¹).

Results and Conclusions

Statistically significant differences were found in the velocity execution for all the load percentages (%1RM) studied from 50% to 70% RM ($p \leq 0.001$). A significant linear relationship was observed between the mean velocity propulsive and the %RM corresponding to each absolute load used during the two tests (fast MPV ($R^2 = 0.961$; $p < 0.05$) and slow MPV ($R^2 = 0.969$; $p < 0.05$). In conclusion, the results of the present research demonstrate that the execution velocity during the eccentric phase in the bench press exercise significantly influences the velocity of the concentric phase, measured through the MVP. These findings underline the importance of considering eccentric velocity as a key variable in training programming.

Keywords: Eccentric velocity, concentric velocity, bench press, velocity-based training.

EFFECTS OF A DETRAINING PERIOD AFTER A RESISTANCE TRAINING INTERVENTION WITH DIFFERENT VELOCITY LOSS THRESHOLDS ON MUSCLE HYPERTROPHY

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Abstract

Introduction

Velocity loss (VL) is established as a valid indicator to determine the level of effort attained during resistance training (RT) (Sánchez-Medina & González-Badillo, 2011). In long-term adaptations, it is well known that a high VL threshold optimizes muscle mass gain (Pareja-Blanco et al., 2020). However, skeletal muscle tissue exhibits a high degree of plasticity and adapts to different states of neuromuscular activity, partially losing the adaptations achieved during periods of training cessation (Mujika & Padilla, 2001). Therefore, the aim of this study was to compare the effects of two 8-week full-squat (SQ) training programs with different VL thresholds (i.e., 20% vs. 40%) and 3 weeks of detraining on muscle hypertrophy.

Methods

Forty-three physically active men followed an 8-week RT program based on the SQ exercise (16 sessions). Subjects were randomly assigned to the two intervention groups, which differed in the VL attained within the set (VL20: 20%; VL40: 40%). The relative intensity (65-80% 1-RM), inter-set recovery (4 minutes), and number of sets (3) were matched for both groups in each training session. The ultrasonography was evaluated on three occasions: pre-training (PRE), post-training (POST), and after 3 weeks of the detraining period (DET). The variables analyzed were, the anatomical cross-sectional area (ACSA) of the vastus lateralis at 1) 75% (proximal; ACSA75), 2) 57.5% (medial; ACSA57.5), and 3) 40% (distal; ACSA40) of the femur length, defined as the distance between the inferior part of the lateral femoral condyle and the superior part of the greater trochanter of the femur (Hogrel et al., 2015), as well as 4) muscle volume, which was estimated using a method based on data derived from five ACSA slices (Cornejo-Daza et al., 2024).

Results and Conclusions

Significant main effects of “time” were reported for muscle volume, ACSA57.5, and ACSA40 ($p = 0.005$ to $p < 0.001$). A significant “group x time” interaction ($P = 0.03$) was observed for ACSA75, favoring VL40. Both groups evoked significant improvements in muscle volume. During DET, significant decreases in ACSA75 and muscle volume were observed in both groups, and in ACSA57.5 only in VL40. Greater effect size values were observed for VL40 in ACSA40, ACSA57.5, ACSA75, and muscle volume across all assessed time points. Higher levels of fatigue within the set maximize muscle

hypertrophy. However, despite the accumulated fatigue, the effects of detraining on muscle mass loss were similar across groups

Keywords: Fatigue, ACSA, Training Cessation, Full-Squat, Muscle Volume, Vastus Lateralis

A escassez na prática de exercícios físicos e o impacto no desempenho ocupacional de idosos institucionalizados.

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Abstract

Introduction

O envelhecimento populacional tem se tornado uma crescente pauta na sociedade, discussões acerca dos cuidados e necessidades específicas dessa população vem ampliando a demanda por cuidados de longa permanência, especialmente entre pessoas idosas com limitações funcionais e fragilidade social. Nesse contexto, as Instituições de Longa Permanência para Idosos (ILPIs) de maneira geral, apresentam rotinas frequentemente marcadas pelo sedentarismo e pela baixa participação em atividades físicas, fatores que podem impactar diretamente o desempenho ocupacional e a funcionalidade dos residentes. Assim, o presente estudo objetivou analisar a relação entre a ausência da prática de exercícios físicos e o impacto no desempenho ocupacional de idosos institucionalizados.

Methods

Trata-se de um estudo transversal, de abordagem quantitativa, realizado em uma ILPI de Sergipe. Participaram da coleta 40 pessoas idosas institucionalizadas, de ambos os sexos, com idade superior a 60 anos. Para coleta de dados foram utilizados um questionário sociodemográfico e a Medida de Independência Funcional (MIF), instrumento destinado à avaliação da funcionalidade nas atividades de vida diária. Os dados foram analisados por meio de estatística descritiva.

Results and Conclusions

Os resultados demonstraram predominância do sexo feminino (85%), com média de idade de $83,5 \pm 6,90$ anos. Os resultados obtidos sinalizam uma baixa frequência na realização de atividade física, sendo que 80% dos participantes relataram não praticar exercícios físicos, na sua rotina, além da reduzida frequência de saídas da instituição e preferência por atividades passivas, como assistir televisão. Em relação à funcionalidade, os menores escores foram encontrados nas categorias de locomoção ($9,60 \pm 4,40$) e conhecimento social ($14,7 \pm 6,04$), evidenciando limitações na mobilidade, resolução de problemas e participação ocupacional. Apesar de algumas atividades de autocuidado apresentarem relativa independência, verificou-se que a ausência de estímulos físicos e ocupacionais pode contribuir para o declínio funcional e diminuição do engajamento ocupacional. Conclui-se que a ausência da prática de exercícios físicos influencia negativamente o desempenho ocupacional de idosos institucionalizados, comprometendo principalmente aspectos relacionados à mobilidade, funcionalidade e participação nas atividades cotidianas. Dessa forma, destaca-se a importância da promoção de exercícios físicos e atividades significativas no contexto das ILPIs, visando favorecer a autonomia, qualidade de vida e o envelhecimento ativo, com atuação integrada da equipe multiprofissional.

Keywords: Exercício físico; Desempenho ocupacional; Pessoas idosas institucionalizadas; Funcionalidade; Instituição de Longa Permanência para Idosos.

The Impact of Training-Induced Fatigue on the Speed of U-17 Soccer Players

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Abstract

Introduction

The aim of this study was to analyze the impact of training-induced fatigue on 30-meter sprint performance in U-17 athletes. The sample consisted of 20 soccer players, aged 16 to 17, from Grupo Desportivo Fabril.

Methods

Data collection consisted of performing a 30-meter sprint before and after training on two separate days, with the average of the obtained values being considered. Data analysis was performed using Microsoft Excel, including descriptive statistics and the t-test for paired samples ($p \leq 0.05$).

Results and Conclusions

The results showed an increase in the average sprint time from the pre-training period (4.44 ± 0.18 s) to the post-training period (4.51 ± 0.21 s), indicating a decrease in performance. This difference was statistically significant ($p = 0.005$), with a small-to-moderate effect size ($d = 0.41$). It is concluded that training-induced fatigue negatively affects speed performance, highlighting the importance of proper training load management.

Keywords: Speed, Fatigue, Sprint, Athletes, Performance

PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION VERSUS CONVENTIONAL EXERCISES IN ROTATOR CUFF TENDINOPATHY: A RANDOMIZED CLINICAL TRIAL

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Abstract

Introduction

Rotator cuff tendinopathy (RCT) is one of the main causes of shoulder pain and disability, negatively affecting functionality and the performance of daily living activities. Although therapeutic exercises are widely recommended for its treatment, studies comparing conventional approaches and Proprioceptive Neuromuscular Facilitation (PNF) using patient-reported outcome measures remain scarce.

Methods

Objective: To compare the effects of a PNF-based protocol and conventional exercises on pain, function, fear-avoidance behavior, and patient satisfaction in individuals with RCT. **Methods:** A randomized, controlled, double-blind clinical trial registered in the Brazilian Registry of Clinical Trials (ReBEC; RBR-38xfyp5). Thirty-six participants diagnosed with RCT were randomly allocated into two groups: the PNF Group (PNFG) and the Conventional Group (CG). Both groups underwent three treatment sessions per week for four weeks. Outcome measures included upper limb function assessed by the Shoulder Pain and Disability Index (SPADI), pain intensity assessed by the Numeric Rating Scale (NRS), fear-avoidance behavior assessed by the Avoidance of Daily Activities due to Pain Scale (ADAP), treatment expectations, adherence, and patient satisfaction. Assessments were conducted at baseline, after two weeks, and at the end of the intervention.

Results and Conclusions

Results: Both groups showed significant improvements in function, pain, and fear-avoidance behavior over time ($p < 0.001$). SPADI scores decreased significantly in both groups; however, the PNFG demonstrated superior outcomes compared to the CG at week four ($p = 0.034$). Regarding pain intensity (NRS), both groups experienced significant symptom reduction ($p < 0.001$), with no significant between-group differences at post-intervention ($p = 0.297$). Similar findings were observed for ADAP scores, with significant within-group improvements ($p < 0.001$) but no significant between-group differences at the final assessment ($p = 0.341$). Treatment adherence was high in both groups, reaching 89% in the PNFG and 83% in the CG. Concerning satisfaction, 67% of participants in the PNFG reported being “very satisfied,” compared to 27% in the CG. **Conclusion:** Both interventions were effective in reducing pain and fear of movement while improving functional outcomes in individuals with RCT. However, PNF demonstrated superior functional improvement and higher patient satisfaction, suggesting

that this approach may represent a valuable therapeutic alternative for the rehabilitation of rotator cuff tendinopathy.

Keywords: Rotator Cuff Tendinopathy; Proprioceptive Neuromuscular Facilitation; Therapeutic Exercise; Rehabilitation; Shoulder.

Effects of Acute Nitrate Supplementation on Neuromuscular Recovery Following Resistance Exercise to Failure in Trained Women

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Abstract

Introduction

Resistance exercise performed to muscular failure induces metabolic disturbances and neuromuscular fatigue. Nitrate supplementation increases nitric oxide bioavailability, enhancing muscle perfusion, calcium handling, and contractile efficiency. However, its effects on neuromuscular recovery following exercise performed to muscular failure remain unclear. Therefore, this study aimed to investigate the effects of acute nitrate supplementation on neuromuscular recovery after resistance exercise performed to muscular failure in trained women.

Methods

Sixteen resistance-trained women participated in the study (27 ± 5 years; 62.6 ± 10.6 kg; $27.6 \pm 7.0\%$ body fat; $1RM = 198.6 \pm 44.0$ kg). During the first visit, participants performed three countermovement jumps (CMJ), three squat jumps (SJ), a one-repetition maximum (1RM) test on the 45° leg press, and familiarization procedures. During the subsequent visits, in a randomized, crossover, double-blind, and placebo-controlled design, participants ingested nitrate-rich beetroot juice (~ 12.8 mmol NO_3^-) or placebo (~ 0.92 mmol NO_3^-) 2.5 h before the experimental protocol. They then completed four sets of the 45° leg press at 60% of 1RM until concentric failure, with two-minute rest intervals between sets. Five minutes after exercise, CMJ and SJ performance were reassessed.

Results and Conclusions

A mixed two-way repeated-measures ANOVA showed no condition $\times$ time interaction for CMJ ($F(1,15) = 0.23$, $p = 0.638$, $\eta^2p = 0.015$) and SJ ($F(1,15) = 0.17$, $p = 0.680$, $\eta^2p = 0.012$). Additionally, no main effects of time or condition were observed ($p > 0.05$).

Keywords: Resistance Training; Beetroot Juice; Nitric Oxide

Differences in the knowledge acquired and consolidated by university students regarding first aid, depending on the level of interest and importance they demonstrate

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Abstract

Introduction

First aid training is an essential component of the preparation of university students studying Physical Activity and Sports Sciences, as it enables them to respond effectively to emergency situations in educational and sporting settings (Khrabra et al., 2025). However, various studies have shown that the level of first aid knowledge among the university population is often insufficient (Goktas et al., 2014; Run et al., 2019), highlighting the need to implement specific and structured training programmes. Although these interventions have proven effective in increasing first aid knowledge (Aljawfi et al., 2023; Brito et al., 2020; Yüksel et al., 2022), questions remain regarding the factors that determine their effectiveness. In this regard, interest in and the perceived importance of the content are considered relevant motivational variables in the learning process, as they can influence student engagement and the outcomes achieved (García-Blaya et al., 2025). However, there is limited scientific evidence on how interest or perceived importance influences the acquisition and consolidation of first aid knowledge among university students. For this reason, it is necessary to understand the differences that may arise in the acquisition and consolidation of first aid knowledge depending on students' interest and perceived importance. The objective was to analyse differences in the acquisition and consolidation of first aid knowledge following a training course, based on university students' perceived interest and importance.

Methods

A pre-experimental study with a pre-test/post-test design was conducted on a sample of 100 students on the bachelor's degree in physical activity and sport sciences (35 women and 65 men), with a mean age of 24.76 ± 5.5 years. All participants completed a university first aid course integrated into the module 'Fundamentals of Contingencies in Physical and Sports Activity', comprising 60 hours of training, divided equally between theoretical and practical content. The course covered aspects related to basic first aid procedures, wounds, trauma, allergies, cardiopulmonary resuscitation (CPR) and the use of an automated external defibrillator (AED). To assess the knowledge acquired and its retention, the "Questionnaire to assess the level of first aid knowledge" (Abraldes & Fonseca, 2019) was used, administered before and after the training session. The instrument consists of 30 items rated on a four-point Likert scale, designed to measure the level of first aid knowledge. Furthermore, the students indicated the degree of confidence associated with each response, which allowed the consolidated knowledge to be estimated by applying a correction factor (x^1 for very unsure and x^4 for very sure). Interest in the content and the importance perceived by the students were assessed using a 4-point Likert scale, where ^{1} indicated little interest/importance and 4 indicated a great

deal of interest/importance. After verifying the normal distribution of the data using the Kolmogorov-Smirnov test, parametric analyses were employed. To examine the differences between the scores obtained in the pre-test and post-test according to levels of interest and perceived importance, Student's t-test for paired samples was applied. Furthermore, the effect size was estimated using Cohen's d, classified as small (0.10–0.29), moderate (0.30–0.49), large (0.50–0.69) or very large (>0.70). The level of statistical significance was set at $p < 0.05$.

Results and Conclusions

In response to the interest shown by the students, it was observed that students with moderate and high levels of interest showed significant improvements in knowledge acquisition across most of the assessed content ($p < 0.001$ – 0.017). However, no significant improvements were observed in basic procedures or in wound care in the group with moderate interest ($p = 0.134$ and $p = 0.483$, respectively), nor in basic procedures in the group with high interest ($p = 0.652$). With regard to consolidated knowledge, a significant improvement was found across all content areas and levels of interest ($p < 0.001$). Regarding the importance perceived by the students, a similar pattern was observed, with significant improvements in knowledge acquisition across most content areas ($p < 0.001$ – 0.020). However, no significant differences were found in basic procedures ($p = 0.343$), wounds ($p = 0.617$) and CPR ($p = 0.070$) in the group that attributed moderate importance to the content, nor in basic procedures in the group with high perceived importance ($p = 0.126$). Consolidated knowledge increased significantly across all content areas and levels of perceived importance ($p < 0.001$ – 0.002). The university first-aid training course proved effective in promoting both the acquisition and consolidation of knowledge among students of Physical Activity and Sports Sciences, regardless of their level of interest or the importance they attributed to the subject. Although some specific differences were observed in certain content areas, particularly in basic procedures, wounds and CPR, the general improvement in consolidated knowledge suggests that the combination of theoretical and practical content helps to reinforce confidence and the assimilation of learning across all the motivational profiles analysed. These findings indicate that this type of training can be beneficial even when students do not initially perceive the content to be highly relevant, which reinforces the educational value of incorporating first aid programmes into university education. However, future research should analyse the long-term retention of this knowledge and explore in greater depth how motivational variables may influence outcomes differently depending on the type of content covered.

Keywords: Higher education; First aid; Interest; Knowledge; Perceived importance.

Differences in Maximum Isometric Force according to the menstrual cycle phase

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Abstract

Introduction

Historically, sports science research has exhibited a gender bias, extrapolating male-derived models to female physiology without considering the hormonal variability of the menstrual cycle. Estradiol and progesterone possess modulating effects on central nervous system excitability and peripheral contractile function, suggesting fluctuations in neuromuscular performance across different hormonal phases. The objective of this study was to compare lower-body Maximum Isometric Force (MIF) levels in physically active women across three key phases of the menstrual cycle: Follicular Phase (FP), Ovulatory Phase (OP), and Luteal Phase (LP).

Methods

A longitudinal, repeated-measures design was employed with a sample of 7 physically active, eumenorrheic women (age: 21.7 ± 4.3 years). Monitoring was conducted over two complete menstrual cycles, with phases determined using the chronological method. MIF was evaluated via an isometric squat test at 90° of knee flexion, utilizing Kinvent K-Deltas force plates. Data were analyzed using a repeated-measures ANOVA.

Results and Conclusions

Although no statistically significant differences were found between phases ($p = 0.084$), a large effect size was observed for MIF ($\eta^2p = 0.338$). Peak strength values were reached during the luteal phase (783.9 ± 246.9 N), while minimum values were observed during the ovulatory phase (734.2 ± 200.9 N). These results suggest a trend toward increased peak strength production capacity in the post-ovulatory window. The findings suggest that there is no clear pattern of neuromuscular performance linked to the menstrual cycle, contradicting some of the classic literature that places peak strength in the ovulatory phase.

Keywords: Menstrual cycle; maximum isometric force; female athlete; neuromuscular performance.

Mechanical and Metabolic Responses to Different Bench Press Loading Conditions Using the Same Absolute Velocity Loss Threshold

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Abstract

Introduction

Velocity loss (VL) has been proposed as a key indicator for monitoring intra-set fatigue, given its relationship with metabolic responses and performance decrements across different resistance training configurations (Sánchez-Medina & González-Badillo, 2011). VL thresholds have traditionally been prescribed using a relative approach. However, when these relative VL thresholds are applied across different loading conditions, the absolute VL attained differs. Consequently, equivalent relative VL thresholds may induce different levels of mechanical and metabolic fatigue depending on the relative load applied (Pareja-Blanco et al., 2019). Therefore, this study aimed to compare the mechanical and metabolic responses elicited by two bench press training protocols performed under distinct loading conditions ($1.3 \text{ m}\cdot\text{s}^{-1}$ vs. $0.7 \text{ m}\cdot\text{s}^{-1}$), while maintaining a standardized absolute VL threshold of $0.5 \text{ m}\cdot\text{s}^{-1}$.

Methods

Twenty-four resistance-trained men randomly performed two experimental protocols that differed only in the initial target velocity during the bench-press exercise [$1.3 \text{ m}\cdot\text{s}^{-1} \approx 30\%$ of 1RM (V30) vs. $0.7 \text{ m}\cdot\text{s}^{-1} \approx 65\%$ of 1RM (V65)]. In each protocol, participants completed a single set until reaching an absolute within-set VL threshold of $0.5 \text{ m}\cdot\text{s}^{-1}$. For V30, the set ended when participants reached a mean propulsive velocity of $0.8 \text{ m}\cdot\text{s}^{-1}$, whereas for V65, the set stopped when velocity declined to $0.2 \text{ m}\cdot\text{s}^{-1}$. Blood lactate concentrations were assessed before and 1 min 30 s after each protocol. Additionally, performance against the load associated with a mean propulsive velocity of $0.8 \text{ m}\cdot\text{s}^{-1}$ (V0.8-load) was evaluated through a set of three repetitions at baseline, 3 min 30 s post-exercise, and 24 h post-exercise to examine the recovery time course. The highest mean propulsive velocity attained was retained for subsequent analysis

Results and Conclusions

Significant “time effects” were reported for both lactate levels and V0.8-load, whereas no significant ‘protocol $\times$ time’ interaction was observed for any variable. Lactate levels increased significantly after both V30 and V65 ($p < 0.001$), with no differences between protocols. Furthermore, V0.8-load decreased significantly following both protocols and returned to baseline values 24 hours post-exercise. The present findings support the idea that the same absolute VL threshold can induce comparable mechanical and metabolic

fatigue responses under different loading conditions during the bench-press exercise, despite both protocols ending at different proximities to failure.

Keywords: Strength, fatigue, recovery

Relationship between extracurricular sports participation and flexibility and speed levels in adolescents.

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Abstract

Introduction

The present study aimed to analyse the relationship between extracurricular sports participation and physical fitness levels, specifically flexibility and speed, in middle and secondary school students.

Methods

The sample consisted of 290 students from the 7th, 10th and 12th grades of Escola Secundária de Palmela, aged between 12 and 19 years, including 137 male and 153 female participants. Data were collected through the FITescola battery, using the Sit and Reach test to assess flexibility and the 20 m sprint test to assess speed. Participants were divided according to the presence or absence of extracurricular sports participation. Descriptive and inferential statistical analyses were performed using independent samples t-tests.

Results and Conclusions

The results revealed statistically significant differences in the 20-meter sprint test, with students involved in extracurricular sports presenting lower average times compared to non-sport participants. Regarding flexibility, no statistically significant differences were observed between groups. These findings support the importance of regular physical activity and sports participation in the development of physical fitness during adolescence, particularly in motor performance-related capacities such as speed. The study also highlights the relevance of school-based fitness assessment tools, such as FITescola, in monitoring youth physical fitness and promoting healthy lifestyles.

Keywords: physical fitness; flexibility; speed; extracurricular sports participation; adolescents; FITescola.

The Influence of Caffeine on Anaerobic Training

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Abstract

Introduction

This review analyzes the influence of acute caffeine supplementation on anaerobic performance, focusing on maximal muscle strength, mechanical power, and localized muscle resistance.

Methods

The methodology was based on systematic reviews, meta-analyses, and umbrella reviews that integrated crossover clinical trials, double-blind, placebo-controlled. The sample, predominantly young and male, included 149 participants in the strength tests (116 men, 33 women) and 145 in the power tests (116 men, 29 women). Protocols consisted of ingesting 3 to 6 mg/kg of anhydrous caffeine 60 minutes prior to exercise.

Results and Conclusions

The results demonstrated significant overall improvements in 1RM dynamic strength (SMD = 0.20; $p = 0.023$) and vertical jump power (SMD = 0.17; $p = 0.047$). Upper-body strength responded robustly in free weights and machines, while lower-body strength was effective only in free weights. The improvement in power was exclusively significant in athletes (SMD = 0.23; $p = 0.025$). Muscular endurance revealed consistent improvements. However, results in the female subgroups did not present statistical significance. It is concluded that caffeine has a small but effective ergogenic effect on anaerobic performance, but its impact remains inconclusive in women due to the pronounced sex bias in the literature.

Keywords: Caffeine; Anaerobic Training; Muscular Strength; Mechanical Power; Ergogenic Resources; Meta-analysis.

Relation between Flexibility and Performance in Leg Press (1RM)

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Abstract

Introduction

This study investigated the relationship between the flexibility of different muscle groups and maximum strength performance (1RM) on the leg press among college students majoring in sports.

Methods

The sample consisted of 17 participants (11 males and 6 females), with an average age of 20.47 ± 4.16 years, height of 171.94 ± 7.20 cm, and weight of 69.95 ± 9.9 kg. They underwent assessment of maximum load on the Leg Press and three flexibility tests (Sit and Reach, Finger-to-Floor, and Weight-bearing Lunge), with the data analyzed using Pearson's correlation and multiple linear regression.

Results and Conclusions

The results indicated the absence of significant correlations in the overall sample ($p > 0.05$) and the failure of the predictive model, which did not achieve statistical significance and revealed a high standard error of the estimate (100.6 kg). The segmented analysis demonstrated that, in males, the correlations remained nonsignificant; however, in females, a positive and significant correlation ($r = 0.48$; $p = 0.03$) was observed in the Weight-bearing Lunge test. Despite this, multiple linear regressions failed to demonstrate predictive power across all sample subgroups. It is concluded that flexibility is not a viable predictor of maximum lower-body strength due to the lack of statistical significance in the models and the high associated error, although dorsiflexion range of motion may favor execution mechanics, suggesting that 1RM performance depends primarily on neuro-morphofunctional factors.

Keywords: Flexibility; 1RM; Leg Press; Sit-and-Reach; Finger-to-Floor; Weight-bearing Lunge; Stretch-Shortening Cycle; Maximum Strength; Differences between sexes.

The impact of strength production on agility in youth soccer players (U12 and U15 age categories)

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Abstract

Introduction

This study aims to analyze the influence of explosive strength on agility in youth soccer players, comparing data between the Under-12 (U-12) and Under-15 (U-15) categories.

Methods

Forty-one male athletes participated in the study, divided into U-12 (n = 21; 11.33±0.48 years; 141.12±32.69 cm; 39.37±7.75 kg) and U-15 (n = 20; 14.00±0.32 years; 168.25±11.33 cm; 58.11±14.78 kg) categories, and were assessed for agility using the T Test and for explosive strength through the Squat Jump (SJ) and Countermovement Jump (CMJ).

Results and Conclusions

The results showed statistically significant differences in all variables, with the U 15 group presenting superior performances ($p < 0.001$) and very large effect sizes for the T-Test ($d = 3.20$), CMJ ($d = 1.90$), and SJ ($d = 1.60$). Correlation analysis revealed a significant, strong negative relationship between strength and agility time in the U-12 category. However, in the U-15 category, this relationship was no longer statistically significant. Linear regression confirmed that the predictive capacity of pure concentric strength (SJ with $R^2 = 0.44$) is determinant in younger athletes, losing its influence in older ones, where agility depends on multifactorial components such as intermuscular coordination and biomechanical efficiency. In conclusion, explosive strength training has distinct impacts depending on the maturational stage, making it crucial to adapt training strategies to optimize motor performance throughout the developmental process.

Keywords: Keywords: explosive strength, agility, youth soccer, youth, biological maturation.

Effects of Two Multimodal Educational Programs (Online vs. In-Person) on Quality of Life in People with Multiple Sclerosis: A Randomized Controlled Trial

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Abstract

Introduction

Health-related quality of life (HRQoL) is a frequently affected domain in people with relapsing-remitting multiple sclerosis (RRMS).¹ Although multidomain educational programs (EPs) may contribute to symptom management and improved well-being, there is limited evidence regarding the most appropriate delivery modality, particularly when comparing supervised and individualized interventions (EP-IS) with self-guided online programs (EP-AW).^{2,3} Thus, the aim of the present study was to compare the effects of two delivery modalities of a multidisciplinary educational program (one supervised and individualized, and the other self-guided online) on HRQoL in individuals with RRMS.

Methods

A randomized controlled trial was conducted to compare two 12-week educational programs (EP-IS vs. EP-AW). The EP-IS included individualized strength-training sessions (three times per week at moderate intensity), a personalized Mediterranean-diet plan delivered by a nutritionist, and eight cognitive-behavioral therapy sessions led by a psychologist. The EP-AW included home-based elastic-band exercises (moderate RPE-based intensity), standardized dietary guidelines, and cognitive-behavioral therapy sessions delivered asynchronously through the ADVICE platform. Adults with RRMS, with EDSS <1 or >6 and clinically stable, were included. Mixed linear models were used with group, time, and group×time interaction as factors.

Results and Conclusions

A total of 46 participants were included in the analysis, 23 per group. Both groups were comparable at baseline in age, sex, and EDSS. The physical health dimension of the MSQoL-54 improved by +5.6 points in the EP-IS group and +4.7 points in the EP-AW group, with no significant time effect ($p = 0.201$) and no group × time interaction ($p = 0.907$). The mental health dimension improved by +5.8 and +4.8 points, respectively, with no significant time effect ($p = 0.147$) and no differences between programs ($p = 0.891$). Global quality of life improved by +4.3 points in the EP-IS group and +3.7 points in the EP-AW group, with no significant time effect ($p = 0.237$) and no differences between programs ($p = 0.938$). Adherence was higher in the supervised group for nutrition, psychology, and exercise, but these differences did not translate into statistical superiority

in quality-of-life outcomes. In conclusion, both programs were associated with improvements in the physical, psychological, and overall components of quality of life in individuals with RRMS. Although adherence was higher in the supervised modality, no statistically significant differences were observed between programs.

Keywords: relapsing-remitting multiple sclerosis; health-related quality of life; multidomain educational program; digital health; supervised intervention; physical exercise; randomized controlled trial.

Nonlinear Characterization of Speed Dynamics During a Continuous 4x4x4 Basketball Task: Spectral, Entropy and Change-Point Analysis

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Abstract

Introduction

Traditional external load analysis in basketball is commonly based on magnitude-related variables such as mean speed, maximum speed or distance covered. However, these metrics do not describe how movement fluctuations are temporally organized during continuous game-based tasks. Nonlinear approaches, such as spectral analysis, detrended fluctuation analysis and entropy-based measures, may provide complementary information about movement variability, regularity and adaptive organization. Therefore, this pilot study aimed to characterize the temporal structure of players' speed dynamics during a continuous 4x4x4 basketball task.

Methods

Ten male professional basketball players performed a continuous 4x4x4 basketball task. Speed data were collected at 100 Hz using an ultra-wideband local positioning system. The speed signal was filtered using a second-order zero-phase Butterworth low-pass filter with a 3 Hz cut-off frequency, selected after residual analysis and visual inspection. General descriptive statistics were calculated for each player. The spectral structure of the speed signal was examined using Welch's power spectral density, and the spectral exponent β was estimated within the 0.05–2.0 Hz frequency band. Detrended fluctuation analysis was used to estimate the scaling exponent α and assess long-range temporal correlations. Sample Entropy was calculated using rolling windows of 2 s with a 1 s step, with parameters $m = 2$ and $r = 0.2 \times \text{SD}$. Change-point analysis was then applied to the rolling entropy time series using the PELT algorithm, without forcing the detection of breakpoints.

Results and Conclusions

Spectral analysis showed brown-like β values in all players, indicating that speed fluctuations were dominated by low-frequency, persistent components. In contrast, DFA showed pink-like α values across players, suggesting long-range temporal correlations and a non-random multiscale organization of movement. These findings indicate that the continuous 4x4x4 task generated temporally structured speed dynamics rather than random fluctuations. Rolling Sample Entropy allowed the characterization of local changes in movement regularity throughout the task, while non-forced change-point analysis was used to identify meaningful transitions in entropy only when sufficiently clear changes were present. Overall, these preliminary results suggest that nonlinear analyses provide relevant complementary information to traditional external load metrics, highlighting the importance of considering not only how much players move, but also how their movement is temporally organized during basketball-specific tasks.

Keywords: Basketball; external load; speed; spectral analysis; Sample Entropy; detrended fluctuation analysis; change-point analysis.

Menstrual cycle affects psycho-emotional readiness and session rating of perceived exertion in resistance-trained women with premenstrual syndrome

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Abstract

Introduction

Symptoms of Premenstrual Syndrome (PMS) may negatively affect physical performance; however, it remains inconclusive whether psycho-emotional readiness and session rating of perceived exertion (sRPE) during resistance training is affected by menstrual cycle (MC). This study investigated potential changes in motivation, affectivity, and sRPE during resistance training performed in different phases of the MC in women with PMS.

Methods

Ten resistance-trained women (27.8 ± 4.8 year; 164.3 ± 6.4 cm; 68.2 ± 10.2 kg), with natural regular MC and diagnosed with PMS, were evaluated in early follicular (EF), late follicular (LF), and late luteal (LT) phases. Participants performed three resistance training sessions in each phase with a standardized external load. Symptoms of PMS, motivation and affectivity were assessed prior each training session, while sRPE was recorded 30 minutes after the training session. The average between the three sessions into a given MC phase was used for analysis. After confirmation of normality via Shapiro-Wilk test, data were analyzed using repeated measures ANOVA with Bonferroni-adjusted post hoc test. Statistical significance was set at $p < 0.05$.

Results and Conclusions

There was a significant effect of MC phases on symptoms of PMS, motivation, affectivity, and sRPE ($P < 0.01$). Symptoms of PMS were more pronounced and motivation and affectivity were lower in the EF and LT phases than in the LF phase ($p \leq 0.01$), without differences between EF and LF ($p > 0.05$). The sRPE was higher in the EF phase (6.6 ± 1.0 a.u.) compared to LF and LT phases (5.0 ± 1.3 and 5.4 ± 1.0 a.u.; respectively; $p \leq 0.006$), with no differences between LF and LT phases ($p = 0.46$). In conclusion, resistance-trained women with PMS exhibit lower motivation and affectivity during the EF and LT phases, and higher sRPE in the EF phase. These findings suggest strategies aimed at enhancing pre-exercise motivation and affectivity in women with PMS.

Keywords: Menstruation; Menses; Premenstrual symptoms, Internal training loads; Physical performance.

Role of Structured Physical Activity in Managing Musculoskeletal Pain and Improving Pregnancy-Related Health Outcomes: A Review of Evidence

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Abstract

Introduction

Background and Objective: Pregnancy is a natural yet critical period accompanied by extensive physiological, hormonal, and anatomical changes. These alterations, including weight gain, shifts in the center of gravity, postural adjustments, and hormonal effects on ligaments, often contribute to musculoskeletal pain and dysfunction, particularly low back pain and pelvic girdle pain, which can adversely affect maternal well-being and pregnancy-related health outcomes. This study aims to review the evidence regarding the role of structured physical activity in managing musculoskeletal pain and improving maternal and pregnancy-related health outcomes.

Methods

This systematic review was conducted through electronic searches in reputable national and international databases (including PubMed, Web of Science, ScienceDirect, Google Scholar, IranDoc, SID, and Magiran) from 2000 to 2024. After the initial screening of 2,100 articles, 94 relevant and high-quality studies were selected for final analysis.

Results and Conclusions

The findings indicate that structured and supervised physical activity programs, particularly aquatic exercises, motor control training, and strengthening exercises, effectively reduce musculoskeletal pain, improve postural stability and balance, support appropriate gestational weight gain, and enhance quality of life during pregnancy. Furthermore, regular physical activity before and during pregnancy is associated with improved pregnancy-related health outcomes, including a reduced risk of obesity, gestational diabetes, excessive gestational weight gain, preterm birth, and cesarean delivery. Evidence suggests that structured physical activity represents an effective non-pharmacological strategy for managing pregnancy-related musculoskeletal pain and promoting favorable maternal and pregnancy-related health outcomes. The integration of professionally supervised exercise programs with musculoskeletal assessment and body mass index management before and during pregnancy may contribute substantially to maternal and fetal health and reduce pregnancy-related complications.

Keywords: Pregnancy, Physical activity, Musculoskeletal pain, Exercise interventions, Pregnancy outcomes, Body mass index, Balance, Posture, Low back pain

Relationship Between Maturational Status and Quantitative Biometric Indicators in Elementary and Secondary School Students

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Abstract

Introduction

This study examined the relationship between chronological age, as an indirect indicator of maturational status, and physical fitness indicators assessed through the FITescola test battery, in a sample of 163 students from basic and secondary education distributed across the 7th (n = 59), 10th (n = 30) and 12th grade (n = 74), aged between 11 and 19 years.

Methods

Six physical fitness components were evaluated: speed (40-metre sprint), aerobic endurance (mile run), abdominal muscular endurance (curl-ups), lower limb explosive strength (standing broad jump), upper limb muscular endurance (push-ups) and flexibility (sit and reach). Statistical analysis included descriptive statistics, one-way ANOVA, independent-samples Student's t-test and Pearson correlation coefficient, with the significance level set at $\alpha = 0.05$.

Results and Conclusions

Relação entre Estado Maturacional e Indicadores Biométricos Quantitativos em Estudantes do Ensino Básico e SecundárioResults revealed statistically significant differences in five of the six variables analysed, with a consistent pattern of performance improvement associated with advancing school year. Differences were concentrated in comparisons involving the 7th grade, with no significant differences observed between the 10th and 12th grade in any variable. The standing broad jump showed the most expressive evolution ($d = 1.13$; $r = 0.529$), while flexibility stabilised from the 10th grade onwards. Chronological age showed significant associations with all variables assessed, supporting its utility as a proxy for maturational development in school settings.

Keywords: Biological maturation; physical fitness; FITescola; chronological age; base and secondary education; physical development

Isometric Strength-Based Assessments and Physical Interventions in Cancer Patients: A Systematic Review

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Abstract

Introduction

Cancer is currently one of the major public health problems worldwide due to the increasing incidence of the disease and the growing survival rates among patients, which has led many patients to live with long-term side effects. In this context, physical exercise has been shown to be an effective strategy to improve functionality and quality of life. However, due to the functional decline experienced by many cancer patients, it is necessary to explore alternative training strategies, among which isometric strength training can be found. The main objective of this systematic review was to analyze the effectiveness of isometric strength-based assessments and physical interventions in patients with cancer.

Methods

A systematic review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The systematic search was performed on March 10, 2026, by two independent researchers in the main scientific databases: PubMed, Scopus, and Web of Science. The inclusion criteria were defined according to the PICOS structure and included adults over 18 years of age undergoing cancer treatment or cancer survivors, studies involving isometric strength training programs or the use of isometric tests for strength assessment, and outcomes related to physical function, performance, or strength. Studies with or without a control group were considered eligible. The search identified 967 initial records, of which 9 studies were finally included in the review after removing duplicates and applying the selection criteria.

Results and Conclusions

Of the 9 studies included, 6 used isometric methods for strength assessment, while 3 examined isometric training interventions. The results show that isometric assessments were useful as simple and feasible tools to identify physical decline in cancer patients. Regarding isometric training, the reviewed studies suggest potential improvements in muscle strength and physical function, with good safety and feasibility in this population. Isometric strength-based assessments and interventions may be a useful strategy in oncology rehabilitation, although further studies with standardized protocols and long-term follow-up are needed.

Keywords: Oncology rehabilitation; Muscle strength; Physical function; Functional assessment.

Physical Activity, Hardiness, and Life Expectancy as Correlates of Life Satisfaction

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Abstract

Introduction

This study aimed to examine the relationship between hope (life expectancy), psychological hardiness, and life satisfaction among male high school students, with emphasis on physical activity. Adolescence is a critical developmental period, and psychological factors such as hope and hardiness play an important role in mental well-being. Regular physical activity has also been suggested as a factor that may enhance psychological resilience and life satisfaction. Therefore, this study compared athlete and non-athlete students to investigate how hope and hardiness predict life satisfaction.

Methods

This research used a descriptive, correlational, and causal-comparative design. The population included 1,415 male high school students in Piranshahr city (2022–2023). A total of 302 students were selected using Morgan's table, including 15 athletes and 15 non-athletes. Athletes were selected through convenience sampling, while non-athletes were selected randomly. Athletes were defined as students with at least two years of regular training and at least three sessions per week. Data were collected using three standardized questionnaires: • Life Expectancy (Hope) Scale • Psychological Hardiness Questionnaire • Satisfaction with Life Scale (Diener) Data were analyzed using SPSS with Pearson correlation and stepwise multiple regression ($p < 0.05$).

Results and Conclusions

Findings showed that both hope and psychological hardiness were positively and significantly related to life satisfaction. Hope was a moderate predictor of life satisfaction and explained 11% of the variance. When hardiness was added, the explained variance increased to 15%. Results also indicated a positive relationship between hope and hardiness. Students with higher hope and hardiness reported greater life satisfaction. These variables were stronger predictors among athlete students, suggesting that physical activity may enhance psychological well-being. Hope and psychological hardiness are significant predictors of life satisfaction among high school students. Physical activity appears to support the development of these psychological resources, leading to improved mental well-being. Therefore, encouraging regular sports participation in schools may enhance students' psychological health and overall life satisfaction.

Keywords: Hope; Psychological Hardiness; Life Satisfaction; Physical Activity; Adolescents; Students

Analysis of the Influence of the Menstrual Cycle on Physiological Stress in Professional Female Footballers

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Abstract

Introduction

Research specifically designed to investigate menstrual cycle physiology in female athletes remains limited (McGawley et al., 2023). Although some evidence suggests that physical performance may be slightly reduced during the early follicular phase compared with other phases of the menstrual cycle, findings remain inconsistent and no clear scientific consensus has been established (McNulty et al., 2020). Therefore, longitudinal studies examining the relationship between menstrual cycle phases and performance variables are needed.

Methods

A quantitative, observational, and longitudinal study was conducted over a three-month period involving 16 professional female soccer players. External load variables were collected during training sessions and official matches using GPS devices and included relative distance covered ($\text{m} \cdot \text{min}^{-1}$) and distance covered at intensities corresponding to 75–85%, 85–95%, and 95–100% of maximal speed. Menstrual cycle phases were monitored using the Clue application. Data were analysed using linear mixed models, with menstrual cycle phase as a fixed effect and player as a random effect.

Results and Conclusions

A total of 470 observations were analysed. No significant effect of menstrual cycle phase was observed on relative distance covered ($F(5,450)=0.14$, $p=.984$), distance covered at 75–85% of maximal speed ($F(5,405)=1.20$, $p=.306$), 85–95% of maximal speed ($F(5,414)=0.89$, $p=.485$), or 95–100% of maximal speed ($F(5,451)=1.06$, $p=.381$). Although higher mean values were generally observed during the predicted ovulation phase, these differences were not statistically significant. These findings suggest that external training load remains relatively stable across menstrual cycle phases in professional female soccer players.

Keywords: Menstrual cycle, performance, relative distance, maximal speed

Influence of Menstrual Bleeding on Muscle Oxygenation During Squat Tasks in Physically Active Women

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Abstract

Introduction

Interest in understanding the influence of the menstrual cycle on physiological responses to exercise has increased considerably over the last decade. Fluctuations in estrogen and progesterone concentrations throughout the menstrual cycle may affect several physiological systems related to physical performance, including cardiovascular function, energy metabolism, and tissue perfusion. However, current evidence regarding their impact on exercise performance and muscular responses remains inconsistent, showing substantial inter-individual variability (Carmichael et al., 2021). Near-infrared spectroscopy (NIRS) allows the non-invasive assessment of muscle oxygen saturation (SmO_2) and local hemodynamic changes during exercise. This technology has been shown to be a valid tool for monitoring oxygen availability and utilization within skeletal muscle during different exercise modalities (Beever et al., 2020; Orcioli-Silva et al., 2024). More recently, several studies have begun to investigate the potential influence of the menstrual cycle on muscle oxygenation, suggesting that hormonal fluctuations may alter local oxygen delivery and utilization during exercise and recovery. Nevertheless, the available evidence remains limited and findings are still inconclusive (Baker et al., 2026; Tagliapietra et al., 2025). Therefore, further research is needed to better understand muscle oxygenation responses during functional tasks commonly performed in training settings. The aim of the present study was to analyze the influence of menstrual bleeding status on muscle oxygen saturation and total hemoglobin concentration during isometric and dynamic squat tasks in physically active women.

Methods

Participants Thirteen physically active women participated in the study (age: 24.46 ± 3.02 years). **Menstrual Status Assessment** Menstrual status was determined using the Flo application as a prospective menstrual bleeding tracking tool. Assessments were classified into two conditions: • Bleeding phase. • Non-bleeding phase. **Instrumentation** Muscle oxygen saturation (SmO_2) and total hemoglobin concentration (THb) were continuously recorded using two MOXY Monitor devices positioned over the vastus lateralis of both quadriceps muscles. **Experimental Procedure** Participants completed the following protocol: 1. Seated rest: 2 minutes. 2. Isometric squat: 1 minute. 3. Recovery period: 2 minutes. 4. Dynamic squat: 2 minutes, performing one squat every 3 seconds. 5. Final recovery: 3 minutes. Physiological variables were continuously recorded throughout the entire protocol. **Statistical Analysis** Data were analyzed using linear mixed models. Menstrual status (bleeding vs. non-bleeding), task, and measurement time were included as fixed effects, while participant was included as a random effect to account for repeated measurements. Statistical significance was set at $p < .05$.

Results and Conclusions

Results The linear mixed model revealed a significant effect of menstrual status on muscle oxygen saturation ($F = 72.1$, $p < .001$). SmO_2 values were significantly lower during the bleeding phase compared with the non-bleeding phase ($\beta = -1.72$; 95% CI $[-2.12, -1.33]$; $p < .001$). Significant effects were also observed for task and measurement time ($p < .001$). Regarding total hemoglobin concentration, a significant effect of menstrual status was found ($F = 22273.5$, $p < .001$). THb values were slightly higher during the non-bleeding phase compared with the bleeding phase (11.587 ± 0.055 vs. 11.538 ± 0.055 ; difference = 0.049; $p < .001$). **Conclusions** Menstrual bleeding status appears to influence muscle oxygenation responses during squat exercise in physically active women. Specifically, lower muscle oxygen saturation values were observed during the bleeding phase, accompanied by small but significant differences in total hemoglobin concentration. These findings suggest that menstrual bleeding may affect local oxygen dynamics during exercise and highlight the importance of considering menstrual status when monitoring physiological responses and planning training programs for physically active women.

Keywords: Menstrual cycle; menstruation; muscle oxygen saturation; NIRS; MOXY Monitor; physically active women.

Análisis de lesiones y factores de riesgo en nadadores que compiten al menos en dos estilos diferentes de natación, utilizando el test OSTR-02 y OSTRC-H2.

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Abstract

Introduction

La natación competitiva presenta una persistente prevalencia de lesiones en hombro, rodilla y columna, (Adiele y Morgan, 2018; Nahar, Martínez, Cara y Berral de la Rosa, 2020) originadas por factores como la técnica, la edad y el volumen de entrenamiento y los años de práctica (Divyanka y Dahiya, 2018). Aunque el dolor de hombro genera consenso científico como la principal patología, la literatura actual se divide al determinar si la rodilla o la zona lumbar ocupa el segundo lugar en incidencia. Estas afecciones limitan el rendimiento deportivo e impactan negativamente la calidad de vida diaria del nadador. Ante esta falta de unanimidad, el propósito de este estudio es identificar y clasificar las lesiones principales en nadadores que compiten en diferentes estilos en periodos breves. Para ello, se examinará la relación directa entre la planificación del entrenamiento y las lesiones producidas.

Methods

Durante la temporada competitiva 2020-2021, 159 nadadores amateurs que participaban en competiciones oficiales con diferentes clubes de natación en la Comunidad Valenciana (España), participaron en esta investigación. Con edades comprendidas entre 1'y 2'años. Todos los nadadores que conformaron el estudio complementaron de manera satisfactoria los test OSTR-02 y OSTRC-H2.

Results and Conclusions

RESULTADOS: Se observó que algunos nadadores no profesionales que participan en competiciones oficiales se lesionan sobre todo en el hombro (27%), en rodilla (17'6%) y columna (8'2%). El 36% de los nadadores modificó su entrenamiento: 28% levemente y 8% de forma moderada. Esto indica que la mayoría (64%) pudo continuar entrenando sin cambios. Asimismo, se observa que existe relación directa entre la zona de dolor y el volumen de entrenamiento, además de influir significativamente el estilo que utiliza el nadador durante los entrenamientos. **CONCLUSIÓN:** Los nadadores amateurs en competiciones oficiales se lesionan principalmente en el hombro, condicionados por la carga metodológica y la especialización biomecánica. El volumen de entrenamiento y el perfil de estilos determinan la localización del dolor. Esto demuestra la necesidad de individualizar los programas de prevención y compensación muscular. Así, se podrá mitigar el impacto musculoesquelético y optimizar el rendimiento.

Keywords: Palabras clave: Entrenamiento de natación, lesiones, rendimiento, nadadores amateurs, competiciones oficiales.

200-meter sprint as a practical and low-cost tool to estimate muscle power in recreational runners.

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Abstract

Introduction

While running performance is traditionally explained by factors such as VO_2max , running economy, and metabolic thresholds, some findings indicates that neuromuscular variables, particularly muscle power, can also influence running performance. However, the gold-standard method for measurement of muscle power, such as Countermovement Jump (CMJ) and Squat Jump (SJ), requires high-cost equipment as force platform or contact mat, resulting in limited applicability for recreational runners. Thus, the aim of the current study was to propose a 200-meter sprint test as a practical and accessible alternative to indirectly estimate muscle power in recreational runners.

Methods

Twenty recreational runners (10 men and 10 women) participated in the study. After a familiarization session, participants executed two experimental sessions in a randomized and counterbalanced order, each consisting of a jump protocol (CMJ or SJ) and two maximum 200-meter sprints [on flat or uphill terrain (14-meter elevation gain, 4-degree, 7% gradient)].

Results and Conclusions

Significant correlations were found between sprint time on flat (s) and power ($\text{W}\cdot\text{kg}^{-1}$) of the CMJ and SJ jumps ($r = -0.896$ and -0.884 , $p < 0.001$), as well as between sprint time on uphill and power of CMJ and SJ jumps ($r = -0.884$ and -0.880 , $p < 0.001$). Using ROC curve analysis, sprint time on flat and hill showed similar accuracy in discriminating men from women, with AUC values ranging from considerable to excellent ($\text{AUC} > 0.91$, $p < 0.01$), high sensitivity ($\geq 90\%$), and specificity ($\geq 90\%$). In conclusion, the 200-meter sprint can be considered a practical and accessible tool for estimating muscle power in recreational runners of both sexes.

Keywords: Muscle Power, Performance, Indirect Test, Recreational Runners.

The Influence of Supplements Used During the Menstrual Cycle

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Abstract

Introduction

The menstrual cycle is a cyclical biological process regulated by hormonal changes, especially at the level of estrogen and progesterone. These changes influence several systems of the body and can cause physical, emotional and behavioral symptoms. Among the The most common symptoms are menstrual pain, mood changes, anxiety, irritability, fatigue, abdominal swelling, breast discomfort and decreased general well-being. Although the menstrual cycle is a natural process, associated symptoms can vary quite a lot from person to person. In some cases, symptoms are mild and do not interfere significantly with the daily routine. In others, they can affect quality of life, participation school or professional, sports practice and social relationships. For this reason, studies have been different strategies to reduce the negative impact of these symptoms. In recent years, nutritional supplementation has gained importance as a possible complementary strategy for controlling menstrual pain and premenstrual tension. Supplements such as curcumin, vitamin D, zinc, calcium, magnesium, omega-3 and ginger have been investigated due to its anti-inflammatory, antioxidant, neuromuscular and analgesics. Therefore, this work aims to analyze how these supplements can influence symptoms associated with the menstrual cycle, based on scientific articles.

Methods

The search for articles was carried out in academic databases and search engines, namely Google Scholar, PubMed, ScienceDirect, SpringerLink and journal databases scientific.

Results and Conclusions

We conclude that supplementation may be a useful complementary strategy to improve symptoms associated with the menstrual cycle, such as pain, anxiety and mood changes. However, supplements do not replace a balanced diet or professional support when necessary.

Keywords: menstrual cycle; supplementation; premenstrual syndrome; dysmenorrhea; nutrition

ANALYSIS OF INJURIES AMONG THE BRAZILIAN DELEGATION AT THE SOUTH AMERICAN SCHOOL GAMES – A CROSS-SECTIONAL STUDY

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Abstract

Introduction

Epidemiological surveillance of injuries at sporting events allows for the identification of patterns of occurrence and supports preventive actions aimed at athletes.

Methods

This cross-sectional epidemiological study aimed to analyze the profile of musculoskeletal injuries among Brazilian athletes participating in the 2023 South American School Games, held in Santiago, Chile, and Asunción, Paraguay. A total of 202 athletes under 15 years of age, from different sports, were evaluated using an injury surveillance system based on emergency and outpatient physiotherapy care during the competitions. Variables related to sex, type of injury, anatomical location, injury mechanism, therapeutic approach, and hospital referral were analyzed using descriptive statistics, chi-square test, and Fisher's exact test ($p < 0.05$).

Results and Conclusions

A total of 272 physiotherapy sessions were conducted, predominantly among female athletes (57.4%). Athletics had the highest number of sessions (34.2%), followed by judo (14.7%) and basketball (12.1%). Muscle (47.9%) and joint (40.4%) injuries were the most frequent, mainly affecting the lower limbs, especially the knee, thigh, and ankle. Most injuries were atraumatic (84.9%) and managed on an outpatient basis (59.9%), with a low rate of hospital referral (6.6%). No significant differences were observed between the sexes regarding the type or location of the injuries. These findings suggest that non-traumatic lower limb injuries have a high prevalence among Brazilian school athletes and may contribute to the development of preventive strategies and the planning of healthcare in youth multisport competitions.

Keywords: Injury; Health Surveillance System; Epidemiological Studies; Sports Medicine; Athletes.

Impacto da atividade física no controle Inibitório de crianças de 8 a 11 anos diagnosticadas com TDAH.

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Abstract

Introduction

O Transtorno do Déficit de Atenção com Hiperatividade (TDAH) é um transtorno do neurodesenvolvimento caracterizado por sintomas de desatenção, hiperatividade e impulsividade, que podem comprometer significativamente o desempenho acadêmico, social e emocional das crianças. Entre os déficits cognitivos mais frequentemente observados nessa população destaca-se o comprometimento do controle inibitório, considerado uma das principais funções executivas relacionadas à capacidade de controlar respostas impulsivas e regular o comportamento. Evidências científicas indicam que intervenções baseadas em atividade física e psicoterapia, especialmente a Terapia Cognitivo-Comportamental (TCC), podem contribuir para a melhora das funções executivas em crianças com TDAH. Entretanto, ainda são limitados os estudos que comparam os efeitos dessas abordagens sobre o controle inibitório.

Methods

Trata-se de um ensaio clínico controlado e randomizado composto por 16 crianças com diagnóstico clínico de TDAH, com idades entre 8 e 11 anos. Os participantes serão distribuídos aleatoriamente em dois grupos: Grupo Atividade Física e Grupo Psicoterapia, ambos os grupos participarão de um programa de oito semanas, com duração de 50 minutos e 3 sessões semanais. Inicialmente, serão realizadas triagem, anamnese estruturada e aplicação da escala SNAP-IV junto aos responsáveis. O controle inibitório será avaliado por meio do protocolo Go/No-Go, considerando indicadores como tempo de reação e taxa de erros. O Grupo Atividade Física participará de um programa estruturado envolvendo exercícios aeróbicos e sessões de psicoterapia voltada a demandas cognitivas voltadas ao desenvolvimento das funções executivas e impulsividade. O Grupo Psicoterapia participará de um programa baseado na Terapia Cognitivo-Comportamental associada ao treino cognitivo, utilizando atividades lúdicas e terapêuticas direcionadas ao controle inibitório, impulsividade e tomada de decisão e exercícios combinados (aeróbicos + coordenação + demandas cognitivas). Ao final das intervenções, os participantes serão reavaliados utilizando os mesmos instrumentos aplicados na avaliação inicial.

Results and Conclusions

Espera-se conseguir avaliar qual das intervenções traz mais promove melhorias significativas no controle inibitório das crianças com TDAH, refletidas na redução dos comportamentos impulsivos. Além disso, espera-se observar ganhos no autocontrole, na autorregulação comportamental e no desempenho das funções executivas. A comparação entre os grupos poderá fornecer evidências sobre a eficácia relativa das intervenções propostas. A presente pesquisa busca ampliar o conhecimento acerca dos efeitos da

atividade física e da psicoterapia no controle inibitório de crianças com TDAH. Espera-se que os resultados contribuam para o desenvolvimento de intervenções mais eficazes e para a promoção do desenvolvimento cognitivo e comportamental dessa população. Além disso, o estudo poderá ampliar as evidências científicas sobre intervenções não farmacológicas no TDAH, fornecendo subsídios para futuras pesquisas e para a prática clínica e educacional.

Keywords: Transtorno do Déficit de Atenção com Hiperatividade; Controle Inibitório; Atividade Física; Criança; Funções Executivas.

The Influence of Body Composition on the Performance and Asymmetry of the Single-Leg Hop in Sports Sciences Students

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Abstract

Introduction

Mechanical power and the propulsive capacity of the lower limbs are vital determinants in sports performance. The Single-Leg Hop (SLH) emerges as an ecological field test to evaluate horizontal explosive strength and detect functional asymmetries. However, the expression of this capacity can be modulated by the individual's anthropometric profile and body composition. Objective: To analyze the influence of body composition, specifically Body Fat percentage (%BF) and Total Muscle Mass (TMM), on the absolute performance and Asymmetry Index (AI) of the SLH.

Methods

The sample consisted of 32 male university students enrolled in a Sports Sciences degree ($13.09 \pm 4.42\%$ BF; 31.3 ± 4.76 kg TMM). Body composition was assessed via electrical bioimpedance (Tanita MC-780MA), and neuromuscular performance was evaluated using the best of three maximal horizontal jumps for each leg. The AI was calculated using a standard literature formula. Statistical and correlational analyses were performed using IBM SPSS Statistics software, version 30.0 ($p < 0,05$).

Results and Conclusions

Results: The mean distance achieved in the horizontal jump was 2.00 ± 0.20 m, with a mean AI of $3.76 \pm 3.13\%$. Pearson's correlational analysis demonstrated the expected mechanical trends, albeit without statistical significance: a weak negative correlation was found between %BF and jump distance ($r = -0,118$; $p = 0,519$), and a weak positive correlation with TMM ($r = 0,031$; $p = 0,864$). Positive correlations were observed between the AI and %BF ($r = 0,203$; $p = 0,264$), as well as with TMM ($r = 0,256$; $p = 0,156$). Conclusions: Fat mass tends to act as a mechanical limiter of absolute performance ("dead weight") and a catalyst for bilateral asymmetries. However, in populations with high motor literacy and proficiency, such as Sports Sciences students, neuromuscular control factors appear to mitigate and compensate for the negative impact of adiposity on the final ballistic performance.

Keywords: Body Composition; Explosive Strength; Single-Leg Hop; Bilateral Asymmetry; Sports Students.

Muscle Mechanical Properties and Clinical Laterality in People with Multiple Sclerosis: An Exploratory Analysis Using Myotonometry in the ADVICE Project

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Abstract

Introduction

Multiple sclerosis (MS) typically presents with clinical asymmetry, manifesting as greater weakness in one leg (1) and symptoms such as spasticity, which alters muscle tone and properties. Although its assessment is usually based on clinical scales (2), myotonometry (MyotonPro®) allows for the objective quantification of tissue tension, stiffness, and elasticity, which are altered by spasticity. The objective of this study was to analyze the relationship between muscle mechanical properties assessed via myotonometry and the clinical laterality of the leg perceived as most affected in individuals with MS.

Methods

Thirty-six participants (28 women and 8 men) were recruited through the MS Unit of the Hospital Virgen de la Arrixaca in Murcia. The leg perceived as most affected was recorded, and muscle mechanical parameters were evaluated bilaterally using the MyotonPro® in the vastus medialis, vastus lateralis, rectus femoris, Achilles tendon, medial gastrocnemius, and lateral gastrocnemius. Right-left anatomical asymmetries were analyzed across the entire sample using the paired-samples Student's t-test. The comparison between the clinically most affected leg and the less affected leg was performed in 32 participants using the paired-samples Student's t-test, calculating the difference Δ = affected leg - unaffected leg, the 95% confidence interval (95% CI), and the paired Cohen's d. As a complementary exploratory analysis, the capacity of right-left Δ to classify clinical laterality was evaluated using ROC analysis, expressed as the area under the curve (AUC), and through a multivariable model with cross-validation. Statistical significance was set at $p < 0.05$.

Results and Conclusions

Right-left anatomical asymmetries were observed in 9 out of 24 variables, with 6 additional trends, indicating the presence of muscle mechanical asymmetry, though not necessarily clinical. In the affected vs. unaffected comparison, the only statistically significant difference was observed in vastus lateralis frequency, with higher values in the affected leg compared to the unaffected leg (13.89 ± 2.80 vs. 13.38 ± 2.34 ; $\Delta = 0.512$; 95% CI = 0.024 to 1.001; $p = 0.048$; $d = 0.363$). Vastus lateralis stiffness showed a trend in the same direction (282.0 ± 81.9 vs. 267.64 ± 70.48 ; $\Delta = 14.369$; $p = 0.098$; $d = 0.301$). However, right-left deltas did not allow for a robust classification of clinical laterality (maximum individual AUC = 0.659; cross-validated model AUC = 0.617); therefore,

these results should be interpreted as exploratory. Overall, the MyotonPro® can provide complementary information regarding the mechanical state of muscle tissue, particularly in relation to vastus lateralis tone, but in this sample, it did not reliably explain or predict the clinically more affected leg.

Keywords: spasticity; myotonometry; neuromuscular function; tissue stiffness; objective assessment.

Influence of Specific Warm-up on the Outcome of the Two-Legged Jump

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Abstract

Introduction

The ability to produce explosive force, particularly through the two-footed jump, is a fundamental motor skill in most sports, whether individual or team (such as basketball, volleyball, or athletics). Performance in this action depends on the neuromuscular system's ability to generate maximum force in the shortest possible time. To optimize performance in these high-intensity, short-duration actions, prior warm-up is a widely used strategy. The main objective of warm-up is to prepare the athlete physiologically and psychologically for exertion, promoting an increase in body temperature, improved blood circulation, and accelerated metabolism. However, warm-up can be divided into components: general warm-up (low-intensity exercises, such as light jogging) and specific warm-up (movements that mimic the sporting action, often involving higher intensity or plyometric exercises). The main research problem of this study is to understand whether the addition of a specific warm-up protocol brings additional and measurable benefits to the performance of the two-footed jump, compared to a purely general warm-up. It becomes essential to understand whether more targeted neuromuscular stimuli can enhance an individual's jumping ability, information that is crucial for coaches and physical trainers in structuring training and pre-competition routines.

Methods

This study adopts a quasi-experimental design with a cross-subject design. Each participant will be evaluated on two different days/time points to avoid the influence of fatigue, serving as their own control. On Day 1, participants will perform only a general warm-up before the jump assessment. On Day 2, they will perform a general warm-up followed by a specific warm-up before the assessment. The independent variable corresponds to the type of warm-up protocol (general vs. specific), while the dependent variable is performance in the two-foot jump (maximum height achieved).

Results and Conclusions

Aqui tens a tradução para inglês, mantendo o tom técnico e académico adequado para um artigo científico: Discussion of Results The present study aimed to evaluate the impact of a specific warm-up protocol on standing long jump performance compared to a no-warm-up condition. The initial hypothesis predicted that the application of a specific warm-up would result in a statistically significant increase in standing long jump performance, derived from greater neuromuscular activation. The results obtained (Table 1) fully confirm the established hypothesis, as a cross-sectional and statistically significant improvement in performance was observed ($p < 0.001$). The mean jump distance increased from 217.7 cm (without specific warm-up) to 223.8 cm (with specific

warm-up), reflecting an average gain of approximately 6.1cm. These data are consistent with existing literature. The improvement observed after the warm-up can be explained by the physiological changes that prepare the musculoskeletal system and, most notably, by the phenomenon of Post-Activation Potentiation (PAP), as suggested by Tillin & Bishop (2009). The exercises performed in the specific warm-up appear to have reduced muscle viscosity and recruited fast-twitch motor units more efficiently, allowing participants to maximize explosive force production at the moment of the jump. Furthermore, the fact that 100% of the sample recorded improvements suggests that the volume and intensity of the applied warm-up were appropriate. The protocol succeeded in "awakening" the central nervous system without generating excessive accumulated fatigue (Seitz & Haff, 2016). It is thus concluded that the systematic inclusion of a specific warm-up is a highly effective and indispensable strategy to enhance explosive actions, optimizing performance in the standing long jump.

Conclusion The present study had the central purpose of investigating the influence of a specific warm-up protocol on standing long jump performance. Through the analysis of data collected from a sample of 26 physically active individuals, it was possible to address the research problem and the objectives initially outlined. The results unequivocally demonstrate that the inclusion of specific and targeted neuromuscular stimuli produces measurable benefits in explosive force performance. A statistically significant improvement ($p < 0.001$) was verified between the no-warm-up condition and the specific warm-up condition, with an average increment of 6.1cm in the jumped distance. These values confirm the formulated hypothesis, validating the premise that a specific warm-up enhances an individual's jumping capacity. From a theoretical perspective, this evolution is explained by the Post-Activation Potentiation (PAP) phenomenon, which optimizes motor unit recruitment and improves the transmission rate of nerve impulses. The efficacy of the protocol used demonstrates that the balance between the volume of plyometric exercises and rest time was respected, allowing the potentiation effects to outweigh any residual fatigue. In practical terms, this work offers crucial information for coaches and physical trainers, highlighting that warm-up should not be viewed merely as a preventive measure or a means to increase body temperature, but rather as a strategic tool for immediate performance optimization. Therefore, it is recommended to systematically integrate specific warm-up routines into training and competition contexts involving high-intensity, short-duration actions. As a suggestion for future research, it would be pertinent to evaluate the impact of this protocol on different populations (such as elite athletes vs. beginners) or to test different recovery intervals to identify the exact point of maximum neuromuscular potentiation.

Keywords: Two-footed long jump; Specific warm-up; Explosive strength; Post-Activation Potentiation (PAP); Neuromuscular performance.

Epidemiology and Anatomical Distribution of Overuse Running Injuries in Recreational Half-Marathon Athletes

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Abstract

Introduction

Amateur or recreational running has become one of the most popular endurance activities, but it is greatly associated with injuries. Despite its growth, there is a need to understand how training patterns and demographic profiles affect injury rates in recreational athletes. Therefore, the objective of the present study was to analyse the incidence of injuries and the anatomical region of amateur runners connected to training load, describing the most usual injuries and their origin.

Methods

An online survey was administered to a total of 234 Basque amateur runners during the 54th edition of the Behobia San Sebastián half marathon. The sample was composed of 62 females (age: 37.06 ± 7.55 years), and 172 males (age: 41.27 ± 8.94 years).

Results and Conclusions

Our results indicate that 53.8% of the runners reported at least one injury, with a total of 210 injuries registered. Overuse was identified as the main cause, accounting for 77.10% of the cases and this high incidence was directly associated with training load, particularly during high-volume periods (54.0%). On the other hand, traumatic injuries were less frequent (22.9%). Training sessions represented the period with the highest rate of injuries (87.1%). Regarding location, lower extremities concentrated 73.5% of the total injury incidence, mainly divided between the knee–leg region (41.4%) and the foot–ankle complex (30.5%). In conclusion, in recreational running, most injuries are caused by overuse, predominantly affecting the knee–leg area during training periods. Therefore, prevention training plans are critically needed to reduce injury incidence in amateur runners.

Keywords: epidemiology; recreational runners; endurance; lower limb; training volume.

Epidemiology of Musculoskeletal Injuries and Training Load in Fixed-Seat Rowing (Traineras): A Cross-Sectional Study

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Abstract

Introduction

Fixed-seat rowing or traditional rowing(traineras) has become a highly demanding endurance sport in the Basque Country, yet it is closely associated with specific musculoskeletal injuries. Despite its popularity over the Cantabric sea, there is a need to understand how training patterns affect injury rates in these rowers. Therefore, the objective of the present study was to analyse the incidence of injuries and the anatomical region of rowers connected to training load, describing the most usual injuries and their origin.

Methods

An online survey was administered to a total of 165 Basque rowers. The sample was composed of 86 females (age: 23.97 ± 4.31 years) and 79 males (age: 26.34 ± 5.56 years).

Results and Conclusions

Our results indicate that 67.5% of the rowers reported at least one injury ($n=110$). Overuse was identified as the main cause, accounting for 88.2% of the cases, and this high incidence was directly associated with training volume and repetitive gesture, while traumatic injuries were less frequent (11.8%). Training sessions represented the period with the highest rate of injuries (91.8%). Regarding location, the lumbar spine, with the low back showing 30,9 % and the upper back the 10,9% of the injuries, concentrated the highest injury incidence (44.7%), followed by the and pelvis area (11,8%) and the knee–leg complex (13.2%). In conclusion, in fixed-seat rowing, most injuries are caused by overuse, predominantly affecting the lower back area during training periods. Therefore, specific prevention and core-stabilization training plans are critically needed to reduce injury incidence in trainera rowers.

Keywords: epidemiology; fixed-seat rowing; traineras; overuse injuries; lumbar spine; training volume.

Fatigue and Anatomical Distribution of Multisegmental Kinematics in Traditional Rowing: Catch and Finish Phase Analysis

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Abstract

Introduction

Neuromuscular fatigue alters technique in cyclic sports such as traditional rowing (fixed-seat), yet its effects remain insufficiently explored. This study aimed to examine the impact of fatigue on multisegmental kinematics during the rowing stroke, focusing on joint angles, segment heights, and center of gravity (CoG) position at the catch and finish phases.

Methods

Using a within-subject pre-post design, trained rowers performed an incremental test to exhaustion on an adapted fixed-seat ergometer. Three-dimensional kinematic data were collected before and after fatigue using an optical motion capture system. Variables included trunk inclination; shoulder, elbow, and knee flexion; head, shoulder, and hand heights; and CoG position along vertical and anteroposterior axes.

Results and Conclusions

Results show significant phase-specific alterations. At the catch, shoulder flexion increased while knee flexion decreased, indicating a less compact entry posture. At the finish, elbow flexion increased and knee flexion decreased, suggesting compensatory adjustments in arm pull and leg extension. Additionally, head, shoulder, and hand heights significantly decreased in both phases, reflecting a diminished ability to maintain trunk extension. The CoG showed a consistent vertical decrease without anteroposterior changes, indicating a postural collapse in height. In conclusion, fatigue alters the coordination of multiple body segments in traditional rowing, showing distinct adaptations at key phases. Multisegmental kinematic analysis emerges as a valuable tool for monitoring fatigue and identifying technique alterations associated with increased mechanical stress and potential injury risk.

Keywords: traditional rowing; neuromuscular fatigue; anatomical distribution; multisegmental kinematics; stroke technique; catch and finish.

Influence of the menstrual cycle on performance in jumping ability and muscular strength

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Abstract

Introduction

The aim of this study was to investigate the influence of the menstrual cycle phases on the capacity of strength production, assessed by vertical jump (CMJ), absolute strength (1RM) and velocity of execution (VMP) under different loads in the full squat exercise. As a secondary objective, different body composition variables were compared across the different phases of menstrual cycle.

Methods

Seven physically active young women participated voluntarily. A counting method was used to verify the following menstrual cycle phases: follicular phase, ovulatory phase and luteal phase. In each phase, three CMJ and VMP were measured under loads representing 40%, 50% and 60% of 1RM.

Results and Conclusions

These results showed a significant increase in maximum strength production capacity relative to body mass (1RM/BMI) in the luteal phase compared to follicular phase. Furthermore, an increase in body mass and BMI was observed in the follicular phase compared to the luteal phase. Finally, absolute strength, velocities under different loads and jump height remained stable throughout the cycle. These findings suggest that the ability to produce strength relative to body mass was enhanced during the luteal phase. However, these results should be interpreted with caution due to the limitations of this study, and individualized training monitoring is recommended, considering the menstrual cycle as a potential modulating variable of strength application capacity.

Keywords: Menstrual cycle; Luteal phase; Body composition; Relative force; Neuromuscular performance.

Motivations and Sociodemographic Distribution of Amateur Silver Runners: Health Status, Professional Life, and Leisure Influences

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Abstract

Introduction

Older adulthood is associated with multiple changes in professional life, health status, and leisure time. Within this stage, running has become one of the most common physical activities; however, these athletes' motives to run have not been appropriately addressed yet. The main objective of this research was to better understand the motivations of amateur silver runners (older adults) and to analyze whether their motives vary depending on their health status, professional life, and leisure activities.

Methods

Using a cross-sectional design, a total of 244 older adult recreational athletes (56% women, 44% men) completed an online questionnaire utilizing the Polish version of the Motivation of Marathon Scale (MOMS). Data were collected regarding the presence of chronic diseases, employment status (retired or actively working), volunteering, cultural recreation, residential environment, and educational level.

Results and Conclusions

The results showed significant statistical differences between runners suffering from a chronic disease and healthy athletes in six out of nine dimensions of the MOMS scale. Moreover, practicing volunteering and cultural recreation showed differences in two dimensions, while professional life and education reflected differences in a single dimension of the MOMS. The place of residence did not show any statistical association with any dimension of the scale. In conclusion, older adult runners present specific motivational characteristics, and their health status appears to be the most determinant factor in maintaining running practice during this stage of life.

Keywords: master runners; motivations; older adults; health determinants; lifestyle; MOMS scale.

Impact of a Lifestyle Educational Intervention on Frailty Risk Assessed by Relative Sit-to-Stand Muscle Power in Older Adults: A Multicenter Randomized Controlled Trial.

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Abstract

Introduction

Frailty represents a major public health challenge that threatens the independence of aging populations, highlighting the critical need for scalable, non-pharmacological interventions to prevent or reverse functional decline. This study aimed to evaluate the impact of a 6-month healthy lifestyle educational program on mitigating frailty risk, determined by relative sit-to-stand (STS) muscle power, among community-dwelling pre-frail and frail older adults.

Methods

This multicenter, parallel-group randomized controlled trial included 199 community-dwelling pre-frail/frail older adults (74±7 years) randomized into an intervention group (n=109) and a usual-care control group (n=90). The 6-month intervention comprised four group sessions and six phone calls promoting a healthy lifestyle. To evaluate the longitudinal clinical impact of the intervention, a Generalized Estimating Equations (GEE) model with a Poisson distribution and a log link function was employed. The outcome evaluated was the probability of exhibiting an increased risk of frailty, which was determined using validated algorithms that convert STS test performance into relative muscle power. Frailty risk status was then classified based on established, sex-specific diagnostic thresholds: < 2.6 W/kg for males and < 2.1 W/kg for females. The GEE model accounted for repeated measures across the baseline, and 6-month time point, incorporating main effects for group (control vs. intervention), time, and their interaction (group x time) to extract Risk Ratios (RRs) with 95% Confidence Intervals (CI). Finally, post-hoc pairwise comparisons were conducted using estimated marginal means with a Bonferroni adjustment for multiple comparisons.

Results and Conclusions

At baseline, frailty risk prevalence was high and statistically similar between groups (Control: 76.7%; Intervention: 72.5%; $p = 0.479$). Following the educational program, the intervention group demonstrated a robust and progressive within-group reduction in frailty risk; specifically, risk levels decreased significantly at 6 months (reflecting a 1.55-fold reduction from baseline, $p < 0.001$). In contrast, the control group maintained a stable, high-risk profile ($p = 0.857$). Due to these diverging clinical trajectories, the gap between the two cohorts widened significantly: compared to the intervention group, the control group exhibited a 73% higher risk prevalence at 6 months ($RR = 1.73$, $p < 0.001$).

A 6-month healthy lifestyle educational program modifies clinical trajectories in pre-frail and frail older adults, providing a substantial reduction in frailty risk. This study is part of FRAGSALUD Project funded by the Regional Government of Andalusia (Junta de Andalucía) 10.13039/501100011011, reference UMA20-FEDERJA-154.

Keywords: Elderly, Health Education, Frailness, Physical Capacity, Physical Functional Performance

Effect of whole-body electromyostimulation on post-exercise recovery following repeated sprint ability (RSA), assessing creatine kinase and range of motion

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Abstract

Introduction

Muscle fatigue resulting from repeated high-intensity efforts can negatively affect sports performance and increase muscle damage. Various post-exercise recovery strategies have been proposed, including whole-body electromyostimulation (WB-EMS), although evidence regarding its effectiveness remains limited and inconclusive. Therefore, the aim of this study was to analyze the effect of WB-EMS on recovery following a repeated sprint protocol by assessing markers of muscle damage (creatine kinase) and range of motion in physically active young adults.

Methods

A randomized crossover study was conducted with 21 physically active men (23.2 ± 9.8 years). Participants performed a repeated sprint ability (RSA) protocol consisting of seven 30-m sprints interspersed with 30 s of recovery. Following the protocol, subjects completed either passive recovery (control condition) or recovery using whole-body electromyostimulation (WB-EMS). Recovery was assessed through creatine kinase (CK) levels as a marker of muscle damage and range of motion (ROM), measured at baseline and at 30 min, 24 h, 48 h, and 72 h post-exercise.

Results and Conclusions

RESULTS: Creatine kinase (CK) levels increased following the repeated sprint protocol in both groups, reaching peak values between 24 and 48 h post-exercise. However, the group that underwent recovery using WB-EMS showed lower CK levels throughout the recovery period, with the greatest differences compared to the control group observed at 72 h. Regarding range of motion (ROM), no relevant changes were found over time, and no substantial differences were observed between groups. **CONCLUSIONS:** Whole-body electromyostimulation (WB-EMS) appears to enhance recovery from muscle damage following a repeated sprint protocol, as reflected by a faster return of creatine kinase levels toward baseline values. In contrast, no effects were observed on range of motion, suggesting that this variable may not be a sensitive indicator of post-exercise recovery in this context.

Keywords: Whole-body electromyostimulation (WB-EMS); Repeated sprint ability (RSA); Recovery; Creatine kinase; Muscle damage; Range of motion

Test–Retest Reproducibility of Maximum Voluntary Isometric Contraction of the Knee Extensor and Flexor Muscles in Healthy Young Adults

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Abstract

Introduction

Maximum voluntary isometric contraction (MVIC) is widely used to assess muscle force production capacity in clinical, sports, and research settings. However, differences related to testing protocols, the muscle group assessed, and participants' level of familiarization may influence the stability of the measurements obtained. Therefore, determining the test–retest reproducibility of MVIC is essential to ensure that changes observed over time reflect true adaptations rather than measurement error. Thus, the aim of the present study was to analyze the test–retest reproducibility of knee extensor and flexor MVIC in healthy young adults.

Methods

The study was approved by the Research Ethics Committee of the Federal University of Viçosa (CAAE: 81740024.5.0000.5153). Ten healthy male volunteers (22.4 ± 0.7 years) were recruited. Participants completed two assessment sessions separated by 48 hours under identical experimental conditions. Muscle strength was assessed using a strain-gauge load cell (MK Controle, model CSL/ZL-1T, Brazil) with a sampling frequency of 1000 Hz. For knee extensor assessment, participants were seated on a leg extension machine with the knee positioned at 90° of flexion. For knee flexor assessment, participants remained in a standing position with the knee flexed at 90°. In both conditions, participants were instructed to perform a maximal voluntary isometric contraction for five seconds while receiving standardized verbal encouragement. Two attempts were performed for each muscle group, separated by a two-minute rest interval, and the highest value obtained in each visit was used for analysis. Test–retest reproducibility was determined using the intraclass correlation coefficient [ICC(3,1)], with corresponding 95% confidence intervals (95% CI), typical error of measurement (TEM), coefficient of variation (CV%), and Bland–Altman agreement analysis. Statistical significance was set at $p < 0.05$.

Results and Conclusions

The knee extensors presented mean values of 96.37 ± 24.88 and 104.67 ± 27.95 in visits ¹ and 2, respectively, corresponding to an average increase of approximately 8.6% between assessments. Excellent reliability was observed for the knee extensors (ICC = 0.967; 95% CI = 0.821–0.994; TEM = 4.82; CV = 4.80%; $p < 0.001$), accompanied by high agreement between sessions. Bland–Altman analysis revealed a bias of 8.30 and

limits of agreement ranging from -5.06 to 21.66 , suggesting a possible familiarization effect. For the knee flexors, mean values were 28.39 ± 6.90 and 28.73 ± 7.67 in visits ¹and 2, respectively, with moderate reliability (ICC = 0.731; 95% CI = 0.050–0.948; TEM = 3.78; CV = 13.25%; $p = 0.020$), a bias of 0.34, and limits of agreement ranging from -10.14 to 10.83 . It can be concluded that knee extensor MVIC demonstrates excellent test–retest reproducibility and low measurement error, supporting its use for longitudinal monitoring of muscle strength. In contrast, knee flexor MVIC exhibited greater between-session variability and lower measurement stability. These findings suggest that using the highest value obtained during each assessment provides consistent estimates of maximal isometric strength, particularly for the knee extensors. Furthermore, familiarization sessions are recommended to reduce measurement variability and improve the accuracy of neuromuscular assessments.

Keywords: Muscle Strength; Reproducibility of Results; Biomechanical Phenomena; Reference Standards.

Kinematic Analysis of the Movement- Supported Finish

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Abstract

Introduction

Handball is a collective sport characterized by a high intensity of intermittent actions, where offensive success depends, in large part, on the effectiveness and speed of execution of technical actions. In the game's ecosystem, the shot is assumed as the terminal technical gesture par excellence, whose main objective is to overcome the defensive barrier and the goalkeeper for the achievement of the goal. Among the various existing finishing variants, the support shot stands out as one of the fundamental motor patterns, basing its effectiveness on the correct transfer of forces along the kinetic chain, from stable contact with the ground to the release of the ball. From a biomechanical point of view, the execution of the support finish involves a sequential and proximal-distal coordination of multiple body segments. The stabilization of the lower limbs and the rotation of the pelvis work as the energy-generating base, which is subsequently transferred through the trunk and the joint complex from the shoulder to the elbow and wrist of the executing limb. The literature points out that variations in the context of execution, namely the transition from a static posture (standstill) to a dynamic posture (in motion) exert a direct influence on the kinematic parameters of the movement, changing the joint angles, the activation times and, consequently, the final exit speed of the ball. The use of videogrammetry and two-dimensional kinematic analysis tools, such as Kinovea software, has proven methodologically robust for the detailed characterization of these movement patterns in performance and training sports. By quantifying variables such as linear trajectories, angular velocities and displacements, it becomes possible to identify asymmetries and mechanical fluctuations that go unnoticed by direct visual observation. Therefore, the relevance of this case study is justified, which aims to analyze and compare the cinematic behavior of the shot in support of an amateur athlete under two distinct conditions: the shot in a static situation and after previous displacement. This approach will allow us to understand how the dynamic component and the approach race interfere with the joint stability and biomechanical effectiveness of the technical gesture, providing concrete data that can guide the specificity of the training process and the optimization of sports performance in the modality. Handball is a collective sport characterized by a high intensity of intermittent actions, where offensive success depends, in large part, on the effectiveness and speed of execution of technical actions. In the game's ecosystem, the shot is assumed as the terminal technical gesture par excellence, whose main objective is to overcome the defensive barrier and the goalkeeper for the achievement of the goal. Among the various existing finishing variants, the support shot stands out as one of the fundamental motor patterns, basing its effectiveness on the correct transfer of forces along the kinetic chain, from stable contact with the ground to the release of the ball. From a biomechanical point of view, the execution of the support finish involves a sequential and proximal-distal coordination of multiple body segments. The stabilization of the lower limbs and the rotation of the pelvis work as the energy-generating base, which is subsequently transferred through the trunk and the joint complex from the shoulder to the elbow and wrist of the executing limb. The literature points out that variations in the context of execution, namely the transition from a static posture (standstill) to a dynamic posture (in motion) exert a direct influence on the kinematic parameters of the movement, changing the joint angles, the activation times and, consequently, the final exit speed of the ball. The use of videogrammetry and two-dimensional kinematic analysis tools, such as Kinovea software, has proven methodologically robust for the detailed characterization of t

Methods

This chapter describes in detail the methodological design adopted for the kinematic characterization of the shot in support in handball, explaining the characteristics of the sample, the instruments used, the data collection procedures and the variables under analysis.

Results and Conclusions

Based on the kinematic and biomechanical analysis conducted throughout this case study, it was possible to objectively characterize and compare the movement patterns of the standing throw in handball, assessing the impact of lateral preference and the transition from a static to a dynamic context. The results obtained through computerized videogrammetry using the Kinovea software enabled the extraction of key conclusions regarding the understanding of the technical gesture and its application in the training process. Firstly, it became evident that lateral preference exerts a critical influence on the spatial organization and mechanical efficiency of the movement. The throw performed with the non-dominant upper limb revealed pronounced neuromuscular asymmetries across the entire sample, reflected in a preparatory phase characterized by reduced trunk rotation, a lower and more restricted ball-cocking position, and incomplete terminal elbow extension at the moment of ball release (release point). This limitation in joint range of motion reduces the capacity to store elastic potential energy and impairs the smooth transfer of forces along the proximal-to-distal kinetic chain, compromising both ballistic acceleration and the final accuracy of the shot. Secondly, the comparison between execution conditions demonstrated that the dynamic component significantly alters joint stabilization. The throw performed in a static situation (standing still) provided a more stable base of support, promoting cleaner linear trajectories and a progressive, coordinated acceleration pattern. In contrast, during the throw performed in motion, although the inertia generated by the approach run supplies kinetic energy capable of increasing the ball's terminal velocity, it also introduces considerable postural instability. To maintain dynamic balance during the final support phase, athletes tend to shorten the cocking phase and reduce the backward range of motion of the throwing arm, prioritizing body control over the ideal technical pattern and consequently generating greater fluctuations in the kinematic curves. Furthermore, the mechanical demands extended to the deceleration and post-throw recovery phases. Under dynamic conditions and when using the non-dominant limb, the eccentric muscular action required to decelerate the throwing arm and prevent falling or entering the goal area proved to be considerably more intense and rigid, requiring shorter recovery steps and greater neuromuscular effort to regain stability. In summary, this case study reinforces that the development of explosive strength and throwing efficiency in the standing handball throw should not be dissociated from training dynamic coordination, approach running mechanics, and motor symmetry. To optimize sporting performance in youth development categories, technical training programs should be adapted to closely replicate real-game situations, enabling athletes to manage inertial forces effectively and maintain biomechanical consistency even under highly demanding dynamic conditions.

Keywords: Handball, Set Shot, Kinematics, Standing Shot, Shot in Motion.

Impact of the Mediterranean diet (MD) on the prevention of relative energy deficiency in sports in adolescent girls: a pilot study

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Abstract

Introduction

Relative Energy Deficiency Syndrome in Sport (RED-S) affects the health and performance of adolescent athletes due to low energy availability, causing bone, cardiovascular, gastrointestinal, immunological, and mental health problems. A MD, rich in healthy fats, vegetables, fruits, and lean protein, benefits cardiovascular health, weight management, and mental well-being, making it particularly useful for adolescent athletes. Proper nutrition is crucial for performance and health at this stage. This project aims to evaluate the impact of the MD on the prevention of RED-S in adolescent female volleyball players. Adherence to this diet, the prevalence of RED-S in the sample, and the relationship between dietary adherence and the incidence of RED-S will be analyzed. Furthermore, the influence of this diet on the players' athletic performance and overall health will be assessed.

Methods

This pilot study examines the relationship between adherence to the Mediterranean diet and the risk of RED-S in 22 adolescent female volleyball players. The KIDMED questionnaire and the Reds Scoring Tool 2 or LEAF-Q are used to assess diet and RED-S risk, and the data are analyzed to identify potential associations. Inferential statistical tests will be used to explore the associations between the Mediterranean diet and RED-S risk.

Results and Conclusions

Adherence to the Mediterranean diet is mostly moderate (56.5%) or low (36.4%). 4.5% of the sample presents a high risk of developing RED-S. No significant correlation was found between the Mediterranean diet and the risk of RED-S, although differences in risk according to adherence levels could be relevant. The Mediterranean diet is known for its positive impact on bone, metabolic, hormonal, and immunological health, and thus its positive impact on athletic performance; however, this benefit is contingent upon athletes consuming the necessary amount of energy to maintain their performance and prevent RED-S. This emphasizes the importance of combining dietary adherence with adequate energy compensation.

Keywords: RED-S (Relative Energy Deficiency Syndrome in Sport), Mediterranean Diet, Adolescent Athletes, Athletic Performance, Nutrition

Relationship Between Strength Training and Body Fat Percentage and BMI

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Abstract

Introduction

Regular physical exercise plays a fundamental role in promoting health and preventing various diseases associated with sedentary behavior. Among the different forms of exercise, strength training has gained increasing attention due to its positive effects on body composition, particularly in terms of increasing muscle mass and reducing fat mass. Body composition is one of the main indicators of health status, with body fat percentage being considered a more accurate measure for assessing adiposity levels when compared to general indicators. In fact, scientific evidence demonstrates that strength training can significantly contribute to the reduction of body fat, showing positive effects even in overweight populations (Méndez-Hernández et al., 2022). In this context, Body Mass Index (BMI) continues to be widely used due to its simplicity, being calculated based on the relationship between weight and height. However, it has important limitations, as it does not distinguish between fat mass and lean mass. Studies indicate that BMI may not accurately reflect actual body composition, as individuals may present BMI values considered normal while still having high body fat percentages (Méndez-Hernández et al., 2022). Additionally, the literature shows that body fat percentage has a more consistent relationship with indicators of physical performance and health when compared to BMI. For example, a significant negative correlation was observed between body fat percentage and muscular performance, whereas BMI showed no significant relationship with these variables (Dhar & Purwar, 2023). These findings reinforce the importance of using more specific measures of body composition in scientific research. Therefore, the combined use of body fat percentage and BMI allows for a more comprehensive and accurate assessment. The analysis of these variables in relation to strength training practice may contribute to a better understanding of its effects on body composition. Thus, the present study aims to analyze the relationship between strength training practice and body fat percentage, considering Body Mass Index as a complementary variable, in male individuals aged between 18 and 30 years who attend a gym.

Methods

The present study follows a quantitative approach, with a cross-sectional, descriptive, and comparative design, aiming to analyze differences between distinct groups at a single point in time. **Sample/Participants** The sample of the present study consists of 30 male individuals, aged between 18 and 30 years, all gym members of Fitness Factory. The participants were divided into two distinct groups: the first composed of 15 individuals

practicing strength training, with a frequency of two or more sessions per week, and the second group consisting of 15 individuals not practicing this type of training. The sample selection was carried out using a convenience sampling method, taking into account the availability and voluntary acceptance of the participants. Table 1— Sample characterization (Mean $\pm$ Standard Deviation) The groups showed similar values in terms of height and body weight, with no relevant differences observed between participants practicing and not practicing strength training. Inclusion criteria The inclusion criteria defined the participation of male individuals aged between 18 and 30 years, who attended the gym where the study took place. Additionally, all participants were required to sign informed consent, authorizing their participation in the research. Exclusion criteria Individuals presenting physical limitations that prevented the practice of physical exercise were excluded from the study, as well as participants with incomplete or inconsistent data, in order to ensure the reliability of the obtained results. Data collection instruments Data collection was carried out using a structured questionnaire, previously designed, aimed at identifying participants' strength training practice, namely in terms of weekly frequency and whether they met the inclusion criteria, allowing their correct classification into the defined groups. In addition, a body composition assessment was performed using a machine available at the gym, which provided data regarding body weight, height, Body Mass Index (BMI), and body fat percentage. Procedures Initially, formal authorization was obtained from the institution where the study was conducted. Subsequently, participants were informed about the objectives and procedures of the research, and anonymity and confidentiality of the data were guaranteed. After signing the informed consent form, participants completed the questionnaire via Google Forms and underwent body composition assessment. The entire process took place at the gym facilities, in a controlled environment. Study variables The independent variable corresponds to strength training practice, with participants classified into two distinct groups: practicing individuals (group 1), with a frequency of two or more sessions per week, and non-practicing individuals (group 2). Regarding the dependent variables, the main variable under analysis is body fat percentage, and as a secondary dependent variable, Body Mass Index (BMI) was included. Research hypotheses Two research hypotheses were formulated. The null hypothesis (H0) states that there are no statistically significant differences in body fat percentage and Body Mass Index between individuals practicing and not practicing strength training. On the other hand, the alternative hypothesis (H1) assumes the existence of statistically significant differences in these variables, namely in body fat percentage and/or Body Mass Index, between the two groups under analysis.

Results and Conclusions

The results of this study clearly show how strength training influences body composition in young adults. The most important point to highlight is the difference between Body Mass Index (BMI) and body fat percentage in the assessment of the two groups. Although both practitioners and non-practitioners presented exactly the same BMI values ($24.5 \pm 1.2 \text{ kg/m}^2$), the analysis of body fat percentage revealed a very large statistical difference. While strength training practitioners recorded an average body fat of 13.5%, the non-training group presented a much higher value of 20.9%. These data confirm the limitations of BMI that have already been pointed out in previous studies. As Méndez-Hernández et al. (2022) indicate, BMI is a simple calculation that cannot distinguish between fat mass and lean mass. In the case of this investigation, the fact that weight and BMI were identical in both groups suggests that resistance training practitioners have greater muscle mass, whereas non-practitioners have a higher accumulation of fat mass

for the same total body weight. The mean difference of 7.45% in body fat between the groups demonstrates that strength training is an effective strategy for improving body composition. These results are consistent with the scientific literature, which states that body fat percentage is a much more accurate indicator of health and physical condition than weight or BMI alone. Even with an accessible training frequency (two or more sessions per week), significant benefits in fat reduction were observed. It is important to note that this study presents some limitations that may have influenced the results. Key variables such as participants' dietary habits and extra-gym cardiovascular exercise were not assessed. Since nutrition and resistance training (cardio) have a direct impact on energy balance and fat loss, the lack of control over these factors prevents us from stating with full certainty that the differences in body composition are exclusively due to strength training. Furthermore, the small sample size ($n = 30$) and the use of convenience sampling limit the generalizability of the results to the general population. For future research, it is suggested to include a food diary and to control other forms of physical exercise performed by participants, in order to better isolate the effect of strength training. It would also be interesting to conduct longitudinal studies, following the same individuals over several months of training, and to use larger and more diverse samples, including different age groups and female part

Keywords: Strength training; body fat percentage; body mass index (BMI); body composition; physical exercise.

Nutritional Knowledge Level and Dietary Supplement Consumption in Turkish Wrestlers: A Preliminary Data Analysis

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Abstract

Introduction

Wrestling imposes significant physical demands on athletes, necessitating proper nutrition and informed food choices. Optimal performance and safe dietary supplement use require athletes to possess robust, evidence-based nutrition knowledge. Despite this, limited research has explored the relationship between these factors among elite Turkish wrestlers. This study aims to investigate the association between sports nutrition knowledge levels and dietary supplement use in this population.

Methods

This pilot study collected voluntary online data from 60 active, licensed wrestlers registered with the Turkish Wrestling Federation. A field-specific question form incorporating sociodemographic, sports-related, and dietary supplement consumption characteristics, along with the Nutrition for Sport Knowledge Questionnaire, was utilized as a data collection tool.

Results and Conclusions

The study sample comprised predominantly male (78.3%, n=47), professional (90.0%, n=54), and 68.3% (n=41) competing at an international level wrestlers, with 21.7% (n=13) being female, 10.0% (n=6) amateur, and 31.7% (n=19) at a national level. The descriptive statistics of the participants revealed a mean age of 24.3 ± 6.54 years, a mean height of 175 ± 11.5 cm, and a mean body weight of 77.2 ± 19.4 kg. Among the athletes, 83.3% use dietary supplements, while 16.7% do not. The usage prevalence of the 10 most frequently used supplements was found to be 51.7% for BCAA, 41.7% for magnesium, 40.0% for creatine, 36.7% for omega-3 fatty acids, 31.7% for whey protein, 30.0% each for carnitine and caffeine, 23.3% each for beta-alanine and glutamine, and 21.7% for arginine. Regarding their sports nutrition knowledge, 83.3% of the athletes demonstrated inadequate knowledge, while the remaining 16.7% scored at a moderate level, with no athletes scoring in the good or excellent categories. Statistical analyses revealed that levels of sports nutrition knowledge differed significantly by gender ($p < 0.05$). Furthermore, dietary supplement use status showed significant differences by athletes' competitive league level and wrestling discipline ($p < 0.05$). Conversely, the number of dietary supplements consumed did not differ significantly across athletes' levels of sports nutrition knowledge ($p > 0.05$). The lack of statistical significance indicates that supplement consumption remains uniformly high and unselective across nutrition knowledge levels. To enhance generalizability, future studies should investigate larger wrestler populations while expanding the research framework to include comprehensive metabolic profiles and long-term performance metrics.

Keywords: Athletes, Knowledge, Nutrition, Supplements

Vitamin D3 Supplementation Attenuates Inflammation and Muscle Damage While Improving Overall Ironman 70.3 Performance

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Abstract

Introduction

Ultra-endurance triathlon induces substantial inflammatory stress and exercise-induced muscle damage, which may impair recovery and performance. Vitamin D3 has been suggested as a potential immunomodulatory and cytoprotective agent in athletes exposed to prolonged physiological stress. This study aimed to evaluate the effects of eight weeks of vitamin D3 supplementation on inflammatory markers, muscle damage biomarkers, and overall race performance in Ironman 70.3 triathletes.

Methods

Twenty-seven male triathletes competing in the Ironman 70.3 Sergipe 2024 event participated in this randomized, double-blind, placebo-controlled trial. Athletes were allocated to either a placebo group (n = 13) or a vitamin D3 group (50,000 IU/week; n = 14) for eight weeks. Blood samples were collected before and 1 hour after the race. Serum 25-hydroxyvitamin D [25(OH)D], interleukin-6 (IL-6), and creatine kinase (CK) were analyzed. The total race time was obtained from official race records.

Results and Conclusions

Post-race 25(OH)D concentrations were significantly higher in the vitamin D group compared with placebo (81.17 ± 6.72 vs. 36.15 ± 5.41 ng/mL; $p < 0.001$). The supplemented group also presented lower IL-6 concentrations (20.72 ± 8.26 vs. 37.14 ± 17.98 pg/mL; $p = 0.017$) and lower CK levels (446.30 ± 198.80 vs. 4621.00 ± 1881.00 U/L; $p < 0.001$). In addition, total race time was significantly shorter in the vitamin D group (17.48 ± 1.77 vs. $19.42 \pm 2.37 \times 10^3$ s; $p = 0.043$). Eight weeks of vitamin D3 supplementation attenuated inflammatory responses and exercise-induced muscle damage while improving overall race performance in Ironman 70.3 triathletes. These findings suggest that optimizing vitamin D status may support recovery and performance during ultra-endurance competition.

Keywords: Vitamin D3; IL-6; Creatine kinase; Ironman 70.3; Ultra-endurance exercise

Effects of a cycling training programme using balance bikes in children with suspected DCD: study protocol

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Abstract

Introduction

Childhood is a crucial period for promoting physical activity and developing foundational motor skills, which are essential for adopting active lifestyles and social participation throughout life. Acquiring these skills enables more independent participation in recreational, school and sporting activities. However, some children experience significant difficulties with motor coordination, as is the case with children with Developmental Coordination Disorder (DCD) or those at risk of developing it. These limitations can compromise performance in everyday activities and reduce participation in physical activity settings. Among the various foundational motor skills, learning to cycle is particularly important, as it promotes independent mobility, exploration of the surrounding environment and participation in outdoor activities. This study describes a PhD project that aims to analyse the effects of a structured cycling training programme adapted for children at risk of DCD (r-DCD) and with probable DCD (p-DCD). Specifically, the aim is to promote and assess this learning, i.e. cycling, and to analyse its effect on motor skills, balance and levels of physical activity.

Methods

A longitudinal experimental study will be conducted with an experimental group and a control group, including pre-intervention, post-intervention and follow-up assessments. The sample will consist of pre-school children (aged 4–5 years) from educational institutions in the district of Santarém, Portugal, who have been identified as having r-DCD or p-DCD. The variables under analysis will include cycling ability, motor competence assessed using the Motor Competence Assessment battery, perception of motor competence using the “Pictorial Scale for Assessing Perceived Motor Competence in Children”, balance, and levels of physical activity measured by accelerometry. The experimental group will participate in a structured cycling learning programme, starting with balance bikes and progressing to conventional bicycles, whilst the control group will continue with their usual activities.

Results and Conclusions

It is expected that the participating children will learn to cycle independently and demonstrate improvements in motor skills, perception of motor skills, balance and levels of physical activity. The results may reinforce the importance of structured cycling programmes as a strategy for promoting motor development and participation in physical

activity among children with coordination difficulties. It is concluded that early, structured and inclusive motor interventions may contribute to enhancing motor development and encouraging physically active lifestyles from childhood, including in children with motor coordination disorders.

Keywords: Physical Activity; Balance Bike; Motor Skill; Motor Development; Coordination Development Disorder

Intervention programmes to teach independent cycling to children and young people at risk or with DCD: a systematic review protocol

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Abstract

Introduction

Children with Developmental Coordination Disorder (DCD), or those at risk of developing it, experience persistent difficulties with motor coordination that interfere with their ability to perform daily activities and participate in physical and sporting activities. Learning to ride a bicycle independently, i.e. cycling, is considered an important developmental milestone, capable of promoting motor competence, autonomy, social participation and engagement in physical activities. However, not all children follow a typical motor development trajectory. Children at risk of, or with probable DCD, face greater challenges in acquiring this skill. Evidence regarding intervention programmes designed to promote the acquisition of independent cycling skills in this population remains limited. This review therefore aims to identify and synthesise intervention programmes developed to teach independent cycling to children and young people at risk of, or with probable DCD, as well as to compare their effectiveness and identify the associated benefits.

Methods

A systematic review will be conducted in accordance with the PRISMA guidelines. Databases including SCOPUS, PubMed and Web of Science will be searched to identify experimental and quasi-experimental intervention studies. Eligible studies will include children and young people up to the age of 18 who are at risk, with probable or diagnosed DCD. Interventions must have the specific aim of teaching independent cycling and include the use of a conventional bicycle at some stage of the programme. Studies must include pre- and post-intervention assessments. Primary outcomes will include the acquisition of the ability to cycle independently using a conventional bicycle. Secondary outcomes will include associated benefits, such as improvements in motor skills and related functional outcomes. Studies involving children who were already able to cycle independently prior to the intervention, observational studies and review articles will be excluded. No restrictions will be applied regarding publication date or language.

Results and Conclusions

This systematic review is expected to provide a comprehensive overview of intervention programmes designed to teach children and young people at risk of, or with probable DCD, to ride a bicycle independently. The findings may help to identify effective

strategies to support the acquisition of this skill and to clarify the broader developmental and motor benefits associated with learning to cycle in this population.

Keywords: Developmental Coordination Disorder; children; cycling; motor development; motor competence; motor skills; intervention.

Post-Race Neutrophilia Is Associated with Poorer Ironman 70.3 Performance in Endurance Triathletes

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Abstract

Introduction

Ultra-endurance exercise promotes marked activation of the innate immune system, characterized by leukocytosis and neutrophilia after competition. The magnitude of this inflammatory response may be associated with impaired performance and delayed recovery. This study aimed to investigate the association between post-race inflammatory markers and overall performance in Ironman 70.3 triathletes.

Methods

Twenty-seven male triathletes competing in the Ironman 70.3 Sergipe 2024 event were evaluated after the race. Hematological variables were measured 1 hour after race completion, including total leukocyte and neutrophil counts analyses. The total race time was obtained from official race records. Associations between inflammatory markers and race performance were assessed using Spearman's correlation and simple linear regression analyses.

Results and Conclusions

Significant positive correlations were observed between total race time and leukocyte counts ($r_s = 0.66$; $p = 0.031$), as well as between total race time and neutrophil counts ($r_s = 0.65$; $p = 0.035$). Simple linear regression analysis demonstrated a significant positive association between total race time and neutrophil counts ($R^2 = 0.4850$; $p = 0.0173$), indicating that athletes with poorer overall performance exhibited higher post-race neutrophilia. Leukocyte counts also showed a positive trend with total race time, although statistical significance was not reached ($R^2 = 0.3367$; $p = 0.0613$). Greater post-race neutrophilia was associated with poorer Ironman 70.3 performance, reinforcing the relationship between prolonged physiological stress, systemic inflammation, and reduced endurance performance. Post-race neutrophil response may represent a relevant biomarker of physiological stress in ultra-endurance athletes.

Keywords: Neutrophils; Leukocytes; Inflammation; Ironman 70.3; Endurance performance

Functional performance in women with breast cancer: a comparative study with healthy women

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Abstract

Introduction

Cancer has become the leading cause of morbidity and mortality worldwide, ranking among the most prevalent diseases of the 21st century, with a steady increase in the number of cases each year. According to the Spanish Society of Medical Oncology (SEOM) (2025), the projected figures are worrying: it is estimated that one in four people may develop cancer during their lifetime. The World Health Organisation (WHO) (2022) notes that breast cancer is one of the most common forms of the disease. Furthermore, it is known that cancer treatments can significantly affect the quality of life of those who have undergone them. The side effects of these therapies can include physical changes: loss of function, increased body fat, loss of strength, and even cognitive changes: memory loss, and impaired language skills (Garcia et al., 2020; Lange et al., 2019). The aim of this study is to analyse whether performance in functional tasks is affected in women with breast cancer compared to women with no history of cancer.

Methods

No significant differences were observed between the groups in the selected functional tests (p -value < 0.05). In each of the tests, the results were better in the control group, as they performed more repetitions and achieved better times. However, statistically there were no significant differences between the groups: CST test (p -value = 0.594); ACT test (p -value = 0.494) and TUG test (p -value = 0.326). Although there were no intergroup differences, it would be advisable to promote and improve muscle strength through strength training in women undergoing cancer treatment, in order to enhance their functional capacity.

Results and Conclusions

No significant differences were observed between the groups in the selected functional tests (p -value < 0.05). In each of the tests, the results were better in the control group, as they performed more repetitions and achieved better times. However, statistically there were no significant differences between the groups: CST test (p -value = 0.594); ACT test (p -value = 0.494) and TUG test (p -value = 0.326). Although there were no intergroup differences, it would be advisable to promote and improve muscle strength through strength training in women undergoing cancer treatment, in order to enhance their functional capacity.

Keywords: Side effects, cross-sectional study, functional tests, cancer treatments, cancer patients

Assessment of General and Specific Motor Coordination in Youth Football: Analysis of the M-Test and Single-Leg Jumps in Traquinas and Benjamins

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Abstract

Introduction

The main objective of this study was to analyze and compare the technical efficiency in ball dribbling, as well as vertical jump capacity and dynamic balance, between two distinct age categories (Traquinas and Benjamins). It sought to understand how maturational factors and practice time influence motor control in dynamic situations.

Methods

The study applied specific motor coordination assessment tests (M-Test and Single-Leg Jumps) to a sample of 40 children (20 Traquinas and 20 Benjamins), aged between 7 and 11 years, who regularly play youth football at the Nani Football Academy.

Results and Conclusions

The collected data reveal statistically and practically significant improvements in test execution as the chronological and biological age of the young athletes increases. Specifically, the Benjamins category demonstrated a faster mean execution time in the M-Test by 1.95 seconds (15.14s compared to 17.08s for Traquinas) and a higher mean score by 4.8 points in the Single-Leg Jumps (43.60 compared to 38.80 points). Gross and specific motor coordination proved to be an essential element within the sport's context, directly impacting practical performance. Therefore, it is concluded that systematically integrating exercises focused on coordinative development into training session planning is imperative, serving as a foundational basis for the future technical and tactical development of young football players.

Keywords: Keywords: Motor coordination; Youth football; Ball control; Agility; Single-leg jumps; Motor development.

Inter- and intra-rater reliability of pressure pain threshold in the quadriceps femoris 48 hours after flywheel exercise in young women

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Abstract

Introduction

Pressure pain threshold (PPT) is a measure frequently used to assess responses to exercise-induced muscle damage (EIMD), particularly delayed onset muscle soreness (DOMS). However, its reliability, especially after flywheel training, still needs to be investigated. This is of great importance for studies that use PPT as an indirect marker of EIMD. To analyze the inter- and intra-rater reliability of PPT in different regions of the quadriceps femoris, 48 hours after a flywheel leg extension session in young women.

Methods

The study was approved by the Research Ethics Committee of the Federal University of Viçosa (CAAE: 81740024.5.0000.5153). Fifteen young women participated in the study, with age of 25.33 ± 4.58 years, body mass of 64.00 ± 8.92 kg, height of 1.66 ± 0.06 m, and BMI of 22.9 ± 3.33 kg/m². The participants performed a flywheel training session consisting of 4 sets of 10 repetitions, with 2 minutes of rest between sets and an inertia of 0.05 kg·m² in the leg extension exercise. After 48 hours, PPT was assessed using a digital algometer. The assessed points were the proximal, middle, and distal regions of the vastus lateralis, rectus femoris, and vastus medialis. Rater A performed two measurements, and rater B performed one measurement. Inter-rater reliability was analyzed between rater A and rater B, while intra-rater reliability was analyzed between the two measurements performed by rater A. The normality of the differences was verified using the Shapiro-Wilk test. Reliability was determined using the intraclass correlation coefficient (ICC3), with a 95% confidence interval, and the coefficient of variation (CV).

Results and Conclusions

In the inter-rater analysis, the vastus lateralis showed an ICC of 0.828 (95% CI: 0.510–0.947; CV = 17.45%) in the proximal region, 0.828 (0.512–0.947; CV = 16.19%) in the middle region, and 0.819 (0.491–0.944; CV = 14.85%) in the distal region. In the rectus femoris, the values were 0.888 (0.622–0.966; CV = 16.07%) in the proximal region, 0.899 (0.692–0.970; CV = 11.89%) in the middle region, and 0.928 (0.733–0.979; CV = 10.41%) in the distal region. In the vastus medialis, the values were 0.867 (0.606–0.959; CV = 16.24%) in the proximal region, 0.721 (0.284–0.910; CV = 19.79%) in the middle region, and 0.750 (0.342–0.920; CV = 18.75%) in the distal region. In the intra-rater analysis, the vastus lateralis showed an ICC of 0.727 (0.295–0.912; CV = 25.24%) in the proximal region, 0.772 (0.387–0.928; CV = 19.63%) in the middle region, and 0.929 (0.767–0.978; CV = 10.59%) in the distal region. In the rectus femoris, the values were

0.905 (0.708–0.971; CV = 14.49%) in the proximal region, 0.918 (0.744–0.975; CV = 11.10%) in the middle region, and 0.955 (0.854–0.987; CV = 8.54%) in the distal region. In the vastus medialis, the values were 0.89¹(0.668–0.967; CV = 17.45%) in the proximal region, 0.780 (0.404–0.931; CV = 20.01%) in the middle region, and 0.679 (0.206–0.894; CV = 27.62%) in the distal region. PPT in the quadriceps femoris showed predominantly good to excellent inter- and intra-rater reliability. The rectus femoris showed the most consistent results, while the vastus lateralis demonstrated good inter-rater reliability and region-dependent intra-rater reliability. The vastus medialis showed the greatest variability, especially in the middle and distal regions. These findings indicate that PPT can be used as a measure of DOMS, provided that anatomical points are rigorously selected and standardized.

Keywords: Algometry; reliability; exercise-induced muscle damage; strength training; delayed onset muscle soreness.

Inter and intra-rater agreement of extension knee goniometry after flywheel training in untrained women

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Abstract

Introduction

After the first flywheel training session, untrained individuals may experience discomfort due to delayed-onset muscle soreness (DOMS), leading to muscle stiffness and reduced range of motion (ROM). The goniometer is the instrument used to measure ROM; however, this equipment can exhibit substantial inter-rater variability depending on the evaluator. Assessing intra- and inter-rater agreement should be an essential step for the effective use of the goniometer. The aim of this study was to evaluate intra- and inter-rater agreement of the goniometer for knee ROM during active flexion following a single session of flywheel resistance training.

Methods

Fifteen women with no prior experience in resistance training or flywheel equipment were recruited. The study involved two laboratory visits. During the first visit, participants completed a flywheel prone leg curl training session consisting of 4 sets of 10 repetitions with an inertial load of 0.05 kg·m² and a 1-minute rest interval. The second visit took place 48 hours after the training session, during which ROM was assessed using a goniometer. The assessment was conducted by two raters in an alternating sequence: rater “A” performed 2 measurements, followed by rater “B” performing 2 measurements, and finally rater “A” performed another 2 measurements. Measurements were taken with the participants lying prone on a stretcher, and they were instructed to perform knee flexion. Intra rater agreement was calculated using the mean of the two initial measurements taken by rater “A” compared to the mean of the two final measurements. Inter rater agreement was calculated using the mean of rater “A”’s first measurements and the mean of rater “B”’s measurements. The intraclass correlation coefficient (ICC) with 95% confidence interval (95% CI) and the coefficient of variation (CV) were employed.

Results and Conclusions

The intra rater analysis revealed excellent agreement between the means of the measurements taken by rater “A” (ICC = 0.971; 95% CI = 0.903–0.991; CV = 14.04%). The inter rater analysis revealed excellent agreement between the mean measurements of rater “A” and those of rater “B” (ICC = 0.976; 95% CI = 0.919–0.993; CV = 12.48%). Based on the analyzed data, it can be concluded that the measurements obtained by rater “A” are similar to those obtained by rater “B”. Furthermore, rater “A” demonstrates excellent precision in their measurements.

Keywords: Delayed onset muscle soreness, resistance training, rigidity.

ANALYSIS OF THE IMPACT OF DISTRACTORS ON HEART RATE VARIABILITY IN A HIGH-PERFORMANCE CLIMBER: A TRAINING PROPOSAL

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Abstract

Introduction

Sport climbing performance is influenced not only by physical and technical factors but also by athletes' psychophysiological responses to competitive stress. Heart rate variability (HRV) has emerged as a useful tool for assessing autonomic regulation and stress responses during sport-specific tasks. Therefore, understanding how stressors affect climbers may help develop more effective training interventions.

Methods

A case study was conducted with a high-performance female climber with 16 years of experience and national-level competitive achievements. HRV was assessed at rest and during the completion of four bouldering problems designed to simulate competitive situations through the inclusion of different physical and psychological distractors. Based on the autonomic responses observed, an individualized training intervention was developed.

Results and Conclusions

The climbing tasks elicited an increase in mean heart rate and a reduction in parasympathetic-related HRV indices compared with baseline values. The greatest autonomic disturbance was observed in situations combining technically demanding movements with external distractors. These findings revealed difficulties in coping with specific competitive stressors and highlighted areas requiring improvement, including coordination-based movements, slab climbing performance, and management of external pressure during competition. The results suggest that competitive stressors negatively influence autonomic regulation in high-performance climbers. Consequently, an individualized pre-competitive training intervention incorporating competition simulations, progressive exposure to distractors, and sport-specific technical practice was proposed. Integrating competition-like stressors into training may improve stress management and optimize climbing performance.

Keywords: sport climbing; heart rate variability; autonomic regulation; competitive stress; bouldering; training intervention.

INFLUENCE OF MENSTRUAL CYCLE PHASES ON MUSCLE FATIGUE IN YOUNG WOMEN

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Abstract

Introduction

Scientific literature in Sports Sciences presents a significant knowledge gap due to the historical exclusion of women from research studies. This exclusion is mainly due to the methodological complexity introduced by the hormonal fluctuations inherent to the menstrual cycle. As a result, current resistance training recommendations are based on data obtained from men and extrapolated to women. The main objective was to analyze the influence of the menstrual cycle phases on muscular fatigue caused by a training protocol in the full squat exercise in young women.

Methods

Observational longitudinal study with a sample of 7 physically active women with regular menstrual cycles who were not taking oral contraceptives. The phases of the menstrual cycle were monitored using a chronological method based on day counting. All participants completed two familiarization sessions and an incremental load test; subsequently, they were assessed across the three phases of the cycle in a randomized manner. The training protocol consisted of a set of 10 repetitions of the full squat exercise at 60% of 1RM. To quantify muscle fatigue induced by the training protocol, pre- and post-protocol measurements were taken of countermovement jump (CMJ) height loss and execution velocity, recording the highest mean propulsive velocity (VMP_C60best) and the average (VMP_C60prom). Data normality and homogeneity were assessed using the Shapiro–Wilk and Levene tests, and a 2×3 repeated-measures analysis of variance (ANOVA) was applied. When significant differences were found, post hoc comparisons with Bonferroni adjustment were performed.

Results and Conclusions

Significant differences were found in the time effect for all studied variables: CMJ ($p < 0.001$), VMP_C60best ($p = 0.041$), and VMP_C60prom ($p = 0.049$). This confirmed that the training protocol was effective in inducing a performance decline regardless of menstrual cycle phase. Regarding the phase effect, no statistically significant differences were found for any variable: CMJ ($p = 0.08$), VMP_C60best ($p = 0.465$), VMP_C60prom ($p = 0.651$). Similarly, no significant time $\times$ phase interaction was detected (CMJ: $p = 0.294$; VMP_C60best: $p = 0.195$; VMP_C60prom: $p = 0.193$), suggesting that the magnitude of fatigue was similar across all cycle phases. However, a trend toward greater loss of vertical jump height was observed during the follicular phase compared to the luteal phase, where the pre–post difference was 3.6 cm ($p = 0.07$). This may be related to the low estrogen levels characteristic of the early cycle, which, according to García-Pinillos et al. (2021), could reduce musculotendinous stiffness and therefore the

efficiency of the stretch-shortening cycle (SSC). Overall, the results suggest that the menstrual cycle did not significantly influence acute neuromuscular fatigue in young physically active women. Finally, training individualization and velocity monitoring may represent tools of greater practical relevance than planning training exclusively based on menstrual cycle phases.

Keywords: Menstrual cycle, fatigue, resistance training, VBT, CMJ.

Democratising Human Movement Biomechanical Analysis through Artificial Intelligence and Commercial Cameras: Project methodology

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Abstract

Introduction

Human movement assessment is a fundamental tool for enhancing performance, preventing injuries, and supporting rehabilitation processes. However, the reference systems currently used for this purpose require expensive equipment, highly specialised personnel, and laboratory-based environments, which limit their application in real-world settings. At present, three-dimensional motion capture systems such as VICON are considered the gold standard for movement assessment; nevertheless, their high cost and technical complexity restrict their use outside highly specialised environments. Recent advances in artificial intelligence and computer vision have created new opportunities for analysing human movement using videos captured with commercial cameras. Despite their potential, the available scientific evidence remains limited for complex sporting movements and real-world practice environments, where the validity and accuracy of these technologies still require rigorous evaluation. To address these limitations, the Sport-Mechanics project aims to develop and validate an open-access, automated and user-friendly web-based tool capable of analysing human movement through artificial intelligence and commercial cameras, thereby promoting the democratisation of biomechanical assessment across sport, health, and research settings.

Methods

A concurrent validation study will be conducted involving 120 athletes of both sexes, distributed across different age groups and levels of sporting experience. Participants will perform a battery of tasks representing the main movement patterns used in sport, including strength exercises, jumping tasks, accelerations, and changes of direction. All tasks will be recorded simultaneously using commercial cameras positioned from different perspectives and synchronised with one another. In parallel, movements will be analysed using a VICON three-dimensional motion capture system and force platforms, which are considered reference standards for biomechanical assessment. A sport-specific database will be developed from the recorded videos through the manual annotation of key anatomical landmarks. Subsequently, the validity of different artificial intelligence algorithms for three-dimensional human movement estimation and biomechanical variable extraction will be evaluated by comparing their outputs against those obtained from the reference systems. Finally, the algorithms demonstrating the highest levels of accuracy and reliability will be integrated into an open-access web-based tool designed to facilitate biomechanical assessment in sport, clinical, and research settings through the use of commercial cameras and artificial intelligence technologies.

Results and Conclusions

The project is expected to identify the artificial intelligence algorithms best suited to analysing human movement accurately and reliably in real-world sporting environments using commercial cameras. Furthermore, an accessible web-based tool is expected to be developed to support the democratisation of biomechanical assessment across sport, health, and research settings.

Keywords: Artificial Intelligence; Biomechanics; Human Movement; Computer Vision; Injury Prevention; Kinetics; Kinematics

Impact of dual-task performance on the SPPB in older adults with hypertension

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Abstract

Introduction

Hypertension (HTN) has been associated with functional and cognitive impairments in older adults. Dual-task (DT) assessment allows the analysis of performance when a motor task is performed simultaneously with a cognitive demand. In this context, the Short Physical Performance Battery (SPPB) may provide relevant information regarding the functional performance of balance, gait, and lower-limb strength.

Methods

A cross-sectional study was conducted with 46 older adults, divided into two groups: healthy individuals ($n = 23$) and individuals with HTN ($n = 23$). Functional performance was assessed using the SPPB under single-task (ST) and DT conditions. The DT condition consisted of simultaneously performing the motor test and an arithmetic cognitive task. Outcomes were compared between groups and conditions.

Results and Conclusions

Under ST conditions, the healthy group achieved a higher overall SPPB score than the HTN group (11.87 ± 0.34 vs. 11.35 ± 0.94 ; $p = 0.001$). Under DT conditions, this difference increased (10.70 ± 1.1 in the healthy group vs. 9.09 ± 1.95 in the HTN group; $p = 0.003$). Furthermore, significant differences were observed under DT conditions in the 3-m gait test ($p = 0.001$) and the Sit-to-Stand test ($p = 0.031$), whereas static balance showed lower discriminative capacity. These findings suggest that DT assessment may reveal a more pronounced functional decline in older adults with HTN.

Keywords: Physical functional performance, postural balance, gait

Relationship Between Maturational Status and Quantitative Biometric Indicators in Elementary and Secondary School Students

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Abstract

Introduction

This study examined the relationship between chronological age, as an indirect indicator of maturational status, and physical fitness indicators assessed through the FITescola test battery, in a sample of 163 students from basic and secondary education distributed across the 7th (n = 59), 10th (n = 30) and 12th grade (n = 74), aged between 11 and 19 years.

Methods

Six physical fitness components were evaluated: speed (40-metre sprint), aerobic endurance (mile run), abdominal muscular endurance (curl-ups), lower limb explosive strength (standing broad jump), upper limb muscular endurance (push-ups) and flexibility (sit and reach). Statistical analysis included descriptive statistics, one-way ANOVA, independent-samples Student's t-test and Pearson correlation coefficient, with the significance level set at $\alpha = 0.05$.

Results and Conclusions

Results revealed statistically significant differences in five of the six variables analysed, with a consistent pattern of performance improvement associated with advancing school year. Differences were concentrated in comparisons involving the 7th grade, with no significant differences observed between the 10th and 12th grade in any variable. The standing broad jump showed the most expressive evolution ($d = 1.13$; $r = 0.529$), while flexibility stabilised from the 10th grade onwards. Chronological age showed significant associations with all variables assessed, supporting its utility as a proxy for maturational development in school settings.

Keywords: Biological maturation; physical fitness; FITescola; chronological age; base and secondary education; physical development

Relationship between extracurricular sports participation and flexibility and speed levels in adolescents.

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Abstract

Introduction

The present study aimed to analyse the relationship between extracurricular sports participation and physical fitness levels, specifically flexibility and speed, in middle and secondary school students.

Methods

The sample consisted of 290 students from the 7th, 10th and 12th grades of Escola Secundária de Palmela, aged between 12 and 19 years, including 137 male and 153 female participants. Data were collected through the FITescola battery, using the Sit and Reach test to assess flexibility and the 20 m sprint test to assess speed. Participants were divided according to the presence or absence of extracurricular sports participation. Descriptive and inferential statistical analyses were performed using independent samples t-tests.

Results and Conclusions

The results revealed statistically significant differences in the 20-meter sprint test, with students involved in extracurricular sports presenting lower average times compared to non-sport participants. Regarding flexibility, no statistically significant differences were observed between groups. These findings support the importance of regular physical activity and sports participation in the development of physical fitness during adolescence, particularly in motor performance-related capacities such as speed. The study also highlights the relevance of school-based fitness assessment tools, such as FITescola, in monitoring youth physical fitness and promoting healthy lifestyles.

Keywords: physical fitness; flexibility; speed; extracurricular sports participation; adolescents; FITescola.

The Impact of Nutrient Timing on Post-Resistance Training Muscle Protein Synthesis and Recovery

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Abstract

Introduction

Nutrition plays a pivotal role in modulating the physiological adaptations induced by resistance training. Among sports optimization strategies, nutrient timing—which refers to the planned intake of nutrients at specific periods surrounding exercise—has been extensively investigated. This study aims to analyze the impact of post-workout nutrient timing on muscle protein synthesis (MPS) and glycogen recovery.

Methods

The methodology was based on a review of current scientific literature, focusing on the consensus statements of the International Society of Sports Nutrition (ISSN). Evidence demonstrates that resistance exercise stimulates both protein breakdown and synthesis; however, net protein balance remains negative in the absence of nutritional support. The co-ingestion of high-biological-value proteins (rich in essential amino acids, particularly leucine) combined with carbohydrates in the immediate post-workout period (up to 2 hours) maximizes the activation of the mTORC1 signaling pathway. This synergy accelerates the repair of muscle micro lesions and optimizes muscle glycogen resynthesis by enhancing insulin secretion.

Results and Conclusions

It is concluded that post-exercise nutrient timing is an effective metabolic strategy to accelerate recovery and enhance muscle hypertrophy. Although total daily macronutrient intake is the primary factor, the strategic distribution of nutrients in the immediate post-workout period plays a decisive role in the performance of athletes undergoing multiple daily sessions or high-intensity training. The practical application of these guidelines minimizes recovery time and mitigates exercise induced muscle damage.

Keywords: Nutrient timing, Muscle protein synthesis, Glycogen recovery, Resistance training, Muscle hypertrophy.

Test-retest reliability of motor and cognitive performance during a dual-task Sit-to-Stand test in women undergoing breast cancer treatment

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Abstract

Introduction

Breast cancer treatments may negatively affect both physical and cognitive function, including cancer-related cognitive impairment. Consequently, dual-task assessments, which simultaneously evaluate motor and cognitive performance, have gained increasing attention in oncology. However, the reliability of dual-task functional tests in women undergoing breast cancer treatment remains unclear. This study aimed to determine the test–retest reliability of motor and cognitive performance during a dual-task Sit-to-Stand (STS) test in women receiving treatment for breast cancer.

Methods

Thirty-one women undergoing breast cancer treatment participated in this test–retest reliability study. Participants had a mean age of 55.35 ± 9.35 years and a body mass index of 26.78 ± 4.28 kg/m². Most participants were receiving hormone therapy (74.2%), chemotherapy (67.7%) and/or radiotherapy (61.3%). Participants completed a dual-task STS test on two separate occasions. Relative reliability was assessed using the intraclass correlation coefficient (ICC), whilst absolute reliability was evaluated using the standard error of measurement (SEM) and the smallest real difference (SRD).

Results and Conclusions

Motor performance during the dual-task STS increased from 11.02 ± 2.52 to 11.97 ± 2.54 repetitions and demonstrated good reliability (ICC = 0.833, 95% CI: 0.682–0.916), with a SEM of 1.03 repetitions (8.99%) and an SRD of 2.87 repetitions (24.93%). Cognitive performance also showed excellent reliability. Operation performance increased from 13.19 ± 4.85 to 15.71 ± 4.87 correct operations (ICC = 0.918, 95% CI: 0.838–0.960), whilst correct responses increased from 12.55 ± 4.96 to 15.29 ± 5.27 (ICC = 0.922, 95% CI: 0.845–0.962). SEM values ranged from 9.63% to 10.26%, and SRD values ranged from 26.70% to 28.45%. The dual-task STS test demonstrated good reliability for motor performance and excellent reliability for cognitive performance in women undergoing breast cancer treatment. These findings support its use as a feasible tool for assessing dual-task functional capacity in clinical and research settings. Future studies should investigate its responsiveness to interventions and its relationship with treatment-related cognitive and functional impairments.

Keywords: breast cancer; dual-task; Sit-to-Stand test; test–retest reliability; cancer-related cognitive impairment.

Kinematic analysis of the long pass in football: ground ball versus suspended ball analysis

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Abstract

Introduction

The long pass in football is a fundamental tool, requiring biomechanical coordination to optimize the transfer of energy to the ball. The aim of this study was to analyze and compare the biomechanical demands of the long pass under two distinct conditions: ground ball and ball suspended on a cone.

Methods

The sample consisted of 10 football athletes. Data collection and linear and angular kinematic analysis were performed using the Kinovea program.

Results and Conclusions

Results: The majority of the athletes recorded significant losses in maximum ball velocity in the suspended condition. The angular kinematic analysis revealed that this performance drop resulted from a shortening in the backswing phase of the pass, reducing knee flexion by approximately 20 to 30 degrees, caused by visual and spatial constraints. Only a minority (two athletes) achieved a positive adaptation, increasing their range of motion to maximize the "whip effect". Conclusions: The success of the long pass with the suspended ball does not depend solely on the physical advantage of eliminating ground friction, but fundamentally on the athlete's ability to take advantage of greater angular freedom, avoiding postural hesitation and the shortening of the motor movement.

Keywords: Football; Long pass; Kinematics; Kinovea; Motor adaptation.

Biomechanical profile of elite vs. recreational runners using wearable sensors

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Abstract

Introduction

The aim of this study was to compare key biomechanical variables between elite and recreational distance runners across standardized treadmill speeds using foot-mounted inertial sensors.

Methods

Fifty-five elite runners (10 km PB < 31 min) were matched 1:1 with recreational runners by sex, age, height, and body mass. Running biomechanics of contact time (CT), step frequency (SF), step length (SL), leg stiffness (Kleg), vertical ground reaction force loading rate (vGRF rate), and footstrike type (FST) were assessed using RunScribe inertial measurement units during an incremental treadmill protocol (10, 12, and 14 km/h). Paired t-tests with Benjamini-Hochberg FDR correction were applied.

Results and Conclusions

Elite runners showed significantly shorter contact time at all three speeds (10 km/h: $d = -0.78$; 12 km/h: $d = -0.85$; 14 km/h: $d = -0.97$), greater leg stiffness ($d = +0.69$ to $+0.87$), faster vertical GRF loading rate ($d = +0.70$ to $+1.02$) — the largest effect sizes observed across the entire variable set — and a more anterior footstrike pattern ($d = +0.63$ to $+0.68$). No differences were found in step frequency or step length. Elite runners exhibit a fundamentally different force application strategy — shorter ground contact, greater leg stiffness, faster loading, and more anterior foot strike — that is not explained by anthropometric differences or stride dimensions. These findings, obtained under ecologically valid conditions using wearable sensors, provide actionable targets for running technique training in recreational athletes.

Keywords: Running economy; Wearable technology; RunScribe; Spring-mass model; Matched-pairs design

Impact of Fatigue on Decision-Making in Futsal Players During Small-Sided Games

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Abstract

Introduction

Futsal requires constant decision-making under conditions of high temporal and spatial pressure. Although fatigue is commonly associated with physical performance, its influence on cognitive processes and decision-making remains a relevant topic of investigation. Therefore, this study aimed to analyse the impact of fatigue on the quality of decision-making in futsal players during small-sided games.

Methods

The sample consisted of 22 senior futsal players assessed under two distinct conditions: without fatigue (beginning of training) and with fatigue (end of training). Data collection was carried out using a systematic observation grid applied during 4 x 4 small-sided games. The analysed variables included inadequate decisions, ball losses and failed passes.

Results and Conclusions

In the non-fatigue condition, 113 actions were recorded, including 20 inadequate decisions (17.7%), 17 ball losses (15.0%) and 12 failed passes (10.6%). In the fatigue condition, the total number of actions increased to 140, with 32 inadequate decisions (22.9%), 25 ball losses (17.9%) and 13 failed passes (9.3%). The results demonstrated an increase in inadequate decisions and ball losses under fatigue, suggesting a decrease in decision-making quality during accumulated physical effort. The slight reduction in failed passes may indicate an adaptation towards lower-risk decisions under fatigue. It is concluded that fatigue negatively influences cognitive performance and decision-making in futsal, reinforcing the importance of integrating decision-making exercises under fatigue into training processes.

Keywords: futsal; fatigue; decision-making; small-sided games; sports performance

Training patterns among middle-distance runners: Differences between genders, level of competition and event focused.

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Abstract

Introduction

The different types of middle-distance runners (400-800m/800m/800-1500m) have been well recognized over the years. Recently some physiological differences of these runners have been highlighted, but the training patterns of each group have not yet been investigated. The objective of this study is to analyze training characteristics according to the event they were targeting, the level at which they competed and their gender.

Methods

Data was collected online with a validated questionnaire previously used in middle-distance runners. 105 subjects participated in the study and were categorized into different subgroups, according to gender (male and female), level of competition (regional, national or international) and event focused (400-800m, 800m only or 800-1500m).

Results and Conclusions

Regarding gender, men reported a higher total weekly running volume, whereas women showed higher values in running technique training. In relation to competitive level, higher-level athletes performed more easy running kilometers, greater total weekly running volume, and higher weekly training time. Regarding the target event, athletes focused on the 800–1500m performed more weekly kilometers than those focused on the 800m only or 400–800m. Conversely, 400–800m athletes reported higher volumes of resistance training and technical training than those focused on the endurance-oriented events. In conclusion, middle-distance runners appear to adapt their training according to their competitive level, target event, and gender, showing relevant differences between subgroups. However, further research is needed to determine which training strategies are most effective for improving performance in each specific subgroup.

Keywords: Middle-distance, training patterns, individualization, performance, athletics.

Substrate Oxidation is associated with Skeletal Muscle Mitochondrial Respiration in Men with Prediabetes and Type 2 Diabetes

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Abstract

Introduction

Altered substrate utilisation is a hallmark feature of type 2 diabetes (T2D). While whole-body substrate oxidation at rest and during exercise can be tracked via indirect calorimetry, how these systemic parameters associate with tissue-level mitochondrial respiration remains unclear. This study aimed to determine whether resting respiratory exchange ratio (RER) and maximal fat oxidation (MFO) are associated with skeletal muscle mitochondrial respiration in men with T2D.

Methods

In a cross-sectional analysis of men with prediabetes and T2D ($N = 69$, 56 ± 6 years, glycated haemoglobin: 6.86 ± 1.22 %), skeletal muscle biopsy samples from the vastus lateralis were analysed. High-resolution respirometry quantified absolute and intrinsic (normalised to citrate synthase activity) mitochondrial respiratory states across Complex I (CI), Complex I+II (CI+II), and electron transfer system capacity (ETSC). Substrate oxidation outcomes included resting RER (measured via indirect calorimetry in a supine position between 08:00–10:00 h following an overnight fast) and MFO normalised to fat-free mass (determined via a 3-min step incremental cycle ergometer test using the Frayn equation, terminating when $RER \geq 1$). Simple linear regression analyses were performed to evaluate these relationships.

Results and Conclusions

Resting RER was positively associated with absolute CI capacity ($\beta = 0.049$, $p < 0.001$), accounting for 25.4% of its total variance, and with intrinsic CI respiration ($\beta = 0.382$, $p < 0.001$). Furthermore, MFO was negatively correlated across multiple intrinsic outcomes, significantly associating with intrinsic CI ($\beta = -0.414$, $p = 0.001$), and intrinsic ETSC ($\beta = -0.510$, $p < 0.001$). In men with prediabetes and T2DM, substrate oxidation is associated with skeletal muscle mitochondrial respiration. The positive association between resting RER and CI capacity could be mechanistically supported by the respirometry protocol utilised. Because CI respiration was stimulated using pyruvate, malate, and glutamate, this state specifically reflects the mitochondrial capacity to oxidise carbohydrate-derived substrates. Thus, a higher carbohydrate reliance (elevated RER) is tightly associated with tissue-level carbohydrate-linked mitochondrial respiratory capacity. Meanwhile, higher MFO is associated with reduced intrinsic respiratory

capacities, which could represent a compensatory mechanism where in individuals with low MFO upregulate their intrinsic respiratory capacity to offset metabolic efficiency deficits. This study is supported by the Spanish Ministry of Science, Innovation and Universities/State Research Agency (MICIU/AEI/10.13039/501100011033) through (EDUGUTION, PID2019-110063RA-I00); the Consejo Superior de Deportes (ENTRENOX, EXP_74977); and the Biomedical Research and Innovation Institute of Cádiz (INiBICA, MITOX, PP11-007-2023). JCP was supported by Instituto de Salud Carlos III ('Sara Borrell' contract).

Keywords: Mitochondrial function; Fatty acids; Oroboros; Skeletal muscle.

The Impact of Fatigue on Lower-Limb Explosive Power in Senior Football Athletes

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Abstract

Introduction

Explosive lower-limb strength is a key physical capacity in soccer, being closely associated with actions such as accelerations, changes of direction, shooting, and jumping. Fatigue accumulated during training sessions may negatively affect this capacity and consequently impair athletic performance. Therefore, the aim of this study was to analyze the impact of training-induced fatigue on lower-limb explosive strength in senior soccer players through the assessment of horizontal jump performance. The sample consisted of 12 senior soccer players from Clube de Futebol Gadiana, aged between 19 and 35 years. An observational repeated-measures design was adopted, comparing athletes' performances before and after a regular training session. At each assessment moment, participants performed two horizontal jump attempts, with the best result being recorded for analysis. The results showed a decrease in performance for all athletes after training, highlighting the negative effect of fatigue on explosive force production. Mean horizontal jump performance decreased from 2.26 m before training to 2.19 m after training, corresponding to an average reduction of 0.07 m and a mean variation of -3.22%. Individual responses to fatigue varied among participants, with performance decreases ranging from -2.19% to -4.09%. This variability suggests that other factors, such as physical condition, training experience, individual recovery, or physiological characteristics, may also have influenced the results obtained. It can be concluded that training-induced fatigue negatively affects lower-limb explosive strength in senior soccer players, resulting in reduced horizontal jump performance. These findings emphasize the importance of fatigue monitoring and appropriate training-load management to optimize athletic performance. Keywords: Explosive Strength; Fatigue; Horizontal Jump; Soccer; Lower Limbs.

Methods

Methodology 5.1 **Study Design** The present study follows a quantitative observational approach, based on data collection at distinct moments from the same participants. The aim is to analyze potential changes in performance as a function of the training-induced state of fatigue. The investigation will be conducted in a real training context, allowing greater proximity to sports practice, albeit with less control over external factors. 5.2 **Sample** The study will include the participation of 12 senior football athletes from Clube de Futebol Gadiana. Players who regularly participate in training sessions and do not present physical limitations or injuries at the time of evaluation will be considered eligible. Selection will be made by convenience. Data confidentiality and the informed

consent of the participants will be guaranteed.

5.3 Evaluation Instruments

Horizontal Jump Test

The explosive power of the lower limbs will be evaluated using the standing long jump (horizontal jump from a static position). Each participant will perform two attempts, and the greatest distance achieved will be considered. Measurement will be recorded in centimeters using a tape measure, from the starting line to the final point of contact upon landing.

Data Registration

The results will be recorded in predefined grids, ensuring uniformity in data collection.

Anthropometric Data

Participants' height and weight values will be recorded using instruments available within the club context. The athletes' age will also accompany the collected data.

Study Variables

Independent Variable

5.4.1 Fatigue state (before vs. after training)

Dependent Variable

5.4.2 Horizontal jump distance (centimeters)

5.5 Collection Procedures

Data collection will be performed before and after the training session.

Pre-Training Evaluation

Following the usual warm-up, the athletes will perform the horizontal jump test. Two attempts will be made, and the best result will be recorded.

Training Session

Subsequently, the training session planned by the coaching staff will take place, including different components of football training (tactical, technical, and physical).

Post-Training Evaluation

At the end of the session, and after a brief recovery period (3 to 5 minutes), the athletes will repeat the test under the same conditions. Two attempts will be recorded once again. Efforts will be made to maintain consistency in the application conditions during both moments of data collection.

5.6 Data Analysis

The collected data will be processed using Microsoft Excel. Initially, a descriptive analysis will be conducted, including the mean, standard deviation, and extreme values, with the objective of characterizing the behavior of the sample. Subsequently, a comparison will be made between the two evaluation moments (before and after training), allowing the verification of significant differences in the horizontal jump test. The individual behavior of the athletes in response to fatigue will also be analyzed. The results will be presented in the form of tables and, whenever relevant, through graphical representations to facilitate data interpretation.

Results and Conclusions

Results Analysis

The results obtained in the horizontal jump test indicate an overall decrease in performance following the football training session. A reduction in the distance achieved in the post-training horizontal jump was observed across all athletes, which suggests the presence of fatigue impacting the explosive force production capacity of the lower limbs. Despite this global downward trend, the data also show some individual variability. Some athletes presented relatively moderate losses, such as athlete 2 (-2.19%) and athlete 9 (-2.59%), while others showed more pronounced reductions, such as athlete 8 (-4.07%) and athlete 11 (-4.09%). This variability suggests that the response to fatigue is not homogeneous and can be influenced by individual factors such as training status, exercise tolerance, recovery, and neuromuscular characteristics. In general, it is observed that older athletes tended to present slightly higher losses, although this relationship is not entirely linear. Considering the 12 evaluated athletes, the pre-training horizontal jump mean was 2.26 m, while the post-training mean was 2.19 m. The mean difference was -0.07 m, which corresponds to an average fatigue variation of approximately -3.22%.

Discussion

The results obtained allow the conclusion that the football training session had a negative effect on horizontal jump performance, demonstrating a consistent reduction in the explosive capacity of the lower limbs post-effort. The average decrease of 7 centimeters and the mean variation of -3.22% indicate that the fatigue accumulated during training interfered with the ability to produce force quickly and effectively. This behavior is in agreement with what was described in the literature review. Dambroz, Clemente, and Teoldo (2022) state that physical fatigue

compromises multiple performance indicators in football, including explosive actions. Similarly, Armada-Cortés et al. (2022) demonstrated that repeated efforts reduce the capacity for rapid force expression, while Uddin et al. (2020) highlighted that fatigue induced by specific match tasks directly affects lower-limb muscle function. It is also important to note that, although the overall trend was a reduction in performance, the magnitude of this decrease was not identical across all athletes. This aspect reinforces the perspective presented by Cortis et al. (2013), according to which the response to fatigue depends on multiple individual and contextual factors, and is not necessarily linear. Thus, even within relatively homogeneous groups, distinct neuromuscular responses to the same training stimulus can exist. Furthermore, as observed from the presented graph, it is concluded that age influenced the variation of fatigue in the evaluated athletes, even though this influence does not follow an obvious linear relationship. The results show a tendency toward more pronounced fatigue values at older ages, though not in a linear manner, as some younger athletes also present similar values. Therefore, it can be stated that age constitutes a relevant variable in fatigue analysis, although it is not the sole element responsible for the differences observed among the athletes. In summary, the data suggest that training-induced fatigue compromises the explosive power of the lower limbs, reflecting a decrease in horizontal jump performance. These results support the theme of this study and reinforce the importance of monitoring fatigue within training and competition contexts, especially when the goal is to preserve explosive capacities that are decisive for football performance.

Keywords: Explosive Strength; Fatigue; Horizontal Jump; Soccer; Lower Limbs

Análise cinemática do lançamento em suspensão no Basquetebol

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Abstract

Introduction

The jump shot is one of the most important and widely used technical actions in modern basketball, being crucial for offensive effectiveness and for creating scoring opportunities in a competitive context.

Methods

Analysis of jump shots in basketball by different athletes.

Results and Conclusions

Each athlete has a different way of performing throws, with varying speed, trajectory, and body position.

Keywords: Basketball; Jump Shot; Kinematic Analysis; Biomechanics; Joint Angles; Sports Performance.

Influence of Menopausal Status on Basal Cortisol and Handgrip Strength Following a 12-Week Exercise and Diet Intervention in Women with Type 2 Diabetes.

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Abstract

Introduction

The hormonal transition during menopause significantly impacts endocrine profiles and musculoskeletal health. Basal cortisol, a marker of chronic stress and catabolic activity, may interact differently with physical performance depending on hormonal status. This study aimed to evaluate how a 12-week exercise and diet intervention affects basal cortisol and handgrip strength (HGS) in premenopausal versus postmenopausal women with overweight/obesity and type 2 diabetes (T2D).

Methods

This randomized controlled trial included 69 women (age: 55.3 ± 7.09 years) with prediabetes or T2D ($\text{HbA1c} \geq 5.7\%$) and overweight/obesity. Of these, 25 were premenopausal (ranging from less than 40 days since their last menstrual cycle to up to 2 years) and 44 were postmenopausal (>2 years since their last menstrual cycle). The 12-week intervention involved six groups with different combinations of exercise (3 days per week) and hypocaloric diet: high-intensity interval training (HIIT), HIIT-DIET, moderate-intensity continuous training (MICT), MICT-DIET, inactive (INACT), or INACT-DIET. HIIT included 1-minute cycling intervals at 90 % peak power output, MICT involved continuous cycling at 10 % above the first ventilatory threshold for 50 minutes, and INACT maintained their usual lifestyle. Diet groups received biweekly 20-minute counseling sessions with a nutritionist to follow a balanced, personalized menu aimed at diabetes control and a 5% weight reduction. Fasting serum cortisol was analyzed via Alinity CI (Abbott Laboratories). Handgrip strength was measured using a dynamometer (Takei tkk5401). A mixed factorial ANOVA time*exercise*diet*menopause status was applied with Bonferroni post hoc comparisons.

Results and Conclusions

A significant main effect of menopausal status was found for cortisol levels ($F = 5.3347$; $p = 0.024$; $\eta^2p = 0.09$), with postmenopausal women exhibiting higher levels (14.4 ± 0.47 ug/dL) than the premenopausal group (12.5 ± 0.65 ug/dL). No significant interactions were observed between cortisol levels and intervention modalities. Regarding HGS, a significant effect of menopausal status was observed ($F = 13.7840$; $p < 0.001$; $\eta^2p = 0.21$); premenopausal women were stronger at baseline (mean difference: 3.7^1kg , $p < 0.001$).

Correlations between cortisol and HGS showed divergent, non-significant trends: positive in premenopausal ($r=0.21$, $p=0.15$) and negative in post-menopausal women ($r=-0.15$, $p=0.15$). Menopausal status significantly influenced basal cortisol levels and handgrip strength in women with overweight/obesity and T2D. Postmenopausal women exhibited higher cortisol levels and lower muscle strength, suggesting that hormonal shifts after menopause may require specialized exercise programs to reduce muscle breakdown and preserve physical function. Grants: This work was supported by the Spanish Ministry of Science, Innovation and Universities and the State Research Agency (MICIU/AEI/10.13039/501100011033) through grants PID2020-120034RA-I00 (APETEX) and PID2019-110063RA-I00 (EDUGUTION). Additionally, the ENTRENOX project (Ref: EXP_74977) was funded by the High Council for Sports (Ministry of Culture and Sports, 2022) under the "Recovery, Transformation and Resilience Plan - Funded by the European Union – NextGenerationEU". Andrea González Mariscal is supported by a predoctoral grant from the Spanish Ministry of Universities (grant number: FPU22/01480).

Keywords: Chronic stress, insulin, inflammation, health, overweight

Effects of undulant or stable velocity loss programming in the bench press exercise on muscle hypertrophy

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Abstract

Introduction

Velocity loss (VL) is considered a key variable in determining strength and muscle hypertrophy adaptations during resistance training (RT) programs (Pareja-Blanco et al., 2017; Rodríguez-Rosell et al., 2020). In this regard, the effects of manipulating different VL thresholds during RT have received considerable research attention (Myrholt et al., 2023; Pareja-Blanco et al., 2020; Rodiles-Guerrero et al., 2022). These studies have typically prescribed a constant VL threshold within sets throughout the RT intervention. However, the effects of modulating VL throughout an RT program on muscle hypertrophy have not yet been investigated. Therefore, the aim of this study was to compare the effects of a stable VL threshold versus progressively increasing VL thresholds at each relative load on muscle hypertrophy

Methods

Thirty-two resistance-trained men were randomly assigned to two training programs that differed in the VL evolution for each relative intensity (STA: stable VL; UND: undulant VL). Subjects followed 16 bench press sessions during 8 weeks with matched intensity (60%-75% 1-RM), sets (3), average VL (25%), and resting time between sets (4 minutes). STA performed all RT sessions at a 25% VL while UND performed 0% and 50% VL, alternately. Before and after the RT program, the pectoralis major's cross-sectional area (CSA) was assessed.

Results and Conclusions

After the training program, a “time effect” was observed ($p < 0.05$). Despite no “group x time” interaction being found ($p > 0.05$), only the UND intervention showed significant increases in muscle hypertrophy ($p < 0.001$), with similar mean total repetitions but a different distribution across velocity ranges. The STA group completed more repetitions at 0.9-0.6 $\text{m}\cdot\text{s}^{-1}$ ($p < 0.01$). On the other hand, UND performed more repetitions at 0.5-0.2 $\text{m}\cdot\text{s}^{-1}$ ($p < 0.001$). Although no significant differences were observed between groups, only the UND intervention was effective in inducing muscle hypertrophy

Keywords: strength training, muscle adaptations, programming models, cross-sectional area.

Effects of beetroot juice supplementation on rating of perceived exertion in swimmers: a systematic review and meta-analysis

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Abstract

Introduction

Beetroot juice (BRJ) and dietary nitrate supplementation have been extensively studied for their potential ergogenic effects, mainly through enhanced nitric oxide bioavailability. While evidence regarding performance outcomes in swimming remains inconsistent, perceptual responses such as the Rating of Perceived Exertion (RPE) may provide additional insight into the effects of supplementation on exercise tolerance.

Methods

A systematic review and meta-analysis of randomized controlled trials was conducted following PRISMA 2020 guidelines. A comprehensive search up to July 2025 identified studies comparing BRJ or nitrate supplementation with placebo or no supplementation in swimmers. Only studies reporting RPE outcomes were included. Data were pooled using random-effects models, and mean differences (MD) with 95% confidence intervals (CI) were calculated.

Results and Conclusions

Perceptual responses to exercise, specifically RPE, were reported in four studies comprising a total of 55 swimmers. The pooled analysis revealed a small but statistically significant reduction in RPE following BRJ supplementation compared to placebo (MD = -0.25; 95% CI = -0.48 to -0.02; $p = 0.03$). Moreover, heterogeneity among studies was negligible ($I^2 = 0\%$). Despite differences in supplementation protocols and participant characteristics, the direction of the effect was consistent across studies. BRJ supplementation appears to induce a modest reduction in perceived exertion in swimmers. Although the magnitude of this effect is small, it may have practical relevance in training settings, where a lower perception of effort could facilitate greater training tolerance or adherence. Further research with larger samples and standardized methodologies is needed to confirm these findings and clarify their practical significance.

Keywords: Beetroot juice, nitrate supplementation, rating of perceived exertion, swimmers, swimming.

Influence of the Foot-Ankle Complex on Dynamic Balance in Youth Football Players

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Abstract

Introduction

Dynamic balance and postural control are critical components for athletic performance and injury prevention in youth football. During the U14 stage, athletes undergo anthropometric and maturational changes that can alter postural control. The objective of this study was to analyze whether ankle and first toe range of motion (ROM), first toe strength, or plantar arch morphology differentiate U14 football players with high and low performance in the anterior reach of dynamic balance.

Methods

A total of 92 of U14 football players (12.76 ± 0.58 years old) were evaluated. Neuromechanical variables of the foot and ankle were measured: navicular drop, first toe ROM and strength, and ankle dorsiflexion ROM (with both extended and flexed knee). Dynamic postural control was determined using the anterior reach in the Y-Balance Test (YBT). Statistical analysis employed Bayesian inference, using the Bayes Factor (BF10) to quantify the strength of evidence between the high- and low-performance groups.

Results and Conclusions

Players with high performance in the Anterior YBT showed a significantly greater ROM in ankle dorsiflexion, both with the knee extended ($36.26 \pm 4.55^\circ$ vs $33.83 \pm 4.54^\circ$; BF10 = 3.791, moderate evidence) and flexed ($40.17 \pm 6.76^\circ$ vs $36.70 \pm 5.18^\circ$; BF10 = 5.954, moderate evidence). Conversely, navicular drop, first toe ROM, and first toe strength showed only anecdotal evidence (BF10 < 1). Ankle dorsiflexion range of motion is a critical mechanical determinant for success in the dynamic postural control of under-14 football players, whereas arch morphology and first toe factors do not discriminate such performance. It is recommended to include systematic assessment and flexibility training for ankle dorsiflexion in performance optimization and injury prevention programs within this category.

Keywords: Range of motion, Y-Balance Test, postural control, youth football

MARATHON PERFORMANCE PREDICTION THROUGH 1,000-M, 2,000-M, AND 3,000-M RUNNING TIME-TRIALS

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Abstract

Introduction

To our knowledge, no study has investigated whether performance in running sprints can be used to predict marathon performance. Therefore, this study aimed to develop predictive equations to estimate marathon performance from performance in 1,000-m, 2,000-m, and 3,000-m running time-trials.

Methods

Recreational runners of both sexes were, allocated into three groups: 1,000-m running time-trial (11 men and 7 women), 2,000-m running time-trial (10 men and 7 women), and 3,000-m running time-trial (10 men and 7 women). During the first trial session, familiarization with the respective running time-trial. During the second trial, runners performed a maximal 1,000-m, 2,000-m, or 3,000-m running time-trial. During the third trial, they completed the Curitiba Marathon – Brazil.

Results and Conclusions

For the development of predictive models, stepwise multiple regression analysis was applied, resulting in the following equations: (1) Race time (s) = $1738.6 + 52.2 \cdot T1000$ (s); $R^2 = 0.887$; SEE = 899 s (6.7%) ; (2) Race time (s) = $-618.0 + 29.2 \cdot T2000$ (s); $R^2 = 0.883$; SEE = 965 s (7.2%) and; (3) Race time (s) = $3340.1 + 13.4 \cdot T3000$ (s); $R^2 = 0.861$; SEE = 1057 s (7.9%). Findings of this study indicate that marathon performance can be predicted from maximum performance running time-trials ranged from 1,000-m to 3,000-m. However, among the proposed models, the equation based on the 1,000-m running time-trial showed the best predictive model for estimating marathon performance, as evidenced by the highest coefficient of determination (R^2) and the lowest standard error of the estimate (SEE).

Keywords: Performance prediction; Recreational runners; Road running; Marathon; Running time-trials of 1,000, 2,000, and 3,000 meters.

PREDICTION OF 5-KM ROAD RUNNING PERFORMANCE BASED ON FIELD AND ANTHROPOMETRIC VARIABLES

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Abstract

Introduction

While a few studies have investigated 5-km running performance prediction using physiological variables, it is possible to speculate that performance in 5-km road race can also be predicted using anthropometric and training variables. Thus, this study aimed to develop a predictive equation to estimate 5-km road race performance using 1,200-meter running time-trial performance, age, and body mass index (BMI) as predictors.

Methods

The sample consisted of 17 adult recreational runners (13 women and 4 men). In the first assessment session, height and body mass were measured, followed by a familiarization with 1,200-meters running time-trials. In the second assessment session, 1,200-meter sprint was performed at maximum effort. In the third assessment session, participants engaged in an official 5-km road race. Multiple linear regression analysis (stepwise) was used in the development of the equation.

Results and Conclusions

The mean $\pm$ standard deviation of the sample for the 1,200-meter time, age, body mass index (BMI), and 5-km time road race performance time were 377 ± 38.3 seconds, 39.9 ± 8.6 years, $25.8 \pm 4.1 \text{ kg/m}^2$, and $1,854 \pm 226$ seconds, respectively. The generated equation was: Race time (s) = $418.87 + 3.06 \cdot 1200 \text{ m time (s)} - 10.79 \cdot \text{Age (years)} + 27.55 \cdot \text{BMI (kg/m}^2\text{)}$; $R^2 = 0.910$; EPE = 66 s (11.0%). This result suggests that performance during a 5-km road race is associated with performance in a 1,200-meter running time-trial, age, and BMI, which potentially serve as useful predictors of performance in this event.

Keywords: Performance prediction; Recreational runners; Road running; Running time-trial; Body mass index; Age.

Differences in Physical Fitness Indicators between Students from the Azores and Mainland Portugal in the 8th and 10th Grades

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Abstract

Introduction

Physical fitness during adolescence is a fundamental indicator of health and functional development, associated with motor performance, chronic disease prevention, and quality of life. This study aimed to compare physical fitness indicators between students from the Azores and mainland Portugal in the 8th and 10th grades, seeking to understand how geographical and sociocultural context may influence the physical profile of adolescents

Methods

A total of 105 public school students participated, distributed across four groups: 8th grade mainland Portugal ($n = 44$), 8th grade Azores ($n = 18$), 10th grade mainland Portugal ($n = 18$), and 10th grade Azores ($n = 25$). Four physical fitness variables were assessed using the standardized FITescola protocol: aerobic endurance (shuttle run test), linear speed (40-meter sprint), abdominal muscle endurance (curl-up test), and lower limb explosive power (horizontal jump). Data were analyzed using the independent samples t-test, with prior verification of normality assumptions (Kolmogorov-Smirnov and Shapiro-Wilk) and homogeneity of variances (Levene), at a significance level of $\alpha = .05$. Effect size was calculated using Cohen's d to assess the practical relevance of observed differences.

Results and Conclusions

The findings suggest that certain components of physical fitness particularly localized muscular endurance may be influenced by the geographical and sociocultural context of adolescents. The Azorean superiority in the 8th grade is consistent with literature associating less urbanized environments with greater exposure to informal physical activity (Petroski et al., 2012; Loh et al., 2019). The reversal observed in the 10th grade points to the mediating role of biological maturation and differential access to organized sports infrastructure throughout adolescence (Albaladejo-Saura et al., 2021; Ré, 2011). The absence of differences in aerobic and speed capacities reinforces the equalizing role of the national Physical Education curriculum. Future research should control for maturation status, expand sample sizes, and adopt longitudinal designs to deepen understanding of the factors underlying the regional differences observed.

Keywords: : Physical fitness; Azores; motor performance; biological maturation; Physical Education.

Comparison of Energy Intake, Energy Availability and Macronutrient Adequacy in Team and Individual Sports Athletes

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Abstract

Introduction

Adequate nutrition is a key factor for optimizing athletic performance, recovery, and long-term health. This study aimed to determine differences in nutritional intake between team and individual sport athletes.

Methods

Nutritional intake of 184 athletes (59 individual sport athletes, 125 team sport athletes; age: 21.2 ± 4.8 years; body mass: individual 70.5 ± 14.6 kg, team 70.0 ± 13.8 kg; body fat: individual $22.6 \pm 8.8\%$, team $23.9 \pm 9.1\%$) was recorded using a 7-day dietary diary and using the macronutrient intake recommendations of the AND/ACSM/AC and the 2023 IOC consensus for energy availability. Body composition was estimated using bioelectrical impedance analysis, obtaining body fat percentage and fat-free mass (FFM).

Results and Conclusions

Mean energy intake in individual athletes was 2610.1 ± 663.3 kcal/day and in team athletes 2257.4 ± 665.8 kcal/day ($p = 0.001$), corresponding to an energy availability of 25.2 ± 12.8 and 24.6 ± 14.0 kcal/FFM/day, respectively ($p = 0.803$). Overall, 8.7% of athletes were classified as having optimal energy availability (individual: 6.1%; team: 10.4%), 22.8% as suboptimal (individual: 28.8%; team: 20.0%), and 68.5% as low energy availability (individual: 66.1%; team: 69.6%) ($p = 0.254$). Individual athletes consumed higher amounts of carbohydrates (292.0 ± 88.5 vs. 256.0 ± 93.4 g/day, $p = 0.014$), protein (148.9 ± 46.6 vs. 125.1 ± 45.7 g/day, $p = 0.001$), and fats (92.2 ± 36.9 vs. 80.7 ± 33.4 g/day, $p = 0.037$), as well as higher relative intakes per kg body mass for carbohydrates (4.3 ± 1.5 vs. 3.8 ± 1.5 g/kg/day, $p = 0.028$), protein (2.2 ± 0.7 vs. 1.8 ± 0.7 g/kg/day, $p = 0.003$), and fat (1.33 ± 0.5 vs. 1.2 ± 0.5 g/kg/day, $p = 0.05$). Regarding adherence to macronutrient recommendations, 40.8% of athletes did not meet fat guidelines (individual: 40.7%; team: 40.8%, $p = 0.988$), 90.2% did not meet carbohydrate recommendations (individual: 86.4%; team: 92.0%, $p = 0.236$), and 51.1% did not meet protein recommendations (individual: 64.4%; team: 44.8%, $p = 0.013$). Athletes in individual sports present higher energy and macronutrient intake compared to team sport athletes; however, this greater intake does not translate into differences in energy availability between groups. The prevalence of low energy availability is high in both sport modalities, affecting more than two-thirds of athletes. In addition, adherence to macronutrient recommendations is suboptimal, particularly for carbohydrate intake, which shows the lowest level of compliance. These findings highlight the need for individualized nutritional strategies to improve dietary adequacy and reduce the risk of low energy availability in athletes.

Keywords: Energy Availability, Nutritional Intake, Macronutrients, Nutritional Adequacy

Analysis of the soccer kick with the dominant and non-dominant leg.

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Abstract

Introduction

Kicking is one of the most decisive technical actions in soccer, directly influencing offensive effectiveness and competitive success. The ability to execute the kicking technique effectively with both lower limbs represents an important advantage, providing players with greater versatility and unpredictability during competition. The aim of this study was to perform a kinematic analysis of the soccer kicking technique by comparing executions performed with the dominant and non-dominant leg through the assessment of joint angles and ball velocity throughout the different phases of the movement.

Methods

The sample consisted of nine athletes and one coach aged between 13 and 18 years (mean age: 15 years). All participants identified the right leg as their dominant limb and the left leg as their non-dominant limb. Each participant performed one kick with each leg, allowing for a comparative analysis of the biomechanical variables associated with the technical gesture.

Results and Conclusions

The kinematic analysis revealed significant differences between the two lower limbs. Kicks performed with the dominant leg exhibited more consistent angular patterns throughout the movement phases, demonstrating superior segmental coordination and greater mechanical efficiency. Furthermore, higher ball velocities were observed when the kick was executed with the dominant leg, reflecting a greater capacity for force production and energy transfer throughout the kinetic chain. In contrast, the non-dominant leg showed greater angular variability and lower final ball velocity, suggesting reduced motor control and lower levels of technical automatization. It is concluded that limb dominance significantly influences the biomechanical characteristics of soccer kicking, affecting both movement mechanics and performance outcomes. These findings highlight the importance of incorporating specific training strategies aimed at developing the non-dominant leg in order to promote functional symmetry, improve technical effectiveness, and increase the range of motor solutions available during competition.

Keywords: Soccer; Kicking Technique; Kinematic Analysis; Limb Dominance; Ball Velocity; Biomechanics.

Effect of a health promotion educational intervention on urinary incontinence in older adults with frailty: The Fragsalud project.

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Abstract

Introduction

Frailty is defined as a multifactorial clinical syndrome characterized by a decline in physiological reserves and an impaired homeostasis that increases vulnerability to adverse health outcomes. Among these, urinary incontinence (UI), defined as any involuntary loss of urine, is particularly noteworthy. Older adults presenting with both UI and frailty experience a significant reduction in physical function, an increased risk of falls and fractures, social isolation, and mood deterioration. However, despite this interdependence, current clinical practice persists in addressing UI in isolation; therefore, comprehensive interventions such as those conducted within the Fragsalud project are required to address its complex, multifactorial etiology.

Methods

A two-arm, multicenter randomized clinical trial was conducted in the provinces of Cadiz and Malaga, in which 199 older adults with frailty completed the study (74.2 ± 6.5 years). The intervention group ($n=109$) underwent a six-month health promotion educational program, structured into an initial phase of four group sessions on frailty, physical activity, healthy eating habits, cognitive training, and mental well-being, followed by a follow-up phase with six telephone calls over five months. The control group, conversely, maintained their usual care routine ($n=90$). Regarding assessment, bladder control ability was evaluated at baseline and at six months using item 6 of the Barthel Index, which identifies the presence of UI. Participants who reported an accident frequency of less than once per week or indicated having UI were assigned to the incontinent group. Statistical analysis was performed using generalized estimating equations, evaluating the time x group interaction moderated by the dichotomous urinary variable.

Results and Conclusions

The time x group interaction showed significant differences in the evolution of UI odds in the intervention group compared to the control group from pre to post-intervention (interaction OR = 0.54; 95% CI 0.30 to 0.97; $p = 0.04$). These findings suggest that a 6-month health promotion educational program could help improve UI in older adults with frailty. This study (project UMA20-FEDERJA-154) was funded by the Regional Government of Andalusia (Junta de Andalucía) (10.13039/501100011011) and the ERDF under the 2014-2020 ERDF Operational Program for Andalusia.

Keywords: Urinary incontinence, frailty, educational sessions, older adults, health promotion.

Effects of aerobic exercise and diet on DNA oxidative stress in adult women with Type 2 Diabetes Mellitus: a randomized factorial trial.

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Abstract

Introduction

The pathophysiology of Type 2 Diabetes (T2D) is characterized by increased production of reactive oxygen species (ROS). Elevated ROS impair insulin signaling and beta-cell function, worsening T2D, and cause DNA damage that increases 8-Hydroxy-2'-deoxyguanosine (8-OHdG) levels. Dietary interventions and exercise are cornerstones of T2D therapy. While moderate-intensity continuous training (MICT) is widely used, it requires long sessions. Conversely, high-intensity interval training (HIIT) is a time-efficient, safe alternative. However, the superiority of either modality, or of their interaction with diet, regarding 8-OHdG remains unestablished. Furthermore, despite known sex differences in ROS production, research on women remains limited. Therefore, this preliminary study investigates the isolated and combined effects of MICT vs. HIIT and diet on 8-OHdG levels in adult women with T2D.

Methods

This randomized factorial trial enrolled 64 women with T2D and overweight or obesity (55 ± 6 years, $6.7 \pm 1.0\%$ HbA1c, 33.3 ± 5.5 kg/m² BMI). The study included an exercise factor with 3 levels (MICT, HIIT, or Inactive) and a diet factor with 2 levels (No Diet (ND) or Diet (D)), yielding 6 parallel groups: Inactive-ND (n=10), Inactive-D (n=11), MICT-ND (n=11), MICT-D (n=10), HIIT-ND (n=11), and HIIT-D (n=11). MICT involved 50 minutes of continuous pedaling at 10% above the first ventilatory threshold, while HIIT comprised 10 x 1-minute intervals at 90% peak power output. The diet intervention consisted of a balanced menu individualized for fat loss and glycemic control. Supervised exercise sessions occurred 3 times weekly, and dietary counseling was delivered bi-weekly, both for 12 weeks. Fasting serum 8-OHdG was quantified via ELISA (EU2548, Fine Test, Wuhan Fine Biotech Co., Ltd). Data were analyzed using a 2 (pre vs. post) x 3 (MICT vs. HIIT vs. Inactive) x 2 (ND vs. D) mixed factorial ANOVA with Bonferroni post hoc comparisons.

Results and Conclusions

Baseline 8-OHdG levels were similar across groups ($p > 0.05$): Inactive-ND (76.3 ± 7.5), Inactive-D (80.5 ± 7.6), MICT-ND (86.5 ± 17.7), MICT-D (77.9 ± 13.3), HIIT-ND (83.7 ± 9.2), and HIIT-D (74.7 ± 4.6) ng/mL. No significant Time $\times$ Exercise ($F = 1.284$, $\eta^2p = 0.042$, $p = 0.285$), Time $\times$ Diet ($F = 1.485$, $\eta^2p = 0.025$, $p = 0.228$), or Time $\times$ Exercise $\times$

Diet ($F = 2.195$, $\eta^2p = 0.070$, $p = 0.121$) interactions were found. These findings suggest that 12 weeks of MICT, HIIT, or dietary interventions, either alone or in combination, are insufficient to attenuate DNA oxidative stress markers in this population. Longer-term randomized controlled trials are warranted to evaluate extended interventions. This work was supported by the Spanish Ministry of Science, Innovation and Universities and the State Research Agency (MICIU/AEI/10.13039/501100011033) through grant PID2019-110063RA-I00 (EDUGUTION project), the Consejo Superior de Deportes (Ministry of Culture and Sports, 2022) under the "Recovery, Transformation and Resilience Plan - Funded by the European Union – NextGenerationEU" through the ENTRENOX project (Ref: EXP_74977), and the MITOX project funded by an internal call of the Biomedical Research and Innovation Institute of Cádiz (INiBICA) (grant number: PP11-007-2023). Manuel Costilla is supported by a predoctoral grant from the Spanish Ministry of Universities (grant number: FPU22/03208).

Keywords: Insulin Resistance, Hyperglycemia, Weight Loss, Adipose Tissue, Free Radicals, Antioxidants

Kinematic analysis of movement – Straight Punch in Boxing

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Abstract

Introduction

Boxing is a sport that requires high levels of physical and technical preparation, involving capacities such as strength, speed, power, cardiovascular endurance, motor coordination, balance, and concentration. Among the fundamental technical skills of the sport, the straight punch is one of the most frequently used due to its speed, effectiveness, and ability to generate high impact forces. Understanding the biomechanical factors associated with its execution may contribute to performance optimization and injury prevention. The aim of this study was to perform a kinematic analysis of the straight punch in boxing, comparing executions performed with the dominant and non-dominant hand through the assessment of joint angles and movement velocity.

Methods

The sample consisted of nine right-handed amateur boxers who performed two straight punches under controlled conditions: one with the dominant hand and one with the non-dominant hand. The analysis focused on kinematic parameters including joint angles during the preparatory phase, movement amplitude, body positioning, and punch execution velocity.

Results and Conclusions

The results revealed relevant biomechanical differences between the two upper limbs. In general, punches executed with the dominant hand demonstrated greater mechanical efficiency, superior segmental coordination, and higher movement velocity. Furthermore, more consistent angular patterns and a more effective transfer of force throughout the kinetic chain—from the lower limbs and trunk to the striking arm—were observed. In contrast, the non-dominant hand exhibited greater technical variability, less coordinated movement amplitude, and a reduced ability to generate and transfer force. It is concluded that limb dominance significantly influences the biomechanical characteristics of the straight punch, affecting movement velocity, coordination, and overall technical effectiveness. These findings highlight the importance of bilateral technical and motor development in boxing training programs, promoting greater functional balance, movement efficiency, and competitive versatility.

Keywords: Boxing; Straight Punch; Kinematic Analysis; Biomechanics; Limb Dominance; Sports Performance.

Potenciação Pós Ativação

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Abstract

Introduction

O estudo foca-se na otimização da força explosiva dos membros inferiores, investigando os efeitos agudos da Potenciação Pós-Ativação (PPA) no Salto com Contramovimento (CMJ) após a realização de um agachamento pesado.

Methods

A amostra consistiu em 17 participantes, estratificados em dois perfis distintos de força relativa: Treinados ($\geq 1.5x$ a massa corporal no agachamento) e Não Treinados ($< 1.5x$). O desenho quase-experimental misto envolveu uma avaliação baseline do salto vertical, seguida imediatamente do estímulo de ativação: 1 série de 3 repetições de agachamento a 85% de 1RM. O desempenho no CMJ foi reavaliado de forma estrita aos 2, 4, 8 e 12 minutos de repouso passivo pós-estímulo.

Results and Conclusions

A análise inferencial (ANOVA Mista) demonstrou que o protocolo de agachamento pesado não produziu um efeito principal significativo no CMJ de forma global ($p=0.074$). Isolou-se apenas um pico marginal de melhoria de desempenho aos 4 minutos de recuperação em relação à baseline ($p=0.007$).

Keywords: Potenciação Pós-Ativação, Salto Vertical, Agachamento, Desempenho, Força.

"Comparing a gradual incremental test in cycle-ergometer and half squat: A case report"

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Abstract

Introduction

Maximal oxygen volume consumption (VO₂max) is the main factor that determines quality and expectancy of life. Therefore, since the firsts physical activity recommendations were based in endurance training discriminating between moderate and vigorous intensity which is determined by the first and second ventilatory thresholds (VT¹ and VT²). However, today physical activity recommendations include a combination of endurance and resistance training. For that, it should be very interesting to adapt a gradual exercise test to resistance exercises for combining resistance and endurance training stimuli. Therefore, the objective of this study is to compare a gradual exercise test in cycling with half squat.

Methods

A competitive male swimmer participant in the Spanish Championship with experience in half squat exercise went three times to the Sport Sciences Laboratory. In the first session performed a gradual exercise test in cycle-ergometer which consisted in increasing 15W per minute until exhaustion. Then, the participant executed a test for determining one repetition maximum (1-RM) in a second session while in the last experimental session was performed a gradual incremental test in half squat based on 5% 1-RM load increasement in 1 minute interval interspersed by 2 minutes until fatigue. In both gradual incremental tests were determined: VT¹, VT², VO₂máx and % HRmax and % VO₂max related to VT¹ and VT².

Results and Conclusions

It was identified VT¹ and VT² in cycle-ergometer and half squat using the same criteria: i) VT¹: first disproportional increasement of ventilation (VE) in relation to intensity and the first increasement of VE/VO₂ without increasement of VE/VCO₂; ii) VT²: second non-proportional increasement of VE in relation to intensity and a combined increasement of VE/VO₂ and VE/VCO₂. Additionally, intensity related to VT¹ was similar in both exercise modalities: 55.6% VO₂max and 77.3% HRmax in cycle-ergometer vs 65.2% VO₂max and 73.2% HRmax in half squat. Similar response was reported for VT²: 77.3% VO₂max and 91.7% HRmax in cycle-ergometer vs 81.4% VO₂max and 84.5% HRmax in half squat. These preliminary results suggest that resistance training programs could be prescribed based on ventilatory thresholds and be an opportunity for developing endurance and muscle strength.

Keywords: Athlete; Exercise; Metabolism; Resistance Training; Strength.

The Effect of Fatigue on Acceleration and Speed in Young Athletes

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Abstract

Introduction

Fatigue is widely recognised as one of the main factors influencing sports performance, particularly in tasks that require high force production over short periods of time, such as acceleration and speed. In young athletes, these abilities play a decisive role in motor development and performance in sports, while also being strongly influenced by biological maturation. Studies indicate that acceleration, maximum speed and the ability to perform repeated sprints are interrelated in young athletes, showing that these qualities are still developing during childhood and early adolescence. The literature demonstrates that exercise-induced fatigue can significantly compromise neuromuscular performance. In repeated-sprint protocols, increases in physiological markers of fatigue, such as blood lactate, as well as reductions in force production capacity and muscular power, have been observed. These changes are reflected in poorer performance in explosive tasks, suggesting that fatigue directly affects neuromuscular efficiency. Additionally, high-intensity training sessions combining speed, agility and small-sided games have been shown to induce significant neuromuscular fatigue in young athletes, with effects that may persist for up to 24 hours after exertion. In this context, it is relevant to analyse the impact of fatigue on the performance of under-17 athletes born in 2015, particularly by comparing pre- and post-training moments. Since this age group corresponds to a sensitive phase of motor development, characterised by high neuromuscular plasticity and rapid skill acquisition, understanding the effects of fatigue may contribute to better organisation and prescription of training. Therefore, the present study aims to investigate how fatigue influences acceleration and speed in young athletes, providing relevant data for optimising the training process and promoting appropriate athletic development.

Methods

The present study adopts a quantitative, observational and comparative design, with the aim of analysing the effect of fatigue on acceleration and speed performance in under-17 young athletes born in 2015. The assessment was carried out at two different moments: before and after the training session, allowing the comparison of participants' performance under conditions of lower and higher fatigue. The sample consisted of 30 under-17 young athletes, all born in 2015 and integrated into a regular sports training context. Participant selection followed previously defined inclusion criteria, namely regular participation in training and the absence of injuries or physical limitations that could compromise the performance of the test. For data collection, a 30-metre linear sprint test was used, with an intermediate mark at 10 metres. This test was chosen because

it is a simple, practical and suitable tool for assessing acceleration and speed in youth sports contexts. Execution time was recorded using a stopwatch, from the start to the moment the athletes crossed the defined points. Data collection was carried out immediately before training and immediately after its completion. Before performing the test, the athletes completed a standardised warm-up in order to ensure similar conditions for all participants and reduce the risk of injury. Each athlete performed a straight-line 30-metre sprint, starting from a previously defined static position. The total time up to 30 metres was recorded, as well as the partial time at 10 metres. The segment between 0 and 10 metres was considered an indicator of acceleration capacity, while the segment between 0 and 30 metres was used as a reference for running speed. In this way, it was possible to compare the athletes' performance before and after exposure to the training load. The independent variables corresponded to the assessment moment, namely pre-training and post-training. The dependent variables were the time obtained over 10 metres, representing acceleration, and the time obtained over 30 metres, representing speed. The comparison between these values made it possible to identify possible performance changes associated with fatigue. The collected results were organised and compared between the two assessment moments. The analysis made it possible to verify whether there was variation in performance after training, with a possible decrease in acceleration and speed effectiveness expected due to the effect of fatigue. Whenever applicable, the data were treated using descriptive statistics, including means and absolute differences between the pre- and post-training moments. This methodological procedure allowed for an objective analysis of the acute impact of fatigue on the locomotor performance of young athletes. The information obtained may contribute to a better understanding of the physical demands of training at early ages and to more appropriate planning of training sessions in the under-11 age group.

Results and Conclusions

Results The results presented follow the same order of athletes, meaning that the athlete who appears in the first position in the table of results obtained before training also appears in the first position in the table of results obtained after training, and so on. The variations also follow the same order previously presented in the tables of results obtained before and after training. The descriptive statistics show the detailed variations in acceleration performance over 0–10 metres and speed performance over 30 metres, comparing the pre- and post-training moments. The analysis of the data reveals significant heterogeneity in the individual response to neuromuscular fatigue induced by the training session. Although most of the sample showed an increase in execution times, which reflects a decrease in performance after exertion, distinct variations between athletes can be observed, with some individuals showing physical resilience or even marginal improvements in the post-training moment. This dispersion of results suggests that, in addition to accumulated fatigue, other factors, such as variability in biological maturation and the specific neuromuscular adaptation of each young athlete, influence locomotor performance differently under conditions of physical stress. In terms of descriptive statistics, acceleration increased from 2.23 ± 0.3 seconds before training to 2.38 ± 0.34 seconds after training, representing a difference of +0.15 seconds. Speed increased from 5.53 ± 0.42 seconds before training to 5.73 ± 0.47 seconds after training, representing a difference of +0.20 seconds. These results indicate a general decrease in performance after training, especially in acceleration, suggesting that the fatigue induced by the training session had a negative effect on the athletes' locomotor performance. **Conclusion** In summary, the results obtained allow us to conclude that the training session had a negative effect on the locomotor performance of the young athletes assessed, with a

general decrease in acceleration and speed capacity in the post-training moment. Although there were some individual exceptions, the predominant tendency was a worsening of the recorded times, confirming the presence of acute fatigue after exposure to effort. This pattern reinforces the idea that, in youth training categories, training can produce immediate changes in physical performance, especially in tasks that depend on high force production and neuromuscular efficiency. Among the variables analysed, acceleration proved to be more sensitive to the effects of fatigue than total speed, showing a greater relative loss. This result is particularly relevant because the initial phase of the sprint requires a rapid response from the neuromuscular system, greater coordination and the ability to apply force in a very short period of time. In under-17 athletes, these skills are still developing, which may explain the greater vulnerability observed after training. Thus, the data obtained are consistent with the literature presented, suggesting that fatigue significantly interferes with explosive performance in this age group. From a practical perspective, this study highlights the importance of careful planning of training sessions at early ages, in order to balance training intensity with adequate recovery periods. Monitoring the state of fatigue should be considered a central aspect in the organisation of training, especially when the objective is to improve acceleration and speed. In conclusion, training-induced fatigue compromises young athletes' performance, with a greater impact on acceleration than on speed, making it essential to continue investigating this phenomenon with larger samples and more precise assessment methods.

Keywords: fatigue; acceleration; speed; young athletes; sprint

Effects of an educational intervention on the improvement of the lower body: The Fragsalud Project.

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Abstract

Introduction

One of the main problems associated with frailty is the loss of muscle mass in the lower body, which causes functional limitations that can lead to immobility, falls, and even social isolation. Although multicomponent exercise interventions have been shown to help enhance lower body strength, evidence regarding the efficacy of health education programs to improve lower body strength remains scarce.

Methods

A total of 199 participants from the provinces of Cádiz and Málaga took part in a health promotion educational project named 'Fragsalud.' This program involved an intervention consisting of four sessions focused on frailty, nutrition, physical activity, mental well-being, social well-being and sleep. At baseline and six months post-intervention, lower-limb strength was assessed using the 5-repetition sit-to-stand (STS) test, which is a component of the Short Physical Performance Battery (SPPB). To analyze the effects of the intervention on lower-limb performance (5-STs performance), a 2x2 mixed-model factorial analysis of variance (ANOVA) was conducted, with group (intervention vs. control) as the between-subjects factor and time (baseline vs. 6 months) as the within-subjects factor. Effect sizes were calculated using partial eta-squared (η_p^2), with values of 0.01, 0.06, and 0.14 considered to represent small, medium, and large effects, respectively.

Results and Conclusions

A significant interaction effect between group and time was observed ($F = 7.89$; $\eta_p^2 = 0.04$; $p < 0.001$). Although a baseline disparity existed between the groups ($p = 0.002$), pairwise comparisons adjusted using the Bonferroni method revealed that the intervention group achieved a pronounced and sustained reduction in execution time compared to the control group, particularly at 6 months (Mean Difference [MD] = 16.48; 95% CI: 11.90 to 21.07; $p < 0.001$). These results suggest that a health promotion educational intervention could optimize lower body strength, which is associated with better functional independence, thereby leading to an improved quality of life, as evaluated by the STS test.

Keywords: Lower body; Educational intervention; Sit-to-stand test; Frailty; Older adults.

Reliability of the Cutting Movement Assessment Score (CMAS) Score

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Abstract

Introduction

Deceleration manoeuvres such as landing or change of direction (COD) are frequent and potentially high-risk actions in team sports. Sidestep cuts between 60° and 180° and one-leg landings have been identified as the main mechanisms in ACL injury—inciting events in several sports. In football, most movements are not performed in a forward direction, so COD manoeuvres are especially frequent and relevant in this sport, with CODs up to 90° being the most frequently performed action. The need for sophisticated and expensive laboratory instruments makes the calculation of external KAM less accessible and difficult to apply in field-based contexts by sports and conditioning professionals. For that reason, different field-based tests that evaluate landing mechanics have been developed and have been shown to be valid and reliable in estimating knee load or KAM in female athletes. In contrast, few studies have evaluated COD mechanics to analyse the risk of ACL injury in sports, with very few applying valid and reliable field-based procedures and instruments. In a recent study, a specific and accessible tool was designed, called the Cutting Movement Assessment Score (CMAS), for the qualitative observation of certain high-risk mechanics in a 90° COD manoeuvre. This study therefore sought to determine the intra- and inter-rater reliability using the CMAS tool to assess the movement quality of a 90° COD when the test is applied in the real framework of sport practice with female footballers. A second aim was to ascertain the inter-session reliability to estimate the reproducibility of the protocol with the execution of the test in different sessions.

Methods

First, this study had a cross-sectional design to determine the reliability of the CMAS tool to assess 90° cuts to both sides using a specific field-based approach in football. Second, a within-subject, repeated measures, pre-to-post design (test–retest) was used to study the reproducibility of the protocol over two sessions (one week apart). Two-dimensional video footage data were captured to allow for observational qualitative screening using the CMAS.

Results and Conclusions

Low inter-rater reliability was found, as well as moderate intra-observer reliability. The items in the tool with the highest reliability scores were: item 2 ‘Wide lateral leg support’, 4 ‘Initial knee valgus position’ and 6 ‘Trunk position in the frontal plane’, as well as item 9 ‘Excessive knee valgus movement’. When inter-session reliability was analysed, low reproducibility of the protocol was observed, with low correlations in the scores awarded by the same observer across sessions. For these reasons, it is strongly recommended that

more objective criteria (cut-off points) and clearer definitions be established for each criterion within the CMAS, as well as a longer and standardised training period for those wishing to begin assessing changes of direction.

Keywords: Movement quality; Injury Risk; Sidestep; Cutting Task; Kinetics; Kinematics

Squat (agachamento)

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Abstract

Introduction

The squat is one of the most widely used exercises in strength training due to its effectiveness in developing lower-body strength, postural stability, and functional performance. Among its main variations, the Back Squat and Front Squat are commonly used and present important biomechanical differences regarding body posture, load distribution, and joint demands. The aim of this study was to perform a comparative kinematic analysis of these two squat techniques, focusing on barbell trajectory, movement velocity, and knee joint kinematics.

Methods

The sample consisted of 10 athletes aged between 18 and 22 years. All participants performed both the Back Squat and Front Squat using a standardized barbell load of 10 kg. The analysis focused on linear and angular variables, including barbell velocity, barbell trajectory throughout the movement, and knee joint angles during the different phases of squat execution.

Results and Conclusions

The results demonstrated that barbell velocity values were relatively homogeneous among participants in both squat variations, suggesting similar movement control patterns when using a light external load. Regarding angular analysis, the Back Squat exhibited greater knee flexion amplitudes compared with the Front Squat. These differences may be explained by the specific postural adaptations required by each exercise variation, particularly barbell positioning, trunk inclination, and center-of-mass distribution during movement execution. It is concluded that although both squat techniques display similar barbell velocity profiles, relevant biomechanical differences exist in knee joint kinematics. Understanding these differences may contribute to more effective exercise prescription, allowing practitioners and coaches to select the squat variation most appropriate for specific training goals, individual characteristics, and functional requirements.

Keywords: Biomechanics; Back Squat; Front Squat; Kinematic Analysis; Knee Joint Angle; Strength Training.

Kinematic analysis of the jump smash in volleyball: dominant versus non-dominant hand analysis

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Abstract

Introduction

The jump smash in volleyball is one of the primary offensive actions used to score. Although it is a highly dynamic and complex gesture, it demands a high level of motor coordination, strength, and angular control across distinct phases. Therefore, the aim of this study was to perform a comparative kinematic evaluation and analysis of the jump smash, examining lower and upper limb angular variations between the executions with the dominant and non-dominant hand.

Methods

The sample consisted of 8 active athletes from the AAIPS sports club (age range: 18–25 years, mean: 21 years; weight: 59.15–102 kg, mean: 70.62 kg; height: 1.58–1.88 m, mean: 1.73 m), all of whom were right-handed. Each participant executed two trials (one with the dominant upper limb and one with the non-dominant), and the video recordings captured in the sagittal plane were analyzed using Kinovea software.

Results and Conclusions

Results: In the preparatory phase, the mean knee angle was 123.9° on the first approach step and 132.5° on the second step. During the takeoff phase, the mean angle for the dominant leg reached approximately 105.5°, compared to 110.9° for the non-dominant leg. In the airborne phase, the humeroradial joint showed a mean angle of 95.5° with the dominant hand and 112.3° with the non-dominant hand. At the specific moment of contact/ball impact, the mean humeroradial joint measurements were 158.1° and 156.1° for the dominant and non-dominant strikes, respectively. Lastly, during landing, knee angles stabilized at 134° for the dominant side and 136.6° for the non-dominant side. **Conclusions:** The kinematic analysis demonstrated that, at the angular level across the analyzed joint axes, there were no major discrepancies or significant asymmetries between the execution performed with the dominant and non-dominant side. This homogeneity suggests overall stability in weight transfer and adaptive bilateral motor coordination in the sagittal plane during this technical skill.

Keywords: Volleyball; Jump smash; Kinematics; Kinovea; Dominant hand; Non-dominant hand.

¿El complejo tobillo-pie determina el rendimiento del salto en 92 jugadores infantiles de fútbol?

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Abstract

Introduction

El rendimiento físico del futbolista se encuentra estrechamente vinculado a la eficiencia en el salto. En este sentido, la fuerza y la flexibilidad del complejo tobillo-pie, así como la morfología del arco plantar, constituyen importantes predictores de dicho rendimiento. Sin embargo, este complejo anatómico suele ser ignorado en la planificación anual del fútbol base.

Methods

Se realizó un estudio observacional, descriptivo y de corte transversal con 92 jugadores federados con edades comprendidas entre 12 y 14 años (edad: 12,76±0,58 años; peso: 49,73±10,3kg; talla: 156,48±8,38cm; IMC: 20,17±3,03 kg/m²) de la Escuela de Fútbol Base Pinatar. Se midió la altura del arco interno del pie, el rango de movimiento (ROM) de dorsiflexión del tobillo y de la extensión del primer dedo del pie, la fuerza isométrica máxima (FIM) de flexor del primer dedo del pie y la capacidad de salto horizontal (salto único, salto triple y salto cruzado o en zigzag) siguiendo metodologías publicadas previamente.

Results and Conclusions

La inferencia bayesiana no mostró asimetrías entre la extremidad dominante y no dominante para las variables neuromecánicas ($B_{10} \leq 1,296$; evidencia anecdótica). Asimismo, al estratificar la muestra (alto vs bajo rendimiento en los saltos), encontramos cierta fuerza de la evidencia entre el ROM de dorsiflexión de tobillo con rodilla flexionada y el salto triple ($B_{10} = 3,991$; moderada). La FIM de los flexores del primer dedo del pie emerge como una variable complementaria, aunque con una fuerza de evidencia casi moderada ($B_{10} = 2,285$; moderada).

Keywords: Predictores neuromecánicos, rango de movimiento, batería Hop Test, fútbol base

Análise das Capacidades Físicas de Árbitros de Futebol do Distrito de Setúbal

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Abstract

Introduction

O futebol exige elevados níveis de aptidão física não apenas dos jogadores, mas também dos árbitros, que precisam de acompanhar o ritmo do jogo para garantir decisões precisas. Apesar do aumento de investigações nesta área, a maioria foca-se em elites, existindo uma lacuna sobre a realidade regional. O objetivo deste estudo foi analisar as capacidades físicas (flexibilidade, velocidade linear, agilidade e força explosiva) de árbitros de futebol do contexto distrital de Setúbal de diferentes categorias competitivas.

Methods

Estudo quantitativo, descritivo e transversal realizado com uma amostra de conveniência de 10 árbitros da Associação de Futebol de Setúbal. Após aquecimento padronizado, os participantes foram submetidos a uma bateria de quatro testes de campo: teste de senta e alcança (flexibilidade lombar e isquiotibial), teste Illinois de agilidade (mudança de direção), sprint de 30 metros (velocidade linear) e teste de impulsão horizontal (força explosiva dos membros inferiores).

Results and Conclusions

Os resultados indicaram níveis de aptidão física adequados para o contexto distrital (médias: Illinois = 15,72s; Sprint 30m = 4,71s; Impulsão Horizontal = 2,14m; Senta e Alcança D = 35,83cm / E = 34,28cm). Verificou-se uma forte correlação positiva entre o desempenho no sprint de 30m e o teste Illinois ($r = 0,88$), sugerindo interligação entre velocidade e agilidade. Observou-se heterogeneidade individual, possivelmente associada à idade e experiência. Conclui-se que os árbitros possuem níveis funcionais adequados, realçando a importância da monitorização regular e do treino específico para responder às exigências do jogo.

Keywords: Arbitragem, Futebol, Aptidão física, Agilidade, Velocidade, Flexibilidade.

Changes in Lower-Limb Muscle Power Are Associated with Fall Incidence in Frail Older Adults: Findings from the FRAGSALUD Project

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Abstract

Introduction

Falls are among the most frequent and disabling geriatric syndromes in older adults with frailty. Lower-limb muscle power has emerged as a key determinant of functional performance and mobility during ageing; however, its relationship with fall incidence in frail older adults remains insufficiently understood. Therefore, the aim of this study was to explore the association between changes in lower-limb muscle power and the number of falls in community-dwelling older adults with frailty who participated in a health-promotion educational intervention.

Methods

A multicentre randomized controlled trial was conducted in the provinces of Cádiz and Málaga, Spain. A total of 199 pre-frail and frail older adults completed the 6-month assessment after participating in an educational programme aimed at promoting healthy and active ageing. Lower-body performance was assessed using the 5-repetition Sit-to-Stand test (5-STS), included in the Short Physical Performance Battery. Mean muscle power was estimated from the 5-STS using the following equation: Mean Power (W) = $(0.9 \cdot m \cdot g \cdot (0.5 \cdot H - h_{\text{chair}})) / (TSTS \cdot 0.1)$, at both baseline and the 6-month follow-up assessment. Falls were recorded through structured interviews, and changes in muscle power (Δ) were calculated as the difference between 6-month and baseline values. Associations between changes in muscle power and the number of falls recorded during the previous six months were analysed using Spearman's correlation coefficient.

Results and Conclusions

A statistically significant negative correlation was observed between changes in mean muscle power estimated from the 5-STS and the number of falls recorded at the 6-month assessment ($\rho(199) = -0.162$; $p = 0.022$). These findings suggest that greater improvements in lower-limb muscle power are associated with a lower number of falls in frail older adults. Therefore, health-promotion educational interventions may contribute to fall-prevention strategies in this vulnerable population. This study (project UMA20-FEDERJA-154) has been funded by the Regional Government of Andalusia (10.13039/501100011011) and the European Regional Development Fund (ERDF) within the Andalusia ERDF Operational Programme 2014–2020.

Keywords: Frailty; Falls; Muscle Power; Sit-to-Stand; Older Adults.

Update on the Influence of Cyclists' Anthropometric Variables on Their Force–Velocity Profile

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Abstract

Introduction

Biomechanical analysis of pedaling, particularly from a kinematic perspective, allows a better understanding of how cyclists generate the primary propulsive force required for forward motion [1]. The study of the force–velocity (F–V) profile during cycling is relevant, as in other sporting actions, since it characterizes the cyclist's ability to produce force at different velocities under varying loads, with direct implications for training prescription [2]. Additionally, anthropometric variables such as height, body mass, and crank length may influence force production, both in absolute and relative terms, as well as the behavior of the F–V profile. Understanding these relationships can contribute to individualized training strategies and performance optimization according to each cyclist's characteristics.

Methods

The pedaling F–V profile was assessed in seven trained amateur cyclists using repeated 7-second maximal sprints performed on a direct-drive trainer. Each participant performed between 6 and 9 maximal efforts with different gear ratios to generate progressively increasing loads. Maximum cadence (RPM_{max}) and peak power (P_{max}) were recorded for each sprint. Pedal linear velocity was calculated from crank length and cadence. The maximal force applied in each sprint was estimated as P_{max} divided by velocity. Power output was measured using a validated Favero Duo power meter, and cadence was recorded with a Sigma R2 magnetic cadence sensor.

Results and Conclusions

Results: A linear regression between force and velocity was computed for each subject, yielding individual F–V profiles. All seven participants showed highly consistent individual profiles, with coefficients of determination (R^2) greater than 0.98, indicating an almost perfect linear relationship between force and velocity during pedaling. However, when pooling data across all participants, the combined model yielded a slightly lower coefficient of determination ($R^2 = 0.85$), which, although still high, reflects greater variability. This difference is likely due to the small sample size and the considerable inter-individual variability in anthropometric characteristics ($N = 7$, body mass 71.8 ± 12.4 kg). Conclusions: The pedaling force–velocity profile can be accurately modeled using short sprints on a cycle ergometer, obtaining near-perfect individual fits. Future research should confirm these findings in larger samples. Anthropometric variables such as height and body mass are positively associated with absolute power production. However, relative power output ($W \cdot kg^{-1}$) does not appear to follow the same trend, reinforcing the importance of considering morphological characteristics in cycling

training planning. These findings support the use of the F–V profile as a practical tool for talent identification, performance assessment, and training prescription in cycling, enabling improvements in peak power through a single, rapid, and simple testing protocol. References: 1. V. Rodríguez-Rielves, D. Barranco-Gil, Á. Buendía-Romero, A. Hernández-Belmonte, E. Higuera- Liébana, J. Iriberry, et al., *Sensors* 24 (2024) 1997. 2. P. Leo, B. Martinez-Gonzalez, I. Mujika, A. Giorgi, *J. Sports Sci.* 43 (2025) 887.

Keywords: force, mass, acceleration, cycle ergometer, power, training

Effect of a strength training session on subsequent performance during a high-intensity interval training in runners

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Abstract

Introduction

Strength training (ST) and high-intensity interval training (HIIT) have been used to improve running performance. However, whether performing a ST session impairs HIIT performance the following day is currently underexplored. Therefore, this study aimed to investigate the effects of a prior ST session on performance during a subsequent HIIT session performed 24 hours later.

Methods

Ten recreational runners (5 women; age: 21.5 ± 1.9 years; body mass: 67.4 ± 10.5 kg) completed, in a randomized, counterbalanced, and crossover design, two training schedules: one ST session followed by one HIIT session 24 h later (ST-HIIT) or one HIIT session without previous ST session (NoST-HIIT). The ST session included 4 sets at 85% of 1-RM executed until concentric failure of the following exercises: Leg Press, Leg Curl, and Seated Calf Raise. The HIIT session consisted of six 600-m track intervals at maximal sustainable effort. Interval time, stride length (SL), stride frequency (SF), heart rate (HR), and rating of perceived exertion (RPE) were measured during the HIIT session.

Results and Conclusions

There was a significant main effect of condition for interval time ($P = 0.011$) and SF ($P = 0.014$) during the HIIT session, with mean interval time being longer (165 ± 14.4 vs. 156 ± 12.84 s) and SF lower (87.7 ± 6.8 vs. 90.7 ± 5.5 cycles.min⁻¹) in the ST-HIIT compared to NoST-HIIT sequence. No significant differences between conditions were found for SL, RPE, and HR ($P > 0.05$).

Keywords: concurrent training; endurance training; fatigue; recovery; runners.

INTRA- AND INTER-RATER RELIABILITY AND AGREEMENT OF PRESSURE PAIN THRESHOLD MEASUREMENTS IN THE BICEPS BRACHII FOLLOWING INERTIAL DEVICE TRAINING

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Abstract

Introduction

Pressure algometry is a widely used clinical-instrumental procedure for the objective quantification of Pressure Pain Thresholds (PPT), representing a relevant tool for monitoring Delayed-Onset Muscle Soreness (DOMS). However, the psychometric accuracy of this technique largely depends on the technical competence of the evaluator, which may generate considerable variability during data collection. In the context of physical exercise, particularly following the application of eccentric overload stimuli using inertial devices (flywheel), untrained individuals tend to exhibit a significant increase in pain sensitivity. In this context, the determination of measurement stability and reproducibility constitutes a fundamental requirement to ensure the validity of monitoring exercise-induced muscle damage. Objective: To determine the reproducibility and the degree of intra- and inter-rater agreement of PPT measurements obtained through pressure algometry at the medial (BB_med) and distal (BB_dis) regions of the biceps brachii muscle following the application of an inertial resistance training protocol.

Methods

Fifteen women with no previous experience in resistance training or the use of flywheel devices were recruited. The experimental protocol consisted of a single inertial training session comprising four sets of ten repetitions, using an inertial load of 0.05 kg·m² and a one-minute recovery interval between sets. Forty-eight hours after the intervention, PPT was assessed using pressure algometry. Measurements were performed alternately by two evaluators: evaluator A performed two measurements for intra-rater agreement analysis, whereas evaluator B performed a single measurement for inter-rater agreement analysis. Data distribution was verified using the Shapiro–Wilk test. Reliability was determined using the Intraclass Correlation Coefficient (ICC) with 95% confidence intervals (95% CI). ICC values were classified as moderate (0.50–0.74), good (0.75–0.89), or excellent (≥ 0.90).

Results and Conclusions

Results: The sample presented a mean age of 25.33 ± 4.58 years and a body mass index of 22.91 ± 3.33 kg/m². The results obtained for the biceps brachii muscle were as follows: Intra-rater agreement: The BB_med site demonstrated excellent reliability (ICC = 0.958; 95% CI: 0.862–0.988), with a coefficient of variation (CV) of 12.59%. In turn, the BB_dis site demonstrated good agreement (ICC = 0.797; 95% CI: 0.440–0.936) and a CV of

18.96%. Inter-rater agreement: The BB_dis site maintained good consistency between evaluators (ICC = 0.861; 95% CI: 0.591–0.957), with a CV of 13.89%. In contrast, the BB_med site demonstrated moderate agreement (ICC = 0.660; 95% CI: 0.174–0.888) and the highest coefficient of variation observed (28.6%). Conclusion: Algometric assessment performed at the distal region of the biceps brachii demonstrated adequate reproducibility for both intra- and inter-rater evaluations following training with an inertial device. However, although the medial region exhibited high consistency when assessed by the same examiner, the lower agreement observed between evaluators suggests a greater dependence on individual measurement technique.

Keywords: Pressure Pain Threshold; Pressure Algometry; Flywheel Resistance Training; Reliability.

The Influence of Flexibility on Horizontal Jump Performance in Acrobatic Gymnastics Athletes Aged 8 to 10 Years Old

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Abstract

Introduction

The main objective of this research project is to analyze the influence of posterior chain flexibility on horizontal jump performance in acrobatic gymnastics athletes aged 8 to 10 years old.

Methods

The methodological design is descriptive-correlational, non-experimental, and ecological. The sample consisted of 30 female athletes, equally distributed into three age groups ($n=10$). The methodology involved assessing flexibility through the "sit and reach" test and explosive power via the maximum horizontal jump. The independent variables were age and flexibility, while the dependent variable was jump distance. Data were analyzed in SPSS using descriptive statistics and Pearson's correlation coefficient ($p<0.05$).

Results and Conclusions

The results revealed a significant increase in jump distance between the ages of 8 (104.25 cm) and 9 (128.45 cm), stabilizing at age 10 (127.95 cm), while flexibility values remained homogeneous. A moderate and significant positive correlation was confirmed ($r=0.417$; $p=0.022$), indicating that flexibility explains 17.3% of the jump variance acting as a mechanical facilitator of the stretch-shortening cycle.

Keywords: Flexibility, Horizontal jump, Stretch-shortening cycle, Acrobatic gymnastics, Young athletes.

Remate Rasteiro: Pé Dominante VS Pé Não Dominante

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Abstract

Introduction

The project entitled “Trabalho Biomecânica – Remate rasteiro: Pé Dominante VS Pé Não Dominante” focuses on the biomechanical analysis of the shooting technique in football, comparing the performance of the dominant foot and the non-dominant foot in different athletes. The main objective of this study was to understand how the hip, knee, and ankle joints influence the execution of a low shot, by analysing biomechanical variables such as joint angles, execution speed, and force transfer between body segments. To achieve this, three fundamental phases of the movement were examined: the approach phase, the ball contact phase, and the follow-through phase.

Methods

The study involved several athletes with different ages, body weights, and years of federated football experience, allowing comparisons between distinct levels of sporting practice and technical development. Data collection and analysis were carried out using the Kinovea platform, a software tool commonly used for biomechanical analysis in sports.

Results and Conclusions

Throughout the study, it was observed that the dominant foot consistently demonstrated greater biomechanical efficiency when compared to the non-dominant foot. The velocity graphs revealed that the ankle was the segment responsible for the highest speed peaks during the shot, showing more explosive movements and greater acceleration capacity. In contrast, the knee played a more stabilising role, while the hip presented a more controlled movement pattern, contributing to postural balance and overall coordination of the technical gesture. The results also showed that the dominant foot generated higher maximum velocities and better movement continuity, especially during the ball contact phase. Athletes displayed greater segmental coordination, improved force transfer, and smoother movement execution when using the dominant limb. On the other hand, the non-dominant foot showed lower levels of explosiveness, earlier deceleration, and reduced range of motion, factors that negatively affected the mechanical efficiency of the shot. Another important aspect identified during the analysis was the stability of the hip in both limbs. Despite the differences between the dominant and non-dominant foot, the hip maintained reduced oscillations and relatively stable velocity patterns, highlighting the importance of postural control in the efficient execution of the movement. Furthermore, athletes with more years of federated practice generally demonstrated better coordination, higher execution speeds, and more balanced biomechanical patterns. Overall, the study concluded that biomechanics applied to football is an essential tool for understanding the mechanisms of human movement and for optimising sports performance. The comparison between the dominant and non-dominant foot allowed the identification of significant differences in terms of velocity

production, motor coordination, and technical efficiency. Therefore, the study reinforces the importance of bilateral training in football, not only to improve athletes' technical performance, but also to promote muscular balance, joint stability, and injury prevention.

Keywords: Biomechanics, Football, Low shot, Dominant foot, Motor coordination

The Relationship Between Flexibility and Age in Senior Futsal Athletes

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Abstract

Introduction

Flexibility is an essential physical capacity in sports performance, playing an important role in movement efficiency and injury prevention. In futsal, a sport characterized by high intensity and frequent changes of direction, the range of motion assumes particular relevance. In this context, the present study aimed to analyze the relationship between age and flexibility levels in male senior futsal athletes.

Methods

The sample consisted of 17 players from the senior team of A.D. Quinta do Conde, with flexibility being evaluated through the Sit and Reach test. Athletes' age was considered as the independent variable, while flexibility levels constituted the dependent variable, recording the best absolute score achieved by each athlete between the lower limbs. Data were processed using IBM SPSS Statistics software through descriptive statistics and Pearson's correlation coefficient ($p \leq 0,05$).

Results and Conclusions

Descriptive results revealed a mean age of 23.53 ± 4.57 years and a mean flexibility level of 26.88 ± 6.4 cm. Inferential analysis demonstrated an extremely weak, clinically negligible positive correlation with no statistical significance between the variables ($r = 0.041$; $p = 0.877$). It is concluded that chronological age does not act as an explanatory factor for flexibility variations in this sample, suggesting that the continuous and systematic stimulus of training in young adults plays a major role in preserving the posterior range of motion

Keywords: flexibility; futsal; age; sit and reach test; SPSS.

Cinematic Analysis of Standing Overhead Volleyball Serve

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Abstract

Introduction

The overhead serve is one of the fundamental technical skills in volleyball, playing a decisive role in initiating offensive actions and creating difficulties for the opposing team. The effectiveness of this movement depends on the efficient coordination of the body segments involved, particularly the upper limbs, which are responsible for generating the final acceleration and transferring energy to the ball. The aim of this study was to perform a kinematic analysis of upper-limb movement during the execution of the standing overhead serve, comparing the performance of the dominant and non-dominant arm throughout the different phases of the technical action.

Methods

The sample consisted of 10 volleyball athletes from the Polytechnic Institute of Setúbal volleyball team. All executions were recorded in the sagittal plane using an iPhone 13 Pro camera and subsequently analyzed using the Kinovea motion analysis software. Joint angles and movement patterns were assessed during the preparatory phase, ball toss, acceleration phase, and ball contact, as well as variables related to movement velocity and acceleration.

Results and Conclusions

The results demonstrated that the dominant arm exhibited greater biomechanical efficiency in most athletes throughout serve execution. Higher acceleration values, greater ball-contact velocity, and superior segmental coordination between the shoulder, elbow, and wrist were observed. Additionally, several athletes demonstrated limitations in achieving full elbow extension at ball contact, which compromised energy transfer and reduced serve effectiveness. In contrast, the non-dominant arm displayed a lower capacity for force production, reduced technical stability, and greater variability in joint movement patterns. It is concluded that upper-limb kinematic parameters directly influence ball velocity, mechanical efficiency, and serve effectiveness in volleyball. Kinematic analysis proved to be an important tool for identifying technical limitations, optimizing segmental coordination, and supporting the development of targeted training strategies aimed at improving performance and reducing injury risk.

Keywords: Volleyball; Overhead Serve; Kinematic Analysis; Biomechanics; Dominant Limb; Sports Performance.

Comparison between the Flexibility of Athletes and Practitioners of Different Combat Sports

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Abstract

Introduction

Muscle flexibility plays a key role in technical performance and injury prevention in martial arts practitioners. This study aimed to compare the levels of lumbo-pelvic and hamstring flexibility between Muay Thai and Boxing practitioners.

Methods

Adopting a quantitative, descriptive, and cross-sectional design, a convenience sample consisting of 40 participants (N=40) was evaluated, divided equally between both modalities, all integrated into the same sports environment and under homogeneous training criteria. Data collection was performed using the Sit and Reach flexibility test, utilizing a standardized measuring tape.

Results and Conclusions

The results indicated that Muay Thai practitioners recorded a slightly higher absolute mean (10.93 ± 8.27 cm) compared to Boxing practitioners (9.60 ± 3.16 cm). However, Student's t-test for independent samples with Welch's correction revealed that this difference of 1.33 cm has no statistically significant relevance ($t = 0.661$; $p = 0.515$), leading to the retention of the null hypothesis. Additionally, a marked inter-individual heterogeneity was observed in Muay Thai, in contrast to the cohesion demonstrated in Boxing. It is concluded that the practiced modality, on its own, does not determine a superior posterior flexibility profile, suggesting the importance of an individualized methodological approach in the training process.

Keywords: Combat Sports; Flexibility; Muay Thai; Boxing; Sit and Reach Test.

Kinematic Analysis of Lat Pull Down Exercise with 80% Load

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Abstract

Introduction

In the present work, an analysis of the Lat Pulldown exercise was carried out, comparing its execution between athletes with experience and athletes without gym training experience. The study aimed to observe and analyze possible differences in the performance of the movement between the two groups, taking into account technical and mechanical aspects of execution.

Methods

Shooting in the sagittal plane; load utilization corresponding to 80% of the maximum load; Joint marking: Shoulder, Elbow, Handle; Analysis through the Kinovea

Results and Conclusions

For this study, 10 athletes were evaluated, 5 experienced and 5 inexperienced, with ages between 18 and 23 years, heights between 1.69 m and 1.87 m, and weights between 56,6 kg and 87 kg, with an average body mass of 68,86 kg. All participants performed the exercise with a load corresponding to 80% of their maximum load. In conclusion, it was found that experienced athletes showed greater technical control and stability during execution, while inexperienced athletes demonstrated more difficulty in maintaining posture and controlling the eccentric phase of the movement.

Keywords: Lat Pulldown; strength training; technical execution; motor control; physical performance.

Should be added beetroot juice to caffeine supplementation procedures for increasing neuromuscular performance?

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Abstract

Introduction

The level of competency in the most of sport modalities is increasing with minimal differences between the athletes. Therefore, increasing performance less than 1% impact significantly in the results of a competition. In this context, athletic population is increasing the prevalence of dietary supplements consumption. Caffeine (CAF) supplementation presents high evidence for increasing sport performance. CAF is the most consumed dietary supplement by the most of competitive athletes. At the opposite, beetroot juice supplementation (BRJ) with high evidence presents a very low consumption between competitive athletes, specifically between explosive sport modalities. Because it has been very limited the knowledge about the effectiveness of consuming more than one dietary supplement in comparison to isolated dietary supplements, the main aim of this study is to analyse the possible additional effects of BRJ to CAF supplementation in neuromuscular performance of lower limbs in a sample of well-trained athletes.

Methods

A sample formed by 20 young adult males well-trained (more than 3 training session weekly for more than 2 years) went to the laboratory 3 times. Randomly, participants ingested 6 mg/kg of caffeine + 140 ml of BRJ depleted in NO₃⁻ (CAF), 6 mg/kg of caffeine + 140 ml of BRJ enriched in NO₃⁻ (CAF+BRJ) or 6 mg/kg of placebo (sucrose) + 140 ml of BRJ depleted in NO₃⁻ (PLA). Experimental session consisted in a general and specific warming-up for optimizing performance in a countermovement jump (CMJ) test. A total of 3 CMJs interspersed 45 seconds were performed and the medium of the 3 jumps were extracted of the next outcomes: height (H) expressed in cm, and peak and medium power output (PP and MP) expressed as W/kg. A repeated measured ANOVA (RM-ANOVA) was performed with the adjustment of Bonferroni. Additionally, partial eta squared (η^2p) was determined. Statistical differences were set up as $p < 0.05$.

Results and Conclusions

It was reported a significant effect for H ($F=4.30$; $\eta^2p=0.18$; $p=0.02$), PP ($F=5.56$; $\eta^2p=0.23$; $p=0.01$) and MP ($F=4.07$; $\eta^2p=0.18$; $p=0.04$). Therefore, it was showed as CAF acts as ergogenic aid in comparison with PLA in H (+5.8%; $p=0.01$), PP (+4.0%; $p<0.01$) and MP (+5.7%; $p<0.1$). Nevertheless, CAF + BRJ did not increase performance and did not present additional effects to CAF supplementation. These results suggest us that ergogenic properties of dietary supplements with isolated consumption is not accumulative even it could be an interaction effect. For that reason, future studies should include a combination of dietary supplements for analysing a real context in competition.

Keywords: CMJ; Ergogenic Aids; Sport Nutrition; Supplement; Strength.

Weight training, "Bicep Curl" exercise

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Abstract

Introduction

The strength and bodybuilding movement known as the "bicep curl" is the main objective of this study and analysis, focusing on how the movement can be performed with each individual's dominant and non-dominant arm at 80% of their maximum load.

Methods

Filming of 10 individuals performing the "bicep curl" movement in the sagittal plane with both their dominant and non-dominant arms, followed by analysis using the "Kinovea" tool.

Results and Conclusions

During the movement, the speed did not correspond to the neuromuscular control of the dominant arm, being greater in the non-dominant arm. At the angular level, there was a greater predominance of muscular control by the dominant arm, with greater lengthening in the eccentric phase of the movement and greater contraction in the concentric phase of the same movement. Speed is often not proportional to good movement.

Keywords: Keywords: Bicep Curl, Resistance Training, Kinematics, Angles, Arm

O Impacto da Fadiga na Velocidade de Atletas

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Abstract

Introduction

O Conselho da Europa define desporto como: “todas as formas de atividade física que, através da participação ocasional ou organizada, visam exprimir ou melhorar a condição física e o bem-estar mental, constituindo relações sociais ou obtendo resultados nas competições a todos os níveis.” (Carta Europeia de Desporto, adotada em 1992 e revista em 2001). Neste trabalho pretendo espelhar o impacto da fadiga causada pelo treino sobre o rendimento no sprint de 40 metros em 12 atletas da equipa de futebol Sénior do Clube de Futebol Gadiana. Adotar-se-á um delineamento observacional com medidas repetidas, comparando os resultados dos participantes antes e depois do treino. A amostra será composta por cerca de 10 jogadores de futebol do escalão Sénior, avaliados numa sessão de treino de futebol. A atividade prevê a realização de um sprint de 40 metros em cada ocasião, registrando-se o melhor tempo, além da recolha de dados antropométricos. Espera-se observar uma redução do desempenho no sprint depois do treino, refletindo os efeitos da fadiga aguda. A velocidade no sprint desempenha um papel crucial no rendimento dos atletas de futebol, sendo muitas vezes influenciada por elementos como a fadiga acumulada ao longo do treino.

Methods

O estudo possui um desenho observacional com medidas repetidas, comparando o desempenho dos atletas antes e depois do treino. A recolha de dados será feita numa sessão de treino, com controlo das condições como o local, superfície e contexto da sessão. A participação é totalmente voluntária, podendo o atleta desistir a qualquer momento, sem qualquer prejuízo. Os testes não apresentam riscos superiores aos de um treino regular. Confidencialidade dos dados e será igualmente assegurado o anonimato dos participantes e da instituição, sempre que solicitado ou aplicável.

Results and Conclusions

Todos os atletas apresentaram aumento do tempo de sprint • Houve uma diminuição global de performance • A variação média foi de +0.13 segundos ($\approx +2.38\%$) • Relativamente aos valores de desvio padrão nos momentos pré e pós-treino ($DP = 0,15$ s) sugerem uma dispersão moderada dos tempos entre os atletas. Por outro lado, o desvio padrão muito reduzido da diferença ($DP = 0,005$ s) e da variação percentual ($DP = 0,11\%$) indica que a resposta à fadiga foi bastante homogênea em toda a amostra. Os resultados obtidos neste estudo evidenciam uma influência clara do estado de fadiga na velocidade dos atletas avaliados. Através da comparação entre os tempos de sprint de 40 metros antes e após a sessão de treino, verificou-se um aumento consistente no tempo de execução após o esforço físico, indicando uma redução do desempenho de velocidade em situação de fadiga.

Keywords: Fadiga; Sprint; Velocidade; Futebol; Atletas.

Set Shot and Jump Shot in Basketball

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Abstract

Introduction

This study, developed within the scope of the Biomechanics curricular unit, aimed to perform a kinematic and comparative analysis between two fundamental basketball techniques: the set shot and the jump shot.

Methods

The study sample consisted of 10 male federated athletes, aged between 17 and 21 years old, from Scalipus Clube de Setúbal. For data collection, technical executions were recorded in the sagittal plane using an iPhone 15 Pro Max mobile device camera. Kinematic analysis and data processing were performed using the Kinovea motion analysis software, allowing the measurement and comparison of the ankle, knee, hip, shoulder, elbow, and wrist joint angles across four distinct phases of movement (preparatory, impulsion, release, and final phases), as well as calculating the ball velocity profile. It should be noted that the preparatory phase was the only stage in which the wrist joint was not subject to kinematic analysis, given that its angle was not visible in the sagittal plane during this specific phase.

Results and Conclusions

The results demonstrate that in the set shot, the athletes recorded an arithmetic mean of 7.97 m/s for peak maximum ball velocity, characterized by a joint pattern of sequential and progressive triple extension (ankle, knee, and hip) in the propulsive phase, coordinated with shoulder elevation and rapid elbow extension, culminating in wrist flexion. In contrast, the jump shot revealed a mean peak maximum ball velocity of 7.51 m/s, with an angular trend adapted to the need to release the ball at the highest point of the jump, requiring greater trunk stabilization and a more rigorous aerial segmental coordination to compensate for the lack of direct contact with the ground. Additionally, the identification of the most common execution errors allowed the correlation of biomechanical flaws with a loss of shot effectiveness. It is concluded that kinematic analysis through video analysis constitutes an accessible and crucial tool for technical optimization, allowing an efficient transfer of kinetic energy (from the proximal base to the distal extremity), meticulous correction of the sports gesture, and injury prevention in basketball.

Keywords: Basketball, Biomechanics, Kinematic Analysis, Set Shot, Jump Shot, Kinovea.

Comparison of injury incidence between male and female soccer players from the same club

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Abstract

Introduction

Football is a sport associated with high physical demands and a significant risk of injury, making it important to understand the differences between male and female athletes. The present study aimed to compare the incidence and characteristics of injuries in senior male and female football players.

Methods

This observational, descriptive and cross sectional study was conducted with athletes from Sporting Clube de Portugal through an anonymous and voluntary online questionnaire.

Results and Conclusions

The results demonstrated a high prevalence of injuries in both sexes, with a greater number of accumulated injuries observed in male football players. Sprains were the most frequent type of injury in both groups, while muscle tears were more prevalent in men and knee injuries were more common in women. Overload and fatigue were identified as the main factors associated with injuries. In male football, physical contact and competitive intensity showed greater influence, whereas in female football there was a greater impact of psychological, biomechanical and hormonal factors. Most female athletes reported that the menstrual cycle influenced injury susceptibility and sports performance. In conclusion, football injuries have a multifactorial origin, with important differences between male and female football regarding risk factors and injury characteristics. These findings reinforce the need for individualized prevention strategies adapted to the physiological and competitive specificities of each sex.

Keywords: football, sports injuries, female football, male football, hormonal factors, injury prevention.

Effects of post-activation potentiation on vertical jump after performing a squat.

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Abstract

Introduction

The present study aimed to investigate the acute effect of a Post-Activation Potentiation (PAP) induction protocol on Countermovement Jump (CMJ) performance.

Methods

. The sample consisted of 20 competitive CrossFit practitioners, subjected to a crossover experimental design. The conditioning stimulus consisted of performing 3 repetitions of back squat at 85% of 1RM. Jump performance was assessed before the stimulus (baseline) and monitored at 2, 4, 8, and 12 minutes of recovery. The results indicated a performance drop at minute 2 (29.8 cm) due to predominant neuromuscular fatigue, followed by a recovery at minute 4 (32.5 cm). Peak performance occurred at 8 minutes of recovery, with the mean jump height reaching 35.4 cm, representing a statistically significant increase of 10.6% compared to the baseline (32.0 cm). At 12 minutes, a performance decline was observed (33.2 cm), demonstrating the dissipation of activation.

Results and Conclusions

It is concluded that the high-intensity squat protocol is effective in inducing PAP and that the optimal temporal recovery window to maximize vertical jump performance is 8 minutes.

Keywords: Post-Activation Potentiation; vertical jump; squat; CrossFit; sports performance.

Associação entre desempenho na condução de bola e precisão do passe em jovens futebolistas (7 a 11 Anos)

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Abstract

Introduction

Football is a sport in which technical skills play a fundamental role in athletes' performance, particularly during the early stages of development. The present study aimed to analyse the relationship between dribbling ability and passing quality in young football players.

Methods

The sample consisted of 30 male athletes aged between 7 and 11 years. Technical skills were assessed using the M-Test to evaluate dribbling performance and an adapted version of the Loughborough Soccer Passing Test (LSPT(A)) to assess passing quality. Data were analysed using descriptive statistics, the Shapiro–Wilk normality test, and Pearson's and Spearman's correlation analyses.

Results and Conclusions

After excluding one outlier identified in the scatter plot, a significant positive correlation was found between the M-Test and LSPT(A) results ($r = 0.615$; $p < 0.001$), which was also confirmed by Spearman's correlation ($\rho = 0.622$; $p < 0.001$). The results suggest that athletes who demonstrate better dribbling performance also tend to achieve better performance in passing-related tasks, reinforcing the importance of ball control and motor coordination in the technical development of young football players.

Keywords: youth football; dribbling; passing; ball control; motor coordination.

Flexibility and Agility in Youth Soccer: Examining Their Relationship in Under-19 Players A Correlational Study

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Abstract

Introduction

This correlational study, conducted within the Bachelor's degree in Sport at the Polytechnic Institute of Setúbal, analyzed the relationship between posterior chain flexibility and agility in 2^o youth soccer players (Under-19) from Charneca de Caparica Futebol Clube

Methods

For data collection, the "Sit and Reach" test (using the Wells Bench) was applied to measure flexibility in centimeters, while the "T-Test" evaluated agility in seconds.

Results and Conclusions

The athletes recorded an average score of 29 cm in the flexibility test and 9.37 seconds in the agility circuit. The results revealed a strong and statistically significant negative linear correlation between both capacities ($r = -0.732$; $p < 0.001$). This demonstrates that players with higher levels of flexibility achieved lower times (better performance) in the agility test. Biomechanically, greater extensibility of the hamstrings and lower back appears to optimize movement efficiency during braking and rapid changes of direction. Despite the study's limitations, such as the small sample size and the inability to establish a direct cause-and-effect relationship, the data reinforce the relevance of integrating regular flexibility training into physical preparation programs for youth soccer.

Keywords: Soccer; Agility; Flexibility; Juniors; T-Test; Sit and Reach

Maximal Strength Training: Physiological Foundations, Application Methods, and Impacts on Performance

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Abstract

Introduction

Maximum strength training is considered one of the most relevant methodologies in physical conditioning, sports performance, and health promotion, being characterized by the use of high loads, typically above 85% of one-repetition maximum (1RM). The aim of this study was to analyze the physiological foundations, neuromuscular and structural adaptations, and the main application methods of maximum strength training through a narrative review of the scientific literature available in PubMed and Scopus databases.

Methods

The analyzed evidence demonstrates that maximum strength training promotes significant neural adaptations, including increased motor unit recruitment and synchronization, improved intra- and intermuscular coordination, and enhanced neural firing frequency. In parallel, important structural adaptations are observed, particularly myofibrillar hypertrophy associated with increased contractile protein content and greater force production capacity. Furthermore, the systematic application of this training method contributes to substantial improvements in rate of force development, joint stability, mechanical efficiency, and motor performance across different sports modalities.

Results and Conclusions

Beyond the competitive context, maximum strength training also presents important health and functional benefits, particularly in the prevention of sarcopenia, maintenance of functional autonomy, and reduction of injury and fall risk in adult and older populations. However, the literature highlights that the effectiveness and safety of this methodology depend on appropriate periodization, proper control of training variables, and qualified technical supervision. In conclusion, maximum strength training represents a fundamental tool for optimizing neuromuscular and functional performance, playing a central role both in high-performance sport and in exercise programs aimed at health and quality of life.

Keywords: maximal strength, strength training, neuromuscular adaptation, sports performance, muscle hypertrophy.

Scientific Foundations of Muscular Hypertrophy: A Review of Training Variables and Adaptation Strategies

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Abstract

Introduction

Muscle hypertrophy, characterized by an increase in muscle fiber diameter induced by resistance training, plays a central role in sports performance, metabolic health, and the prevention of age-related functional decline such as sarcopenia. The aim of this study was to analyze the scientific foundations of muscle hypertrophy, focusing on training variables, physiological adaptation mechanisms, and nutritional strategies associated with muscle growth.

Methods

A narrative review of the scientific literature was conducted using original articles, systematic reviews, and meta-analyses indexed in the PubMed and Scopus databases.

Results and Conclusions

The analyzed evidence demonstrates that training volume is one of the most determinant variables for muscle hypertrophy, with multiple-set protocols consistently showing superior results compared to single-set approaches. Additionally, a weekly training frequency of two or more sessions per muscle group, the systematic application of progressive overload, and training close to muscular failure were identified as effective strategies to maximize hypertrophic adaptations. The findings further indicate that the primary mechanisms underlying muscle hypertrophy involve mechanical tension, metabolic stress, and stimulation of muscle protein synthesis. From a nutritional perspective, adequate protein intake, particularly in the post-exercise period, was shown to be essential for optimizing muscle recovery and enhancing anabolic processes. Furthermore, recovery-related factors, especially sleep quality and fatigue management, appear to play a crucial role in optimizing training adaptations. In conclusion, muscle hypertrophy results from a multifactorial interaction between mechanical stimulus, nutritional strategies, and adequate recovery, highlighting the importance of individualized training prescription to maximize body composition, physical functionality, and sports performance.

Keywords: Muscle hypertrophy, Resistance training, Protein synthesis, Training variables, Recovery.

Athletic race walking: analysis of the difference between a professional and a beginner in technique

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Abstract

Introduction

This study focuses on the biomechanical analysis of race walking, a sport characterized by the absence of a flight phase and the need to maintain the knee extended at the moment of ground contact. These technical demands make this discipline a complex motor skill, where precision and efficiency of movement are fundamental for both performance and adherence to the rules. From a biomechanical perspective, a kinematic analysis was conducted, focusing on describing the movement without considering the forces that produce it, through the study of variables such as joint angles, velocity, and acceleration. The main objective of the research was to compare the technical execution of race walking between a professional athlete and an untrained subject, in order to identify possible differences in the movement pattern

Methods

To this end, two young adult subjects were analyzed using video recordings made with a mobile device, maintaining a constant distance and using a reference point on the ground for calibration. The analysis was performed using Kinovea software, which allowed for the study of the different phases of the movement (ground contact, mid-stance, and toe-off), as well as the quantification of joint angles in each phase.

Results and Conclusions

The results show differences between the two participants, especially in knee extension during ground contact and mid-stance, where the professional athlete exhibits a pattern more in line with the technical demands of race walking. However, in other variables, such as elbow and ankle movement, the differences are not particularly significant, indicating that the untrained subject is able to partially reproduce the technical movement. In conclusion, this study demonstrates that, although experience influences the correct execution of the movement, the differences are not always drastically marked in all the variables analyzed, especially in a study with a small number of subjects. Furthermore, it highlights the usefulness of kinematic analysis as a fundamental tool for movement assessment and the improvement of athletic performance.

Keywords: race walking, biomechanics, movement analysis, sports technique

Effects of Creatine Monohydrate on Endurance Performance in a Trained Population

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Abstract

Introduction

There is robust evidence that creatine monohydrate supplementation can enhance short-term high-intensity exercise in athletes. However, the effect of creatine monohydrate supplementation on aerobic performance and its role during aerobic activities is still controversial.

Methods

The search strategy in this systematic review and meta-analysis was designed following Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, and PubMed/MEDLINE, Web of Science, and Scopus databases were explored from inception until 19 May, 2022. Only human experimental trials, controlled with a placebo group, evaluating the effects of creatine monohydrate supplementation on endurance performance in a trained population were analyzed in this systematic review and meta-analysis. The methodological quality of included studies was evaluated using the Physiotherapy Evidence Database (PEDro) scale.

Results and Conclusions

A total of 13 studies satisfied all the eligibility criteria and were included in this systematic review and meta-analysis. The results for the pooled meta-analysis showed a non-significant change in endurance performance after creatine monohydrate supplementation in a trained population ($p = 0.47$), with a trivial negative effect (pooled standardized mean difference = -0.07 [95% confidence interval -0.32 to 0.18]; $I^2 = 34.75\%$). Further, after excluding the studies not evenly distributed around the base of the funnel plot, the results were similar (pooled standardized mean difference = -0.07 [95% confidence interval -0.27 to 0.13]; $I^2 = 0\%$; $p = 0.49$).

Keywords: Creatine monohydrate, Endurance performance, Trained population, Systematic review, Meta-analysis.

Protein Supplement to increase muscle mass and performance

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Abstract

Introduction

Protein supplementation is widely used by individuals engaged in physical exercise with the aim of improving muscle mass, strength, recovery, and physical performance. The main purpose of this study is to analyze the effectiveness of protein supplementation on increasing muscle mass and enhancing physical performance in healthy adults who engage in regular physical activity.

Methods

The methodology consisted of a literature review based on scientific articles indexed in PubMed and other databases, focusing on studies published within the last 10 years.

Results and Conclusions

The selected studies indicate that protein supplementation can significantly contribute to muscle hypertrophy, strength gains, and recovery, especially when combined with resistance training and adequate nutritional intake. However, the results vary according to factors such as the type of protein consumed, training intensity, daily protein intake, and individual characteristics. Whey protein was identified as one of the most effective supplements due to its rapid absorption and high biological value. In conclusion, protein supplementation may represent an important nutritional strategy for optimizing sports performance and muscle development when integrated into a balanced diet and appropriate training program.

Keywords: Protein Supplementation; Muscle Mass; Strength; Physical Performance; Recovery.

Effects of Dietary Supplements on Athletic Performance in Elite Soccer Players

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Abstract

Introduction

Nutritional supplementation has become increasingly relevant in professional soccer, being widely used to optimize physical performance, accelerate muscle recovery, and reduce fatigue associated with the high competitive demands of the sport. The main aim of this study was to analyze the scientific evidence regarding the effects of nutritional supplementation in elite soccer players classified as Tier 4 and Tier 5 athletes.

Methods

A narrative review of the scientific literature was conducted, including five studies primarily focused on the effects of supplements such as caffeine, creatine, protein, and carbohydrate-electrolyte beverages.

Results and Conclusions

The analyzed studies demonstrated that caffeine supplementation may improve sprint performance, muscular power, and the ability to repeat high-intensity efforts. Regarding creatine, consistent benefits were observed in muscular strength, agility, power, and recovery between repeated efforts, which are essential characteristics in competitive soccer. Protein intake also showed positive effects on muscle recovery and the reduction of muscle damage, particularly during congested competitive schedules involving consecutive matches. Additionally, carbohydrate and electrolyte beverages were shown to be effective in maintaining energy availability, fluid-electrolyte balance, and delaying fatigue during prolonged exercise. However, some studies reported inconsistent findings, suggesting that the magnitude of ergogenic effects may vary according to individual factors such as training status, supplementation dosage, timing, and competitive context. It can be concluded that nutritional supplementation may represent an effective strategy to improve physical performance and recovery in elite soccer players when integrated into a structured training program and supported by professional nutritional guidance. The individualization of supplementation strategies appears to be essential for maximizing ergogenic benefits while minimizing potential adverse effects.

Keywords: Dietary supplementation; Professional football; Physical performance; Elite players; Hydration.

Difference in results on the T-Test and Illinois agility tests between soccer players born in the 1st semester and in the 2nd semester, in the Youth category.

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Abstract

Introduction

Agility is one of the determining physical abilities in football performance, being directly related to the ability to quickly change direction, react to stimuli and perform motor actions efficiently. Among the most used tests to assess this ability are the T-Test and the Illinois, both widely recognized for their validity in the evaluation of agility in athletes. Athletes born in the 1st semester often tend to have physical and motor advantages compared to those born in the 2nd semester, which can influence their performance in physical tests and, consequently, the opportunities for sports progression. The main objective of this work is to analyze and compare the results obtained in the T-Test and Illinois agility tests among soccer athletes of the Youth level of the Sports and Recreational Group "O Sindicato", considering the semester of birth. This assessment contributes to a better understanding of the impact of relative age on the assessment of agility in young footballers.

Methods

This study follows a quantitative, cross-sectional design, with the objective of comparing agility performance between two groups of young soccer players, according to their birth semester. Participants: The sample will consist of soccer players from the Youth (Under-17) category of the "O Sindicato" Sports and Recreation Group. Participants will be divided into two groups: athletes born in the first semester of the year (January to June) and athletes born in the second semester (July to December). All participants must be regularly active and injury-free at the time of data collection. Instruments and tests: Agility will be assessed using two standardized tests: T-Test – used to assess multidirectional movement capacity (forward, lateral and backward); Illinois Test – used to assess speed and agility with changes of direction on an obstacle course. Cones will be used to delimit the tests; and a stopwatch, to record the times. Procedures: Data collection will be carried out during a pre-scheduled training session. Before the tests, all participants will perform a standardized warm-up, consisting of light jogging, dynamic stretching, and mobility exercises. Each athlete will perform both tests under the same conditions. For each test: - Two attempts will be allowed; - The best time (in seconds) will be recorded; - An adequate rest period (2–3 minutes) will be ensured between attempts, in order to avoid fatigue. The tests will be performed on the same surface (e.g., synthetic turf) and under similar environmental conditions, ensuring data consistency.

Results and Conclusions

In the first semester group (n=7), the average of the best times was 9.96 seconds on the T-Test, and 14.86 seconds on the Illinois Test. In the second semester group (n=8), the

average of the best times was 10.22 seconds on the T-Test, and 15.33 seconds on the Illinois Test. Therefore, an average difference of approximately 0.26 seconds is observed on the T-Test, and 0.47 seconds on the Illinois Test, in favor of the athletes born in the first semester. The results show an advantage for athletes born in the first half of the year in both agility tests. This difference, although relatively small in absolute terms, is relevant in the context of football at this youth level, where tenths of a second can influence perceptions of performance, selection, and progression between levels. The most likely explanation for this difference lies in the relative age effect. In training levels such as Under-17, athletes born between January and June may have up to 11–12 additional months of biological development compared to colleagues born at the end of the year. This difference, at a stage where growth and neuromuscular maturation are not yet fully stabilized, can translate into better coordination, greater reaction speed, and superior ability to accelerate and change direction. The largest difference observed in the Illinois Test (approximately 0.47s) compared to the T-Test (approximately 0.26s) may suggest that more complex tasks with a greater number of changes of direction slightly amplify the differences between groups with different levels of maturation. The Illinois, by requiring greater body control and efficiency in direction transitions, may be more sensitive to small physical and technical advantages. Still, it is important to emphasize that the observed differences are not large enough to indicate a "clearly superior group". There is overlap between athletes from the two groups, with several players from the second half of the year showing equal or better results than some from the first half. This reinforces the idea that, within the same age group, performance is highly individual and depends not only on relative age, but also on factors such as training level and experience, body composition, technical quality of movement, coordination and motor control, and individual motivation and maturation. In a training context, these results support the need for a more individualized assessment of athletes, in order to avoid an interpretation that is excessively dependent on the month of birth. Although there is a statistical trend favoring athletes born in the first semester, individual performance remains the most decisive factor for actual performance on the field.

Keywords: Agility; T-Test; Illinois; Soccer; Youth; Semester; Performance.

Competitive model characterization in male SH6 parabadminton athletes

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Abstract

Introduction

Parabadminton is an adapted version of badminton for athletes with disabilities and gained greater visibility after its inclusion in the Tokyo 2020 Paralympic Games. However, research on the sport is still limited, especially for the SH6 class. Performance analysis is essential to understand technical, tactical, and temporal patterns and to support coaching decisions.

Methods

This was a descriptive, quantitative, observational study. Matches from the semifinals and final of the 2022 BWF Para Badminton World Championships (SH6 men's singles) were analyzed using video-based notational analysis in Lince Plus. The variables studied were time measures, stroke frequencies, and outcomes in points won and unforced errors.

Results and Conclusions

A total of 1,713 strokes were analyzed in eight games. The matches showed high intensity and intermittent play, with greater stroke frequency than in conventional badminton. The most used strokes were net-lift, clear, drop-shot, and net-shot. Unforced errors occurred more often than winning points, indicating that precision is decisive in SH6 performance.

Keywords: Parabadminton; SH6; performance analysis; notational analysis; adapted sport

Relationship between level of involvement in the game and performance in soccer players in the children's category.

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Abstract

Introduction

This study aims to analyze whether athletes with greater involvement in the game show better performance in a game context, essentially focusing on two classes of several athletes in the U7 age group (6-8 years).

Methods

Observations

Results and Conclusions

It can be concluded that there is a clear relationship between the influence of athletes and their effective participation in the game. Players classified as having high influence demonstrated a greater capacity for intervention in the different phases of the matches, showing higher values in offensive and defensive actions, dribbling, goals, and assists.

Keywords: youth football, performance analysis, player involvement, observational study, technical-tactical performance, player development.

Inter and intra-rater agreement of extension knee goniometry after flywheel training in untrained women

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Abstract

Introduction

It is very common for individuals not trained in flywheel training to feel discomfort from the first session due to delayed onset muscle soreness (DOMS), which also causes muscle stiffness and reduced range of motion (ROM). In this sense, the goniometer is a very useful measurement tool to assess this decrease in ROM. However, for these measurements to be useful in professional practice, it is essential that the instruments demonstrate adequate levels of reliability between different evaluators and in repeated measurements performed by the same evaluator. The aim of this study was to evaluate the inter- and intra-rater reliability of knee extension (F_J) measurements using a goniometer.

Methods

15 women were recruited, with no previous experience with resistance training or flywheel equipment. 2 visits to the laboratory were carried out. On the first visit, a training session was performed on the flywheel flexor table, consisting of 4 sets of 10 repetitions with an inertia load of 0.05 kg·m² and 1-minute rest interval. The second visit took place 48 hours after the training session, in which ROM was evaluated using a goniometer. The evaluation was conducted by two evaluators alternately: evaluator "A" performed 2 measurements, evaluator "B" performed 2 measurements, and finally evaluator "A" performed 2 measurements. The measurements were taken with the volunteers in the supine position on a stretcher and then she was asked to perform knee extension

Results and Conclusions

Intra-rater agreement was calculated using the mean of the two initial measurements taken by rater "A" with the mean of the two final measurements. Inter-rater agreement was calculated using the mean of the first measurements of rater "A" and the mean of the measurements of rater "B". The intraclass correlation coefficient (ICC) with a 95% confidence interval (95%CI) and coefficient of variation (CV) were used. In the inter-rater evaluation, the variable knee flexion showed moderate reliability (ICC = 0.518; 95% CI: 0.044–0.831) with a VC of 2.63%, while in the intra-rater evaluation it showed moderate reliability (ICC = 0.466; 95% CI: 0.144–0.809) with a VC of 2.58%. As a conclusion, the results suggest that the measurement can be influenced by the evaluator and, therefore, it would be advisable to reinforce the standardization of the procedure.

Keywords: Delayed onset muscle soreness, resistance training, rigidity.

Physical Exercise and Health in Young Adults: Development and Prescription of a 12-Week Training Program for Hypertrophy, Physical Fitness and Well-Being

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Abstract

Introduction

Regular physical exercise is one of the most effective strategies for promoting health, preventing chronic diseases, and improving quality of life throughout adulthood. The aim of this study was to develop and support an exercise program for a healthy young adult based on current exercise prescription principles and scientific evidence regarding the benefits of physical activity.

Methods

A case study was conducted involving a 25-year-old male recreational Taekwondo practitioner with previous resistance-training experience. Following an initial assessment of health status, body composition, and physical fitness, a 12-week training program was designed and implemented. The intervention consisted of three weekly resistance-training sessions focused on muscular hypertrophy, joint mobility, and overall physical fitness, complemented by cardiovascular and postural stability exercises.

Results and Conclusions

Exercise prescription was based on the principles of individualization, specificity, and progressive overload. During the first six weeks, training intensity ranged between 65 and 75% of one-repetition maximum (1RM), progressing to 75–85% of 1RM in the second phase, accompanied by adjustments in training volume and recovery periods. The program included both multi-joint and single-joint exercises targeting the major muscle groups, aiming to promote neuromuscular and functional adaptations.

The scientific literature reviewed consistently demonstrates that regular physical exercise improves body composition, cardiorespiratory fitness, metabolic health, cognitive function, and psychological well-being, while reducing the risk of chronic diseases and premature mortality. It is concluded that individualized and evidence-based exercise programs represent an effective strategy for optimizing health, functionality, and quality of life in physically active young adults.

Keywords: physical exercise; exercise prescription; young adults; muscular hypertrophy; physical fitness; health.

Scientific Foundations of Maximal Strength Training: Practical Applications for Exercise Prescription in Beginner Adults

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Abstract

Introduction

Maximal strength is one of the most important physical capacities for motor performance, functionality, and overall health. Its development requires evidence-based exercise prescription strategies that ensure both training effectiveness and participant safety, particularly in individuals with limited training experience. The aim of this study was to analyze the physiological and methodological foundations of maximal strength training and apply this knowledge to the development of a structured exercise program for beginner adults.

Methods

The methodology combined a narrative review of the scientific literature addressing resistance training, neuromuscular adaptations, and exercise prescription with the design of a structured 12-week training intervention. The program was organized into progressive phases following the principles of individualization, specificity, and progressive overload.

Results and Conclusions

The intervention began with an anatomical adaptation phase focused on technical learning and musculoskeletal preparation, followed by stages aimed at developing foundational strength and, subsequently, specific maximal strength adaptations. Multi-joint and accessory exercises were incorporated to ensure balanced muscular development, while training intensity was monitored through heart rate reserve and systematic load progression.

The reviewed literature consistently demonstrates that maximal strength training promotes substantial neural adaptations, including enhanced motor unit recruitment, improved intermuscular coordination, and increased force-production capacity. Furthermore, the systematic implementation of progressive resistance-training programs is associated with improvements in physical function, body composition, and overall performance. It is concluded that carefully structured, progressive, and individualized training programs represent an effective strategy for improving maximal strength in beginner individuals while minimizing injury risk and enhancing long-term adherence to physical exercise.

Keywords: maximal strength; resistance training; neuromuscular adaptations; progressive overload; exercise prescription; physical performance.

Muscular Hypertrophy and Strength Development: Applying Periodization Principles to Exercise Prescription

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Abstract

Introduction

Muscular hypertrophy and strength development are central objectives of exercise programs aimed at improving physical performance, body composition, and health. Optimizing these adaptations requires appropriate manipulation of training variables, including volume, intensity, frequency, and proximity to muscular failure. The aim of this study was to analyze the scientific foundations of hypertrophy and strength training and apply this knowledge to the development of a structured exercise program for a young athlete with neuromuscular characteristics predominantly associated with speed-oriented performance.

Methods

The methodology combined a literature review on the mechanisms of muscular hypertrophy, strength-training methods, and periodization strategies with the design of a 12-week training program. The intervention was developed for a 21-year-old athlete with a relatively balanced physical profile and included an undulating periodization model structured into introduction, volume accumulation, intensification, and tapering phases. Training loads ranged between 60% and 85% of one-repetition maximum (1RM), adjusted according to the objectives of each training phase.

Results and Conclusions

The reviewed literature indicates that muscular hypertrophy is primarily driven by three physiological mechanisms: mechanical tension, metabolic stress, and muscle damage. The strategic combination of these stimuli, together with the predominant use of multi-joint exercises and planned recovery periods (deload), appears to maximize anabolic adaptations while reducing the risk of excessive fatigue, overtraining, and injury.

It is concluded that the application of evidence-based periodization and exercise prescription principles represents an effective approach for simultaneously enhancing muscular hypertrophy and strength development. Individualized, progressive, and well-structured training programs optimize neuromuscular adaptations and contribute to improved physical performance in young athletes.

Keywords: muscular hypertrophy; strength training; periodization; mechanical tension; exercise prescription; neuromuscular adaptations.

Strength and Hypertrophy Periodization: Application of Load Monitoring and Progressive Training Principles in Intermediate Practitioners

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Abstract

Introduction

Strength-training periodization is a key strategy for maximizing neuromuscular adaptations, promoting muscular hypertrophy, and reducing injury risk. The systematic manipulation of training variables, including intensity, volume, and recovery, allows practitioners to optimize performance while minimizing biological accommodation and training plateaus. The aim of this study was to develop and scientifically support a periodized strength-training program for an intermediate-level practitioner, integrating contemporary concepts of load monitoring and strength development.

Methods

The methodology involved the creation of a representative anthropometric and functional profile based on the average characteristics of the study participants, combined with a literature review addressing strength training, muscular hypertrophy, velocity-based training (VBT), and injury prevention. The program was structured over 13 weeks and organized into progressive phases including anatomical adaptation, hypertrophy, high-strength development, maximal strength, peak strength, and active recovery.

Results and Conclusions

Training prescription included a gradual progression in intensity, ranging from approximately 50% to 100% of one-repetition maximum (1RM), accompanied by a progressive reduction in volume and an increase in recovery intervals. Particular emphasis was placed on posterior-chain strengthening and the correction of muscular imbalances identified through the hamstring-to-quadriceps ratio. The integration of multi-joint exercises and velocity-based load monitoring aimed to simultaneously enhance structural and neural adaptations.

The reviewed evidence demonstrates that combining periodization principles, fatigue management, and objective load-monitoring strategies represents an effective approach to improving strength and muscular hypertrophy. It is concluded that progressive and individualized training programs supported by modern monitoring methods can optimize physical performance, improve training safety, and promote long-term adaptations in intermediate practitioners.

Keywords: strength training; muscular hypertrophy; periodization; velocity-based training; load monitoring; physical performance.

Hybrid Training for Hyrox Competition: Application of Periodization and Exercise Prescription Principles

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Abstract

Introduction

Hyrox has emerged as one of the fastest-growing hybrid fitness competitions worldwide, combining endurance running with high-demand functional exercise stations. Performance in this discipline relies on the efficient integration of aerobic, anaerobic, neuromuscular, and fatigue-resistance capacities. The aim of this study was to develop and scientifically support a periodized training program for Hyrox competition based on contemporary principles of exercise physiology and training prescription.

Methods

The methodology combined a narrative review of the literature addressing physical exercise, concurrent training, hybrid-sport performance, and periodization strategies. Based on the profile of a 21-year-old male athlete with previous experience in running and functional training, a 12-week training program was designed and organized into four progressive mesocycles: Foundation and Accumulation, Strength Endurance and Threshold Development, Specificity and Competition Simulation, and Tapering.

Results and Conclusions

The training prescription included three high-density weekly sessions integrating aerobic conditioning, resistance training, sport-specific functional exercises, and strategies aimed at improving compromised running capacity, a key determinant of Hyrox performance. Training intensity was monitored using heart rate reserve through the Karvonen formula, allowing individualized physiological stimulus control.

The reviewed evidence indicates that the structured combination of aerobic and resistance training promotes superior improvements in overall physical fitness compared with either modality performed in isolation. It is concluded that evidence-based and sport-specific periodized training programs represent an effective strategy for maximizing competitive performance and meeting the physiological and functional demands of Hyrox competition.

Keywords: Hyrox; hybrid training; periodization; exercise prescription; concurrent training; exercise physiology.

Physical Exercise and Hypertension: Application of Exercise Prescription Principles for Cardiovascular Health Promotion

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Abstract

Introduction

Hypertension is one of the leading modifiable risk factors for cardiovascular disease and is associated with substantial morbidity and mortality worldwide. Regular physical exercise is widely recognized as one of the most effective non-pharmacological strategies for blood pressure control and cardiovascular health promotion. The aim of this study was to develop and scientifically support an exercise program for a young adult with hypertension, integrating current international exercise-prescription recommendations.

Methods

The methodology combined a narrative review of the scientific literature with the development of a 12-week periodized exercise program. The intervention was designed for a 23-year-old male with mild overweight status and grade I hypertension. The program was organized into three progressive phases: exercise adaptation, physical fitness development, and consolidation of adaptations, integrating aerobic exercise, resistance training, and mobility exercises.

Results and Conclusions

Training intensity was individualized according to heart rate reserve and progressively increased throughout the intervention. Aerobic training included walking, treadmill exercise, cycling, and elliptical exercise, whereas resistance training was performed using moderate loads in accordance with safety recommendations for hypertensive populations. The reviewed evidence consistently demonstrates that combining aerobic and resistance exercise leads to clinically meaningful reductions in blood pressure, improvements in cardiorespiratory fitness, enhanced muscular strength, and positive changes in body composition and quality of life.

It is concluded that individualized, progressive, and evidence-based exercise programs represent an effective strategy for hypertension management and cardiovascular risk reduction, reinforcing the role of physical exercise as a cornerstone of health promotion and disease prevention.

Keywords: hypertension; physical exercise; cardiovascular health; aerobic training; resistance training; exercise prescription.

Physical Exercise and Nutrition: An Integrated Approach to Health Promotion and Quality of Life

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Abstract

Introduction

Physical exercise and nutrition are fundamental pillars of health promotion, chronic disease prevention, and quality-of-life enhancement. The global increase in sedentary behavior, together with the adoption of unhealthy dietary patterns, has contributed substantially to the burden of public health problems, highlighting the need for integrated strategies that support healthy lifestyles. The aim of this study was to analyze the scientific evidence regarding the combined effects of physical exercise and nutrition on human health and to discuss their practical application within the context of exercise prescription.

Methods

The methodology consisted of a narrative review of the scientific literature addressing physical exercise, nutrition, and health promotion, complemented by the development of a structured and progressive exercise-prescription proposal. Evidence related to the cardiovascular, musculoskeletal, metabolic, and psychological effects of exercise was examined, alongside the impact of nutritional interventions on body composition, immune function, sleep quality, and cardiometabolic risk management.

Results and Conclusions

The reviewed literature demonstrates that programs combining regular physical exercise with appropriate nutritional strategies produce greater benefits than isolated interventions. This integrated approach is associated with improvements in physical fitness, body composition, physical activity levels, dietary quality, and functional autonomy. Furthermore, these positive effects appear particularly relevant in specific populations, including older adults, university students, and individuals with chronic diseases.

It is concluded that the integration of physical exercise and nutrition represents an effective strategy for optimizing health and preventing disease throughout the lifespan. The implementation of individualized, safe, and evidence-based programs constitutes an essential tool for promoting significant improvements in functionality, well-being, and longevity.

Keywords: physical exercise; nutrition; health promotion; exercise prescription; quality of life; healthy lifestyle.

Strength, Power, and Anaerobic Capacity Development: Individualized Exercise Prescription for Physical Performance Optimization

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Abstract

Introduction

Functional assessment is a fundamental component of individualized exercise prescription, allowing practitioners to identify physical limitations, establish specific goals, and optimize training adaptations. The aim of this study was to develop an exercise program based on a multidimensional assessment of the neuromuscular, cardiorespiratory, and functional capacities of a physically active young adult.

Methods

The methodology included anthropometric assessment, muscular strength and power testing, force–velocity profiling, mobility evaluation, and cardiorespiratory fitness measurements. The participant, a 27-year-old male, presented a healthy body mass index but demonstrated limitations in maximal strength, anaerobic capacity, and power production at moderate loads. Based on the assessment results, a 12-week periodized training program was developed and structured into four weekly training sessions.

Results and Conclusions

The intervention incorporated lower- and upper-body strength training, posterior-chain development with a specific emphasis on eccentric hamstring strengthening, high-intensity interval training aimed at improving anaerobic performance, and mobility exercises targeting the hip, ankle, and thoracic spine. Training progression followed the principles of progressive overload, linear and undulating periodization, and autoregulatory strategies based on rating of perceived exertion (RPE) and compatibility with Velocity-Based Training (VBT) methodologies.

The expected outcomes include improvements in maximal strength, enhanced power production at moderate loads, increased posterior-chain robustness, improved cardiorespiratory fitness, and greater functional mobility. It is concluded that individualized programs based on comprehensive functional assessment represent an effective strategy for promoting specific physiological adaptations, improving physical performance, and enhancing long-term health and functionality.

Keywords: strength training; muscular power; anaerobic capacity; periodization; functional assessment; exercise prescription.

Physical Exercise and Hypertension: Application of Exercise Prescription Principles for Cardiovascular Health Promotion

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Abstract

Introduction

Hypertension is one of the most prevalent cardiovascular diseases worldwide and is associated with a significantly increased risk of cardiovascular events, morbidity, and premature mortality. Among the currently recommended non-pharmacological interventions, physical exercise is recognized as a safe and effective strategy for the prevention, management, and treatment of hypertension. The aim of this study was to analyze the scientific evidence regarding exercise prescription for hypertensive individuals and apply this knowledge to the development of an adapted training program.

Methods

The methodology consisted of a narrative review of the scientific literature on physical exercise and hypertension, complemented by a case-study approach. An initial physical fitness assessment was conducted on a medicated young adult diagnosed with hypertension, serving as the basis for the development of a 12-week exercise program. The intervention was structured into three weekly sessions integrating cardiorespiratory and resistance training while respecting the principles of individualization, progression, and safety.

Results and Conclusions

The reviewed literature demonstrates that regular aerobic exercise promotes clinically meaningful reductions in both systolic and diastolic blood pressure, whereas resistance training complements these benefits by improving functional capacity, body composition, and muscular fitness. The combination of these training modalities enhances favorable cardiovascular adaptations, contributing to reduced cardiometabolic risk and improved quality of life. However, the magnitude of these adaptations depends on factors such as training intensity, volume, frequency, and individual characteristics.

It is concluded that a well-structured and individualized exercise prescription represents an effective therapeutic strategy for hypertension management. The integration of cardiorespiratory and resistance training should be considered an essential component of cardiovascular health promotion programs and a fundamental complement to pharmacological treatment.

Keywords: hypertension; physical exercise; exercise prescription; cardiorespiratory training; resistance training; cardiovascular health.

Exercise Prescription for Healthy Adults: Development of Strength and Cardiorespiratory Fitness through a 12-Week Periodized Training Program

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Abstract

Introduction

Regular physical exercise is one of the most effective strategies for promoting health, preventing chronic diseases, and improving quality of life throughout adulthood. International guidelines recommend the combination of aerobic and resistance training as the optimal approach for the integrated development of physical fitness. The aim of this study was to develop and scientifically support an exercise program designed for a healthy young adult, focusing on the simultaneous improvement of muscular strength and cardiorespiratory fitness.

Methods

The methodology combined a narrative review of the scientific literature with the development of a 12-week periodized training program. The intervention was designed for a physically active 24-year-old recreational football player with a healthy body composition and limited experience in structured resistance training. The program followed a 3:1 progression model, alternating periods of gradual workload increases with planned recovery weeks. Training progressed from a basic strength phase to a submaximal strength phase and was complemented by moderate-intensity continuous aerobic exercise.

Results and Conclusions

The training structure incorporated multi-joint exercises targeting major muscle groups, progressive overload strategies, and intensity monitoring through percentages of one-repetition maximum (1RM) and heart rate reserve. The reviewed evidence demonstrates that combining resistance and aerobic training promotes significant improvements in cardiorespiratory fitness, muscular strength, body composition, metabolic health, and injury prevention.

It is concluded that periodized and individualized training programs grounded in scientific principles represent an effective strategy for optimizing physical fitness in healthy adults while simultaneously enhancing neuromuscular and cardiovascular adaptations relevant to long-term health and physical performance.

Keywords: physical exercise; healthy adults; resistance training; cardiorespiratory training; periodization; exercise prescription.

Carrera en posesión y fuera de posesión y rendimiento técnico-táctico en el fútbol

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Resumo

Introduction

Este estudio derivó índices compuestos del desempeño del equipo atacante y defensivo, cuantificó cómo las métricas de ejecución en posesión (IP) y fuera de posesión (OP) se relacionaban con estos índices y evaluó los efectos contextuales.

Methods

Se analizaron 1.346 observaciones de partidos de equipos masculinos que compiten en la Superliga danesa, la liga de fútbol profesional de primer nivel de Dinamarca, a lo largo de 3,5 temporadas utilizando el seguimiento de Second Spectrum y los datos de eventos de Wyscout. El análisis de componentes principales generó índices de desempeño ofensivo y defensivo. Los modelos lineales de efectos mixtos probaron asociaciones entre las métricas de carrera específicas de cada fase y los índices, con el equipo como una intersección aleatoria y el resultado del partido y la ubicación como covariables. Los modelos XGBoost con SHAP evaluaron la importancia de las características.

Results and Conclusions

Resultados: El rendimiento de los ataques estuvo más fuertemente asociado con la distancia total de IP. Después del ajuste por volumen de movimiento IP, la carrera de alta velocidad IP y la distancia de sprint IP mostraron asociaciones condicionales. La distancia total OP se asoció negativamente con ambos índices. El rendimiento defensivo se asoció positivamente con la carrera de alta velocidad OP y el conteo de carreras de alta intensidad IP, pero se asoció negativamente con la distancia de sprint IP y la distancia total OP. Una interacción distancia de sprint OP x ubicación indicó que una mayor distancia de sprint OP se relacionaba con un menor rendimiento defensivo, principalmente en partidos fuera de casa. El resultado del partido mostró pequeños efectos independientes. XGBoost mostró una gran precisión predictiva para el ataque (R^2 retenido = 0,765) y una precisión predictiva moderada para el rendimiento defensivo (R^2 retenido = 0,399), con SHAP confirmando la distancia total de IP y OP como predictores dominantes. Conclusión(es): El rendimiento del equipo está estrechamente relacionado con el comportamiento de

carrera específico de la fase. El volumen de movimiento durante la posesión fue el correlato más claro de la producción ofensiva, mientras que el rendimiento defensivo reflejó una menor carga de trabajo OP y una mayor actividad defensiva de alta velocidad.

Keywords: Posesión de balón, análisis del partido, factores contextuales, exigencias físicas.

La rehabilitación supervisada de la marcha en tapiz rodante mejora la movilidad y la fatiga en adultos con esclerosis múltiple: resultados de un estudio piloto de 12 semanas

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Resumo

Introduction

Las alteraciones de la marcha y la fatiga se encuentran entre los síntomas más discapacitantes en personas con esclerosis múltiple (EM), contribuyendo a una reducción de la función física y de la calidad de vida (QoL). El entrenamiento de la marcha en tapiz rodante (EMTR) ha emergido como una estrategia prometedora de rehabilitación para mejorar el rendimiento de la marcha y la capacidad funcional en poblaciones neurológicas. Sin embargo, la evidencia sobre su viabilidad, seguridad y efectos sobre resultados multidimensionales en personas con EM sigue siendo limitada. Por ello, el objetivo de este estudio piloto fue evaluar la viabilidad, seguridad y los cambios pre-post asociados con un programa supervisado de EMTR de 12 semanas sobre el rendimiento de la marcha, la función física, la fatiga y la QoL en adultos con EM.

Methods

Se realizó un estudio piloto de único brazo con evaluaciones pre-post (T1–T2) en el Complejo Asistencial Universitario de Soria (España). Once adultos diagnosticados con EM (Expanded Disability Status Scale [EDSS] ≤ 6) completaron un programa supervisado de EMTR de 12 semanas consistente en dos sesiones semanales de 25 minutos. Las variables evaluadas incluyeron la QoL mediante el cuestionario SF-36, la movilidad funcional mediante el Timed Up and Go test (TUG), la velocidad de la marcha en 4 metros, la función física mediante la Short Physical Performance Battery (SPPB) y la fatiga mediante la Modified Fatigue Impact Scale (MFIS). Las diferencias pre-post se analizaron mediante pruebas t de Student pareadas o pruebas de rangos con signo de Wilcoxon según correspondiera.

Results and Conclusions

La puntuación total del SF-36 no mostró cambios significativos ($p = 0,160$), aunque se observaron mejoras significativas en los dominios de salud general ($p = 0,039$) y vitalidad ($p = 0,043$). El rendimiento de la marcha mejoró significativamente, observándose una reducción del tiempo en el TUG ($p = 0,007$) y un aumento de la velocidad de la marcha en 4 metros ($p < 0,001$). La función física evaluada mediante la SPPB también aumentó significativamente ($p = 0,003$). El impacto de la fatiga disminuyó tras la intervención, incluyendo la puntuación total de la MFIS ($p = 0,015$), la subescala física ($p = 0,007$) y la subescala psicosocial ($p = 0,026$), mientras que la subescala cognitiva no mostró

cambios significativos ($p = 0,094$). La adherencia al programa fue del 91,7% y no se reportaron eventos adversos. Estos hallazgos sugieren que el EMTR supervisado es una intervención viable y segura que puede mejorar la movilidad, la función física y la fatiga en adultos con EM. No obstante, debido al diseño exploratorio de único brazo y al reducido tamaño muestral, los resultados deben interpretarse con cautela y confirmarse mediante ensayos clínicos aleatorizados con potencia estadística adecuada.

Keywords: esclerosis múltiple; entrenamiento de la marcha en tapiz rodante; velocidad de la marcha; Timed Up and Go; Short Physical Performance Battery; fatiga; calidad de vida; estudio piloto

Efectos dependientes de la dosis del ejercicio aeróbico sobre la respuesta inmunitaria durante la infección por virus herpes simple

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Resumo

Introduction

El ejercicio aeróbico se reconoce cada vez más como un estímulo biológicamente activo capaz de modular la función inmunitaria antiviral. Sin embargo, sus efectos sobre las infecciones latentes por herpesvirus, especialmente sobre el virus herpes simple (HSV), siguen sin comprenderse completamente y parecen depender de la intensidad del ejercicio y del estrés fisiológico asociado. Comprender cómo el ejercicio influye sobre la inmunidad antiviral puede contribuir a optimizar la prescripción de ejercicio y reducir la vulnerabilidad a la reactivación viral.

Methods

Se realizó una revisión narrativa estructurada con síntesis cualitativa y semi-cuantitativa para analizar estudios experimentales y en humanos publicados entre 1993 y 2026 que evaluaran la interacción entre el ejercicio aeróbico y las respuestas inmunitarias durante la infección por HSV. La evidencia se organizó según la intensidad del ejercicio, los mecanismos inmunitarios, la regulación neuroendocrina y las características específicas del virus.

Results and Conclusions

El ejercicio aeróbico de intensidad moderada se asoció de forma consistente con una mejora de las respuestas inmunitarias antivirales, incluyendo una mayor resistencia antiviral de los macrófagos, preservación de la citotoxicidad de las células natural killer, optimización de la señalización de interferones y perfiles favorables de citocinas T helper tipo 1. Estas adaptaciones se relacionaron con una menor carga viral y mejores resultados clínicos en modelos experimentales. Por el contrario, el ejercicio prolongado o de alta intensidad se asoció con disfunción inmunitaria transitoria caracterizada por alteraciones de la inmunidad innata y adaptativa, cambios en la producción de citocinas, reducción de la vigilancia antiviral y mayor susceptibilidad a la infección y reactivación viral. En conjunto, el ejercicio aeróbico ejerce efectos dependientes de la dosis sobre la inmunidad antiviral durante la infección por HSV. El ejercicio de intensidad moderada parece constituir una estrategia segura y potencialmente eficaz para favorecer la función inmunitaria y la defensa antiviral, mientras que cargas excesivas de ejercicio podrían comprometer la homeostasis inmunitaria y aumentar la vulnerabilidad a patologías relacionadas con HSV.

Keywords: Ejercicio; Herpes Simple; Sistema Inmunitario; Inmunidad Antiviral; Células Natural Killer; Estrés Fisiológico

¿Calor seco o húmedo? Diferencias termorreguladoras y tolerancia al ejercicio en deportistas bajo un WBGT constante de 28°C

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Resumo

Introduction

El ejercicio en ambientes calurosos incrementa la temperatura corporal central (Tcore) y compromete la estabilidad térmica, afectando al rendimiento y aumentando el riesgo de enfermedad por calor. Las respuestas fisiológicas pueden variar según el tipo de ambiente (seco o húmedo) y el sexo, aunque la evidencia disponible bajo un índice de estrés térmico integrado constante (WBGT) es limitada. El objetivo de este estudio piloto fue analizar las respuestas termorreguladoras de deportistas entrenados durante ejercicio en calor seco y húmedo bajo un WBGT equivalente de 28°C.

Methods

Se realizó un estudio factorial cruzado en cámara climática (NCT07307191). Seis deportistas entrenados (3 hombres y 3 mujeres) completaron cuatro condiciones aleatorizadas: calor húmedo alto (31°C, 70% HR), calor seco alto (40°C, 20% HR), calor húmedo bajo y calor seco bajo, manteniendo un WBGT constante (~28°C). Los participantes realizaron ejercicio continuo a 6 y 12 km/h hasta agotamiento o un máximo de 70 min. Se registraron Tcore, temperatura cutánea (Tskin), temperatura corporal (Tbody), frecuencia cardíaca (FC), consumo de oxígeno, tasa metabólica, sudoración y respuestas perceptivas.

Results and Conclusions

El tiempo de exposición fue menor en calor seco intenso (36±11,4 min) que en calor húmedo intenso (48±16,8 min). Se observaron diferencias significativas entre condiciones para Tcore, Tskin, Tbody y FC ($p<0,001$), mostrando un ascenso más rápido de la carga térmica en ambientes secos. Los análisis exploratorios sugirieron patrones diferenciales entre hombres y mujeres, con una tendencia a menor tolerancia en hombres bajo calor seco intenso. No se observaron diferencias relevantes en VO₂ ni tasa metabólica. En este contexto experimental controlado, deportistas entrenados pudieron mantener ejercicio moderado durante aproximadamente 40 min sin superar Tcore de 38,5°C. Estos hallazgos preliminares sugieren que el tipo de ambiente térmico y el sexo podrían influir en la tolerancia al ejercicio bajo estrés térmico equivalente, justificando futuras investigaciones con muestras mayores.

Keywords: WBGT; estrés térmico; termorregulación; ejercicio en calor; diferencias por sexo; deportistas; estudio piloto.

Prehabilitación basada en ejercicio y recuperación física postoperatoria: resultados preliminares de un ensayo clínico prospectivo

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Resumo

Introduction

Introducción: Las estrategias de prehabilitación basadas en ejercicio supervisado podrían mejorar la recuperación funcional tras cirugía de pared abdominal; sin embargo, la evidencia sobre sus efectos en variables físicas continúa siendo limitada. **Objetivo:** Evaluar los efectos de una intervención de entrenamiento supervisado preoperatorio sobre variables de rendimiento físico y fuerza a los 3 meses postcirugía en comparación con un grupo control.

Methods

Métodos: Se realizó un ensayo clínico prospectivo con grupos paralelos que incluyó un grupo de intervención supervisada (IS, n=17) y un grupo control (CG, n=15). Las evaluaciones físicas se realizaron en el momento basal (T0) y a los 3 meses postcirugía (T4). Las variables analizadas fueron fuerza isométrica máxima abdominal a 90° y 45° (FIM 90° y FIM 45°), tasa de desarrollo de fuerza (RFD 90° y RFD 45°), fuerza de prensión manual dominante, test de levantarse y sentarse en 30 segundos (CST 30s) y velocidad de la marcha. Se emplearon modelos lineales de efectos mixtos (LMM) con estimación REML para analizar la interacción grupo × tiempo. Se aplicó corrección de Bonferroni para comparaciones múltiples ($\alpha = 0.0071$).

Results and Conclusions

Resultados: Se observaron diferencias basales significativas entre grupos en la mayoría de las variables de fuerza, con valores iniciales superiores en el grupo IS. La única variable que mostró una interacción grupo x tiempo significativa tras la corrección de Bonferroni fue el CST 30s ($p < 0.001$). El grupo IS mejoró de 15.2 ± 3.8 a 22.1 ± 7.6 repeticiones (+45%), mientras que el grupo control permaneció estable (15.9 ± 5.2 a 15.2 ± 6.2 repeticiones). El tamaño del efecto en T4 fue grande (d de Cohen = 1.00). No se encontraron efectos diferenciales significativos en fuerza abdominal, tasa de desarrollo de fuerza, handgrip ni velocidad de la marcha ($p > 0.05$). **Conclusiones:** El entrenamiento supervisado preoperatorio mejoró significativamente el rendimiento funcional del miembro inferior a los 3 meses postcirugía, reflejado en el CST 30s. Sin embargo, no se observaron efectos diferenciales en fuerza abdominal, tasa de desarrollo de fuerza, fuerza de prensión manual ni velocidad de la marcha. Estos resultados deben interpretarse con cautela debido a las diferencias basales entre grupos y al reducido tamaño muestral.

Keywords: Prehabilitación; Ejercicio supervisado; Cirugía de pared abdominal; Recuperación funcional; Fuerza muscular; Modelos lineales mixtos; Rendimiento físico; Rehabilitación postoperatoria

Efeitos crônicos da suplementação combinada de quercetina e flavanóis do cacau na velocidade de processamento cognitivo e na função visuoespacial em jovens futebolistas de elite

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Resumo

Introduction

A velocidade de processamento cognitivo e o desempenho de varredura visual são determinantes importantes do desempenho no futebol de elite. Compostos polifenólicos como a quercetina e os flavonoides do cacau têm sido propostos para melhorar a eficiência neurocognitiva. Este estudo examinou os efeitos de um período de suplementação de 60 dias com quercetina (Q), flavonoides do cacau (CF) e sua combinação (Q+CF) na velocidade de processamento cognitivo em jovens futebolistas.

Methods

Cinquenta futebolistas masculinos de elite (18–21 anos) foram aleatorizados em cinco grupos (n = 10 por grupo): quercetina (Q), flavonoides do cacau (CF), suplementação combinada (Q+CF; 500 mg/dia de cada), placebo (P) e controlo (C). O desempenho cognitivo foi avaliado através do Trail Making Test Parte A (TMT-A) no início e após o período de intervenção de 60 dias. Foi realizada uma ANOVA de modelo misto para avaliar as interações grupo × tempo. Foram calculadas pontuações de mudança (dTMT = Pós – Baseline) para quantificar as alterações de desempenho ao longo do tempo.

Results and Conclusions

Resultados: Foi observada uma interação significativa grupo x tempo ($p < 0,01$). Todos os grupos de suplementação demonstraram reduções no tempo de conclusão do TMT-A após 60 dias, indicando melhoria na velocidade de processamento cognitivo e no desempenho de varredura visual. O grupo Q+CF apresentou a maior melhoria em comparação com o grupo placebo (diferença média no dTMT: $-11,8 \pm 4,2$ s; $p < 0,01$, d de Cohen = 1,12). Além disso, o grupo de suplementação combinada demonstrou melhorias numericamente superiores às dos grupos de suplementação isolada (Q e CF), embora essa superioridade em relação aos grupos isolados não tenha sido confirmada estatisticamente. Conclusão: A co-suplementação crônica com quercetina e flavonoides do cacau ao longo de 60 dias melhorou significativamente a velocidade de processamento cognitivo e o desempenho de varredura visual em jovens futebolistas. Estes resultados

sugerem que estratégias nutricionais baseadas em polifenóis podem apoiar o desempenho cognitivo em contextos desportivos de alta intensidade.

Keywords: Futebol, quercetina, flavonoides do cacau, velocidade de processamento cognitivo, varredura visual, polifenóis

Diferencias en la composición corporal y la condición física de los adultos mayores en función del nivel de actividad física y el sexo

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Resumo

Introduction

El aumento de la esperanza de vida ha posicionado la calidad de vida y la independencia funcional como indicadores de salud principales en los adultos mayores (Marcos-Pardo et al., 2023). La composición corporal es un aspecto fundamental de este bienestar, ya que el declive de la masa muscular junto al aumento de la adiposidad eleva el riesgo de padecer enfermedades no transmisibles y de perder funcionalidad (Prado et al., 2024). Paralelamente, el mantenimiento de una condición física óptima, con niveles adecuados de fuerza, capacidad cardiorrespiratoria y equilibrio, es fundamental para mantener la autonomía diaria y reducir las tasas de hospitalización y mortalidad (El Assar et al., 2022). Sin embargo, la disminución de la actividad física que se produce en esta población, especialmente entre las mujeres y en los entornos institucionalizados, acelera el deterioro de ambos factores (Rúa-Alonso et al., 2023). Aunque se conocen los beneficios de la práctica de actividad física, son escasos los estudios que comparan las diferencias en la composición corporal y la condición física de los adultos mayores en función del sexo y su nivel de actividad física. Por este motivo, el objetivo del presente estudio fue analizar las diferencias en la composición corporal y la condición física de los adultos mayores en función del sexo y el nivel de actividad física.

Methods

Se llevó a cabo un estudio transversal con 505 adultos mayores (367 mujeres y 138 hombres; edad media: $74,9 \pm 8,4$ años). La muestra estuvo compuesta por adultos mayores que vivían en residencias (institucionalizados: $n=74$) y que vivían en la comunidad (no institucionalizados: $n=431$). Mediante el International Physical Activity Questionnaire Adapted to Elderly (IPAQ-E) se clasificó a los adultos mayores en cuatro grupos de actividad física: institucionalizados (74), inactivos (103), poco activos (178) y muy activos (150). Se evaluó la composición corporal a través de antropometría y bioimpedancia (masa corporal, talla, grasa corporal, masa muscular esquelética y perímetro de cintura). Asimismo, la condición física se valoró mediante las pruebas de fuerza de prensión manual, sprint (4, 6 y 10 m), Timed Up and Go (TUG) y fuerza isométrica de miembros superiores e inferiores.

Results and Conclusions

Los hombres institucionalizados mostraron mayor height ($p<0.001$), body mass ($p=0.036$), fat free mass ($p<0.001$), skeletal muscle mass ($p<0.001$), waist girth

($p=0.042$), así como un mejor rendimiento en handgrip strength ($p\leq 0.038$), sprint ($p\leq 0.019$), TUG ($p<0.001$) y upper body IS ($p=0.002$) que las mujeres. Respecto a los hombres inactivos y poco activos no institucionalizados, mostraron mayor height ($p<0.001$), fat free mass ($p<0.001$), skeletal muscle mass ($p<0.001$), waist girth ($p\leq 0.014$), así como mayor rendimiento en handgrip ($p<0.001$), upper body IS ($p<0.001$) y lower body IS ($p\leq 0.050$), y una menor fat mass ($p=0.001$) que las mujeres. Y, en cuanto a los adultos mayores muy activos, los hombres mostraron mayor height ($p<0.001$), fat free mass ($p<0.001$), skeletal muscle mass ($p<0.001$), waist girth ($p<0.001$), así como una mayor handgrip strength ($p<0.001$), y upper ($p<0.001$) and lower ($p<0.001$) body IS. En conclusión, los hombres adultos mayores presentaron, en general, mejores valores de condición física y composición corporal que las mujeres, independientemente del nivel de actividad física.

Keywords: : Actividad física; Adultos mayores; Composición corporal; Condición física; Sexo.

Efecto de un protocolo de resistencia priming con mínimo equipamiento sobre el rendimiento neuromuscular 24 horas después en futbolistas masculinos sub-19: un ensayo cruzado aleatorizado.

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Resumo

Introduction

Las sesiones de priming se han propuesto como una estrategia práctica y eficaz en términos de tiempo para aumentar la exposición a estímulos neuromusculares sin añadir una carga de entrenamiento excesiva. Como resultado, han recibido una atención creciente en la literatura científica como herramienta para mejorar de forma aguda el rendimiento neuromuscular. La estrategia priming puede definirse como un estímulo de fuerza o potencia, de bajo volumen, realizado habitualmente a una intensidad moderada-alta dentro de las 0–48 horas previas a la competición. Esta ventana temporal más amplia permite a los preparadores físicos integrar ejercicios de priming dentro del microciclo competitivo —por ejemplo, en MD-1, MD-2 o incluso en el propio día de partido— sin interferir con las sesiones tácticas o técnicas. Dependiendo del tipo de estímulo —por ejemplo, ejercicios de fuerza, sprint o ejercicios balísticos, de la carga utilizada —por ejemplo, cargas pesadas, ligeras u óptimas para la potencia— y del momento de aplicación de la sesión, los ejercicios de priming pueden mejorar de forma aguda el rendimiento neuromuscular minimizando, al mismo tiempo, la acumulación de fatiga. Por ejemplo, González-García et al. demostraron que series pesadas de sentadilla trasera realizadas con cargas superiores al 80% de una repetición máxima (1RM) aumentaron la altura de salto aproximadamente un 6,5% (+3,4–9,5 cm) seis horas después del ejercicio. Del mismo modo, Loturco et al. observaron que la altura de salto aumentó un +5,6% y un +4,0% seis horas después de realizar jump squat al 40% y al 80% de 1RM, respectivamente. Además, los efectos retardados o al día siguiente —es decir, entre 24 y 48 horas después del estímulo— muestran tendencias prometedoras bajo determinadas condiciones.

Methods

Trece futbolistas masculinos (edad: $18,78 \pm 1,48$ años; altura: $1,76 \pm 0,07$ m; masa corporal: $72,38 \pm 7,10$ kg) pertenecientes a un equipo español sub-19 de segunda división —nivel 3 según McKay et al.— fueron incluidos en el estudio. Se utilizó un diseño aleatorizado cruzado y contrabalanceado para investigar los efectos retardados de

potenciación de una sesión de priming sobre el rendimiento físico. La evaluación basal, que incluyó el CMJ, el sprint de 20 m, Short Recovery Stress Scale (SRSS) y la escala visual analógica (Visual Analogue Scale, VAS), se realizó 24 horas antes del día de partido (MD-1). En la condición de priming, los jugadores completaron cinco series compuestas por cuatro vertical drop jumps (VDJ), cuatro horizontal drop jumps (HDJ) desde un cajón de 50 cm, seguidos de un sprint de 20 m, con 3 minutos de descanso entre series. Se calcularon estadísticos descriptivos, medidas de fiabilidad relativa y absoluta (ICC, CV, SEM), así como el SWC, para identificar respuestas individuales. Las diferencias entre condiciones y momentos se analizaron mediante ANOVA de medidas repetidas, con pruebas post-hoc de Bonferroni y tamaños del efecto.

Results and Conclusions

Todas las variables analizadas mostraron una fiabilidad relativa de moderada a excelente, mientras que la fiabilidad absoluta fue aceptable. En la variable de sprint, no se observaron diferencias significativas por tiempo, condición ni interacción condición x tiempo. En el análisis post hoc tampoco se hallaron diferencias significativas entre condiciones a las 24 horas ni entre baseline y la condición priming. No obstante, se observó un efecto moderado favorable en la reducción del tiempo de sprint tras la condición priming. En relación con el CMJ, la variable jump momentum disminuyó significativamente a las 24 horas en la condición priming. Por otro lado, en la condición control se observó un deterioro significativo en las variables peak propulsive force y peak braking force inmediatamente después del entrenamiento en campo. Respecto al análisis de respuestas individuales en el sprint, en la condición priming, 24 horas después de la intervención, 0 de 13 jugadores aumentaron su tiempo, 8 de 13 mantuvieron valores similares y 5 de 13 redujeron su tiempo de sprint, siendo clasificados como respondedores positivos. En cuanto a las respuestas individuales en el CMJ, en la condición priming, 24 horas después de la intervención, 0 de 13 jugadores aumentaron la altura de salto, 4 de 13 la disminuyeron y 9 de 13 mantuvieron valores similares. En la condición control, 3 de 13 jugadores aumentaron la altura de salto, 9 de 13 mantuvieron valores similares y 1 de 13 disminuyó la altura de salto. En las escalas perceptivas, no se observaron diferencias significativas en ninguna de las variables analizadas. Las principales conclusiones de la investigación fueron las siguientes: El protocolo de priming no produjo un beneficio claro a nivel grupal 24 horas después de su realización. A pesar de ello, podría haber contribuido a atenuar el deterioro neuromuscular inmediato tras el entrenamiento en campo, ya que la condición control mostró descensos en algunas variables del CMJ, mientras que estos cambios no se observaron en la condición priming. El análisis individual mostró que 5 de 13 jugadores mejoraron su rendimiento en sprint 24 horas después de la intervención, lo que refuerza la importancia de analizar la respuesta jugador por jugador. La ausencia de mejoras claras en el CMJ podría estar relacionada con el uso de un cajón demasiado alto, de 50 cm, que pudo generar una demanda excéntrica excesiva en algunos jugadores. Por ello, los preparadores físicos deberían ajustar la altura del cajón, el volumen del protocolo y la experiencia previa de los jugadores con este tipo de estímulos antes de aplicar estrategias de priming en MD-1.

Keywords: Potencialización retardada, fuerza, fútbol, ejercicio balístico, rendimiento deportivo, potencia.

Adaptación respiratoria, respuestas hematológicas y recuperación del rendimiento en atletas de CrossFit® mediante entrenamiento con resistencia respiratoria tras infección por SARS-CoV-2

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Resumo

Introduction

La infección por SARS-CoV-2 puede afectar negativamente la función respiratoria y el rendimiento físico, especialmente en atletas de alta intensidad que retoman el entrenamiento tras la enfermedad. La Elevation Training Mask 2.0 (ETM) ha sido propuesta como un dispositivo de resistencia respiratoria capaz de mejorar la función de la musculatura respiratoria durante el ejercicio. Sin embargo, la evidencia sobre sus efectos fisiológicos y de rendimiento en deportistas post-COVID-19 sigue siendo limitada.

Methods

Se realizó un ensayo clínico aleatorizado simple ciego siguiendo las recomendaciones CONSORT en 20 atletas masculinos entrenados de CrossFit®, un mes después de la desaparición de los síntomas por SARS-CoV-2. Los participantes fueron asignados aleatoriamente a un grupo experimental (GE; $n = 10$) que utilizó una ETM 2.0 configurada, o a un grupo control (GC; $n = 10$) que utilizó un dispositivo ETM simulado. Ambos grupos completaron un programa de entrenamiento CrossFit® de 12 semanas (36 sesiones). Las evaluaciones pre y post intervención incluyeron parámetros espirométricos, fuerza de la musculatura respiratoria, biomarcadores hematológicos y pruebas de rendimiento deportivo, incluyendo CrossFit® Total y Fran WOD.

Results and Conclusions

No se observaron diferencias significativas entre grupos ($p > 0,05$) en variables espirométricas, biomarcadores hematológicos ni en el rendimiento deportivo global. Sin embargo, se encontraron efectos significativos de interacción grupo x tiempo para la ventilación voluntaria máxima (MVV), la presión inspiratoria máxima (MIP), CrossFit® Total y Fran WOD ($p < 0,05$). Las mejoras en MVV y MIP se observaron exclusivamente en el GE tras la intervención. Ambos grupos mejoraron el rendimiento físico a lo largo del estudio, aunque sin recuperar completamente los niveles previos a la infección por SARS-CoV-2. En conjunto, el uso de ETM durante el entrenamiento CrossFit® podría aportar beneficios modestos sobre la adaptación de la musculatura respiratoria durante la recuperación post-COVID-19, aunque no parece actuar como un verdadero simulador de altitud bajo las condiciones experimentales evaluadas.

Keywords: CrossFit®; SARS-CoV-2; entrenamiento de musculatura respiratoria; Elevation Training Mask; rendimiento deportivo; espirometría; biomarcadores hematológicos; recuperación post-COVID.

Influencia de la ansiedad competitiva en atletas de la selección nacional masculina de voleibol de Honduras 2025

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Resumo

Introduction

La ansiedad competitiva se reconoce como una variable psicológica central en el rendimiento deportivo, especialmente en escenarios de alta exigencia como competencias oficiales e internacionales. Diversos estudios han señalado que este fenómeno se asocia con la disminución del rendimiento atlético, afectando dimensiones físicas, técnicas y tácticas de los deportistas (Pozo, 2007; Tendero, 2019). En disciplinas colectivas como el voleibol, donde las decisiones deben tomarse en fracciones de segundo, la capacidad de los atletas para gestionar emociones y controlar pensamientos anticipatorios resulta determinante para diferenciar un desempeño óptimo de uno limitado. Martens et al. (1990) conceptualizaron la ansiedad competitiva como una respuesta emocional multidimensional, integrada por tres componentes: ansiedad cognitiva, ansiedad somática y autoconfianza. Este modelo ha sido ampliamente utilizado para comprender cómo los atletas interpretan y afrontan las demandas competitivas. La ansiedad cognitiva se refiere a pensamientos negativos, preocupación excesiva y dudas sobre la propia capacidad de ejecución. Según Weinberg y Gould (2010), esta dimensión se vincula con el miedo al fracaso, la autocrítica y la pérdida de concentración, factores que reducen la calidad del rendimiento. Además, altos niveles de ansiedad cognitiva suelen relacionarse con una disminución de la autoconfianza, ya que los atletas perciben la competencia como amenaza más que como desafío (Vealey, 1986). La ansiedad somática comprende las respuestas fisiológicas derivadas del estrés competitivo, como tensión muscular, incremento del ritmo cardíaco, sudoración o temblores. Aunque estas reacciones forman parte de la activación normal del organismo, niveles elevados pueden interferir en la coordinación motora fina y gruesa, afectando movimientos clave como el salto o la defensa (Martens et al., 1990). En el voleibol de alto rendimiento, el control de la activación fisiológica es esencial para mantener la eficacia táctica. La autoconfianza, por su parte, actúa como un factor protector frente a la ansiedad competitiva. Vealey (1986) la define como la creencia del deportista en su capacidad para rendir exitosamente bajo presión. Bandura (1997) añade que la autoconfianza permite interpretar la activación fisiológica como energía funcional y no como amenaza, reduciendo respuestas ansiosas desadaptativas. Investigaciones recientes destacan que la autoconfianza favorece la resiliencia, la regulación emocional y la persistencia (Gucciardi, 2017). La literatura confirma la interacción entre estas dimensiones. Olmedilla et al. (2016) evidencian que atletas con mayor autoconfianza presentan niveles más bajos de ansiedad cognitiva y somática, lo que facilita un mejor control emocional. De manera similar, Moreno-Murcia et al. (2010) encontraron que jóvenes deportistas con mayor percepción de competencia experimentan menor ansiedad y mayor disfrute deportivo. En síntesis, la ansiedad

competitiva es un fenómeno psicológico determinante para el rendimiento en voleibol, particularmente en escenarios internacionales de alta presión. La comprensión del modelo de Martens et al. (1990) permite explicar cómo interactúan pensamientos, respuestas fisiológicas y creencias de competencia en la conformación del estado emocional precompetitivo. En este contexto, la Selección Nacional Masculina de Voleibol de Honduras ha mostrado una marcada inestabilidad en su rendimiento competitivo, lo que ha despertado el interés por estudiar la influencia de la ansiedad competitiva en sus atletas de cara a los Juegos Centroamericanos 2025. El diagnóstico de este fenómeno busca aportar conocimiento causal y apoyar decisiones oportunas para fortalecer el componente psicológico del equipo y mejorar su desempeño deportivo.

Methods

Diseño. El presente estudio se enmarca en la línea de investigación de Estudios Disciplinarios, y en el área temática de Salud Integral, debido a que se analiza variables psicológicas que influyen directamente en el bienestar emocional y el rendimiento de los atletas. El estudio adoptó un enfoque cuantitativo, con un diseño no experimental, transversal y descriptivo-correlacional, puesto que no se manipularon variables y los datos se recolectaron en un único momento. **Muestra.** La población en estudio estuvo conformada por la Selección Nacional Masculina de Voleibol de Honduras. Se seleccionó una muestra de 12 atletas mediante un muestreo por conveniencia, considerando como criterio de inclusión ser jugador activo del primer equipo. La edad de los participantes osciló entre los 22 y 28 años. En cuanto a la estatura, la mayoría se encontraba en el rango de 1.90 a 1.94 metros, con excepción de dos jugadores que median 1.86 metros. **Instrumentos.** Como instrumento de recolección de datos se utilizó el Competitive State Anxiety Inventory-2 (CSAI-2), diseñado por Martens et al. (1990), compuesto por 27 ítems distribuidos en tres dimensiones: ansiedad cognitiva, ansiedad somática y autoconfianza. La aplicación del cuestionario se llevó a cabo el día de llegada de las delegaciones al país anfitrión de los XII Juegos Centroamericanos, Guatemala 2025. Para ello, se empleó un formulario digital en Google Forms, administrado por un miembro de la selección. **Análisis estadístico.** Los datos fueron tabulados y analizados mediante el software Microsoft Excel. El procesamiento se realizó a través de un análisis de frecuencias absolutas y relativas, lo que permitió establecer agrupaciones para establecer tendencias generales que caracterizan el estado psicológico previo a la competencia.

Results and Conclusions

Los hallazgos permiten identificar un patrón claro en las dimensiones evaluadas de la ansiedad competitiva y la autoconfianza en los jugadores de la Selección Nacional Masculina de Voleibol de Honduras. En primer lugar, la ansiedad cognitiva se presentó como la dimensión más predominante, con un 59.25% de los participantes reportando preocupaciones o pensamientos anticipatorios previos a la competencia. Este resultado coincide con lo señalado en la literatura, que describe la ansiedad cognitiva como un factor recurrente en contextos de alta exigencia deportiva, donde los atletas anticipan posibles escenarios de desempeño y resultados (Martens et al., 1990). Aunque esperable, este tipo de ansiedad puede tener efectos positivos, al motivar una preparación más cuidadosa, o negativos, al intensificarse y afectar la concentración y la toma de decisiones (Craft et al., 2003). En contraste, la ansiedad somática mostró una tendencia baja, con el 53.75% de los jugadores indicando ausencia de síntomas fisiológicos. Este hallazgo sugiere un adecuado control en la regulación corporal, consistente con estudios que

señalan que los atletas experimentados desarrollan estrategias de afrontamiento que reducen la manifestación somática de la ansiedad (Weinberg & Gould, 2019). Sin embargo, el 46.25% reportó niveles moderados, lo que evidencia que un sector de la muestra aún experimenta nerviosismo o tensión, con posibles repercusiones en el rendimiento competitivo (Jones, 1995). Los resultados sobre autoconfianza reflejan un panorama altamente favorable: el 93.5% de los atletas manifestó sentirse capaces, seguros y en control de su desempeño. Este hallazgo es relevante, dado que la autoconfianza ha sido identificada como un predictor clave del rendimiento deportivo (Bandura, 1997; Vealey, 2001). Una elevada percepción de eficacia personal actúa como factor protector frente a la ansiedad, favoreciendo la resiliencia psicológica y la disposición para enfrentar la presión competitiva (Woodman & Hardy, 2003). No obstante, la presencia de un pequeño grupo con niveles bajos de autoconfianza pone de manifiesto diferencias individuales que requieren atención, pues podrían representar un riesgo en situaciones de alta demanda psicológica. En síntesis, los resultados sugieren que, aunque la ansiedad cognitiva está presente en la mayoría de los jugadores, esta no se acompaña de elevados niveles de ansiedad somática, lo que indica un equilibrio entre activación mental y regulación fisiológica. Además, el alto nivel de autoconfianza observado constituye un recurso psicológico fundamental para disminuir los efectos de la ansiedad, fomentar la resiliencia ante errores y aumentar la motivación individual y colectiva, contribuyendo a un mejor desempeño competitivo. Estos hallazgos subrayan la importancia de implementar programas de entrenamiento psicológico orientados a la gestión de la ansiedad cognitiva y al fortalecimiento de la autoconfianza, con el fin de optimizar el rendimiento y el bienestar de los atletas en escenarios de alta presión.

Keywords: Ansiedad competitiva, ansiedad cognitiva, Ansiedad somática, Autoconfianza.

Efeitos do timing da ingestão de proteína após o exercício nas adaptações do trem inferior após o treinamento de resistência em mulheres treinadas

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Resumo

Introduction

A importância do timing da ingestão de proteína nas adaptações ao treinamento de resistência ainda é debatida, especialmente quando a ingestão diária total de proteína é suficiente. Este estudo investigou se a ingestão imediata versus tardia de proteína após o exercício influencia as alterações na morfologia e no desempenho do trem inferior em mulheres treinadas.

Methods

Vinte e quatro mulheres treinadas em resistência ($23,2 \pm 2,6$ anos) foram aleatoriamente distribuídas em dois grupos: Proteína Imediata (PI, $n = 12$; 25 g de proteína imediatamente após o exercício) e Proteína Atrasada (PA, $n = 12$; 25 g de proteína 3 horas após o exercício). Ambos os grupos completaram um programa de treinamento de resistência para o trem inferior com duração de 8 semanas (3 sessões/semana), com ênfase em exercícios multiarticulares (elevação pélvica, agachamento búlgaro e levantamento terra). As variáveis avaliadas incluíram circunferência glútea (cm) e altura do salto vertical (teste de Sargent), avaliadas no início e após a intervenção. As diferenças entre grupos nas variações foram analisadas usando testes t independentes

Results and Conclusions

Resultados: Ambos os grupos melhoraram após a intervenção de 8 semanas, com apenas pequenas diferenças entre os grupos. O grupo Proteína Imediata apresentou aumentos ligeiramente maiores na circunferência glútea em comparação com o grupo Proteína Atrasada (Δ : $+1,6 \pm 0,5$ cm vs. $+1,2 \pm 0,4$ cm; $p = 0,044$). Um padrão semelhante foi observado no desempenho do salto vertical, com uma diferença marginal entre os grupos favorecendo o grupo Proteína Imediata ($p = 0,049$). As diferenças entre os grupos foram pequenas em magnitude. Conclusão: A ingestão imediata de proteína após o treino de resistência pode proporcionar uma pequena vantagem em relação à ingestão tardia nas adaptações do trem inferior em mulheres treinadas, quando a ingestão total de proteína e a carga de treino são controladas. No entanto, a magnitude desse efeito parece limitada, sugerindo que o timing da proteína provavelmente desempenha um papel secundário em relação ao estímulo global do treino e à ingestão total de proteína

Keywords: Treinamento de resistência para o trem inferior, timing da ingestão de proteína, mulheres treinadas, hipertrofia muscular

Efectos de un programa de ejercicios multicomponente sobre la función cognitiva y física en mujeres con fibromialgia: protocolo de un ensayo clínico aleatorizado y controlado.

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Resumo

Introduction

Las caídas afectan a las personas con fibromialgia debido a los síntomas reumatológicos que deterioran el rendimiento en las actividades de la vida diaria. La reducción del rendimiento en tareas duales incrementa el riesgo de caídas, lo que pone de manifiesto la necesidad de un programa de ejercicio multicomponente que combine fuerza y danza creativa. Objetivo: evaluar el efecto de un programa de ejercicio multicomponente de 6 semanas (que combina ejercicio de fuerza y danza creativa) sobre las funciones cognitivas, motoras y cerebrales, así como sobre la modulación autonómica cardíaca.

Methods

Métodos: Este ensayo controlado aleatorizado por conglomerados se dividirá en un grupo de ejercicio (n=22) y un grupo control (n=22) en mujeres con fibromialgia. La intervención de 6 semanas incluye 2 sesiones semanales de 60 minutos (30 minutos de entrenamiento de fuerza y 30 minutos de entrenamiento divergente). El resultado primario son los cambios en los síntomas de fibromialgia (FIQ-R) y la condición física (fuerza del tren superior, fuerza del tren inferior, movilidad, equilibrio y prueba de marcha con agilidad en tarea simple y tarea dual). Los resultados secundarios incluyen la actividad eléctrica cerebral (mediante electroencefalograma), el sistema nervioso autónomo (mediante variabilidad de la frecuencia cardíaca), la codificación de archivos de eventos evaluada mediante un paradigma de estímulo-respuesta, el nivel de actividad física (IPAQ-SV), el miedo a las caídas (FES-I) y la calidad de vida relacionada con la salud (EQ-5D-5L). Las comparaciones entre grupos en la línea de base se realizarán mediante la prueba chi-cuadrado, la prueba t y la prueba de Mann-Whitney (U). Los cambios en los grupos a lo largo del tiempo (interacción grupo x tiempo) se modelarán mediante una regresión de modelos mixtos lineales.

Results and Conclusions

Conclusión: Un programa de ejercicio multicomponente que combine fuerza y tareas divergentes puede mejorar la función física y cognitiva, contribuir a la prevención de caídas y ayudar a preservar la independencia en mujeres con fibromialgia.

Keywords: BRAC; dolor crónico; EEG; VFC; danza improvisada; fuerza muscular.

¿Responden de manera diferente las posiciones de juego al ratio agudo:crónico de carga? Evidencia en futbolistas de élite

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Resumo

Introduction

El ratio agudo:crónico de carga (A:C ratio) ha sido ampliamente investigado en relación con el riesgo de lesión en el fútbol. Sin embargo, su relación con el rendimiento físico en competición sigue sin estar clara, especialmente entre diferentes posiciones de juego. Dadas las distintas demandas físicas asociadas a cada rol posicional, comprender las respuestas específicas según la posición frente a las fluctuaciones de carga podría mejorar el monitoreo individualizado y la gestión del rendimiento en futbolistas de élite.

Methods

Este estudio observacional longitudinal analizó datos recopilados durante dos temporadas competitivas (2022–2023 y 2023–2024) en jugadores élite de categoría U-19 ($n = 45$) y del equipo filial ($n = 30$) pertenecientes a un club que compete en la máxima liga profesional checa. Se incluyeron un total de 770 observaciones de partidos completos (≥ 90 min). Los datos fueron normalizados a 90 minutos. La carga externa fue monitorizada mediante tecnología GPS e incluyó distancia total (TD), distancia recorrida a alta velocidad con umbrales absolutos (>19.8 km/h; HSR19) y relativos ($>70\%$; HSR70), distancia de sprint (>25.2 km·h⁻¹; SPR), aceleraciones (ACC24; ACC4) y desaceleraciones (DEC24; DEC4). El ratio agudo:crónico de carga (A:C ratio) fue calculado mediante medias exponencialmente ponderadas acopladas de la carga aguda (7 días) y crónica (28 días). Se utilizaron modelos lineales mixtos para examinar si la asociación entre el A:C ratio y el rendimiento físico en competición difería según la posición de juego, incluyendo al jugador como intercepto aleatorio. Las interacciones significativas entre A:C ratio $\times$ posición de juego fueron seguidas mediante análisis de pendientes simples. El tamaño del efecto fue interpretado utilizando g de Hedges. El estudio fue aprobado por el Comité de Ética de la Faculty of Physical Education and Sport, Charles University, y se llevó a cabo de acuerdo con la Declaración de Helsinki.

Results and Conclusions

Se observaron interacciones significativas entre A:C ratio $\times$ posición de juego para HSR70 y SPR ($p < 0.05$). Los análisis posteriores de pendientes simples indicaron asociaciones específicas según la posición: valores más altos de A:C ratio se asociaron con mayores valores de HSR70 y SPR en los laterales, mientras que se observaron asociaciones inversas en los extremos. Sin embargo, la magnitud de estos efectos fue trivial-pequeña ($g \approx 0.24$), lo que sugiere una relevancia práctica limitada. El A:C ratio

por sí solo puede no representar una herramienta suficientemente fiable para la gestión de la carga en el fútbol de élite, y las asociaciones observadas podrían reflejar parcialmente artefactos estadísticos más que efectos con significado práctico.

Keywords: fútbol, ratio agudo:crónico de carga, posición de juego, monitoreo GPS, rendimiento físico

Exercise-Induced Myokines Attenuate Brain Insulin Resistance: Uncovering Muscle–Central Nervous System Metabolic Communication

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Resumo

Introduction

Brain insulin resistance (BIR) is increasingly recognized as a critical contributor to neurodegenerative disorders, including Alzheimer's disease, by impairing synaptic plasticity, cognition, and neuronal metabolism. While regular exercise training enhances peripheral insulin sensitivity, the mechanisms linking muscle contraction to improved brain insulin signaling remain incompletely understood. This review tests the hypothesis that myokines—cytokines and peptides secreted by contracting skeletal muscle—serve as essential endocrine mediators that cross or signal at the blood–brain barrier to directly enhance brain insulin sensitivity and metabolic function.

Methods

We conducted a comprehensive narrative synthesis of peer-reviewed literature (2010–2025) focusing on: (1) molecular mechanisms of BIR, (2) exercise-induced myokine secretion across aerobic, resistance, and high-intensity interval training (HIIT) modalities, and (3) direct and indirect effects of key myokines (irisin, BDNF, cathepsin B, IL-6, FGF21) on central insulin signaling pathways, neuroinflammation, and synaptic plasticity.

Results and Conclusions

Results Evidence demonstrates that exercise training robustly enhances the release of multiple myokines. Irisin (cleaved from FNDC5) crosses the blood–brain barrier, upregulates hippocampal BDNF via CREB signaling, and activates AKT/ERK pathways, improving neuronal insulin sensitivity. Cathepsin B, elevated by aerobic exercise, promotes adult hippocampal neurogenesis and reduces NLRP3 inflammasome-mediated neuroinflammation. IL-6, despite dual roles, acutely enhances hypothalamic insulin signaling and glucose uptake. FGF21 improves synaptic plasticity and mitochondrial function in insulin-resistant states. Importantly, an 8-week supervised aerobic intervention restored brain insulin responsiveness to levels of normal-weight individuals, with myokine secretion identified as a plausible mediator. Modality-specific effects were observed: aerobic training preferentially elevates IL-6 and irisin, while resistance training potently increases IGF-1 and BDNF. **Conclusion** Regular exercise training—particularly structured aerobic, resistance, or combined regimens—enhances the release of

neuroprotective myokines, which improve brain insulin sensitivity, reduce neuroinflammation, and promote synaptic and cognitive health. These findings establish myokine-mediated muscle–CNS cross-talk as a central mechanism underlying the neuroprotective effects of exercise. Optimizing exercise type, intensity, and duration to maximize beneficial myokine secretion represents a promising non-pharmacological strategy to prevent and mitigate BIR-associated neurodegeneration.

Keywords: Brain · CNS metabolic disorders · Exercise training · Insulin resistance · Myokine

Validez entre Absorciometría de Rayos X de Doble Energía e Impedancia Bioeléctrica para el Análisis de Grasa Segmentaria, y Modelos Predictivos Antropométricos en Hombres Jóvenes

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Resumo

Introduction

La evaluación precisa de la distribución de grasa corporal segmentaria es fundamental para la gestión de enfermedades cardiovasculares y trastornos metabólicos. Aunque la Absorciometría de Rayos X de Doble Energía (DXA) es el método de referencia, su elevado coste limita su disponibilidad. El Análisis de Impedancia Bioeléctrica (BIA) constituye una alternativa portátil y accesible, aunque su validez frente a DXA a nivel segmentario en hombres no ha sido suficientemente estudiada. La antropometría, estandarizada mediante el protocolo ISAK, representa una opción aún más económica, cuya aplicación a la estimación de grasa segmentaria en población masculina presenta limitaciones metodológicas relevantes en la literatura existente. Por esto, los objetivos de este estudio fueron: (a) Analizar las diferencias entre DXA y BIA en la medición de la masa grasa segmentaria en hombres jóvenes, y determinar la influencia del IMC y el estado de hidratación sobre dichas diferencias. (b) Desarrollar modelos de regresión multivariante antropométricos para predecir la masa grasa en kg en los diferentes segmentos corporales (miembros superiores, tronco y miembros inferiores), validados frente a DXA en muestra masculina.

Methods

Estudio transversal que incluyó a 16¹ hombres jóvenes (edad media $23,04 \pm 5,6^1$ años; IMC $24,77 \pm 3,18$ kg/m²). La masa grasa segmentaria se midió mediante DXA (Hologic Horizon) y BIA (TANITA MC-780-MA). Se recogió un perfil antropométrico ISAK completo de forma bilateral (45 variables). La concordancia entre DXA y BIA se analizó mediante ANOVA/ANCOVA de medidas repetidas y análisis de Bland-Altman, considerando el IMC y el estado de hidratación como covariables. Para el desarrollo de modelos predictivos se empleó regresión múltiple por pasos, controlando la multicolinealidad mediante el Factor de Inflación de la Varianza ($FIV \leq 5$).

Results and Conclusions

Se encontraron diferencias significativas entre DXA y BIA en todos los segmentos corporales en la muestra masculina, tanto en kilogramos como en porcentaje de masa grasa ($p < 0,001$; tamaño del efecto: pequeño a grande). El análisis de Bland-Altman

reveló una sobreestimación sistemática de la BIA en los miembros (diferencia media: 0,06–1,50 kg) y una subestimación de la grasa de tronco (diferencia media: –0,78 kg; límites de acuerdo: –3,86 a 2,28 kg), con amplios límites de concordancia en todos los segmentos. Ni el IMC ni el estado de hidratación influyeron significativamente en las diferencias entre métodos. Los modelos de regresión antropométrica presentaron una elevada capacidad predictiva en todos los segmentos ($R^2 = 0,758\text{--}0,887$; $p < 0,001$), requiriendo únicamente 10 variables clave: masa corporal, pliegues del tríceps y del bíceps (miembros superiores), pliegues supraespinal y subescapular (tronco), perímetro de cintura (tronco), pliegues de muslo y pierna (miembros inferiores), perímetro de brazo relajado y perímetro de muslo a 1 cm del glúteo. Tiempo estimado de evaluación: aproximadamente 6 minutos. DXA y BIA no son intercambiables para la estimación de la masa grasa segmentaria en hombres jóvenes. Los modelos de regresión antropométrica desarrollados ofrecen una alternativa validada, accesible y de bajo coste para estimar la masa grasa segmentaria en contextos clínicos y de salud pública donde la DXA no está disponible, con una capacidad predictiva elevada alcanzada en menos de 10 minutos mediante medidas ISAK estándar.

Keywords: Composición corporal · Masa grasa segmentaria · DXA · Impedancia bioeléctrica · Antropometría · ISAK · Pliegues cutáneos

EFEITO DE UM PROGRAMA DE ATIVIDADE FÍSICA NAS RESPOSTAS NEUROMUSCULARES E NOS FATORES DE RISCO PARA QUEDAS EM IDOSOS: UM ESTUDO PRÉ-PÓS NÃO RANDOMIZADO.

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Resumo

Introduction

O envelhecimento populacional no Brasil é relativamente alto em comparação com outros países em desenvolvimento. As quedas podem levar a consequências graves, como traumatismos cranioencefálicos e fraturas, uma vez que o processo de envelhecimento envolve alterações neuromusculares e biopsicossociais.

Methods

Idosos de ambos os sexos foram recrutados na Clínica Escola Amarina Motta (serviço de fisioterapia) ou na Universidade da Terceira Idade da UNISUAM. O teste Timed Up & Go (TUG) foi utilizado para mensurar a agilidade. Para avaliar o equilíbrio, empregou-se a posturografia, na qual os participantes foram instruídos a permanecer descalços, com os braços ao lado do corpo, sob três condições diferentes em uma plataforma de força. A avaliação neuromuscular foi realizada simultaneamente à posturografia, com a coleta de sinais de eletromiografia de superfície (EMGs) dos músculos Gastrocnêmio Medial e Tibial Anterior, bilateralmente, para avaliar o sinergismo muscular entre os membros inferiores dominante e não dominante. Para avaliar a força muscular, utilizou-se a contração isométrica voluntária máxima (CIVM) de preensão manual.

Results and Conclusions

Observou-se uma redução clinicamente importante ($p=0,077$) no desempenho do TUG, que diminuiu de 19,15 s para 13,38 s, indicando um melhor desempenho funcional, embora os participantes tenham permanecido na categoria de risco moderado de quedas. Em relação ao equilíbrio, houve redução da velocidade média anteroposterior na postura tandem direita, enquanto as análises da força muscular e da ativação do tibial anterior não se mantiveram estatisticamente significativas após a correção. A intervenção produziu uma redução clínica no TUG; no entanto, essa melhora não foi suficiente para reclassificar os participantes em uma categoria de menor risco de quedas. Diante da ausência de mudanças significativas na força máxima e no controle postural, os ganhos observados são provavelmente atribuíveis a adaptações neuromotoras. Do ponto de vista prático, protocolos focados em mobilidade parecem promissores; contudo, estudos

futuros devem investigar intervenções de maior intensidade e incorporar análises cinemáticas para elucidar melhor os mecanismos subjacentes.

Keywords: eletromiografia, reabilitação, fisioterapia, envelhecimento, função neuromuscular, teste TUG, risco de quedas.

¿Importa el orden de los intervalos de descanso durante el entrenamiento interválico de alta intensidad en jugadores masculinos de fútbol?

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Resumo

Introduction

Antecedentes: El fútbol es un deporte intermitente exigente que requiere sprints repetidos, aceleraciones, cambios de dirección y acciones explosivas con una recuperación limitada. El HIIT de intervalos cortos se utiliza con frecuencia para mejorar el rendimiento específico del fútbol, pero el efecto de diferentes estructuras de tiempo de descanso, especialmente los modelos de descanso variable, aún no se comprende bien en jugadores masculinos de fútbol. Objetivo: Este estudio tuvo como objetivo comparar los efectos de estrategias de tiempo de descanso ascendente, descendente y constante durante el HIIT corto sobre el rendimiento físico en jugadores masculinos de fútbol.

Methods

Veinticuatro jugadores masculinos de fútbol semiprofesionales fueron asignados aleatoriamente a HIIT con tiempo de descanso ascendente (A-HIIT; $n = 8$), HIIT con tiempo de descanso descendente (D-HIIT; $n = 8$) o HIIT con tiempo de descanso constante (C-HIIT; $n = 8$). La intervención incluyó ocho sesiones de HIIT de pretemporada, realizadas dos veces por semana. Cada sesión consistió en dos series de siete repeticiones de carrera de ida y vuelta de 30 s al 95 % de la VIFT. Los intervalos de descanso fueron de 15–90 s en A-HIIT, 90–15 s en D-HIIT y 52,5 s en C-HIIT, con el descanso total igualado entre los grupos. El rendimiento físico se evaluó antes y después mediante pruebas de CMJ, sprint de 30 m, cambio de dirección 5-0-5 y Wingate.

Results and Conclusions

Resultados Las tres estrategias de tiempo de descanso en HIIT produjeron cambios pequeños e inconsistentes en el rendimiento físico. El CMJ mejoró únicamente en el grupo D-HIIT ($p = 0,042$), mientras que los resultados de sprint, cambio de dirección y Wingate no mostraron una mejora clara. Tampoco hubo diferencias significativas entre los grupos para ningún resultado ($p > 0,05$). Conclusión: En general, las diferentes estrategias de tiempo de descanso solo produjeron pequeños cambios en los resultados de rendimiento seleccionados. El modelo de descanso descendente mostró un apoyo ligeramente mayor para el rendimiento en salto, pero ninguna estrategia mostró una ventaja general clara.

Keywords: HIIT; soccer; rest intervals; physical performance; countermovement jump

Diferencias relacionadas con la edad en las asimetrías del CMJ y del salto horizontal en jugadoras de fútbol

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Resumo

Introduction

La asimetría de miembros inferiores es un factor relevante en el rendimiento físico y el riesgo de lesión en futbolistas (1). A pesar del crecimiento del fútbol femenino, existe escasa evidencia sobre cómo varían las asimetrías entre diferentes categorías de edad (2-4). El objetivo de este estudio fue analizar la asimetría en el salto con contramovimiento (CMJ) y el salto horizontal (HJ) en futbolistas femeninas.

Methods

Participaron 76 jugadoras de fútbol femenino distribuidas en cuatro categorías de edad (U14, U16, U18 y +18). Se evaluó la asimetría bilateral mediante pruebas de CMJ y HJ, registrando el rendimiento de cada extremidad. Se analizaron las diferencias entre categorías y la relación entre las asimetrías y el rendimiento físico.

Results and Conclusions

Resultados= Los resultados mostraron que la asimetría en el CMJ varió significativamente entre los diferentes grupos de edad ($p < 0,001$), registrándose los valores más elevados en la categoría U14 y los más bajos en el grupo +18. Por el contrario, la asimetría en el HJ se mantuvo baja y estable en todas las categorías de edad ($p = 0,113$). No se encontró una correlación significativa entre la asimetría del CMJ y la del HJ. Además, los niveles de asimetría en el CMJ se asociaron significativamente con la edad ($p = 0,003$), mientras que en el HJ no se observaron asociaciones relevantes. Conclusiones= Estos hallazgos sugieren que la maduración y el entrenamiento pueden contribuir a reducir las asimetrías entre extremidades inferiores en futbolistas femeninas. Los entrenadores y preparadores físicos deberían incluir programas específicos de fuerza y control neuromuscular para minimizar las asimetrías y optimizar el rendimiento deportivo.

Keywords: fútbol femenino, asimetría, salto con contramovimiento, prueba de salto horizontal, rendimiento neuromuscular.

Análisis de las barreras percibidas en la práctica del remo de banco fijo

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Resumo

Introduction

El remo de traineras es una disciplina de alta exigencia técnica y colectiva profundamente arraigada en la costa cantábrica. No obstante, y a pesar de su relevancia cultural, son todavía limitadas las investigaciones centradas en los factores que dificultan la continuidad de su práctica. La Escala de Barreras Percibidas en el Remo de Banco Fijo (EBPR-BF-16), recientemente validada, contempla cinco dimensiones: Contexto Social, Clima Técnico, Psicológicas, Recursos y Motivación. Sin embargo, todavía se desconoce de qué manera estas barreras difieren en función del género y la edad, así como su relación con los recursos psicológicos de los y las deportistas. Este estudio tiene como objetivo analizar las diferencias en función del género y la edad respecto a las barreras percibidas para la práctica del remo de banco fijo, así como explorar su relación con el Capital Psicológico y la Cohesión de Equipo.

Methods

El estudio cuenta con la participación de un total de 423 remeros y remeras pertenecientes a las federaciones del País Vasco, Cantabria, Asturias y Galicia de los cuales 258 eran hombres (61,0%); y 165 mujeres (39,0%); ($M = 25,06$ años, $DT = 8,89$). Para la recogida de datos se emplearon la EBPR-BF-16, el Sport Psychological Capital Questionnaire y la subescala de Cohesión de Equipo del CPRD. Los análisis estadísticos incluyeron pruebas t de Student, ANOVA de un factor, correlaciones de Pearson, análisis factoriales confirmatorios diferenciados por género y regresiones jerárquicas, con el fin último de examinar la capacidad predictiva incremental del Capital Psicológico sobre las barreras percibidas, controlando los efectos del género y la edad.

Results and Conclusions

Las remeras presentaron niveles significativamente más elevados de Barreras Psicológicas que los remeros, con un tamaño del efecto moderado. El análisis por grupos por edad reveló diferencias significativas en Barreras Psicológicas, Clima Técnico y Recursos, observándose una disminución de las barreras psicológicas a medida que aumentan la edad y la experiencia acumulada. El Capital Psicológico mostró asociaciones negativas con cuatro de los cinco factores evaluados y predijo de forma incremental las barreras percibidas tras controlar género y edad. La Cohesión de Equipo se relacionó negativamente con todas las dimensiones, aunque la fiabilidad insuficiente mostrada por el instrumento empleado limita estos hallazgos a un carácter exploratorio. El Capital

Psicológico emerge como factor protector frente a las barreras percibidas en remeros y remeras de banco fijo, con un efecto independiente del género y la edad. Los datos relativos a la Cohesión de Equipo apuntan en una dirección teóricamente coherente, aunque con carácter exploratorio. Estos hallazgos tienen implicaciones prácticas para el diseño de programas de retención deportiva orientados a fortalecer los recursos psicológicos individuales y colectivos en esta modalidad.

Keywords: remo de traineras, barreras percibidas, capital psicológico, diferencias individuales, adherencia deportiva

Ocio, valores y barreras en la práctica deportiva del alumnado universitario: una aproximación exploratoria en el contexto de instituciones jesuitas

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Resumo

Introduction

El deporte universitario constituye un espacio de ocio con alto potencial para el bienestar y el desarrollo de valores en el alumnado. Las instituciones jesuitas de educación superior articulan esta práctica en torno a torneos interinstitucionales enmarcados en un modelo educativo basado en la consciencia, la competencia y la compasión. Sin embargo, la etapa universitaria conlleva condicionantes específicos; en particular, la dificultad para compatibilizar la práctica físico-deportiva con las exigencias académicas, que actúan como barrera para la continuidad deportiva. Este estudio pretende analizar los valores percibidos por el alumnado universitario participante en los torneos interinstitucionales para así, identificar las principales barreras que condicionan su práctica físico-deportiva cotidiana.

Methods

Se plantea un estudio cuantitativo, exploratorio y de corte transversal cuya muestra se compone de 133 estudiantes (63 mujeres y 70 hombres, $M = 20,36$ años, $DT = 3,10$) de instituciones jesuitas, principalmente de la Universidad de Deusto, aunque también se contó con la representación de otras universidades y colegios mayores pertenecientes a la red UNIJES. Así, la muestra, fue reclutada en el marco de tres torneos celebrados en el periodo lectivo 2025-2026: el XXVI Torneo Deportivo UNIJES, el Campeonato de Euskadi de Deporte Universitario, y el III Torneo UNIJES Colegios Mayores. Se administró un cuestionario autoadministrado en Google Forms que integró variables sociodemográficas y dos escalas Likert de 1 a 5: escala de valores de elaboración propia compuesta por un total de 10 ítems para evaluar la percepción de valores e identidad ignaciana, y una adaptación de la EBPR-BF-16 (16 ítems) al contexto universitario. Se calcularon estadísticos descriptivos para todas las variables.

Results and Conclusions

Los resultados preliminares indican que el alumnado percibe los torneos interinstitucionales como espacios que promueven la comunidad y los valores, con puntuaciones elevadas en las dimensiones de cuidado mutuo y sentido de pertenencia. Respecto a las barreras cotidianas, las dimensiones relacionadas con la temporalidad y lo motivacional emergen como las más relevantes, siendo la conciliación entre práctica deportiva y exigencias académicas el principal obstáculo identificado. Los torneos

interinstitucionales en contextos jesuitas emergen como espacios de ocio con valor formativo, percibidos por el alumnado universitario como promotores de comunidad y valores. Las barreras temporales y motivacionales condicionan de forma específica la práctica cotidiana, lo que apunta a la necesidad de desarrollar estrategias institucionales que faciliten la compatibilización entre actividad física y vida académica. Estos resultados ofrecen una base exploratoria para el diseño de intervenciones orientadas a la promoción de la actividad físico-deportiva en instituciones de educación superior.

Keywords: deporte universitario, valores, barreras percibidas, instituciones jesuitas, ocio

Optimización nutricional en la rehabilitación de lesiones musculoesqueléticas en mujeres deportistas

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Resumo

Introduction

Las lesiones musculoesqueléticas presentan una alta prevalencia en mujeres deportistas debido a factores anatómicos, hormonales, genéticos, biomecánicos y ambientales. Las estrategias nutricionales han surgido como una herramienta importante en los procesos de prevención y rehabilitación de lesiones. Este estudio tuvo como objetivo analizar la relación entre las lesiones musculoesqueléticas más frecuentes en mujeres deportistas y la rehabilitación nutricional en la prevención y recuperación, mediante un enfoque multidisciplinar basado en fisioterapia, readaptación física y nutrición deportiva.

Methods

Se realizó una revisión bibliográfica utilizando las bases de datos Web of Science, Scopus y PubMed. Los términos de búsqueda incluyeron lesiones deportivas, rehabilitación, nutrición y mujeres deportistas. Se incluyeron estudios centrados en atletas femeninas, intervenciones nutricionales y estrategias de rehabilitación.

Results and Conclusions

La adecuada disponibilidad energética, la ingesta de proteínas, carbohidratos complejos, grasas saludables y micronutrientes como calcio, hierro, magnesio y vitamina D fueron identificados como factores clave en la recuperación y prevención de lesiones. El timing nutricional y las estrategias dietéticas individualizadas pueden mejorar la reparación tisular, el mantenimiento muscular y la recuperación funcional. La integración de la rehabilitación nutricional con la fisioterapia y la readaptación física optimiza la recuperación y ayuda a prevenir lesiones musculoesqueléticas en mujeres deportistas, favoreciendo una práctica deportiva más segura y un mejor rendimiento.

Keywords: Mujeres deportistas; Nutrición deportiva; Lesiones musculoesqueléticas; Rehabilitación; Prevención de lesiones

Saúde Mental e Distúrbios Alimentares nos Atletas

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Resumo

Introduction

Saúde Mental e Distúrbios Alimentares nos Atletas

Methods

O presente estudo teve como objetivo analisar, por meio de uma revisão narrativa da literatura, a prevalência de TA em atletas de modalidades sensíveis ao peso e o papel mediador dos processos de regulação emocional neste cenário, além de discutir os potenciais benefícios da atividade física e da nutrição integradas. Para a fundamentação metodológica, realizou-se um levantamento bibliográfico nas bases de dados PubMed/MEDLINE, BMC Nutrition e MDPI (Healthcare), com foco em revisões sistemáticas e meta-análises publicadas entre 2025 e 2026.

Results and Conclusions

Os resultados indicam uma disparidade significativa na vulnerabilidade dos atletas conforme a modalidade praticada: desportos aquáticos enfrentam pressões estéticas severas e exposição corporal (com prevalência estimada de 27,56% para TA), enquanto desportos de combate como o wrestling são marcados por métodos perigosos de Perda de Peso Rápida (PPR) para enquadramento em categorias de peso. Adicionalmente, constatou-se que o impacto destas pressões exógenas é mediado pela regulação emocional do indivíduo, em que estratégias disfuncionais (como a supressão expressiva) atuam como gatilhos para comportamentos patológicos, ao passo que estratégias adaptativas (como a reavaliação cognitiva) oferecem proteção psicológica. Conclui-se que o desporto estruturado e o suporte nutricional de base científica operam como robustos fatores de proteção biológica e mental. Torna-se, portanto, imperativa a implementação de protocolos de triagem padronizados e a atuação de equipas multidisciplinares (treinadores, nutricionistas e psicólogos) para assegurar a saúde sistémica e a sustentabilidade da carreira dos atletas.

Keywords: Palavras-chave: Transtornos Alimentares; Atletas; Regulação Emocional; Composição Corporal; Nutrição Desportiva.

Competência Motora e Aptidão Física em Crianças Portuguesas: o papel do sexo, da idade e do nível socioeconómico numa amostra portuguesa

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Resumo

Introduction

A literacia física emergiu como um constructo central nas ciências contemporâneas do desporto e da saúde, englobando a motivação, a confiança, a competência física e a compreensão necessárias para valorizar e sustentar a atividade física ao longo da vida (Whitehead, 2010). Dois constructos fundamentais e parcialmente sobrepostos subjazem à literacia física: a competência motora (CM), definida como a capacidade de executar uma ampla variedade de habilidades motoras com eficiência e controlo, e a aptidão física (AF), definida como a capacidade de realizar tarefas musculoesqueléticas e cardiorrespiratórias em níveis suficientes para sustentar o funcionamento quotidiano e uma vida ativa. Os anos do 1.º ciclo do ensino básico (6–10 anos de idade) representam um período desenvolvimentalmente sensível, durante o qual as habilidades motoras fundamentais se consolidam e se estabelecem padrões habituais de atividade física, tornando a monitorização simultânea da CM e da AF uma prioridade de saúde pública. A relação teórica entre CM e AF é mais influentemente enquadrada pelo modelo desenvolvimental de Stodden et al. (2008), que postula que a CM é um facilitador proximal da atividade física e, por essa via, promove a AF. O modelo prevê ainda que as associações entre CM e AF se fortalecem ao longo da infância, uma trajetória empiricamente sustentada por Barnett, Morgan, et al. (2008a), Barnett, Van Beurden, et al. (2008b, 2009) e confirmada meta-analiticamente por Utesch et al. (2019; $r \approx 0,45$ ao longo do ciclo vital). Robinson et al. (2015) ampliaram este modelo ao demonstrar que a CM também segue trajetórias desenvolvimentais positivas próprias, independentemente da participação em atividade. Mais recentemente, Barnett et al. (2022) reviram sistematicamente a evidência longitudinal, confirmando que a relação CM–AF é bidirecional e se fortalece ao longo do desenvolvimento. Para além da associação central entre CM e AF, três variáveis demográficas merecem atenção específica. Em primeiro lugar, as diferenças entre sexos na CM estão bem documentadas: os rapazes apresentam tipicamente um melhor desempenho em habilidades de controlo de objetos (lançamento, pontapé), enquanto as raparigas revelam vantagens em tarefas de estabilidade e equilíbrio (Barnett et al., 2016; Lubans et al., 2010). As diferenças entre sexos na AF são geralmente menores durante os anos do 1.º ciclo, tornando-se mais pronunciadas após a puberdade. Em segundo lugar, a idade constitui um determinante primário tanto da CM como da AF

na infância, refletindo a maturação neuromotora e a prática acumulada; contudo, dado que as pontuações percentílicas referenciadas a normas controlam o efeito da idade, os efeitos residuais da idade em dados baseados em percentis são teoricamente significativos e potencialmente pouco explorados. Em terceiro lugar, o NSE está associado a um acesso diferenciado a oportunidades de atividade física, à qualidade do ensino da educação física (EF) e às affordances ambientais, podendo amplificar ou atenuar o desenvolvimento da CM e da AF (Goodway et al., 2019; Rodrigues et al., 2016). A bateria MCA (Luz et al., 2016; Rodrigues et al., 2019, 2022) é um instrumento português orientado para o produto, composto por três subdomínios — Estabilidade, Locomoção e Manipulação —, com dados normativos dos 3 aos 23 anos de idade e excelente fiabilidade teste-reteste ($ICC \geq 0,95$). O programa PréFitescola (DGE, 2023), desenvolvido pela Faculdade de Motricidade Humana em parceria com a Direção-Geral da Educação, avalia quatro componentes da AF em crianças do 1.º ciclo: resistência cardiorrespiratória (Shuttle run 4×10), velocidade/agilidade (Agilidade 4×10 m), potência dos membros inferiores (Salto em Comprimento sem Corrida, SLJ) e equilíbrio dinâmico (Transferências Laterais), padronizados em percentis nacionais referenciados à idade e ao sexo. Apesar da disponibilidade de ambas as baterias nas escolas portuguesas, nenhum estudo aplicou simultaneamente o MCA e o PréFi

Methods

Desenho do Estudo e Contexto Foi conduzido um estudo observacional transversal durante o ano letivo de 2024–2025, em escolas básicas parceiras do distrito de Leiria, no centro de Portugal, no âmbito de um programa regional de monitorização da competência motora. O presente estudo foi desenhado, conduzido e reportado em conformidade com a declaração Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) para estudos transversais (von Elm et al., 2007); a respetiva checklist é fornecida como Material Suplementar. Todas as avaliações decorreram durante as aulas regulares de educação física, em condições padronizadas, sendo aplicados protocolos idênticos pela mesma equipa de investigação em todas as escolas. Participantes A amostra inicial foi constituída por 164 crianças do 1.º ao 4.º ano de escolaridade. Foram excluídos 12 casos por dados em falta ($n = 8$ com valores em falta no Shuttle run 4×10; $n = 2$ sem dados de NSE; $n = 2$ com administração incompleta da MCA), resultando numa amostra analítica de 152 crianças (84 rapazes, 68 raparigas; idade média = $8,62 \pm 1,03$ anos; intervalo: 6,7–10,4). As crianças foram distribuídas por três grupos etários: 6–7 anos ($n = 36$; 23,7%), 8–9 anos ($n = 93$; 61,2%) e ≥ 10 anos ($n = 23$; 15,1%). O NSE foi classificado em três níveis: Baixo ($n = 47$; 30,9%), Médio ($n = 73$; 48,0%) e Elevado ($n = 32$; 21,1%), com base nos registos administrativos de três níveis da Direção-Geral da Educação (DGE, 2023). **Procedimentos Éticos** O estudo foi conduzido em conformidade com os princípios éticos para a investigação com seres humanos estabelecidos na Declaração de Helsínquia (World Medical Association, 2013) e foi aprovado pela Comissão de Ética da Universidade da Extremadura. Foi adicionalmente obtida autorização institucional dos órgãos diretivos das escolas participantes e da DGE, no enquadramento do programa regional de monitorização da competência motora. Foi obtido consentimento informado escrito de todos os pais ou encarregados de educação antes da recolha de dados; foi ainda obtido assentimento verbal de cada criança imediatamente antes dos testes. Todos os dados foram anonimizados no momento da recolha e tratados como estritamente confidenciais, em conformidade com o Regulamento Geral sobre a Proteção de Dados (Regulamento [UE] 2016/679). Não foram oferecidos incentivos financeiros ou materiais. Variáveis Sociodemográficas e

Antropométricas O sexo foi registado conforme inscrito no sistema de matrícula escolar (rapazes = 84; raparigas = 68). A idade cronológica (em anos, com uma casa decimal) foi calculada a partir da diferença entre a data de avaliação e a data de nascimento do participante, sendo utilizada tanto como variável contínua como categorizada em três grupos etários (6–7 anos, 8–9 anos e ≥ 10 anos). O índice de massa corporal (IMC; $\text{kg}\cdot\text{m}^{-2}$) foi classificado de acordo com os pontos de corte específicos por idade e sexo da International Obesity Task Force para crianças (Cole & Lobstein, 2012). O NSE foi classificado em três níveis (Baixo, Médio, Elevado), utilizando os registos administrativos escolares da DGE (2023), com base no escalão de ação social escolar atribuído a cada família. Instrumentos Motor Competence Assessment (MCA). A CM foi avaliada através de seis testes orientados para o produto: Shifting Platforms e Saltos Laterais (subdomínio Estabilidade); Shuttle Run 4×10 m e Salto em Comprimento sem Corrida (subdomínio Locomoção); Velocidade de Pontapé na Bola e Velocidade de Lançamento da Bola (subdomínio Manipulação). As tabelas de conversão em percentis referenciados à idade e ao sexo (Rodrigues et al., 2019) produziram os valores de Estabilidade%, Locomoção%, Manipulação% e uma pontuação compósita Total MCA% (escala 0–100). A MCA apresenta excelente fiabilidade teste–reteste (ICC entre 0,95 e 0,99; Rodrigues et al., 2022) e uma estrutura tri-fatorial confirmada nos vários grupos etários e em ambos os sexos. Bateria PréFitescola. A AF foi avaliada através de quatro te

Results and Conclusions

Estatísticas Descritivas Globais A Tabela 1 apresenta as estatísticas descritivas globais. As crianças obtiveram uma média de Total MCA% de 62,53 (DP = 17,11), sendo a Locomoção o subdomínio mais forte (M = 73,17; DP = 21,00) e a Estabilidade o mais fraco (M = 54,98; DP = 18,76). Entre as componentes da AF, a resistência cardiorrespiratória (percentil do Shuttle run 4×10: M = 46,22; DP = 28,59) foi a dimensão mais fraca relativamente às normas nacionais, enquanto a agilidade (M = 72,77) e a potência dos membros inferiores (M = 67,84) foram comparativamente mais elevadas.

Tabela 1 Estatísticas Descritivas para as Variáveis de Competência Motora e Aptidão Física, Globalmente e por Sexo (N = 152)

Variável	Total M (DP)	Rapazes M (DP)	Raparigas M (DP)
UpCompetência Motora (Bateria MCA)	Total MCA %62,53 (17,11)	64,18 (15,59)	60,50 (18,75)
Estabilidade %	54,98 (18,76)	53,82 (19,30)	56,42 (18,10)
Locomoção %	73,17 (21,00)	76,30 (16,97)	69,31 (24,68)
Manipulação %	59,48 (25,63)	62,45 (25,52)	55,82 (25,47)
Aptidão Física — Percentis (PréFitescola)	Percentil Shuttle run 4×1046,22 (28,59)	45,18 (29,98)	47,51 (26,95)
Percentil Agilidade 4×10 m	72,77 (18,29)	73,78 (17,76)	71,52 (18,98)
Percentil SLJ	67,84 (23,42)	71,51 (19,99)	63,31 (26,52)
Percentil Transferências Laterais	62,91 (20,56)	59,58 (21,19)	67,02 (19,10)

* Nota. U = estatística U de Mann–Whitney; SLJ = Standing Long Jump (Salto em Comprimento sem Corrida). Rapazes n = 84; raparigas n = 68. * p < 0,05. Diferenças por Sexo Os rapazes obtiveram pontuações numericamente superiores às das raparigas em Total MCA% (64,18 vs. 60,50), Locomoção% (76,30 vs. 69,31) e Manipulação% (62,45 vs. 55,82), embora nenhuma destas diferenças tenha alcançado significância estatística (todos p > 0,05), contradizendo parcialmente a H1. A única diferença significativa entre sexos foi encontrada no Percentil das Transferências Laterais, no qual as raparigas superaram os rapazes (67,02 vs. 59,58; U = 2254; p = 0,026; r = 0,211), consistente com a vantagem feminina prevista em tarefas de estabilidade. Diferenças por Grupo Etário A Tabela 2 apresenta as estatísticas descritivas e os testes de Kruskal–Wallis por grupo etário. Não

se verificaram diferenças significativas entre grupos etários em qualquer variável de CM (todos $p > 0,06$). A exceção foi o percentil do Shuttle run 4×10 ($H = 12,44$; $p = 0,002$). Os testes post-hoc de Mann–Whitney com correção de Bonferroni revelaram que as crianças com 6–7 anos obtiveram pontuações significativamente inferiores às do grupo dos 8–9 anos ($p = 0,001$; $r = 0,372$) e às do grupo com ≥ 10 anos ($p = 0,005$; $r = 0,437$). Embora os testes de Kruskal–Wallis por grupo etário não tenham atingido significância para a Locomoção% ($H = 5,59$; $p = 0,061$), as correlações de Spearman revelaram uma relação negativa significativa entre a idade contínua e a Locomoção% ($\rho = -0,260$; $p = 0,001$). A idade correlacionou-se ainda negativamente com o percentil SLJ ($\rho = -0,235$; $p = 0,004$) e positivamente com o percentil do Shuttle run 4×10 ($\rho = 0,211$; $p = 0,009$).

Tabela 2 Estatísticas Descritivas e Diferenças por Grupo Etário na Competência Motora e na Aptidão Física

Variável	6–7 anos (n = 36)	8–9 anos (n = 93)	≥ 10 anos (n = 23)
HpCompetência Motora (Bateria MCA)	Total MCA %63,73 (14,25)62,10 (18,49)62,42	(15,94)0,010,994	Estabilidade %56,39 (18,94)53,19 (18,58)60,00 (18,92)2,200,332
Locomoção	%80,23 (11,04)71,96 (23,62)67,05 (19,28)5,590,061	Manipulação %54,93 (24,36)61,02 (27,06)60,40 (21,35)2,430,296	Aptidão Física — Percentis (PréFitescola)
Percentil Shuttle run 4×10	33,47 (24,20)49,30 (29,06)53,76 (27,99)12,440,002**	Percentil Agilidade 4×10 m73,46 (16,74)71,84 (19,93)75,45 (13,33)0,060,972	Percentil SLJ75,70 (9,55)67,23 (25,52)58,00 (26,28)4,880,087
Percentil Transferências Laterais	58,92 (20,26)63,32 (20,96)67,47 (19,00)2,900,234		

Nota. Valores apresentados como M (DP). H = estatística de Kruskal–Wallis (gl = 2). Testes post-hoc de Mann–Whitney com correção de Bonferroni signifi

Keywords: competência motora; aptidão física; diferenças entre sexos; efeitos da idade; nível socioeconômico; bateria MCA; PréFitescola; ensino básico

Ingesta Nutricional en Duatlón de Media Distancia

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Resumo

Introduction

La ingesta nutricional durante pruebas de resistencia prolongadas es un factor determinante del rendimiento en duatlón de media distancia. Las recomendaciones actuales sugieren un consumo de 90 g/h de carbohidratos (CHO), 400–800 mL/h de fluidos y 300–600 mg/h de sodio para mantener la disponibilidad energética, retrasar la fatiga y prevenir la deshidratación. Sin embargo, existe escasa evidencia sobre las estrategias nutricionales empleadas específicamente por duatletas durante la competición.

Methods

Se realizó un estudio descriptivo y transversal en 88 duatletas participantes del ZuiaDu 2024 (España), una prueba de media distancia compuesta por 15 km de carrera, 70 km de ciclismo y 7 km finales de carrera. La ingesta nutricional durante la competición fue evaluada mediante el cuestionario validado Nutritional Intake Questionnaire for Endurance Competitions (NIQEC), que registró el consumo de alimentos, bebidas y suplementos durante la prueba. Se analizaron variables como ingesta de fluidos, energía, CHO, sodio, proteínas, grasas y cafeína.

Results and Conclusions

Los duatletas consumieron una media de 578.6 ± 271.26 mL/h de fluidos, situándose dentro de las recomendaciones establecidas, con un 54.5% ingiriendo entre 400–800 mL/h. La ingesta de CHO fue de 48.26 ± 20.54 g/h, inferior a las recomendaciones, siendo el rango más frecuente 30–60 g/h (53.4%). Los alimentos sólidos representaron la principal fuente de CHO. La ingesta de sodio fue insuficiente (191.85 ± 135.20 mg/h), con un 81.8% de participantes por debajo de 300 mg/h. Además, una mayor ingesta energética intra-competición se asoció significativamente con menores tiempos de finalización. En conclusión, los duatletas presentaron una adecuada reposición hídrica, pero una ingesta insuficiente de CHO y sodio durante la competición. Estos hallazgos resaltan la necesidad de estrategias nutricionales individualizadas para optimizar el rendimiento en duatlón de media distancia.

Keywords: Duatlón; hidratación; carbohidratos; sodio; nutrición deportiva

Prácticas de nutrición, hidratación y suplementación en nadadores de aguas abiertas: análisis transversal.

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Resumo

Introduction

La natación en aguas abiertas es una disciplina de resistencia con elevadas demandas energéticas y condicionantes logísticos que pueden dificultar la aplicación práctica de las recomendaciones de nutrición deportiva. Sin embargo, la evidencia específica sobre las estrategias reales de ingesta en este contexto sigue siendo limitada.

Methods

Se realizó un estudio transversal en 73 nadadores (69,9% hombres; edad $46,8 \pm 12,5$ años) que participaron en tres travesías de aguas abiertas en España (distancias de 1.000 a 10.000 m). La información sobre ingesta nutricional y síntomas gastrointestinales se recogió mediante el cuestionario NIQEC, diferenciando las fases precompetitivas, intracompetitiva y postcompetitiva inmediata. Se estimaron las ingestas de líquidos, energía, macronutrientes, sodio y cafeína, y se clasificó a los participantes según su cumplimiento de las recomendaciones internacionales para deportes de resistencia. Se emplearon análisis descriptivos, comparaciones por sexo y distancia, y modelos de regresión para identificar predictores del tiempo de finalización.

Results and Conclusions

La mayoría de los nadadores realizó alguna ingesta en la hora previa (95,9%) y posterior (90,4%) a la competición, pero la ingesta de carbohidratos fue frecuentemente inferior a las recomendaciones (73,9% consumió menos de 1 g/kg antes de la prueba y 80,8% menos de 0,8 g/kg en la primera hora de recuperación). Durante la competición, más de la mitad de la muestra no ingirió líquidos ni carbohidratos; el 94,5% consumió menos de 30 g/h de carbohidratos y el 98,7% menos de 300 mg/h de sodio, con patrones más activos únicamente en las distancias de 9–10 km. La prevalencia de síntomas gastrointestinales fue relativamente baja (26,0% cualquier síntoma; 5,5% moderados o intensos). En los modelos multivariantes, el tiempo de finalización se explicó principalmente por la distancia, la edad, la condición de federado y la ingesta de carbohidratos durante la prueba; cada g/h adicional de carbohidratos se asoció con una reducción aproximada de 0,3–0,4 minutos en el tiempo total.

Keywords: Natación en aguas abiertas; deportes de resistencia; nutrición deportiva; hidratación; suplementos deportivos; síntomas gastrointestinales.

Prácticas de nutrición, hidratación y suplementación en nadadores de aguas abiertas: análisis transversal.

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Resumo

Introduction

La natación en aguas abiertas es una disciplina de resistencia con elevadas demandas energéticas y condicionantes logísticos que pueden dificultar la aplicación práctica de las recomendaciones de nutrición deportiva. Sin embargo, la evidencia específica sobre las estrategias reales de ingesta en este contexto sigue siendo limitada.

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Keywords: Natación en aguas abiertas; deportes de resistencia; nutrición deportiva; hidratación; suplementos deportivos; síntomas gastrointestinales

Como a nutrição pode contribuir para a performance desportiva em atletas pubertários

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Resumo

Introduction

A nutrição desempenha um papel determinante na performance desportiva de atletas pubertários, influenciando diretamente os processos fisiológicos, metabólicos e hormonais associados ao crescimento, maturação e adaptação ao exercício físico. Durante a puberdade, o organismo encontra-se numa fase de desenvolvimento acelerado, caracterizada por alterações significativas na composição corporal, aumento das necessidades energéticas e elevada exigência funcional. Neste contexto, uma alimentação adequada assume importância fundamental não apenas na otimização do rendimento desportivo, mas também na promoção da saúde, crescimento e desenvolvimento saudável dos jovens atletas.

Methods

O presente trabalho teve como principal objetivo analisar a influência da nutrição na performance desportiva de atletas pubertários, identificando os principais fatores nutricionais envolvidos no desempenho físico, recuperação muscular e adaptação ao treino. Para tal, foi realizada uma revisão narrativa da literatura científica através das bases de dados PubMed, Google Scholar, ScienceDirect, Web of Science e SciELO, incluindo artigos científicos, revisões sistemáticas e documentos de consenso relacionados com nutrição desportiva e atletas adolescentes.

Results and Conclusions

Os resultados evidenciam que a adequada disponibilidade energética constitui um fator essencial para a manutenção do equilíbrio fisiológico, crescimento saudável e prevenção do défice energético relativo no desporto (RED-S). Verificou-se igualmente que os hidratos de carbono desempenham um papel central na produção de energia e reposição das reservas de glicogénio, enquanto as proteínas são fundamentais para a síntese proteica muscular, recuperação e desenvolvimento da massa magra. Paralelamente, as gorduras contribuem para importantes funções hormonais e metabólicas associadas ao desenvolvimento pubertário. Os resultados demonstraram ainda que micronutrientes como ferro, cálcio e vitamina D são indispensáveis para a saúde óssea, função muscular, transporte de oxigénio e capacidade aeróbia. A hidratação adequada revelou igualmente impacto significativo na termorregulação, função cognitiva e desempenho físico. Conclui-se que a nutrição deve ser entendida como um componente estruturante da performance desportiva em atletas pubertários, sendo fundamental a implementação de

estratégias nutricionais individualizadas, ajustadas às exigências do treino, crescimento e maturação biológica, e sustentadas pela evidência científica.

Keywords: nutrição desportiva; atletas pubertários; performance desportiva; disponibilidade energética; hidratação

Efeito da suplementação de cafeína no desempenho físico e na fadiga

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Resumo

Introduction

A cafeína é uma das substâncias psicoativas mais consumidas mundialmente, estando presente em produtos como café, chá, bebidas energéticas e suplementos nutricionais. No contexto desportivo, a cafeína é amplamente utilizada como auxiliar ergogénico devido ao seu potencial para melhorar o desempenho físico, reduzir a fadiga e otimizar a capacidade de esforço. O presente estudo teve como principal objetivo reunir e analisar criticamente a evidência científica disponível sobre os efeitos da suplementação aguda de cafeína no desempenho físico e na fadiga em atletas e adultos fisicamente ativos.

Methods

Foi realizada uma revisão sistemática da literatura de acordo com as diretrizes PRISMA 2020, recorrendo às bases de dados PubMed, Web of Science, B-on, Google Scholar, SciELO, ResearchGate e ScienceDirect. Foram incluídos 14 estudos científicos publicados entre 2016 e 2026 que investigaram os efeitos da suplementação aguda de cafeína em diferentes modalidades e contextos de exercício físico.

Results and Conclusions

Os resultados demonstraram efeitos ergogénicos positivos e consistentes da cafeína tanto no desempenho aeróbio como anaeróbio. No desempenho anaeróbio, observaram-se melhorias significativas na potência pico, potência média, força máxima e capacidade de produção de força explosiva. Relativamente ao desempenho aeróbio, verificaram-se aumentos no tempo até à exaustão, melhoria da tolerância ao esforço prolongado e maior capacidade de manutenção da intensidade do exercício. Paralelamente, a suplementação de cafeína demonstrou reduzir a perceção subjetiva de esforço e favorecer a recuperação neuromuscular após exercícios de elevada intensidade. Contudo, os estudos analisados evidenciaram elevada variabilidade interindividual na resposta à cafeína, influenciada por fatores como nível de treino, hábitos habituais de consumo, tolerância individual e características genéticas relacionadas com o metabolismo da cafeína. Conclui-se que a suplementação aguda de cafeína, em doses entre 3 e 6 mg·kg⁻¹ ingeridas aproximadamente 60 minutos antes do exercício, representa uma estratégia nutricional eficaz para otimizar o desempenho desportivo, devendo a sua aplicação ser individualizada de acordo com as características fisiológicas e contextuais de cada atleta.

Keywords: Cafeína; Desempenho Físico; Fadiga; Ergogénico; Suplementação.

TREINO BASEADO EM VELOCIDADE - VELOCITY BASED TRAINING: Fundamentos, Metodologia e Aplicação no Treino de Força

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Resumo

Introduction

O Treino Baseado em Velocidade (Velocity Based Training – VBT) tem emergido como uma das metodologias mais inovadoras no treino de força, baseando-se na monitorização em tempo real da velocidade de execução do movimento como indicador objetivo da intensidade e da fadiga neuromuscular. O fundamento científico do VBT assenta na relação inversamente proporcional e altamente consistente entre a velocidade média concêntrica e a carga relativa expressa em percentagem de uma repetição máxima (1RM), descrita pioneiramente por González-Badillo e Sánchez-Medina. O presente estudo teve como objetivo sistematizar a evidência científica disponível sobre o VBT, abordando os seus fundamentos teóricos, metodologias de prescrição, tecnologias de monitorização e efeitos nas adaptações neuromusculares e no desempenho físico.

Methods

Para tal, foi realizada uma revisão narrativa da literatura científica baseada em artigos originais, revisões sistemáticas e meta-análises indexadas nas bases de dados PubMed e Scopus. A evidência analisada demonstra que o VBT permite uma prescrição mais individualizada e dinâmica da carga de treino, possibilitando ajustes imediatos em função do estado neuromuscular do praticante. Os resultados das revisões sistemáticas e meta-análises mais recentes indicam que esta metodologia promove melhorias significativas na força máxima, potência muscular, desempenho no salto vertical e velocidade de sprint. Adicionalmente, o VBT apresenta vantagens relevantes relativamente aos modelos tradicionais baseados em percentagens fixas do 1RM, particularmente no controlo da fadiga, na autorregulação do volume de treino e na otimização da relação estímulo-recuperação.

Results and Conclusions

Os resultados também evidenciam que a utilização de limiares de perda de velocidade constitui uma estratégia eficaz para modular o grau de fadiga induzido durante o treino, permitindo direcionar adaptações específicas relacionadas com força, potência ou hipertrofia muscular. Conclui-se que o VBT representa uma metodologia válida, fiável e cientificamente sustentada, com elevado potencial de aplicação prática no contexto do treino desportivo, da preparação física e da monitorização do desempenho neuromuscular.

Keywords: Palavras-chave: Velocity Based Training; treino de força; velocidade de movimento; auto-regulação; perfil carga-velocidade; limiar de perda de velocidade.

Efeitos do treino em jejum vs. alimentado no desempenho físico, percepção de esforço, fadiga e tolerância ao exercício em praticantes de CrossFit

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Resumo

Introduction

Analisar o efeito do estado nutricional pré-exercício (jejum vs. alimentado) no desempenho físico, percepção subjetiva de esforço, fadiga, tolerância ao exercício e sintomas associados em praticantes de CrossFit.

Methods

Onze praticantes recreacionais de CrossFit (6 mulheres e 5 homens; idade: $35,3 \pm 6,7$ anos; IMC: $25,3 \pm 1,8 \text{ kg} \cdot \text{m}^{-2}$; experiência de treino: $6,4 \pm 3,4$ anos) participaram num estudo crossover contrabalançado, realizando duas sessões experimentais: uma em jejum ($\geq 8 \text{ h}$; $11,1 \pm 2,0 \text{ h}$; apenas ingestão de água, sem cafeína) e outra em estado alimentado (refeição padronizada 1–2 h antes do exercício: pão, queijo, ovo e fruta; $1,8 \pm 0,7 \text{ h}$; sem cafeína). O protocolo experimental consistiu num AMRAP (“as many rounds as possible”) de 15 minutos envolvendo 10 Wall Balls, 8 Box Jumps e 6 Burpees, precedido de um aquecimento padronizado de 10 minutos. Foram avaliados o número total de repetições, rondas completas, desempenho por blocos de 5 minutos, pausas não programadas, percepção subjetiva de esforço (RPE), fadiga pós-exercício, sensação de energia e fome pré-treino, bem como sintomas adversos pós-esforço. As comparações entre condições foram realizadas através do teste de Wilcoxon para amostras emparelhadas ($\alpha = 0,05$).

Results and Conclusions

Não foram observadas diferenças estatisticamente significativas entre condições no total de repetições realizadas (Jejum: $229,3 \pm 25,7$ vs. Alimentado: $237,6 \pm 28,5$; $p = 0,232$), número de rondas completas ($9,1 \pm 0,9$ vs. $9,4 \pm 1,1$; $p = 0,375$) ou RPE pós-exercício ($7,5 \pm 1,1$ vs. $7,1 \pm 1,0$; $p = 0,359$). Contudo, a condição de jejum apresentou níveis significativamente superiores de fadiga pós-exercício ($7,2 \pm 1,7$ vs. $6,0 \pm 1,5$; $p = 0,043$), menor sensação de energia pré-treino ($4,9 \pm 2,0$ vs. $7,2 \pm 1,5$; $p = 0,012$) e maior sensação de fome ($5,5 \pm 3,5$ vs. $1,1 \pm 0,3$; $p = 0,002$). Sintomas de quebra de energia e fraqueza foram reportados exclusivamente na condição de jejum. O jejum pré-exercício não comprometeu o desempenho físico objetivo durante um protocolo AMRAP de curta duração em praticantes de CrossFit. No entanto, associou-se a maior fadiga subjetiva, menor sensação de energia e maior prevalência de sintomas adversos, sugerindo impacto negativo no bem-estar percebido e na tolerância ao esforço. Estes resultados reforçam a importância da individualização das estratégias nutricionais no contexto do treino funcional de alta intensidade.

Keywords: Palavras-chave: jejum; CrossFit; desempenho físico; fadiga; RPE; nutrição pré-exercício; AMRAP; exercício de alta intensidade.

Análisis de la fiabilidad de los dispositivos K-AI de K-Sport® en la monitorización de la distancia total recorrida y la velocidad máxima en el entrenamiento y la competición en fútbol

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Resumo

Introduction

La tecnología de monitorización es utilizada ampliamente en el fútbol para analizar la carga externa durante los entrenamientos y la competición. Sin embargo, a pesar del creciente uso de estos sistemas, cada nuevo dispositivo debe demostrar una fiabilidad adecuada antes de su implementación en la práctica aplicada. Actualmente, existe una evidencia científica limitada sobre la fiabilidad de los dispositivos K-AI de K-Sport®. Por ello, el objetivo de este estudio fue analizar la fiabilidad entre dispositivos y entre sesiones de los dispositivos K-AI de K-Sport® durante juegos reducidos en fútbol realizados en diferentes espacios de juego.

Methods

Veinticuatro jugadores de fútbol realizaron de forma repetida juegos en espacios reducidos 3vs3 en campos de 10x10 m, 20x20 m y 30x30 m mientras portaban simultáneamente dos dispositivos K-AI (K-SPORT WORLD S.R.L., Pesaro, Italy) de 50 Hz DGNSS con microsensors. La distancia total recorrida (TD) y la velocidad máxima (SpeedMAX) fueron seleccionadas como variables representativas de distancia y velocidad. La fiabilidad entre dispositivos y entre sesiones se evaluó mediante coeficientes de correlación intraclase (ICC) y coeficientes de variación (CV).

Results and Conclusions

La TD mostró una excelente fiabilidad entre dispositivos y entre sesiones (ICC = 0.99–1.00; CV < 1%) en todos los espacios de juego analizados. La SpeedMAX también presentó una excelente fiabilidad (ICC = 0.97–0.99; CV = 1.4–2.3%). Estos hallazgos indican que los dispositivos K-AI (K-Sport®) muestran una fiabilidad excelente entre dispositivos y entre sesiones para la medición de la distancia total recorrida y la velocidad máxima durante juegos en espacios reducidos en fútbol. Estos hallazgos muestran que los dispositivos K-AI de K-Sport® podrían ser utilizados en entornos de entrenamiento y competición en fútbol.

Keywords: GPS; GNSS; EPTS; fiabilidad; deportes de equipo; juegos en espacios reducidos.

Associações entre angulo de fase, estratégias de controlo postural e desempenho neuromuscular em militares

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Resumo

Introduction

Em contextos de operações militares, a prontidão fisiológica pode ser determinada pela interação entre composição corporal, estado de hidratação, fatores nutricionais e sono. O angulo de fase (PhA) tem sido proposto como um biomarcador integrador da saúde celular, da integridade da membrana e da qualidade muscular, estando estas variáveis associadas com maior estabilidade funcional e desempenho. Na Força Aérea Portuguesa, as equipas de busca e salvamento são constituídas por pilotos, copilotos, recuperadores-salvadores e operadores de sistemas, cujas funções envolvem diferentes exigências a bordo, desde tarefas de controlo motor fino a tarefas fisicamente mais exigentes, condições que podem conduzir a perfis fisiológicos e neuromusculares distintos entre os vários elementos a bordo. Considerando que a relação entre o PhA, o desempenho neuromuscular e o controlo postural permanecem insuficientemente compreendidas, o presente estudo teve como objetivo explorar as associações entre o PhA, o desempenho neuromuscular e indicadores biomecânicos de controlo postural em militares da Força Aérea Portuguesa.

Methods

Foram realizadas avaliações da composição corporal, da água corporal total e dos seus compartimentos (por bioimpedância elétrica), do perfil nutricional (através de registos alimentares) e de padrões de sono (por acelerometria) em 43 militares masculinos integrados em missões de busca e salvamento. O desempenho neuromuscular foi avaliado através da força de prensão manual, isometric mid-thigh pull (IMTP) e contração voluntária máxima (CVM) dos extensores do joelho, enquanto o controlo postural foi avaliado através de métricas derivadas do centro de pressão (CP) em diferentes condições sensoriais (olhos abertos vs. olhos fechados). Foram realizadas análises de correlação para a amostra total e estratificada por função (pilotos vs. não-pilotos).

Results and Conclusions

Na amostra total, o PhA apresentou associações diretas de magnitude baixa a moderada com variáveis neuromusculares e biomecânicas, incluindo a CVM dos extensores do joelho e métricas derivadas do CP, nomeadamente comprimento do trajeto, velocidade, aceleração e área da elipse, particularmente em condições de olhos fechados. Quando estratificados por função, os não-pilotos apresentaram associações mais fortes entre o PhA, o desempenho neuromuscular (diretas) e o controlo postural (inversas). Estas incluíram relações com a CVM dos extensores do joelho e parâmetros derivados do CP, como área e ângulo da elipse, tanto em condições de olhos abertos como de olhos fechados, sem um padrão consistente de dependência visual. Em contraste, os pilotos demonstraram associações moderadas apenas com métricas selecionadas do controlo postural, predominantemente em condições de olhos abertos, incluindo aceleração máxima do CP e ângulo da elipse, sugerindo uma estratégia de controlo postural mais específica da tarefa e potencialmente mais automatizada. Estes resultados sugerem que o PhA está associado ao desempenho neuromuscular e postural. Contudo, a direção das associações indica que valores mais elevados de PhA não refletem necessariamente maior estabilidade postural. Em vez disso, poderão representar estratégias de controlo motor mais dinâmicas e adaptativas, particularmente em condições de maior exigência sensorial. As associações mais fortes observadas nos não-pilotos sugerem ainda que a dependência do estado fisiológico poderá ser modulada pela experiência e pelo treino específico da função desempenhada. O PhA parece constituir um marcador integrador relevante da prontidão fisiológica, associado à função neuromuscular e ao controlo postural adaptativo, sustentando a sua potencial aplicação na monitorização do desempenho militar.

Keywords: ângulo de fase, estratégias de controlo postural, centro de pressão, função neuromuscular, fisiologia militar

Demandas de carga externa durante la competición oficial en jugadores jóvenes de pádel: implicaciones para la prescripción del entrenamiento

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Resumo

Introduction

El creciente auge y profesionalización del pádel ha incrementado la necesidad de comprender mejor las demandas físicas de la competición, especialmente durante las etapas de formación. Aunque diversos estudios han analizado las exigencias competitivas en jugadores adultos, existe escasa información sobre las demandas de competición en deportistas jóvenes. Además, las posibles diferencias entre sexos en estas categorías han sido poco estudiadas. Por ello, el objetivo de este estudio fue describir la carga externa experimentada durante la competición oficial y analizar las diferencias entre sexos en jugadores de pádel U18 de alto nivel.

Methods

Participaron dieciocho jugadores de pádel U18 altamente entrenados (9 hombres y 9 mujeres) que compitieron en el Campeonato de España de Selecciones Autonómicas. Las variables de carga externa fueron monitorizadas durante partidos oficiales mediante dispositivos inerciales portátiles (OLIVER™, Barcelona, España). Se analizaron variables como tiempo de juego, distancia total recorrida, aceleraciones de alta intensidad, desaceleraciones de alta intensidad, cambios de dirección, distancia recorrida a alta potencia metabólica, volumen de sesión, intensidad de sesión y velocidad máxima. Se emplearon modelos lineales mixtos para examinar las diferencias entre sexos, estableciendo la significación estadística en $p < 0.05$.

Results and Conclusions

Los jugadores masculinos presentaron valores significativamente superiores de carga externa en diversas variables relacionadas con el rendimiento. En concreto, mostraron mayores valores de tiempo de juego, distancia total recorrida, aceleraciones de alta intensidad, desaceleraciones de alta intensidad, cambios de dirección, distancia recorrida a alta potencia metabólica, volumen de sesión e intensidad de sesión ($p < 0.05$). No se observaron diferencias significativas entre sexos en la velocidad máxima ($p > 0.05$). Estos resultados indican que los jugadores masculinos U18 están expuestos a mayores demandas externas durante la competición en comparación con las jugadoras de la misma categoría. La competición oficial en pádel de formación impone elevadas demandas de carga externa, observándose diferencias significativas entre sexos. Las mayores

exigencias competitivas identificadas en los jugadores masculinos sugieren que la planificación y el control de las cargas de entrenamiento deberían considerar las demandas específicas de competición según el sexo. Estos hallazgos aportan información de interés para entrenadores y preparadores físicos, facilitando una prescripción más individualizada del entrenamiento y favoreciendo el desarrollo óptimo del rendimiento en jugadores jóvenes de pádel.

Keywords: Pádel, deportistas jóvenes, carga externa, unidades de medición inercial, rendimiento deportivo, diferencias por sexo.

Asimetría entre las extremidades en diferentes posiciones de juego en jugadores de fútbol sala masculinos juveniles de élite.

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Resumo

Introduction

La asimetría interlimbal se ha relacionado con alteraciones del rendimiento físico y un posible incremento del riesgo de lesión en deportistas. En fútbol sala, las demandas específicas de cada posición de juego podrían influir en el rendimiento unilateral y en la presencia de desequilibrios funcionales, especialmente en jugadores jóvenes. Por ello, el objetivo de este estudio fue analizar las diferencias posicionales en la asimetría interlimbal y el rendimiento funcional unilateral en jugadores juveniles masculinos de élite de fútbol sala.

Methods

Participaron 83 jugadores juveniles masculinos de élite de fútbol sala (edad: $17,2 \pm 0,8$ años), clasificados según su posición de juego: ala derecho, ala izquierdo, pívot y cierre. Los jugadores realizaron pruebas de salto vertical unilateral con contramovimiento (CMJ), salto horizontal unilateral (HJ) y cambio de dirección 505 (COD 505). La asimetría interlimbal se calculó para cada prueba. Se utilizó un análisis de varianza de un factor para comparar los valores de asimetría entre posiciones. Además, se calcularon correlaciones de Pearson para explorar las relaciones entre las asimetrías específicas de cada prueba. Los jugadores también fueron clasificados en grupos de alta asimetría ($\geq 10\%$) o baja asimetría ($< 10\%$), y se utilizaron pruebas de Chi-cuadrado para examinar las asociaciones con la posición de juego.

Results and Conclusions

No se observaron diferencias significativas entre posiciones en la asimetría interlimbal para el CMJ ($p = 0,61$), HJ ($p = 0,13$) ni COD 505 ($p = 0,26$), aunque el HJ mostró una mayor variabilidad entre posiciones ($\eta^2 = 0,07$). Se encontró una correlación significativa entre las asimetrías del CMJ y del HJ ($r = 0,31$; $p < 0,01$), lo que sugiere demandas neuromusculares parcialmente compartidas entre ambas tareas de salto. No se encontró una asociación significativa entre la categoría de asimetría y la posición de juego en ninguna de las pruebas. Sin embargo, el 38,9% de los pívots y el 40,7% de los alas derechos superaron el umbral del 10% de asimetría en el CMJ. Las asimetrías interlimbales no difirieron significativamente entre posiciones en jugadores juveniles masculinos de élite de fútbol sala. No obstante, la presencia de valores de asimetría $\geq 10\%$ en una proporción relevante de jugadores destaca la importancia de realizar un seguimiento individualizado. Estos hallazgos apoyan la inclusión de evaluaciones

funcionales unilaterales dentro de estrategias de prevención de lesiones y control del rendimiento en fútbol sala juvenil.

Keywords: fútbol sala; asimetría interlimbal; prevención de lesiones; rendimiento unilateral; jóvenes deportistas.

Acclerometría wearable para monitorizar la carga de impacto osteogénica en mujeres posmenopáusicas

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Resumo

Introduction

El ejercicio de impacto es una estrategia relevante para la prevención de la osteoporosis, ya que la adaptación ósea requiere que la carga mecánica supere un umbral mínimo de estimulación osteogénica. Sin embargo, la cuantificación de la carga de impacto suele limitarse al entorno de laboratorio, lo que dificulta su aplicación en programas clínicos y comunitarios de ejercicio. Los acelerómetros portátiles podrían representar una alternativa práctica para monitorizar el ejercicio con potencial osteogénico fuera del laboratorio. Por ello, este estudio tuvo como objetivo analizar si un acelerómetro de muñeca puede estimar la carga de impacto basada en fuerzas de reacción del suelo durante saltos con contramovimiento en mujeres posmenopáusicas.

Methods

Treinta y seis mujeres posmenopáusicas realizaron 12 saltos con contramovimiento válidos sobre una plataforma de fuerzas mientras llevaban un acelerómetro en la muñeca. La aceleración vertical máxima derivada de la plataforma se utilizó como medida criterio. La aceleración vectorial máxima registrada en la muñeca y variables antropométricas se emplearon para predecir la aceleración de la plataforma mediante regresión multivariable. La concordancia entre los valores observados y estimados se evaluó mediante comparaciones pareadas y análisis de Bland–Altman. Además, las aceleraciones estimadas se clasificaron en categorías de intensidad osteogénica clínicamente relevantes: <2 g, 2–<3 g, 3–<3,9 g y ≥3,9 g.

Results and Conclusions

La aceleración registrada en la muñeca explicó una proporción relevante de la varianza de la aceleración máxima medida por la plataforma, con un R² ajustado de 0,584 y un sesgo medio prácticamente nulo. La exactitud de clasificación entre categorías de intensidad osteogénica fue de 0,61, con mejor rendimiento en los rangos de intensidad baja y moderada, habitualmente utilizados para iniciar y progresar el ejercicio de impacto. Los errores de clasificación se produjeron principalmente cerca de los umbrales de mayor intensidad. Estos resultados sugieren que la acelerometría de muñeca puede ser una herramienta factible para estimar y categorizar la carga osteogénica durante tareas de alto impacto. Aunque no sustituye a los sistemas de laboratorio, puede ayudar a monitorizar

la adherencia, orientar la progresión segura y trasladar los umbrales de intensidad basados en la evidencia a programas de prevención de osteoporosis en contextos reales.

Keywords: sensores portátiles; carga osteogénica; prevención de la osteoporosis; acelerometría; mujeres posmenopáusicas

Análisis de la estabilidad espacio-temporal basada en la amplitud en fútbol profesional: Un estudio en LaLigaTM EA Sports

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Resumo

Introduction

El fútbol moderno se caracteriza por un ritmo más exigente, una complejidad táctica creciente y una competición cada vez más equilibrada, lo que hace indispensable un análisis más detallado del juego que permita una comprensión avanzada y el uso de esta información por parte de los técnicos. El objetivo de este estudio fue analizar la ocupación espacial basada en la amplitud media de los equipos de LaLigaTM en fase ofensiva y defensiva por partes del partido y clasificación final de la temporada.

Methods

El estudio se llevó a cabo mediante el seguimiento de todos los futbolistas y los 20 equipos en los 760 partidos de fútbol durante la temporada 2024-2025 en primera división masculina española (rango de edad: 17-39 años). Los partidos de fútbol fueron monitorizados a través del sistema oficial de LaLigaTM (Mediacoach®, Madrid, España). En este estudio se registró la amplitud media tanto ofensiva como defensiva en ambas partes de los partidos. Los datos fueron organizados, también, siguiendo la clasificación final de la temporada (equipos clasificados para competiciones europeas, media tabla y descenso). El estudio fue desarrollado de acuerdo con las normas éticas de la Declaración de Helsinki. El análisis de datos fue elaborado con IBM SPSS STATISTICS v.27.

Results and Conclusions

La amplitud media de los equipos de LaLigaTM en fase ofensiva fue de $48,60 \pm 3,82$ m durante la primera parte, reduciéndose hasta $46,68 \pm 4,20$ m en la segunda parte. En fase defensiva, la amplitud media alcanzó $37,13 \pm 1,99$ m en la primera parte y los $36,54 \pm 2,06$ m en la segunda parte. Los resultados indican la existencia de una modificación espacial colectiva basada en la amplitud entre ambas partes, tanto en fase ofensiva como defensiva. En este sentido, se muestra una tendencia hacia el estrechamiento del bloque, tanto en fase ofensiva ($\Delta = -1.92$ m; $p < .001$; $d = 0.537$), como defensiva ($\Delta = -0,59$ m; $p < .001$; $d = 0.331$). En la comparación por niveles competitivos (Europa, Media Tabla y Descenso) se encontraron diferencias significativas en la amplitud ofensiva en la primera parte para equipos clasificados para Europa y media tabla respecto a los equipos del descenso ($p < .001$). En la segunda parte, las diferencias significativas en amplitud ofensiva solo aparecieron entre los equipos clasificados para Europa y los situados en

descenso ($p < .001$). Los equipos mejor clasificados mostraron una amplitud media mayor en fase ofensiva que los peor clasificados. En el caso de la amplitud defensiva no se encontraron diferencias significativas entre ninguno de los grupos de nivel competitivo en primera y segunda parte del partido, lo que podría indicar una mayor estabilidad en fase defensiva, y sugerir la existencia de un “estándar defensivo” en la LaLigaTM. Estos resultados evidencian la necesidad de investigar la estabilidad espacio-temporal en el fútbol profesional, especialmente en relación con las modificaciones colectivas derivadas del contexto competitivo y transcurso temporal del partido.

Keywords: Amplitud; Monitorización; Competición; Partido; LaLigaTM; Mediacoach®.

Relación entre los factores de riesgo conductuales de los trastornos alimentarios y la aparición de síntomas de deficiencia energética relativa en el deporte (REDs) en mujeres deportistas de escalada españolas

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Resumo

Introduction

La presión competitiva de la escalada y los posibles beneficios de un peso corporal bajo pueden llevar a las escaladoras a desarrollar conductas alimentarias que les exponen al riesgo de padecer trastornos alimentarios (ED) y que preceden a distintos efectos adversos sobre la salud y el rendimiento deportivo derivados de la baja disponibilidad energética (LEA) y la deficiencia energética relativa en el deporte (RED). Debido a la falta de investigación sobre las escaladoras, este estudio tuvo como objetivo analizar la relación entre el riesgo de conductas de riesgo hacia ED y el desarrollo de síntomas fisiológicos característicos de la REDs en las escaladoras españolas.

Methods

Se seleccionó a cien escaladoras españolas (de entre 18 y 58 años) para que completaran una encuesta anónima que incluía el Eating Attitudes Test (EAT-26) y el Low Energy Availability in Female Questionnaire (LEAF-Q). Se consideró que las participantes presentaban síntomas de trastorno alimentario y de baja disponibilidad energética si obtenían una puntuación ≥ 1 en el EAT-26 y ≥ 8 en el LEAF-Q, respectivamente.

Results and Conclusions

Entre los deportistas participantes, el 43 % ($n = 43$) se clasificó en el grupo de riesgo de sufrir un trastorno alimentario y el 39 % ($n = 39$) en riesgo de sufrir LEA/REDs. Las escaladoras con riesgo de ED mostraron una probabilidad 3,54 veces mayor de riesgo de REDs en comparación con las escaladoras sin riesgo de ED. De los componentes del LEAF-Q, la función gastrointestinal y la función menstrual mostraron asociaciones positivas estadísticamente significativas con el riesgo de ED. Este estudio demostró que las escaladoras con riesgo de ED tenían una mayor probabilidad de riesgo de REDs/LEA que las escaladoras con menor riesgo de ED. Se requieren iniciativas educativas multidisciplinares adecuadas para prevenir los efectos adversos de estas afecciones clínicas en las escaladoras.

Keywords: «Déficit energético relativo en el deporte»; «Trastornos alimentarios»; «Escalada deportiva»; «Escalada en bloque»; «Comportamiento alimentario»; «Baja disponibilidad energética»

Diseño y validación por consenso de expertos de un cuestionario de conocimiento en salvamento acuático

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Resumo

Introduction

La literatura científica señala que la educación en seguridad acuática y la formación específica en rescate contribuyen a disminuir las conductas de riesgo y mejorar la respuesta ante emergencias acuáticas (Luo et al., 2024; Turgut y Turgut, 2012). Sin embargo, diferentes investigaciones advierten de una preparación insuficiente en contenidos relacionados con la seguridad acuática y las técnicas de rescate, incluso en personas vinculadas al entorno acuático (Barcala-Furelos et al., 2021; Petrass y Blitvich, 2018). Esta situación incrementa el riesgo de accidentes y favorece actuaciones inadecuadas durante una intervención. El dominio del medio acuático y la capacidad de nado no garantizan una actuación eficaz ante una emergencia en el agua (Quan et al., 2015; Stallman et al., 2017). Diversos estudios muestran limitaciones para identificar situaciones de peligro, seleccionar técnicas de rescate adecuadas o intervenir de forma segura y eficaz (Langendorfer y Bruya, 1995; Petrass y Blitvich, 2018). Del mismo modo que ocurre en los primeros auxilios, el conocimiento teórico resulta insuficiente si no se acompaña de habilidades prácticas específicas (García-Blaya et al, 2022). Además, se observa una falta de homogeneidad en los programas formativos y una preparación limitada en prevención y técnicas de rescate, aspectos esenciales para reducir el número de ahogamientos (Abrales y Agras, 2010; Agras y Abrales, 2013). Recientes investigaciones han desarrollado instrumentos dirigidos a evaluar la competencia acuática preventiva y la seguridad en el medio acuático (Castañón-Rubio et al., 2022; Ortiz y Moreno-Murcia, 2022). Sin embargo, la literatura científica sigue mostrando una escasa presencia de herramientas específicas dirigidas a evaluar el conocimiento técnico en salvamento acuático. Esta limitación dificulta la valoración objetiva de los conocimientos necesarios para intervenir de forma segura y eficaz ante una emergencia acuática. Por ello, se plantea el diseño de un cuestionario específico que permita determinar el nivel de conocimiento en salvamento acuático y disponer de un instrumento válido, actualizado y adaptado a las necesidades reales de intervención en el medio acuático.

Methods

Se realizó un estudio metodológico orientado al diseño y validación de contenido de un cuestionario para evaluar el nivel de conocimiento en salvamento acuático. El proceso de validación se desarrolló mediante juicio de expertos y consenso, siguiendo las recomendaciones metodológicas para la validación de instrumentos científicos (Escobar-Pérez y Cuervo-Martínez, 2008; Polit y Beck, 2006). El procedimiento se estructuró en diferentes fases: elaboración inicial de los ítems, revisión por expertos, reformulación del cuestionario y verificación final del grado de concordancia. Inicialmente se elaboró un

banco de 30 preguntas relacionadas con contenidos específicos de salvamento acuático. Los ítems se estructuraron en cuatro dimensiones: fases de actuación del socorrista, uso o ausencia de material de rescate, tipo de víctima y entorno donde se desarrolla la intervención. Todas las preguntas presentaban cuatro opciones de respuesta. Tras una primera revisión interna de redacción, claridad y distribución de contenidos, se seleccionaron 20 ítems definitivos procurando una representación equilibrada de todas las subescalas planteadas. La selección de expertos se realizó mediante un muestreo intencional o por conveniencia. Inicialmente fueron invitados 16 expertos y finalmente 12 completaron todo el proceso de validación. Los criterios de inclusión establecidos fueron poseer el grado de doctor universitario o la titulación de Técnico Deportivo Superior, además de acreditar una experiencia mínima de diez años como socorrista en playas y/o piscinas. Cada experto valoró la importancia de los ítems mediante una escala Likert de 1 a 4 puntos. Asimismo, se calculó el porcentaje de concordancia de expertos que consideraban adecuada la univocidad y pertinencia de cada pregunta del cuestionario. Este mismo procedimiento se utilizó para verificar la correspondencia de cada ítem con las distintas subescalas planteadas: fase de actuación, uso de material, tipo de espacio y tipo de víctima. Además, se solicitó la valoración individual de cada una de las cuatro opciones de respuesta y se incluyó un apartado abierto de observaciones para recoger sugerencias relacionadas con la claridad, comprensión y adecuación técnica de las preguntas y respuestas. Tras la primera valoración, se realizó un análisis descriptivo mediante medias, modas y porcentajes de concordancia. La puntuación asignada a cada opción de respuesta se estableció a partir de la moda indicada por los expertos y, en ausencia de consenso, mediante el valor promedio obtenido. Posteriormente, se revisaron todas las observaciones cualitativas y se reformularon aquellos ítems y respuestas que presentaban problemas de comprensión, ambigüedad o baja concordancia. Realizadas las modificaciones oportunas, se elaboró una segunda versión del cuestionario. Esta nueva propuesta fue remitida nuevamente a los expertos junto con los cambios introducidos y los niveles de acuerdo obtenidos en la primera valoración. Tras esta segunda revisión, se volvieron a analizar las respuestas emitidas y se verificó una concordancia igual o superior al 75% en los diferentes ítems y dimensiones evaluadas. Finalmente, se confeccionó la versión definitiva del cuestionario de conocimiento en salvamento acuático.

Results and Conclusions

Los resultados obtenidos mostraron un elevado nivel de concordancia entre los expertos participantes en el proceso de validación del cuestionario. Todos los ítems alcanzaron un 100% de concordancia en relación con su pertinencia dentro del instrumento. Respecto a la univocidad, los porcentajes de acuerdo oscilaron entre el 83,3% y el 100%, indicando que los expertos consideraron que las preguntas presentaban una redacción clara, precisa y fácilmente comprensible. En relación con la importancia de los ítems, las puntuaciones medias obtenidas variaron entre 3,25 y 3,83 puntos sobre un máximo de 4, alcanzándose una media global de 3,5 puntos. Estos resultados reflejan una elevada valoración de la relevancia de los contenidos incluidos en el cuestionario. Asimismo, se obtuvo un consenso superior al 80% en la asignación de valores a las diferentes opciones de respuesta de todos los ítems. A partir de este acuerdo, se estableció una escala de puntuación comprendida entre -1 y 2 puntos para todas las respuestas, donde 2 correspondía a la opción ideal, 1 a la adecuada, 0 a la neutra y -1 a la más inapropiada. Respecto a las fases de actuación del socorrista, los expertos identificaron una distribución equilibrada de los ítems en las diferentes etapas operativas del salvamento

acuático. Los ítems 1, 2, 3, 4 y 5 quedaron asociados a las fases de prevención y vigilancia. Los ítems 6, 7, 8, 9 y 10 se relacionaron con las fases de entrada al agua y aproximación a la víctima. Los ítems 11, 12, 13, 14, 15 y 20 se vincularon con el control y traslado de la víctima. Finalmente, los ítems 16, 17, 18 y 19 se asociaron a las fases de extracción y evacuación. En relación con el uso de material de rescate, los expertos clasificaron los ítems 8, 10, 11, 13 y 18 como intervenciones realizadas sin material, mientras que los ítems 6, 9, 12, 15, 16, 17, 19 y 20 fueron identificados como actuaciones con material de rescate. Respecto al entorno de intervención, los ítems 1, 3, 6, 8, 9, 12, 13, 15, 17 y 20 quedaron vinculados a espacios acuáticos naturales, mientras que los ítems 2, 4, 5, 7, 10, 11, 14, 16, 18 y 19 se asociaron a instalaciones acuáticas. En cuanto al tipo de víctima, los expertos identificaron cinco ítems relacionados con víctimas conscientes (ítems 5, 9, 10, 12 y 15), cuatro vinculados a víctimas inconscientes (ítems 7, 11, 14 y 17) y cuatro asociados a víctimas con lesión medular (ítems 13, 16, 18 y 19). Todos los bloques temáticos alcanzaron niveles de concordancia superiores al 75%, criterio previamente establecido para la aceptación definitiva de los ítems dentro de cada subescala. Conclusiones El cuestionario diseñado presenta adecuados niveles de validez de contenido y consenso entre expertos para la evaluación del conocimiento en salvamento acuático. Los elevados porcentajes de concordancia obtenidos en pertinencia, univocidad e importancia evidencian que el instrumento posee una adecuada claridad, relevancia y coherencia con los contenidos que pretende evaluar. La distribución equilibrada de los ítems en función de las fases de actuación, el uso de material de rescate, el entorno acuático y el tipo de víctima permite realizar una valoración estructurada y específica de los conocimientos teóricos relacionados con la intervención en emergencias acuáticas. Asimismo, el proceso de revisión y reformulación desarrollado mediante consenso de expertos favoreció la mejora de la comprensión y adecuación técnica de las preguntas y respuestas incluidas en el cuestionario. En conjunto, el instrumento desarrollado constituye una herramienta específica, actualizada y aplicable al ámbito educativo, formativo y profesional del salvamento acuático. Su utilización puede facilitar la evaluación objetiva de conocimientos, la detección de necesidades formativas y el desarrollo de programas orientados a mejorar la seguridad acuática y la prevención del ahogamiento.

Keywords: salvamento acuático; seguridad acuática; rescate acuático; validación de contenido; cuestionario; juicio de expertos; prevención del ahogamiento; formación en socorrismo.

Análisis de las palabras clave en la literatura científica sobre lesiones en baloncesto

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Resumo

Introduction

La investigación sobre lesiones en baloncesto ha aumentado en los últimos años, aunque presenta una notable diversidad conceptual y metodológica. Los estudios utilizan términos diferentes para describir lesiones, factores de riesgo, mecanismos lesionales, monitorización de la carga y estrategias de prevención o retorno a la competición. Por ello, el análisis de las palabras clave permite identificar los principales enfoques del campo y ordenar la evidencia desde una perspectiva integrada.

Methods

Se realizó una revisión de artículos científicos sobre lesiones en baloncesto. A partir de las palabras clave propuestas por los autores, se llevó a cabo una normalización terminológica para unificar términos equivalentes y reducir duplicidades. Posteriormente, se aplicó una codificación temática abierta y axial, agrupando las palabras clave en categorías funcionales relacionadas con el contexto competitivo, los procesos etiológicos, el evento lesional, la evaluación, la monitorización y la intervención aplicada.

Results and Conclusions

El análisis mostró que las palabras clave se organizan en una estructura jerarquizada de cinco niveles: determinantes estructurales y contextuales, procesos etiológicos, evento lesional, evaluación y monitorización, e intervención aplicada. El evento lesional constituye el núcleo del modelo, con predominio de términos vinculados a lesiones de la extremidad inferior, especialmente tobillo y rodilla. Sin embargo, el campo avanza hacia una visión más amplia, incorporando la carga competitiva, la biomecánica, la evaluación funcional, la prevención, la rehabilitación y el return to play. En conclusión, el análisis de palabras clave permite comprender la investigación sobre lesiones en baloncesto como un sistema multidimensional. Esta aproximación ayuda a ordenar el conocimiento disponible y destaca la necesidad de integrar planificación competitiva, monitorización de la carga, evaluación individualizada e intervención interdisciplinar para mejorar la prevención y la gestión de lesiones.

Keywords: baloncesto; lesiones deportivas; palabras clave; análisis conceptual; prevención de lesiones; return to play

Influencia de factores exógenos relacionados con aspectos nutricionales, de hidratación y climatológicos en la aparición de fatiga en deportes de 45min a 3h de duración: revisión sistemática con metaanálisis.

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Resumo

Introduction

El objetivo de esta revisión sistemática con metaanálisis es examinar la influencia de los factores exógenos relacionados con la fatiga en pruebas de resistencia de entre 45 minutos y 3 horas de duración.

Methods

Se realizó una búsqueda en cuatro bases de datos hasta el 15 de junio de 2022: PubMed, Web of Science, Sport Discus y EBSCO. Se revisaron 5103 artículos y se incluyeron 34 en el metaanálisis. La revisión se registró en PROSPERO (CRD420222327203) y se adhirió a la guía PRISMA. https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022327203. La calidad de los estudios se evaluó de acuerdo con la puntuación PEDro, y se valoró con la N a prueba de fallos de Rosenthal. En este artículo se menciona varios agentes exógenos, pero se centrará en este abstract en los carbohidratos (CHO) como repercute en la Rate of Perceived Exertion (RPE) y la frecuencia cardíaca (HR). Tras la aplicación de los diferentes criterios de inclusión y exclusión, se detectaron un total de 1 artículos, 3 artículos median la RPE y 3 artículos la HR.

Results and Conclusions

Al comparar los cambios encontrados en el grupo experimental respecto al grupo control, se encontró que la ingesta de CHO durante el ejercicio disminuyó o mantuvo el incremento de la HR durante la prueba (IC95%: -1,07 a -0,09; $p = 0,018$), durante el ejercicio disminuyó o mantuvo el incremento en el RPE ($p = 0,959$). Los resultados revelaron que la administración de carbohidratos durante el deporte proporciona una mejora mitigando el incremento de HR y RPE durante la prueba.

Keywords: fatiga; resistencia; factores exógenos; condiciones extremas; nutrición; deporte.

Revisión de la literatura sobre la prevención del impacto de la fibromialgia en mujeres físicamente activas y en mujeres sedentarias

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Resumo

Introduction

La fibromialgia se trata de un síndrome musculoesquelético crónico, presente en mujeres en edad adulta, cursa con dolor generalizado, fatiga, trastornos del sueño y puede estar acompañado de trastornos psicológicos. El ejercicio físico, se asocia con mejoras en los síntomas relacionados con esta enfermedad. Objetivos: Identificar si las mujeres físicamente activas con fibromialgia presentan un menor impacto de la enfermedad en su vida diaria en comparación con mujeres sedentarias.

Methods

La presente investigación se diseñó como una revisión sistemática de tipo descriptivo, siguiendo las directrices establecidas por la declaración PRISMA, donde se incluyen artículos científicos de las bases de datos “PubMed”, “Scopus”, “Web of Science” de los últimos 10 años, excepto algunos de los estudios que fueron incluidos debido a su alta relevancia clínica para este estudio. Se realizó una estrategia de búsqueda con los términos “fibromyalgia”, “Risk reduction”, “Disease management”, “women”, “female”, “Physical Activity”, “Exercise”, “Active lifestyle”, “Sedentary lifestyle”, “Sedentary behavior” y “Physical inactivity”, unidos por AND/OR. Se identificaron 133 artículos, de los cuales, tras el proceso de cribado se incluyeron 19 para su análisis.

Results and Conclusions

El entrenamiento aeróbico demostró ser eficaz para mejorar la memoria de trabajo, la función motora y los síntomas depresivos, sin embargo, estos beneficios tienden a disminuir si la práctica no se mantiene en el tiempo. El entrenamiento de fuerza demostró ser eficaz para la reducción de la fatiga y del dolor generalizado. En conjunto, la actividad física se presenta como una estrategia fundamental en el abordaje de la fibromialgia, contribuyendo además a la reducción de su impacto sociosanitario

Keywords: Fibromialgia, mujeres, actividad física, sedentarismo, manejo de la enfermedad.

Repetições até à Falha em Três Intensidades Relativas no Exercício de Prensa de Peito em Mulheres Sobreviventes de Cancro da Mama

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Resumo

Introduction

O treino de força é recomendado para mulheres sobreviventes de cancro da mama. Contudo, a prescrição da intensidade e do volume de treino continua a representar um desafio devido à variabilidade interindividual no desempenho e na tolerância ao esforço. Compreender como o número de repetições até à falha varia em diferentes cargas relativas pode apoiar uma prescrição do treino de força mais adequada e individualizada. Este estudo pretende comparar o número de repetições até à falha em três intensidades relativas no exercício de prensa de peito em mulheres sobreviventes de cancro da mama.

Methods

Onze mulheres sobreviventes de cancro da mama (57.0 ± 6.7 anos; intervalo: 44–67 anos), integradas no programa de exercício físico supervisionado MAMA_MOVE®, realizaram uma avaliação intra-sujeitos no exercício de prensa de peito, utilizando a Matrix Fitness Versa Converging Chest Press, VS-S13. Após um protocolo incremental inicial, utilizado para determinar os perfis individuais carga-velocidade e carga-potência, as participantes realizaram uma série até à falha mecânica em três intensidades: 50% de uma repetição máxima (1RM), carga ótima individual e 90% 1RM. A carga ótima individual correspondeu à intensidade relativa associada à potência mecânica máxima. Foi registado o número de repetições realizadas. As diferenças entre condições foram analisadas através de ANOVA de medidas repetidas, com comparações múltiplas ajustadas pelo método de Bonferroni.

Results and Conclusions

O número de repetições até à falha diferiu significativamente entre intensidades ($p < 0.001$; $\eta^2 = 0.904$), diminuindo de 36 ± 8 repetições a 50% 1RM para 26 ± 7 na carga ótima e 7 ± 2 a 90% 1RM. As comparações múltiplas ajustadas pelo método de Bonferroni confirmaram diferenças significativas entre todas as condições: 50% 1RM vs. carga ótima ($p = 0.004$), 50% 1RM vs. 90% 1RM ($p < 0.001$), e carga ótima vs. 90%

1RM ($p < 0.001$). O número de repetições até à falha diminuiu progressivamente à medida que a intensidade relativa aumentou no exercício de prensa de peito. Estes resultados destacam a importância de considerar respostas específicas ao nível das repetições em função da intensidade, aquando da prescrição do volume de treino de força em mulheres sobreviventes de cancro da mama.

Keywords: Sobreviventes de cancro da mama; treino de força; repetições até à falha; intensidade relativa; prensa de peito.

Uso de suplementos dietéticos y medicamentos en bailarines y bailarinas profesionales y pre-profesionales: uso extendido pero limitada evidencia de beneficios – una revisión sistemática

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Resumo

Introduction

Los suplementos dietéticos son ampliamente utilizados en la danza, reflejando las tendencias observadas en poblaciones de deportistas. Las razones que afirman bailarines y bailarinas para el consumo de suplementos son mantener la salud, reforzar el sistema inmunitario, reducir la fatiga, aumentar la energía y prevenir lesiones. A pesar de las distintas motivaciones, se han descrito altas tasas de deficiencias nutricionales en esta población (en particular, vitamina D y bajas concentraciones de ferritina sérica). Sin embargo, la relación entre el consumo de suplementos y medicamentos, el estado nutricional y los resultados en el rendimiento sigue sin estar clara. Por tanto, el objetivo de esta revisión sistemática era examinar la prevalencia del uso de suplementos dietéticos y medicamentos entre bailarines y bailarinas profesionales y pre-profesionales, así como sus efectos sobre el rendimiento, los resultados en salud y las patologías relacionadas con la danza.

Methods

Esta revisión sistemática siguió las directrices PRISMA 2020 y fue registrada en PROSPERO (CRD420251000872). Se realizaron búsquedas en PubMed, Scopus, Web of Science y Cochrane Library desde su creación hasta abril de 2025. Los estudios elegibles incluyeron bailarines y bailarinas profesionales o pre-profesionales que utilizaban suplementos dietéticos o medicamentos con posibles efectos terapéuticos o ergogénicos. Dos revisores independientes llevaron a cabo la extracción de datos y la evaluación del riesgo de sesgo utilizando las herramientas RoB 2 (ensayos controlados aleatorios), ROBINS-I (intervenciones no aleatorias) y JBI (estudios observacionales). Se realizó una síntesis narrativa; no se llevó a cabo un metaanálisis debido a la considerable heterogeneidad clínica y metodológica.

Results and Conclusions

Resultados: Se incluyeron veintidós estudios (12 observacionales, 6 ensayos controlados aleatorizados y 4 intervenciones no aleatorizadas), en los que participaron 740 bailarines (654 mujeres y 86 hombres) de diversas disciplinas. Estudios observacionales mostraron prevalencias de uso de suplementos dietéticos que oscilaron entre el 21–42 % en profesionales y el 11–54 % en pre-profesionales. Hasta un 90 % de bailarines y bailarinas

declaró utilizar analgésicos y medicamentos antiinflamatorios no esteroideos. Entre los suplementos más consumidos se encontraban la proteína de suero, la creatina, la cafeína, los multivitamínicos, el complejo vitamínico B y la vitamina C. Sin embargo, los estudios de intervención que evaluaron los efectos de la proteína de suero y la creatina mostraron resultados inconsistentes, incluyendo aumentos de masa muscular sin efectos ergogénicos. Por el contrario, la suplementación con vitamina D mostró mejoras en la fuerza isométrica, potencia muscular y una reducción de la incidencia de lesiones en bailarines y bailarinas de ballet con insuficiencia de vitamina D. Conclusiones: Esta revisión sistemática muestra una prevalencia heterogénea del uso de suplementos dietéticos en los estudios incluidos. A pesar de ello, deficiencias nutricionales clínicamente relevantes parecen ser frecuentes en bailarines y bailarinas, junto con una evidencia limitada e inconsistente que respalde los beneficios ergogénicos de los suplementos más utilizados. Más estudios son necesarios para determinar si las prácticas de suplementación están adecuadamente alineadas con las necesidades individuales o con las motivaciones de uso. En consecuencia, podría ser beneficioso adoptar un enfoque más específico y personalizado de las estrategias de suplementación en bailarines, guiadas por cribados, pruebas bioquímicas y las demandas fisiológicas particulares del entrenamiento en danza. Esto podría minimizar el consumo innecesario de suplementos, reducir el enmascaramiento de problemas de salud y aumentar la eficacia de las intervenciones destinadas a restaurar o mantener la salud.

Keywords: Palabras clave: bailarines, suplementos dietéticos, ayudas ergogénicas, analgésicos, rendimiento físico, dolor musculoesquelético.

A maturacao biologica afeta a velocidade do pontape, mas nao a organizacao cinematica em futebolistas de academia

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Resumo

Introduction

Objetivo: A maturacao biologica influencia os resultados de velocidade de bola durante o pontape de bico em jogadores jovens, mas ainda nao foi formalmente estabelecido se reorganiza tambem a estrutura cinematica do movimento ou apenas amplifica a saida de velocidade de um padrao motor ja consolidado. Examinámos se a maturacao afeta (i) a magnitude da velocidade produzida pelo pontape de bico, (ii) a organizacao cinematica subjacente, ou ambos.

Methods

Metodos: Sessenta futebolistas masculinos de academia (Sub-13 a Sub-19) realizaram tres remates maximos de bico enquanto a cinematica tridimensional foi captada com um sistema markerless validado (OpenCap; dois iPads a 240 Hz). Oito variaveis cinematicas foram registadas e medias por jogador. A maturidade biologica foi estimada atraves de tres indicadores convergentes (offset de Mirwald, percentagem de estatura adulta prevista, Z-score de estatura). Diferencas entre grupos foram testadas por ANOVA; correlacoes de Pearson e parciais quantificaram as associacoes; uma regressao hierarquica de tres blocos avaliou o valor preditivo unico da biomecanica sobre a velocidade de bola.

Results and Conclusions

Resultados: Apenas a velocidade de pico do pe diferiu significativamente entre grupos etarios ($F = 5,83$; $p = ,002$; $\eta^2(2) = 0,24$) e grupos de maturidade ($F = 7,82$; $p = ,001$; $\eta^2(2) = 0,22$), correlacionando-se significativamente com o offset de maturidade ($r = +0,40$; $p = ,002$). A associacao idade-velocidade foi totalmente explicada pela maturacao: a correlacao parcial controlando o offset de maturidade tornou-se nao significativa ($r = +0,09$; $p = ,487$). Angulos articulares, rotacao pelvica, velocidade angular do joelho e o indice proximal-distal foram estatisticamente indistinguiveis entre grupos (todos $p \geq ,08$; todos $\eta^2(2) \leq 0,11$). A regressao hierarquica confirmou esta dissociacao: maturidade e tamanho corporal explicaram 73,1% da variancia na velocidade de bola, sem incremento significativo com variaveis cinematicas ($\Delta R(2) = 0,009$; $p = ,957$). Conclusao: A maturacao biologica atua sobre a magnitude da velocidade produzida pelo pontape de bico, mas nao reorganiza a sua estrutura cinematica. A organizacao cinematica do pontape parece estar largamente consolidada antes da entrada na academia, com a maturacao subsequente a potenciar o escalonamento fisico e nao o refinamento

coordenativo. As avaliações de velocidade de bola utilizadas na identificação de talentos jovens indexam predominantemente a maturação física e não a competência técnica independente da maturação.

Keywords: Palavras-chave: pontape de bico; biomecânica do futebol; maturação biológica; captura de movimento markerless; identificação de talentos; futebol jovem

Características isométricas fuerza-tiempo del tren inferior discriminan mejor el ranking competitivo que el rendimiento de salto en jugadores de baloncesto U18.

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Resumo

Introduction

Este estudio examinó las diferencias en el rendimiento neuromuscular entre jugadores masculinos de baloncesto U18 pertenecientes a equipos con distinto nivel competitivo (alto, medio y bajo).

Methods

Treinta y un jugadores realizaron pruebas de salto con contramovimiento (CMJ), isometric mid-thigh pull (IMTP) y sprint de 20 m. Las variables fuerza-tiempo del CMJ se clasificaron según el marco Person–Outcome–Driver–Strategy. Se observaron efectos significativos entre grupos en variables del CMJ, incluyendo el índice de fuerza reactiva modificado (mRSI), variables de la fase de frenado y variables temporales ($p \leq 0.05$), así como en la fuerza pico y fuerza pico relativa del IMTP y el tiempo en el sprint de 20 m ($p \leq 0.05$).

Results and Conclusions

El equipo con mejor ranking mostró una mayor producción de fuerza máxima, mayores valores de fuerza e impulso durante la fase de frenado y un menor tiempo hasta el despegue en comparación con los equipos de menor ranking. Por el contrario, no se encontraron diferencias significativas en la altura de salto del CMJ. El equipo de ranking medio mostró consistentemente perfiles neuromusculares menos favorables, especialmente en variables dependientes del tiempo. Estos hallazgos indican que las características neuromusculares relacionadas con la producción máxima de fuerza y la rápida aplicación de fuerza discriminan mejor el ranking competitivo que las medidas tradicionales de resultado. La evaluación de métricas fuerza-tiempo puede proporcionar una comprensión más precisa de las diferencias de rendimiento en jugadores jóvenes de baloncesto.

Keywords: fuerza máxima; índice de fuerza reactiva; salto con contramovimiento; neuromuscular; potencia; desarrollo del atleta.

Efectos agudos del uso de chicle con cafeína sobre el rendimiento en voleibol: un ensayo cruzado aleatorizado, controlado con placebo, que compara la administración de dosis única y dosis fraccionada

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Resumo

Introduction

El chicle con cafeína puede constituir una estrategia práctica para la administración rápida de cafeína en el voleibol; sin embargo, sus efectos sobre el rendimiento en habilidades específicas del deporte y si la administración de dosis fraccionada ofrece beneficios adicionales aún no están claros.

Methods

Once jugadoras de voleibol de nivel nacional (media $\pm$ DE; edad: 28 $\pm$ 4 años; IMC: 21 $\pm$ 1 kg $\cdot$ m⁻²; todas consumidoras habituales de cafeína) participaron en tres sesiones de evaluación de 2 horas, en las que masticaron durante 5 minutos una dosis única (3 piezas de chicle = 300 mg de cafeína), una dosis fraccionada (100 mg de chicle con cafeína x 3, administrados a intervalos de 30 minutos) o un chicle placebo (3 piezas), en orden aleatorizado. Se compararon entre condiciones el salto vertical y la percepción subjetiva del esfuerzo antes y después de las sesiones de evaluación, la frecuencia cardíaca durante las sesiones, y la eficiencia (%) de las acciones de ataque, bloqueo y defensa durante un juego de habilidades específicas de voleibol de 30 minutos realizado dentro de las sesiones.

Results and Conclusions

La eficiencia en el bloqueo fue significativamente menor con la dosis fraccionada de chicle con cafeína que con el placebo ($p=0.031$; $d=-1.17$), mientras que la eficiencia en el ataque fue significativamente mayor con la dosis fraccionada de chicle con cafeína que con el placebo ($p=0.044$; $d=1.47$). Aunque las diferencias no fueron estadísticamente significativas, se observó un aumento en la percepción subjetiva del esfuerzo ($d=0.060$) y una disminución en el salto vertical ($d=0.106$) durante la condición de chicle placebo en comparación con las demás condiciones. El chicle con cafeína, con la dosis y el protocolo evaluados, no tuvo un efecto ergogénico significativo sobre la percepción subjetiva del esfuerzo, el salto vertical, la frecuencia cardíaca ni la eficiencia defensiva. Sin embargo, el chicle con cafeína afectó positivamente la eficiencia en el ataque, pero tuvo un efecto desfavorable sobre la eficiencia en el bloqueo en jugadoras de voleibol entrenadas. Se recomienda que el uso de chicle con cafeína en el voleibol, particularmente en relación con las habilidades específicas del deporte, se realice con cautela, considerando la posición de juego y la respuesta individual.

Keywords: Chicle con cafeína; rendimiento en voleibol; dosis fraccionada

Efecto de dos modelos de calzado de tecnología avanzada en la durabilidad en corredores hombres entrenados

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Resumo

Introduction

Esta investigación tuvo como objetivo investigar los cambios fisiológicos y de rendimiento durante un esfuerzo de 1 hora y su influencia en una prueba de esfuerzo incremental (GXT) hasta el agotamiento en fatiga, comparando dos zapatillas con tecnología avanzada de calzado (AFT) en corredores varones entrenados.

Methods

Doce corredores varones entrenados (puntuación World Athletics [WA]: $820,8 \pm 107,3$ puntos) realizaron, en un diseño aleatorizado y contrabalanceado, una GXT hasta la determinación de la velocidad del VT1, seguida de un esfuerzo de 1 hora al +10 % de la velocidad del VT1 y, por último, tras 5 minutos de descanso, se realizó una GXT hasta el agotamiento, en dos visitas diferentes separadas por 7-10 días con distintas zapatillas AFT (Cloudbloom Strike [CS] y Cloudbloom Echo 3 [CE]). Se monitorizaron los parámetros metabólicos y autopercebidos durante todo el protocolo.

Results and Conclusions

Resultados: No se encontró un efecto de interacción zapatilla*tiempo durante la prueba de esfuerzo de 1 hora; no obstante, los participantes mostraron un aumento de la frecuencia cardíaca ($p < 0,001$) y del RPE ($p < 0,001$), así como una reducción del cociente de intercambio respiratorio (RER) ($p < 0,01$) y de la producción de dióxido de carbono ($p < 0,05$), junto con un cambio en la utilización de sustratos desde la oxidación de hidratos de carbono hacia la oxidación de grasas ($p < 0,05$), con independencia del modelo de zapatilla. Durante la GXT final, los participantes en la condición CS alcanzaron una mayor velocidad pico ($p < 0,05$) y una mayor velocidad en el VT2 ($p < 0,05$) en comparación con la CE. Además, con la condición CS se alcanzó un menor RER en el VT2 ($p < 0,05$). Conclusiones: Un esfuerzo de 1 hora al +10 % de la velocidad del VT1 incrementa la carga cardiovascular y la percepción de esfuerzo, con un aumento de la oxidación de grasas sin que influya el modelo de zapatilla utilizado. Durante la prueba GXT, los participantes alcanzaron una mayor velocidad pico y una mayor velocidad en el VT2 con la condición CS en comparación con CE.

Keywords: maratón, rendimiento de resistencia, durabilidad

A Relação entre o Perfil Oromotor e o Comportamento à Hora da Refeição em Crianças com Perturbação do Espectro do Autismo

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Resumo

Introduction

As crianças com perturbação do espectro do autismo (PEA) frequentemente apresentam problemas de comportamento à hora da refeição, associados a uma disfunção oromotora subjacente. Estes desafios podem afetar negativamente a ingestão nutricional, o crescimento e as rotinas familiares. Esclarecer a relação entre a função oromotora e os hábitos nutricionais pode apoiar intervenções clínicas mais eficazes. Este estudo apresenta dados preliminares que examinam a relação entre os perfis oromotores e os comportamentos na hora da refeição em crianças com PEA.

Methods

Uma amostra equilibrada em termos de género, constituída por 64 crianças dos 3 aos 8 anos ($4,70 \pm 1,14$ anos) com perturbação do espectro do autismo (32 rapazes e 32 raparigas), foi avaliada através do Inventário Breve de Comportamento Refeicional no Autismo (BAMBI) e da Escala de Avaliação Motora Oral (OMAS). Foram realizadas análises estatísticas descritivas, correlações de Pearson e regressão linear.

Results and Conclusions

A pontuação média no BAMBI foi de $43,3 \pm 10,6$ e a no OMAS, de $45,8 \pm 10,5$. O peso médio foi de $17,30 \pm 3,94$ kg e a altura média foi de $107 \pm 8,0$ cm. Não foram encontradas diferenças significativas entre os sexos quanto à idade, altura, peso ou pontuação no OMAS. No entanto, as pontuações no BAMBI foram significativamente mais elevadas entre as mulheres do que entre os homens ($p < 0,01$, d de Cohen = $-1,08$), indicando maiores dificuldades na hora da refeição entre as raparigas. As pontuações no BAMBI apresentaram correlações negativas com o OMAS ($r = -0,256$, $p = 0,041$), a idade ($r = -0,354$, $p = 0,004$), o peso ($r = -0,372$, $p = 0,002$) e a altura ($r = -0,269$, $p = 0,031$). A regressão linear simples mostrou que os escores do OMAS previram significativamente os escores do BAMBI, $F(1, 62) = 4,33$, $p = 0,041$, explicando 6,6% da variância ($R^2 = 0,065$). O coeficiente de regressão negativo ($\beta = -0,256$) indica que uma melhor função oromotora está modestamente associada a menos comportamentos problemáticos durante as refeições. Os resultados preliminares sugerem que uma função oromotora inferior e uma idade mais jovem estão associadas a um maior número de comportamentos problemáticos durante as refeições em crianças com PEA. Estes achados realçam a importância de incluir as avaliações oromotoras nas avaliações e nas intervenções alimentares desta população.

Keywords: Perturbação do Espectro do Autismo, Função Oromotora, Estado Nutricional, Biomecânica

Effects of *Miconia albicans* supplementation on thermal responses during recovery in Paralympic powerlifting athletes

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Resumo

Introduction

Monitoring of physiological responses during recovery has become increasingly important in strength sports, especially in Paralympic athletes exposed to high training loads. This study investigated the effects of acute supplementation with *Miconia albicans* on skin temperature responses during recovery after resistance exercises in Paralympic powerlifting athletes.

Methods

Thirteen nationally classified athletes participated in a randomized crossover design comparing supplementation with placebo and *Miconia albicans* (10 mg/kg). The athletes performed bench press training protocols while skin temperature was assessed by infrared thermography before exercise, immediately after exercise, 24 hours and 48 hours after the training sessions. Thermal analyses were performed in the sternal pectoral, clavicular pectoral, deltoid, and triceps regions.

Results and Conclusions

Significant increases were observed only in the sternal sectoral region after supplementation, especially after 48 hours ($p=0.010$), suggesting localized physiological modulation during recovery. No significant changes were identified in other anatomical regions. These findings suggest that acute supplementation with *Miconia albicans* may influence localized thermal responses associated with muscle recovery and metabolic activity after high-intensity resistance exercise. Infrared thermography appears to be a useful and non-invasive tool for monitoring recovery responses in Paralympic strength athletes.

Keywords: Para-athletes; Melastomataceae; Substances for Performance Enhancement; Thermography

Efeitos da suplementação de *Miconia albicans* sobre variáveis biomecânicas e temperatura corporal em atletas de powerlifting Paralímpico

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Resumo

Introduction

O powerlifting paralímpico exige elevados níveis de desempenho neuromuscular e capacidade de recuperação, aumentando o interesse por estratégias nutricionais com potencial ergogênico. Este estudo investigou os efeitos da suplementação aguda de *Miconia albicans* sobre variáveis biomecânicas e temperatura da pele em atletas de powerlifting paralímpico.

Methods

Treze atletas paralímpicos ranqueados nacionalmente participaram de um delineamento randomizado, cruzado e contrabalançado, comparando placebo e suplementação com *Miconia albicans* (10 mg/kg). O desempenho de força dinâmica foi avaliado por meio de encoder durante protocolos de supino com cargas de 80% e 45% de uma repetição máxima (1RM), enquanto a temperatura da pele foi avaliada por termografia infravermelha antes, imediatamente após e durante os períodos de recuperação.

Results and Conclusions

Não foram observadas diferenças significativas para velocidade média propulsiva ou potência a 80% de 1RM; entretanto, a velocidade máxima apresentou melhora significativa durante a segunda série após a suplementação. A 45% de 1RM, não foram encontradas diferenças significativas nas variáveis biomecânicas, embora a velocidade média propulsiva tenha apresentado tendência à significância. A análise térmica revelou aumento significativo da temperatura apenas na região peitoral esternal, especialmente após 48 horas. A suplementação aguda com *Miconia albicans* promoveu efeitos ergogênicos localizados sobre o desempenho neuromuscular e alterou respostas térmicas, sugerindo potencial modulação fisiológica durante a recuperação, embora os efeitos não tenham sido sustentados em todos os desfechos avaliados.

Keywords: Paratletas; Melastomataceae; Substâncias para Melhoria do Desempenho; Termografia

Interocepção, Nutrição e Atividade Física: Um Ciclo de Feedback Dinâmico

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Resumo

Introduction

A interocepção é o processo pelo qual o sistema nervoso percebe e interpreta sinais fisiológicos do interior do corpo, como a fome, a saciedade e os batimentos cardíacos, para manter a homeostase. Com base neste conceito, este estudo visa sintetizar as interações entre interocepção, atividade física (AF) e nutrição.

Methods

Esta revisão foi realizada por meio de uma pesquisa nas bases de dados PubMed e Google Scholar. As palavras-chave incluem "Interocepção", "Atividade Física", "Exercício", "Nutrição", "Dieta", "Alimentação Intuitiva" e "Homeostase". A análise focou em pesquisas originais, ensaios clínicos randomizados, revisões críticas, revisões sistemáticas e meta-análises publicadas entre 2015 e 2025. Avaliou-se como a intensidade do exercício, os protocolos de jejum e os hábitos alimentares específicos modulam a precisão interoceptiva e a consciência metabólica.

Results and Conclusions

A atividade física opera em um ciclo de feedback dinâmico que modula a interocepção em níveis agudos e crônicos. O exercício aumenta a intensidade dos sinais viscerais, como a frequência cardíaca e a dispnéia, permitindo que esses dados fisiológicos sejam percebidos com maior sensibilidade e clareza pelo sistema interoceptivo. No entanto, embora modelos teóricos prevejam que o exercício aumentará a precisão interoceptiva cardíaca, há contradições significativas na literatura. Avalia-se que as razões subjacentes a essas inconsistências são a variedade de metodologias utilizadas nos estudos, os tipos de tarefas interoceptivas e as características demográficas dos grupos de participantes. Em relação à nutrição, determinou-se que a alimentação com restrição de tempo aumenta a variabilidade da frequência cardíaca e a precisão interoceptiva objetiva; a dieta mediterrânea favorece uma alta consciência cognitiva, enquanto dietas ao estilo ocidental prejudicam rapidamente a sensibilidade interoceptiva. Neste contexto, o desenvolvimento da sensibilidade interoceptiva pode ser uma estratégia de intervenção clínica que fortalece a homeostase metabólica e apoia o bem-estar psicológico. O aumento de estudos experimentais nesta área no futuro contribuirá para o desenvolvimento de protocolos de tratamento personalizados nas áreas de medicina preventiva, envelhecimento saudável e saúde do atleta.

Keywords: Interocepção, Dieta, Exercício, Nutrição, Atividade Física.

Influencia de la morfología del músculo plantar delgado sobre la fuerza de la musculatura flexora plantar

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Resumo

Introduction

El músculo plantar delgado es un pequeño músculo del compartimento posterior de la pierna, presente en el 80–93% de la población adulta, con notable variabilidad morfológica entre individuos. Anatómicamente, comparte su inserción distal en el calcáneo con el tendón de Aquiles, en estrecha relación con el sóleo y los gemelos. Si su tamaño se relaciona con la capacidad de fuerza flexora plantar no había sido cuantificado previamente.

Methods

Estudio exploratorio transversal con 49 adultos (29 mujeres, 20 hombres; edad media $32,0 \pm 12,5$ años) con presencia confirmada del músculo plantar delgado. El grosor y la AST del vientre muscular se midieron mediante ecografía (V-scan Air CL, GE HealthCare) en plano transversal en el tercio superior de la pierna. La fuerza isométrica máxima de flexión plantar se evaluó bilateralmente con un dinamómetro Active Force 2, con rodilla extendida para los gemelos y rodilla flexionada para el sóleo. Se calcularon correlaciones de Pearson ($\alpha = 0,05$).

Results and Conclusions

El grosor medio del plantar delgado fue de $1,21$ mm y la AST media de $2,16$ cm². La fuerza máxima media fue de 229 N para los gemelos y 204 N para el sóleo. El tamaño del vientre muscular correlacionó de forma significativa con la fuerza del sóleo ($r = 0,45$ para el grosor; $r = 0,42$ para la AST; $p < 0,01$), pero no con la fuerza de los gemelos ($r = 0,18$ y $r = 0,16$, respectivamente). Conclusiones: Un mayor tamaño del músculo plantar delgado se asocia significativamente con una mayor fuerza isométrica del sóleo, pero no con la de los gemelos, lo que sugiere una relación funcional específica de músculo. El plantar delgado no parece funcionalmente inerte — su morfología podría reflejar una contribución selectiva a la flexión plantar postural junto al sóleo.

Keywords: músculo plantar delgado, ecografía, flexión plantar, fuerza isométrica, morfología muscular.

Impacto de las diferentes fases del ciclo menstrual en la tasa metabólica en reposo en mujeres físicamente activas

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Resumo

Introduction

La obesidad es un importante problema de salud en la población porque está asociado a la enfermedad y disminución de la expectativa y calidad de vida en población adulta y de edad avanzada, así como en población pediátrica y adolescente. La obesidad puede ser definida como un exceso de grasa corporal que refleja una mayor ingesta energética que el gasto energético (GE) diario. El principal factor que influye en el GE diario es el metabolismo en reposo. La actividad física emerge como un factor de prevención de la obesidad, ya que, además de aumentar el GE, contribuye a incrementar la tasa metabólica en reposo. Aunque, a nivel global se considera que el metabolismo en reposo es superior en los hombres que en las mujeres, no se ha estudiado extensamente el impacto de las diferentes fases del ciclo menstrual (FCM) sobre la tasa metabólica en reposo. Así, este estudio pretende analizar el impacto de FCM en la tasa metabólica en reposo en un grupo de mujeres físicamente activas.

Methods

14 mujeres físicamente activas en un rango de edad de 20 a 26 años acudieron en 6 ocasiones al laboratorio de Ciencias del Deporte de la Universidad de Sevilla incluyendo una sesión experimental durante la fase folicular, ovulatoria y lútea a lo largo de 2 ciclos menstruales consecutivos. En cada sesión experimental se realizó un test de metabolismo en reposo de 15 minutos de duración usando un analizador de gases (ENDO Medical, Palo Alto, CA) previamente calibrado. Se analizaron los valores medios de los últimos 5 minutos del test de las siguientes variables: VO₂, VCO₂, VE, VE/VO₂, VE/VCO₂, RER, EE y MET. Un test de análisis de la varianza y medidas repetidas (ANOVA-RM) fue aplicado para los factores FCM (fase folicular vs ovulatoria vs lútea), Ciclo (1º vs 2º ciclo) y la interacción FCM·Ciclo. Adicionalmente, para las comparativas a medias se aplicó un Post-Hoc de Bonferroni. El nivel de significación estadística se fijó como $p < 0,05$.

Results and Conclusions

FCM muestra una tendencia a la significación estadística en el VO₂ ($p=0,08$) incluyendo un valor superior en la fase ovulatoria con respecto a la fase folicular ($p=0,03$). Además, el Post-Hoc reflejó un mayor RER en la fase lútea con respecto a la folicular ($p=0,04$). Además, se detectó un efecto para el factor Ciclo en las variables VCO₂ ($p < 0,01$), VE ($p=0,04$), VE/VO₂ ($p=0,04$), RER ($p < 0,01$), y GE ($p=0,04$). Así, los resultados del presente estudio reflejan que las FCM tienen un impacto en la tasa metabólica en reposo

incluyendo una reducción del GE en la fase folicular con respecto a la ovulatoria, así como una mayor contribución metabólica de los lípidos al metabolismo (en detrimento de los hidratos de carbono) en comparación con la fase lútea. Sin embargo, otro hallazgo importante ha sido la detección de significación estadística para el factor Ciclo en varias de las variables analizadas lo que debe interpretarse como un efecto diferencial de los diferentes ciclos menstruales sobre el metabolismo en reposo. Así, cada ciclo menstrual induce a una diferente respuesta sobre el gasto y la contribución de los distintos sustratos al metabolismo energético reflejando una gran heterogeneidad entre diferentes ciclos menstruales en una misma mujer. Es por ello que se aboga por tomar con cautela e intentar evitar la estandarización de las demandas energéticas y metabólicas en la población adolescente y adulta femenina.

Keywords: Gasto Energético; Mujer Deportista; Metabolismo; Actividad Física; Obesidad.

EFEITOS CRÔNICOS DO PRÉ-CONDICIONAMENTO ISQUÊMICO SOBRE O DESEMPENHO: UMA REVISÃO SISTEMÁTICA

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Resumo

Introduction

Introdução: A aplicação crônica do pré-condicionamento isquêmico (PCI) parece potencializar uma janela de proteção tardia com efeitos adaptativos de longo prazo na função vascular e na recuperação muscular (Bo et al., 2025), repercutindo positivamente no desempenho. **Objetivo:** Identificar os efeitos da aplicação crônica de PCI sobre o desempenho.

Methods

Essa revisão sistemática seguiu as diretrizes do PRISMA (Page et al., 2021) e foi cadastrada na plataforma PROSPERO (CRD420251139477). As buscas ocorreram em outubro de 2025 nas bases de dados PubMed; Scopus, Web of Science, Embase e SportDiscus com a busca conduzida pelos pesquisadores NRR e JVSM. A estratégia de busca foi elaborada a partir da combinação entre as palavras-chave (“ischemic preconditioning”) AND (“resistance training” OR “sports” OR “sham treatment” OR “control”) AND (“muscle strength” OR “neuromuscular adaptation” OR “power output” OR “performance”). Após o processo de seleção conduzidos no software Rayyan, 18 artigos compuseram a revisão.

Results and Conclusions

De maneira geral, os estudos encontraram aumento no VO₂máx, na potência máxima e média, redução no índice de fadiga e ganhos superiores em 1RM. Evidências de efeitos positivos no desempenho de atletas de natação e corrida. Entretanto, houve variações nos protocolos de PCI. Na aplicação de PCI de 3, 4 e 5 ciclos de isquemia/reperfusão, variação na pressão do manguito de 50 mmHg acima da PAS, 220 e 250 mmHg. Quanto ao número de sessões, variou de 3, 7 e 10 dias de aplicações consecutivas até aplicações 2 vezes na semana por 2, 4 ou 6 semanas e aplicações 3 vezes na semana por 8 semanas. **Conclusão:** PCI crônico parece induzir adaptações positivas para o desempenho, bem como na função endotelial, na capacidade oxidativa mitocondrial e na modulação da resposta inflamatória, resultando em maior volume de treino e proteção contra a fadiga.

Keywords: recuperação da fadiga, anti-inflamatório, VO₂máx, desempenho

Efeito agudo do pré-condicionamento isquêmico no tempo de desempenho fran e nas respostas hemodinâmicas em praticantes de crosstraining

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Resumo

Introduction

Objetivo: investigar o efeito agudo do pré-condicionamento isquêmico no tempo de desempenho fran, na frequência cardíaca, na pressão arterial sistólica, na pressão arterial diastólica.

Methods

Doze homens realizaram 3 visitas. Uma familiarização, 2 com sessões randomizadas: a) PCI (3x5 min. 220 mmHg) + 30 min. intervalo + fran; b) SHAM (3x5 min. 20 mmHg) + 30 min. + fran. Mediu-se FC, PAS e PAD em repouso (rep.) e nos 1º, 5º e 10º min. de recuperação (rec.), pelo monitor MAPA. Fran é um treino de crosstraining que consiste em completar 21-15-9 Reps For Time de thruster (95 lb) e pull-Ups no menor tempo possível. Utilizou-se ANOVA two-way. Adotou-se $p \leq 0,05$.

Results and Conclusions

Resultados: Observou-se uma redução na FC nos três momentos de recuperação, sem diferença significativa entre PCI/SHAM. Redução na PAS em PCI no 1º minuto de recuperação. Redução na PAD em PCI no 5º minuto de recuperação. Sem diferença estatisticamente significativa no tempo de desempenho fran. Conclusão: Apesar de não apresentar diferença estatística no tempo de desempenho fran, o grupo PCI apresentou comportamento mais eficiente nas respostas hemodinâmicas (FC, PAS e PAD). Como aplicabilidade prática, seu principal benefício aplicado não seria uma melhoria imediata de desempenho, mas sim a promoção de uma recuperação cardiovascular mais rápida e com menor sobrecarga hemodinâmica. Esse achado contribui para encorajar o uso do PCI em treinamentos e competições com múltiplas etapas, onde uma recuperação mais eficiente entre os workouts pode contribuir para a manutenção do desempenho e reduzir o risco de fadiga cardiovascular acumulada.

Keywords: Desempenho, Hemodinâmica, Oclusão vascular

CARACTERÍSTICAS ANTROPOMÉTRICAS E VELOCIDADE DE PROVA EM UMA CORRIDA OFF-ROAD DE 16 KM

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Resumo

Introduction

O desempenho em corridas off-road (off-road running; ORR) é influenciado por fatores fisiológicos, biomecânicos, técnicos, táticos e relacionados ao terreno. Embora o desempenho não possa ser explicado por características isoladas, variáveis antropométricas podem fornecer informações úteis em provas de curta distância, nas quais as dimensões corporais podem estar relacionadas à velocidade de corrida. Este estudo teve como objetivo analisar as associações entre massa corporal, estatura, índice de massa corporal (IMC) e velocidade de prova em uma corrida ORR de 16 km, considerando a amostra total e subgrupos específicos por sexo.

Methods

Foram incluídos 50 corredores que completaram uma prova ORR de 16 km. A prova foi realizada em um percurso em circuito, com largada e chegada no mesmo local, totalizando 307 m de ganho de elevação e 307 m de perda de elevação. A amostra foi analisada como grupo total e estratificada por sexo: homens ($n = 37$) e mulheres ($n = 13$). A velocidade de prova foi expressa como velocidade média no percurso de 16 km ($\text{km} \cdot \text{h}^{-1}$). As variáveis antropométricas incluíram massa corporal (kg), estatura (m) e IMC ($\text{kg} \cdot \text{m}^{-2}$). A normalidade dos dados foi avaliada pelo teste de Shapiro-Wilk, e as associações foram analisadas por meio do coeficiente de correlação de Spearman bicaudal.

Results and Conclusions

Na amostra total, a velocidade média de prova apresentou correlação negativa com o IMC ($\rho = -0,381$; $p = 0,006$), mas não com a massa corporal ($\rho = -0,081$; $p = 0,576$) ou a estatura ($\rho = 0,155$; $p = 0,284$). Entre os homens, a velocidade de prova apresentou correlação negativa com a massa corporal ($\rho = -0,556$; $p < 0,001$) e com o IMC ($\rho = -0,553$; $p < 0,001$), enquanto nenhuma associação significativa foi observada com a estatura ($\rho = -0,218$; $p = 0,194$). Entre as mulheres, a velocidade de prova apresentou correlação positiva com a estatura ($\rho = 0,655$; $p = 0,018$) e negativa com o IMC ($\rho = -0,703$; $p = 0,009$), enquanto a massa corporal não se associou significativamente à velocidade de prova ($\rho = -0,157$; $p = 0,606$). O IMC foi a variável antropométrica mais consistentemente associada à velocidade na prova ORR de 16 km, apresentando correlações negativas na amostra total e em ambos os subgrupos por sexo. Esses achados sugerem que características antropométricas podem estar relacionadas ao desempenho

em provas ORR de curta distância de maneira sexo-específica. No entanto, os resultados devem ser interpretados com cautela, especialmente entre as mulheres, devido ao menor tamanho amostral e à natureza exploratória da análise.

Keywords: desempenho esportivo; índice de massa corporal; corrida de endurance; diferenças entre os sexos.

Influencia de la Localización en el Rendimiento Técnico-Táctico de La Liga Santander (2022-2023)

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Resumo

Introduction

Introducción. Gozar de la localía y contar con la presencia de la afición, genera un sentimiento de territorialidad en los jugadores, lo que les permite completar esfuerzos más intensos y lograr más remates (Medina et al., 2019). También, se ha demostrado que afecta las decisiones arbitrales, favoreciendo al equipo local y no así al equipo visitante (Wühr et al., 2025). De manera, que conocer el efecto de la localía sobre el rendimiento en el fútbol, permite conocer ventajas relacionadas a factores sociales que el cuerpo técnico debe presentar atención. Por lo tanto, el objetivo de este trabajo fue estudiar la influencia de la Localización del partido en los Indicadores de Rendimiento (IdR) durante una temporada de La Liga española.

Methods

Metodología. Se analizaron 380 partidos de la primera división española de fútbol durante las 38 jornadas de la temporada 2022/23 para un total de 760 casos. En esta liga de fútbol participan 20 equipos dentro de un formato todos contra todos en ida y vuelta. Se tomó como variable independiente la Localización de Partido (Local o Visitante), y como variable dependiente a los Indicadores de Rendimiento que se obtuvieron de distintas páginas web (<https://es.besoccer.com/>, <https://www.sofascore.com/es/>, <https://www.flashscore.es/>). Se realizó un Modelo Lineal Mixto (MLM) controlando el factor aleatorio de los equipos participantes y utilizando el software Jamovi 2.4.7 (R Core Team, 2022; The Jamovi Project, 2023).

Results and Conclusions

Resultados y Discusión. Los resultados del MLM para el factor aleatorio Equipo y el factor fijo Localización del partido fue estadísticamente significativo en nueve IdR ($p < .05$) con un AIC desde 2337 hasta 9386. Se obtuvieron tamaños del efecto entre .14, efecto moderado para la variable saques de banda hasta .69, efecto grande para la variable remates (efecto moderado= una variables y efecto grande= nueve variables). El modelo ajustado para el factor aleatorio fue estadísticamente significativo en las nueve variables que presentaron diferencias significativas. Estos presentaron un R² marginal entre .01-.10, un R² condicional entre .08 - .47 y un ICC entre .07- .49 ($p < .05$), indicando que la respuesta individual de los equipos fue diferente. Los resultados de este trabajo, indican que los equipos Locales realizaron más acciones en ataque que los equipos Visitantes en la mayoría de los IdR estudiados, a excepción de los goles en contra. Fernández-Cortés

et al. (2020), también observaron que los equipos Locales buscaban mantener la iniciativa del juego ofensivo sobre el rival, incrementando la posibilidad de conseguir un resultado a favor. Específicamente, se ha demostrado que los delanteros y mediocampistas rinden mejor en condición de localía, mientras que de visitantes, los defensas comenten más falta (Chacón-Fernández et al., 2025). Esto comprueba que los equipos locales gozan de una ventaja que les permite desarrollar mejor su juego ofensivo y dictar el ritmo del partido. Además, es evidente que otros factores podrían intervenir en el rendimiento deportivo, como las posiciones específicas de juego. Conclusiones. Los hallazgos de esta investigación permiten concluir que, durante las 20 jornadas de la temporada 2022/23 de La Liga Santander, los equipos locales mantuvieron un estilo de juego más ofensivo que los equipos visitantes. Estos resultados concuerdan con investigaciones previas sobre la ventaja de localía en diferentes competiciones de alto nivel de fútbol masculino. Finalmente, se recomienda continuar esta línea de investigación incorporando variables como puestos específicos, ranking final y el resultado final del partido.

Keywords: europa, fútbol, localización del partido

Influencia del ciclo menstrual en la respuesta metabólica y cardiorrespiratoria durante el ejercicio submáximo en mujeres físicamente activas

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Resumo

Introduction

Durante las diferentes fases del ciclo menstrual (FCM) fluctúa la respuesta neuroendocrina tanto en reposo como durante el esfuerzo. Durante la fase folicular existe unos bajos niveles de estrógenos, progesterona y relaxina que comienzan a incrementar sus valores 3 días previos a la ovulación. A las 36-48 horas post-ovulación se alcanzan los valores pico de hormona estimulante del folículo (FSH) y hormona luteinizante (LH). Durante la fase lútea, por su parte, se produce una disminución progresiva de los niveles de FSH y LH al tiempo que incrementan los niveles de progesterona. Los estrógenos se relacionan con un incremento de la síntesis de glucógeno y una mayor metabolización de lípidos mientras que la progesterona presenta efectos antiestrogénicos. Considerando a los test incremental progresivos en cciclismo y carrera como la metodología gold estándar para la valoración de la respuesta cardiorrespiratoria y metabólica durante el esfuerzo; el objetivo del presente estudio fue analizar el efecto de las 3 FCM sobre las principales variables cardiorrespiratorias y metabólicas en un test incremental progresivo en cicloergómetro en una muestra formada por mujeres físicamente activas.

Methods

14 mujeres físicamente activas (edad: de 20 a 26 años) realizaron un test incremental progresivo en cicloergómetro (incremento de 15 W cada minuto hasta llegar a la extenuación) siendo monitorizadas por un pulsómetro y analizador de gases en 6 ocasiones: durante la fase folicular, ovulatoria y lútea en 2 ciclos menstruales consecutivos. Para el posterior análisis se empleó la media de cada minuto de trabajo de trabajo desde los 15 W hasta los 105 W que fue la máxima carga alcanzada por la totalidad de la muestra. Las variables analizadas fueron las siguientes: VO₂, VCO₂, VE, VE/VO₂, VE/VCO₂, RER, GE, MET, frecuencia cardíaca (FC) y percepción subjetiva del esfuerzo (RPE). Un test de análisis de la varianza para medidas repetidas (ANOVA-RM) se aplicó para los siguientes 3 factores: FCM (fase folicular vs ovulatoria vs lútea), Ciclo (1º vs 2º ciclo), Carga (15 W – 30 W – 45 W – 60 W – 75 W – 90 W – 105 W) y la interacción FCM·Ciclo·Carga. Adicionalmente, para la comparativas de medias se usó un Post-Hoc de Bonferroni. La significación estadística se fijó como $p < 0,05$.

Results and Conclusions

FCM induce a diferencias estadísticamente significativas en VCO₂ ($p<0,05$), VE ($p<0,05$) y RER ($p=0,01$) con niveles estadísticamente inferiores en la fase ovulatoria en comparación con la fase folicular en VCO₂ ($p=0,01$), VE ($p<0,01$) y RER ($p=0,01$). Además, se detectó un efecto significativo para la FCM en VE/VO₂ con valores estadísticamente inferiores en la fase ovulatoria en comparación con las fases folicular ($p<0,01$) y lútea ($p<0,01$). Además, se detectó un efecto significativo del factor Ciclo para VCO₂ ($p=0,04$) y RER ($p<0,05$) mientras que se detectaron diferencias estadísticamente significativas para todas las variables analizadas para el factor Carga ($p<0,01$). En base a estos resultados, las conclusiones de este estudio son las siguientes: i) la fase ovulatoria se caracteriza por uno menores niveles de RER, VCO₂ y VE con respecto a la fase folicular lo que refleja una mayor contribución metabólica de los lípidos y unas menores demandas ventilatorias; ii) durante la fase ovulatoria existe una mayor eficiencia ventilatoria que durante las fases folicular y lútea; iii) las demandas cardiorrespiratorias y metabólicas pueden variar entre los diferentes ciclos menstruales.

Keywords: Economía; Resistencia; Fisiología del Ejercicio; Mujer Deportista; Deporte

O Papel Potencial da D-Ribose como Suplemento Esportivo no Gerenciamento da Fibromialgia

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Resumo

Introduction

A fibromialgia (FM) é uma síndrome complexa caracterizada por dor musculoesquelética generalizada, fadiga crônica e disfunção cognitiva, na qual a disfunção mitocondrial e os prejuízos no metabolismo energético celular desempenham um papel fundamental na sua etiologia. A D-ribose, conhecida como um suporte ergogênico na nutrição esportiva, é um monossacarídeo de cinco carbonos que forma a base estrutural de moléculas transportadoras de energia, como ATP, NAD⁺ e FAD. O objetivo deste estudo é avaliar os efeitos bioquímicos da D-ribose na síntese mitocondrial de ATP e seu potencial papel terapêutico no gerenciamento dos sintomas da fibromialgia à luz da literatura atual.

Methods

As bases de dados PubMed, Google Scholar, Web of Science e Scopus foram pesquisadas usando as palavras-chave "D-ribose", "fibromyalgia", "mitochondrial dysfunction" e "ATP synthesis". Os dados obtidos foram analisados em termos das vias metabólicas da molécula, eficácia clínica, perfil de segurança e interação com terapias complementares.

Results and Conclusions

Observa-se que, após entrar na célula, a D-ribose é fosforilada a ribose-5-fosfato (R-5-P) através da enzima riboquinase e ativa as vias de recuperação de nucleotídeos acelerando a síntese de fosforibosil pirofosfato (PRPP). Análises metabômicas realizadas em pacientes com FM confirmam baixos níveis de ATP; é relatado que a suplementação com D-ribose fecha essa lacuna de energia, proporcionando uma melhora significativa nos níveis de energia e na qualidade de vida. De uma perspectiva ergogênica, observa-se que ela apoia a capacidade aeróbica ao aumentar a concentração de ATP nos cardiomiócitos e reduz o acúmulo de ácido láctico após o exercício. Em relação ao perfil de segurança, afirma-se que a ingestão diária dentro de certas faixas é considerada segura pela EFSA, mas doses excessivas podem representar um risco de hipoglicemia temporária. A D-ribose destaca-se como um agente metabólico racional no gerenciamento da FM com seu mecanismo de suporte direto à função mitocondrial. Seus efeitos positivos sobre a intolerância ao exercício e a fadiga muscular crônica, em particular, indicam que este suplemento pode oferecer uma abordagem de tratamento integrada com os princípios da nutrição esportiva.

Keywords: Síntese de ATP, D-ribose, Fibromialgia, Suplementos

Densidad mineral ósea y factores asociados en adultos físicamente activos con síndrome de Down.

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Resumo

Introduction

El síndrome de Down (SD) es una condición genética causada por la trisomía del cromosoma 21, asociada a una menor masa muscular y a alteraciones en la densidad mineral ósea, lo que incrementa el riesgo de osteoporosis. Sin embargo, existe escasa evidencia sobre la salud ósea en adultos con SD físicamente activos. El objetivo de este estudio fue determinar la prevalencia de osteoporosis y osteopenia, así como analizar los factores asociados a la densidad mineral ósea del cuello femoral (DMO- CF).

Methods

Se realizó un estudio transversal en 50 adultos físicamente activos con SD mayores de 20 años. Se realizó una absorciometría de rayos X de doble energía (DXA) para la determinación de la DMO-CF y de la masa magra total. La osteoporosis se definió como un T-score de la DMO-CF ≤ -2.5 y la osteopenia como un T-score entre -1.0 y -2.5 , según los criterios de la Organización Mundial de la Salud. Se realizaron análisis descriptivos y comparaciones por sexo, así como una regresión lineal múltiple con la DMO-CF como variable dependiente y la edad, el sexo y la masa magra total como variables independientes.

Results and Conclusions

La muestra presentó una edad de 30.68 (7.42) años, una masa magra total de 40.82 (7.53) kg y un T-score de la DMO-CF de -1.28 (1.24). Se observó una prevalencia de osteoporosis del 14.0% y de osteopenia del 40.0%, sin observarse diferencias significativas según el sexo en las categorías diagnósticas. No obstante, la T-score de la DMO-CF fue significativamente inferior en hombres [-1.512 (1.046)] que en mujeres [-0.900 (1.455)] ($p = 0.019$). En el análisis multivariante, la DMO-CF se asoció significativamente con la edad, el sexo y la masa magra total ($R = 0.521$; $R^2 = 0.271$; R^2 ajustado = 0.224; $p = 0.002$). La edad mostró una asociación negativa con la DMO-CF ($B = -0.006$; $\beta = -0.292$; $p = 0.027$), mientras que el sexo ($B = 0.108$; $p = 0.028$) y la masa magra total ($B = 1.177 \times 10^{-5}$; $\beta = 0.587$; $p < 0.001$) se asociaron positivamente con la DMO, siendo la masa magra total el predictor de mayor peso del modelo. Los adultos con SD físicamente activos presentan una elevada prevalencia de alteraciones en la salud ósea. El sexo masculino se asoció con una peor DMO-CF, mientras que una mayor masa magra total se relacionó con mejores valores de DMO-CF. Estos hallazgos refuerzan la

importancia de diseñar intervenciones específicas de ejercicio físico orientadas al mantenimiento o incremento de la masa muscular, con el fin de favorecer la salud ósea y musculoesquelética en esta población.

Keywords: Síndrome de Down; densidad mineral ósea; osteoporosis; osteopenia; composición corporal; masa muscular.

Suplementación ergogénica en futbolistas femeninas: una scoping review sobre cafeína, creatina y beta-alanina.

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Resumo

Introduction

La profesionalización del fútbol femenino ha incrementado las demandas físicas y fisiológicas de las jugadoras, destacando el posible papel de ayudas ergogénicas como la cafeína, la creatina y la beta-alanina. Sin embargo, la evidencia disponible específicamente en futbolistas femeninas sigue siendo limitada, metodológicamente heterogénea y de aplicabilidad incierta para establecer recomendaciones específicas para mujeres.

Methods

Se realizó una scoping review siguiendo las recomendaciones del Joanna Briggs Institute y la guía PRISMA-ScR. Se realizaron búsquedas sistemáticas en PubMed, Scopus y Web of Science hasta marzo de 2026. Se incluyeron estudios experimentales y cuasi-experimentales en futbolistas femeninas que evaluaran resultados de rendimiento o variables fisiológicas relacionadas con la suplementación con cafeína, creatina o beta-alanina. Los datos se sintetizaron de forma descriptiva y la calidad metodológica se evaluó críticamente mediante herramientas JBI.

Results and Conclusions

Se incluyeron diez estudios (cafeína n=3; creatina n=4; beta-alanina n=3). En general, la evidencia disponible fue limitada y metodológicamente heterogénea, con tamaños muestrales pequeños, protocolos de suplementación variados, diversidad de variables analizadas y frecuentes cointervenciones. La calidad metodológica fue generalmente baja-moderada debido a condiciones de control insuficientes, inconsistencias en el cegamiento y escasa consideración de variables específicas femeninas. La cafeína mostró algunos beneficios agudos sobre el rendimiento de alta intensidad, aunque los resultados estuvieron frecuentemente condicionados por formulaciones multi-ingrediente. La creatina se mostró como el suplemento más prometedor para el rendimiento repetido de alta intensidad y variables relacionadas con la fuerza, especialmente cuando se combinó con entrenamiento estructurado, además de mostrar un perfil de seguridad favorable. Los resultados de la beta-alanina fueron inconsistentes. De forma importante, factores específicos femeninos, como la fase del ciclo menstrual y el uso de anticonceptivos

hormonales, fueron escasamente reportados o controlados. La evidencia actual sigue siendo insuficiente para establecer recomendaciones sólidas específicas para futbolistas femeninas. Futuras investigaciones deberían priorizar ensayos adecuadamente controlados, medidas de resultado estandarizadas y la consideración sistemática de factores fisiológicos específicos femeninos.

Keywords: Fútbol femenino; ayudas ergogénicas; cafeína; creatina; beta-alanina; nutrición deportiva.

Efectos de la suplementación aislada con L-leucina sobre la fuerza y el rendimiento de potencia en adultos físicamente activos: revisión sistemática y metaanálisis.

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Resumo

Introduction

La L-leucina es un regulador clave de la síntesis de proteínas musculares mediante la activación de la vía mTORC1. Aunque las respuestas anabólicas agudas a la suplementación con leucina están ampliamente descritas, sus efectos aislados sobre el rendimiento funcional en adultos sanos y físicamente activos siguen siendo inciertos. Los estudios previos muestran resultados inconsistentes, especialmente cuando la ingesta proteica es adecuada. Por ello, el objetivo de esta revisión sistemática y metaanálisis fue determinar si la suplementación crónica con L-leucina aislada mejora el rendimiento relacionado con la fuerza y la potencia/sprint en adultos físicamente activos y deportistas.

Methods

Se realizó una revisión sistemática y metaanálisis siguiendo las directrices PRISMA 2020. Se buscaron estudios en cinco bases de datos electrónicas (PubMed, Web of Science, Scopus, CENTRAL y SPORTDiscus) desde su inicio hasta noviembre de 2025. Se incluyeron ensayos controlados aleatorizados que evaluaran suplementación aislada con L-leucina durante al menos cuatro semanas en adultos sanos físicamente activos. Se extrajeron variables relacionadas con fuerza muscular, potencia anaeróbica y rendimiento de sprint. El riesgo de sesgo se evaluó mediante la herramienta RoB 2 y los tamaños del efecto se calcularon mediante modelos de efectos aleatorios (Hedges' g).

Results and Conclusions

Ocho ensayos controlados aleatorizados con un total de 214 participantes cumplieron los criterios de inclusión. Los análisis combinados mostraron efectos pequeños pero estadísticamente significativos a favor de la suplementación con L-leucina tanto en variables de fuerza ($g = 0.23$; IC95%: 0.05–0.41) como de potencia/sprint ($g = 0.31$; IC95%: 0.05–0.57). Los efectos fueron más evidentes en individuos no entrenados o recreacionalmente activos y en protocolos de mayor duración, mientras que los atletas entrenados mostraron beneficios mínimos. En conjunto, la suplementación aislada con L-

leucina parece generar efectos ergogénicos modestos y dependientes del contexto, con relevancia práctica limitada cuando la nutrición y el entrenamiento ya están optimizados.

Keywords: L-leucina; suplementación con aminoácidos; fuerza muscular; rendimiento de sprint; entrenamiento de fuerza; nutrición deportiva; ayudas ergogénicas; metaanálisis.

“Análise Correlacional entre a Potência dos Membros Inferiores, Velocidade e Agilidade em Estudantes de Desporto”

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Resumo

Introduction

Este estudo tem o objetivo de analisar a relação entre a potência dos membros inferiores, a velocidade e a agilidade em estudantes do 3º ano de Desporto. Dado que o rendimento desportivo requer ações explosivas, como saltos, acelerações e mudanças de direção bruscas, é fundamental perceber em que medida a capacidade de produzir força explosiva influencia o desempenho motor nesta amostra.

Methods

Trata-se de um estudo de carácter Descritivo-Correlacional, envolvendo uma amostra de 23 estudantes do sexo masculino com uma idade média de $21,43 \pm 3,96$ anos, uma altura média de $176,15 \pm 5,42$ cm e um peso médio de $74,15 \pm 10,66$ kg. Foram aplicados testes de velocidade de 20 metros, de agilidade pelo T-Test e de potência através do Countermovement Jump (CMJ) e do Squat Jump (SJ).

Results and Conclusions

Os resultados mais importantes revelaram uma correlação positiva forte entre o CMJ e o SJ ($r=0,954$), uma correlação negativa forte entre o SJ e o teste de velocidade de 20 metros ($r=-0,670$), e uma correlação negativa forte entre os 20 metros e o T-Test ($r=-0,669$). Conclui-se que existe uma base neuromuscular comum para a potência muscular, que a força concêntrica é determinante para vencer a inércia na aceleração inicial e que a velocidade linear funciona como um pré-requisito fundamental para o desempenho na agilidade.

Keywords: Potência, Agilidade, Velocidade, Correlação, Estudantes.

Analizando el impacto del ciclo menstrual en un test incremental progresivo en mujeres físicamente activas

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Resumo

Introduction

A día de hoy, existe una brecha de género en cuanto a las respuestas y adaptaciones al esfuerzo se refiere. Esta brecha de género viene explicada por el reducido número de mujeres que formaron parte de los ensayos clínicos aleatorizados que han servido para realizar los meta-análisis que sustentan las recomendaciones de ejercicio físico en instituciones internacionales de Medicina del Deporte y Ciencias del Deporte. Para reducir esta brecha, las directrices proponen: i) reproducir estudios realizados en muestras formadas por hombres en otras formadas por mujeres; ii) incluir en futuros estudios muestras formadas por mujeres y hombres para realizar comparaciones basadas en el sexo; iii) incluir equipos de investigación formadas por hombres y mujeres; iv) analizar el impacto de las fases del ciclo menstrual (FCM). Hay que considerar que la metodología gold estándar para valorar el rendimiento en resistencia son los tests incrementales progresivos porque permiten detectar los 3 hitos fisiológicos más importantes: primer y segundo umbral ventilatorios (VT₁ y VT₂) y el consumo de oxígeno máximo (VO₂máx). De este modo, el objetivo del presente estudio es analizar el efecto de las 3 FCM sobre VT₁, VT₂ y VO₂máx en un test incremental progresivo en cicloergómetro en una muestra formada por mujeres físicamente activas.

Methods

16 mujeres físicamente activas acudieron en 6 ocasiones al Laboratorio de Ciencias del Deporte de la Universidad de Sevilla para realizar un test incremental progresivo en cicloergómetro consistente en incrementos de 15 W hasta la fatiga. Durante el test se monitorizó el intercambio gaseoso usando un analizador de gases para detectar VT₁, VT₂ y VO₂máx. Antes del test incremental, se analizó la composición corporal por medio de bioimpedancia eléctrica. Además, se tomó una muestra de orina en condiciones basales y de post-ejercicio para determinar los niveles de hormona luteinizante (LH). Un análisis de la varianza para medidas repetidas (ANOVA-MR) con el factor intra-sujeto PMC (fase folicular vs ovulatoria vs lútea) se aplicó, realizándose un post-hoc de Bonferroni. Las diferencias estadísticas se fijaron como $p < 0,05$.

Results and Conclusions

Se identificaron diferencias estadísticamente significativas en los niveles de LH ($p < 0,01$; $\eta^2 p = 0,49$), con mayores niveles en la fase ovulatoria con respecto a la folicular ($p = 0,04$) y la lútea ($p = 0,04$). Con respecto al máximo rendimiento en resistencia, no se detectó

ningún efecto significativo ni en el VO2máx ($p=0,89$; $\eta^2p<0,01$) ni en el tiempo hasta el agotamiento ($p=0,80$; $\eta^2p<0,01$). En cuanto al rendimiento submáximo, no se identificaron diferencias estadísticamente significativas en VT1(), aunque el VT2 fue afectado por FCM ($p=0,04$; $\eta^2p=0,20$) con un mayor %VO2máx en la fase ovulatoria con respecto a la fase lútea ($87,3 \pm 5,9\%$ vs $81,7 \pm 8,6\%$; $p=0,03$). A pesar de que el VO2máx es considerado el marcador más importante para clasificar a atletas por nivel de competencia, VT1y VT2 permiten detectar diferencias entre atletas de un mismo nivel de competencia. De este modo, los resultados de este estudio presentan importantes aplicaciones prácticas porque durante la fase ovulatoria las mujeres deportistas pueden ser más competitivas en competiciones de resistencia y soportar mayores demandas en las sesiones de entrenamiento de resistencia.

Keywords: Ciclismo; Resistencia; Mujer Deportista; Rendimiento Deportivo; VO2max.

Impacto hormonal en el riesgo de lesión del ligamento cruzado anterior en la atleta femenina: mecanismos bioquímicos, evidencia actual y perspectivas clínicas

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Resumo

Introduction

Las mujeres deportistas presentan un riesgo de rotura del ligamento cruzado anterior (LCA) entre 2 y 10 veces superior al de sus homólogos masculinos en el mismo deporte. Aunque los factores anatómicos y biomecánicos están bien documentados, el papel de las fluctuaciones hormonales del ciclo menstrual como modulador del riesgo de lesión permanece insuficientemente estudiado y sin consenso clínico. La relaxina y el estrógeno han emergido como los principales candidatos hormonales implicados en la vulnerabilidad ligamentosa cíclica de la atleta femenina.

Methods

Se realizó una revisión narrativa con búsqueda sistematizada en PubMed y Web of Science, utilizando los términos: relaxin, ACL injury, menstrual cycle, female athlete, estrogen, knee laxity, entre otros, con operadores booleanos AND y OR. Se incluyeron revisiones sistemáticas, metaanálisis, scoping reviews y estudios de cohorte publicados entre 2014 y 2026, con texto completo disponible y que analizaran la relación entre hormonas, ciclo menstrual y lesiones del LCA.

Results and Conclusions

La evidencia identifica una secuencia hormonal en dos fases. En los días 12–14, el pico de estrógeno inhibe el entrecruzamiento del colágeno y aumenta la expresión de receptores de relaxina en el LCA (Birt & McCarthy, 2023). Entre los días 21–24, el pico de relaxina activa las MMP-1 y MMP-13, degradando el colágeno tipo I y suprimiendo su síntesis (Parker et al., 2024; Berger et al., 2023). Las atletas con relaxina sérica superior a 6,0 pg/mL presentan un riesgo 4,4 veces mayor de rotura (Dragoo et al., 2011), y la hiperextensión de rodilla aumenta significativamente en la fase ovulatoria junto con una caída del control neuromuscular activo (Shagawa et al., 2021). Respecto a los ACO, estudios anteriores a 2020 sugerían una reducción del riesgo del 20%, pero White et al. (2023), con datos de 5 millones de mujeres, concluyen que no existe evidencia de alta calidad que respalde su uso preventivo, ya que actúan solo sobre la laxitud pasiva sin corregir los déficits neuromusculares. La principal limitación del campo es la ausencia de confirmación hormonal analítica en la mayoría de estudios (Dos'Santos et al., 2023; MacMillan et al., 2024).

Keywords: Ligamento cruzado anterior · Ciclo menstrual · Relaxina · Estrógeno · Atleta femenina · Laxitud articular · Prevención de lesiones · Fisioterapia deportiva

AValiação de Indicadores Psicossociais em Relação ao Gênero nos Atletas do Powerlifting Paralímpico

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Resumo

Introduction

Introdução: O Powerlifting Paralímpico (PP), é um esporte que além de demandar muito desempenho físico, ainda exige estabilidade psicossocial dos seus participantes.

Methods

Métodos: Trata-se de um estudo Cross-Sectional. Foram selecionados 40 atletas de Powerlifting paralímpicos, de ambos os sexos. As coletas ocorreram antes de uma competição de nível nacional organizado pelo Comitê Paralímpico Brasileiro (CPB). Os questionários utilizados foram: SF-36 (qualidade de vida), BDI-II (depressivos), IDATE (ansiedade traço e estado), POMS (perfil de humor) e o CSAI-2 (Ansiedade Pré-Competitiva).

Results and Conclusions

Resultados: Não foram encontradas diferenças significativas no Inventário de Depressão de Beck. Observou-se, por meio do instrumento POMS (Perfil de Humor), um discreto aumento nos níveis de humor entre as atletas do sexo feminino (homens $101,67 \pm 1,62$ e as mulheres $103,21 \pm 2,61$, $p = 0,035$, d de Cohen = $0,720$, efeito moderado). Na Ansiedade Pré-Competitiva (questionário CSAI-2), observou-se uma diferença entre homens ($28,68 \pm 5,82$) e mulheres ($23,61 \pm 6,50$, $p = 0,037$, d de Cohen = $0,712$, efeito moderado) apenas na Autoconfiança, com os atletas do sexo masculino com maior autoconfiança. Conclusão: Os dados demonstraram que as mulheres mostraram um perfil de humor mais elevado comparado ao dos homens. Em contraste, os homens exibiram uma maior autoconfiança e estabilidade emocional no cenário competitivo. De forma ampla, a realização do powerlifting paralímpico evidenciou-se benéfica para a saúde mental e a qualidade de vida dos atletas. Esses resultados salientam a importância do suporte psicológico contínuo no esporte paralímpico de alta performance.

Keywords: powerlifting paralímpico; atletas; saúde mental.

Influencia del ciclo menstrual en la fatigabilidad de un protocolo de entrenamiento de fuerza en sentadilla completa.

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Resumo

Introduction

Las fluctuaciones hormonales que están relacionadas con el desarrollo de la fuerza, como pueden ser la hormona luteinizante (LH), la foliculoestimulante (FSH), la progesterona y los estrógenos, a lo largo de las diferentes fases del ciclo menstrual (CM), podrían afectar al desarrollo de la fatiga originada en las mujeres. El conocimiento del impacto del ciclo menstrual en la fatigabilidad que supone un entrenamiento de fuerza en atletas femeninas es fundamental, ya que podría determinar la respuesta y la adaptación neuromuscular del estímulo de entrenamiento. El objetivo de esta investigación fue analizar la influencia del ciclo menstrual en la fatigabilidad producida por un protocolo de entrenamiento de fuerza en sentadilla completa con el 60% de una repetición máxima en mujeres físicamente activas.

Methods

Participaron siete mujeres eumenorreicas (edad: $21,7 \pm 4.3$ años, estatura: 162 ± 6.4 cm, peso corporal: $63,05 \pm 7,36$ kg) que realizaron tres sesiones de una serie de diez repeticiones continuas con el 60% de una repetición máxima, distribuidas en cada una de sus fases del CM: Fase folicular temprana, fase ovulatoria y fase lútea. El protocolo consistió en la realización de 10 repeticiones continuas en la que se registró la velocidad media propulsiva de cada repetición (VMP-10), la pérdida de velocidad (PV-10) y la pendiente de la recta de regresión.

Results and Conclusions

No existieron diferencias estadísticamente significativas entre las fases del CM en relación con la VMP-10, PV-10 y la pendiente de regresión lineal utilizada para estimar la fatigabilidad ($p > 0.05$). No obstante, se observó una tendencia a una mayor VMP-10 durante la fase lútea (VMP-10 fase lútea = $0,68 \text{ m}\cdot\text{s}^{-1}$), en comparación con la fase ovulatoria (VMP-10 fase ovulatoria = $0,67 \text{ m}\cdot\text{s}^{-1}$) y la fase folicular (VMP-10 fase folicular = $0,65 \text{ m}\cdot\text{s}^{-1}$). En conclusión, las fluctuaciones hormonales producidas durante el CM parecen no afectar significativamente a la fatigabilidad en protocolos de fuerza submáximos.

Keywords: Ciclo menstrual, fatigabilidad, velocidad media propulsiva, sentadilla y mujeres.

Influence of the menstrual cycle on maximum isometric strength and rate of strength development after a squat training session in young women

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Resumo

Introduction

Hormonal fluctuations throughout the muscle growth cycle (CM) can affect force production and neuromuscular responses. Maximum isometric strength (FIM) and rate of force development (RFD) are key indicators of neuromuscular function and athletic performance. Therefore, understanding their behavior in the different phases of the CM can contribute to optimizing training prescription and performance monitoring in women.

Methods

Seven physically active young women voluntarily participated in the study. Participants completed three assessment sessions corresponding to the follicular, ovulatory, and luteal phases of a complete menstrual cycle. Menstrual cycle tracking was performed individually using a period tracking app. The FIM and RFD variables were assessed before and after the intervention using Kinvent Delta force platforms during an isometric half-squat test.

Results and Conclusions

No significant main effects of time or menstrual cycle phase were observed for peak isometric strength (FIM) or rate of force development (RFD) ($p > 0.05$). However, a significant interaction between phase and time was found for FIM ($p = 0.02$), with significant differences between pre- and post-intervention values during the ovulatory phase and significant differences between the ovulatory and luteal phases in post-exercise values. Significant intraphase increases were identified during the ovulatory phase, along with post-exercise differences between the ovulatory and luteal phases. These findings suggest that the menstrual cycle does not exert a uniform influence on neuromuscular performance, although the ovulatory phase may represent a more physiologically favorable period for maximal isometric strength and rapid force production following endurance exercise.

Keywords: Menstrual cycle, ovulatory phase, follicular phase, luteal phase, maximum isometric strength, and rate of strength development

A maturacao explica a velocidade de bola, mas nao a precisao no futebol jovem: implicacoes para a identificacao de talentos

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Resumo

Introduction

Objetivo: A identificacao de talentos no futebol jovem e amplamente confundida pela maturacao biologica. Testamos se a velocidade de bola e a precisao do remate partilham os mesmos determinantes maturacionais, biomecanicos e visuais, ou se representam dimensoes dissociaveis da competencia de remate com implicacoes distintas para a avaliacao de talentos.

Methods

Metodos: Sessenta futebolistas masculinos de academia de quatro grupos etarios (Sub-13, Sub-15, Sub-17, Sub-19) realizaram um protocolo de remate de bico estandardizado. A velocidade de bola foi registada por radar Doppler e a precisao como congruencia em seis regioes entre a localizacao pretendida (definida por eye-tracker) e a real. A maturidade biologica foi estimada por tres indicadores (offset de Mirwald, percentagem de estatura adulta prevista, Z-score de estatura). O comportamento visual foi registado com eye-tracking movel (Tobii Pro Glasses 3), a cinematica com captura de movimento markerless (OpenCap) e a potencia do membro inferior com o salto com contramovimento. A regressao hierarquica testou as contribuicoes unicas de cada dominio para a velocidade e a precisao.

Results and Conclusions

Resultados: A maturidade e o tamanho corporal explicaram 73% da variancia na velocidade de bola ($R(2) = 0,731$, $p < ,001$). A adicao de variaveis biomecanicas ($\Delta R(2) = 0,010$, $p = ,616$) ou visuais ($\Delta R(2) = 0,018$, $p = ,374$) nao produziu melhoria significativa. Em contraste, nenhum bloco de preditores explicou a precisao (modelo completo $R(2) = 0,119$, $p > ,25$). Quando classificados por estatuto de maturidade, os jogadores precocemente maturados apresentaram uma grande vantagem na velocidade de bola ($F = 54,05$, $p < ,001$, $\eta^2(2) = 0,68$), mas nenhuma vantagem na precisao ($F = 0,72$, $p = ,489$, $\eta^2(2) = 0,03$). Conclusao: A velocidade de bola em futebolistas adolescentes e esmagadoramente um resultado relacionado com a maturacao, enquanto a precisao de remate representa uma dimensao independente e nao relacionada com a maturacao. A avaliacao de talentos baseada exclusivamente na velocidade de bola seleciona o ritmo de maturacao em vez da capacidade genuina. Incorporar a precisao a par da velocidade oferece uma base mais equitativa para identificar e desenvolver jovens futebolistas.

Keywords: Palavras-chave: identificacao de talentos; maturacao biologica; desempenho de remate; velocidade de bola; precisao de remate; bio-banding; futebol jovem; avaliacao multimodal

Análise cinemática do Squat Snatch no CrossFit: análise de atletas experientes versus indivíduos inexperientes

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Resumo

Introduction

O CrossFit tem-se expandido globalmente como um método de treino de alta intensidade que integra movimentos funcionais da ginástica, do condicionamento cardiovascular e da estabilidade corporal. O propósito central deste estudo consistiu em realizar uma análise biomecânica detalhada do Squat Snatch, comparando os padrões de execução entre atletas experientes (com acompanhamento profissional) e indivíduos inexperientes (somente com a visualização de um vídeo da técnica).

Methods

Utilizouse videometria bidimensional no plano sagital com o auxílio do software Kinovea para mapear trajetórias e calcular as amplitudes e ângulos de sete articulações críticas em todas as fases de execução. A amostra foi constituída por 10 participantes, divididos entre 4 atletas com experiência prática oriundos da Box de CrossFit Caramela e 6 indivíduos sem qualquer contato prévio com a modalidade.

Results and Conclusions

Os dados recolhidos evidenciaram trajetórias mais retilíneas, extensões articulares explosivas e eficientes (tripla extensão) e receções estáveis em agachamento profundo (overhead squat) no grupo experiente. Em contraste, o grupo inexperiente demonstrou desvios técnicos recorrentes, tais como flexão prematura dos cotovelos, défices de mobilidade nos joelhos e instabilidade na fase de receção. Conclusões: Os desvios cinemáticos identificados nos praticantes inexperientes resultam em trajetórias dispersas da barra que limitam a performance e aumentam significativamente o potencial lesivo do gesto. O estudo reforça a necessidade de instrução técnica qualificada e supervisão profissional contínua para garantir a segurança, eficácia mecânica e longevidade na prática do CrossFit.

Keywords: Cinemática; Squat Snatch; CrossFit; Kinovea; Prevenção de lesões.

O Impacto do Ramadão em Atletas Muçulmanos no Contexto Desportivo e Estratégias Para Minimizar a Perda de Rendimento

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Resumo

Introduction

O Ramadão é um dos pilares da religião islâmica e implica a ausência total de alimentos e líquidos entre o nascer e o pôr do sol, durante cerca de 30 dias. Para os atletas muçulmanos, este período coincide muitas vezes com fases competitivas exigentes, o que levanta dúvidas sobre os seus efeitos no rendimento desportivo. O nosso trabalho consiste numa investigação que procura compreender de que forma o jejum intermitente do Ramadão afeta diferentes capacidades físicas, comparando o seu impacto em desportos individuais, coletivos e de combate.

Methods

A análise baseou-se no artigo de Ghaffar et al. (2025), complementado por outros estudos relevantes na área.

Results and Conclusions

. Os resultados sugerem que o impacto do Ramadão varia consideravelmente entre atletas e modalidades, sendo mais evidente em esforços anaeróbios repetidos e em desportos coletivos. Por outro lado, atletas que ajustam o treino, a alimentação e o sono à nova rotina conseguem, em muitos casos, manter níveis competitivos satisfatórios. Conclui-se que o Ramadão deve ser encarado como um período de adaptação que exige um planeamento individualizado, e não simplesmente como uma limitação do rendimento.

Keywords: Ramadão; jejum intermitente; rendimento desportivo; nutrição; hidratação; recuperação.

O Impacto da Suplementação e da Regulação de Sódio em Atletas de Resistência

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Resumo

Introduction

1. Introdução 1.1 Enquadramento e Definição do Problema Nos desportos de endurance e ultra-endurance — categoria que engloba maratonas, triatlos de longa distância (e.g., Ironman), ciclismo de estrada de várias etapas e provas de trail ultra running —, a manutenção da homeostase hidroeletrolítica representa um dos maiores desafios biológicos impostos ao organismo humano. Durante esforços físicos contínuos e prolongados, o metabolismo energético aumenta exponencialmente, gerando uma quantidade massiva de calor endógeno que necessita de ser dissipado. O principal mecanismo termorregulador do ser humano é a evaporação do suor na superfície da pele. Contudo, esta resposta fisiológica adaptativa para evitar a hipertermia implica uma perda concomitante de água e solutos iónicos do meio interno (Baker, 2017). O ião sódio (Na^+) assume o papel de principal catião do líquido extracelular (LEC), constituindo o pilar fundamental para a determinação da pressão osmótica do plasma. Coordena não apenas o equilíbrio de fluidos entre os compartimentos intra e extracelulares, mas é também estritamente necessário para a transmissão de potenciais de ação nas células musculares e neuronais, através da bomba sódio-potássio. Quando um atleta se submete a treinos ou competições que ultrapassam as duas a três horas sob stresse térmico, o volume de suor excretado pode atingir valores consideráveis. Na ausência de um planeamento nutricional e de hidratação rigoroso e individualizado, a perda acumulada de sódio resulta numa redução do volume circulante efetivo, com potenciais disfunções cardiovasculares e neuromusculares agudas (McCubbin & Costa, 2018). As repercussões desta perda iónica e hídrica refletem-se diretamente no rendimento competitivo e na saúde do indivíduo. Dados contemporâneos demonstram que a desregulação dos gradientes eletrolíticos nas membranas axonais constitui um fator crítico para a hiperexcitabilidade neuromuscular, contrariando a narrativa clássica que atribuía as câibras e a fadiga precoce exclusivamente à acumulação de lactato ou à depleção de glicogénio (Maughan & Shirreffs, 2019). Adicionalmente, quando o atleta consome volumes excessivos de água ou soluções fortemente hipotónicas, desencadeia uma diluição severa do sódio plasmático remanescente, precipitando um quadro de Hiponatremia Associada ao Exercício (EAH), cujas complicações podem evoluir para edema cerebral agudo e desfechos fatais na ausência de intervenção médica imediata (Hew-Butler et al., 2017).

1.2 Objetivos do Trabalho Com o objetivo de sintetizar as evidências científicas e propor estratégias de aplicação prática no terreno, o presente trabalho estruturou-se em torno dos seguintes eixos: (a) Avaliar o impacto ergogénico e fisiológico da suplementação direcionada de sódio na estabilização hemodinâmica e no tempo até à exaustão em desportos de endurance; (b) Analisar os mecanismos moleculares e celulares de transporte e reabsorção iónica na glândula sudorípara écrina durante o stresse térmico; (c) Esclarecer a etiologia

multifatorial da EAH, mapeando os riscos neurológicos e identificando as suas causas primárias; (d) Fornecer um protocolo prático e reproduzível para a determinação individualizada da taxa de sudororrese e o planeamento personalizado da reposição eletrolítica.

Methods

3. Metodologia 3.1 Desenho do Estudo e Estratégia de Pesquisa O presente trabalho adota o formato de uma revisão narrativa estruturada, por oposição a uma revisão sistemática com meta-análise. Esta opção metodológica justifica-se pela heterogeneidade dos desenhos de estudo disponíveis na literatura — que combina ensaios clínicos, estudos observacionais, revisões narrativas e estudos de modelação matemática —, pela ausência de dados primários suficientemente homogêneos para agregação estatística formal e pelo âmbito curricular do trabalho, de acordo com o preconizado por Greenhalgh et al. (2018) para a síntese narrativa de evidências em contextos onde a meta-análise não é metodologicamente adequada. O objetivo não é, portanto, produzir uma estimativa de efeito combinado, mas antes mapear, sistematizar e analisar criticamente o estado do conhecimento sobre a regulação do sódio em atletas de endurance. Realizou-se uma pesquisa eletrónica estruturada nas bases de dados PubMed, Scopus, Web of Science e Google Académico. A janela cronológica foi restrita ao período compreendido entre 2017 e 2023, assegurando a integração das diretrizes mais recentes e dos consensos internacionais. Utilizaram-se operadores booleanos (AND, OR) e termos validados no sistema MeSH, combinados da seguinte forma: "sodium supplementation" AND "endurance athletes"; "exercise-associated hyponatremia" OR "sweat rate"; "SGLT intestinal absorption exercise"; "renin-angiotensin-aldosterone system exercise". A pesquisa foi conduzida de forma independente por dois autores, com triagem inicial por título e resumo, seguida de leitura integral dos artigos selecionados.

3.2 Critérios de Inclusão e Exclusão Os critérios de inclusão foram predefinidos antes do início da pesquisa. Incluíram-se ensaios clínicos controlados e aleatorizados (ECR), revisões narrativas e sistemáticas, estudos de modelação matemática e consensos clínicos publicados por federações desportivas. Os participantes tinham de ser humanos adultos saudáveis (idade ≥ 18 anos), de ambos os sexos, classificados como praticantes de desportos de endurance ou ultra-endurance (recreativos ou de elite). Foram excluídos artigos baseados em modelos animais ou simulações in vitro, publicados fora do intervalo temporal definido, relatos de caso isolados, cartas ao editor e resumos de congressos sem revisão por pares. Após a aplicação destes filtros, dez artigos foram selecionados para leitura integral e extração de evidências.

3.3 Limitações Metodológicas A presente revisão apresenta limitações inerentes ao seu desenho que devem ser consideradas na interpretação dos resultados. Em primeiro lugar, a restrição da pesquisa a publicações em língua inglesa pode ter excluído estudos relevantes publicados noutras línguas. Em segundo lugar, a heterogeneidade dos estudos incluídos — que combina revisões narrativas, ECR e estudos de modelação — impede a atribuição de um nível de evidência uniforme às conclusões apresentadas; especificamente, quatro dos dez artigos incluídos são revisões narrativas, o que representa um nível de evidência mais baixo do que estudos experimentais primários. Em terceiro lugar, a maioria dos estudos analisados foi conduzida com amostras predominantemente masculinas e em condições de laboratório ou de prova controlada, limitando a generalização dos resultados a populações femininas e a contextos competitivos reais com variáveis ambientais não controladas. Por fim, a ausência de extração formal de dados por dois revisores independentes com cálculo de

concordância inter-avaliadores (e.g., coeficiente Kappa) constitui uma limitação processual relativamente ao rigor de uma revisão sistemática formal.

Results and Conclusions

4. Resultados A análise dos dez estudos incluídos demonstrou que o sódio desempenha um papel fundamental na manutenção da homeostase hídrica, da função neuromuscular e do desempenho em atletas de endurance. A evidência sugere que a suplementação adequada de sódio favorece a absorção intestinal de água e glicose, contribui para a manutenção do volume plasmático e reduz o impacto do desvio cardiovascular durante exercícios prolongados, permitindo retardar o aparecimento da fadiga. Relativamente à Hiponatremia Associada ao Exercício (EAH), os estudos analisados indicam que a sua principal causa não é a perda excessiva de sódio através do suor, mas sim a ingestão excessiva de água ou de bebidas hipotónicas, associada à retenção hídrica mediada pela hormona antidiurética. Esta condição pode originar edema cerebral e complicações neurológicas graves, reforçando a importância de estratégias de hidratação baseadas na sensação de sede e nas necessidades individuais do atleta. Os resultados evidenciaram igualmente uma elevada variabilidade interindividual nas taxas de sudororrese e na concentração de sódio no suor. Atletas classificados como heavy sweaters ou salty sweaters apresentam perdas significativamente superiores de sódio, tornando necessária uma abordagem personalizada da reposição eletrolítica. A aclimatização ao calor mostrou-se um fator importante na redução das perdas de sódio através da melhoria da capacidade de reabsorção pelas glândulas sudoríparas. Por fim, a comparação das diferentes estratégias de reposição eletrolítica revelou que não existe uma solução universal aplicável a todos os atletas. A eficácia da suplementação depende de fatores como a duração e intensidade do exercício, as condições ambientais, a taxa de sudororrese e as características fisiológicas individuais, destacando a importância de planos de hidratação e suplementação personalizados.

6. Conclusão A presente revisão permitiu concluir que o sódio desempenha um papel essencial na manutenção da homeostase hídrica, da função neuromuscular e do desempenho em atletas de endurance e ultra-endurance. A evidência científica demonstra que uma suplementação adequada de sódio contribui para a preservação do volume plasmático, reduz o desvio cardiovascular e ajuda a retardar o aparecimento da fadiga durante esforços prolongados. Os resultados indicam ainda que a composição do suor é fortemente influenciada pelos mecanismos de reabsorção de sódio nas glândulas sudoríparas, explicando a elevada variabilidade individual observada entre atletas. Relativamente à Hiponatremia Associada ao Exercício (EAH), conclui-se que a sua principal causa é a sobre-hidratação dilucional, agravada pela retenção hídrica mediada pela vasopressina, e não a perda excessiva de sódio através do suor. A revisão reforça igualmente a importância de estratégias de hidratação e reposição eletrolítica individualizadas, baseadas na taxa de sudororrese e nas características específicas de cada atleta. O protocolo de determinação da taxa de sudororrese apresenta-se como uma ferramenta prática para apoiar esse processo. Por fim, identificam-se como áreas prioritárias para investigação futura o estudo da fisiologia feminina no contexto da hidratação e do equilíbrio eletrolítico, a influência de fatores genéticos nas perdas de sódio pelo suor e o desenvolvimento de tecnologias de monitorização eletrolítica em tempo real, capazes de otimizar a personalização das estratégias de hidratação em contexto competitivo.

Keywords: sódio, desportos de endurance, taxa de sudororrese, hiponatremia associada ao exercício, SRAA, SGLT1, reposição eletrolítica

Comparativa del rendimiento defensivo entre dos sistemas tácticos 2-1-3 en voleibol femenino de formación

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Resumo

Introduction

El sistema defensivo ha cobrado una gran importancia a nivel científico en los últimos años, al consolidarse como un factor determinante para el éxito en competición. En el voleibol femenino de formación, la elección de un sistema táctico adecuado resulta clave para optimizar la respuesta colectiva del equipo. El objetivo de este estudio fue comparar dos sistemas de defensa (2-1-3 con basculación a la diagonal frente a 2-1-3 con basculación a la línea) para determinar cuál de ellos permite obtener un mejor rendimiento en las acciones de juego.

Methods

La muestra estuvo compuesta por 15 jugadoras de categorías juvenil y sénior (17.87 ± 2.50 años). Se analizaron 387 acciones de defensa en situaciones de juego real 6 contra 6. Para el registro se utilizaron cámaras Sony, y el rendimiento se evaluó mediante el sistema de observación de la FIVB, basado en una escala de eficacia de 0 (error) a 3 (defensa excelente). El análisis estadístico se realizó con el software SPSS, empleando tablas de contingencia, la prueba chi-cuadrado de Pearson y el coeficiente V de Cramer.

Results and Conclusions

Se encontraron diferencias estadísticamente significativas en el rendimiento entre ambos sistemas defensivos ($p = 0.018$; $V = 0.190$). El sistema con basculación a la línea, correspondiente a la situación experimental 2, mostró una asociación positiva con la eficacia máxima, alcanzando un 73.3% de defensas perfectas frente al 26.7% obtenido por el sistema con basculación a la diagonal. El rendimiento defensivo se ve condicionado por el sistema táctico empleado. Los resultados muestran que el sistema 2-1-3 con basculación a la línea ofrece un rendimiento superior al sistema 2-1-3 con basculación a la diagonal, al asociarse con un mayor porcentaje de defensas excelentes.

Keywords: Metodología observacional, eficacia del toque de defensa, etapas de formación

Relação entre hábitos saudáveis e exercício físico em jovens: Revisão da literatura

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Resumo

Introduction

A atividade física está associada a diversos benefícios para a saúde. Níveis insuficientes de atividade física podem resultar em danos à saúde e ao bem-estar do indivíduo, aumentando o risco de doenças cardiovasculares, hipertensão, diabetes, alguns tipos de cancro, obesidade e mortalidade precoce. (Chaput et al., 2020) Estudos anteriores sugerem que programas de atividade física via dispositivos móveis que oferecem apenas acompanhamento semanal ou diário por mensagem de texto apresentam eficácia limitada na promoção da atividade física em adolescentes com sobrepeso ou obesidade. É possível que incentivos, combinados com acompanhamento de saúde e feedback diário sobre o alcance das metas, possam aumentar a eficácia do programa; no entanto, tais programas ainda não foram testados com adolescentes com sobrepeso e obesidade. (Chen et al., 2024) Nas últimas décadas, a obesidade infantil e juvenil aumentou significativamente em diversos países, tornando-se um problema preocupante para a saúde pública. A adoção de estilos de vida sedentários, associada a hábitos alimentares pouco saudáveis, contribui para o aumento do excesso de peso entre crianças e adolescentes. (Biddle et al., 2017) Artigo/article O excesso de peso tem múltiplas causas, e sabe-se que estas estão intimamente correlacionadas com o aumento do consumo de alimentos hipercalóricos ricos em açúcares e gorduras, baixos níveis de atividade física e envolvimento excessivo em comportamentos sedentários. Comportamentos sedentários são atividades com baixo gasto energético (< 1,5 equivalentes metabólicos), realizadas enquanto acordado, sentado ou reclinado. Estes incluem assistir televisão, usar o computador, ficar sentado durante o trajeto para o trabalho, jogar videogames, usar dispositivos móveis e tablets, entre outros. (Marques et al., 2016) Presume-se que adolescentes que passam mais tempo em atividades com ecrãs tenham uma dieta de pior qualidade, com maior consumo de lanches com alta densidade energética e baixo valor nutricional, e que o consumo desses alimentos e o tempo gasto em frente às telas atuem sinergicamente e estejam diretamente associados ao sobrepeso. (Biddle et al., 2017). Os Índices ou Pontuações de Qualidade da Dieta (IQDs) são ferramentas que visam avaliar a dieta geral de um indivíduo e categorizá-lo de acordo com o grau em que seus hábitos alimentares são saudáveis. As três principais categorias de IQDs são baseadas em nutrientes, em frequências/grupos alimentares ou em uma combinação de ambos. Além disso, alguns IQDs são projetados para países ou faixas etárias específicas e podem não ser aplicáveis a outras populações. (Biddle et al., 2017). O conceito de qualidade da dieta tem recebido crescente atenção na investigação científica. A qualidade da dieta descreve o grau de adesão às recomendações alimentares e aos padrões nutricionais saudáveis, refletindo uma ingestão alimentar equilibrada e adequada às necessidades do organismo (Chaput et al., 2020). Assim, o presente estudo teve como objetivo analisar, através de uma revisão da literatura, a

relação entre atividade física, comportamentos sedentários, qualidade da dieta e sobrepeso em adolescentes.

Methods

O presente trabalho caracteriza-se como uma revisão da literatura de natureza qualitativa. Foram analisados artigos científicos relacionados com atividade física, comportamentos sedentários, qualidade da dieta e obesidade em adolescentes. A pesquisa bibliográfica foi realizada em bases de dados científicas como PubMed, Google Scholar e ScienceDirect, utilizando descritores como physical activity, sedentary behavior, diet quality, adolescent obesity e overweight. Foram selecionados artigos publicados em português e inglês relacionados com adolescentes e jovens. Os artigos analisados permitiram identificar que níveis insuficientes de atividade física estão associados a diversos riscos para a saúde, incluindo doenças cardiovasculares, hipertensão, diabetes, obesidade e mortalidade precoce (Chaput et al., 2020). Além disso, alguns estudos analisaram programas de promoção da atividade física realizados através de dispositivos móveis, demonstrando que intervenções com acompanhamento diário, feedback sobre metas e incentivos podem melhorar a adesão à prática de atividade física em adolescentes com sobrepeso e obesidade (Chen et al., 2024). De acordo com os conteúdos analisados, verificou-se ainda que o aumento da obesidade infantil e juvenil nas últimas décadas está fortemente relacionado com estilos de vida sedentários e hábitos alimentares inadequados (Marques et al., 2016). Os estudos incluídos abordaram os comportamentos sedentários como atividades de baixo gasto energético realizadas em posição sentada ou reclinada, tais como assistir televisão, utilizar computadores, jogar videojogos e utilizar dispositivos móveis (Biddle et al., 2017). Segundo os artigos analisados, o tempo excessivo em frente aos ecrãs encontra-se associado a padrões alimentares menos saudáveis, caracterizados pelo maior consumo de alimentos hipercalóricos e de baixo valor nutricional, contribuindo para o aumento do sobrepeso em adolescentes (Marques et al., 2016). Relativamente à alimentação, os artigos enfatizaram o conceito de qualidade da dieta como o grau de adesão às recomendações nutricionais e aos padrões alimentares saudáveis (Chaput et al., 2020). Foi ainda possível destacar a utilização dos Índices de Qualidade da Dieta como instrumentos de avaliação dos hábitos alimentares, permitindo classificar os indivíduos de acordo com a qualidade nutricional da alimentação (Biddle et al., 2017). Assim, a metodologia deste trabalho consistiu na análise comparativa e interpretativa dos diferentes artigos científicos selecionados, permitindo relacionar os principais fatores associados ao sedentarismo, à qualidade da dieta e ao excesso de peso em adolescentes.

Results and Conclusions

Os estudos analisados demonstram uma forte relação entre baixos níveis de atividade física e o aumento da obesidade em crianças e adolescentes. O sedentarismo, frequentemente associado ao uso excessivo de tecnologias, reduz o gasto energético diário e favorece o aumento do peso corporal. (Marques et al., 2016) O artigo Physical activity and obesity in children destaca que crianças fisicamente ativas apresentam menor probabilidade de desenvolver obesidade e doenças associadas, como diabetes tipo 2 e problemas cardiovasculares. A prática regular de exercício melhora o metabolismo e ajuda no equilíbrio energético. (Chaput et al., 2020) No estudo Physical activity in children and adolescents, os autores referem que a atividade física é essencial para o crescimento saudável, desenvolvimento muscular e fortalecimento ósseo.

Além disso, o exercício físico melhora o desempenho escolar e o bem-estar psicológico. (Chaput et al., 2020). A meta-análise *Effect of physical activity on anxiety, depression and obesity index in children and adolescents with obesity* concluiu que a prática regular de atividade física reduz significativamente os níveis de ansiedade e depressão em jovens com obesidade. Os resultados mostraram também melhorias no índice de massa corporal (IMC) e na saúde emocional. (Chen et al., 2024) Por sua vez, o estudo *Effects of physical activity on quality of life in overweight and obese children* demonstrou que crianças com excesso de peso que praticam exercício físico regularmente apresentam melhor qualidade de vida, maior autoestima e melhor interação social. (Aguilar-Cordero et al., 2021) Os resultados reforçam a importância da implementação de programas de atividade física em escolas e comunidades, incentivando hábitos saudáveis desde cedo. A participação da família também é fundamental para promover estilos de vida mais ativos e equilibrados (Chaput et al., 2020).

Keywords: atividade física; sedentarismo; obesidade juvenil; qualidade da dieta; adolescentes

Estudio de los cambios fisiológicos tras un programa de ejercicio físico dirigido en pacientes cardíacos.

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Resumo

Introduction

La rehabilitación cardíaca (RC) basada en el ejercicio es una intervención consolidada en prevención secundaria, aunque su impacto fisiológico en condiciones clínicas reales no siempre está bien documentado. El objetivo fue comparar los parámetros de la prueba de esfuerzo cardiopulmonar (PECP) entre un grupo basal (grupo PRE) y un grupo que había completado un programa de ejercicio supervisado (grupo POST) en pacientes con cardiopatía isquémica.

Methods

Estudio observacional retrospectivo con dos grupos independientes: PRE (n = 19) y POST (n = 16), procedentes del Hospital Universitario Ramón y Cajal (Madrid). El programa supervisado consistió en tres sesiones semanales de 60 minutos combinando ejercicio aeróbico al 70% de la FC máxima y trabajo de fuerza. Variables analizadas: VO₂ máximo, umbrales ventilatorios (VT¹ y VT²), cociente respiratorio (RQ) máximo, FC máxima y tiempo total de ejercicio. Normalidad evaluada con Shapiro-Wilk; comparación entre grupos con t de Student para muestras independientes o Mann-Whitney U; tamaño del efecto con d de Cohen ($\alpha = 0,05$; IBM SPSS Statistics v26.0).

Results and Conclusions

El VO₂ máximo aumentó un 25,4% en el grupo POST ($21,5 \pm 3,8$ vs. $27,0 \pm 6,5$ ml/kg/min; $p = ,004$; $d = 1,03$). El VO₂ en el VT² aumentó un 28,5% ($p = ,004$; $d = 0,96$). El RQ máximo disminuyó significativamente ($1,1 \pm 0,08$ vs. $1,03 \pm 0,04$; $p = ,001$; $d = -1,24$). Los tres efectos fueron de magnitud grande según los criterios de Cohen. No se observaron diferencias significativas en FC máxima ni en tiempo de ejercicio, atribuibles al tratamiento con betabloqueantes (87,5% de los sujetos POST). La respuesta hemodinámica fue normal en el 100% de los sujetos POST. Conclusiones. El programa de RC supervisada produjo mejoras de gran magnitud y relevancia clínica en la capacidad aeróbica y la eficiencia metabólica. El VO₂ máximo y el VT² son indicadores de adaptación cardiovascular más sensibles que la FC máxima en poblaciones tratadas con betabloqueantes.

Keywords: rehabilitación cardíaca; VO₂ máximo; umbrales ventilatorios; cociente respiratorio; cardiopatía isquémica.

Efectos de un programa de entrenamiento multicomponente en la capacidad funcional de personas mayores de 70 años.

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Resumo

Introduction

La población española continúa su proceso de envejecimiento, según la proyección del INE (2020-2068), citado por Pérez Díaz, J., et al., (2020), en 2068 podría haber más de 14 millones de personas mayores, representando así este grupo de edad, casi un 30% de la población. Esto supone que una parte considerable sería calificada como adulto mayor o persona mayor (+65a), y que además esta tendencia irá en aumento. La OMS en su informe sobre Directrices sobre la actividad física y hábitos sedentarios (2020), recomienda a las personas mayores de 65 años, la práctica de actividad física con regularidad. Este segmento poblacional, debe acumular en la semana un mínimo de entre 150 y 300 minutos de actividad física aeróbica de intensidad moderada, o bien un mínimo de 75 y 150 minutos de actividad física aeróbica de alta intensidad, así como una combinación de ambos, con el fin de obtener resultados notables para la salud. En cuanto a la frecuencia y el tipo de actividad a realizar, la Organización Mundial de la Salud recomienda al menos 2 días a la semana para actividades de fuerza y trabajar así grandes grupos musculares. Además, dedicar al menos 3 días a la semana a la práctica de actividades físicas multicomponentes, donde predomine el equilibrio funcional, aportando beneficios como mejora de la capacidad funcional y evitar caídas.

Methods

La muestra participante consta de 35 personas mayores (+70 años) residentes a tiempo parcial en una residencia de mayores de la provincia de Sevilla. La media de edad de participación es 74,2 años, siendo 21 mujeres y 14 hombres. Población particularmente vulnerable, pero al mismo tiempo con un nivel funcional y capacidad cognitiva lo suficientemente alto como para permitirles realizar la intervención de ejercicio programada. En este sentido, se solicitó la firma de un consentimiento informado para la participación en la intervención. El estudio se rigió por los principios de la Declaración de Helsinki. Se establecieron los siguientes criterios de inclusión: edad de 70 años o más, que se encontrase en régimen de internamiento parcial, que aportase el consentimiento informado. Asimismo, se establecieron los siguientes criterios de exclusión: padecer algún tipo de patología que limitase la participación, no asistir al menos al 90% de las sesiones. La intervención se programó en 3 sesiones semanales (lunes, miércoles y viernes) de 30 minutos de duración durante 8 semanas. El cumplimiento del programa de intervención de ejercicios se documentó en un registro semanal. Los ejercicios que componen la intervención, son una adaptación del programa de ejercicios multicomponente Vivifrail para prevenir la debilidad y las caídas (Izquierdo M. et al., 2017). Este programa multicomponente se centró en una combinación estratégica de

ejercicios de resistencia, coordinación, fuerza y equilibrio, adaptados específicamente a las capacidades individuales de personas mayores . La intervención buscó una transferencia directa a las actividades de la vida diaria, utilizando materiales cotidianos y adaptados para estimular las habilidades motrices básicas de forma progresiva. Para determinar la eficacia del programa, la variable principal de estudio fue la evolución de la capacidad funcional de los participantes entre la evaluación inicial y la final. Esta medición se llevó a cabo utilizando la Batería Corta de Rendimiento Físico (SPPB, por sus siglas en inglés), una herramienta que valora conjuntamente tres parámetros clave: el equilibrio, la velocidad de la marcha y la fuerza de los miembros inferiores a través del Test de la velocidad de la marcha, Test de equilibrio y el Test de levantarse de la silla.

Results and Conclusions

Los datos presentados en la Tabla 1 reflejan una mejora general altamente significativa en la capacidad funcional de la muestra tras la intervención ($p < .001$). Esta progresión global se hace especialmente evidente al observar la mediana de la puntuación total, que asciende de 6.50 puntos en la evaluación basal a 8.50 puntos en la medición final. Este avance está impulsado de manera primordial por mejoras estadísticamente significativas en la velocidad de la marcha ($p = .015$) y en la prueba de fuerza de miembros inferiores ("Levantarse de la silla", $p = .011$). En ambas pruebas se observa un desplazamiento notable de los participantes desde los niveles de rendimiento inferiores hacia el nivel máximo (Nivel 4). Por ejemplo, el porcentaje de sujetos capaces de alcanzar la máxima puntuación en la velocidad de la marcha saltó del 15.6% al 40.0%, mientras que en la acción de levantarse de la silla creció de un escaso 6.67% inicial a un 28.9%. Por otro lado, los resultados del test de equilibrio no mostraron diferencias estadísticamente significativas entre la fase basal y la final ($p = .360$). Aunque se aprecia una tendencia clínica positiva con un aumento de los individuos que lograron el Nivel 4, pasando del 33.3% al 42.2%, esta variación no es suficiente para atribuirla directamente a la intervención descartando el efecto del azar. En conjunto, estos hallazgos sugieren que el programa fue altamente efectivo para fomentar la fuerza explosiva de las piernas y la movilidad dinámica (marcha), mientras que la estabilidad estática o el equilibrio podrían requerir un enfoque más prolongado o específico para alcanzar cambios estadísticamente concluyentes. A modo de conclusión, la implementación de un programa de entrenamiento multicomponente adaptado ha demostrado ser altamente eficaz para mejorar la capacidad funcional global de los adultos mayores. Esta intervención generó mejoras sustanciales y estadísticamente significativas tanto en la fuerza de los miembros inferiores como en la velocidad de la marcha, factores clave que se traducen en una mayor independencia para las actividades de la vida diaria y en una reducción directa del riesgo de caídas. No obstante, aunque el equilibrio mostró una tendencia clínica positiva, la ausencia de significancia estadística en las pruebas simuladas sugiere que la estabilidad estática en esta población podría requerir un mayor volumen de entrenamiento o un enfoque temporal más prolongado. En definitiva, estos hallazgos confirman que las rutinas de ejercicio físico estructurado, como la propuesta a través de la metodología Vivifrail, son fundamentales para combatir la fragilidad, fomentar la autonomía y elevar significativamente la calidad de vida en la tercera edad.

Keywords: Personas mayores, actividad física, calidad de movimiento, capacidad funcional, entrenamiento multicomponente

Comparación entre control e instrucción explícita en el entrenamiento inspiratorio

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Resumo

Introduction

Durante el entrenamiento de la musculatura inspiratoria (IMT), es frecuente la aparición de compensaciones cervicales y elevación escapular asociadas a una mayor activación de la musculatura accesoria. Aunque la mayoría de protocolos se centran en la carga respiratoria aplicada, existe poca evidencia sobre el efecto de las instrucciones técnicas en la calidad del patrón motor respiratorio. La instrucción explícita podría mejorar el control biomecánico durante tareas inspiratorias, reduciendo la activación compensatoria cervical y el movimiento escapular excesivo. El objetivo de este estudio fue comparar los efectos de una condición control y una instrucción explícita sobre la activación electromiográfica cervical y el desplazamiento vertical del acromion durante una tarea de entrenamiento inspiratorio.

Methods

Participaron 22 adultos jóvenes sanos físicamente activos. Todos realizaron una tarea de entrenamiento inspiratorio bajo dos condiciones experimentales: condición control (CNT) e instrucción explícita (EXP). Se registró la actividad electromiográfica de superficie (sEMG) del esternocleidomastoideo y de los escalenos, expresada como porcentaje de contracción voluntaria máxima (%MVC). Asimismo, se analizó el desplazamiento vertical del acromion mediante registro cinemático. Las diferencias entre condiciones se analizaron mediante análisis de varianza de medidas repetidas, estableciendo el nivel de significación en $p < 0.05$.

Results and Conclusions

La condición EXP mostró una menor activación del esternocleidomastoideo en comparación con CNT (19.0 ± 4.85 vs 27.6 ± 8.62 %MVC). Del mismo modo, el desplazamiento vertical del acromion fue considerablemente inferior en EXP respecto a CNT (0.85 ± 0.17 cm vs 2.33 ± 0.28 cm). Los resultados indican que la instrucción explícita reduce las compensaciones cervicales y escapulares durante el entrenamiento inspiratorio, favoreciendo un patrón respiratorio más eficiente desde el punto de vista biomecánico. Estos hallazgos sugieren que las estrategias instruccionales deben considerarse un componente relevante dentro de los programas de entrenamiento de la musculatura inspiratoria.

Keywords: Entrenamiento inspiratorio; electromiografía; esternocleidomastoideo; control motor; biomecánica respiratoria

¿Afecta un periodo de desentrenamiento de 10 días al rendimiento del ciclo estiramiento-acortamiento en jugadoras de voleibol de élite?

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Resumo

Introduction

La monitorización del rendimiento neuromuscular a lo largo de la temporada puede ayudar a los profesionales a identificar fluctuaciones del rendimiento asociadas al equilibrio entre estrés y recuperación, así como a periodos de reducción del estímulo de entrenamiento. Sin embargo, la evidencia sobre el desentrenamiento en voleibol es escasa y se limita principalmente a deportistas jóvenes y a periodos de desentrenamiento más prolongados (>8 semanas). Por tanto, la evidencia sobre los efectos del desentrenamiento a corto plazo en jugadoras de voleibol de élite sigue siendo limitada. Así, el objetivo del presente estudio fue analizar los efectos de un periodo corto de desentrenamiento sobre el rendimiento del ciclo estiramiento-acortamiento lento y rápido en jugadoras de voleibol de élite, utilizando el salto con contramovimiento (CMJ) y el countermovement jump rebound (CMJ-RE).

Methods

Once jugadoras profesionales de voleibol que competían en la Primera División española participaron voluntariamente en el estudio (edad: $23,55 \pm 4,97$ años; altura: $1,76 \pm 0,09$ m; masa corporal: $71,16 \pm 9,85$ kg). Las participantes completaron tres sesiones de evaluación. Las dos primeras sesiones, separadas por 24 h, se utilizaron para analizar la fiabilidad test-retest, mientras que la tercera sesión se realizó tras una pausa invernal de 10 días para evaluar los cambios pre-post desentrenamiento. En cada sesión, las jugadoras realizaron tres CMJ y tres CMJ-RE sobre plataformas de fuerza portátiles duales con una frecuencia de muestreo de 1000 Hz. Las variables fuerza-tiempo se clasificaron siguiendo el marco Person-Outcome-Driver-Strategy. La fiabilidad se analizó mediante el coeficiente de correlación intraclase, coeficiente de variación, error estándar de medida y smallest detectable difference. Las diferencias pre-post se analizaron mediante pruebas t para muestras relacionadas o Wilcoxon, calculándose además el tamaño del efecto mediante Hedges' g.

Results and Conclusions

No se observaron cambios significativos en las métricas fuerza-tiempo del CMJ tras el periodo de desentrenamiento. Sin embargo, el impulso concéntrico del CMJ-RE mostró

una reducción estadísticamente significativa, aunque trivial ($p = 0,046$; $ES = 0,11$), mientras que el mRSI disminuyó de forma no significativa ($p = 0,088$; $ES = 0,23$) y el impulso excéntrico aumentó de forma no significativa ($p = 0,095$; $ES = 0,34$). El análisis de respuesta individual reveló que solo un número limitado de jugadoras superó el smallest detectable difference, identificándose respondedoras en el impulso concéntrico, el impulso excéntrico y el mRSI del CMJ-RE. Estos hallazgos sugieren que un periodo de desentrenamiento de 10 días afecta mínimamente al rendimiento del ciclo estiramiento-acortamiento lento en jugadoras de voleibol de élite, mientras que las métricas específicas del rebote podrían ser más sensibles para detectar cambios neuromusculares sutiles tras pausas breves durante la temporada.

Keywords: desentrenamiento; voleibol; salto con contramovimiento; plataformas de fuerza; rendimiento neuromuscular

Asociación entre la fuerza de prensión relativa, la función física y la salud física autopercibida en adultos mayores no institucionalizados

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Resumo

Introduction

La fuerza de prensión relativa (rHGS) ha sido propuesta como un indicador potencialmente más informativo del estado funcional que la fuerza de prensión absoluta en personas mayores. Sin embargo, la evidencia sobre su relación con la función física y la calidad de vida relacionada con la salud sigue siendo limitada. El objetivo fue analizar la asociación entre la fuerza de prensión relativa, la función física y la calidad de vida relacionada con la salud física en adultos mayores que viven en la comunidad.

Methods

Se realizó un estudio transversal con 56 adultos mayores ($65,5 \pm 4,7$ años; 71,4% mujeres). La fuerza de prensión se evaluó mediante dinamometría manual y se relativizó al peso corporal. La función física se valoró mediante el Short Physical Performance Battery (SPPB), el Timed Up and Go (TUG) y la prueba de marcha de 4 metros. La salud física percibida se evaluó mediante los dominios físicos del cuestionario SF-36. Se realizaron correlaciones de Spearman y modelos de regresión lineal ajustados por edad y sexo.

Results and Conclusions

Una mayor rHGS se asoció significativamente con un mejor rendimiento en el TUG ($\rho = -0.33$; $p = 0.012$), la prueba de marcha de 4 metros ($\rho = -0.39$; $p = 0.003$) y el SPPB ($\rho = 0.35$; $p = 0.009$). Asimismo, se observaron asociaciones positivas con la función física ($\rho = 0.40$; $p = 0.003$) y el dolor corporal del SF-36 ($\rho = 0.35$; $p = 0.008$). Tras ajustar por edad y sexo, la rHGS mantuvo asociaciones significativas con el TUG ($\beta = -2.61$; $p = 0.007$), la prueba de marcha de 4 metros ($\beta = -0.64$; $p = 0.047$), el SPPB ($\beta = 2.31$; $p = 0.049$), la función física ($\beta = 40.72$; $p = 0.003$) y el dolor corporal ($\beta = 39.29$; $p = 0.046$). En conclusión, La fuerza de prensión relativa se asoció de forma independiente con medidas objetivas de función física y con indicadores percibidos de salud física en adultos mayores que viven en la comunidad. Debido a su sencillez, bajo coste y facilidad de aplicación, podría constituir una herramienta útil para la detección precoz del deterioro funcional.

Keywords: envejecimiento; fuerza de prensión; función física; calidad de vida; sarcopenia; adultos mayores.

Cambios agudos en la impedancia bioeléctrica regional tras foam rolling: un ensayo controlado aleatorizado

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Resumo

Introduction

Introducción: La evidencia previa ha demostrado que el foam rolling (FR) puede inducir aumentos localizados de la impedancia bioeléctrica, reflejando potencialmente un desplazamiento transitorio de fluidos o una pérdida de agua en los tejidos tratados [1]. Sin embargo, aún no está claro si estas respuestas están específicamente relacionadas con la autoliberación miofascial o con la propia ejecución del movimiento. Por lo tanto, el objetivo de este estudio fue investigar los efectos agudos de un protocolo de FR realizado sobre el miembro inferior dominante (MID) en los parámetros regionales crudos de impedancia bioeléctrica en diferentes segmentos corporales.

Methods

Métodos: Se realizó un ensayo controlado aleatorizado que incluyó un grupo de intervención con FR y un grupo control (CON). Participaron 27 sujetos sanos (24.63 ± 2.55 años; 40.74 % mujeres): 16 fueron asignados al grupo FR (25.3 ± 2.87 años) y 1 al grupo CON (23.64 ± 1.63 años). El protocolo de FR consistió en tres series consecutivas de 60 segundos aplicadas sobre la fascia plantar, los músculos de la pantorrilla, el tibial anterior, los peroneos, los cuádriceps, los isquiotibiales, los aductores, la banda iliotibial y los glúteos del MID. El grupo CON realizó el mismo patrón de movimiento utilizando un monopatín (skateboard) para reproducir el ejercicio sin aplicar una presión miofascial significativa ni un estímulo de masaje. La resistencia (R_z) y la reactancia (X_c) se evaluaron mediante análisis regional de impedancia bioeléctrica (BIA 10¹ Anniversary, Akern, Italia) en condiciones basales, inmediatamente después de la intervención, a los 15 minutos y a los 30 minutos postintervención, siguiendo las recomendaciones del fabricante. Se realizaron ANOVAs de medidas repetidas 2 x 4 (grupo x tiempo) para cada segmento corporal con el fin de analizar los cambios de R_z y X_c a lo largo del tiempo.

Results and Conclusions

Resultados: Se observaron efectos significativos del tiempo en todos los segmentos corporales excepto en el tronco. Para la R_z , se encontraron cambios significativos en la extremidad superior dominante (ESD) ($F = 5.44$; $p = 0.02$), la extremidad superior no dominante (ESND) ($F = 10.32$; $p < 0.001$), el segmento corporal superior (SCS) ($F = 10.92$; $p < 0.001$), el segmento corporal inferior (SCI) ($F = 52.38$; $p < 0.001$), el miembro inferior dominante (MID) ($F = 40.10$; $p < 0.001$) y el miembro inferior no dominante

(MIND) ($F = 59,86$; $p < 0,001$). Del mismo modo, se encontraron efectos temporales significativos para la Xc en la ESD ($F = 10,67$; $p = 0,002$), la ESND ($F = 14,30$; $p < 0,001$), el SCS ($F = 23,23$; $p < 0,001$), el SCI ($F = 52,74$; $p < 0,001$), el MID ($F = 50,45$; $p < 0,001$) y el MIND ($F = 22,86$; $p < 0,001$). Tras el protocolo, los valores de Rz y Xc disminuyeron en ambas extremidades superiores y en el SCS hasta los 15 minutos postintervención, seguidos de un aumento a los 30 minutos. Por el contrario, ambas variables aumentaron progresivamente en los miembros inferiores y en el SCI durante todas las evaluaciones posteriores a la intervención. No se observaron efectos significativos del grupo ni interacciones grupo x tiempo. Conclusiones: La interpretación de estos hallazgos sigue siendo incierta. Por un lado, las variaciones bioeléctricas observadas podrían indicar una redistribución de los fluidos corporales inducida por la ejecución del movimiento, independientemente de los efectos mecánicos del foam rolling. Por otro lado, la posición prolongada en decúbito supino adoptada durante las mediciones de impedancia podría haber contribuido de manera sustancial a los cambios detectados, influyendo potencialmente en los desplazamientos de fluidos más que la propia intervención. Referencia: 1. <https://doi.org/10.1016/j.jbmt.2021.02.012>

Keywords: Self-Myofascial release; Foam rolling; Bioelectrical impedance vector analysis; BIVA; Body fluid distribution

Diferenças entre a alimentação vegana e omnívora em atletas: impacto no desempenho, recuperação e composição corporal.

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Resumo

Introduction

Nos últimos anos, verificou-se um aumento significativo da adesão às dietas vegetarianas e veganas, incluindo entre atletas profissionais e recreativos. Esse crescimento encontra-se associado a fatores éticos, ambientais e de promoção da saúde. Paralelamente, aumentou o interesse científico em compreender os efeitos dessas dietas no desempenho desportivo, recuperação muscular e composição corporal. A alimentação omnívora continua a ser o padrão alimentar mais utilizado no contexto desportivo, sobretudo devido à facilidade em atingir as necessidades energéticas e proteicas através do consumo de alimentos de origem animal. Em contraste, a dieta vegana exclui totalmente produtos de origem animal, exigindo maior atenção ao planeamento nutricional para assegurar ingestão adequada de nutrientes essenciais. Segundo Rogerson (2017), atletas veganos podem alcançar desempenho físico semelhante ao de atletas omnívoros quando a dieta é adequadamente planeada. Contudo, alguns nutrientes importantes para o rendimento desportivo apresentam maior risco de inadequação em dietas exclusivamente vegetais, nomeadamente vitamina B12, ferro, cálcio, zinco, creatina e ácidos gordos ómega-3. A proteína também representa um ponto central na comparação entre ambos os padrões alimentares. De acordo com Thomas, Erdman e Burke (2016), atletas necessitam aproximadamente entre 1,2 e 2,0 g/kg/dia de proteína, dependendo da intensidade e modalidade praticada. Embora dietas veganas possam atingir essas recomendações, frequentemente requerem maior variedade alimentar e atenção à qualidade proteica. Dessa forma, torna-se relevante analisar as diferenças entre alimentação vegana e omnívora em atletas, avaliando benefícios, limitações e possíveis impactos no desempenho físico.

Methods

O presente trabalho consiste numa revisão narrativa da literatura científica. A pesquisa bibliográfica foi realizada nas bases de dados PubMed, Google Scholar e SciELO, utilizando os descritores “vegan diet”, “omnivorous diet”, “athletes”, “sports nutrition” e “exercise performance”. Foram incluídos artigos publicados entre 2015 e 2025, estudos realizados em humanos e trabalhos relacionados com atletas ou indivíduos fisicamente ativos. Foram seleccionados artigos de revisão, estudos observacionais e ensaios clínicos que abordassem os efeitos das dietas vegana e omnívora no desempenho desportivo, recuperação muscular e saúde nutricional. Foram excluídos estudos realizados exclusivamente em populações clínicas, artigos duplicados e trabalhos sem relação direta com nutrição desportiva.

Results and Conclusions

Conclui-se que tanto a alimentação vegana quanto a omnívora podem ser compatíveis com um desempenho atlético adequado, desde que corretamente planeadas e ajustadas às necessidades individuais do atleta. A dieta vegana apresenta benefícios relacionados ao elevado consumo de alimentos vegetais ricos em antioxidantes e fibras, podendo favorecer recuperação muscular e saúde cardiovascular. Contudo, requer maior atenção à ingestão de nutrientes críticos, como vitamina B12, ferro, proteína, creatina e ômega-3. Já a alimentação omnívora facilita a obtenção de proteínas de elevado valor biológico e micronutrientes importantes para o desempenho físico, embora também necessite de equilíbrio e qualidade alimentar. Dessa forma, o acompanhamento nutricional individualizado é essencial para garantir saúde, recuperação e rendimento desportivo independentemente do padrão alimentar adotado.

Keywords: Nutrição desportiva; dieta vegana; dieta omnívora; atletas; desempenho físico.

La influencia de la velocidad excéntrica en el perfil carga-velocidad en el ejercicio Press de Banca

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Resumo

Introduction

Los dispositivos actuales, como el sistema T-Force, permiten un monitoreo preciso de la velocidad de repetición durante el entrenamiento de resistencia. (González-Badillo et al., 2017). Sin embargo, el control de la velocidad excéntrica dentro de un rango definido y su influencia en el rendimiento concéntrico aún no se ha investigado utilizando tecnología. Por lo tanto, el objetivo de este estudio fue examinar los efectos de diferentes velocidades en la fase excéntrica sobre la velocidad concéntrica durante el ejercicio de press de banca.

Methods

23 hombres se ofrecieron como voluntarios para participar en este estudio (20 ± 1.2 años; 1.77 ± 0.07 m; 72.4 ± 6.8 kg). Los participantes completaron dos protocolos de prueba de press de banca bajo condiciones de velocidad excéntrica distintas (lenta: -0.25 a -0.35 $\text{m} \cdot \text{s}^{-1}$; rápida: -0.65 a -0.75 $\text{m} \cdot \text{s}^{-1}$).

Results and Conclusions

Se encontraron diferencias estadísticamente significativas en la ejecución de la velocidad para todos los porcentajes de carga (%1RM) estudiados del 50% al 70% RM ($p \leq 0.001$). Se observó una relación lineal significativa entre la velocidad propulsiva media y el %RM correspondiente a cada carga absoluta utilizada durante las dos pruebas (MPV rápida ($R^2 = 0.961$; $p < 0.05$) y MPV lenta ($R^2 = 0.969$; $p < 0.05$). En conclusión, los resultados de la presente investigación demuestran que la velocidad de ejecución durante la fase excéntrica en el ejercicio de press de banca influye significativamente en la velocidad de la fase concéntrica, medida a través del MVP. Estos hallazgos subrayan la importancia de considerar la velocidad excéntrica como una variable clave en la programación del entrenamiento.

Keywords: Velocidad excéntrica, velocidad concéntrica, press de banca, entrenamiento basado en la velocidad.

EFFECTOS DE UN PERÍODO DE DESENTRENAMIENTO DESPUÉS DE UNA INTERVENCIÓN DE ENTRENAMIENTO DE FUERZA CON DIFERENTES UMBRALES DE PÉRDIDA DE VELOCIDAD SOBRE LA HIPERTROFIA MUSCULAR

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Resumo

Introduction

La pérdida de velocidad (Velocity Loss, VL) se ha establecido como un indicador válido para determinar el nivel de esfuerzo alcanzado durante el entrenamiento de fuerza (RT) (Sánchez-Medina y González-Badillo, 2011). En las adaptaciones a largo plazo, se sabe que un umbral elevado de pérdida de velocidad optimiza las ganancias de masa muscular (Pareja-Blanco et al., 2020). Sin embargo, el tejido muscular esquelético presenta un alto grado de plasticidad y se adapta a diferentes estados de actividad neuromuscular, perdiendo parcialmente las adaptaciones logradas durante los periodos de cese del entrenamiento (Mujika y Padilla, 2001). Por lo tanto, el objetivo de este estudio fue comparar los efectos de dos programas de entrenamiento de sentadilla completa (SQ) de 8 semanas con diferentes umbrales de pérdida de velocidad (es decir, 20 % frente a 40 %) y de 3 semanas de desentrenamiento sobre la hipertrofia muscular

Methods

Cuarenta y tres hombres físicamente activos siguieron un programa de entrenamiento de fuerza (RT) de 8 semanas basado en el ejercicio de sentadilla completa (SQ) (16 sesiones). Los participantes fueron asignados aleatoriamente a los dos grupos de intervención, que diferían en la pérdida de velocidad alcanzada dentro de la serie (VL20: 20 %; VL40: 40 %). La intensidad relativa (65–80 % de 1-RM), la recuperación entre series (4 minutos) y el número de series (3) se igualaron para ambos grupos en cada sesión de entrenamiento. La ecografía se evaluó en tres ocasiones: antes del entrenamiento (PRE), después del entrenamiento (POST) y tras 3 semanas de desentrenamiento (DET). Las variables analizadas fueron el área de sección transversal anatómica (ACSA) del vasto lateral al 75 % (proximal; ACSA75), al 57,5 % (media; ACSA57.5) y al 40 % (distal; ACSA40) de la longitud del fémur, definida como la distancia entre la parte inferior del cóndilo femoral lateral y la parte superior del trocánter mayor del fémur (Hogrel et al., 2015), así como el volumen muscular, que se estimó mediante un método basado en datos derivados de cinco cortes de ACSA (Cornejo-Daza et al., 2024).

Results and Conclusions

Se observaron efectos principales significativos del factor «tiempo» para el volumen muscular, ACSA57.5 y ACSA40 ($p = 0,005$ a $p < 0,001$). Se observó una interacción significativa «grupo x tiempo» ($p = 0,03$) para ACSA75, favoreciendo al grupo VL40. Ambos grupos produjeron mejoras significativas en el volumen muscular. Durante el período de desentrenamiento (DET), se observaron disminuciones significativas en ACSA75 y en el volumen muscular en ambos grupos, y en ACSA57.5 únicamente en el grupo VL40. Se observaron mayores valores de tamaño del efecto en VL40 para ACSA40, ACSA57.5, ACSA75 y volumen muscular en todos los momentos evaluados. Niveles más altos de fatiga dentro de la serie maximizan la hipertrofia muscular. Sin embargo, a pesar de la fatiga acumulada, los efectos del desentrenamiento sobre la pérdida de masa muscular fueron similares entre los grupos

Keywords: Fatiga, ACSA, Cese del entrenamiento, Sentadilla Completa, Volumen Muscular, Vasto Lateral

The Lack of Physical Exercise and Its Impact on the Occupational Performance of Institutionalized Older Adults

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Resumo

Introduction

Population aging has become an increasingly important topic in society. Discussions regarding the specific care needs of older adults have expanded the demand for long-term care services, especially among those with functional limitations and social vulnerability. In this context, Long-Term Care Facilities for Older Adults (LTCFs) are often characterized by sedentary routines and low participation in physical activities, factors that may directly affect residents' occupational performance and functionality. Therefore, this study aimed to analyze the relationship between the absence of physical exercise and its impact on the occupational performance of institutionalized older adults.

Methods

This was a cross-sectional study with a quantitative approach, conducted in a long-term care facility in the state of Sergipe, Brazil. The sample consisted of 40 institutionalized older adults of both sexes, aged over 60 years. Data were collected using a sociodemographic questionnaire and the Functional Independence Measure (FIM), an instrument designed to assess functionality in activities of daily living. Data were analyzed using descriptive statistics.

Results and Conclusions

The results showed a predominance of female participants (85%), with a mean age of 83.5 ± 6.90 years. Findings indicated a low frequency of physical activity, as 80% of participants reported not engaging in physical exercise as part of their daily routine. In addition, there was a low frequency of leaving the institution and a preference for passive activities, such as watching television. Regarding functionality, the lowest scores were observed in the locomotion (9.60 ± 4.40) and social cognition (14.7 ± 6.04) domains, highlighting limitations in mobility, problem-solving skills, and occupational participation. Although some self-care activities demonstrated relative independence, the lack of physical and occupational stimulation may contribute to functional decline and reduced occupational engagement. Conclusion: It can be concluded that the absence of physical exercise negatively influences the occupational performance of institutionalized older adults, particularly affecting mobility, functionality, and participation in daily activities. Therefore, promoting physical exercise and meaningful activities within long-term care facilities is essential to enhance autonomy, quality of life, and active aging, supported by the integrated work of a multidisciplinary team.

Keywords: Physical exercise; Occupational performance; Institutionalized older adults; Functionality; Long-term care facility for older adults.

O Impacto da Fadiga induzida pelo Treino na Velocidade de Jogadores de Futebol Sub-17

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Resumo

Introduction

O presente estudo teve como objetivo analisar o impacto da fadiga induzida pelo treino no desempenho de sprint de 30 metros em atletas Sub-17. A amostra foi constituída por 23 jogadores de futebol, com idades compreendidas entre os 16 e os 17 anos, pertencentes ao Grupo Desportivo Fabril.

Methods

A recolha de dados consistiu na realização de um sprint de 30 metros antes e após o treino, em dois dias distintos, sendo considerada a média dos valores obtidos. A análise dos dados foi realizada com recurso ao Microsoft Excel, incluindo estatística descritiva e o teste t para amostras emparelhadas ($p \leq 0,05$).

Results and Conclusions

Os resultados evidenciaram um aumento do tempo médio de sprint do momento pré-treino ($4,44 \pm 0,18$ s) para o pós-treino ($4,51 \pm 0,21$ s), indicando uma diminuição do desempenho. Esta diferença foi estatisticamente significativa ($p = 0,005$), com um tamanho do efeito de magnitude pequena a moderada ($d = 0,41$). Conclui-se que a fadiga induzida pelo treino afeta negativamente o desempenho em velocidade, destacando a importância da adequada gestão da carga de treino.

Keywords: Velocidade, Fadiga, Sprint, Atletas, Desempenho

Facilitação neuromuscular proprioceptiva versus exercícios convencionais na tendinopatia do manguito rotador: ensaio clínico randomizado

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Resumo

Introduction

A tendinopatia do manguito rotador (TMR) é uma das principais causas de dor e incapacidade do ombro, impactando negativamente a funcionalidade e a realização das atividades de vida diária. Embora os exercícios terapêuticos sejam amplamente recomendados para seu tratamento, ainda são escassos estudos que comparem abordagens convencionais e a Facilitação Neuromuscular Proprioceptiva (FNP) utilizando medidas autorrelatadas de desfecho.

Methods

Objetivo: Comparar os efeitos de um protocolo baseado em FNP e de exercícios convencionais sobre dor, função, medo/evitação de atividades e satisfação em indivíduos com TMR. Métodos: Ensaio clínico controlado, randomizado e duplo-cego, registrado no ReBEC (RBR-38xfyp5). Trinta e seis participantes com diagnóstico clínico de TMR foram distribuídos aleatoriamente em dois grupos: Grupo FNP (GFNP) e Grupo Convencional (GC). Ambos realizaram três sessões semanais, durante quatro semanas. Os desfechos avaliados foram função do membro superior (Shoulder Pain and Disability Index – SPADI), intensidade da dor (Numeric Rating Scale – NRS), medo e evitação de atividades de vida diária (ADAP), expectativa de melhora, adesão e satisfação com o tratamento. As avaliações ocorreram na linha de base, após duas semanas e ao final da intervenção.

Results and Conclusions

Resultados: Ambos os grupos apresentaram melhora significativa na função, dor e medo/evitação de atividades ao longo do tempo ($p < 0,001$). No SPADI, observou-se redução significativa dos escores em ambos os grupos, porém o GFNP apresentou desempenho superior ao GC na quarta semana ($p = 0,034$). Em relação à dor (NRS), ambos os grupos demonstraram redução significativa dos sintomas ($p < 0,001$), sem diferenças intergrupos ao final do tratamento ($p = 0,297$). Resultados semelhantes foram observados para o ADAP, com melhora significativa intragrupo ($p < 0,001$), porém sem diferença entre os grupos na avaliação final ($p = 0,341$). A adesão ao tratamento foi elevada em ambos os grupos, sendo de 89% no GFNP e 83% no GC. Quanto à satisfação, 67% dos participantes do GFNP relataram estar muito satisfeitos, em comparação a 27% no GC. Conclusão: Ambas as intervenções foram eficazes na redução da dor e do medo de

movimento e na melhora funcional de indivíduos com TMR. Entretanto, a FNP demonstrou superioridade na recuperação funcional e apresentou maiores índices de satisfação dos participantes, sugerindo que essa abordagem pode representar uma alternativa terapêutica relevante para a reabilitação da tendinopatia do manguito rotador.

Keywords: Tendinopatia do Manguito Rotador; Facilitação Neuromuscular Proprioceptiva; Exercício Terapêutico; Reabilitação; Ombro.

Efeitos da suplementação aguda de nitrato na recuperação neuromuscular após exercício resistido até a falha em mulheres treinadas

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Resumo

Introduction

O treinamento resistido até a falha muscular promove perturbações metabólicas e fadiga neuromuscular. A suplementação de nitrato aumenta a biodisponibilidade de óxido nítrico, melhorando a perfusão muscular, o manejo de cálcio e a eficiência contrátil. Entretanto, seus efeitos na recuperação neuromuscular após exercícios até a falha permanecem pouco esclarecidos. Assim, este estudo objetivou investigar os efeitos da suplementação aguda de nitrato na recuperação neuromuscular após treinamento resistido realizado até a falha em mulheres treinadas.

Methods

Participaram do estudo 16 mulheres treinadas em treinamento resistido (27 ± 5 anos; $62,6 \pm 10,6$ kg; $27,6 \pm 7,0\%$ gordura corporal; $1RM = 198,6 \pm 44,0$ kg). Na primeira visita foram realizados três saltos verticais countermovement Jump (CMJ) e três squat Jump (SJ), teste de 1RM no leg press 45° , seguidos da familiarização com o protocolo experimental. Nas visitas subsequentes, em ordem randomizada, contrabalanceada, duplo-cego e placebo-controlada, as participantes ingeriram suco de beterraba rico em nitrato ($\sim 12,8$ mmol de NO_3^-) ou placebo ($\sim 0,92$ mmol de NO_3^-), 2,5 h antes do protocolo experimental. Em seguida, elas realizaram quatro séries no leg press 45° até a falha concêntrica a 60% de 1RM, com intervalo de dois minutos entre séries. O desempenho do CMJ e SJ foram reavaliados após cinco minutos.

Results and Conclusions

A ANOVA mista de medidas repetidas não demonstrou interação condição x tempo para CMJ ($F(1,15) = 0.23$, $p = 0.638$, $\eta^2p = 0.015$) e SJ ($F(1,15) = 0.17$, $p = 0.680$, $\eta^2p = 0.012$). Também não foram observados efeitos principais de tempo ou condição ($p > 0.05$). Em conclusão, os resultados do presente estudo sugerem que a suplementação aguda de nitrato não foi efetiva para melhorar a recuperação da fadiga neuromuscular após um protocolo de treinamento resistido realizado até a falha muscular.

Keywords: Treinamento Resistido; Suco de Beterraba; Óxido nítrico

Diferencias en los conocimientos adquiridos y asimilados por los estudiantes universitarios en materia de primeros auxilios, en función del nivel de interés y la importancia que demuestran

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Resumo

Introduction

La formación en primeros auxilios es un componente esencial de la preparación de los estudiantes universitarios de Ciencias de la Actividad Física y del Deporte, ya que les permite responder de manera eficaz ante situaciones de emergencia en entornos educativos y deportivos (Khrabra et al., 2025). Sin embargo, diversos estudios han demostrado que el nivel de conocimientos de primeros auxilios entre la población universitaria suele ser insuficiente (Goktas et al., 2014; Run et al., 2019), lo que pone de relieve la necesidad de implementar programas de formación específicos y estructurados. Aunque estas intervenciones han demostrado su eficacia para aumentar los conocimientos de primeros auxilios (Aljawfi et al., 2023; Brito et al., 2020; Yüksel et al., 2022), siguen existiendo dudas sobre los factores que determinan su eficacia. En este sentido, el interés por los contenidos y la importancia que se les atribuye se consideran variables motivacionales relevantes en el proceso de aprendizaje, ya que pueden influir en la implicación de los estudiantes y en los resultados obtenidos (García-Blaya et al., 2025). Sin embargo, la evidencia científica sobre cómo el interés o la importancia percibida influyen en la adquisición y consolidación de los conocimientos de primeros auxilios entre los estudiantes universitarios es limitada. Por este motivo, es necesario comprender las diferencias que pueden surgir en la adquisición y consolidación de los conocimientos de primeros auxilios en función del interés y la importancia percibida por parte de los estudiantes. El objetivo fue analizar las diferencias en la adquisición y consolidación de conocimientos sobre primeros auxilios tras un curso de formación, basándose en el interés y la importancia que los estudiantes universitarios les atribuyen.

Methods

Se llevó a cabo un estudio preexperimental con un diseño pre-test/post-test en una muestra de 100 estudiantes del grado en Ciencias de la Actividad Física y del Deporte (35 mujeres y 65 hombres), con una edad media de $24,76 \pm 5,5$ años. Todos los participantes completaron un curso universitario de primeros auxilios integrado en el módulo «Fundamentos de contingencias en la actividad física y deportiva», que comprendía 60 horas de formación, divididas a partes iguales entre contenido teórico y práctico. El curso abarcó aspectos relacionados con los procedimientos básicos de primeros auxilios, heridas, traumatismos, alergias, reanimación cardiopulmonar (RCP) y el uso de un desfibrilador externo automático (DEA). Para evaluar los conocimientos adquiridos y su retención, se utilizó el «Cuestionario para evaluar el nivel de conocimientos de primeros auxilios» (Abrales y Fonseca, 2019), que se administró antes

y después de la sesión de formación. El instrumento consta de 30 ítems valorados en una escala de Likert de cuatro puntos, diseñada para medir el nivel de conocimientos de primeros auxilios. Además, los alumnos indicaron el grado de confianza asociado a cada respuesta, lo que permitió estimar los conocimientos consolidados mediante la aplicación de un factor de corrección (x^1 para muy inseguro y x^4 para muy seguro). El interés por el contenido y la importancia percibida por los alumnos se evaluaron mediante una escala de Likert de 4 puntos, en la que el 1 indicaba poco interés o importancia y el 4, mucho interés o importancia. Tras verificar la distribución normal de los datos mediante la prueba de Kolmogorov-Smirnov, se emplearon análisis paramétricos. Para examinar las diferencias entre las puntuaciones obtenidas en la prueba previa y la prueba posterior según los niveles de interés e importancia percibida, se aplicó la prueba t de Student para muestras emparejadas. Además, el tamaño del efecto se estimó utilizando la d de Cohen, clasificada como pequeña (0,10-0,29), moderada (0,30-0,49), grande (0,50-0,69) o muy grande ($>0,70$). El nivel de significación estadística se fijó en $p < 0,05$.

Results and Conclusions

En respuesta al interés mostrado por los estudiantes, se observó que los estudiantes con niveles de interés moderados y altos mostraron mejoras significativas en la adquisición de conocimientos en la mayor parte de los contenidos evaluados ($p < 0,001-0,017$). Sin embargo, no se observaron mejoras significativas en los procedimientos básicos ni en el cuidado de heridas en el grupo con interés moderado ($p = 0,134$ y $p = 0,483$, respectivamente), ni en los procedimientos básicos en el grupo con interés alto ($p = 0,652$). En cuanto a los conocimientos consolidados, se observó una mejora significativa en todas las áreas de contenido y niveles de interés ($p < 0,001$). En cuanto a la importancia percibida por los estudiantes, se observó un patrón similar, con mejoras significativas en la adquisición de conocimientos en la mayoría de las áreas temáticas ($p < 0,001-0,020$). Sin embargo, no se encontraron diferencias significativas en procedimientos básicos ($p = 0,343$), heridas ($p = 0,617$) y RCP ($p = 0,070$) en el grupo que atribuía una importancia moderada al contenido, ni en procedimientos básicos en el grupo con alta importancia percibida ($p = 0,126$). Los conocimientos consolidados aumentaron significativamente en todas las áreas de contenido y niveles de importancia percibida ($p < 0,001-0,002$). El curso universitario de formación en primeros auxilios demostró su eficacia a la hora de fomentar tanto la adquisición como la consolidación de conocimientos entre los estudiantes de Ciencias de la Actividad Física y del Deporte, independientemente de su nivel de interés o de la importancia que atribuyeran a la materia. Aunque se observaron algunas diferencias específicas en determinadas áreas de contenido, especialmente en los procedimientos básicos, el tratamiento de heridas y la RCP, la mejora general en los conocimientos consolidados sugiere que la combinación de contenidos teóricos y prácticos contribuye a reforzar la confianza y la asimilación del aprendizaje en todos los perfiles motivacionales analizados. Estos resultados indican que este tipo de formación puede resultar beneficiosa incluso cuando los estudiantes no perciben inicialmente que el contenido sea muy relevante, lo que refuerza el valor educativo de incorporar programas de primeros auxilios en la educación universitaria. Sin embargo, futuras investigaciones deberían analizar la retención a largo plazo de estos conocimientos y explorar con mayor profundidad cómo las variables motivacionales pueden influir de manera diferente en los resultados dependiendo del tipo de contenido tratado.

Keywords: Educación superior; Primeros auxilios; Interés; Conocimientos; Importancia percibida.

Diferencias en la Fuerza Isométrica Máxima según la fase del ciclo menstrual

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Resumo

Introduction

Históricamente, la investigación en ciencias del deporte ha presentado un sesgo de género, extrapolando modelos masculinos a la fisiología femenina sin considerar la variabilidad hormonal del ciclo menstrual. El estradiol y la progesterona poseen efectos moduladores sobre la excitabilidad del sistema nervioso central y la función contráctil periférica, lo que sugiere fluctuaciones en el rendimiento neuromuscular a lo largo de las distintas fases hormonales. El objetivo fue comparar los niveles de Fuerza Isométrica Máxima (FIM) en el tren inferior en mujeres físicamente activas durante tres fases del ciclo menstrual: Fase Folicular (FF), Fase Ovulatoria (FO) y Fase Lútea (FL).

Methods

Se empleó un diseño longitudinal con medidas repetidas en una muestra de 7 mujeres físicamente activas y eumenorreicas (edad: 21.7 ± 4.3 años). El seguimiento se realizó durante dos ciclos menstruales completos, determinando las fases mediante el método cronológico. La FIM se evaluó mediante un test de sentadilla isométrica a 90° de flexión de rodilla, utilizando plataforma de fuerza Kinvent K-Deltas. Se analizó la variable mediante un ANOVA de medidas repetidas.

Results and Conclusions

Aunque no se encontraron diferencias estadísticamente significativas entre las fases ($p = 0,084$), se registró un tamaño del efecto grande para la FIM ($\eta^2p = 0,338$). Los valores máximos de fuerza se alcanzaron durante la Fase Lútea ($783,9 \pm 246,9$ N), mientras que los valores mínimos se observaron en la Fase Ovulatoria ($734,2 \pm 200,9$ N). Estos resultados sugieren una tendencia al incremento de la capacidad de producción de fuerza máxima en la ventana post-ovulatoria. Los hallazgos sugieren que no existe un patrón claro de rendimiento neuromuscular ligado al ciclo menstrual, contradiciendo parte de la literatura clásica que sitúa el pico de fuerza en la fase ovulatoria.

Keywords: Ciclo menstrual; fuerza isométrica máxima; mujer deportista; rendimiento neuromuscular.

Respuestas Mecánicas y Metabólicas ante Diferentes Cargas en el Ejercicio de Press-Banca, Utilizando el mismo Umbral de Pérdida de Velocidad Absoluta.

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Resumo

Introduction

La pérdida de velocidad (VL) ha sido propuesta como un indicador clave para monitorizar la fatiga intra-serie, debido a su estrecha relación con las respuestas metabólicas y las pérdidas de rendimiento en diferentes configuraciones de entrenamiento de fuerza (Sánchez-Medina & González-Badillo, 2011). Tradicionalmente, los umbrales de VL se han prescrito mediante un enfoque relativo. Sin embargo, cuando estos umbrales relativos se aplican ante diferentes cargas, la VL absoluta alcanzada es diferente. En consecuencia, VL relativas equivalentes pueden inducir diferentes niveles de fatiga mecánica y metabólica en función de la carga relativa utilizada (Pareja-Blanco et al., 2019). Por ello, el objetivo del presente estudio fue comparar las respuestas mecánicas y metabólicas producidas al realizar dos protocolos de entrenamiento con diferentes cargas ($1.3 \text{ m}\cdot\text{s}^{-1}$ vs. $0.7 \text{ m}\cdot\text{s}^{-1}$), manteniendo una pérdida de velocidad absoluta de $0.5 \text{ m}\cdot\text{s}^{-1}$ en ambos protocolos.

Methods

Veinticuatro hombres con experiencia previa en entrenamiento de fuerza realizaron de manera aleatorizada dos protocolos experimentales en el ejercicio de press banca. Estos protocolos únicamente diferían en la velocidad inicial a la que se realizaba el ejercicio [$1.3 \text{ m}\cdot\text{s}^{-1} \approx 30\% \text{ 1RM}$ (V30) vs. $0.7 \text{ m}\cdot\text{s}^{-1} \approx 65\% \text{ 1RM}$ (V65)]. En ambos protocolos, los participantes realizaban una única serie hasta alcanzar una VL absoluta de $0.5 \text{ m}\cdot\text{s}^{-1}$. En el protocolo V30, la serie terminaba cuando los participantes alcanzaban una velocidad media propulsiva (VMP) de $0.8 \text{ m}\cdot\text{s}^{-1}$, mientras que el V65 finalizaba cuando la velocidad descendía hasta $0.2 \text{ m}\cdot\text{s}^{-1}$. La concentración de lactato sanguíneo fue evaluada de forma previa y 1 min 30 s después de cada protocolo. Además, el rendimiento ante la carga asociada a la VMP de $0.8 \text{ m}\cdot\text{s}^{-1}$ (V0.8-load) se evaluó a través de una serie de tres repeticiones que se realizó de forma previa al protocolo, 3 min 30 s después y 24 h post-ejercicio con el objetivo de analizar el tiempo de recuperación. La mayor VMP alcanzada fue la que se tuvo en cuenta para el análisis posterior.

Results and Conclusions

Se observó un ‘efecto’ tiempo significativo para las variables de lactato sanguíneo y V0.8-load, sin embargo, no se encontró ninguna interacción significativa ‘protocolo x tiempo’ para ninguna de las variables analizadas. Los niveles de lactato aumentaron de manera significativa después de ambos protocolos V30 y V65 ($p < 0.001$), no se encontraron diferencias entre protocolos. Además, V0.8-load disminuyó de manera significativa tras completar ambos, volvió a los valores de normalidad 24h post-ejercicio. Los resultados obtenidos sugieren que el mismo umbral de VL absoluta puede producir respuestas metabólicas y mecánicas similares ante diferentes condiciones de carga en el ejercicio de press-banca, a pesar de que ambos protocolos concluyesen en diferentes proximidades del fallo.

Keywords: Fuerza, fatiga, recuperación

Relação entre a prática desportiva extracurricular e os níveis de flexibilidade e velocidade em adolescentes

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Resumo

Introduction

O presente estudo teve como objetivo analisar a relação entre a prática desportiva extracurricular e os níveis de aptidão física, especificamente a flexibilidade e a velocidade, em alunos do ensino básico e secundário

Methods

A amostra foi constituída por 290 alunos do 7.º, 10.º e 12.º anos da Escola Secundária de Palmela, com idades compreendidas entre os 12 e os 19 anos, incluindo 137 participantes do sexo masculino e 153 do sexo feminino. Os dados foram recolhidos através da bateria FITescola, utilizando o teste Sit and Reach para avaliar a flexibilidade e o teste de sprint de 20 metros para avaliar a velocidade. Os participantes foram divididos de acordo com a existência ou não de prática desportiva extracurricular. Foram realizadas análises estatísticas descritivas e inferenciais através do teste t para amostras independentes.

Results and Conclusions

Os resultados revelaram diferenças estatisticamente significativas no teste de sprint de 20 metros, verificando-se que os alunos envolvidos em prática desportivos extracurriculares apresentaram tempos médios inferiores aos dos alunos não praticantes. Relativamente à flexibilidade, não foram observadas diferenças estatisticamente significativas entre os grupos. Estes resultados reforçam a importância da prática regular de atividade física e desportiva no desenvolvimento da aptidão física durante a adolescência, particularmente em capacidades relacionadas com o desempenho motor, como a velocidade. O estudo destaca ainda a relevância de instrumentos de avaliação da aptidão física em contexto escolar, como o FITescola, na monitorização da condição física dos jovens e na promoção de estilos de vida saudáveis.

Keywords: aptidão física; flexibilidade; velocidade; prática desportiva extracurricular; adolescentes; FITescola.

A Influência da Cafeína no Treino Anaeróbio

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Resumo

Introduction

Esta revisão analisa a influência da suplementação aguda de cafeína no rendimento anaeróbio, com foco na força muscular máxima, potência mecânica e resistência muscular localizada.

Methods

A metodologia baseou-se em revisões sistemáticas, meta-análises e umbrella reviews que integraram ensaios clínicos crossover, duplamente cegos e controlados por placebo. A amostra, predominantemente masculina e jovem, incluiu 149 participantes nos testes de força (116 homens, 33 mulheres) e 145 nos testes de potência (116 homens, 29 mulheres). Os protocolos consistiram na ingestão de 3 a 6 mg/kg de cafeína anidra 60 minutos antes do exercício.

Results and Conclusions

Os resultados demonstraram melhorias gerais significativas na força dinâmica de 1RM (SMD = 0.20; $p = 0.023$) e na potência de salto vertical (SMD = 0.17; $p = 0.047$). A força superior respondeu de forma robusta em pesos livres e máquinas, enquanto a inferior foi eficaz apenas em pesos livres. A melhoria na potência foi significativa exclusivamente em atletas (SMD = 0.23; $p = 0.025$). A resistência muscular revelou melhorias consistentes. No entanto, os resultados nos subgrupos femininos não apresentaram significância estatística. Conclui-se que a cafeína tem um efeito ergogénico ligeiro mas eficaz no rendimento anaeróbio, mas o seu impacto permanece inconclusivo nas mulheres devido ao acentuado viés de sexo na literatura.

Keywords: Cafeína; Treino Anaeróbio; Força Muscular; Potência Mecânica; Recursos Ergogénicos; Meta-análise.

Relação entre Flexibilidade e Desempenho Leg press (1RM)

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Resumo

Introduction

O presente estudo investigou a relação entre a flexibilidade de diferentes cadeias musculares e o desempenho de força máxima (1RM) no Leg Press em estudantes universitários de Desporto.

Methods

A amostra foi constituída por 17 participantes (11 do sexo masculino e 6 do sexo feminino), com média de idades de $20,47 \pm 4,16$ anos, altura de $171,94 \pm 7,20$ cm e peso de $69,95 \pm 9,91$ kg. Estes foram submetidos à avaliação da carga máxima no Leg Press e a três testes de flexibilidade (Sit and Reach, Finger-to-Floor e Weight-bearing Lunge), sendo os dados analisados através de correlação de Pearson e regressão linear múltipla.

Results and Conclusions

Os resultados indicaram a inexistência de correlações significativas na amostra global ($p > 0.05$) e o insucesso do modelo preditivo, que não obteve significância estatística e revelou um elevado erro-padrão da estimativa (100,6 kg). A análise segmentada demonstrou que, no sexo masculino, as correlações permaneceram não significativas; contudo, no sexo feminino, verificou-se uma correlação positiva e significativa ($r = 0,48$; $p = 0.03$) no teste Weight-bearing Lunge. Apesar disto, as regressões lineares múltiplas falharam em demonstrar capacidade preditiva em todas as segmentações da amostra. Conclui-se que a flexibilidade não é um preditor viável para a força máxima nos membros inferiores devido à ausência de significância dos modelos e ao elevado erro associado, embora a mobilidade na dorsiflexão possa favorecer a mecânica de execução, sugerindo que o desempenho no 1RM depende primariamente de fatores neuro morfofuncionais.

Keywords: Flexibilidade; 1RM; Leg Press; Senta e Alcança; Dedo-Solo; Dorsiflexão em Carga; Ciclo Alongamento-Encurtamento; Força Máxima; Diferença entre Sexos.

A influência que a produção de força tem na agilidade em atletas de futebol jovens (Escalões Sub-12 e Sub-15)

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Resumo

Introduction

Este estudo tem como objetivo analisar a influência da força explosiva na agilidade em jovens praticantes de futebol, comparando os dados entre os escalões Sub 12 e Sub-15.

Methods

Participaram no estudo 41 atletas do sexo masculino, distribuídos pelos escalões Sub-12 (n = 21; 11.33±0.48 anos; 141.12±32.69 cm; 39.37±7.75 kg) e Sub-15 (n = 20; 14.00±0.32 anos; 168.25±11.33 cm; 58.11±14.78 kg), avaliados na agilidade através do T-Test e na força explosiva através dos saltos Squat Jump (SJ) e Countermovement Jump (CMJ).

Results and Conclusions

Os resultados evidenciaram diferenças estatisticamente significativas em todas as variáveis, com o escalão Sub-15 a apresentar desempenhos superiores ($p < 0.001$) e magnitudes de efeito muito grandes no T-Test ($d = 3.20$), no CMJ ($d = 1.90$) e no SJ ($d = 1.60$). A análise correlacional revelou que, no escalão Sub-12, existe uma relação negativa, forte e significativa entre a força e o tempo de agilidade. Pelo contrário, nos Sub-15, esta relação deixou de ser estatisticamente significativa. A regressão linear confirmou que a capacidade preditiva da força concêntrica pura (SJ com $R^2 = 0.44$) é determinante nos atletas mais jovens, perdendo influência nos mais velhos, onde a agilidade passa a depender de fatores multifatoriais como a coordenação intermuscular e a eficiência biomecânica. Conclui-se que o treino de força explosiva tem impactos distintos consoante a etapa maturacional, sendo crucial adaptar as estratégias de treino para otimizar a performance motora ao longo de todo o processo de formação.

Keywords: Palavras-chave: força explosiva, agilidade, futebol de formação, jovens, maturação biológica.

Efectos de dos programas educativos multimodales (online vs presencial) sobre la calidad de vida en personas con esclerosis múltiple: un ensayo controlado aleatorizado

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Resumo

Introduction

La calidad de vida relacionada con la salud (CVRS) es un dominio frecuentemente afectado en personas con esclerosis múltiple remitente recurrente (EMRR).¹ Aunque los programas educativos multidominio (PEs) pueden contribuir al manejo de los síntomas y a la mejora del bienestar, existe escasa evidencia sobre la modalidad de aplicación más adecuada, especialmente al comparar intervenciones supervisadas e individualizadas (PE-IS) con programas autoguiados en línea (PE-AW).^{2,3} Así, el objetivo del presente estudio fue comparar los efectos de dos modalidades de aplicación de un programa educativo multidisciplinar, una supervisada e individualizada y otra autoguiada en línea, sobre la CVRS en personas con EMRR.

Methods

Se realizó un ensayo controlado aleatorizado en el que se compararon dos PEs (PE-IS vs. PE-AW) de 12 semanas. El PE-IS incluyó sesiones individualizadas de entrenamiento de fuerza (3 veces por semana y una intensidad moderada), un plan personalizado de dieta mediterránea llevado a cabo por una nutricionista y 8 sesiones de terapia cognitivo conductual dirigidos por un psicólogo. El PE-AW incluyó ejercicios domiciliarios con bandas elásticas (intensidad moderada RPEX), pautas dietéticas estandarizadas y sesiones de terapia cognitivo conductual sin interacción en directo y realizadas en la plataforma ADVICE. Se incluyeron adultos con EMRR, con EDSS <10 y clínicamente estables. Se utilizaron modelos lineales mixtos con grupo, tiempo, e interacción grupo x tiempo.

Results and Conclusions

En el análisis se incluyeron a 46 participantes, 23 por grupo. Ambos grupos fueron comparables al inicio en edad, sexo y EDSS. La dimensión de salud física del MSQoL-54 mejoró +5.6 puntos en el PE-IS y +4.7 puntos en el PE-AW, sin un efecto significativo del tiempo ($p = 0.201$) y sin interacción grupo x tiempo ($p = 0.907$). La dimensión de salud mental mejoró +5.8 y +4.8 puntos, respectivamente, sin efecto significativo del tiempo ($p = 0.147$) y sin diferencias entre programas ($p = 0.891$). La calidad de vida

global mejoró +4.3 puntos en el PE-IS y +3.7 puntos en el PE-AW, sin efecto significativo del tiempo ($p = 0.237$) y sin diferencias entre programas ($p = 0.938$). La adherencia fue superior en el grupo presencial en nutrición, psicología y ejercicio, pero estas diferencias no se tradujeron en una superioridad estadística en los outcomes de calidad de vida. En conclusión, ambos programas se asociaron con mejoras en los componentes físico, psicológico y global de la calidad de vida en personas con EMRR. Aunque la adherencia fue mayor en la modalidad presencial, no se observaron diferencias estadísticamente significativas entre programas.

Keywords: esclerosis múltiple remitente-recurrente; calidad de vida relacionada con la salud; programa educativo multidominio; salud digital; intervención supervisada; ejercicio físico; ensayo controlado aleatorizado.

Caracterização Não Linear da Dinâmica da Velocidade Durante uma Tarefa Contínua 4x4x4 de Basquetebol: Análise Espectral, Entropia e Pontos de Mudança

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Resumo

Introduction

A análise tradicional da carga externa no basquetebol baseia-se frequentemente em variáveis relacionadas com a magnitude do movimento, como a velocidade média, a velocidade máxima ou a distância percorrida. No entanto, estas métricas não descrevem como as flutuações do movimento se organizam temporalmente durante tarefas contínuas baseadas no jogo. Abordagens não lineares, como a análise espectral, a análise de flutuação destendenciada e as medidas baseadas em entropia, podem fornecer informação complementar sobre a variabilidade, regularidade e organização adaptativa do movimento. Assim, este estudo piloto teve como objetivo caracterizar a estrutura temporal da dinâmica da velocidade dos jogadores durante uma tarefa contínua 4x4x4 de basquetebol.

Methods

Dez jogadores masculinos profissionais de basquetebol realizaram uma tarefa contínua 4x4x4. Os dados de velocidade foram recolhidos a 100 Hz através de um sistema de posicionamento local de banda ultralarga. O sinal de velocidade foi filtrado através de um filtro Butterworth passa-baixo de segunda ordem, aplicado com fase zero, com frequência de corte de 3 Hz, selecionada após análise residual e inspeção visual. Foram calculadas estatísticas descritivas gerais para cada jogador. A estrutura espectral do sinal de velocidade foi analisada através da densidade espectral de potência pelo método de Welch, sendo estimado o expoente espectral β na banda de frequência entre 0.05 e 2.0 Hz. A análise de flutuação destendenciada foi utilizada para estimar o expoente α e avaliar correlações temporais de longo alcance. A Sample Entropy foi calculada através de janelas móveis de 2 s com passo de 1s, utilizando os parâmetros $m = 2$ e $r = 0.2 \times DP$. Posteriormente, foi aplicada análise de pontos de mudança à série temporal da entropia utilizando o algoritmo PELT, sem forçar a deteção de breakpoints.

Results and Conclusions

A análise espectral revelou valores de β compatíveis com uma estrutura tipo brown-like em todos os jogadores, indicando que as flutuações da velocidade foram dominadas por componentes de baixa frequência e elevada persistência temporal. Por outro lado, a DFA revelou valores de α compatíveis com uma estrutura tipo pink-like, sugerindo correlações temporais de longo alcance e uma organização multiescala não aleatória do movimento. Estes resultados indicam que a tarefa contínua 4x4x4 gerou uma dinâmica da velocidade

temporalmente estruturada, em vez de flutuações aleatórias. A Sample Entropy em janelas móveis permitiu caracterizar alterações locais na regularidade do movimento ao longo da tarefa, enquanto a análise não forçada de pontos de mudança foi utilizada para identificar transições relevantes na entropia apenas quando existiam alterações suficientemente claras. Em conjunto, estes resultados preliminares sugerem que as análises não lineares fornecem informação complementar relevante às métricas tradicionais de carga externa, destacando a importância de considerar não apenas quanto os jogadores se deslocam, mas também como o seu movimento se organiza temporalmente durante tarefas específicas de basquetebol.

Keywords: Basquetebol; carga externa; velocidade; análise espectral; Sample Entropy; análise de flutuação destendenciada; pontos de mudança.

O ciclo menstrual afeta a prontidão psicoemocional e a percepção subjetiva de esforço da sessão em mulheres com síndrome pré-menstrual praticantes de treinamento resistido

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Resumo

Introduction

Os sintomas da Síndrome Pré-Menstrual (SPM) podem afetar negativamente o desempenho físico; entretanto, ainda é inconclusivo se a prontidão psicoemocional e a percepção subjetiva de esforço da sessão (sPSE) durante o treinamento resistido variam ao longo do ciclo menstrual (CM). Este estudo investigou alterações na motivação, afetividade e sPSE do treinamento resistido em diferentes fases do CM de mulheres com SPM.

Methods

Dez mulheres (27,8±4,8 anos, 164,3±6,4 cm; 68,2±10,2kg) praticantes de treinamento resistido, com CM regular e diagnosticadas com SPM, foram avaliadas nas fases folicular precoce (FP), folicular tardia (FT) e lútea tardia (LT), realizando três sessões de treinamento resistido com carga externa padronizada em cada fase. Os sintomas da SPM, motivação e afetividade para o treinamento foram registrados antes das sessões, enquanto a sPSE foi registrada 30 minutos após a sessão de treinamento. A média das três sessões em cada fase do CM foi utilizada nas análises. Após confirmação da normalidade pelo teste de Shapiro-Wilk, os dados foram comparados por ANOVA de medidas repetidas com post-hoc de Bonferroni, adotando $p < 0,05$. Houve efeito das fases do CM sobre os sintomas da SPM, motivação, afetividade e sPSE ($p < 0,01$).

Results and Conclusions

Os sintomas da SPM foram maiores nas fases FP e LT comparadas à FT, enquanto motivação e afetividade foram menores nessas mesmas fases ($p \leq 0,01$), não havendo diferenças entre FP e LT ($p > 0,05$). A sPSE foi maior na fase FP (6,6±1,0 u.a.) em relação à FT e LT (5,0±1,3 e 5,4±1,0 u.a., respectivamente; $p \leq 0,01$), sem diferenças entre FT e LT ($p = 0,46$). Conclui-se que mulheres com SPM praticantes de treinamento resistido apresentam menor motivação e afetividade nas fases FP e LT, intensificando a sPSE apenas na fase FP. Esses achados sugerem que estratégias que aumentem a motivação e a afetividade podem atenuar os efeitos negativos encontrados nas fases FP e LT de mulheres com SPM.

Keywords: Menstruação; Sintomas pré-menstruais; Carga interna de treinamento; Desempenho físico.

Papel da Atividade Física Estruturada no Controle da Dor Musculoesquelética e na Melhoria dos Resultados de Saúde Relacionados à Gravidez: Uma Revisão das Evidências

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Resumo

Introduction

Contexto e Objetivo: A gravidez é um período natural, porém crítico, acompanhado por extensas alterações fisiológicas, hormonais e anatómicas. Estas alterações, incluindo o aumento de peso, mudanças no centro de gravidade, ajustes posturais e efeitos hormonais sobre os ligamentos, frequentemente contribuem para dor e disfunção musculoesquelética, particularmente dor lombar e dor da cintura pélvica, que podem afetar negativamente o bem-estar materno e os resultados de saúde relacionados à gravidez. Este estudo teve como objetivo revisar as evidências sobre o papel da atividade física estruturada no controle da dor musculoesquelética e na melhoria dos resultados de saúde materna e relacionados à gravidez.

Methods

Esta revisão sistemática foi realizada por meio de pesquisas eletrônicas em bases de dados nacionais e internacionais de reconhecida credibilidade (incluindo PubMed, Web of Science, ScienceDirect, Google Scholar, IranDoc, SID e Magiran) no período de 2000 a 2024. Após a triagem inicial de 2.100 artigos, 94 estudos relevantes e de elevada qualidade foram selecionados para análise final.

Results and Conclusions

Os resultados indicam que programas estruturados e supervisionados de atividade física, particularmente exercícios aquáticos, treino de controle motor e exercícios de fortalecimento muscular, reduzem eficazmente a dor musculoesquelética, melhoram a estabilidade postural e o equilíbrio, favorecem o ganho de peso gestacional adequado e aumentam a qualidade de vida durante a gravidez. Além disso, a prática regular de atividade física antes e durante a gestação está associada a melhores resultados de saúde relacionados à gravidez, incluindo redução do risco de obesidade, diabetes gestacional, ganho excessivo de peso gestacional, parto pré-termo e parto por cesariana. As evidências sugerem que a atividade física estruturada representa uma estratégia não farmacológica eficaz para o controle da dor musculoesquelética relacionada à gravidez e para a promoção de resultados favoráveis de saúde materna e gestacional. A integração de programas de exercício supervisionados por profissionais, juntamente com a avaliação musculoesquelética e o controle do índice de massa corporal antes e durante a gravidez,

pode contribuir significativamente para a saúde materna e fetal e para a redução de complicações gestacionais.

Keywords: Gravidez; Atividade física; Dor musculoesquelética; Intervenções de exercício; Resultados da gravidez; Índice de massa corporal; Equilíbrio; Postura; Dor lombar

Relação entre Estado Maturacional e Indicadores Biométricos Quantitativos em Estudantes do Ensino Básico e Secundário

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Resumo

Introduction

O presente estudo analisou a relação entre a idade cronológica, enquanto indicador indireto do estado maturacional, e os indicadores de aptidão física avaliados através dos testes do programa FITescola, numa amostra de 163 estudantes do ensino básico e secundário distribuídos pelo 7.º (n = 59), 10.º (n = 30) e 12.º ano de escolaridade (n = 74), com idades compreendidas entre os 11 e os 19 anos.

Methods

Os testes aplicados avaliaram seis componentes da condição física: velocidade (40 metros), resistência aeróbia (milha), força resistente abdominal (abdominais), força explosiva dos membros inferiores (impulsão horizontal), força resistente dos membros superiores (extensões de braços) e flexibilidade (senta e alcança). A análise estatística incluiu estatística descritiva, ANOVA, Teste t de Student para amostras independentes e correlação de Pearson, com um nível de significância fixado em $\alpha = 0,05$.

Results and Conclusions

Os resultados evidenciaram diferenças estatisticamente significativas em cinco das seis variáveis analisadas, com um padrão consistente de melhoria do desempenho associado ao avanço no ano de escolaridade. As diferenças concentraram-se nas comparações que envolvem o 7.º ano, não tendo sido observadas diferenças significativas entre o 10.º e o 12.º ano em nenhuma variável. A impulsão horizontal foi a variável com evolução mais expressiva ($d = 1,13$; $r = 0,529$) e a flexibilidade estabilizou a partir do 10.º ano. A idade cronológica revelou associações significativas com todas as variáveis avaliadas, corroborando a sua utilidade como proxy do desenvolvimento maturacional em contexto escolar.

Keywords: Maturação biológica; aptidão física; FITescola; idade cronológica; ensino básico e secundário; desenvolvimento físico

Evaluaciones basadas en la fuerza isométrica e intervenciones físicas en pacientes con cáncer: una revisión sistemática

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Resumo

Introduction

El cáncer es actualmente uno de los principales problemas de salud pública a nivel mundial debido al aumento de la incidencia de la enfermedad y al incremento de las tasas de supervivencia de los pacientes, lo que ha llevado a que muchos de ellos vivan con efectos secundarios a largo plazo. En este contexto, se ha demostrado que el ejercicio físico es una estrategia eficaz para mejorar la funcionalidad y la calidad de vida. Sin embargo, debido al deterioro funcional que experimentan muchos pacientes con cáncer, es necesario explorar estrategias alternativas de entrenamiento, entre las que se encuentra el entrenamiento de fuerza isométrica. El objetivo principal de esta revisión sistemática fue analizar la eficacia de las evaluaciones basadas en la fuerza isométrica y de las intervenciones físicas en pacientes con cáncer.

Methods

Se realizó una revisión sistemática siguiendo las directrices Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). La búsqueda sistemática se llevó a cabo el 10 de marzo de 2026 por dos investigadores independientes en las principales bases de datos científicas: PubMed, Scopus y Web of Science. Los criterios de inclusión se definieron según la estructura PICOS e incluyeron adultos mayores de 18 años en tratamiento oncológico o supervivientes de cáncer, estudios que incluyeran programas de entrenamiento de fuerza isométrica o el uso de pruebas isométricas para la evaluación de la fuerza, y resultados relacionados con la función física, el rendimiento o la fuerza. Se consideraron elegibles los estudios con o sin grupo control. La búsqueda identificó 967 registros iniciales, de los cuales finalmente se incluyeron 9 estudios en la revisión tras eliminar duplicados y aplicar los criterios de selección.

Results and Conclusions

De los 9 estudios incluidos, 6 utilizaron métodos isométricos para la evaluación de la fuerza, mientras que 3 analizaron intervenciones de entrenamiento isométrico. Los resultados muestran que las evaluaciones isométricas fueron útiles como herramientas simples y viables para identificar el deterioro físico en pacientes con cáncer. En cuanto al entrenamiento isométrico, los estudios revisados sugieren posibles mejoras en la fuerza muscular y la función física, con una buena seguridad y viabilidad en esta población. Las evaluaciones e intervenciones basadas en la fuerza isométrica pueden ser una estrategia

útil en la rehabilitación oncológica, aunque se necesitan más estudios con protocolos estandarizados y seguimiento a largo plazo.

Keywords: Rehabilitación oncológica; fuerza muscular; función física; terapia mediante ejercicio.

Atividade Física, Resiliência Psicológica e Esperança de Vida como Fatores Associados à Satisfação com a Vida

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Resumo

Introduction

Este estudo teve como objetivo investigar a relação entre esperança (expectativa de vida), resiliência psicológica e satisfação com a vida entre estudantes do sexo masculino do ensino médio, com ênfase na atividade física. A adolescência é um período crítico do desenvolvimento, no qual fatores psicológicos como esperança e resiliência desempenham um papel importante no bem-estar mental. A atividade física regular também é considerada um fator que pode aumentar a resiliência psicológica e a satisfação com a vida. Assim, este estudo comparou estudantes atletas e não atletas para analisar como a esperança e a resiliência predizem a satisfação com a vida.

Methods

Este estudo utilizou um delineamento descritivo, correlacional e causal-comparativo. A população foi composta por 1.415 estudantes do sexo masculino do ensino médio na cidade de Piranshahr (2022–2023). A amostra final foi de 302 estudantes, sendo 151 atletas e 151 não atletas, selecionados com base na tabela de Morgan. Os atletas foram selecionados por amostragem por conveniência, enquanto os não atletas foram selecionados por amostragem aleatória simples. Os atletas eram definidos como estudantes com pelo menos dois anos de prática esportiva contínua e no mínimo três sessões de treino por semana. Foram utilizados três instrumentos padronizados de coleta de dados: • Escala de Esperança (Life Expectancy / Hope Scale) • Questionário de Resiliência Psicológica • Escala de Satisfação com a Vida (Diener) A análise dos dados foi realizada no SPSS, utilizando correlação de Pearson e regressão linear múltipla ($p < 0,05$).

Results and Conclusions

Os resultados mostraram que tanto a esperança quanto a resiliência psicológica apresentaram correlação positiva e significativa com a satisfação com a vida. A esperança foi um preditor moderado da satisfação com a vida, explicando 11% da variância. Quando a resiliência foi incluída no modelo, a variância explicada aumentou para 15%. Também foi observada uma relação positiva entre esperança e resiliência. Estudantes com maiores níveis desses fatores apresentaram maior satisfação com a vida. Esses resultados foram

mais fortes entre os estudantes atletas, sugerindo que a atividade física pode contribuir para o desenvolvimento psicológico. A esperança e a resiliência psicológica são preditores significativos da satisfação com a vida entre estudantes do ensino médio. A atividade física parece favorecer o desenvolvimento desses recursos psicológicos, contribuindo para melhor bem-estar mental. Portanto, incentivar a prática regular de esportes nas escolas pode melhorar a saúde psicológica e a satisfação com a vida dos estudantes.

Keywords: Esperança; Resiliência psicológica; Satisfação com a vida; Atividade física; Adolescentes; Estudantes

Analysis of the Influence of the Menstrual Cycle on Physiological Stress in Professional Female Footballers

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Resumo

Introduction

La investigación diseñada específicamente para estudiar la fisiología del ciclo menstrual en deportistas femeninas sigue siendo limitada (McGawley et al., 2023). Aunque algunas evidencias sugieren que el rendimiento físico puede verse ligeramente reducido durante la fase folicular temprana en comparación con otras fases del ciclo menstrual, los resultados continúan siendo inconsistentes y aún no se ha alcanzado un consenso científico claro al respecto (McNulty et al., 2020). Por ello, son necesarios estudios longitudinales que analicen la relación entre las diferentes fases del ciclo menstrual y las variables de rendimiento deportivo.

Methods

Se llevó a cabo un estudio cuantitativo, observacional y longitudinal durante un período de tres meses con la participación de 16 futbolistas profesionales. Las variables de carga externa se registraron durante los entrenamientos y partidos oficiales mediante dispositivos GPS, e incluyeron la distancia relativa recorrida ($\text{m} \cdot \text{min}^{-1}$) y la distancia recorrida a intensidades correspondientes al 75–85 %, 85–95 % y 95–100 % de la velocidad máxima. Las fases del ciclo menstrual fueron monitorizadas mediante la aplicación Clue. Los datos se analizaron mediante modelos lineales mixtos, considerando la fase del ciclo menstrual como efecto fijo y la jugadora como efecto aleatorio.

Results and Conclusions

Se analizaron un total de 470 observaciones. No se observó un efecto significativo de la fase del ciclo menstrual sobre la distancia relativa recorrida ($F(5,450)=0.14$; $p=.984$), ni sobre la distancia recorrida a intensidades comprendidas entre el 75–85 % de la velocidad máxima ($F(5,405)=1.20$; $p=.306$), el 85–95 % de la velocidad máxima ($F(5,414)=0.89$; $p=.485$) o el 95–100 % de la velocidad máxima ($F(5,451)=1.06$; $p=.381$). Aunque, en general, se observaron valores medios más elevados durante la fase de ovulación estimada, estas diferencias no alcanzaron significación estadística. Estos resultados sugieren que la carga externa de entrenamiento se mantiene relativamente estable a lo largo de las diferentes fases del ciclo menstrual en futbolistas profesionales.

Keywords: Ciclo menstrual, rendimiento, distancia relativa, velocidad máxima.

INFLUENCIA DEL SANGRADO MENSTRUAL SOBRE LA OXIGENACIÓN MUSCULAR DURANTE TAREAS DE SENTADILLA EN MUJERES FÍSICAMENTE ACTIVAS

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Resumo

Introduction

El interés por comprender la influencia del ciclo menstrual sobre las respuestas fisiológicas al ejercicio ha aumentado considerablemente durante la última década. Las fluctuaciones de estrógenos y progesterona a lo largo del ciclo pueden afectar diferentes sistemas fisiológicos relacionados con el rendimiento físico, incluyendo la función cardiovascular, el metabolismo energético y la perfusión tisular. Sin embargo, la evidencia disponible sobre su impacto en el rendimiento y las respuestas musculares continúa siendo inconsistente, mostrando una elevada variabilidad interindividual (Carmichael et al., 2021). La espectroscopia de infrarrojo cercano (NIRS) permite evaluar de forma no invasiva la saturación de oxígeno muscular (SmO_2) y los cambios hemodinámicos locales durante el ejercicio. Esta tecnología ha demostrado ser una herramienta válida para monitorizar la utilización y disponibilidad de oxígeno en el músculo esquelético durante diferentes tipos de esfuerzo físico (Beever et al., 2020; Orcioli-Silva et al., 2024). Recientemente, algunos estudios han comenzado a investigar la posible influencia del ciclo menstrual sobre la oxigenación muscular, sugiriendo que las variaciones hormonales podrían modificar la disponibilidad y utilización local de oxígeno durante el ejercicio y la recuperación. No obstante, la evidencia sigue siendo escasa y los resultados no son concluyentes (Baker et al., 2026; Tagliapietra et al., 2025). En este contexto, resulta necesario profundizar en el análisis de la respuesta de oxigenación muscular durante tareas funcionales que reproduzcan demandas habituales del entrenamiento. Por ello, el objetivo de este estudio fue analizar la influencia de la fase de sangrado menstrual sobre la saturación de oxígeno muscular y la hemoglobina total durante tareas de sentadilla isométrica y dinámica en mujeres físicamente activas.

Methods

dinámica en mujeres físicamente activas. Método Participaron 13 mujeres físicamente activas (24.46 ± 3.02 años). La saturación de oxígeno muscular (SmO_2) y la hemoglobina total (THb) fueron registradas de forma continua mediante dos dispositivos MOXY Monitor colocados sobre ambos cuádriceps. La condición menstrual fue determinada mediante registro prospectivo del sangrado utilizando la aplicación FLO. Las evaluaciones se clasificaron en dos condiciones: • Fase de sangrado. • Fase de no sangrado. El protocolo experimental consistió en: 1. Reposo sentado (2 min). 2. Sentadilla isométrica (1^{a} min). 3. Recuperación posterior (2 min). 4. Sentadilla dinámica durante 2 min (1^{a} repetición cada 3 s). 5. Recuperación final (3 min). Los datos fueron analizados mediante modelos lineales mixtos, incluyendo como efectos fijos la fase menstrual, la

tarea realizada y el momento de medición, mientras que la participante fue introducida como efecto aleatorio. El nivel de significación se estableció en $p < .05$.

Results and Conclusions

Resultados El modelo lineal mixto mostró un efecto significativo de la fase menstrual sobre la saturación de oxígeno muscular ($F = 72.1$; $p < .001$). La fase de sangrado presentó valores significativamente inferiores de SmO_2 en comparación con la fase de no sangrado ($\beta = -1.72$; IC95% [-2.12, -1.33]; $p < .001$). Asimismo, se observaron efectos significativos de la tarea realizada y del momento de medición ($p < .001$). Respecto a la hemoglobina total, también se detectó un efecto significativo de la fase menstrual ($F = 22273.5$; $p < .001$). Los valores de THb fueron ligeramente superiores en la fase de no sangrado respecto a la fase de sangrado (11.587 ± 0.055 vs. 11.538 ± 0.055 ; diferencia = 0.049 ; $p < .001$). **Conclusiones** La fase de sangrado menstrual se asocia con una menor saturación de oxígeno muscular durante tareas funcionales de sentadilla en mujeres físicamente activas. Además, se observaron diferencias significativas en la hemoglobina total, sugiriendo modificaciones en la disponibilidad local de oxígeno durante la menstruación. Estos hallazgos indican que la menstruación puede influir sobre la dinámica de oxigenación muscular durante el ejercicio, aportando evidencia sobre la necesidad de considerar la condición menstrual en la monitorización fisiológica y la planificación del entrenamiento en mujeres físicamente activas.

Keywords: Ciclo menstrual; menstruación; oxigenación muscular; NIRS; MOXY Monitor; mujer físicamente activa.

Analysis of injuries and risk factors in swimmers competing in at least two different swimming strokes using the OSTR-02 and OSTRC-H2 tests.

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Resumo

Introduction

Competitive swimming presents a persistent prevalence of shoulder, knee, and spine injuries (Adiele and Morgan, 2018; Nahar, Martínez, Cara, and Berral de la Rosa, 2020), arising from factors such as technique, age, training volume, and years of practice (Divyanka and Dahiya, 2018). Although shoulder pain generates scientific consensus as the main pathology, current literature is divided when determining whether the knee or the lumbar area ranks second in incidence. These conditions limit sports performance and negatively impact the swimmer's daily quality of life. Given this lack of unanimity, the purpose of this study is to identify and classify the main injuries in swimmers who compete in different strokes over short periods. To this end, the direct relationship between training planning and the resulting injuries will be examined.

Methods

During the 2020-2021 competitive season, 159 amateur swimmers who participated in official competitions with different swimming clubs in the Valencian Community (Spain) took part in this research. Ages ranged between 11 and 21 years. All swimmers involved in the study successfully completed the OSTR-02 and OSTRC-H2 tests.

Results and Conclusions

RESULTS: It was observed that some non-professional swimmers participating in official competitions are injured primarily in the shoulder (27%), knee (17.6%), and spine (8.2%). Training modifications were reported by 36% of the swimmers: 28% minor and 8% moderate. This indicates that the majority (64%) were able to continue training without changes. Furthermore, a direct relationship is observed between the pain zone and training volume, with the swimming stroke used during training sessions also exerting a significant influence. **CONCLUSION:** Amateur swimmers in official competitions injure themselves mainly in the shoulder, conditioned by methodological load and biomechanical specialization. Training volume and stroke profile determine the localization of pain. This demonstrates the need to individualize prevention and muscle compensation programs. Thus, the musculoskeletal impact can be mitigated and performance optimized.

Keywords: Keywords: Swimming training, injuries, performance, amateur swimmers, official competitions.

Sprint de 200 metros como ferramenta prática e de baixo custo para estimar potência muscular em corredores recreacionais

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Resumo

Introduction

Apesar do desempenho na corrida de rua ser tradicionalmente explicado por fatores como VO_2 máx, economia de corrida e limiares metabólicos, algumas evidências sugerem que variáveis neuromusculares, especialmente a potência muscular, também podem influenciar a performance de corredores. Contudo, o método padrão de avaliação da potência, como Countermovement Jump (CMJ) e Squat Jump (SJ), demandam equipamentos de alto custo, como plataformas de força ou tapetes de contato, resultando em limitada aplicabilidade em corredores recreacionais. Assim, o objetivo do presente estudo foi propor dois testes de sprint de 200 metros como alternativa prática e acessível para estimar indiretamente a potência muscular em corredores recreacionais.

Methods

Participaram do estudo 20 corredores recreacionais (10 homens e 10 mulheres). Após uma sessão de familiarização, os participantes realizaram duas sessões experimentais em ordem randomizada e contrabalanceada, contendo um protocolo de salto (CMJ e SJ) e dois sprints máximos de 200 m [em terreno plano ou aclone (ganho de 14 metros de elevação, 4 graus, 7% de inclinação)].

Results and Conclusions

Foram encontradas correlações significativas entre a potência ($W \cdot kg^{-1}$) do salto CMJ e SJ ($r = -0.896$ e -0.884 , $p < 0,001$) e o tempo do sprint no plano (s), bem como o tempo no sprint no aclone ($r = -0.884$ e -0.880 , $p < 0,001$). Através de uma análise de curva ROC, demonstrou-se que o tempo em terreno plano e aclone apresentaram precisão semelhante para discriminar homens de mulheres, com valores de AUC variando de consideráveis a excelente ($AUC > 0,91$, $p < 0,01$), alta sensibilidade ($\geq 90\%$) e especificidade ($\geq 90\%$). Conclui-se que o sprint de 200 metros pode representar uma ferramenta prática e acessível para avaliação da potência muscular em corredores recreacionais de ambos os sexos.

Keywords: Potência muscular, Desempenho, Testes Indiretos, Corredores Recreacionais.

A influencia dos suplementos durante o ciclo menstrual

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Resumo

Introduction

O ciclo menstrual é um processo biológico cíclico regulado por alterações hormonais, sobretudo ao nível do estrogénio e da progesterona. Estas alterações influenciam vários sistemas do organismo e podem provocar sintomas físicos, emocionais e comportamentais. Entre os sintomas mais frequentes encontram-se a dor menstrual, alterações de humor, ansiedade, irritabilidade, fadiga, inchaço abdominal, desconforto mamário e diminuição do bem-estar geral. Embora o ciclo menstrual seja um processo natural, os sintomas associados podem variar bastante de pessoa para pessoa. Em alguns casos, os sintomas são ligeiros e não interferem significativamente com a rotina diária. Noutros, podem afetar a qualidade de vida, a participação escolar ou profissional, a prática desportiva e as relações sociais. Por essa razão, têm sido estudadas diferentes estratégias para reduzir o impacto negativo destes sintomas. Nos últimos anos, a suplementação nutricional tem vindo a ganhar importância como possível estratégia complementar no controlo da dor menstrual e da tensão pré-menstrual. Suplementos como a curcumina, vitamina D, zinco, cálcio, magnésio, ómega-3 e gengibre têm sido investigados devido às suas propriedades anti-inflamatórias, antioxidantes, neuromusculares e analgésicas. Assim, este trabalho pretende analisar de que forma estes suplementos podem influenciar os sintomas associados ao ciclo menstrual, com base em artigos científicos.

Methods

A procura de artigos foi realizada em bases de dados e motores de busca académicos, nomeadamente Google Scholar, PubMed, ScienceDirect, SpringerLink e bases de revistas científicas.

Results and Conclusions

Concluimos que a suplementação pode ser uma estratégia complementar útil para melhorar sintomas associados ao ciclo menstrual, como dor, ansiedade e alterações de humor.” “No entanto, os suplementos não substituem uma alimentação equilibrada nem acompanhamento profissional quando necessário.”

Keywords: ciclo menstrual; suplementação; tensão pré-menstrual; dismenorreia; nutrição

ANALYSIS OF INJURIES AMONG THE BRAZILIAN DELEGATION AT THE SOUTH AMERICAN SCHOOL GAMES – A CROSS-SECTIONAL STUDY

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Resumo

Introduction

A vigilância epidemiológica de lesões em eventos esportivos permite identificar padrões de ocorrência e subsidiar ações preventivas voltadas aos atletas.

Methods

Este estudo epidemiológico transversal teve como objetivo analisar o perfil das lesões musculoesqueléticas entre atletas brasileiros participantes dos Jogos Escolares SulAmericanos de 2023, realizados em Santiago, Chile, e Assunção, Paraguai. Um total de 202 atletas com menos de 15 anos, provenientes de diferentes modalidades esportivas, foi avaliado por meio de um sistema de vigilância de lesões baseado em atendimentos fisioterapêuticos de urgência e ambulatoriais durante as competições. Variáveis relacionadas ao sexo, tipo de lesão, localização anatômica, mecanismo da lesão, abordagem terapêutica e encaminhamento hospitalar foram analisadas utilizando estatística descritiva, teste do qui-quadrado e teste exato de Fisher ($p < 0,05$).

Results and Conclusions

Foram realizados 272 atendimentos fisioterapêuticos, predominantemente entre atletas do sexo feminino (57,4%). O atletismo apresentou o maior número de atendimentos (34,2%), seguido do judô (14,7%) e do basquetebol (12,1%). As lesões musculares (47,9%) e articulares (40,4%) foram as mais frequentes, acometendo principalmente os membros inferiores, especialmente joelho, coxa e tornozelo. A maioria das lesões foi atraumática (84,9%) e conduzida em nível ambulatorial (59,9%), com baixa taxa de encaminhamento hospitalar (6,6%). Não foram observadas diferenças significativas entre os sexos quanto ao tipo ou à localização das lesões. Esses achados sugerem que lesões não traumáticas em membros inferiores apresentam elevada prevalência entre atletas escolares brasileiros e podem contribuir para o desenvolvimento de estratégias preventivas e para o planejamento da assistência à saúde em competições multiesportivas juvenis.

Keywords: Lesão; Sistema de Vigilância em Saúde; Estudos Epidemiológicos; Medicina do Esporte; Atletas.

Impact of Physical Activity on Inhibitory Control in Children Aged 8 to 11 Years Diagnosed with ADHD

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Resumo

Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder characterized by symptoms of inattention, hyperactivity, and impulsivity, which can significantly impair children's academic, social, and emotional functioning. Among the cognitive deficits most frequently observed in this population, impairment in inhibitory control stands out as one of the main executive functions related to the ability to suppress impulsive responses and regulate behavior. Scientific evidence suggests that interventions based on physical activity and psychotherapy, particularly Cognitive Behavioral Therapy (CBT), may contribute to improvements in executive functions in children with ADHD. However, studies comparing the effects of these approaches on inhibitory control remain limited.

Methods

This study is a randomized controlled clinical trial involving 16 children with a clinical diagnosis of ADHD, aged between 8 and 11 years. Participants will be randomly assigned to two groups: the Physical Activity Group and the Psychotherapy Group. Both groups will participate in an eight-week intervention program consisting of three 50-minute sessions per week. Initially, participants will undergo screening, a structured anamnesis, and administration of the SNAP-IV scale with their caregivers. Inhibitory control will be assessed using the Go/No-Go protocol, considering indicators such as reaction time and error rate. The Physical Activity Group will participate in a structured program involving aerobic exercises and psychotherapy sessions focused on cognitive demands related to the development of executive functions and impulsivity. The Psychotherapy Group will participate in a program based on Cognitive Behavioral Therapy combined with cognitive training, using playful and therapeutic activities aimed at improving inhibitory control, impulsivity, and decision-making, as well as combined exercises (aerobic activities, coordination training, and cognitive demands). At the end of the intervention period, participants will be reassessed using the same instruments applied during the initial evaluation.

Results and Conclusions

The study is expected to determine which intervention is more effective in promoting significant improvements in inhibitory control among children with ADHD, reflected by a reduction in impulsive behaviors. In addition, improvements in self-control, behavioral self-regulation, and executive functioning are expected. Comparisons between groups

may provide evidence regarding the relative effectiveness of the proposed interventions. This study aims to expand knowledge regarding the effects of physical activity and psychotherapy on inhibitory control in children with ADHD. The findings are expected to contribute to the development of more effective interventions and to promote the cognitive and behavioral development of this population. Furthermore, the study may strengthen the scientific evidence on non-pharmacological interventions for ADHD, providing support for future research as well as for clinical and educational practice.

Keywords: Keywords: Attention-Deficit/Hyperactivity Disorder; Inhibitory Control; Physical Activity; Child; Executive Functions.

A Influência da Composição Corporal no Desempenho e Assimetria do Salto Horizontal Unilateral em Estudantes de Desporto

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Resumo

Introduction

A potência mecânica e a capacidade propulsiva dos membros inferiores são determinantes vitais no rendimento desportivo. O Salto Horizontal Unilateral (SHU) surge como um teste de campo ecológico para avaliar a força explosiva horizontal e detetar assimetrias funcionais. Contudo, a expressão desta capacidade pode ser modulada pelo perfil antropométrico e pela composição corporal do indivíduo. Objetivo: Analisar a influência da composição corporal especificamente a percentagem de Massa Gorda (%MG) e a Massa Muscular Total (MMT) no desempenho absoluto e no Índice de Assimetria (IA) do SHU.

Methods

A amostra foi constituída por 32 estudantes universitários do sexo masculino, a frequentar a Licenciatura em Desporto ($13,09 \pm 4,42\%$ de MG; $31,3 \pm 4,76$ kg de MMT). A composição corporal foi aferida por bioimpedância elétrica (Tanita MC-780MA) e a performance neuromuscular foi avaliada através do melhor de três saltos horizontais máximos com cada perna. O IA foi calculado por fórmula padrão da literatura. A análise estatística e correlações foram realizadas no software IBM SPSS Statistics, versão 30.0 ($p < 0,05$).

Results and Conclusions

A distância média alcançada no salto horizontal foi de $2,00 \pm 0,20$ m, com um IA médio de $3,76 \pm 3,13\%$. A análise correlacional de Pearson demonstrou tendências mecânicas expectáveis, embora sem significância estatística: verificou-se uma correlação negativa fraca entre a %MG e a distância de salto ($r = -0,118$; $p = 0,519$) e uma correlação positiva fraca com a MMT ($r = 0,031$; $p = 0,864$). Observaram-se correlações positivas do IA com a %MG ($r = 0,203$; $p = 0,264$) e com a MMT ($r = 0,256$; $p = 0,156$). Conclusões: A massa gorda tende a atuar como um limitador mecânico da performance absoluta (peso morto) e um catalisador de assimetrias bilaterais. Contudo, em populações com elevada literacia e proficiência motora, como estudantes de Desporto, os fatores de controlo neuromuscular parecem mitigar e compensar o impacto negativo da adiposidade no rendimento balístico final.

Keywords: Composição Corporal; Força Explosiva; Salto Horizontal Unilateral; Assimetria Bilaterais; Estudantes de Desporto

Propiedades mecánicas musculares y lateralidad clínica en personas con esclerosis múltiple: análisis exploratorio mediante miotonometría en el proyecto ADVICE

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Resumo

Introduction

La esclerosis múltiple (EM) suele cursar con asimetría clínica, manifestando mayor debilidad en una pierna (1) y síntomas como la espasticidad, que altera el tono y las propiedades musculares. Aunque su evaluación suele basarse en escalas clínicas (2), la miometría (MyotonPro®) permite cuantificar objetivamente la tensión, rigidez y elasticidad tisular de la musculatura las cuales se ven alteradas por la espasticidad. El objetivo de este estudio fue analizar la relación entre las propiedades mecánicas musculares evaluadas mediante miotonometría y la lateralidad clínica de la pierna percibida como más afectada en personas con EM.

Methods

Se reclutaron 36 participantes (28 mujeres y 8 hombres) a través de la Unidad de EM del Hospital Virgen de la Arrixaca en Murcia. Se registró la pierna percibida como más afectada y se evaluaron bilateralmente, mediante MyotonPro®, parámetros mecánicos musculares en vasto medial, vasto lateral, recto femoral, tendón de Aquiles, gastrocnemio medial y gastrocnemio lateral. Las asimetrías anatómicas derecha-izquierda se analizaron en la muestra total mediante la prueba t de Student para muestras pareadas. La comparación entre la pierna clínicamente más afectada y la pierna menos afectada se realizó en 32 participantes mediante la prueba t de Student para muestras pareadas, calculando la diferencia Δ = pierna afectada - pierna no afectada, el intervalo de confianza al (95%) y la d de Cohen pareada. Como análisis exploratorio complementario, se evaluó la capacidad de los Δ derecha-izquierda para clasificar la lateralidad clínica mediante análisis ROC, expresado como área bajo la curva (AUC), y mediante un modelo multivariable con validación cruzada. La significación estadística se estableció en $p < 0,05$.

Results and Conclusions

Se observaron asimetrías anatómicas derecha-izquierda en 9 de 24 variables, con 6 tendencias adicionales, lo que indica la presencia de asimetría mecánica muscular, aunque no necesariamente clínica. En la comparación afectada vs. no afectada, la única diferencia estadísticamente significativa se observó en la frecuencia del vasto lateral, con valores

superiores en la pierna afectada respecto a la no afectada ($13,89 \pm 2,80$ vs. $13,38 \pm 2,34$; $\Delta = 0,512$; $IC95\% = 0,024$ a $1,001$; $p = 0,048$; $d = 0,363$). La rigidez del vasto lateral mostró una tendencia en la misma dirección ($282,0 \pm 81,9$ vs. $267,64 \pm 70,48$; $\Delta = 14,369$; $p = 0,098$; $d = 0,301$). Sin embargo, los deltas derecha-izquierda no permitieron clasificar de forma robusta la lateralidad clínica (AUC máximo individual = $0,659$; AUC del modelo con validación cruzada = $0,617$), por lo que estos resultados deben interpretarse como exploratorios. En conjunto, el MyotonPro® puede aportar información complementaria sobre el estado mecánico del tejido muscular, especialmente en relación con el tono del vasto lateral, pero en esta muestra no permitió explicar ni predecir de forma fiable la pierna clínicamente más afectada.

Keywords: Espasticidad, miotonometría, función neuromuscular; rigidez tisular; evaluación objetiva

Influência do Aquecimento Específico no Resultado do Salto a Dois Pés

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Resumo

Introduction

A capacidade de produzir força explosiva, nomeadamente através do salto a dois pés, é uma competência motora fundamental em grande parte dos desportos, sejam eles individuais ou coletivos (como o basquetebol, voleibol ou atletismo). O desempenho nesta ação depende da capacidade do sistema neuromuscular em gerar a máxima força no menor período possível. Para otimizar o rendimento nestas ações de elevada intensidade e curta duração, o aquecimento prévio é uma estratégia amplamente utilizada. O aquecimento tem como principal objetivo preparar o atleta fisiológica e psicologicamente para o esforço, promovendo o aumento da temperatura corporal, a melhoria da circulação sanguínea e a aceleração do metabolismo. No entanto, o aquecimento pode ser dividido em componentes: o aquecimento geral (exercícios de baixa intensidade, como corrida leve) e o aquecimento específico (movimentos que mimetizam a ação desportiva, frequentemente envolvendo intensidade mais elevada ou exercícios pliométricos). O principal problema de investigação deste estudo reside em compreender se a adição de um protocolo de aquecimento específico traz benefícios adicionais e mensuráveis ao desempenho do salto a dois pés, em comparação com um aquecimento exclusivamente geral. Torna-se fundamental perceber se estímulos neuromusculares mais direcionados conseguem potenciar a capacidade de salto do indivíduo, informação que é crucial para treinadores e preparadores físicos na estruturação das rotinas de treino e pré-competição.

Methods

O presente estudo adota um desenho quase-experimental, com um delineamento intrasujeito (crossover). Cada participante será avaliado em dois momentos/dias distintos, para evitar a influência da fadiga, funcionando como o seu próprio controlo. No Dia 1, os participantes realizarão apenas um aquecimento geral antes da avaliação do salto. No Dia 2, realizarão o aquecimento geral seguido de um aquecimento específico antes da avaliação. A variável independente corresponde ao tipo de protocolo de aquecimento (geral vs. específico), enquanto a variável dependente é o desempenho no salto a dois pés (altura máxima atingida).

Results and Conclusions

Discussão de Resultados O presente estudo teve como objetivo avaliar o impacto de um protocolo de aquecimento específico no desempenho do salto em comprimento a dois pés, comparativamente a uma condição sem aquecimento. A hipótese inicial do estudo previa que a aplicação do aquecimento específico resultasse num aumento estatisticamente significativo do resultado do salto a dois pés, derivado da maior ativação neuromuscular. Os resultados obtidos (Tabela 1) confirmam plenamente a hipótese

estabelecida, uma vez que se verificou uma melhoria transversal e estatisticamente significativa no desempenho ($p < 0,001$). A média do salto passou de 217,7 cm (sem aquecimento específico) para 223,8 cm (com aquecimento específico), refletindo um ganho médio de aproximadamente 6,1cm. Estes dados vão ao encontro da literatura existente. A melhoria observada após o aquecimento pode ser explicada pelas alterações fisiológicas que preparam o sistema musculoesquelético e, de forma mais marcante, pelo fenómeno de Potenciação PósAtivação (PAP), tal como sugerido por Tillin & Bishop (2009). Os exercícios realizados no aquecimento específico parecem ter reduzido a viscosidade muscular e recrutado as unidades motoras de contração rápida de forma mais eficiente, permitindo aos participantes maximizar a produção de força explosiva no momento do salto. Além disso, o facto de 100% da amostra ter registado melhorias sugere que o volume e a intensidade do aquecimento aplicado foram adequados. O protocolo conseguiu "despertar" o sistema nervoso central sem gerar fadiga acumulada excessiva (Seitz & Haff, 2016). Conclui-se, assim, que a inclusão sistemática de um aquecimento específico é uma estratégia altamente eficaz e indispensável para potenciar ações explosivas, otimizando o rendimento no salto em comprimento a dois pés. Conclusão O presente estudo teve como propósito central investigar a influência de um protocolo de aquecimento específico no desempenho do salto em comprimento a dois pés. Através da análise dos dados recolhidos junto de uma amostra de 26 praticantes de atividade física, foi possível dar resposta ao problema de investigação e aos objetivos inicialmente delineados. Os resultados demonstram de forma inequívoca que a inclusão de estímulos neuromusculares específicos e direcionados produz benefícios mensuráveis no rendimento da força explosiva. Verificou-se uma melhoria estatisticamente significativa ($p < 0,001$) entre a condição sem aquecimento e a condição com aquecimento específico, com um incremento médio de 6,1cm na distância saltada. Estes valores permitem confirmar a hipótese formulada, validando a premissa de que o aquecimento específico potencia a capacidade de salto do indivíduo. Do ponto de vista teórico, esta evolução é explicada pelo fenómeno de Potenciação Pós-Ativação (PAP), que otimiza o recrutamento das unidades motoras e melhora a taxa de transmissão dos impulsos nervosos. A eficácia do protocolo utilizado demonstra que o equilíbrio entre o volume de exercícios pliométricos e o tempo de repouso foi respeitado, permitindo que os efeitos de potenciação superassem qualquer fadiga residual. Em termos práticos, este trabalho oferece informações cruciais para treinadores e preparadores físicos, evidenciando que o aquecimento não deve ser visto apenas como uma medida preventiva ou de aumento da temperatura corporal, mas sim como uma ferramenta estratégica de otimização da performance imediata. Recomenda-se, portanto, a integração sistemática de rotinas de aquecimento específicas em contextos de treino e competição que envolvam ações de elevada intensidade e curta duração. Como sugestão para investigações futuras, seria pertinente avaliar o impacto deste protocolo em diferentes populações (como atletas de elite vs. iniciantes) ou testar diferentes intervalos de recuperação para identificar o ponto exato de máxima potenciação neuromuscular.

Keywords: Salto em comprimento a dois pés; Aquecimento específico; Força explosiva; Potenciação Pós-Ativação (PAP); Desempenho neuromuscular.

Epidemiología y distribución anatómica de las lesiones por sobreuso de atletas amateurs de media maratón

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Resumo

Introduction

El running amateur o recreativo se ha convertido en una de las actividades de resistencia más populares, pero está enormemente asociado con las lesiones. A pesar de su crecimiento, existe la necesidad de comprender cómo los patrones de entrenamiento y los perfiles demográficos afectan a las tasas de lesiones en atletas recreativos. Por lo tanto, el objetivo del presente estudio fue analizar la incidencia de lesiones y la región anatómica de corredores amateurs en relación con la carga de entrenamiento, describiendo las lesiones más habituales y su origen.

Methods

Se administró una encuesta en línea a un total de 234 corredores amateurs vascos durante la 54ª edición de la media maratón Behobia-San Sebastián. La muestra estuvo compuesta por 62 mujeres (edad: 37.06 ± 7.55 años) y 172 hombres (edad: 41.27 ± 8.94 años).

Results and Conclusions

Nuestros resultados indican que el 53.8% de los corredores reportó al menos una lesión, con un total de 210 lesiones registradas. El sobreuso fue identificado como la causa principal, representando el 77.10% de los casos, y esta alta incidencia se asoció directamente con la carga de entrenamiento, particularmente durante los periodos de alto volumen (54.0%). Por otro lado, las lesiones traumáticas fueron menos frecuentes (22.9%). Las sesiones de entrenamiento representaron el periodo con la mayor tasa de lesiones (87.1%). En cuanto a la localización, las extremidades inferiores concentraron el 73.5% de la incidencia total de lesiones, divididas principalmente entre la región de la rodilla-pierna (41.4%) y el complejo pie-tobillo (30.5%). En conclusión, en el running recreativo, la mayoría de las lesiones son causadas por sobreuso, afectando predominantemente a la zona de la rodilla-pierna durante los periodos de entrenamiento. Por lo tanto, se necesitan críticamente planes de entrenamiento de prevención para reducir la incidencia de lesiones en corredores amateurs.

Keywords: epidemiología; corredores recreativos; resistencia; miembro inferior; volumen de entrenamiento.

Epidemiología de las lesiones musculoesqueléticas y la carga de entrenamiento en el remo de banco fijo (Traineras): un estudio transversal

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Resumo

Introduction

El remo de banco fijo o remo tradicional (traineras) se ha convertido en un deporte de resistencia altamente exigente en el País Vasco, aunque está estrechamente asociado con lesiones musculoesqueléticas específicas. A pesar de su popularidad a lo largo del mar Cantábrico, existe la necesidad de comprender cómo los patrones de entrenamiento afectan a las tasas de lesiones en estos remeros. Por lo tanto, el objetivo del presente estudio fue analizar la incidencia de las lesiones y la región anatómica de los remeros en relación con la carga de entrenamiento, describiendo las lesiones más habituales y su origen.

Methods

Se administró una encuesta en línea a un total de 165 remeros vascos. La muestra estuvo compuesta por 86 mujeres (edad: 23.97 ± 4.3 años) y 79 hombres (edad: 26.34 ± 5.56 años).

Results and Conclusions

Nuestros resultados indican que el 67.5% de los remeros notificó al menos una lesión ($n=110$). El sobreuso fue identificado como la causa principal, representando el 88.2% de los casos, y esta alta incidencia se asoció directamente con el volumen de entrenamiento y el gesto repetitivo, mientras que las lesiones traumáticas fueron menos frecuentes (11.8%). Las sesiones de entrenamiento representaron el periodo con la mayor tasa de lesiones (91.8%). En cuanto a la localización, la columna vertebral lumbar, con la zona lumbar mostrando el 30.9% y la zona dorsal el 10.9% de las lesiones, concentró la mayor incidencia de lesiones (44.7%), seguida por el área de la pelvis (11.8%) y el complejo rodilla-pierna (13.2%). En conclusión, en el remo de banco fijo, la mayoría de las lesiones son causadas por sobreuso, afectando predominantemente a la zona lumbar durante los periodos de entrenamiento. Por lo tanto, se necesitan críticamente planes de entrenamiento específicos de prevención y de estabilización del core para reducir la incidencia de lesiones en los remeros de traineras.

Keywords: epidemiología; remo de banco fijo; traineras; lesiones por sobreuso; columna lumbar; volumen de entrenamiento.

Fatiga y distribución anatómica de la cinemática multisegmentaria en el remo tradicional: análisis de las fases de ataque y final

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Resumo

Introduction

La fatiga neuromuscular altera la técnica en deportes cíclicos como el remo tradicional (banco fijo), aunque sus efectos siguen sin estar suficientemente explorados. El objetivo de este estudio fue examinar el impacto de la fatiga sobre la cinemática multisegmentaria durante la palada, enfocándose en ángulos articulares, alturas de los segmentos y posición del centro de gravedad (CoG) en las fases de ataque (catch) y final (finish).

Methods

Mediante un diseño intrasujeto pre-post, remeros entrenados realizaron un test incremental hasta el agotamiento en ergómetro adaptado. Se registraron datos cinemáticos tridimensionales antes y después de la fatiga con un sistema óptico de captura del movimiento. Las variables incluyeron inclinación del tronco; flexión de hombro, codo y rodilla; alturas de cabeza, hombro y mano; y posición del CoG en ejes vertical y anteroposterior.

Results and Conclusions

Los resultados muestran alteraciones significativas específicas de cada fase. En el ataque, aumentó la flexión del hombro y disminuyó la de la rodilla, mostrando una postura menos compacta. En el final, aumentó la flexión del codo y disminuyó la de la rodilla, sugiriendo ajustes compensatorios en brazos y piernas. Además, disminuyeron significativamente las alturas de cabeza, hombro y mano en ambas fases, reflejando menor capacidad para mantener la extensión del tronco. El CoG descendió verticalmente de forma constante sin cambios anteroposteriores, indicando un colapso postural en altura. En conclusión, la fatiga altera la coordinación de múltiples segmentos en el remo tradicional, mostrando adaptaciones distintas en fases clave. El análisis cinemático multisegmentario es una herramienta valiosa para monitorizar la fatiga e identificar alteraciones técnicas asociadas a mayor estrés mecánico y riesgo de lesión.

Keywords: remo tradicional; fatiga neuromuscular; distribución anatómica; cinemática multisegmentaria; técnica de palada; ataque y final.

Influencia del ciclo menstrual sobre el rendimiento en la capacidad de salto y fuerza muscular.

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Resumo

Introduction

El propósito de este estudio fue investigar la influencia de las fases del ciclo menstrual sobre la capacidad de producir fuerza, evaluada mediante el salto vertical (CMJ), la fuerza absoluta (1RM) y la velocidad de ejecución (VMP) ante diferentes cargas en el ejercicio de sentadilla completa. Como objetivo secundario se compararon diferentes variables de composición corporal en las diferentes fases del ciclo menstrual.

Methods

Siete mujeres jóvenes físicamente activas participaron voluntariamente. Se usó un método de conteo para verificar las siguientes fases del ciclo menstrual: fase folicular, fase ovulatoria y fase lútea. En cada fase, se midieron tres CMJ y la VMP ante cargas que representaban el 40%, 50% y 60% de la 1RM.

Results and Conclusions

Los resultados mostraron un incremento significativo de la máxima capacidad de producir fuerza relativa a la masa corporal (1RM/MC) en la fase lútea respecto a la fase folicular. Además, se observó un incremento de la masa corporal y del IMC en la fase folicular en comparación con la lútea. Por último, la fuerza absoluta, las velocidades ante las diferentes cargas utilizadas y la altura del salto permanecieron estables a lo largo del ciclo. Estos hallazgos sugieren que la capacidad de producir fuerza relativa a la masa corporal se vio beneficiada en la fase lútea. No obstante, estos resultados deben interpretarse con precaución debido a las limitaciones del trabajo, y se recomienda la monitorización individualizada del entrenamiento, considerando el ciclo menstrual como una posible variable moduladora de la capacidad de aplicación de fuerza.

Keywords: Ciclo menstrual; Fase lútea; Composición corporal; Fuerza relativa; Rendimiento neuromuscular.

Motivaciones de los corredores amateur o recreativos: influencias del estado de salud, la vida profesional y el ocio

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Resumo

Introduction

La edad adulta avanzada se asocia con múltiples cambios en la vida profesional, el estado de salud y el tiempo de ocio. Dentro de esta etapa, correr se ha convertido en una de las actividades físicas más comunes; sin embargo, los motivos de estos atletas para correr aún no se han abordado adecuadamente. El objetivo principal de esta investigación fue comprender mejor las motivaciones de los corredores recreativos silver (adultos mayores) y analizar si sus motivos varían en función de su estado de salud, vida profesional y actividades de ocio.

Methods

Mediante un diseño transversal, un total de 244 atletas recreativos de edad avanzada (56% mujeres, 44% hombres) completaron un cuestionario en línea utilizando la versión polaca de la Escala de Motivaciones de Maratón (MOMS). Se recogieron datos sobre la presencia de enfermedades crónicas, situación laboral (jubilado o activo), voluntariado, recreación cultural, entorno residencial y nivel educativo.

Results and Conclusions

Los resultados mostraron diferencias estadísticas significativas entre los corredores que padecían una enfermedad crónica y los atletas sanos en seis de las nueve dimensiones de la escala MOMS. Además, la práctica de voluntariado y la recreación cultural mostraron diferencias en dos dimensiones, mientras que la vida profesional y la educación reflejaron diferencias en una sola dimensión de la MOMS. El lugar de residencia no mostró ninguna asociación estadística con ninguna dimensión de la escala. En conclusión, los corredores adultos mayores presentan características motivacionales específicas, y su estado de salud parece ser el factor más determinante para mantener la práctica de la carrera a pie durante esta etapa de la vida.

Keywords: corredores máster; motivaciones; adultos mayores; determinantes de salud; estilo de vida; escala MOMS.

Impacto de una intervención educativa sobre el estilo de vida en el riesgo de fragilidad evaluado mediante la potencia muscular relativa al levantarse de la silla en adultos mayores: un ensayo controlado aleatorizado multicéntrico.

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Resumo

Introduction

La fragilidad representa un desafío de primer orden para la salud pública que amenaza la independencia de las poblaciones en envejecimiento, lo que resalta la necesidad crítica de intervenciones no farmacológicas y escalables para prevenir o revertir el deterioro funcional. Este estudio tuvo como objetivo evaluar el impacto de un programa educativo de 6 meses sobre estilos de vida saludables en la mitigación del riesgo de fragilidad, determinado mediante la potencia muscular relativa en la prueba de levantarse de la silla (sit-to-stand, STS), en adultos mayores prefrágiles y frágiles que viven en la comunidad.

Methods

Este ensayo controlado aleatorizado multicéntrico de grupos paralelos incluyó a 199 adultos mayores prefrágiles/frágiles no institucionalizados (74 ± 7 años), aleatorizados en un grupo de intervención ($n = 109$) y un grupo control de atención habitual ($n = 90$). La intervención de 6 meses constó de cuatro sesiones grupales y seis llamadas telefónicas destinadas a promover un estilo de vida saludable. Para evaluar el impacto clínico longitudinal de la intervención, se empleó un modelo de Ecuaciones de Estimación Generalizadas (GEE, por sus siglas en inglés) con una distribución de Poisson y una función de enlace logarítmica. La variable de resultado evaluada fue la probabilidad de presentar un mayor riesgo de fragilidad, determinado mediante algoritmos validados que convierten el rendimiento en la prueba STS en potencia muscular relativa. Posteriormente, el estado de riesgo de fragilidad se clasificó en función de umbrales diagnósticos establecidos y específicos para cada sexo: $< 2,6$ W/kg para hombres y $< 2,1$ W/kg para mujeres. El modelo GEE tuvo en cuenta las medidas repetidas a lo largo de la línea de base y el punto temporal de los 6 meses, incorporando los efectos principales para el grupo (control vs. intervención), el tiempo y su interacción (grupo X tiempo) para extraer las Razones de Riesgo (RR) con sus Intervalos de Confianza (IC) del 95%. Finalmente, se realizaron comparaciones por pares post-hoc utilizando las medias marginales estimadas con un ajuste de Bonferroni para comparaciones múltiples.

Results and Conclusions

En la línea de base, la prevalencia del riesgo de fragilidad fue elevada y estadísticamente similar entre los grupos (Control: 76,7%; Intervención: 72,5%; $p = 0,479$). Tras el programa educativo, el grupo de intervención demostró una reducción intragrupo robusta y progresiva en el riesgo de fragilidad; específicamente, los niveles de riesgo disminuyeron significativamente a los 6 meses (lo que refleja una reducción de 1,55 veces respecto a la línea de base, $p < 0,001$). Por el contrario, el grupo control mantuvo un perfil de alto riesgo estable ($p = 0,857$). Debido a estas trayectorias clínicas divergentes, la brecha entre ambas cohortes se amplió significativamente: en comparación con el grupo de intervención, el grupo control exhibió una prevalencia de riesgo un 73% mayor a los 6 meses ($RR = 1,73$, $p < 0,001$). Un programa educativo de 6 meses sobre estilos de vida saludables modifica las trayectorias clínicas en adultos mayores prefrágiles y frágiles, proporcionando una reducción sustancial del riesgo de fragilidad. Este estudio forma parte del Proyecto FRAGSALUD, financiado por la Junta de Andalucía (10.13039/501100011011, referencia UMA20-FEDERJA-154).

Keywords: Anciano, Educación en salud, Fragilidad, Capacidad física, Rendimiento físico funcional.

Efecto de la electroestimulación en cuerpo completo en la recuperación post-esfuerzo de RSA midiendo creatinquinasa y amplitud de movimiento

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Resumo

Introduction

La fatiga muscular derivada de esfuerzos repetidos de alta intensidad puede afectar al rendimiento deportivo y aumentar el daño muscular. Existen diferentes estrategias de recuperación post-esfuerzo, entre ellas la electroestimulación de cuerpo completo (WB-EMS), aunque la evidencia sobre su eficacia sigue siendo limitada y contradictoria. Por ello, el objetivo de este estudio fue analizar el efecto de la WB-EMS sobre la recuperación tras un protocolo de sprints repetidos, evaluando marcadores de daño muscular (creatinquinasa) y amplitud de movimiento en jóvenes físicamente activos.

Methods

Se llevó a cabo un estudio cruzado aleatorizado en 21 hombres físicamente activos (23,2 ± 9,8 años). Los participantes realizaron un protocolo de sprints repetidos (RSA) consistente en 7 sprints de 30 m con 30 s de recuperación entre repeticiones. Tras el protocolo, completaron una recuperación pasiva (control) o una recuperación mediante electroestimulación de cuerpo completo (WB-EMS). La recuperación fue evaluada mediante los niveles de creatinquinasa (CK) como marcador de daño muscular y la amplitud de movimiento (ADM), registradas en condiciones basales y a los 30 min, 24 h, 48 h y 72 h posteriores al esfuerzo.

Results and Conclusions

RESULTADOS: Los niveles de creatinquinasa (CK) aumentaron tras el protocolo de sprints repetidos en ambos grupos, alcanzando los valores más elevados entre las 24 y 48 horas post-esfuerzo. Sin embargo, el grupo que realizó recuperación mediante WB-EMS presentó menores niveles de CK durante la recuperación, observándose las mayores diferencias respecto al grupo control a las 72 horas. En cuanto a la amplitud de movimiento (ADM), no se encontraron cambios relevantes a lo largo del seguimiento ni diferencias sustanciales entre grupos. **CONCLUSIONES:** La electroestimulación de cuerpo completo (WB-EMS) parece favorecer la recuperación del daño muscular tras un protocolo de sprints repetidos, reflejado en una recuperación más rápida de los niveles de creatinquinasa. Por el contrario, no se observaron efectos sobre la amplitud de movimiento, por lo que esta variable no parece ser un indicador sensible de la recuperación post-esfuerzo en este contexto.

Keywords: Electroestimulación de cuerpo completo (WB-EMS); Recuperación post-esfuerzo; Sprints repetidos (RSA); Creatinquinasa; Daño muscular; Amplitud de movimiento

Reprodutibilidade teste-reteste da contração voluntária isométrica máxima dos músculos extensores e flexores do joelho em adultos jovens saudáveis

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Resumo

Introduction

A contração voluntária isométrica máxima (CVIM) é amplamente utilizada para avaliar a capacidade de produção de força muscular em contextos clínicos, esportivos e científicos. Entretanto, diferenças relacionadas ao protocolo de avaliação, ao grupamento muscular analisado e ao grau de familiarização dos participantes podem influenciar a estabilidade das medidas obtidas. Dessa forma, a determinação da reprodutibilidade teste-reteste da CVIM é fundamental para assegurar que alterações observadas ao longo do tempo reflitam adaptações reais e não apenas erros de medida. Assim, o objetivo do presente estudo foi analisar a reprodutibilidade teste-reteste da CVIM dos músculos extensores e flexores do joelho em adultos jovens saudáveis.

Methods

O estudo foi aprovado pelo Comitê de Ética em Pesquisa da Universidade Federal de Viçosa (CAAE: 81740024.5.0000.5153). Dez voluntários homens saudáveis ($22,4 \pm 0,7$ anos) foram recrutados. Os participantes realizaram duas sessões de avaliação separadas por 48 horas, sob as mesmas condições experimentais. A força muscular foi avaliada por meio de uma célula de carga extensiométrica (MK Controle, modelo CSL/ZL-1T, Brasil), com frequência de aquisição de 1000 Hz. Para a avaliação dos extensores do joelho, os participantes permaneceram sentados em uma cadeira extensora com o joelho posicionado a 90° de flexão. Para os flexores do joelho, os participantes permaneceram em posição ortostática com o joelho flexionado a 90°. Em ambas as condições, foi solicitada uma contração voluntária isométrica máxima de cinco segundos, acompanhada de estímulo verbal padronizado. Foram realizadas duas tentativas para cada grupamento muscular, com intervalo de dois minutos entre elas, sendo considerado para análise o maior valor obtido em cada visita. A reprodutibilidade teste-reteste foi determinada por meio do coeficiente de correlação intraclassa [ICC(3,1)], com respectivos intervalos de confiança de 95% (IC95%), erro típico de medida (TEM), coeficiente de variação (CV%) e análise de concordância de Bland-Altman. O nível de significância adotado foi de $p < 0,05$.

Results and Conclusions

Os extensores do joelho apresentaram valores médios de $96,37 \pm 24,88$ e $104,67 \pm 27,95$ nas visitas 1 e 2, respectivamente, correspondendo a um aumento médio de aproximadamente 8,6% entre as avaliações. Observou-se confiabilidade excelente para os extensores ($ICC = 0,967$; $IC95\% = 0,821-0,994$; $TEM = 4,82$; $CV = 4,80\%$; $p < 0,001$), acompanhada de elevada concordância entre sessões. A análise de Bland-Altman revelou viés de 8,30 e limites de concordância entre -5,06 e 21,66, sugerindo possível efeito de familiarização. Para os flexores do joelho, os valores médios foram de $28,39 \pm 6,90$ e $28,73 \pm 7,67$ nas visitas 1 e 2, respectivamente, sendo observada confiabilidade moderada ($ICC = 0,731$; $IC95\% = 0,050-0,948$; $TEM = 3,78$; $CV = 13,25\%$; $p = 0,020$), com viés de 0,34 e limites de concordância entre -10,14 e 10,83. Conclui-se que a CVIM dos extensores do joelho apresenta excelente reprodutibilidade teste-reteste e baixo erro de medida, demonstrando ser uma ferramenta adequada para o monitoramento longitudinal da força muscular. Em contrapartida, os flexores do joelho apresentaram maior variabilidade entre sessões e menor estabilidade das medidas. Os resultados sugerem que a utilização do maior valor obtido em cada avaliação fornece estimativas consistentes da força isométrica máxima, especialmente para os extensores do joelho. Adicionalmente, recomenda-se a realização de sessões prévias de familiarização para reduzir a variabilidade das medidas e aumentar a precisão das avaliações neuromusculares.

Keywords: Força Muscular; Reprodutibilidade dos Resultados; Fenômenos Biomecânicos; Padrões de Referência.

Análise Cinemática Do Movimento- Remate em Apoio

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Resumo

Introduction

O andebol é uma modalidade desportiva coletiva caracterizada por uma elevada intensidade de ações intermitentes, onde o sucesso ofensivo depende, em grande parte, da eficácia e da velocidade de execução das ações técnicas. No ecossistema do jogo, o remate assume-se como o gesto técnico terminal por excelência, cujo objetivo principal é ultrapassar a barreira defensiva e o guarda-redes para a concretização do golo. Entre as diversas variantes de finalização existentes, o remate em apoio destaca-se como um dos padrões motores fundamentais, assentando a sua eficácia na correta transferência de forças ao longo da cadeia cinética, desde o contacto estável com o solo até à libertação da bola. Do ponto de vista biomecânico, a execução do remate em apoio envolve uma coordenação sequencial e proximal-distal de múltiplos segmentos corporais. A estabilização dos membros inferiores e a rotação da bacia funcionam como a base geradora de energia, que é posteriormente transferida através do tronco e do complexo articular do ombro até ao cotovelo e pulso do membro executor. A literatura aponta que as variações no contexto de execução nomeadamente a transição de uma postura estática (parado) para uma postura dinâmica (em movimento) exercem uma influência direta nos parâmetros cinemáticos do movimento, alterando os ângulos articulares, os tempos de ativação e, consequentemente, a velocidade final de saída da bola. O recurso a ferramentas de videogrametria e análise cinemática bidimensional, como o software Kinovea, tem-se revelado metodologicamente robusto para a caracterização detalhada destes padrões de movimento no desporto de rendimento e de formação. Através da quantificação de variáveis como trajetórias lineares, velocidades angulares e deslocamentos, torna-se possível identificar assimetrias e flutuações mecânicas que passam despercebidas à observação visual direta. Justifica-se, por isso, a relevância do presente estudo de caso, que visa analisar e comparar o comportamento cinemático do remate em apoio num atleta amador sob duas condições distintas: o remate numa situação estática e após deslocamento prévio. Esta abordagem permitirá compreender de que forma a componente dinâmica e a corrida de aproximação interferem na estabilidade articular e na eficácia biomecânica do gesto técnico, fornecendo dados concretos que possam orientar a especificidade do processo de treino e a otimização da performance desportiva na modalidade.

Methods

O presente capítulo descreve detalhadamente o desenho metodológico adotado para a caracterização cinemática do remate em apoio no andebol, explicitando as características da amostra, os instrumentos utilizados, os procedimentos de recolha de dados e as variáveis em análise.

Results and Conclusions

Com base na análise cinemática e biomecânica realizada ao longo deste estudo de caso, foi possível caracterizar e confrontar de forma objetiva os padrões de movimento do remate em apoio no andebol, avaliando o impacto da preferência lateral e da transição do contexto estático para o dinâmico. Os resultados obtidos através da videogrametria computadorizada com o software Kinovea permitiram extrair conclusões fundamentais para a compreensão do gesto técnico e para a sua aplicação no processo de treino. Em primeiro lugar, evidenciou-se que a preferência lateral exerce uma influência crítica na organização espacial e na eficácia mecânica do movimento. O remate executado com o membro superior não dominante revelou assimetrias neuromusculares acentuadas em toda a amostra, traduzindo-se numa fase preparatória com menor rotação do tronco, uma armação da bola mais baixa e contida, e uma extensão terminal do cotovelo incompleta no momento da libertação (release point). Esta restrição na amplitude articular limita a capacidade de acumulação de energia potencial elástica e prejudica a fluidez da transferência de forças ao longo da cadeia cinética proximal-distal, comprometendo tanto a aceleração balística como a precisão terminal do disparo. Em segundo lugar, a comparação entre as condições de execução demonstrou que a componente dinâmica altera significativamente a estabilização articular. O remate numa situação estática (parado) favoreceu uma base de suporte estável, potenciando trajetórias lineares mais limpas e uma aceleração progressiva e coordenada. Em contrapartida, no remate em movimento, embora a inércia da corrida de aproximação forneça energia cinética capaz de potenciar a velocidade terminal da bola, ela introduz uma elevada instabilidade postural. Para assegurar o equilíbrio dinâmico ao fixar o último apoio, os atletas tendem a encurtar o tempo de armação e a reduzir a amplitude de recuo do braço motor, priorizando o controlo do corpo em detrimento do padrão técnico ideal e gerando maiores flutuações nas curvas cinemáticas. Adicionalmente, as exigências mecânicas estenderam-se à fase de desaceleração e recuperação pós-remate. Na condição dinâmica e no uso do membro não preferencial, a ação muscular excêntrica para travar o braço motor e evitar a queda ou a invasão da área de golo revelou-se muito mais intensa e rígida, exigindo passos de recuperação curtos e um esforço neuromuscular acrescido para reaver a estabilidade. Em suma, este estudo de caso reforça que o desenvolvimento da força explosiva e da eficácia no remate em apoio não deve ser indissociável do treino de coordenação dinâmica, da corrida de aproximação e do trabalho de simetria motora. Para otimizar a performance desportiva no escalão de formação, os programas de treino técnico devem ser ajustados para aproximar os atletas do contexto real de jogo, capacitando-os a gerir as forças de inércia e a manter a consistência biomecânica mesmo sob condições de elevada exigência dinâmica.

Keywords: Andebol, Remate em Apoio, Cinemática, Remate Parado, Remate em Movimento.

Impacto de la dieta mediterránea (DM) en la prevención de la deficiencia energética relativa (RED-s) en el deporte en las adolescentes: estudio piloto

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Resumo

Introduction

El Síndrome de Deficiencia Energética Relativa en el Deporte (RED-S) afecta a la salud y rendimiento de adolescentes deportistas debido a una baja disponibilidad energética, causando problemas óseos, cardiovasculares, gastrointestinales, inmunológicos y mentales. La DM, rica en grasas saludables, vegetales, frutas y proteínas magras, beneficia la salud cardiovascular, el control de peso y la salud mental, siendo útil para adolescentes deportistas. Una nutrición adecuada es crucial para el rendimiento y la salud en esta etapa. El proyecto tiene como objetivo evaluar el impacto de la DM en la prevención del RED-S en jugadoras adolescentes de voleibol. Se analizarán la adherencia a esta dieta, la prevalencia de RED-S en la muestra, y la relación entre adherencia a la dieta y la incidencia de RED-S. Además, se evaluará cómo influye esta dieta en el rendimiento deportivo y la salud general de las jugadoras.

Methods

Este estudio piloto examina la relación entre la adherencia a la dieta mediterránea y el riesgo de RED-S en 22 jugadoras adolescentes de voleibol. Se utilizan los cuestionarios KIDMED y el Reds Scoring Tool 2 o LEAF-Q para evaluar la dieta y el riesgo de RED-S, y los datos se analizan para identificar posibles asociaciones. Se emplearán pruebas estadísticas inferenciales para explorar las asociaciones entre la dieta mediterránea y el riesgo de RED-S.

Results and Conclusions

La adherencia a la dieta mediterránea es mayoritariamente media (56,5%) o baja (36,4%). Presenta un riesgo alto de poder sufrir RED-S un 4,5% de la muestra. No se halló una correlación significativa entre la dieta mediterránea y el riesgo de RED-S, aunque las diferencias en el riesgo según niveles de adherencia podrían ser relevantes. La dieta mediterránea es conocida por su impacto positivo en la salud ósea, metabólica, hormonal e inmunológica y así repercutir positivamente en el rendimiento deportivo; sin embargo, este beneficio está condicionado a que las deportistas consuman la cantidad de energía necesaria para mantener su rendimiento y prevenir el RED-S. Esto enfatiza la importancia de acompañar la adherencia a la dieta con una adecuada compensación energética.

Keywords: RED-S (Síndrome de Deficiencia Energética Relativa en el Deporte), Dieta Mediterránea, Adolescentes Deportistas, Rendimiento Deportivo, Nutrición

Relação do Treino de Força com o percentual de gordura e IMC

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Resumo

Introduction

A prática regular de exercício físico desempenha um papel fundamental na promoção da saúde e na prevenção de diversas doenças associadas ao sedentarismo. Entre as diferentes formas de exercício, o treino de força tem vindo a destacar-se pelos seus efeitos positivos na composição corporal, nomeadamente ao nível do aumento da massa muscular e da redução da massa gorda. A composição corporal é um dos principais indicadores do estado de saúde, sendo a percentagem de gordura corporal considerada uma medida mais precisa na avaliação dos níveis de adiposidade quando comparada com indicadores gerais. De facto, evidência científica demonstra que o treino de força pode contribuir significativamente para a redução da gordura corporal, apresentando efeitos positivos mesmo em populações com excesso de peso (Méndez-Hernández et al., 2022). Neste contexto, o Índice de Massa Corporal (IMC) continua a ser amplamente utilizado devido à sua simplicidade, sendo calculado com base na relação entre o peso e a altura. No entanto, este apresenta limitações importantes, uma vez que não distingue entre massa gorda e massa magra. Estudos indicam que o IMC pode não refletir com precisão a composição corporal real, podendo existir indivíduos com valores considerados normais de IMC, mas com percentagens elevadas de gordura corporal (Méndez-Hernández et al., 2022). Adicionalmente, a literatura evidencia que a percentagem de gordura corporal apresenta uma relação mais consistente com indicadores de desempenho físico e saúde, quando comparada com o IMC. Por exemplo, foi observada uma correlação negativa significativa entre a percentagem de gordura corporal e o desempenho muscular, enquanto o IMC não apresentou uma relação significativa com essas variáveis (Dhar & Purwar, 2023). Estes resultados reforçam a importância de utilizar medidas mais específicas da composição corporal na investigação científica. Deste modo, a utilização conjunta da percentagem de gordura corporal e do IMC permite uma avaliação mais completa e rigorosa. A análise destas variáveis em função da prática de treino de força poderá contribuir para uma melhor compreensão dos seus efeitos na composição corporal. Assim, o presente estudo tem como objetivo analisar a relação entre a prática de treino de força e a percentagem de gordura corporal, considerando o Índice de Massa Corporal como variável complementar, em indivíduos do sexo masculino com idades compreendidas entre os 18 e os 30 anos, frequentadores de um ginásio.

Methods

O presente estudo insere-se numa abordagem quantitativa, de carácter transversal, descritivo e comparativo, tendo como objetivo analisar diferenças entre grupos distintos num único momento temporal. Amostra/Participantes A amostra do presente estudo é constituída por 30 indivíduos do sexo masculino, com idades compreendidas entre os 18 e os 30 anos, todos frequentadores do ginásio Fitness Factory. Os participantes foram distribuídos em dois grupos distintos, sendo o primeiro composto por 15 indivíduos praticantes de treino de força, com uma frequência igual ou superior a duas sessões semanais, e o segundo grupo constituído por 15 indivíduos não praticantes deste tipo de treino. A seleção da amostra foi realizada através de um método de amostragem por conveniência, tendo em consideração a disponibilidade e aceitação voluntária dos participantes. Tabela 1- Caracterização da amostra (Média $\pm$ Desvio Padrão) Os grupos apresentaram valores semelhantes de altura e peso corporal, não se verificando diferenças relevantes entre os participantes praticantes e não praticantes de treino de força. Critérios de inclusão Foram definidos como critérios de inclusão a participação de indivíduos do sexo masculino, com idades compreendidas entre os 18 e os 30 anos, que frequentassem o 4 ginásio onde decorreu o estudo. Adicionalmente, foi necessário que todos os participantes assinassem o consentimento informado, autorizando a sua participação na investigação. Critérios de exclusão Foram excluídos do estudo indivíduos que apresentassem limitações físicas que impedissem a prática de exercício físico, bem como participantes que apresentassem dados incompletos ou inconsistentes, de forma a garantir a fiabilidade dos resultados obtidos. Instrumentos de recolha de dados A recolha de dados foi realizada através de um questionário estruturado, previamente elaborado, com o objetivo de identificar a prática de treino de força por parte dos participantes, nomeadamente ao nível da frequência semanal e se estavam inseridos nos critérios de inclusão, permitindo a sua correta classificação nos grupos definidos. Para além disso, foi realizada uma avaliação da composição corporal através de uma máquina disponível no ginásio, que possibilitou a obtenção de dados relativos ao peso corporal, altura, Índice de Massa Corporal (IMC) e percentagem de gordura corporal. Procedimentos Inicialmente, foi obtida autorização formal por parte da instituição onde decorreu o estudo. Posteriormente, os participantes foram informados acerca dos objetivos e procedimentos da investigação, tendo sido garantidos o anonimato e a confidencialidade dos dados. Após a assinatura do consentimento informado, os participantes procederam ao preenchimento do questionário via Google Forms e à realização da avaliação da composição corporal. Todo o processo decorreu nas instalações do ginásio, em contexto controlado. Variáveis do Estudo A variável independente corresponde à prática de treino de força, sendo os participantes classificados em dois grupos distintos: indivíduos praticantes (grupo 1), com uma frequência igual ou superior a duas sessões semanais, e indivíduos não praticantes (grupo 2). Relativamente às variáveis dependentes, a principal variável em análise é a percentagem de gordura corporal e como variável dependente secundária, foi incluído o Índice de Massa Corporal (IMC). Hipóteses de investigação Foram formuladas duas hipóteses de investigação. A hipótese nula (H_0) estabelece que não existem diferenças estatisticamente significativas na percentagem de gordura corporal e no Índice de Massa Corporal entre indivíduos praticantes e não praticantes de treino de força. Por outro lado, a hipótese alternativa (H_1) pressupõe a existência de diferenças estatisticamente significativas nestas variáveis, nomeadamente na percentagem de gordura corporal e/ou no Índice de Massa Corporal, entre os dois grupos em análise. Tratamento estatístico Os dados foram analisados co

Results and Conclusions

Os resultados deste estudo mostram de forma clara como a prática de treino de força influencia a composição corporal em jovens adultos. O ponto mais importante a destacar é a diferença entre o Índice de Massa Corporal (IMC) e a percentagem de gordura na avaliação dos dois grupos. Embora os praticantes e os não praticantes tenham apresentado valores de IMC exatamente iguais ($24,5 \pm 1,2 \text{ kg/m}^2$), a análise da percentagem de gordura revelou uma diferença estatística muito grande. Enquanto os praticantes de treino de força registaram uma média de 13,5% de gordura, o grupo que não treina apresentou um valor muito superior, de 20,9%. Estes dados confirmam as limitações do IMC que já tinham sido apontadas em estudos anteriores. Como indicam Méndez-Hernández et al. (2022), o IMC é um cálculo simples que não consegue distinguir a massa gorda da massa magra. No caso desta investigação, o facto de o peso e o IMC serem iguais em ambos os grupos sugere que os praticantes de musculação têm mais massa muscular, ao passo que os não praticantes têm uma maior acumulação de gordura para o mesmo peso total. A diferença média de 7,45% na gordura corporal entre os grupos demonstra que o treino de força é uma estratégia eficaz para melhorar a composição do corpo. Estes resultados estão de acordo com a literatura científica, que refere que a percentagem de gordura é um indicador de saúde e de condição física muito mais rigoroso do que o peso ou o IMC isoladamente. Mesmo com uma frequência de treino acessível (duas ou mais sessões por semana), foi possível observar benefícios significativos na redução da gordura corporal. É importante notar que este estudo apresenta algumas limitações que podem ter influenciado os resultados. Variáveis fundamentais como os hábitos alimentares dos participantes e a realização de exercício cardiovascular extra-ginásio não foram avaliadas. Uma vez que a alimentação e o treino de resistência (cardio) têm um impacto direto no balanço energético e na queima de gordura, a ausência deste controlo impede-nos de afirmar com total certeza se a diferença na composição corporal se deve exclusivamente ao treino de força. Além disso, o tamanho reduzido da amostra ($n=30$) e a utilização de 10 amostragem por conveniência limitam a generalização dos resultados para a população em geral. Para investigações futuras, sugere-se a inclusão de um diário alimentar e o controlo de outras formas de exercício físico praticadas pelos sujeitos, de modo a isolar melhor o efeito do treino de força. Seria também interessante realizar estudos longitudinais, acompanhando os mesmos indivíduos ao longo de vários meses de treino, e utilizar amostras maiores e mais variadas, incluindo diferentes faixas etárias e o sexo feminino, para verificar se estas tendências se mantêm.

Keywords: Treino de força; percentagem de gordura corporal; índice de massa corporal; composição corporal; exercício físico.

Nível de Conhecimento Nutricional e Consumo de Suplementos Alimentares em Lutadores de Luta Livre Turcos: Uma Análise de Dados Preliminares

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Resumo

Introduction

A luta livre é uma disciplina dinâmica que exige estratégias nutricionais precisas e escolhas alimentares conscientes devido às elevadas cargas fisiológicas. A capacidade dos atletas de otimizar o desempenho e beneficiar-se de forma segura dos suplementos alimentares depende dos seus níveis de conhecimento nutricional baseados em evidências. Atualmente, a literatura carece de dados suficientes sobre essa interação entre lutadores turcos de elite. Nesse sentido, o objetivo deste estudo é examinar a relação entre os níveis de conhecimento em nutrição esportiva e os comportamentos de consumo de suplementos alimentares entre lutadores turcos.

Methods

Este estudo piloto recolheu dados voluntários online de 60 lutadores ativos e licenciados, registados na Federação Turca de Luta Livre. Um formulário com questões específicas para a área, que incorporam características sociodemográficas, relacionadas com o desporto e com o consumo de suplementos alimentares, juntamente com o Questionário de Conhecimento sobre Nutrição para o Desporto, foi utilizado como instrumento de recolha de dados.

Results and Conclusions

A amostra do estudo foi constituída predominantemente por lutadores do sexo masculino (78,3%, n=47), profissionais (90,0%, n=54), sendo que 68,3% (n=41) competem a nível internacional, 21,7% (n=13) do sexo feminino, 10,0% (n=6) amadores e 31,7% (n=19) a nível nacional. As estatísticas descritivas dos participantes revelaram uma idade média de $24,3 \pm 6,54$ anos, uma altura média de $175 \pm 11,5$ cm e um peso corporal médio de $77,2 \pm 19,4$ kg. Entre os atletas, 83,3% consomem alimentos, enquanto 16,7% não os utilizam. A prevalência de utilização dos 10 suplementos mais utilizados foi de 51,7% para BCAA, 41,7% para magnésio, 40,0% para creatina, 36,7% para ácidos gordos ómega-3, 31,7% para proteína whey, 30,0% para carnitina e cafeína, 23,3% para beta-alanina e glutamina, e 21,7% para arginina. Relativamente ao conhecimento em nutrição desportiva, 83,3% dos atletas apresentaram conhecimentos inadequados, enquanto os restantes 16,7% apresentaram um nível moderado, não tendo nenhum atleta classificado nas categorias boas ou excelentes. As análises estatísticas revelaram que os níveis de conhecimento sobre nutrição desportiva diferiram significativamente entre os géneros (p

$< 0,05$). Além disso, o uso de suplementos alimentares apresentou diferenças significativas de acordo com o nível da liga competitiva e a modalidade de luta dos atletas ($p < 0,05$). Por outro lado, a quantidade de suplementos alimentares consumidos não difere significativamente entre os níveis de conhecimento sobre nutrição desportiva dos atletas ($p > 0,05$). A falta de significância estatística indica que o consumo de suplementos permanece uniformemente elevado e não selectivo em todos os níveis de conhecimento nutricional. Para aumentar a generalização dos resultados, estudos futuros devem investigar questões ambientais maiores dos lutadores, alargando o âmbito da investigação para incluir perfis metabólicos mais abrangentes e métricas de desempenho a longo prazo.

Keywords: Atletas, Conhecimento, Nutrição, Suplementos

Suplementação de Vitamina D3 Atenua Inflamação e Lesão Muscular Enquanto Melhora o Desempenho Geral no Ironman 70.3

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Resumo

Introduction

O triatlon de ultra-resistência induz estresse inflamatório substancial e lesão muscular induzida por exercício, que podem prejudicar a recuperação e o desempenho. A vitamina D3 tem sido sugerida como um agente imunomodulador e citoprotetor potencial em atletas expostos a estresse fisiológico prolongado. O objetivo do presente estudo foi avaliar os efeitos de oito semanas de suplementação de vitamina D3 sobre marcadores inflamatórios, biomarcadores de lesão muscular e desempenho geral na prova em triatletas do Ironman 70.3.

Methods

Vinte e sete triatletas do sexo masculino competindo no evento Ironman 70.3 Sergipe 2024 participaram deste ensaio clínico randomizado, duplo-cego, controlado por placebo. Os atletas foram alocados para um grupo placebo ($n = 13$) ou um grupo vitamina D3 (50.000 UI/semana; $n = 14$) por oito semanas. Amostras de sangue foram coletadas antes e 1 hora após a prova. A 25-hidroxivitamina D sérica [25(OH)D], interleucina-6 (IL-6) e creatina quinase (CK) foram analisadas. O tempo total de prova foi obtido dos registros oficiais da corrida.

Results and Conclusions

As concentrações pós-prova de 25(OH)D foram significativamente maiores no grupo vitamina D comparado ao placebo ($81,17 \pm 6,72$ vs. $36,15 \pm 5,41$ ng/mL; $p < 0,001$). O grupo suplementado também apresentou concentrações de IL-6 mais baixas ($20,72 \pm 8,26$ vs. $37,14 \pm 17,98$ pg/mL; $p = 0,017$) e níveis de CK mais baixos ($446,30 \pm 198,80$ vs. $4621,00 \pm 1881,00$ U/L; $p < 0,001$). Além disso, o tempo total de prova foi significativamente menor no grupo vitamina D ($17,48 \pm 1,77$ vs. $19,42 \pm 2,37 \times 10^3$ s; $p = 0,043$). Oito semanas de suplementação de vitamina D3 atenuaram as respostas inflamatórias e a lesão muscular induzida por exercício enquanto melhoraram o desempenho geral na prova em triatletas do Ironman 70.3. Esses achados sugerem que otimizar o status de vitamina D pode apoiar a recuperação e o desempenho durante competições de ultra-resistência.

Keywords: Vitamina D3; IL-6; Creatina quinase; Ironman 70.3; Exercício de ultra-resistência

Efeitos de um programa de aprendizagem do ciclar com bicicleta de equilíbrio em crianças com provável DCD: protocolo de estudo

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Resumo

Introduction

A infância constitui um período determinante para a promoção da atividade física e para o desenvolvimento de habilidades motoras fundacionais, essenciais à adoção de estilos de vida ativos e à participação social ao longo da vida. A aquisição destas competências possibilita uma participação mais autónoma em atividades recreativas, escolares e desportivas. Contudo, algumas crianças apresentam dificuldades significativas ao nível da coordenação motora, como sucede nas crianças com Perturbação do Desenvolvimento da Coordenação (DCD) ou em risco de a desenvolver. Estas limitações podem comprometer o desempenho nas atividades do quotidiano e reduzir a participação em contextos de atividade física. Entre as várias habilidades motoras fundacionais, a aprendizagem do ciclar assume particular relevância, por favorecer a mobilidade independente, a exploração do meio envolvente e o envolvimento em atividades ao ar livre. O presente estudo descreve um projeto de doutoramento que pretende analisar os efeitos de um programa estruturado de aprendizagem do ciclar, adaptado a crianças com risco de DCD (r-DCD) e provável DCD (p-DCD). Especificamente, pretende-se promover e verificar esta aprendizagem, i.e., ciclar, e analisar o seu efeito na competência motora, equilíbrio e níveis de atividade física.

Methods

Será implementado um estudo experimental longitudinal com grupo experimental e grupo de controlo, incluindo momentos de avaliação pré-intervenção, pós-intervenção e follow-up. A amostra será constituída por crianças em idade pré-escolar (4-5 anos) provenientes de instituições de ensino do distrito de Santarém, Portugal, identificadas como r-DCD ou p-DCD. As variáveis em análise incluirão a capacidade de ciclar, a competência motora avaliada através da bateria Motor Competence Assessment, a perceção da competência motora através da “Escala pictográfica de avaliação da competência percebida em habilidades motoras para crianças”, o equilíbrio e os níveis de atividade física medidos por acelerometria. O grupo experimental participará num programa estruturado de aprendizagem do ciclar com recurso inicial a bicicletas de equilíbrio e progressão para bicicletas tradicionais, enquanto o grupo de controlo continuará a realizar as atividades habituais.

Results and Conclusions

Espera-se que as crianças participantes aprendam a ciclar autonomamente, apresentem ganhos ao nível da competência motora, percepção de competência motora, equilíbrio e níveis de atividade física. Os resultados poderão reforçar a relevância de programas estruturados de aprendizagem do ciclar enquanto estratégia promotora do desenvolvimento motor e da participação em atividade física em crianças com dificuldades de coordenação. Conclui-se que intervenções motoras precoces, estruturadas e inclusivas poderão contribuir para potenciar o desenvolvimento motor e incentivar estilos de vida fisicamente ativos desde a infância, incluindo em crianças com perturbações da coordenação motora.

Keywords: Atividade Física; Bicicleta de Equilíbrio; Competência Motora; Desenvolvimento Motor; Perturbação do Desenvolvimento da Coordenação

Programas de intervenção para aprender a ciclar de forma independente em crianças e jovens em risco ou com DCD: protocolo de revisão sistemática

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Resumo

Introduction

Crianças com Perturbação no Desenvolvimento da Coordenação (DCD), ou em risco de a desenvolver, apresentam dificuldades persistentes na coordenação motora que interferem com o desempenho das atividades diárias e na participação em atividade física e desportiva. Aprender a andar de bicicleta de forma autónoma, i.e., ciclar, é considerado um marco importante do desenvolvimento, capaz de promover a competência motora, a autonomia, a participação social e o envolvimento em atividades físicas. No entanto, nem todas as crianças seguem uma trajetória típica de desenvolvimento motor. Crianças em risco de, ou com provável DCD, enfrentam maiores desafios na aquisição desta habilidade. As evidências relativas a programas de intervenção concebidos para a aquisição da capacidade de ciclar de forma independente nesta população continuam a ser limitadas. Assim esta revisão tem como objetivo identificar e sintetizar programas de intervenção desenvolvidos para ensinar a andar de bicicleta de forma independente crianças e jovens em risco de, ou com provável DCD, bem como comparar a sua eficiência e identificar os benefícios associados.

Methods

Será realizada uma revisão sistemática seguindo as diretrizes PRISMA. Serão efetuadas pesquisas nas bases de dados, SCOPUS, PubMed e Web Of Science para identificar estudos de intervenção experimentais e quase-experimentais. Os estudos elegíveis incluirão crianças e jovens até aos 18 anos de idade que estejam em risco, com provável DCD ou DCD diagnosticada. As intervenções devem ter como objetivo específico ensinar a andar de bicicleta de forma independente e incluir a utilização de bicicleta tradicional em alguma fase do programa. Os estudos deverão incluir avaliações pré e pós-intervenção. Os resultados primários incluirão a aquisição da competência de ciclar de forma independente utilizando uma bicicleta tradicional. Os resultados secundários incluirão benefícios associados, tais como melhorias na competência motora e resultados funcionais relacionados. Serão excluídos estudos envolvendo crianças que já fossem capazes de andar de bicicleta de forma independente antes da intervenção, estudos observacionais e artigos de revisão. Não serão aplicadas restrições relativamente à data de publicação ou ao idioma.

Results and Conclusions

Espera-se que esta revisão sistemática forneça uma visão geral abrangente dos programas de intervenção destinados a ensinar as crianças e os jovens em risco de, ou com provável DCD a andar de bicicleta de forma independente. Os resultados poderão ajudar a identificar estratégias eficazes para auxiliar a aquisição desta competência e a esclarecer os benefícios mais amplos, tanto a nível do desenvolvimento como da motricidade, associados à aprendizagem do ciclar nesta população.

Keywords: Perturbação do Desenvolvimento da Coordenação; crianças; bicicleta; desenvolvimento motor; competência motora; habilidades motoras; intervenção.

Neutrofilia Pós-Prova Está Associada a Desempenho Pior no Ironman 70.3 em Triatletas de Resistência

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Resumo

Introduction

O exercício de ultra-resistência promove ativação marcante do sistema imune inato, caracterizada por leucocitose e neutrofilia após a competição. A magnitude dessa resposta inflamatória pode estar associada a desempenho prejudicado e recuperação atrasada. Este estudo teve como objetivo investigar a associação entre marcadores inflamatórios pós-prova e desempenho geral em triatletas do Ironman 70.3. O objetivo do presente estudo foi Investigar a associação entre marcadores inflamatórios pós-prova e desempenho geral em triatletas do Ironman 70.3.

Methods

Vinte e sete triatletas do sexo masculino competindo no evento Ironman 70.3 Sergipe 2024 foram avaliados após a prova. Variáveis hematológicas foram medidas 1 hora após o término da prova, incluindo análises de contagens totais de leucócitos e neutrófilos. O tempo total de prova foi obtido dos registros oficiais da corrida. As associações entre marcadores inflamatórios e desempenho na prova foram avaliadas usando correlação de Spearman e análises de regressão linear simples.

Results and Conclusions

Correlações positivas significativas foram observadas entre tempo total de prova e contagens de leucócitos ($r_s = 0,66$; $p = 0,031$), bem como entre tempo total de prova e contagens de neutrófilos ($r_s = 0,65$; $p = 0,035$). A análise de regressão linear simples demonstrou associação positiva significativa entre tempo total de prova e contagens de neutrófilos ($R^2 = 0,4850$; $p = 0,0173$), indicando que atletas com desempenho geral pior apresentaram neutrofilia pós-prova mais elevada. As contagens de leucócitos também mostraram tendência positiva com o tempo total de prova, embora a significância estatística não tenha sido alcançada ($R^2 = 0,3367$; $p = 0,0613$). Maior neutrofilia pós-prova estava associada a desempenho pior no Ironman 70.3, reforçando a relação entre estresse fisiológico prolongado, inflamação sistêmica e desempenho de resistência reduzido. A resposta de neutrófilos pós-prova pode representar um biomarcador relevante de estresse fisiológico em atletas de ultra-resistência.

Keywords: Neutrófilos; Leucócitos; Inflamação; Ironman 70.3; Desempenho de resistência

Rendimiento funcional en mujeres con cáncer de mama: estudio comparativo con mujeres sanas

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Resumo

Introduction

El cáncer ha llegado a convertirse en la causa principal de morbi-mortalidad del mundo, siendo una de las enfermedades más prevalentes del siglo XXI, con un aumento progresivo en el número de casos cada año. Según la Sociedad Española de Oncología Médica (SEOM) (2025), las cifras que se esperan obtener son preocupantes, se estima que una de cada cuatro personas podrá desarrollar cáncer a lo largo de su vida. La Organización Mundial de la Salud (OMS) (2022), señala que el cáncer de mama es uno de los más frecuentes. Además, se sabe que los tratamientos oncológicos pueden afectar significativamente en la calidad de vida de las personas que los han recibido. Los efectos secundarios de estas terapias pueden ser alteraciones físicas: pérdida de funcionalidad, aumento de masa grasa, pérdida de fuerza e incluso alteraciones cognitivas: pérdida de memoria, afectación en el lenguaje (García et al., 2020; Lange et al., 2019). Este estudio tiene como objetivo analizar si el rendimiento en tareas funcionales se ve afectado en mujeres con cáncer de mama en comparación con mujeres sin antecedentes oncológicos.

Methods

Se realizó un estudio transversal con un grupo experimental de mujeres con cáncer de mama en fase de tratamiento ($n = 10$) y un grupo control de mujeres sin antecedentes oncológicos ($n = 10$). Los criterios de inclusión para el grupo experimental fueron: i) haber recibido terapia anticáncer ii) poseer funcionalidad para realizar las pruebas seleccionadas del estudio. Las pruebas se realizaron con el siguiente orden: Chair Stand Test (CST), Arm Curl Test (ACT) y Timed Up and Go (TUG), de este modo, se buscaba alternar pruebas de tren inferior con superior. Para el análisis estadístico de variables no paramétricas se realizó la prueba de U de Mann-Whitney. Por el contrario, para variables paramétricas se utilizó la prueba T de muestras independientes.

Results and Conclusions

No se observaron diferencias significativas intergrupo en las pruebas funcionales seleccionadas (p -valor $< 0,05$). En cada una de las pruebas los resultados fueron mejores en el grupo control, ya que realizaron más repeticiones y mejores tiempos. Sin embargo, estadísticamente no hubo diferencias significativas entre los grupos: prueba CST (p -valor=0,594); prueba ACT (p -valor=0,494) y prueba TUG (p -valor= 0,326). A pesar de no existir diferencias intergrupos, sería conveniente fomentar y mejorar la fuerza

muscular mediante el entrenamiento de fuerza en mujeres que se encuentran en fase de tratamiento oncológico, para mejorar su capacidad funcional.

Keywords: Efectos secundarios, estudio transversal, pruebas funcionales, tratamientos oncológicos, población oncológica

Avaliação da Coordenação Motora Geral e Específica no Futebol de Formação: Análise do M-Test e dos Saltos Monopedaís em Traquinas e Benjamins

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Resumo

Introduction

O objetivo central deste estudo consistiu em analisar e comparar o nível de eficiência técnica na condução de bola, bem como a capacidade de impulsão vertical e equilíbrio dinâmico, entre dois escalões distintos (Traquinas e Benjamins), procurando perceber de que forma o fator maturacional e o tempo de prática influenciam o controlo motor em situações dinâmicas.

Methods

O estudo consistiu na aplicação de testes específicos de avaliação da coordenação motora (M-Test e Saltos Monopedaís) numa amostra de 40 crianças (20 Traquinas e 20 Benjamins), com idades compreendidas entre os 7 e os 11 anos, praticantes regulares de futebol de formação na Nani Football Academy.

Results and Conclusions

Os dados recolhidos revelam melhorias estatisticamente e desportivamente significativas na execução dos testes consoante o aumento da idade cronológica e biológica dos jovens atletas. Especificamente, o escalão de Benjamins apresentou um tempo médio de execução mais rápido no M-Test em 1,95 segundos (15,14s face aos 17,08s dos Traquinas) e uma pontuação média superior em 4,8 pontos nos Saltos Monopedaís (43,60 face a 38,80 pontos). A coordenação motora grossa e específica mostrou-se um elemento essencial no contexto da modalidade, influenciando diretamente o desempenho prático. Conclui-se, assim, que a integração de exercícios focados no desenvolvimento coordenativo de forma sistemática no planeamento das sessões de treino é imperativa, servindo como base basilar para o posterior desenvolvimento técnico e tático dos jovens futebolistas.

Keywords: Coordenação motora; Futebol de formação; Controlo de bola; Agilidade; Saltos monopedaís; Desenvolvimento motor.

Confiabilidade inter e intra-avaliador do limiar de dor à pressão no quadríceps femoral 48 horas após exercício no flywheel em mulheres jovens

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Resumo

Introduction

O limiar de dor à pressão (LDP) é uma medida frequentemente utilizada para avaliar respostas ao dano muscular induzido por exercício (DMIE), particularmente a dor muscular de início tardio (DMIT). Entretanto, sua confiabilidade, especialmente após o treinamento com flywheel, ainda precisa ser investigada, sendo de suma importância para estudos que utilizam o LDP como marcador indireto de DMIE. Portanto, o objetivo do presente resumo foi analisar a confiabilidade inter e intra-avaliador do LDP em diferentes regiões do quadríceps femoral, 48 horas após uma sessão de cadeira extensora no flywheel em mulheres jovens.

Methods

O estudo foi aprovado pelo Comitê de Ética em Pesquisa da Universidade Federal de Viçosa (CAAE: 81740024.5.0000.5153). Participaram do estudo 15 mulheres jovens ($25,33 \pm 4,58$), massa corporal ($64,00 \pm 8,92$ kg), estatura ($1,66 \pm 0,06$ m) e IMC ($22,91 \pm 3,33$ kg/m²). As participantes realizaram uma sessão de treinamento no flywheel, composta por 4 séries de 10 repetições, com 2 minutos de intervalo entre séries e inércia de 0,05 kg·m² na cadeira extensora. Após 48 horas, o LDP foi avaliado utilizando-se um algômetro digital. E os pontos avaliados foram as regiões proximal, medial e distal do vasto lateral, reto femoral e vasto medial. O avaliador A realizou duas medidas, e o avaliador B realizou uma medida. A confiabilidade interavaliador foi analisada entre o avaliador A e o avaliador B, enquanto a confiabilidade intra-avaliador foi analisada entre as duas medidas do avaliador A. A normalidade das diferenças foi verificada pelo teste de Shapiro-Wilk. A confiabilidade foi determinada pelo coeficiente de correlação intraclass (ICC3), com intervalo de confiança de 95%, e pelo coeficiente de variação (CV).

Results and Conclusions

Na análise interavaliador, o vasto lateral apresentou ICC de 0,828 (IC95%: 0,510–0,947; CV = 17,45%) na região proximal, 0,828 (0,512–0,947; CV = 16,19%) na região medial e 0,819 (0,491–0,944; CV = 14,85%) na região distal. No reto femoral, os valores foram 0,888 (0,622–0,966; CV = 16,07%) na região proximal, 0,899 (0,692–0,970; CV = 11,89%) na região medial e 0,928 (0,733–0,979; CV = 10,41%) na região distal. No vasto

medial, os valores foram 0,867 (0,606–0,959; CV = 16,24%) na região proximal, 0,72¹(0,284–0,910; CV = 19,79%) na região medial e 0,750 (0,342–0,920; CV = 18,75%) na região distal. Na análise intra-avaliador, o vasto lateral apresentou ICC de 0,727 (0,295–0,912; CV = 25,24%) na região proximal, 0,772 (0,387–0,928; CV = 19,63%) na região medial e 0,929 (0,767–0,978; CV = 10,59%) na região distal. No reto femoral, os valores foram 0,905 (0,708–0,971; CV = 14,49%) na região proximal, 0,918 (0,744–0,975; CV = 11,10%) na região medial e 0,955 (0,854–0,987; CV = 8,54%) na região distal. No vasto medial, os valores foram 0,89¹(0,668–0,967; CV = 17,45%) na região proximal, 0,780 (0,404–0,931; CV = 20,01%) na região medial e 0,679 (0,206–0,894; CV = 27,62%) na região distal. O LDP no quadríceps femoral apresentou confiabilidade inter e intra-avaliador predominantemente boa a excelente. O reto femoral apresentou os resultados mais consistentes, enquanto o vasto lateral demonstrou boa confiabilidade interavaliador e confiabilidade intra-avaliador dependente da região avaliada. O vasto medial apresentou a maior variabilidade, especialmente das regiões medial e distal. Esses achados indicam que o LDP pode ser utilizado como marcador indireto de sensibilidade mecânica associada à DMIT, desde que os pontos anatômicos sejam rigorosamente selecionados e padronizados.

Keywords: Algometria; Confiabilidade; Dano muscular induzido por exercício; Treinamento de força; Dor muscular de início tardio.

Concordância inter e intra-avaliadores da goniometria de extensão do joelho após treinamento com volante de inércia em mulheres não treinadas.

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Resumo

Introduction

Após a primeira sessão de treinamento no flywheel, indivíduos não treinados podem sentir desconforto devido à dor muscular de início tardio (DMIT), ocasionando rigidez muscular e menor amplitude de movimento (ADM). O goniômetro é o instrumento utilizado para medir a ADM, esse equipamento pode apresentar grande variabilidade entre medições, dependendo do avaliador. Avaliar a concordância intra e inter avaliador deve ser uma etapa essencial para utilizar o goniômetro de maneira eficaz. O objetivo do estudo foi avaliar a concordância intra e inter avaliadores do goniômetro na ADM do joelho durante a flexão ativa, após uma sessão de treinamento resistido no flywheel.

Methods

Foram recrutadas 15 mulheres, sem experiência prévia com treinamento resistido nem com equipamentos flywheel. Foram realizadas 2 visitas ao laboratório. Na primeira visita, foi realizada uma sessão de treinamento na mesa flexora flywheel, composta por 4 séries de 10 repetições com uma carga de inércia de 0,05 kg·m² e 1 minuto de intervalo de descanso. A segunda visita ocorreu 48 horas após a sessão de treinamento, na qual foi realizada a avaliação da ADM pelo goniômetro. A avaliação foi conduzida por dois avaliadores de forma alternada: o avaliador “A” realizou 2 medições, o avaliador “B” realizou 2 medições e por fim o avaliador “A” realizou 2 medições. As medições foram realizadas com as voluntárias deitadas em uma maca (decúbito ventral) e então foi solicitado que ela realizasse a flexão dos joelhos. A concordância intra-avaliador foi calculada usando a média das duas medições iniciais realizadas pelo avaliador “A” com a média das duas medições finais. A concordância inter-avaliador foi calculada usando a média das primeiras medições do avaliador “A” e a média das medições do avaliador “B”. Empregou-se o coeficiente de correlação intraclasse (CCI) com intervalo de confiança de 95% (IC95%) e coeficiente de variação (CV).

Results and Conclusions

A análise intra-avaliador revelou excelente concordância entre a média das medidas realizadas pelo avaliador “A” (ICC=0.971;IC95%=0.903;0.991;CV=14.04%). A análise inter-avaliador revelou excelente concordância entre a média das medidas do avaliador

“A” com a média das medidas do avaliador “B” (ICC=0.976;IC95%=0.919;0.993;CV=12.48%). Em acordo com os dados analisados pode-se concluir que as mensurações do avaliador “A” são semelhantes ao avaliador “B”. E que o avaliador “A” tem excelente precisão em suas medidas.

Keywords: Dor muscular tardia, treinamento de resistência, rigidez.

ANÁLISIS DEL IMPACTO DE DISTRACTORES SOBRE LA VARIABILIDAD DE LA FRECUENCIA CARDIACA EN UNA ESCALADORA DE ALTO RENDIMIENTO

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Resumo

Introduction

El rendimiento en escalada deportiva está influenciado no solo por factores físicos y técnicos, sino también por las respuestas psicofisiológicas de los deportistas ante el estrés competitivo. La variabilidad de la frecuencia cardiaca (VFC) se ha consolidado como una herramienta útil para evaluar la regulación autonómica y las respuestas al estrés durante tareas específicas del deporte. Por ello, comprender cómo afectan los factores estresantes a los escaladores puede contribuir al desarrollo de intervenciones de entrenamiento más eficaces.

Methods

Se realizó un estudio de caso con una escaladora de alto rendimiento con 16 años de experiencia y resultados destacados a nivel nacional. La VFC fue evaluada en reposo y durante la realización de cuatro bloques de escalada diseñados para simular situaciones competitivas mediante la inclusión de diferentes distractores físicos y psicológicos. A partir de las respuestas autonómicas observadas, se desarrolló una propuesta de entrenamiento individualizada.

Results and Conclusions

Las tareas de escalada provocaron un incremento de la frecuencia cardiaca media y una reducción de los índices de VFC relacionados con la actividad parasimpática en comparación con los valores basales. La mayor alteración autonómica se observó en situaciones que combinaban movimientos técnicamente exigentes con distractores externos. Estos hallazgos evidenciaron dificultades para afrontar determinados estresores competitivos y permitieron identificar áreas de mejora, entre ellas los movimientos de coordinación, el rendimiento en bloques de placa y la gestión de la presión externa durante la competición. Los resultados sugieren que los estresores competitivos influyen negativamente en la regulación autonómica de escaladores de alto rendimiento. En consecuencia, se propuso una intervención de entrenamiento precompetitiva individualizada que incorporó simulaciones de competición, exposición progresiva a distractores y práctica técnica específica. La integración de situaciones similares a las de competición en el entrenamiento podría mejorar la gestión del estrés y optimizar el rendimiento en escalada.

Keywords: escalada deportiva; variabilidad de la frecuencia cardiaca; regulación autonómica; estrés competitivo; escalada en bloque; intervención de entrenamiento.

INFLUENCIA DE LAS FASES DEL CICLO MENSTRUAL SOBRE LA FATIGA MUSCULAR EN MUJERES JÓVENES

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Resumo

Introduction

La literatura científica en Ciencias del Deporte presenta una importante brecha de conocimiento debido a la exclusión histórica de las mujeres en los estudios de investigación. Esta exclusión se debe, principalmente, a la complejidad metodológica que introducen las fluctuaciones hormonales propias del ciclo menstrual. Como consecuencia, las recomendaciones actuales del entrenamiento de fuerza están basadas en datos obtenidos en hombres y que han sido extrapolados a las mujeres. El objetivo principal fue analizar la influencia de las fases del ciclo menstrual sobre la fatiga muscular provocada por un protocolo de entrenamiento en el ejercicio de sentadilla completa en mujeres jóvenes.

Methods

Estudio observacional longitudinal con una muestra de 7 mujeres físicamente activas, con ciclos menstruales regulares y que no tomaran anticonceptivos orales. Las fases del ciclo se controlaron mediante un método cronológico basado en el conteo de los días. Todas las participantes completaron dos sesiones de familiarización y un test incremental de cargas, posteriormente, fueron evaluadas en las tres fases del ciclo de forma aleatorizada. El protocolo de entrenamiento consistió en una serie de 10 repeticiones en el ejercicio de sentadilla completa al 60% de la 1RM. Para cuantificar la fatiga muscular inducida por el protocolo de entrenamiento, se evaluaron de forma pre y post-protocolo la pérdida de altura en el salto con contramovimiento (CMJ) y la velocidad de ejecución, registrando la mayor Velocidad Media Propulsiva (VMP_C60best) y el promedio (VMP_C60prom). La normalidad y homogeneidad de los datos se evaluaron con Shapiro-Wilk y Levene y se aplicó un análisis de la varianza (ANOVA) de medidas repetidas 2 x 3. Cuando se encontraron diferencias significativas, se realizaron comparaciones post hoc con ajuste de Bonferroni.

Results and Conclusions

Se hallaron diferencias significativas en el efecto tiempo de todas las variables estudiadas: CMJ ($p < 0,001$), VMP_C60best ($p = 0,041$) y VMP_C60prom ($p = 0,049$). Esto confirmó que el protocolo de entrenamiento fue efectivo para provocar un descenso del rendimiento con independencia de la fase. Respecto al efecto fase, no se encontraron diferencias estadísticamente significativas en ninguna variable: CMJ ($p = 0,08$), VMP_C60best ($p = 0,465$), VMP_C60prom ($p = 0,651$). De igual manera, no se detectó una interacción

significativa tiempo x fase (CMJ: $p=0,294$; VMP_C60best: $p=0,195$; VMP_C60prom: $p=0,193$), lo que sugiere que la magnitud de la fatiga fue similar en todas las fases del ciclo. Sin embargo, se observó una tendencia a una mayor pérdida de altura en el salto vertical durante la fase folicular respecto a la lútea, donde la diferencia entre pre y post fue de 3,6 cm ($p=0,07$). Esto podría estar vinculado con los bajos niveles de estrógenos característicos del inicio del ciclo, lo que, según García-Pinillos et al. (2021), podría reducir la rigidez musculotendinosa, y por ello, la eficiencia del CEA. Los resultados sugieren que el ciclo menstrual no influyó de manera significativa en la fatiga neuromuscular inmediata en mujeres jóvenes físicamente activas. Por último, la individualización del entrenamiento y el control de la velocidad podrían suponer herramientas de mayor relevancia práctica que la planificación basada exclusivamente en las fases del ciclo menstrual.

Keywords: Ciclo menstrual, fatiga neuromuscular, entrenamiento de fuerza, VBT, CMJ.

Democratizando el análisis biomecánico del movimiento humano: metodología del proyecto

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Resumo

Introduction

La evaluación del movimiento humano es una herramienta fundamental para mejorar el rendimiento, prevenir lesiones y apoyar procesos de rehabilitación. Sin embargo, los sistemas de referencia utilizados actualmente para este fin requieren equipamiento costoso, personal altamente especializado y entornos de laboratorio, lo que limita su aplicación en contextos reales. Actualmente, los sistemas de captura tridimensional del movimiento, como VICON, representan el estándar de oro para este tipo de evaluaciones, aunque su elevado coste y complejidad restringen su utilización fuera de entornos altamente especializados. Los recientes avances en inteligencia artificial y visión por computador han abierto nuevas posibilidades para analizar el movimiento humano mediante vídeos obtenidos de cámaras comerciales. No obstante, la evidencia científica disponible sigue siendo limitada en movimientos deportivos complejos y en entornos reales de práctica, donde la validez y precisión de estas tecnologías todavía requieren una evaluación rigurosa. Con el objetivo de superar estas barreras, este proyecto propone el desarrollo y validación de una herramienta web abierta, automatizada y accesible que permita analizar el movimiento humano mediante inteligencia artificial y cámaras comerciales, favoreciendo la democratización del análisis biomecánico en los ámbitos del deporte, la salud y la investigación.

Methods

Se llevará a cabo un estudio de validación concurrente con 120 deportistas de ambos sexos, distribuidos en diferentes grupos de edad y niveles de experiencia deportiva. Los participantes realizarán una batería de tareas representativas de los principales patrones de movimientos utilizados en el deporte, incluyendo saltos, aceleraciones y cambios de dirección. Todas las tareas serán registradas simultáneamente mediante cámaras comerciales colocadas en diferentes perspectivas y sincronizadas entre sí. De forma paralela, los movimientos serán analizados mediante un sistema de captura tridimensional del movimiento VICON y plataformas de fuerza, consideradas estándares de referencia para la evaluación biomecánica. A partir de los vídeos obtenidos se desarrollará una base de datos específica para el ámbito deportivo mediante la anotación manual de puntos anatómicos clave. Posteriormente, se analizará la validez de diferentes algoritmos de inteligencia artificial para la estimación tridimensional del movimiento humano y la obtención de variables biomecánicas, comparando sus resultados con los registrados por los sistemas de referencia. Finalmente, los algoritmos con mejor rendimiento serán integrados en una herramienta web de acceso abierto diseñada para facilitar el análisis

biomecánico en contextos deportivos, clínicos y de investigación mediante el uso de cámaras comerciales y tecnologías basadas en inteligencia artificial.

Results and Conclusions

Se espera identificar los algoritmos de inteligencia artificial con mayor capacidad para analizar de forma válida y fiable el movimiento humano en entornos deportivos reales utilizando cámaras comerciales. Asimismo, se prevé desarrollar una herramienta web accesible que contribuya a democratizar el análisis biomecánico en los ámbitos del deporte, la salud y la investigación.

Keywords: Inteligencia artificial; Biomecánica; Movimiento humano; Visión por computador; Prevención de lesiones; Cinética; Cinemática

Impacto de la Tarea Dual sobre la SPPB en Personas Mayores con Hipertensión Arterial

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Resumo

Introduction

La hipertensión arterial (HTA) se ha relacionado con alteraciones funcionales y cognitivas en personas mayores. La evaluación bajo tarea dual (TD) permite analizar el rendimiento cuando una tarea motora se realiza simultáneamente con una demanda cognitiva. En este contexto, la Short Physical Performance Battery (SPPB) puede aportar información relevante sobre el comportamiento funcional del equilibrio, la marcha y la fuerza del tren inferior.

Methods

Se realizó un estudio transversal con 46 personas mayores, distribuidas en dos grupos: sanos ($n = 23$) y con HTA ($n = 23$). El rendimiento funcional se evaluó mediante la SPPB en tarea simple (TS) y TD. La TD consistió en ejecutar simultáneamente la prueba motora y una tarea cognitiva aritmética. Se compararon los resultados entre grupos y condiciones.

Results and Conclusions

En TS, el grupo sano obtuvo una puntuación global SPPB superior al grupo con HTA: $11,87 \pm 0,34$ frente a $11,35 \pm 0,94$; $p = 0,001$. En TD, esta diferencia aumentó: $10,70 \pm 1,1$ en el grupo sano frente a $9,09 \pm 1,95$ en el grupo con HTA; $p = 0,003$. Además, en TD se observaron diferencias significativas en la marcha de 3 metros ($p = 0,001$) y en Sit to Stand ($p = 0,031$), mientras que el equilibrio estático mostró menor capacidad discriminativa. Estos resultados sugieren que la TD puede evidenciar una pérdida funcional más marcada en personas mayores con HTA.

Keywords: Capacidad funcional, marcha, equilibrio postural

Relação entre Estado Maturacional e Indicadores Biométricos Quantitativos em Estudantes do Ensino Básico e Secundário

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Resumo

Introduction

O presente estudo analisou a relação entre a idade cronológica, enquanto indicador indireto do estado maturacional, e os indicadores de aptidão física avaliados através dos testes do programa FITescola, numa amostra de 163 estudantes do ensino básico e secundário distribuídos pelo 7.º (n = 59), 10.º (n = 30) e 12.º ano de escolaridade (n = 74), com idades compreendidas entre os 11 e os 19 anos.

Methods

Os testes aplicados avaliaram seis componentes da condição física: velocidade (40 metros), resistência aeróbia (milha), força resistente abdominal (abdominais), força explosiva dos membros inferiores (impulsão horizontal), força resistente dos membros superiores (extensões de braços) e flexibilidade (senta e alcança). A análise estatística incluiu estatística descritiva, ANOVA, Teste t de Student para amostras independentes e correlação de Pearson, com um nível de significância fixado em $\alpha = 0,05$.

Results and Conclusions

Os resultados evidenciaram diferenças estatisticamente significativas em cinco das seis variáveis analisadas, com um padrão consistente de melhoria do desempenho associado ao avanço no ano de escolaridade. As diferenças concentraram-se nas comparações que envolvem o 7.º ano, não tendo sido observadas diferenças significativas entre o 10.º e o 12.º ano em nenhuma variável. A impulsão horizontal foi a variável com evolução mais expressiva ($d = 1,13$; $r = 0,529$) e a flexibilidade estabilizou a partir do 10.º ano. A idade cronológica revelou associações significativas com todas as variáveis avaliadas, corroborando a sua utilidade como proxy do desenvolvimento maturacional em contexto escolar.

Keywords: Maturação biológica; aptidão física; FITescola; idade cronológica; ensino básico e secundário; desenvolvimento físico

Relação entre a prática desportiva extracurricular e os níveis de flexibilidade e velocidade em adolescentes

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Resumo

Introduction

O presente estudo teve como objetivo analisar a relação entre a prática desportiva extracurricular e os níveis de aptidão física, especificamente a flexibilidade e a velocidade, em alunos do ensino básico e secundário

Methods

A amostra foi constituída por 290 alunos do 7.º, 10.º e 12.º anos da Escola Secundária de Palmela, com idades compreendidas entre os 12 e os 19 anos, incluindo 137 participantes do sexo masculino e 153 do sexo feminino. Os dados foram recolhidos através da bateria FITescola, utilizando o teste Sit and Reach para avaliar a flexibilidade e o teste de sprint de 20 metros para avaliar a velocidade. Os participantes foram divididos de acordo com a existência ou não de prática desportiva extracurricular. Foram realizadas análises estatísticas descritivas e inferenciais através do teste t para amostras independentes.

Results and Conclusions

Os resultados revelaram diferenças estatisticamente significativas no teste de sprint de 20 metros, verificando-se que os alunos envolvidos em prática desportiva extracurricular apresentaram tempos médios inferiores aos dos alunos não praticantes. Relativamente à flexibilidade, não foram observadas diferenças estatisticamente significativas entre os grupos. Estes resultados reforçam a importância da prática regular de atividade física e desportiva no desenvolvimento da aptidão física durante a adolescência, particularmente em capacidades relacionadas com o desempenho motor, como a velocidade. O estudo destaca ainda a relevância de instrumentos de avaliação da aptidão física em contexto escolar, como o FITescola, na monitorização da condição física dos jovens e na promoção de estilos de vida saudáveis.

Keywords: aptidão física; flexibilidade; velocidade; prática desportiva extracurricular; adolescentes; FITescola

O Impacto do Timing Nutricional na Síntese Proteica e Recuperação Muscular Pós Treino de Força

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Resumo

Introduction

A nutrição desempenha um papel fulcral na modulação das adaptações fisiológicas induzidas pelo treino de força. Entre as estratégias de otimização desportiva, o timing nutricional (que se refere à ingestão planeada de nutrientes em períodos específicos em torno do exercício) tem sido amplamente investigado. O presente trabalho tem como objetivo analisar o impacto do timing nutricional pós treino na síntese proteica muscular (SPM) e na recuperação do glicogénio.

Methods

A metodologia baseou-se numa revisão da literatura científica atual, com foco nos consensos da International Society of Sports Nutrition (ISSN). A evidência demonstra que o exercício de força estimula tanto a degradação como a síntese de proteínas; contudo, o balanço proteico líquido permanece negativo na ausência de suporte nutricional. A co ingestão de proteínas de elevado valor biológico (ricas em aminoácidos essenciais, particularmente a leucina) combinada com hidratos de carbono no período pós-treino imediato (até 2 horas) maximiza a ativação da via sinalizadora mTORC1. Esta sinergia acelera a reparação das microlesões musculares e otimiza a ressíntese do glicogénio muscular através da potenciação da secreção de insulina.

Results and Conclusions

Conclui-se que o timing nutricional pós-exercício é uma estratégia metabólica eficaz para acelerar a recuperação e potenciar a hipertrofia muscular. Embora a ingestão total diária de macronutrientes seja o fator primordial, a distribuição estratégica de nutrientes no pós-treino imediato assume um papel determinante na performance de atletas que realizam múltiplas sessões diárias ou treinos de elevada intensidade. A aplicação prática destas diretrizes permite minimizar o tempo de recuperação e mitigar o dano muscular induzido pelo exercício.

Keywords: Timing nutricional, Síntese proteica muscular, Recuperação de glicogénio, Treino de força, Hipertrofia muscular.

Fiabilidad test-retest del rendimiento motor y cognitivo durante una prueba Sit-to-Stand en doble tarea en mujeres con cáncer de mama en tratamiento

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Resumo

Introduction

Los tratamientos para el cáncer de mama pueden afectar negativamente tanto a la función física como cognitiva, incluyendo el deterioro cognitivo asociado al cáncer. En consecuencia, las evaluaciones en doble tarea, que permiten valorar simultáneamente el rendimiento motor y cognitivo, han despertado un interés creciente en oncología. Sin embargo, la fiabilidad de las pruebas funcionales en doble tarea en mujeres con cáncer de mama durante el tratamiento sigue siendo poco conocida. El objetivo de este estudio fue determinar la fiabilidad test-retest del rendimiento motor y cognitivo durante una prueba Sit-to-Stand (STS) en doble tarea en mujeres en tratamiento por cáncer de mama.

Methods

Treinta y una mujeres en tratamiento por cáncer de mama participaron en este estudio de fiabilidad test-retest. Las participantes presentaron una edad media de $55,35 \pm 9,35$ años y un índice de masa corporal de $26,78 \pm 4,28$ kg/m². La mayoría estaba recibiendo hormonoterapia (74,2%), quimioterapia (67,7%) y/o radioterapia (61,3%). Las participantes realizaron una prueba STS en condición de doble tarea en dos ocasiones diferentes. La fiabilidad relativa se evaluó mediante el coeficiente de correlación intraclass (CCI), mientras que la fiabilidad absoluta se analizó mediante el error estándar de medida (SEM) y la mínima diferencia real detectable (SRD).

Results and Conclusions

El rendimiento motor durante la prueba STS en doble tarea aumentó de $11,02 \pm 2,52$ a $11,97 \pm 2,54$ repeticiones, mostrando una buena fiabilidad (CCI = 0,833; IC95%: 0,682–0,916), con un SEM de 1,03 repeticiones (8,99%) y una SRD de 2,87 repeticiones (24,93%). El rendimiento cognitivo también mostró una fiabilidad excelente. El rendimiento en operaciones aumentó de $13,19 \pm 4,85$ a $15,71 \pm 4,87$ operaciones correctas (CCI = 0,918; IC95%: 0,838–0,960), mientras que el número de respuestas correctas aumentó de $12,55 \pm 4,96$ a $15,29 \pm 5,27$ (CCI = 0,922; IC95%: 0,845–0,962). Los valores de SEM oscilaron entre el 9,63% y el 10,26%, mientras que los valores de SRD oscilaron entre el 26,70% y el 28,45%. La prueba STS en doble tarea mostró una buena fiabilidad para el rendimiento motor y una excelente fiabilidad para el rendimiento cognitivo en mujeres con cáncer de mama en tratamiento. Estos hallazgos respaldan su utilización como una herramienta factible para la evaluación de la capacidad funcional en doble tarea.

tanto en contextos clínicos como de investigación. Futuros estudios deberían analizar su capacidad de respuesta a intervenciones y su relación con las alteraciones funcionales y cognitivas asociadas al tratamiento del cáncer de mama.

Keywords: cáncer de mama; doble tarea; Sit-to-Stand test; fiabilidad test–retest; disfunción cognitiva relacionada con el cáncer.

Passe longo no futebol: análise biomecânica com bola no chão versus bola suspensa

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Resumo

Introduction

No futebol, o passe longo é uma ferramenta fundamental, exigindo coordenação biomecânica para otimizar a transferência de energia para a bola. O objetivo deste trabalho foi analisar e comparar as exigências biomecânicas do passe longo em duas condições distintas: bola no chão e bola suspensa num pino.

Methods

A amostra foi constituída por 10 atletas de futebol. A recolha de dados e a análise cinemática linear e angular foram realizadas através do programa Kinovea.

Results and Conclusions

Resultados: A maioria dos atletas registou perdas significativas de velocidade máxima da bola na condição suspensa. A análise da cinemática angular revelou que esta quebra de rendimento resultou de um encurtamento na fase de armamento do passe, reduzindo a flexão do joelho em cerca de 20 a 30 graus, provocado por constrangimentos visuais e espaciais. Apenas uma minoria (dois atletas) conseguiu uma adaptação positiva, aumentando a amplitude do movimento para maximizar o "efeito chicote". Conclusões: O sucesso do passe longo com a bola suspensa não depende apenas da vantagem física da eliminação da fricção com o solo, mas fundamentalmente da capacidade do atleta em aproveitar a maior liberdade angular, evitando a hesitação postural e o encurtamento do movimento motor.

Keywords: Futebol; Passe longo; Cinemática; Kinovea; Adaptação motora.

Perfil biomecánico de corredores de élite vs. recreacionales mediante sensores wearables

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Resumo

Introduction

El objetivo de este estudio fue comparar variables biomecánicas clave entre corredores de fondo de élite y recreativos a velocidades estandarizadas en cinta de correr, utilizando sensores inerciales colocados en las zapatillas.

Methods

Cincuenta y cinco corredores de élite (mejor marca personal en 10 km < 31min) fueron emparejados 1:1 con corredores recreativos por sexo, edad, estatura y masa corporal. Se evaluaron las variables biomecánicas de la carrera: tiempo de contacto (CT), frecuencia de zancada (SF), longitud de zancada (SL), rigidez de la pierna (Kleg), tasa de carga de la fuerza de reacción vertical del suelo (tasa vGRF) y tipo de pisada (FST), utilizando unidades de medición inercial RunScribe durante un protocolo incremental en cinta de correr (10, 12 y 14 km/h). Se aplicaron pruebas t de Student para muestras emparejadas con corrección FDR de Benjamini-Hochberg.

Results and Conclusions

Los corredores de élite mostraron un tiempo de contacto significativamente más corto a las tres velocidades (10 km/h: $d = -0.78$; 12 km/h: $d = -0.85$; 14 km/h: $d = -0.97$), una mayor rigidez de la pierna ($d = +0.69$ a $+0.87$), una tasa de carga de vGRF más rápida ($d = +0.70$ a $+1.02$) —los tamaños del efecto más grandes observados en todo el conjunto de variables— y un patrón de pisada más anterior ($d = +0.63$ a $+0.68$). No se encontraron diferencias en la frecuencia ni en la longitud de la zancada. Los corredores de élite exhiben una estrategia de aplicación de fuerza fundamentalmente diferente —contacto con el suelo más corto, mayor rigidez de la pierna, carga más rápida y una pisada más anterior— que no se explica por diferencias antropométricas ni por las dimensiones de la zancada. Estos hallazgos, obtenidos bajo condiciones ecológicamente válidas utilizando sensores usables (wearables), proporcionan objetivos prácticos para el entrenamiento de la técnica de carrera en atletas recreativos.

Keywords: Economía de carrera; Tecnología vestible; RunScribe; Modelo masa-muelle; Diseño de muestras emparejadas

Impacto da Fadiga na Tomada de Decisão de Jogadores de Futsal em Jogos Reduzidos

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Resumo

Introduction

O futsal exige tomadas de decisão constantes em contextos de elevada pressão temporal e espacial. Embora a fadiga esteja frequentemente associada ao desempenho físico, a sua influência nos processos cognitivos e na tomada de decisão continua a ser um tema relevante de investigação. Assim, o presente estudo teve como objetivo analisar o impacto da fadiga na qualidade da tomada de decisão de jogadores de futsal em jogos reduzidos.

Methods

A amostra foi constituída por 22 jogadores seniores de futsal avaliados em duas condições distintas: sem fadiga (início do treino) e com fadiga (final do treino). A recolha de dados foi realizada através de uma grelha de observação sistemática aplicada em jogos reduzidos 4 x 4. As variáveis analisadas incluíram decisões inadequadas, perdas de bola e passes errados.

Results and Conclusions

Na condição sem fadiga foram registadas 113 ações, incluindo 20 decisões inadequadas (17,7%), 17 perdas de bola (15,0%) e 12 passes errados (10,6%). Na condição com fadiga, o número total de ações aumentou para 140, verificando-se 32 decisões inadequadas (22,9%), 25 perdas de bola (17,9%) e 13 passes errados (9,3%). Os resultados demonstraram um aumento das decisões inadequadas e das perdas de bola sob fadiga, sugerindo uma diminuição da qualidade da tomada de decisão durante esforço físico acumulado. A ligeira diminuição percentual dos passes errados poderá indicar uma adaptação dos jogadores para opções de menor risco sob fadiga. Conclui-se que a fadiga influencia negativamente o desempenho cognitivo e a tomada de decisão no futsal, reforçando a importância da integração de exercícios de tomada de decisão sob fadiga nos processos de treino.

Keywords: futsal; fadiga; tomada de decisão; jogos reduzidos; desempenho desportivo

Patrones de entrenamiento entre los corredores de media distancia: diferencias entre sexos, nivel de competición y tipo de prueba.

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Resumo

Introduction

Los diferentes perfiles de corredores de medio fondo, como los especialistas en 400–800m, 800m y 800–1500m, han sido ampliamente reconocidos a lo largo de los años. Aunque estudios recientes han destacado algunas diferencias fisiológicas entre estos atletas, los patrones de entrenamiento de cada subgrupo todavía no han sido investigados en profundidad. Por ello, el objetivo de este estudio fue analizar las características del entrenamiento de corredores de medio fondo en función de la prueba objetivo, el nivel competitivo y el género.

Methods

Los datos fueron recogidos mediante un cuestionario online validado, utilizado previamente en corredores de medio fondo. En el estudio participaron un total de 105 atletas, que fueron clasificados en diferentes subgrupos según el género, el nivel competitivo y la prueba objetivo. El género se categorizó como masculino o femenino; el nivel competitivo como regional, nacional o internacional; y la prueba objetivo como 400–800m, solo 800 m o 800–1500m. El cuestionario recogió información sobre diferentes variables de entrenamiento, incluyendo el volumen semanal de carrera, el volumen de carrera suave, el tiempo semanal de entrenamiento, el entrenamiento de técnica de carrera, el entrenamiento de fuerza y otras características del entrenamiento.

Results and Conclusions

En relación con el género, los hombres reportaron un mayor volumen total de carrera semanal, mientras que las mujeres mostraron valores superiores en el entrenamiento de técnica de carrera. Respecto al nivel competitivo, los atletas de mayor nivel realizaron más kilómetros de carrera suave, un mayor volumen total semanal y más tiempo de entrenamiento semanal. En cuanto a la prueba objetivo, los atletas centrados en 800–1500m realizaron más kilómetros semanales que aquellos centrados solo en 800m o en 400–800m. Por el contrario, los atletas de 400–800m reportaron mayores volúmenes de entrenamiento de fuerza y de entrenamiento técnico que aquellos orientados hacia pruebas de mayor componente aeróbico. En conclusión, los corredores de medio fondo parecen adaptar su entrenamiento en función del nivel competitivo, la prueba objetivo y el género, mostrando diferencias relevantes entre subgrupos. Sin embargo, se necesita más investigación para determinar qué estrategias de entrenamiento son más eficaces para mejorar el rendimiento en cada subgrupo específico.

Keywords: Media distancia, patrones de entrenamiento, personalización, rendimiento, atletismo.

La oxidación de sustratos se asocia con la respiración mitocondrial del músculo esquelético en hombres con prediabetes y diabetes tipo 2

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Resumo

Introduction

La alteración en la utilización de sustratos es una característica distintiva de la diabetes tipo 2 (T2D). Aunque la oxidación de sustratos a nivel de todo el organismo en reposo y durante el ejercicio puede evaluarse mediante calorimetría indirecta, sigue sin estar claro cómo se asocian estos parámetros sistémicos con la respiración mitocondrial a nivel tisular. Este estudio tuvo como objetivo determinar si el cociente de intercambio respiratorio (RER) en reposo y la oxidación máxima de grasas (MFO) se asocian con la respiración mitocondrial del músculo esquelético en varones con T2D.

Methods

En un análisis transversal de hombres con prediabetes y T2D ($N = 69$, 56 ± 6 años, hemoglobina glicosilada 6.86 ± 1.22 %) se analizaron muestras de biopsia de músculo esquelético del vastus lateralis. Mediante respirometría de alta resolución se cuantificaron los estados respiratorios mitocondriales absolutos e intrínsecos (normalizados respecto a la actividad de la citrato sintasa) en el Complejo I (CI), Complejo I+II (CI+II) y la capacidad del sistema de transporte de electrones (ETSC). Las variables de oxidación de sustratos incluyeron el RER en reposo (medido mediante calorimetría indirecta en decúbito supino entre las 08:00 y las 10:00 h tras un ayuno nocturno) y la MFO normalizada respecto a la masa libre de grasa (determinada mediante una prueba incremental escalonada de 3 min en cicloergómetro utilizando la ecuación de Frayn, finalizando el test cuando el $RER \geq 1$). Se realizaron análisis de regresión lineal simple para evaluar estas relaciones.

Results and Conclusions

El RER en reposo se asoció positivamente con la capacidad absoluta del CI ($\beta = 0.049$, $p < 0.001$, explicando el 25.4% de su varianza total) y con la respiración intrínseca del CI ($\beta = 0.382$, $p < 0.001$). Asimismo, la MFO se correlacionó negativamente con múltiples variables intrínsecas, asociándose significativamente con el CI intrínseco ($\beta = -0.414$, $p = 0.001$) y la ETSC intrínseca ($\beta = -0.510$, $p < 0.001$). En hombres con prediabetes y T2D, la oxidación de sustratos se asocia con la respiración mitocondrial del músculo esquelético. La asociación positiva entre el RER en reposo y la capacidad del CI podría sustentarse mecánicamente en el protocolo de respirometría utilizado. Dado que la

respiración del CI se estimuló con piruvato, malato y glutamato, este estado refleja específicamente la capacidad mitocondrial para oxidar sustratos derivados de los carbohidratos. Por lo tanto, una mayor dependencia de los carbohidratos (RER elevado) está estrechamente vinculada a la capacidad respiratoria mitocondrial asociada a carbohidratos a nivel tisular. Por otro lado, una mayor MFO se asocia con capacidades respiratorias intrínsecas reducidas, lo que podría representar un mecanismo compensatorio en el cual los individuos con baja MFO regulan al alza su capacidad respiratoria intrínseca para contrarrestar los déficits de eficiencia metabólica. Este estudio ha sido financiado por el Ministerio de Ciencia, Innovación y Universidades/Agencia Estatal de Investigación (MICIU/AEI/10.13039/501100011033) a través del proyecto EDUGUTION (PID2019-110063RA-I00); por el Consejo Superior de Deportes (ENTRENOX, EXP_74977); y por el Instituto de Investigación e Innovación Biomédica de Cádiz (INiBICA, MITOX, PP11-007-2023). JCP contó con el apoyo del Instituto de Salud Carlos III (ISCIII), España, a través del contrato postdoctoral 'Sara Borrell'.

Keywords: Función mitocondrial; ácidos grasos; Oroboros; Músculo esquelético.

O Impacto da Fadiga na Força Explosiva dos Membros Inferiores em Atletas de futebol sénior

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Resumo

Introduction

A força explosiva dos membros inferiores constitui uma capacidade física determinante no futebol, estando associada a ações como acelerações, mudanças de direção, remates e saltos. A fadiga resultante das sessões de treino pode comprometer esta capacidade, influenciando negativamente o desempenho dos atletas. Neste contexto, o presente estudo teve como objetivo analisar o impacto da fadiga induzida pelo treino na força explosiva dos membros inferiores em atletas de futebol sénior, através da avaliação do desempenho no teste de salto horizontal. A amostra foi constituída por 12 atletas de futebol sénior do Clube de Futebol Gadiana, com idades compreendidas entre os 19 e os 35 anos. Foi adotado um desenho observacional com medidas repetidas, sendo avaliados os desempenhos dos atletas antes e após uma sessão de treino habitual. Em cada momento de avaliação, foram realizadas duas tentativas do teste de salto horizontal, considerando-se o melhor resultado obtido. Os resultados demonstraram uma diminuição do desempenho em todos os atletas após o treino, evidenciando o efeito da fadiga na capacidade de produção de força explosiva. A média do salto horizontal reduziu de 2,26 m no momento pré-treino para 2,19 m no momento pós-treino, correspondendo a uma diferença média de -0,07 m e a uma variação média de -3,22%. Verificou-se ainda variabilidade individual na resposta à fadiga, com reduções que oscilaram entre -2,19% e -4,09%. Esta dispersão sugere que outros fatores, como a condição física, a experiência de treino, a recuperação individual ou características fisiológicas, poderão também ter influenciado os resultados obtidos. Conclui-se que a fadiga induzida pelo treino compromete a força explosiva dos membros inferiores em atletas de futebol sénior, refletindo-se numa diminuição significativa do desempenho no salto horizontal. Estes resultados reforçam a importância da monitorização da fadiga e da adequada gestão das cargas de treino para otimizar o rendimento desportivo.

Methods

5. Metodologia 5.1 Desenho do Estudo O presente trabalho segue uma abordagem quantitativa de natureza observacional, baseada na recolha de dados em momentos distintos sobre os mesmos participantes. Pretende-se analisar possíveis alterações no desempenho em função do estado de fadiga induzido pelo treino. A investigação será conduzida em contexto real de treino, permitindo maior proximidade com a prática desportiva, embora com menor controlo sobre fatores externos. 5.2 Amostra O estudo

contará com a participação de 12 atletas de futebol sénior do Clube de Futebol Guadiana. Serão considerados elegíveis os jogadores que participem regularmente nas sessões de treino e que não apresentem limitações físicas ou lesões no momento da avaliação. A seleção será feita por conveniência. Será garantida a confidencialidade dos dados e o consentimento informado dos participantes.

5.3 instrumentos de avaliação

Teste do salto horizontal A força explosiva dos membros inferiores será avaliada através do salto horizontal a partir de posição estática. Cada participante realizará duas tentativas, sendo considerada a maior distância obtida. A medição será feita em centímetros, com o uso de uma fita métrica, desde o ponto inicial até ao contacto final na receção. **Registo de dados** Os resultados serão registados em grelhas previamente definidas, assegurando uniformidade na recolha da informação. **Dados antropométricos** Serão registados valores de altura e peso dos participantes, com recurso a instrumentos disponíveis no contexto do clube. A idade dos atletas também irá acompanhar os dados recolhidos. **Variáveis do Estudo**

Variável Independente 5.4.1 Estado de fadiga (antes vs após o treino)

Variável Dependente 5.4.2 Distância do salto horizontal (centímetros)

5.5 Procedimentos de Recolha A recolha será realizada antes e após a sessão de treino. **Avaliação Pré-Treino** Após o aquecimento habitual, os atletas realizarão o teste de salto horizontal. Serão efetuadas duas tentativas e registado o melhor resultado. **Sessão de Treino** Seguidamente, decorrerá a sessão de treino planeada pela equipa técnica, incluindo diferentes componentes do treino de futebol (tática, técnica e física). **Avaliação Pós-Treino** No final da sessão, e após um breve período de recuperação (3 a 5 minutos), os atletas repetirão o teste nas mesmas condições. Serão novamente registadas duas tentativas. Será procurado manter consistência nas condições de aplicação em ambos os momentos da recolha de dados.

5.6 Análise de Dados Os dados recolhidos serão tratados com o auxílio do Microsoft Excel. Inicialmente, será realizada uma análise descritiva, incluindo média, desvio padrão e valores extremos, com o objetivo de caracterizar o comportamento da amostra. Posteriormente, será efetuada uma comparação entre os dois momentos de avaliação (antes e depois do treino) permitindo verificar a existência de diferenças significativas no teste do salto horizontal. Será ainda analisado o comportamento individual dos atletas face à fadiga. Os resultados serão apresentados sob a forma de tabelas e, sempre que pertinente, através de representações gráficas que facilitem a interpretação dos dados.

Results and Conclusions

Análise dos resultados Os resultados obtidos no teste de salto horizontal indicam uma diminuição global do desempenho após o treino de futebol. Em todos os atletas observou-se uma redução da distância alcançada no salto horizontal no momento pós-treino, o que sugere a presença de fadiga com impacto na capacidade de produção explosiva de força dos membros inferiores. Apesar desta tendência global de redução, os dados mostram também alguma variabilidade individual. Alguns atletas apresentaram perdas relativamente moderadas, como o atleta 2 (-2,19%) e o atleta 9 (-2,59%), enquanto outros evidenciaram reduções mais acentuadas, como o atleta 8 (-4,07%) e o atleta 1^a (-4,09%). Esta variabilidade sugere que a resposta à fadiga não é homogénea e pode ser influenciada por fatores individuais como estado de treino, tolerância ao esforço, recuperação e características neuromusculares. De um modo geral, observa-se que os atletas com idades mais elevadas tenderam a apresentar perdas ligeiramente superiores, embora essa relação não seja totalmente linear. Considerando os 12 atletas avaliados, a média do salto horizontal pré-treino foi de 2,26 m, enquanto a média pós-treino foi de 2,19 m. A diferença média foi de -0,07 m, o que corresponde a uma variação média de fadiga de

aproximadamente -3,22%. 7. Discussão Os resultados obtidos permitem concluir que a sessão de treino de futebol teve um efeito negativo na performance do salto horizontal, evidenciando uma redução consistente da capacidade explosiva dos membros inferiores no momento pós-esforço. A diminuição média de 7 centímetros e a variação média de -3,22% indicam que a fadiga acumulada durante o treino interferiu na capacidade de produzir força de forma rápida e eficaz. Este comportamento está de acordo com o que foi descrito na revisão da literatura. Dambroz, Clemente e Teoldo (2022) referem que a fadiga física compromete múltiplos indicadores de desempenho no futebol, incluindo ações explosivas. Da mesma forma, Armada-Cortés et al. (2022) demonstraram que esforços repetidos reduzem a capacidade de expressão de força rápida, enquanto Uddin et al. (2020) destacaram que a fadiga induzida por tarefas específicas de jogo afeta diretamente a função muscular dos membros inferiores. Importa ainda salientar que, embora a tendência global tenha sido de redução do desempenho, a magnitude dessa diminuição não foi igual em todos os atletas. Este aspecto reforça a perspectiva apresentada por Cortis et al. (2013), segundo a qual a resposta à fadiga depende de múltiplos fatores individuais e contextuais, não sendo necessariamente linear. Assim, mesmo em grupos relativamente homogêneos, podem existir respostas neuromusculares distintas perante o mesmo estímulo de treino. Ainda assim como verificamos com base no gráfico apresentado, conclui-se que a idade influenciou a variação da fadiga nos atletas avaliados, ainda que essa influência não siga uma relação linear evidente. Os resultados mostram uma tendência para valores de fadiga mais acentuados em idades mais avançadas, mas não de forma linear, pois alguns atletas mais novos também apresentam valores semelhantes. Desta forma, pode afirmar-se que a idade constitui uma variável relevante na análise da fadiga, embora não seja o único elemento responsável pelas diferenças observadas entre os atletas. Em síntese, os dados sugerem que a fadiga induzida pelo treino compromete a força explosiva dos membros inferiores, refletindo-se na diminuição do desempenho no salto horizontal. Estes resultados sustentam o tema do presente trabalho e reforçam a importância de monitorizar a fadiga em contexto de treino e competição, sobretudo quando o objetivo é preservar capacidades explosivas determinantes para o rendimento no futebol.

Keywords: Palavras-chave: Força Explosiva; Fadiga; Salto Horizontal; Futebol; Membros Inferiores.

Análise cinemática do lançamento em suspensão no basquetebol

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Resumo

Introduction

O lançamento em suspensão constitui uma das ações técnicas mais importantes e utilizadas no basquetebol moderno, sendo determinante para a eficácia ofensiva e para a criação de oportunidades de finalização em contexto competitivo.

Methods

Análise dos lançamentos em suspensão no Basquetebol de diferentes atletas

Results and Conclusions

Cada atleta tem uma diferente forma de realizar os lançamentos com velocidade, trajetória e posição corporal diferenciada

Keywords: Basquetebol; Lançamento em Suspensão; Análise Cinemática; Biomecânica; Ângulos Articulares; Desempenho Desportivo.

Influencia del estado menopáusico en niveles de cortisol basal y la fuerza de prensión manual tras una intervención de ejercicio y dieta de 12 semanas en mujeres con diabetes tipo 2.

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Resumo

Introduction

La transición hormonal durante la menopausia afecta significativamente a los perfiles endocrinos y a la salud musculoesquelética. El cortisol, un marcador de estrés crónico y actividad catabólica, puede interactuar de manera diferente con el rendimiento físico según el estado hormonal. Este estudio tuvo como objetivo evaluar cómo una intervención de ejercicio y dieta de 12 semanas afecta al cortisol basal y a la fuerza de prensión manual (FPM) en mujeres premenopáusicas frente a postmenopáusicas con sobrepeso/obesidad y diabetes tipo 2 (DT2).

Methods

Este ensayo controlado aleatorizado incluyó a 69 mujeres (edad: 55.3 ± 7.09 años) con sobrepeso/obesidad y prediabetes o DT2 ($HbA1c \geq 5.7\%$). De ellas, 25 eran premenopáusicas (desde menos de 40 días desde su último ciclo menstrual hasta un máximo de 2 años) y 44 eran postmenopáusicas (>2 años desde su último ciclo menstrual). La intervención de 12 semanas involucró a seis grupos con diferentes combinaciones de ejercicio (3 días por semana) y dieta hipocalórica: entrenamiento interválico de alta intensidad (HIIT), HIIT-DIETA, entrenamiento continuo de moderada intensidad (MICT), MICT-DIETA, inactivo (INACT) o INACT-DIETA. El HIIT incluyó intervalos de 1 minuto de ciclismo al 90% de la potencia pico, el MICT consistió en ciclismo continuo al 10% por encima del primer umbral ventilatorio durante 50 minutos, y el grupo INACT mantuvo su estilo de vida habitual. Los grupos con dieta recibieron sesiones quincenales de asesoramiento de 20 minutos con una nutricionista para seguir un menú equilibrado y personalizado, orientado al control de la diabetes y a una reducción del 5% del peso corporal. El cortisol sérico en ayunas se analizó mediante Alinity CI (Abbott Laboratories). La fuerza de prensión manual se midió utilizando un dinamómetro (Takei tkk5401). Se aplicó un ANOVA factorial mixto (tiempo $\times$ ejercicio $\times$ dieta $\times$ estado menopáusico) con comparaciones post-hoc de Bonferroni.

Results and Conclusions

Se encontró un efecto principal significativo del estado menopáusico en los niveles de cortisol ($F = 5.3347$; $p = 0.024$; $\eta^2p = 0.09$), mostrando las mujeres postmenopáusicas niveles más altos (14.4 ± 0.47 ug/dL) que el grupo de premenopáusicas (12.5 ± 0.65 ug/dL). No se observaron interacciones significativas entre los niveles de cortisol y las modalidades de intervención. En cuanto a la FPM, se observó un efecto significativo del estado menopáusico ($F = 13.7840$; $p < 0.001$; $\eta^2p = 0.21$); las mujeres premenopáusicas presentaban mayor fuerza en el momento basal (diferencia media: 3.7^1 kg, $p < 0.001$). Las correlaciones entre el cortisol y la FPM mostraron tendencias divergentes y no significativas: positiva en mujeres premenopáusicas ($r = 0.21$, $p = 0.15$) y negativa en postmenopáusicas ($r = -0.15$, $p = 0.15$). El estado menopáusico influyó significativamente en los niveles de cortisol basal y en la fuerza de prensión manual en mujeres con sobrepeso/obesidad y DT2. Las mujeres postmenopáusicas presentaron niveles de cortisol más altos y una menor fuerza muscular, lo que sugiere que los cambios hormonales tras la menopausia podrían requerir programas de ejercicio especializados para reducir el catabolismo muscular y preservar la función física. Financiación: Este trabajo ha sido financiado por el Ministerio de Ciencia, Innovación y Universidades de España y la Agencia Estatal de Investigación (MICIU/AEI/10.13039/501100011033) a través de las ayudas PID2020-120034RA-I00 (APETEX) y PID2019-110063RA-I00 (EDUGUTION). Adicionalmente, el proyecto ENTRENOX (Ref: EXP_74977) fue financiado por el Consejo Superior de Deportes (Ministerio de Cultura y Deporte, 2022) en el marco del "Plan de Recuperación, Transformación y Resiliencia - Financiado por la Unión Europea – NextGenerationEU". Andrea González Mariscal cuenta con una ayuda predoctoral del Ministerio de Universidades de España (número de ayuda: FPU22/01480).

Keywords: Estrés crónico, insulina, inflamación, salud, sobrepeso.

Efectos de una programación estable y ondulante de la pérdida de velocidad sobre la hipertrofia muscular

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Resumo

Introduction

La pérdida de velocidad (VL) está considerada como una variable clave para determinar las adaptaciones producidas por los programas de entrenamiento de fuerza (RT) sobre las adaptaciones en el rendimiento muscular y la hipertrofia. Por ello, el efecto de aplicar diferentes VL durante un RT ha sido objeto de investigación (Myrholm et al., 2023; Pareja-Blanco et al., 2020; Rodiles-Guerrero et al., 2022). Estos estudios prescriben una VL constante durante las series de entrenamiento y durante la intervención. Así mismo, el efecto de manipular la VL durante el periodo de RT sobre las adaptaciones hipertroficas no ha sido estudiado. Por ello, el objetivo del estudio es comparar el efecto de una programación con una VL estable y una programación ondulante en cada una de las cargas relativas sobre la masa muscular.

Methods

Treinta y dos sujetos físicamente activos fueron asignados de manera aleatoria a dos grupos que se distinguían entre sí en como evolucionaba la VL durante el programa de entrenamiento (STA: VL estable de 25%; UND: ondulante de 0-50% en cada intensidad). Los sujetos realizaron 16 sesiones de press de banca durante 8 semanas con la misma intensidad (60-75% 1RM), mismas series (3) misma VL media (25%) y mismo descanso entre series (4 min). Antes y después del RT se realizaron mediciones del área de sección transversal (CSA) del pectoral mayor.

Results and Conclusions

tras el periodo de entrenamiento, se observó un “efecto tiempo” ($p < 0.05$), aunque no se observó interacción “grupo x tiempo”. Solo el grupo UND mostro diferencias significativas pre-post entrenamiento en el CSA ($p < 0.001$) con las mismas repeticiones totales entre grupos, pero distribuidas de forma diferente. El grupo STA realizó un mayor número de repeticiones en rangos de velocidad de $0.9-0.6 \text{ m}\cdot\text{s}^{-1}$ ($p < 0.01$), mientras que UND las realizó en rangos de $0.5-0.2 \text{ m}\cdot\text{s}^{-1}$ ($p < 0.001$). No se observaron diferencias significativas entre grupos aunque solo uno de ellos resultó efectivo para las ganancias de CSA en la musculatura objetivo.

Keywords: Entrenamiento de Fuerza; adaptaciones musculares; modelos de programación; área de sección transversal

Efectos de la suplementación con zumo de remolacha sobre la percepción subjetiva del esfuerzo en nadadores: una revisión sistemática y metaanálisis

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Resumo

Introduction

El zumo de remolacha (BRJ) y la suplementación con nitrato dietético han sido ampliamente estudiados por sus posibles efectos ergogénicos, principalmente a través del aumento de la biodisponibilidad del óxido nítrico. Aunque la evidencia sobre los resultados de rendimiento en natación sigue siendo inconsistente, las respuestas perceptivas, como la percepción subjetiva del esfuerzo (Rating of Perceived Exertion, RPE), pueden aportar información adicional sobre los efectos de la suplementación en la tolerancia al ejercicio.

Methods

Se llevó a cabo una revisión sistemática y metaanálisis de ensayos controlados aleatorizados siguiendo las directrices PRISMA 2020. Una búsqueda exhaustiva hasta julio de 2025 identificó estudios que comparaban la suplementación con zumo de remolacha (BRJ) o nitrato frente a placebo o ausencia de suplementación en nadadores. Solo se incluyeron los estudios que reportaban resultados relacionados con la percepción subjetiva del esfuerzo (RPE). Los datos se combinaron mediante modelos de efectos aleatorios, y se calcularon las diferencias de medias (MD) con intervalos de confianza (IC) del 95%.

Results and Conclusions

Las respuestas perceptivas al ejercicio, específicamente la percepción subjetiva del esfuerzo (RPE), fueron reportadas en cuatro estudios que incluían un total de 55 nadadores. El análisis combinado reveló una pequeña reducción, pero estadísticamente significativa, de la RPE tras la suplementación con zumo de remolacha (BRJ) en comparación con el placebo (MD = -0,25; IC del 95% = -0,48 a -0,02; p = 0,03). Además, la heterogeneidad entre los estudios fue insignificante ($I^2 = 0\%$). A pesar de las diferencias en los protocolos de suplementación y en las características de los participantes, la dirección del efecto fue consistente entre los estudios. La suplementación con BRJ parece inducir una reducción modesta de la percepción del esfuerzo en nadadores. Aunque la magnitud de este efecto es pequeña, podría tener

relevancia práctica en contextos de entrenamiento, donde una menor percepción del esfuerzo podría facilitar una mayor tolerancia al entrenamiento o una mejor adherencia. Se necesitan futuras investigaciones con muestras más amplias y metodologías estandarizadas para confirmar estos hallazgos y aclarar su relevancia práctica.

Keywords: Zumo de remolacha, suplementación con nitrato, percepción subjetiva del esfuerzo, nadadores, natación.

Influencia del complejo pie-tobillo sobre el equilibrio dinámico en futbolistas infantiles

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Resumo

Introduction

El equilibrio dinámico y el control postural son componentes críticos para el rendimiento deportivo y la prevención de lesiones en el fútbol base. Durante la etapa infantil, los deportistas experimentan cambios antropométricos y madurativos que pueden alterar el control postural. El objetivo de este estudio fue analizar si el rango de movimiento (ROM) del tobillo y del primer dedo, la fuerza de este último o la morfología del arco plantar diferencian a los futbolistas infantiles con alto y bajo rendimiento en el alcance frontal del equilibrio dinámico.

Methods

Se evaluó a 92 futbolistas infantiles (12,76±0,58 años). Se midieron variables neuromecánicas del pie y tobillo: caída del arco, ROM y fuerza del primer dedo, y ROM de dorsiflexión del tobillo (con rodilla extendida y flexionada). El control postural dinámico se determinó mediante el alcance frontal en el Y-Balance Test (YBT). El análisis estadístico empleó inferencia Bayesiana, utilizando el Factor de Bayes (BF10) para cuantificar la fuerza de la evidencia entre los grupos de alto y bajo rendimiento.

Results and Conclusions

Los jugadores con alto rendimiento en el YBT Frontal mostraron un ROM significativamente mayor en la dorsiflexión del tobillo, tanto con rodilla extendida (36,26±4,55° vs 33,83 ± 4,54° ; BF10 = 3,791, evidencia moderada) como flexionada (40,17±6,76° vs 36,70±5,18°; BF10=5,954, evidencia moderada). Por el contrario, la caída del arco, el ROM y la fuerza del primer dedo mostraron una evidencia únicamente anecdótica (BF10<1). El rango de movimiento articular en dorsiflexión del tobillo es un determinante mecánico crítico para el éxito en el control postural dinámico de futbolistas infantiles, mientras que la morfología del arco y los factores del primer dedo no discriminan dicho rendimiento. Se recomienda incluir la valoración sistemática y el entrenamiento de la flexibilidad de la dorsiflexión del tobillo en los programas de optimización del rendimiento y prevención de lesiones en esta categoría.

Keywords: Rango de movimiento, Y-Balance Test, control postural, fútbol base

PREDIÇÃO DO DESEMPENHO EM MARATONA A PARTIR DE TESTE DE CORRIDA DE 1.000, 2.000 E 3.000 METROS MÁXIMOS

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Resumo

Introduction

Em nosso conhecimento, nenhum estudo investigou se testes de corrida máximos são capazes de prever o desempenho em maratona. Portanto, este estudo teve como objetivo desenvolver equações preditivas do desempenho em provas de corrida de 42 km a partir de testes de corrida de 1.000, 2.000 e 3.000 metros máximos.

Methods

A amostra foi composta por corredores recreacionais adultos, de ambos os sexos, divididos em três grupos: teste de 1.000 (11 homens e 7 mulheres), teste de 2.000 m (10 homens e 7 mulheres) e teste de 3.000 m (10 homens e 7 mulheres). Na primeira sessão de avaliação, foi realizada a familiarização com o respectivo teste. Na segunda sessão, os corredores realizaram um teste de corrida de 1.000, 2.000 ou 3.000 m máximos. Na terceira sessão, realizaram a prova Maratona de Curitiba – Brasil.

Results and Conclusions

Para elaboração dos modelos preditivos, aplicou-se a análise de regressão múltipla (stepwise), resultando nas seguintes equações: (1) Tempo de prova (s) = $1738,6 + 52,2 \cdot T1000$ (s); $R^2 = 0,887$; EPE = 899 s (6,7%); (2) Tempo de prova (s) = $-618,0 + 29,2 \cdot T2000$ (s); $R^2 = 0,883$; EPE = 965 s (7,2%) e; (3) Tempo de prova (s) = $3340,1 + 13,4 \cdot T3000$ (s); $R^2 = 0,861$; EPE = 1057 s (7,9%). Os resultados deste estudo indicam que o desempenho em maratona pode ser predito a partir do desempenho de testes de corrida de 1.000, 2.000 ou 3.000 metros máximos. Contudo, entre os modelos propostos, a equação baseada no teste de corrida de 1.000 m máximo demonstrou o melhor modelo para estimar o desempenho em maratona, evidenciada pelo maior coeficiente de determinação (R^2) e menor erro padrão de estimativa (EPE).

Keywords: Predição de desempenho; Corredores recreacionais; Corrida de rua; Maratona; Teste de corrida de 1.000, 2.000 e 3.000 metros.

PREDIÇÃO DO DESEMPENHO EM PROVAS DE 5 KM A PARTIR DE VARIÁVEIS DE CAMPO E ANTROPOMÉTRICAS

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Resumo

Introduction

Embora poucos estudos tenham investigado a predição do desempenho em provas de corrida de rua de 5 km utilizando variáveis fisiológicas, é possível especular que o desempenho nessas provas também possa ser predito a partir de variáveis antropométricas e de treinamento. Assim, este estudo teve como objetivo desenvolver uma equação de predição do desempenho em provas de corrida de 5 km usando tempo de um teste de corrida de 1.200 metros máximo, a idade e o índice de massa corporal (IMC) como preditores.

Methods

A amostra foi composta por 17 corredores recreacionais adultos (13 mulheres e 4 homens). Na primeira sessão de avaliação foram realizadas medida da estatura e da massa corporal, seguidas da familiarização com a corrida máxima de 1.200 metros. Na segunda sessão, foi realizado a corrida máxima de 1.200 metros, enquanto na terceira sessão uma prova oficial de corrida de rua de 5 km foi executada. A análise de regressão linear múltipla (stepwise) foi utilizada na elaboração da equação.

Results and Conclusions

A média $\pm$ desvio padrão da amostra para o tempo de 1.200 m, idade, índice de massa corporal (IMC) e tempo nos 5 km foram de $377 \pm 38,3$ s, $39,9 \pm 8,6$ anos, $25,8 \pm 4,1$ kg/m² e 1854 ± 226 s, respectivamente. A equação gerada foi: Tempo da prova (s) = $418,87 + 3,06 \cdot \text{Tempo 1200 m (s)} - 10,79 \cdot \text{Idade (anos)} + 27,55 \cdot \text{IMC (kg.m}^2\text{)}$; $R^2 = 0,910$; EPE = 66 s (11,0%). Esse resultado sugere que o tempo em um teste de corrida 1.200 metros máximo, a idade e o IMC estão associados ao tempo de prova de 5 km, configurando-se como potenciais preditores do desempenho de corredores dessa prova.

Keywords: Predição de desempenho; Corredores recreacionais; Corrida de rua; Teste de corrida; Índice de massa corporal; Idade.

Diferenças nos Indicadores de Aptidão Física entre Alunos dos Açores e do Continente Português nos 8.º e 10.º Anos de Escolaridade

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Resumo

Introduction

A aptidão física durante a adolescência constitui um indicador fundamental de saúde e desenvolvimento funcional, estando associada ao desempenho motor, à prevenção de doenças crónicas e à qualidade de vida. O presente estudo teve como objetivo comparar indicadores de aptidão física entre alunos dos Açores e do Continente português nos 8.º e 10.º anos de escolaridade, procurando compreender de que forma o contexto geográfico e sociocultural poderá influenciar o perfil físico dos adolescentes.

Methods

Participaram 105 alunos do ensino público, distribuídos por quatro grupos: 8.º ano de Portugal Continental (n = 44), 8.º ano dos Açores (n = 18), 10.º ano de Portugal Continental (n = 18) e 10.º ano dos Açores (n = 25). Foram avaliadas quatro variáveis de aptidão física através do protocolo padronizado FITescola: resistência aeróbia (teste de Vaivém), velocidade linear (corrida de 40 metros), resistência muscular abdominal (teste de abdominais/curl-up) e potência muscular explosiva dos membros inferiores (impulsão horizontal). Os dados foram analisados com recurso ao teste t para amostras independentes, com verificação prévia dos pressupostos de normalidade (Kolmogorov-Smirnov e Shapiro-Wilk) e homogeneidade de variâncias (Levene), fixando o nível de significância em $\alpha = 0.05$. Foi ainda calculado o tamanho do efeito através do d de Cohen, de modo a avaliar a relevância prática das diferenças observadas.

Results and Conclusions

Os resultados sugerem que determinadas componentes da aptidão física nomeadamente a resistência muscular localizada, poderão ser influenciadas pelo contexto geográfico e sociocultural dos adolescentes. A superioridade açoriana no 8.º ano é consistente com a literatura que associa ambientes menos urbanizados a maior exposição a atividade física informal (Petroski et al., 2012; Loh et al., 2019). A inversão observada no 10.º ano aponta para o papel mediador da maturação biológica e do acesso diferenciado a infraestruturas desportivas ao longo da adolescência (Albaladejo-Saura et al., 2021; Ré, 2011). A ausência de diferenças nas capacidades aeróbia e de velocidade reforça o papel equalizador do currículo nacional de Educação Física. Futuras investigações deverão controlar o estado maturacional, ampliar as amostras e adotar designs longitudinais para aprofundar a compreensão dos fatores associados às diferenças regionais observadas.

Keywords: Aptidão física; Açores;desempenho motor; maturação biológica; Educação Física.

Comparación de la ingesta energética, la disponibilidad energética y el cumplimiento de las recomendaciones de macronutrientes entre deportistas de deportes de equipo e individuales

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Resumo

Introduction

La nutrición adecuada es un factor clave para optimizar el rendimiento deportivo, la recuperación y la salud a largo plazo. Este estudio tiene como objetivo establecer las diferencias en la ingesta nutricional de deportistas de equipo e individuales.

Methods

La ingesta nutricional de 184 deportistas (59 deportes individuales, 125 deportes de equipo; edad: $21,2 \pm 4,8$ años; masa corporal: individuales $70,5 \pm 14,6$ kg, equipo $70,0 \pm 13,8$ kg; grasa corporal: individuales $22,6 \pm 8,8\%$, equipo $23,9 \pm 9,1\%$) fue registrada mediante un diario dietético de 7 días, usando las recomendaciones de ingesta de macronutrientes de la AND/ACSM/AC y del IOC 2023 para la disponibilidad energética. La composición corporal fue estimada mediante bioimpedancia obteniendo el porcentaje de grasa y la masa libre de grasa (MLG).

Results and Conclusions

La ingesta de energía media en individuales fue de $2610,1 \pm 663,3$ y en equipos $2257,4 \pm 665,8$ kcal/día ($p = 0,001$), correspondiendo a una disponibilidad energética de $25,2 \pm 12,8$ y $24,6 \pm 14,0$ kcal/MLG/día ($p = 0,803$), clasificando al 8,7%, del total de deportistas en un estado de disponibilidad energética óptima (individuales: 6,1%; equipo: 10,4%), 22,8% subóptima (individuales: 28,8%; equipo: 20,0%) y 68,5% baja disponibilidad energética (individuales: 66,1%; equipo: 69,6%) ($p = 0,254$). Los deportistas individuales consumían más carbohidratos ($292,0 \pm 88,5$ frente a $256,0 \pm 93,4$ g/día, $p = 0,014$), proteína ($148,9 \pm 46,6$ frente a $125,1 \pm 45,7$ g/día, $p = 0,001$) y grasas ($92,2 \pm 36,9$ frente a $80,7 \pm 33,4$ g/día, $p = 0,037$) totales y de manera relativa al peso corporal de carbohidratos ($4,3 \pm 1,5$ frente a $3,8 \pm 1,5$ g/kg/día, $p = 0,028$), proteínas ($2,2 \pm 0,7$ frente a $1,8 \pm 0,7$ g/kg/día, $p = 0,003$) y grasas ($1,33 \pm 0,5$ frente a $1,2 \pm 0,5$ g/kg/día, $p = 0,05$). Respecto al cumplimiento de las recomendaciones de macronutrientes el 40,8% no cumplen con las recomendaciones de grasas (individuales: 40,7%; equipo: 40,8%, $p = 0,988$), el 90,2% no cumplen con las ingestas de carbohidratos (individuales: 86,4%; equipo: 92,0%, $p = 0,236$) y el 51,1% no cumplen con las proteínas (individuales: 64,4%; equipo: 44,8%, $p = 0,013$). Los deportistas de disciplinas individuales presentan una mayor ingesta energética y de macronutrientes en comparación con los deportistas de equipo; sin embargo, esta mayor ingesta no se traduce en diferencias en la disponibilidad energética entre grupos. La prevalencia de baja disponibilidad energética es elevada en

ambas modalidades deportivas, afectando a más de dos tercios de los atletas. Además, el cumplimiento de las recomendaciones de macronutrientes es subóptimo, especialmente en la ingesta de carbohidratos, que muestra el menor grado de adecuación. Estos resultados evidencian la necesidad de estrategias nutricionales individualizadas que mejoren la adecuación de la ingesta y reduzcan el riesgo de baja disponibilidad energética en deportistas.

Keywords: Disponibilidad Energética, Ingesta Nutricional, Macronutrientes, Adecuación nutricional

Análise do remate no futebol com a perna dominante e não dominante.

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Resumo

Introduction

O remate constitui uma das ações técnicas mais determinantes no futebol, influenciando diretamente a eficácia ofensiva e o sucesso competitivo. A capacidade de executar o gesto técnico com ambos os membros inferiores representa uma vantagem importante para os jogadores, permitindo maior versatilidade e imprevisibilidade durante o jogo. O presente estudo teve como objetivo analisar cinematicamente a técnica de remate no futebol, comparando a execução realizada com o membro dominante e não dominante, através da avaliação dos ângulos articulares e da velocidade da bola nas diferentes fases do movimento.

Methods

A amostra foi constituída por nove atletas e um treinador, com idades compreendidas entre os 13 e os 18 anos (idade média de 15 anos). Todos os participantes apresentavam o membro inferior direito como dominante e o esquerdo como não dominante. Cada participante realizou um remate com cada membro inferior, permitindo a análise comparativa das variáveis biomecânicas associadas ao gesto técnico.

Results and Conclusions

A análise cinemática revelou diferenças significativas entre os dois membros inferiores. O remate executado com o membro dominante apresentou padrões angulares mais consistentes ao longo das diferentes fases do movimento, evidenciando melhor coordenação segmentar e maior eficiência mecânica. Adicionalmente, foram observados valores superiores de velocidade da bola no remate realizado com o membro dominante, refletindo uma maior capacidade de produção e transferência de energia ao longo da cadeia cinética. Por sua vez, o membro não dominante apresentou maior variabilidade angular e menor velocidade final da bola, sugerindo menor controlo motor e menor automatização do gesto técnico. Conclui-se que a dominância lateral influencia significativamente os parâmetros biomecânicos do remate no futebol, afetando tanto a mecânica do movimento como o desempenho final. Estes resultados reforçam a importância da inclusão de exercícios específicos para o desenvolvimento do membro não dominante, promovendo maior simetria funcional, melhoria da eficácia técnica e aumento das opções motoras disponíveis em contexto competitivo.

Keywords: Futebol; Remate; Análise Cinemática; Dominância Lateral; Velocidade da Bola; Biomecânica.

Efecto de una intervención educativa de promoción de la salud sobre la incontinencia urinaria en adultos mayores con fragilidad: El proyecto Fragsalud.

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Resumo

Introduction

La fragilidad se define como un síndrome clínico multifactorial caracterizado por la disminución de las reservas fisiológicas y una alteración de la homeostasis que incrementa la vulnerabilidad ante desenlaces adversos de salud. Entre ellos, destaca la incontinencia urinaria (IU), definida como cualquier pérdida involuntaria de orina. Los adultos mayores que presentan simultáneamente IU y fragilidad experimentan una reducción significativa de la función física, un mayor riesgo de caídas y fracturas, aislamiento social y deterioro del estado de ánimo. Sin embargo, a pesar de esta interdependencia, la práctica clínica actual persiste en abordar la IU de forma aislada, por lo que se requieren intervenciones integrales como las llevadas a cabo en el proyecto Fragsalud que atiendan su compleja etiología multifactorial.

Methods

Se llevó a cabo un ensayo clínico aleatorizado y multicéntrico de dos brazos en las provincias de Cádiz y Málaga, en el que un total de 199 adultos mayores con fragilidad finalizaron el estudio (74.2 ± 6.5 años). El grupo de intervención ($n=109$) llevó a cabo un programa educativo de promoción de la salud de seis meses de duración, estructurado en una fase inicial de cuatro sesiones grupales sobre fragilidad, actividad física, hábitos alimenticios saludables, entrenamiento cognitivo y bienestar mental, seguida de una fase de seguimiento con seis llamadas telefónicas a lo largo de cinco meses. El grupo control, por el contrario, mantuvo su rutina de atención habitual ($n=90$). Con respecto a la evaluación, la capacidad de control de la micción se evaluó al inicio y a los seis meses mediante el ítem 6 del Índice de Barthel que identifica la presencia de IU. Los participantes que reportaron una frecuencia de accidentes inferior a una vez por semana o indicaron tener IU fueron asignados al grupo de incontinentes. El análisis estadístico se realizó mediante ecuaciones de estimación generalizadas, evaluando la interacción tiempo x grupo moderada por la variable dicotómica de micción.

Results and Conclusions

La interacción tiempo x grupo mostró diferencias significativas en la evolución de las odds de IU en el grupo de intervención respecto al control del pre al post (OR de interacción = 0.54; IC 95% 0.30 a 0.97; $p = 0.04$). Estos hallazgos sugieren que 6 meses

de un programa educativo de promoción de la salud podrían ayudar a mejorar la IU en personas mayores con fragilidad. Este estudio (proyecto UMA20-FEDERJA-154) ha sido financiado por la Junta de Andalucía (10.13039/501100011011) y el FEDER en el marco del Programa Operativo FEDER Andalucía 2014-2020.

Keywords: Incontinencia urinaria, fragilidad, sesiones educativas, personas mayores, promoción de salud

Efectos del ejercicio aeróbico y la dieta sobre el estrés oxidativo del ADN en mujeres adultas con diabetes mellitus tipo 2: un ensayo factorial aleatorizado.

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Resumo

Introduction

La fisiopatología de la diabetes tipo 2 (DM2) se caracteriza por un aumento en la producción de especies reactivas del oxígeno (ERO). Los niveles elevados de ERO alteran la señalización de la insulina y la función de las células beta, empeorando la DM2, y causan daños en el ADN que incrementan los niveles de 8-hidroxi-2'-desoxiguanosina (8-OHdG). Las intervenciones dietéticas y el ejercicio son pilares fundamentales del tratamiento de la DM2. Aunque el entrenamiento continuo de intensidad moderada (MICT) se utiliza ampliamente, requiere sesiones largas. Por el contrario, el entrenamiento interválico de alta intensidad (HIIT) es una alternativa segura y eficiente en cuanto al tiempo. Sin embargo, la superioridad de cualquiera de las dos modalidades, o de su interacción con la dieta, con respecto al 8-OHdG aún no se ha establecido. Además, a pesar de las diferencias conocidas entre sexos en la producción de ERO, la investigación en mujeres sigue siendo limitada. Por lo tanto, este estudio preliminar investiga los efectos aislados y combinados del MICT frente al HIIT y la dieta sobre los niveles de 8-OHdG en mujeres adultas con DM2.

Methods

Este ensayo factorial aleatorizado incluyó a 64 mujeres con DM2 y sobrepeso u obesidad (55 ± 6 años, $6,7 \pm 1,0$ % de HbA1c, IMC de $33,3 \pm 5,5$ kg/m²). El estudio incluyó un factor de ejercicio con 3 niveles (MICT, HIIT o Inactivo) y un factor de dieta con 2 niveles (Sin Dieta [SD] o Dieta [D]), lo que dio lugar a 6 grupos paralelos: Inactivo-SD (n=10), Inactivo-D (n=11), MICT-SD (n=11), MICT-D (n=10), HIIT-SD (n=11) e HIIT-D (n=11). El MICT consistió en 50 minutos de pedaleo continuo al 10 % por encima del primer umbral ventilatorio, mientras que el HIIT constó de 10 intervalos de 1 minuto al 90 % de la potencia pico. La intervención dietética consistió en un menú equilibrado e individualizado para la pérdida de grasa y el control glucémico. Las sesiones de ejercicio supervisadas se realizaron 3 veces por semana y el asesoramiento dietético se ofreció de forma quincenal, ambos durante 12 semanas. El 8-OHdG en suero en ayunas se cuantificó mediante ELISA (EU2548, Fine Test, Wuhan Fine Biotech Co., Ltd). Los datos se analizaron mediante un ANOVA factorial mixto de 2 (pre frente a post) x 3 (MICT frente a HIIT frente a Inactivo) x 2 (SD frente a D) con comparaciones post hoc de Bonferroni.

Results and Conclusions

Los niveles basales de 8-OHdG fueron similares entre los grupos ($p > 0,05$): Inactivo-SD ($76,3 \pm 7,5$), Inactivo-D ($80,5 \pm 7,6$), MICT-SD ($86,5 \pm 17,7$), MICT-D ($77,9 \pm 13,3$), HIIT-SD ($83,7 \pm 9,2$) e HIIT-D ($74,7 \pm 4,6$) ng/mL. No se encontraron interacciones significativas para Tiempo $\times$ Ejercicio ($F = 1,284$; $\eta^2p = 0,042$; $p = 0,285$), Tiempo $\times$ Dieta ($F = 1,485$; $\eta^2p = 0,025$; $p = 0,228$) o Tiempo $\times$ Ejercicio $\times$ Dieta ($F = 2,195$; $\eta^2p = 0,070$; $p = 0,121$). Estos hallazgos sugieren que 12 semanas de MICT, HIIT o intervenciones dietéticas, ya sea de forma aislada o combinada, son insuficientes para atenuar los marcadores de estrés oxidativo del ADN en esta población. Se justifican ensayos controlados aleatorizados a más largo plazo para evaluar intervenciones de mayor duración. Este trabajo fue financiado por el Ministerio de Ciencia, Innovación y Universidades de España y la Agencia Estatal de Investigación (MICIU/AEI/10.13039/501100011033) a través de la ayuda PID2019-110063RA-I00 (proyecto EDUGUTION), el Consejo Superior de Deportes (Ministerio de Cultura y Deporte, 2022) bajo el "Plan de Recuperación, Transformación y Resiliencia - Financiado por la Unión Europea – NextGenerationEU" a través del proyecto ENTRENOX (Ref: EXP_74977), y el proyecto MITOX financiado por una convocatoria interna del Instituto de Investigación e Innovación Biomédica de Cádiz (INiBICA) (número de ayuda: PP11-007-2023). Manuel Costilla cuenta con la financiación de una ayuda predoctoral del Ministerio de Universidades de España (número de ayuda: FPU22/03208).

Keywords: Resistencia a la insulina, Hiperglucemia, Pérdida de peso, Tejido adiposo, Radicales libres, Antioxidantes

Análise cinemática do movimento – Soco Direto do Boxe

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Resumo

Introduction

O boxe é uma modalidade desportiva que exige elevados níveis de preparação física e técnica, envolvendo capacidades como força, velocidade, potência, resistência cardiovascular, coordenação motora, equilíbrio e concentração. Entre os gestos técnicos fundamentais da modalidade destaca-se o soco direto, amplamente utilizado em contexto competitivo devido à sua rapidez, eficácia e potencial para produzir elevados níveis de força de impacto. A compreensão dos fatores biomecânicos associados à sua execução pode contribuir para a otimização do desempenho e prevenção de lesões. O presente estudo teve como objetivo analisar cinematicamente o soco direto no boxe, comparando a execução realizada com a mão dominante e não dominante através da avaliação dos ângulos articulares e da velocidade do movimento.

Methods

A amostra foi constituída por nove atletas amadores destros, que executaram dois socos diretos em condições controladas: um com a mão dominante e outro com a mão não dominante. A análise incidiu sobre os parâmetros cinemáticos do movimento, nomeadamente os ângulos articulares na fase preparatória, a amplitude de movimento, o posicionamento corporal e a velocidade de execução do golpe.

Results and Conclusions

Os resultados evidenciaram diferenças biomecânicas relevantes entre os dois membros superiores. De forma geral, a execução com a mão dominante apresentou maior eficiência mecânica, melhor coordenação segmentar e maior velocidade de execução. Adicionalmente, observaram-se padrões angulares mais consistentes e uma transferência de força mais eficaz ao longo da cadeia cinética, desde os membros inferiores e tronco até ao membro superior responsável pelo impacto. Em contraste, a mão não dominante apresentou maior variabilidade técnica, menor amplitude coordenada de movimento e menor capacidade de geração e transmissão de força. Conclui-se que a dominância lateral influencia significativamente os parâmetros biomecânicos do soco direto, afetando a velocidade, a coordenação e a eficácia do gesto técnico. Estes resultados reforçam a importância do desenvolvimento bilateral das capacidades técnicas e motoras no treino de boxe, promovendo maior equilíbrio funcional, eficiência de movimento e versatilidade competitiva.

Keywords: Boxe; Soco Direto; Análise Cinemática; Biomecânica; Dominância Lateral; Desempenho Desportivo.

Efeitos da Potenciação Pós-Ativação no Salto Vertical Após a Realização de um Agachamento.

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Resumo

Introduction

O estudo foca-se na otimização da força explosiva dos membros inferiores, investigando os efeitos agudos da Potenciação Pós-Ativação (PPA) no Salto com Contramovimento (CMJ) após a realização de um agachamento pesado.

Methods

A amostra consistiu em 17 participantes, estratificados em dois perfis distintos de força relativa: Treinados ($\geq 1.5x$ a massa corporal no agachamento) e Não Treinados ($< 1.5x$). O desenho quase-experimental misto envolveu uma avaliação baseline do salto vertical, seguida imediatamente do estímulo de ativação: 'série de 3 repetições de agachamento a 85% de 1RM. O desempenho no CMJ foi reavaliado de forma estrita aos 2, 4, 8 e 12 minutos de repouso passivo pós-estímulo.

Results and Conclusions

A análise inferencial (ANOVA Mista) demonstrou que o protocolo de agachamento pesado não produziu um efeito principal significativo no CMJ de forma global ($p=0.074$). Isolou-se apenas um pico marginal de melhoria de desempenho aos 4 minutos de recuperação em relação à baseline ($p=0.007$).

Keywords: Potenciação Pós-Ativação, Salto Vertical, Agachamento, Desempenho, Força.

Comparativa de un test incremental progresivo en cicloergómetro y media sentadilla: Estudio de caso

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Resumo

Introduction

El consumo de oxígeno máximo (VO_{2max}) es el principal factor que determina la esperanza y calidad de vida. Por ello, las primeras recomendaciones de ejercicio físico se centraban en el entrenamiento de la resistencia, discriminando entre intensidades moderadas y vigorosas que están determinadas por el primer y segundo umbral ventilatorio (VT_1 y VT_2). Sin embargo, a día de hoy, las recomendaciones de actividad física incluyen la combinación de entrenamiento de fuerza y de resistencia. Por eso, sería muy interesante adaptar los test incrementales progresivos a ejercicios para el desarrollo de la fuerza con objeto de poder combinar estímulos propios del entrenamiento de la fuerza y de la resistencia. De este modo, el objetivo de este estudio es comparar un test incremental progresivo en cicloergómetro vs media sentadilla.

Methods

Un nadador varón que compite a nivel nacional con experiencia en el ejercicio de media sentadilla acudió en 3 ocasiones al Laboratorio de Ciencias del Deporte. En la primera sesión ejecutó un test incremental progresivo en cicloergómetro que consistió en incrementos de 15 W hasta llegar a la extenuación. Luego, en una segunda sesión realizó un test para determinar la repetición máxima (1-RM) en media sentadilla mientras que en la última sesión experimental realizó un test incremental progresivo en media sentadilla. Este último se basó en incrementos del 5% 1-RM en intervalos de 1 minuto de trabajo y 2 de recuperación hasta la fatiga. En ambos tests incrementales progresivos se determinó: VT_1 , VT_2 , VO_{2max} y % FC_{max} y % VO_{2max} asociados a VT_1 y VT_2 .

Results and Conclusions

Tanto en cicloergómetro como en media sentadilla se identificó VT_1 y VT_2 con los mismos criterios: i) VT_1 : primer incremento desproporcional de la ventilación (VE) en relación a la intensidad del ejercicio y primer incremento del VE/ VO_2 sin un aumento concomitante del VE/ VCO_2 ; ii) VT_2 : segundo incremento desproporcional de VE en relación a la intensidad de ejercicio junto con un incremento de VE/ VO_2 y VE/ VCO_2 . Además, la intensidad relativa a VT_1 fue similar en ambas modalidades de ejercicio: 55,6% VO_{2max} y 77,3% FC_{max} en cicloergómetro vs 65,2% VO_{2max} y 73,2% FC_{max} en media sentadilla. Respuesta similar fue la registrada en VT_2 : 77,3% VO_{2max} y 91,7% FC_{max} en cicloergómetro vs 81,4% VO_{2max} and 84,5% FC_{max} en media sentadilla. Estos preliminares resultados sugieren que los programas de entrenamiento de fuerza podrían ser prescritos en base a los umbrales ventilatorios lo que sería una oportunidad para poder desarrollar al mismo tiempo la capacidad de resistencia y de fuerza.

Keywords: Atleta; Ejercicio; Metabolismo; Entrenamiento de Fuerza; Fuerza.

O efeito da fadiga na aceleração e velocidade em jovens atletas

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Resumo

Introduction

A fadiga é amplamente reconhecida como um dos principais fatores que influenciam o desempenho desportivo, particularmente em tarefas que exigem elevada produção de força em curtos intervalos de tempo, como a aceleração e a velocidade. Em jovens atletas, estas capacidades assumem um papel determinante no desenvolvimento motor e no desempenho em modalidades desportivas, sendo também fortemente influenciadas pelo estado de maturação biológica. Estudos indicam que a aceleração, a velocidade máxima e a capacidade de realizar sprints repetidos estão inter-relacionadas em jovens praticantes, evidenciando que estas qualidades ainda se encontram em processo de desenvolvimento durante a infância e início da adolescência (Mendez-Villanueva et al., 2011). A literatura demonstra que a fadiga induzida pelo exercício pode comprometer significativamente o desempenho neuromuscular. Em protocolos de sprints repetidos, observam-se aumentos nos marcadores fisiológicos de fadiga, como o lactato sanguíneo, bem como reduções na capacidade de produção de força e potência muscular. Estas alterações refletem-se em desempenhos inferiores em tarefas explosivas, sugerindo que a fadiga afeta diretamente a eficiência neuromuscular (García-Hermoso et al., 2023). Adicionalmente, sessões de treino de elevada intensidade, que combinam exercícios de velocidade, agilidade e jogos reduzidos, têm demonstrado induzir fadiga neuromuscular significativa em jovens atletas, com efeitos que podem persistir até 24 horas após o esforço (García-Pinillos et al., 2015). Neste contexto, torna-se pertinente analisar o impacto da fadiga no desempenho de jovens atletas pertencentes ao escalão de sub1¹ (nascidos em 2015), particularmente na comparação entre momentos pré e pós-treino. Considerando que esta faixa etária corresponde a uma fase sensível do desenvolvimento motor, caracterizada por elevada plasticidade neuromuscular e rápida aquisição de competências, a compreensão dos efeitos da fadiga poderá contribuir para uma melhor organização e prescrição do treino. Assim, o presente estudo visa investigar de que forma a fadiga influencia a aceleração e a velocidade em jovens atletas, fornecendo dados relevantes para a otimização do processo de treino e para a promoção de um desenvolvimento desportivo adequado.

Methods

Tipo de estudo O presente estudo assume um desenho de natureza quantitativa, observacional e comparativa, com o objetivo de analisar o efeito da fadiga no desempenho de aceleração e velocidade em jovens atletas do escalão sub1¹, nascidos no ano de 2015. A avaliação foi realizada em dois momentos distintos: antes e após a sessão de treino,

permitindo comparar o desempenho dos participantes em condição de menor e de maior fadiga. Amostra A amostra foi constituída por 31 jovens atletas do escalão sub11, pertencentes ao ano de nascimento 2015, integrados num contexto regular de treino desportivo. A seleção dos participantes respeitou os critérios de inclusão previamente definidos, nomeadamente a participação regular no treino e a ausência de lesões ou limitações físicas que possam comprometer a realização do teste. Instrumento de avaliação Para a recolha de dados foi utilizado um teste de sprint linear de 30 metros, com marcação intermédia aos 10 metros. Este teste foi escolhido por ser uma ferramenta simples, prática e adequada à avaliação da aceleração e da velocidade em contextos desportivos de formação. O tempo de execução foi registado com recurso a cronómetro, desde a partida até à passagem pelos pontos definidos. Procedimentos A recolha dos dados foi efetuada em dois momentos: imediatamente antes do treino e imediatamente após o seu término. Antes da realização do teste, os atletas executaram um aquecimento padronizado, de forma a garantir condições semelhantes entre todos os participantes e a reduzir o risco de lesão. Cada atleta realizou um sprint em linha reta de 30 metros, partindo de uma posição estática previamente definida. Foi registado o tempo total até aos 30 metros, bem como o tempo parcial aos 10 metros. O segmento entre 0 e 10 metros foi considerado indicador da capacidade de aceleração, enquanto o segmento entre 0 e 30 metros foi utilizado como referência para a velocidade de deslocamento. Desta forma, foi possível comparar o desempenho dos atletas antes e depois da exposição à carga de treino. Variáveis em estudo As variáveis independentes correspondem ao momento de avaliação, isto é, pré-treino e pós-treino. As variáveis dependentes são o tempo obtido nos 10 metros, representando a aceleração, e o tempo obtido nos 30 metros, representando a velocidade. A comparação entre estes valores permitiu identificar possíveis alterações de desempenho associadas à fadiga. Tratamento dos dados Os resultados recolhidos foram organizados e comparados entre os dois momentos de avaliação. A análise permitiu verificar se existe variação no desempenho após o treino, sendo expectável uma eventual diminuição da eficácia na aceleração e na velocidade devido ao efeito da fadiga. Sempre que aplicável, os dados foram tratados por meio de estatística descritiva, recorrendo a médias e diferenças absolutas entre os momentos pré e pós-treino. Considerações finais Este procedimento metodológico permitiu analisar de forma objetiva o impacto agudo da fadiga no desempenho locomotor de jovens atletas. A informação obtida pôde contribuir para uma melhor compreensão das exigências físicas do treino em idades precoces e para um planeamento mais adequado das sessões de treino no escalão sub11.

Results and Conclusions

Resultados: Aceleração Velocidade 2:10 5:73 2:31 5:50 2:11 5:59 2:44 6:01 2:23 5:80 2:31 5:33 2:70 6:52 3:83 6:72 2:37 6:00 2:49 5:65 2:43 5:72 1:80 4:95 2:24 5:35 2:49 5:92 2:11 5:35 2:29 5:92 2:04 5:31 1:83 5:18 2:16 5:44 2:17 5:26 2:10 5:25 2:10 5:52 1:97 5:21 1:90 5:13 1:84 4:95 2:03 5:06 2:04 5:33 2:16 5:31 2:15 2:26 2:24 5:80 2:18 5:34 Aceleração Velocidade 2:18 5:86 2:40 5:53 2:19 5:82 2:61 6:19 2:37 5:98 2:40 5:45 2:86 6:78 4:02 7:01 2:46 6:17 2:60 5:82 2:53 5:88 1:87 5:05 2:33 5:49 2:61 6:12 2:19 5:47 2:39 6:08 2:03 5:20 1:84 5:15 2:37 5:54 2:24 5:13 2:30 5:73 2:17 5:46 2:17 5:33 2:04 5:40 2:04 5:06 2:44 5:41 2:10 5:59 2:70 5:99 2:50 5:99 2:63 6:46 2:17 5:47 Variação Aceleração (s) Variação Aceleração (%) 0,08 3,81 0,09 3,9 0,08 3,79 0,17 6,97 0,14 6,28 0,09 3,9 0,16 5,93 0,19 4,96 0,09 3,8 0,11 4,42 0,14 12 0,07 3,89 0,09 4,02 0,12 4,82 0,08 3,79 0,14 3,7 -0,01 -0,49 0,01 0,55 0,21 9,72 0,07 3,23 0,2 9,52 0,07 3,33 0,2 10,15 0,14 7,37 0,2 10,87 0,41 20,2 0,06 2,94 0,54 25 0,29 13,12 0,39 17,41 -0,01 -0,46 Variação Velocidade (s) Variação Velocidade (%) 0,13 2,27 0,03 0,55 0,23 4,11 0,18 3 0,18 3,10 12 2,25 0,26

3,99 0,29 4,32 0,17 2,83 0,17 3,01 0,16 2,8 0,12 0,14 2,62 0,2 3,38 0,12 2,24 0,16 2,7 - 0,11 -2,07 -0,03 -0,58 0,11,84 -0,13 -2,47 0,48 9,14 -0,06 -1,09 0,12 2,3 0,27 5,26 0,112,22 0,35 6,92 0,26 4,88 0,68 12,81 0,73 13,88 0,66 11,38 0,13 2,43

Conclusão: Em síntese, os resultados obtidos permitem concluir que a sessão de treino teve um efeito negativo no desempenho locomotor dos jovens atletas avaliados, verificando-se uma diminuição geral da capacidade de aceleração e da velocidade no momento pós-treino. Embora tenham existido algumas exceções individuais, a tendência predominante foi de agravamento dos tempos registados, o que confirma a presença de fadiga aguda após a exposição ao esforço. Este padrão reforça a ideia de que, em escalões de formação, o treino pode produzir alterações imediatas no rendimento físico, sobretudo em tarefas que dependem de elevada produção de força e de eficiência neuromuscular. Entre as variáveis analisadas, a aceleração revelou-se mais sensível aos efeitos da fadiga do que a velocidade total, apresentando uma perda relativa superior. Este resultado é particularmente relevante, uma vez que a fase inicial do sprint exige uma resposta rápida do sistema neuromuscular, maior coordenação e capacidade de aplicação de força em muito pouco tempo. Em atletas sub11, estas competências encontram-se ainda em desenvolvimento, o que pode justificar a maior vulnerabilidade observada após o treino. Assim, os dados obtidos estão em consonância com a literatura apresentada, sugerindo que a fadiga interfere de forma significativa com o desempenho explosivo nesta faixa etária. Do ponto de vista prático, este estudo evidencia a importância de um planeamento criterioso das sessões de treino em idades precoces, de modo a equilibrar a intensidade do estímulo com períodos adequados de recuperação. A monitorização do estado de fadiga deve ser considerada um aspeto central na organização do treino, sobretudo quando o objetivo passa pela melhoria da aceleração e da velocidade. Em termos finais, conclui-se que a fadiga induzida pelo treino compromete o desempenho dos jovens atletas, com maior impacto na aceleração do que na velocidade, sendo essencial continuar a investigar este fenómeno com amostras mais alargadas e métodos de avaliação mais precisos.

Keywords: fadiga; aceleração; velocidade; jovens atletas; sprint

Efectos de una intervención educativa sobre la mejora del tren inferior: El proyecto Fragsalud.

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Resumo

Introduction

Uno de los principales problemas asociados a la fragilidad es la pérdida de masa muscular en el tren inferior, lo cual provoca limitaciones funcionales que pueden derivar en inmovilidad, caídas e, incluso, aislamiento social. Si bien se ha demostrado que las intervenciones basadas en ejercicios multicomponentes ayudan a potenciar la fuerza del tren inferior, sin embargo, es escasa la evidencia sobre la eficacia de los programas educativos de salud para mejorar la fuerza del tren inferior.

Methods

Un total de 199 participantes de las provincias de Cádiz y Málaga formaron parte de un proyecto educativo de promoción de la salud denominado “Fragsalud”. En este programa se llevó a cabo una intervención que constaba de cuatro sesiones centradas en fragilidad, nutrición, actividad física, bienestar mental, bienestar cognitivo y sueño. Al inicio y tras seis meses de intervención, se evaluó la fuerza del tren inferior mediante el test Sit-to-stand "5 repeticiones de levantarse de la silla", el cual forma parte de la batería que evalúa el rendimiento físico SPPB. Para analizar los efectos de la intervención en el rendimiento de las extremidades inferiores (rendimiento en STS de 5 repeticiones), se utilizó un análisis de varianza (ANOVA) factorial mixto 2×2, considerando el grupo (intervención vs. control) como factor entre sujetos, y el tiempo (línea base vs. 6 meses) como factor dentro del sujeto. Los tamaños del efecto se calcularon utilizando el eta cuadrado parcial empleando los valores de 0,01, 0,06 y 0,14 para indicar efectos pequeños, medianos y grandes, respectivamente.

Results and Conclusions

Se observó una interacción significativa entre grupo y tiempo ($F = 7,89$; $\eta^2_p = 0,04$; $p < 0,001$). Aunque existía una disparidad inicial entre los grupos ($p = 0,002$), las comparaciones por pares corregidas mediante el método de Bonferroni revelaron que el grupo de intervención logró una reducción pronunciada y sostenida en el tiempo de ejecución en comparación con el grupo de control, tanto a los 6 meses (Diferencia de medias [MD] = 16,48; IC del 95%: 11,90 a 21,07; $p < 0,001$). Estos resultados sugieren que una intervención educativa de promoción de la salud podría optimizar la fuerza del tren inferior, relacionada con una mejor independencia funcional lo que conlleva a una mejor calidad de vida, evaluada a través del test STS.

Keywords: Tren inferior; Intervención educativa; Test Sit-to-stand; Fragilidad; Personas mayores.

Fiabilidad de la puntuación de la Escala de Evaluación del Movimiento de Corte (CMAS)

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Resumo

Introduction

Las maniobras de desaceleración, como los aterrizajes o los cambios de dirección (COD), son acciones frecuentes y potencialmente de alto riesgo en los deportes de equipo. Se ha determinado que los cambios de dirección laterales de entre 60° y 180° y los aterrizajes sobre una sola pierna son los principales mecanismos que provocan lesiones del ligamento cruzado anterior (LCA) en varios deportes. En el fútbol, la mayoría de los movimientos no se realizan en dirección hacia delante, por lo que las maniobras de COD son especialmente frecuentes y relevantes en este deporte, siendo los COD de hasta 90° la acción más realizada. La necesidad de utilizar instrumentos de laboratorio sofisticados y costosos hace que el cálculo del momento de abducción de la rodilla (KAM) externo sea menos accesible y difícil de aplicar en contextos de campo por parte de los profesionales del deporte. Por ese motivo, se han desarrollado diferentes pruebas de campo que evalúan la mecánica de aterrizaje y que han demostrado ser válidas y fiables para estimar la carga de la rodilla o el KAM en deportistas. El presente estudio buscó determinar la fiabilidad intra e interobservador utilizando la herramienta CMAS para evaluar la calidad del movimiento de un COD de 90° cuando la prueba se aplica en el marco real de la práctica deportiva. Un segundo objetivo fue determinar la fiabilidad entre sesiones para estimar la reproducibilidad del protocolo con la ejecución de la prueba en diferentes sesiones.

Methods

Se realizó un diseño transversal para determinar la fiabilidad de la herramienta CMAS a la hora de valorar el COD de 90° hacia ambos lados. Además, se realizó un diseño intra-sujeto de medidas repetidas, pre-post (test-retest) para analizar la reproducibilidad del protocolo a lo largo de dos sesiones (con una semana de diferencia). Cada repetición fue grabada para el posterior análisis cuantitativo y cualitativo en Kinovea (versión 8.15), mientras que el tiempo de ejecución fue registrado mediante células fotoeléctricas. El presente estudio fue aprobado por el Comité de Ética en Investigación de la Universidad de Murcia (ID: 2424/2019).

Results and Conclusions

Se encontró una fiabilidad baja entre cada par de evaluadores, así como una fiabilidad moderada cuando se calculó la fiabilidad intra-observador. Los ítems de la herramienta con mejores valores de fiabilidad fueron: ítems 2 "Apoyo lateral amplio de la pierna", 4

"Posición inicial de valgo de rodilla" y 6 "Posición del tronco en el plano frontal", así como el ítem 9 "Movimiento excesivo de valgo de rodilla". Cuando se analizó la fiabilidad entre sesiones se observó una baja reproducibilidad del protocolo, con bajas correlaciones en las puntuaciones otorgadas por el mismo observador entre sesiones. Por estos motivos, se recomienda encarecidamente establecer criterios más objetivos (puntos de corte) y definiciones más claras para cada criterio dentro del CMAS, así como un período de formación más prolongado y estandarizado para aquellas personas que quieran iniciarse en la evaluación del cambio de dirección.

Keywords: Calidad del movimiento; Riesgo de lesión; Paso lateral; Tarea de cambio de dirección; Cinética; Cinemática.

Squat (agachamento)

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Resumo

Introduction

O agachamento é um dos exercícios mais utilizados no treino de força devido à sua elevada capacidade de desenvolvimento da força dos membros inferiores, estabilidade corporal e desempenho funcional. Entre as suas principais variantes destacam-se o Back Squat e o Front Squat, exercícios que apresentam diferenças biomecânicas relevantes ao nível da postura, distribuição das cargas e exigências articulares. O presente estudo teve como objetivo realizar uma análise cinemática comparativa destas duas técnicas, com enfoque na trajetória da barra, velocidade de execução e comportamento angular da articulação do joelho.

Methods

A amostra foi constituída por 10 atletas com idades compreendidas entre os 18 e os 22 anos. Todos os participantes realizaram as execuções de Back Squat e Front Squat utilizando uma barra com carga padronizada de 10 kg. A análise incidiu sobre variáveis lineares e angulares, nomeadamente a velocidade da barra, a sua trajetória durante o movimento e o ângulo da articulação do joelho ao longo das diferentes fases da execução.

Results and Conclusions

Os resultados demonstraram que a velocidade da barra apresentou valores relativamente homogêneos entre os participantes em ambas as variantes de agachamento, sugerindo padrões semelhantes de controlo do movimento quando utilizada uma carga reduzida. Relativamente à análise angular, verificou-se que o Back Squat apresentou maiores amplitudes de flexão do joelho comparativamente ao Front Squat. Estas diferenças poderão estar relacionadas com as adaptações posturais exigidas por cada variante, nomeadamente a posição da barra, a inclinação do tronco e a distribuição do centro de massa durante a execução. Conclui-se que, apesar de ambas as técnicas apresentarem comportamentos semelhantes ao nível da velocidade da barra, existem diferenças biomecânicas relevantes na cinemática articular do joelho. A compreensão destas diferenças pode contribuir para uma prescrição mais adequada do exercício, permitindo selecionar a variante mais ajustada aos objetivos de treino, características individuais e necessidades funcionais dos praticantes.

Keywords: Biomecânica; Back Squat; Front Squat; Análise Cinemática; Ângulo do Joelho; Treino de Força.

Análise Cinemática do Remate em suspensão no voleibol: análise de mão dominante versus não-dominante

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Resumo

Introduction

O remate em suspensão no voleibol constitui uma das principais ações ofensivas utilizadas para a obtenção de pontos. Apesar de ser um gesto altamente dinâmico e complexo, exige elevados níveis de coordenação motora, força e controlo angular ao longo das suas diferentes fases. Assim, o objetivo deste estudo foi realizar uma avaliação e análise cinemática comparativa do remate em suspensão, examinando as variações angulares dos membros inferiores e superiores entre as execuções realizadas com a mão dominante e a mão não dominante.

Methods

A amostra foi constituída por 8 atletas ativos do clube desportivo AAIPS (idades entre os 18 e os 25 anos, média de 21 anos; peso entre 59,15 e 102 kg, média de 70,62 kg; altura entre 1,58 e 1,88 m, média de 1,73 m), todos destros. Cada participante realizou duas tentativas (uma com o membro superior dominante e outra com o não dominante), sendo as gravações de vídeo captadas no plano sagital analisadas através do software Kinovea.

Results and Conclusions

Resultados: Na fase preparatória, o ângulo médio do joelho foi de 123,9° no primeiro passo de aproximação e de 132,5° no segundo passo. Durante a fase de impulsão, o ângulo médio do membro inferior dominante atingiu aproximadamente 105,5°, em comparação com 110,9° no membro não dominante. Na fase aérea, a articulação úmero-radial apresentou um ângulo médio de 95,5° na execução com a mão dominante e de 112,3° com a mão não dominante. No momento específico do contacto/impacto com a bola, os valores médios da articulação úmero-radial foram de 158,1° e 156,1° para os remates realizados com o membro dominante e não dominante, respetivamente. Por fim, durante a receção ao solo, os ângulos do joelho estabilizaram em 134° para o lado dominante e 136,6° para o lado não dominante. Conclusões: A análise cinemática demonstrou que, ao nível angular dos eixos articulares analisados, não se verificaram discrepâncias relevantes nem assimetrias significativas entre as execuções realizadas com o lado dominante e o não dominante. Esta homogeneidade sugere uma estabilidade global na transferência de peso e uma coordenação motora bilateral adaptativa no plano sagital durante a execução deste gesto técnico.

Keywords: Keywords: Volleyball; Jump smash; Kinematics; Kinovea; Dominant hand; Non-dominant hand.

Does the ankle-foot complex determine jump performance in 92 youth soccer players?

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Resumo

Introduction

A soccer player's physical performance is closely linked to jump efficiency. In this regard, the strength and flexibility of the ankle-foot complex, as well as the morphology of the plantar arch, constitute important predictors of this performance. However, this anatomical complex is often overlooked in the annual planning of youth soccer training.

Methods

An observational, descriptive, and cross-sectional study was conducted with 92 registered soccer players aged between 12 and 14 years (age: 12.76 ± 0.58 years; weight: 49.73 ± 10.3 kg; height: 156.48 ± 8.38 cm; BMI: 20.17 ± 3.03 kg/m²) from the Pinatar Youth Soccer School. Medial longitudinal arch height, ankle dorsiflexion range of motion (ROM), great toe extension ROM, maximal isometric strength (MIS) of the great toe flexors, and horizontal jump capacity (single hop, triple hop, and crossover hop) were measured following previously published methodologies.

Results and Conclusions

Bayesian inference showed no asymmetries between the dominant and non-dominant limbs for the neuromechanical variables ($BF_{10} \leq 1.296$; anecdotal evidence). Furthermore, when stratifying the sample (high vs. low performance in the jump tests), some strength of evidence was found between ankle dorsiflexion ROM with a flexed knee and the triple hop ($BF_{10} = 3.991$; moderate evidence). Great toe flexor MIS emerged as a complementary variable, showing an almost moderate strength of evidence ($BF_{10} = 2.285$; moderate evidence). Ankle dorsiflexion ROM and great toe flexor MIS are critical mechanical determinants for successful triple hop performance in youth soccer players. It is recommended to implement systematic assessments and include a training program focused on triceps surae flexibility and great toe flexor strength within the annual planning for young players at the Pinatar Youth Soccer School.

Keywords: neuromechanical predictors, range of motion, Hop Test battery, youth soccer

Análise das Capacidades Físicas de Árbitros de Futebol do Distrito de Setúbal

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Resumo

Introduction

O futebol exige elevados níveis de aptidão física não apenas dos jogadores, mas também dos árbitros, que precisam de acompanhar o ritmo do jogo para garantir decisões precisas. Apesar do aumento de investigações nesta área, a maioria foca-se em elites, existindo uma lacuna sobre a realidade regional. O objetivo deste estudo foi analisar as capacidades físicas (flexibilidade, velocidade linear, agilidade e força explosiva) de árbitros de futebol do contexto distrital de Setúbal de diferentes categorias competitivas.

Methods

Estudo quantitativo, descritivo e transversal realizado com uma amostra de conveniência de 10 árbitros da Associação de Futebol de Setúbal. Após aquecimento padronizado, os participantes foram submetidos a uma bateria de quatro testes de campo: teste de senta e alcança (flexibilidade lombar e isquiotibial), teste Illinois de agilidade (mudança de direção), sprint de 30 metros (velocidade linear) e teste de impulsão horizontal (força explosiva dos membros inferiores).

Results and Conclusions

Os resultados indicaram níveis de aptidão física adequados para o contexto distrital (médias: Illinois = 15,72s; Sprint 30m = 4,71s; Impulsão Horizontal = 2,14m; Senta e Alcança D = 35,83cm / E = 34,28cm). Verificou-se uma forte correlação positiva entre o desempenho no sprint de 30m e o teste Illinois ($r = 0,88$), sugerindo interligação entre velocidade e agilidade. Observou-se heterogeneidade individual, possivelmente associada à idade e experiência. Conclui-se que os árbitros possuem níveis funcionais adequados, realçando a importância da monitorização regular e do treino específico para responder às exigências do jogo.

Keywords: Arbitragem, Futebol, Aptidão física, Agilidade, Velocidade, Flexibilidade.

Los cambios en la potencia muscular del tren inferior se asocian con la incidencia de caídas en adultos mayores con fragilidad: resultados del proyecto FRAGSALUD

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Resumo

Introduction

Las caídas constituyen uno de los síndromes geriátricos más frecuentes y discapacitantes en las personas mayores con fragilidad. La potencia muscular del tren inferior ha emergido como un determinante clave del rendimiento funcional y la movilidad durante el envejecimiento; sin embargo, su relación con la incidencia de caídas en personas mayores con fragilidad aún no está completamente esclarecida. Por ello, el objetivo de este estudio fue explorar la asociación entre los cambios en la potencia muscular del tren inferior y el número de caídas en los adultos mayores con fragilidad que viven en la comunidad y participaron en una intervención educativa de promoción de la salud.

Methods

Se realizó un ensayo clínico aleatorizado multicéntrico en las provincias de Cádiz y Málaga, España. Un total de 199 adultos mayores con fragilidad o prefragilidad completaron la evaluación a los 6 meses tras participar en un programa educativo de promoción de envejecimiento saludable y activo. El rendimiento del tren inferior se evaluó mediante el test 5-repetition Sit-to-Stand (5-STTS), perteneciente a la Short Physical Performance Battery. La potencia muscular media fue estimada a partir del 5-STTS utilizando la fórmula; $\text{Mean Power (W)} = (0.9 \cdot m \cdot g \cdot (0.5 \cdot H - h_{\text{chair}})) / (T_{\text{STTS}} \cdot 0.1)$, tanto en la evaluación basal como en la realizada a los 6 meses. Las caídas se registraron mediante entrevistas estructuradas y los cambios en la potencia muscular (Δ) se calcularon como la diferencia entre los valores a los 6 meses y los valores basales. Las asociaciones entre los cambios en la potencia muscular y el número de caídas registradas durante los seis meses previos se analizaron mediante el coeficiente de correlación de Spearman.

Results and Conclusions

Se observó una correlación negativa estadísticamente significativa entre los cambios en la potencia muscular media estimada mediante el 5-STTS y el número de caídas registradas a los 6 meses ($\rho(199) = -0.162$; $p = 0.022$). Estos resultados sugieren que mayores mejoras en la potencia muscular del tren inferior se asocian con un menor número de

caídas en adultos mayores con fragilidad. Por tanto, las intervenciones educativas dirigidas a la promoción de la salud podrían contribuir a las estrategias de prevención de caídas en esta población vulnerable. Este estudio (proyecto UMA20-FEDERJA-154) ha sido financiado por la Junta de Andalucía (10.13039/501100011011) y el FEDER en el marco del Programa Operativo FEDER Andalucía 2014-2020.

Keywords: Fragilidad; Caídas; Potencia muscular; Sit-to-Stand; Personas mayores.

Actualización de la Influencia de variables antropométricas de los ciclistas en su perfil Fuerza-Velocidad.

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Resumo

Introduction

El análisis desde el punto de vista de la biomecánica del pedaleo, y más concretamente desde la cinemática, permite comprender cómo los ciclistas generan la principal fuerza propulsiva que permite el avance de su bicicleta [1]. El estudio del perfil fuerza - velocidad (F-V) del pedaleo es pertinente como en cualquier otro gesto deportivo ya permite caracterizar la capacidad de los ciclistas para aplicar fuerza a distintas velocidades, frente a distintas cargas, lo que tiene implicaciones directas en la prescripción del entrenamiento [2]. Además, variables antropométricas como la estatura, el peso corporal y/o el tamaño de la biela pueden influir en la producción de fuerza, tanto en términos absolutos como relativos, y en el comportamiento del perfil F-V. Comprender estas relaciones puede ayudar a personalizar el entrenamiento y optimizar el rendimiento de los ciclistas en función a dichas características.

Methods

Se evaluó el perfil F-V del pedaleo en 7 ciclistas amateur entrenados mediante esprints cortos de 7 segundos sobre un rodillo de transmisión directa. Cada sujeto realizó entre 6 y 9 esfuerzos máximos con diferentes desarrollos (gear ratios), para generar incrementos proporcionados de carga. Se registraron la cadencia máxima (RPM_{máx}) y la potencia pico (P_{máx}) de cada esprint, y se calculó la velocidad lineal de desplazamiento del pedal a partir de la longitud de la biela y la cadencia. La fuerza máxima aplicada en cada esprint se calculó como la P_{máx} dividida por velocidad. Para la medición de la potencia se utilizó un potenciómetro validado Favero Duo y para la cadencia un sensor de cadencia de imán Sigma R2.

Results and Conclusions

Resultados. Se obtuvo una regresión lineal entre fuerza y velocidad para cada sujeto, obteniendo su perfil F-V individual. Los siete sujetos evaluados mostraron perfiles F-V individuales con coeficientes de determinación (R²) superiores a 0,98, lo que indica una relación lineal casi perfecta entre fuerza y velocidad en el gesto del pedaleo para todos los sujetos. Sin embargo, al agrupar los datos de todos los sujetos, el modelo conjunto presentó un R²=0,85, un coeficiente de determinación muy alta pero ligeramente inferior a los valores individuales. Esta diferencia puede atribuirse al reducido tamaño muestral y a la alta variabilidad interindividual en las características antropométricas como la masa (N = 7, masa corporal 71,8 ± 12,4 kg). Conclusiones: El perfil fuerza-velocidad del

pedaleo puede modelarse de forma precisa mediante esprints en cicloergómetro, obteniendo ajustes casi perfectos a nivel individual. Futuras investigaciones deberían confirmar estas relaciones en muestras más amplias. Además, las variables antropométricas como estatura y peso corporal se relacionan directa y positivamente con la producción de potencia absoluta, aunque la potencia relativa al peso corporal (w/kg) no parece seguir la misma tendencia, lo que refuerza la necesidad de considerar el perfil morfológico en la planificación del entrenamiento ciclista. Estos resultados respaldan el uso del perfil F–V como herramienta para la detección de talento, evaluar y prescribir entrenamiento en ciclismo para la mejora de la P_{máx} con único test rápido y sencillo.

Referencias: 1. V. Rodríguez-Rielves, D. Barranco-Gil, Á. Buendía-Romero, A. Hernández-Belmonte, E. Higuera- Liébana, J. Iriberry, et al., *Sensors* 24 (2024) 1997.
2. P. Leo, B. Martinez-Gonzalez, I. Mujika, A. Giorgi, *J. Sports Sci.* 43 (2025) 887.

Keywords: fuerza, masa, aceleración, cicloergómetro, potencia, entrenamiento

Efeito de uma sessão de treinamento de força no desempenho subsequente durante um treinamento intervalado de alta intensidade em corredores

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Resumo

Introduction

O treinamento de força (TF) e o treinamento intervalado de alta intensidade (HIIT) têm sido utilizados para melhorar o desempenho de corrida. No entanto, se a realização de uma sessão de TF prejudica o desempenho no HIIT no dia seguinte ainda é uma questão pouco explorada. Portanto, este estudo investigou os efeitos de uma sessão de TF no desempenho durante uma sessão de HIIT realizada 24 horas depois.

Methods

Dez corredores recreacionais (5 mulheres; idade: $21,5 \pm 1,9$ anos; massa corporal: $67,4 \pm 10,5$ kg) completaram dois programas de treinamento em um desenho cruzado, randomizado e contrabalanceado: uma sessão de TF seguida por uma sessão de HIIT 24 horas depois (TF-HIIT) ou uma sessão de HIIT sem sessão prévia de TF (SemTF-HIIT[LP2.1][AL2.2]). A sessão de TF incluiu 4 séries a 85% de 1-RM executadas até a falha concêntrica nos seguintes exercícios: Leg Press, Mesa Flexora e Panturrilha Sentado. A sessão de HIIT consistiu em seis intervalos de 600 metros no máximo esforço sustentável. O tempo dos intervalos, o comprimento da passada (CP), a frequência da passada (FP), a frequência cardíaca (FC) e a percepção esforço (PE) foram medidos durante o HIIT.

Results and Conclusions

Houve um efeito principal significativo da condição para os tempos dos intervalos ($P=0,011$) e para a FP ($P=0,014$) durante a sessão de HIIT, com os tempos médios dos intervalos sendo mais longos ($165 \pm 14,4$ vs. $156 \pm 12,84$ s) e a FP menor ($87,7 \pm 6,8$ vs. $90,7 \pm 5,5$ ciclos.min⁻¹) na sequência TF-HIIT em comparação com a SemTF-HIIT. Não foram encontradas diferenças significativas entre as condições para CP, PE e FC ($P>0,05$). Em conclusão, a realização de uma sessão intensa de TF prejudica o desempenho de corrida durante uma sessão de HIIT executada 24 horas depois. Treinadores de corrida devem considerar evitar programar sessões de TF 24 horas antes de sessões de HIIT para otimizar a qualidade dessas sessões.

Keywords: treinamento concorrente; treinamento de endurance; fadiga; recuperação; corredores.

CONFIABILIDADE E CONCORDÂNCIA INTRA E INTERAVALIADOR DAS MEDIDAS DO LIMAR DE DOR À PRESSÃO NO BÍCEPS BRAQUIAL APÓS TREINAMENTO COM DISPOSITIVO INERCIAL

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Resumo

Introduction

A algometria de pressão constitui um procedimento clínico-instrumental amplamente utilizado para a quantificação objetiva dos limiares de dor à pressão (LDP), representando uma ferramenta relevante para o monitoramento da dor muscular de início tardio (DOMS). Entretanto, a precisão psicométrica dessa técnica depende em grande medida da competência técnica do avaliador, o que pode gerar variabilidade considerável durante a obtenção dos dados. No contexto do exercício físico, particularmente após a aplicação de estímulos de sobrecarga excêntrica por meio de dispositivos inerciais (flywheel), indivíduos não treinados tendem a apresentar aumento significativo da sensibilidade dolorosa. Nesse contexto, a determinação da estabilidade e da reprodutibilidade das medidas constitui um requisito fundamental para garantir a validade do monitoramento do dano muscular induzido pelo exercício. Objetivo: Determinar a reprodutibilidade e o grau de concordância intra e interavaliador das medidas de LDP obtidas por meio da algometria nas regiões medial (BB_med) e distal (BB_dis) do músculo bíceps braquial após a aplicação de um protocolo de treinamento de força com dispositivo inercial.

Methods

Foram recrutadas 15 mulheres sem experiência prévia em treinamento de força ou na utilização de dispositivos flywheel. O protocolo experimental consistiu em uma sessão de treinamento em plataforma inercial composta por quatro séries de dez repetições, utilizando uma carga inercial de 0,05 kg·m² e um intervalo de recuperação de um minuto entre as séries. Quarenta e oito horas após a intervenção, os LDP foram avaliados por meio da algometria. As medições foram realizadas de forma alternada por dois avaliadores: o avaliador A efetuou duas medições para a análise da concordância intraavaliador, enquanto o avaliador B realizou uma única medição destinada à análise da concordância interavaliador. A distribuição dos dados foi verificada por meio do teste de Shapiro-Wilk. A confiabilidade foi determinada utilizando o Coeficiente de Correlação Intraclassa (CCI), com intervalos de confiança de 95% (IC95%). Os valores de CCI foram classificados como moderados (0,50–0,74), bons (0,75–0,89) ou excelentes ($\geq 0,90$).

Results and Conclusions

A amostra apresentou idade média de $25,33 \pm 4,58$ anos e índice de massa corporal de $22,91 \pm 3,33$ kg/m². Os resultados obtidos para o músculo bíceps braquial foram os seguintes: Concordância intraavaliador: o ponto BB_med apresentou confiabilidade excelente (CCI = 0,958; IC95%: 0,862–0,988), com coeficiente de variação (CV) de 12,59%. Por sua vez, o ponto BB_dis apresentou concordância boa (CCI = 0,797; IC95%: 0,440–0,936) e CV de 18,96%. Concordância interavaliador: o ponto BB_dis manteve consistência boa entre avaliadores (CCI = 0,861; IC95%: 0,591–0,957), com CV de 13,89%. Em contrapartida, o ponto BB_med apresentou concordância moderada (CCI = 0,660; IC95%: 0,174–0,888) e o maior coeficiente de variação observado (28,6%). Conclusão: A avaliação algométrica realizada na região distal do bíceps braquial demonstrou adequada reprodutibilidade tanto intra quanto interavaliador após o treinamento com dispositivo inercial. Contudo, embora a região medial tenha apresentado elevada consistência quando avaliada pelo mesmo examinador, a menor concordância observada entre avaliadores sugere maior dependência da técnica individual de mensuração.

Keywords: Limiar de Dor à Pressão; Algometria de Pressão; Treinamento Resistido com Flywheel; Confiabilidade.

A Influência da Flexibilidade no Desempenho do Salto Horizontal em Atletas de Ginástica Acrobática de 8 a 10 anos

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Resumo

Introduction

O presente projeto de investigação tem como objetivo analisar a influência da flexibilidade da cadeia posterior no desempenho do salto horizontal em atletas de ginástica acrobática de 8 a 10 anos.

Methods

O desenho metodológico é descritivo-correlacional, não experimental e ecológico. A amostra consistiu em 30 atletas do sexo feminino, divididas equitativamente em três grupos etários ($n=10$). A metodologia envolveu a avaliação da flexibilidade pelo teste de "senta e alcança" e da potência explosiva através do salto horizontal máximo. As variáveis independentes foram a idade e a flexibilidade, e a dependente foi a distância do salto. Os dados foram analisados no SPSS com recurso à estatística descritiva e ao coeficiente de correlação de Pearson ($p<0,05$).

Results and Conclusions

Os resultados revelaram um incremento expressivo no salto entre os 8 anos (104,25 cm) e os 9 anos (128,45 cm), mantendo-se estável aos 10 anos (127,95 cm), com valores de flexibilidade homogêneos. Confirmou-se uma correlação positiva moderada e significativa ($r=0,417$; $p=0,022$), indicando que a flexibilidade explica 17,3% da variação do salto atuando como um facilitador mecânico do ciclo de alongamento-encurtamento.

Keywords: Flexibilidade, Salto horizontal, Ciclo de alongamento-encurtamento, Ginástica acrobática, Jovens atletas.

Remate Rasteiro: Pé Dominante VS Pé Não Dominante

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Resumo

Introduction

O trabalho intitulado “Trabalho Biomecânica – Remate rasteiro: Pé Dominante VS Pé Não Dominante” centra-se na análise biomecânica do gesto técnico do remate no futebol, comparando o desempenho do pé dominante e do pé não dominante em diferentes atletas. A investigação tem como principal objetivo compreender de que forma as articulações da anca, joelho e tornozelo influenciam a execução do remate rasteiro, avaliando variáveis biomecânicas como os ângulos articulares, a velocidade de execução e a transferência de força entre os segmentos corporais. Para tal, foram analisadas três fases fundamentais do movimento: a fase de aproximação, a fase de contacto com a bola e a fase de retorno.

Methods

O estudo foi realizado com vários atletas com diferentes idades, pesos e anos de prática federada, permitindo estabelecer comparações entre níveis distintos de experiência desportiva. A recolha e análise dos dados foram efetuadas através da plataforma Kinovea, software utilizado para a análise biomecânica de movimentos desportivos.

Results and Conclusions

Ao longo do trabalho, verifica-se que o pé dominante apresenta, de forma consistente, maior eficiência biomecânica relativamente ao pé não dominante. Os gráficos de velocidade demonstram que o tornozelo é o segmento responsável pelos maiores picos de velocidade durante o remate, evidenciando movimentos mais explosivos e maior capacidade de aceleração. Em contraste, o joelho assume um papel de estabilização intermédia e a anca apresenta um comportamento mais controlado, contribuindo para o equilíbrio postural e para a coordenação global do gesto técnico. Os resultados mostram igualmente que o pé dominante produz maiores velocidades máximas e uma melhor continuidade do movimento, sobretudo durante a fase de contacto com a bola. Os atletas demonstram maior coordenação segmentar, melhor transferência de força e maior fluidez do movimento quando utilizam o membro dominante. Por outro lado, o pé não dominante evidencia menores níveis de explosividade, desaceleração mais precoce e menor amplitude de movimento, fatores que reduzem a eficácia mecânica do remate. Outro aspeto relevante identificado ao longo da análise é a estabilidade da anca em ambos os membros. Apesar das diferenças entre o pé dominante e o não dominante, a anca mantém oscilações reduzidas e velocidades relativamente estáveis, o que demonstra a importância do controlo postural para a execução eficiente do gesto técnico. Além disso, os atletas com maior tempo de prática federada tendem a apresentar movimentos mais coordenados, velocidades superiores e padrões biomecânicos mais equilibrados. De forma geral, o trabalho conclui que a biomecânica aplicada ao futebol constitui uma ferramenta

essencial para compreender os mecanismos do movimento humano e otimizar o rendimento desportivo. A comparação entre o pé dominante e o não dominante permitiu identificar diferenças significativas ao nível da produção de velocidade, coordenação motora e eficiência técnica. Assim, o estudo reforça a importância do treino bilateral no futebol, não apenas para melhorar o desempenho técnico dos atletas, mas também para promover maior equilíbrio muscular, estabilidade articular e prevenção de lesões.

Keywords: Biomecânica, Futebol, Remate rasteiro, Pé dominante, Coordenação motora

A Relação de Flexibilidade e Idade em atletas de Futsal Sénior

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Resumo

Introduction

A flexibilidade é uma capacidade física essencial no desempenho desportivo, desempenhando um papel importante na eficiência do movimento e na prevenção de lesões. No futsal, modalidade caracterizada por elevada intensidade e frequentes mudanças de direção, a amplitude de movimento assume particular relevância. Neste contexto, o presente estudo teve como objetivo analisar a relação entre a idade e os níveis de flexibilidade em atletas seniores de futsal do sexo masculino.

Methods

A amostra foi constituída por 17 jogadores da equipa sénior da A.D. Quinta do Conde, sendo a flexibilidade avaliada através do teste Sit and Reach. Como variável independente considerou-se a idade dos atletas, enquanto os níveis de flexibilidade constituíram a variável dependente, registando-se o melhor valor absoluto obtido por cada atleta entre os membros inferiores. Os dados foram tratados no software IBM SPSS Statistics através de estatística descritiva e do coeficiente de correlação de Pearson ($p \leq 0,05$).

Results and Conclusions

Os resultados descritivos revelaram uma média de idades de $23,53 \pm 4,57$ anos e um nível médio de flexibilidade de $26,88 \pm 6,41$ cm. A análise inferencial demonstrou a existência de uma correlação positiva de intensidade extremamente fraca, clinicamente nula e sem qualquer significância estatística entre as variáveis ($r = 0,041$; $p = 0,877$). Conclui-se que a idade cronológica não se assume como um fator explicativo para as variações de flexibilidade nesta amostra, sugerindo que o estímulo contínuo e sistemático do treino em adultos jovens atua como um mecanismo preponderante na preservação da amplitude articular posterior.

Keywords: flexibilidade; futsal; idade; teste Sit and Reach; SPSS.

Análise do Cinemática do Serviço Estático por cima de Voleibol

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Resumo

Introduction

O serviço por cima constitui uma das ações técnicas fundamentais do voleibol, desempenhando um papel determinante no início da ação ofensiva e na criação de dificuldades à equipa adversária. A eficácia deste gesto depende da coordenação eficiente dos segmentos corporais envolvidos, particularmente dos membros superiores, responsáveis pela aceleração final da mão e transferência de energia para a bola. O presente estudo teve como objetivo analisar cinematicamente o movimento dos membros superiores durante a execução do serviço estático por cima, comparando o desempenho do braço dominante e não dominante ao longo das diferentes fases do gesto técnico.

Methods

A amostra foi constituída por 10 atletas pertencentes à equipa de voleibol do Instituto Politécnico de Setúbal. As execuções foram registadas no plano sagital através de uma câmara iPhone 13 Pro e posteriormente analisadas com recurso ao software Kinovea. Foram avaliados os ângulos articulares e os padrões de movimento durante as fases preparatória, lançamento da bola, aceleração e contacto, bem como os indicadores relacionados com a velocidade e aceleração do gesto técnico.

Results and Conclusions

Os resultados demonstraram que o braço dominante apresentou, na maioria dos atletas, maior eficiência biomecânica ao longo da execução do serviço. Foram observados valores superiores de aceleração, maior velocidade no momento de contacto com a bola e melhor coordenação segmentar entre ombro, cotovelo e punho. Adicionalmente, verificou-se que vários atletas apresentavam limitações na extensão completa do cotovelo durante a fase de contacto, comprometendo a transferência de energia e reduzindo a eficácia do serviço. Em contraste, o braço não dominante revelou menor capacidade de produção de força, menor estabilidade técnica e maior variabilidade nos padrões articulares observados. Conclui-se que os parâmetros cinemáticos dos membros superiores influenciam diretamente a velocidade da bola, a eficiência mecânica e a eficácia do serviço no voleibol. A análise cinemática revelou-se uma ferramenta importante para identificar limitações técnicas, otimizar a coordenação segmentar e apoiar o desenvolvimento de estratégias de treino direcionadas para a melhoria do desempenho e prevenção de lesões.

Keywords: ; Serviço por Cima; Análise Cinemática; Biomecânica; Membro Dominante; Desempenho Desportivo.

Comparação entre a Flexibilidade de Atletas e Praticantes de diferentes Desportos de Combate

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Resumo

Introduction

A flexibilidade muscular desempenha um papel fulcral no rendimento técnico e na prevenção de lesões em praticantes de artes marciais. Este estudo teve como objetivo comparar os níveis de flexibilidade lombo-pélvica e isquiotibial entre praticantes de Muay Thai e de Boxe.

Methods

Adotando um desenho quantitativo, descritivo e transversal, avaliou-se uma amostra por conveniência constituída por 40 participantes (N=40), divididos igualmente entre as duas modalidades, todos integrados no mesmo espaço desportivo e sob critérios homogéneos de treino. A recolha de dados foi efetuada através do teste de flexibilidade Sit and Reach (Senta e Alcança), utilizando uma fita métrica standardizada.

Results and Conclusions

Os resultados indicaram que os praticantes de Muay Thai registaram uma média absoluta ligeiramente superior ($10,93 \pm 8,27$ cm) face aos de Boxe ($9,60 \pm 3,16$ cm). Contudo, o Teste t de Student para amostras independentes com correção de Welch revelou que esta diferença de 1,33cm não possui relevância estatisticamente significativa ($t = 0,661$; $p = 0,515$), levando à retenção da hipótese nula. Adicionalmente, verificou-se uma acentuada heterogeneidade interindividual no Muay Thai por oposição à coesão demonstrada no Boxe. Conclui-se que a modalidade praticada, de forma isolada, não determina um perfil de flexibilidade posterior superior, sugerindo a importância de uma abordagem metodológica individualizada no processo de treino.

Keywords: Desportos de Combate; Flexibilidade; Muay Thai; Boxe; Teste Sit and Reach.

Análise Cinemática do exercício Lat Pull Down com 80 % da carga

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Resumo

Introduction

No presente trabalho, realizou-se uma análise do exercício Lat Pulldown, comparando a sua execução entre atletas com experiência e atletas sem experiência de treino em ginásio. O estudo teve como objetivo observar e analisar possíveis diferenças no desempenho do movimento entre os dois grupos, tendo em conta aspetos técnicos e mecânicos da execução.

Methods

Filmagem no plano sagital; Utilização de carga correspondente a 80% da carga máxima; Marcação das articulações: Ombro; Cotovelo; Punho; Análise através do software Kinovea.

Results and Conclusions

Para este estudo, foram avaliados 10 atletas, sendo 5 experientes e 5 não experientes, com idades compreendidas entre os 18 e os 23 anos, alturas entre 1,69 m e 1,87 m e pesos entre 56,6 kg e 87 kg, sendo a média de massa corporal 68,86 kg. Todos os participantes realizaram o exercício com uma carga correspondente a 80% da sua carga máxima. Concluindo, verificou-se que os atletas experientes apresentaram maior controlo técnico e estabilidade durante a execução, enquanto os não experientes demonstraram maior dificuldade em manter a postura e controlar a fase excêntrica do movimento.

Keywords: Lat Pulldown; treino de força; execução técnica; controlo motor; desempenho físico.

Should be added beetroot juice to caffeine supplementation procedures for increasing neuromuscular performance?

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Resumo

Introduction

The level of competency in the most of sport modalities is increasing with minimal differences between the athletes. Therefore, increasing performance less than 1% impact significantly in the results of a competition. In this context, athletic population is increasing the prevalence of dietary supplements consumption. Caffeine (CAF) supplementation presents high evidence for increasing sport performance. CAF is the most consumed dietary supplement by the most of competitive athletes. At the opposite, beetroot juice supplementation (BRJ) with high evidence presents a very low consumption between competitive athletes, specifically between explosive sport modalities. Because it has been very limited the knowledge about the effectiveness of consuming more than one dietary supplement in comparison to isolated dietary supplements, the main aim of this study is to analyse the possible additional effects of BRJ to CAF supplementation in neuromuscular performance of lower limbs in a sample of well-trained athletes.

Methods

A sample formed by 20 young adult males well-trained (more than 3 training session weekly for more than 2 years) went to the laboratory 3 times. Randomly, participants ingested 6 mg/kg of caffeine + 140 ml of BRJ depleted in NO₃⁻ (CAF), 6 mg/kg of caffeine + 140 ml of BRJ enriched in NO₃⁻ (CAF+BRJ) or 6 mg/kg of placebo (sucrose) + 140 ml of BRJ depleted in NO₃⁻ (PLA). Experimental session consisted in a general and specific warming-up for optimizing performance in a countermovement jump (CMJ) test. A total of 3 CMJs interspersed 45 seconds were performed and the medium of the 3 jumps were extracted of the next outcomes: height (H) expressed in cm, and peak and medium power output (PP and MP) expressed as W/kg. A repeated measured ANOVA (RM-ANOVA) was performed with the adjustment of Bonferroni. Additionally, partial eta squared (η^2p) was determined. Statistical differences were set up as $p < 0.05$.

Results and Conclusions

It was reported a significant effect for H ($F=4.30$; $\eta^2p=0.18$; $p=0.02$), PP ($F=5.56$; $\eta^2p=0.23$; $p=0.01$) and MP ($F=4.07$; $\eta^2p=0.18$; $p=0.04$). Therefore, it was showed as CAF acts as ergogenic aid in comparison with PLA in H (+5.8%; $p=0.01$), PP (+4.0%; $p<0.01$) and MP (+5.7%; $p<0.1$). Nevertheless, CAF + BRJ did not increase performance and did not present additional effects to CAF supplementation. These results suggest us that

ergogenic properties of dietary supplements with isolated consumption is not accumulative even it could be an interaction effect. For that reason, future studies should include a combination of dietary supplements for analysing a real context in competition.

Keywords: CMJ; Ergogenic Aids; Sport Nutrition; Supplement; Strength.

Musculação, "Bicep Curl" exercício

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Resumo

Introduction

Movimento de força e musculação dado pelo nome de “bicep curl”, o objetivo principal da realização deste trabalho e análise deste movimento é a análise da realização do movimento com o braço dominante e não dominante de cada indivíduo a 80% da carga máxima.

Methods

Filmagem de 10 indivíduos na realização do movimento "bicep curl", no plano sagital com braço dominante e não dominante e posterior análise com ferramenta "Kinovea".

Results and Conclusions

Durante o movimento a velocidade não correspondeu ao controlo neuromuscular do braço dominante, sendo maior no não dominante, a nível angular houve uma maior predominância do controlo muscular do braço dominante, com um maior alongamento na fase excêntrica do movimento e maior contração na fase concêntrica do mesmo movimento. A velocidade muitas das vezes não é proporcional a um bom movimento.

Keywords: Palavras-Chave: Bicep Curl, Musculação, Cinemática, Ângulos, Braço

The Impact of Fatigue on Athletes' Speed

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Resumo

Introduction

The Council of Europe defines sport as “all forms of physical activity which, through casual or organised participation, aim at expressing or improving physical fitness and mental well-being, forming social relationships, or obtaining results in competitions at all levels” (European Sports Charter, adopted in 1992 and revised in 2001). This study aims to analyse the impact of training-induced fatigue on 40-metre sprint performance in senior football players from Clube de Futebol Gadiana. An observational repeated-measures design will be adopted, comparing participants' sprint performances before and after a training session. The sample will consist of approximately 10–12 senior football players assessed during a regular football training session. The protocol involves performing a 40-metre sprint on each occasion, recording the best sprint time and collecting anthropometric data. It is expected that sprint performance will decrease following the training session, reflecting the effects of acute fatigue. Sprint speed plays a crucial role in football performance and is often influenced by factors such as fatigue accumulated throughout training. Understanding these effects may contribute to the optimisation of training load management and performance monitoring in football athletes.

Methods

The study follows an observational design with repeated measures, comparing athletes' performance before and after training. Data collection will be conducted during a training session, with control of conditions such as location, surface, and session context. Participation is entirely voluntary, and athletes may withdraw from the study at any time without any negative consequences. The tests do not pose any risks beyond those associated with a regular training session. Data confidentiality will be strictly maintained, and the anonymity of both participants and the institution will be ensured whenever requested or applicable.

Results and Conclusions

- All athletes showed an increase in sprint time.
- There was an overall decrease in performance.
- The mean change was +0.13 seconds ($\approx +2.38\%$).
- Regarding the standard deviation values observed in the pre- and post-training assessments ($SD = 0.15$ s), these suggest a moderate dispersion of sprint times among the athletes. In contrast, the very low standard deviation of the difference scores ($SD = 0.005$ s) and percentage change

(SD = 0.11%) indicates that the fatigue response was highly homogeneous across the entire sample. The results obtained in this study provide clear evidence of the influence of fatigue on the athletes' sprint performance. By comparing the 40-meter sprint times before and after the training session, a consistent increase in sprint time was observed following physical exertion, indicating a reduction in sprint performance under fatigued conditions.

Keywords: Fatigue; Sprint; Speed; Football; Athletes.

Lançamento em Apoio e em suspensão no Basquetebol

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Resumo

Introduction

Este trabalho, desenvolvido no âmbito da unidade curricular de Biomecânica, teve como objetivo principal realizar uma análise cinemática e comparativa entre duas técnicas fundamentais no basquetebol: o lançamento em apoio e o lançamento em suspensão.

Methods

A amostra do estudo foi constituída por 10 atletas federados masculinos, com idades compreendidas entre os 17 e os 21 anos, pertencentes ao Scalipus Clube de Setúbal. Para a recolha de dados, as execuções técnicas foram gravadas no plano sagital através da câmara de um dispositivo móvel iPhone 15 Pro Max. A análise cinemática e o tratamento de dados foram efetuados com o recurso ao software de análise de movimento Kinovea, permitindo mensurar e comparar os ângulos articulares do tornozelo, joelho, anca, ombro, cotovelo e pulso ao longo de quatro fases distintas do movimento (fase preparatória, de impulsão, de lançamento e fase final), bem como calcular o perfil de velocidade da bola. Salvaguarda-se que a fase preparatória constituiu a única etapa em que a articulação do pulso não foi objeto de análise cinemática, uma vez que, nesta fase específica, o respetivo ângulo não se encontrava visível no plano sagital.

Results and Conclusions

Basquetebol, Biomecânica, Análise Cinemática, Lançamento em Apoio, Lançamento em Suspensão, Kinovea.

Keywords: Basquetebol, Biomecânica, Análise Cinemática, Lançamento em Apoio, Lançamento em Suspensão, Kinovea

Comparação da incidência de lesão entre atletas de futebol masculino e feminino do mesmo clube.

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Resumo

Introduction

O futebol é uma modalidade associada a elevadas exigências físicas e a um risco significativo de lesão, sendo relevante compreender as diferenças existentes entre atletas masculinos e femininos. O presente estudo teve como objetivo comparar a incidência e as características das lesões no futebol sénior masculino e feminino.

Methods

Trata-se de um estudo observacional, descritivo e transversal, realizado com atletas do Sporting Clube de Portugal, através da aplicação de um questionário online anónimo e voluntário.

Results and Conclusions

Os resultados demonstraram elevada prevalência de lesões em ambos os sexos, verificando-se maior número de lesões acumuladas no futebol masculino. As entorses constituíram o tipo de lesão mais frequente em ambos os grupos, musculares enquanto as apresentaram roturas maior incidência nos homens e as lesões do joelho maior prevalência nas mulheres. A sobrecarga e a fadiga foram identificadas como os principais fatores associados às lesões. No futebol masculino destacou-se maior influência do contacto competitiva, físico enquanto e intensidade no futebol feminino se verificou maior impacto de fatores psicológicos, biomecânicos e hormonais. A maioria das atletas femininas referiu influência do ciclo menstrual na suscetibilidade à lesão e no desempenho desportivo. Conclui-se que as lesões no futebol apresentam origem multifatorial, existindo diferenças importantes entre futebol masculino e feminino relativamente aos fatores de risco e às características das lesões. Estes resultados reforçam a necessidade de estratégias preventivas individualizadas e adaptadas às especificidades fisiológicas e competitivas de cada sexo.

Keywords: futebol, lesões desportivas, futebol feminino, futebol masculino, fatores hormonais, prevenção de lesões

Efeitos da potenciação pós ativação no salto vertical após a realização de um agachamento

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Resumo

Introduction

O presente estudo teve como objetivo investigar o efeito agudo de um protocolo de indução de Potenciação Pós-Ativação (PPA) no desempenho do Salto Vertical com Contramovimento (CMJ)

Methods

A amostra foi composta por 20 praticantes de CrossFit de nível competitivo, submetidos a um desenho experimental cruzado. O estímulo condicionante consistiu na realização de 3 repetições de agachamento a 85% de 1RM. O desempenho no salto foi avaliado antes do estímulo (linha de base) e monitorizado aos 2, 4, 8 e 12 minutos de recuperação. Os resultados indicaram uma quebra de desempenho no minuto 2 (29,8 cm) devido à fadiga neuromuscular predominante, seguida de uma recuperação no minuto 4 (32,5 cm). O pico máximo de rendimento ocorreu aos 8 minutos de recuperação, com a altura média do salto a atingir os 35,4 cm, o que representa um aumento estatisticamente significativo de 10,6% face à linha de base (32,0 cm). Aos 12 minutos, verificou-se o declínio do desempenho (33,2 cm), demonstrando a dissipação da ativação

Results and Conclusions

Conclui-se que o protocolo de agachamento de alta intensidade é eficaz na indução de PPA e que a janela temporal ótima de recuperação para maximizar o desempenho no salto vertical é de 8 minutos.

Keywords: Potenciação Pós-Ativação; salto vertical; agachamento; CrossFit; desempenho desportivo

Associação entre desempenho na condução de bola e precisão do passe em jovens futebolistas (7 a 11 Anos)

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Resumo

Introduction

O futebol é uma modalidade desportiva onde as capacidades técnicas desempenham um papel fundamental no desempenho dos atletas, particularmente durante as fases iniciais de formação. O presente estudo teve como objetivo analisar a relação entre a condução de bola e a qualidade do passe em jovens futebolistas.

Methods

A amostra foi constituída por 30 atletas do sexo masculino, com idades compreendidas entre os 7 e os 11 anos. Para avaliação das capacidades técnicas foram utilizados o Teste-M, para análise da condução de bola, e uma versão adaptada do Loughborough Soccer Passing Test (LSPT(A)), para avaliação da qualidade do passe. Os dados foram analisados através de estatística descritiva, teste de normalidade de Shapiro-Wilk e correlações de Pearson e Spearman.

Results and Conclusions

Após exclusão de um outlier identificado no gráfico de dispersão, verificou-se uma correlação positiva significativa entre os resultados do Teste-M e do LSPT(A) ($r = 0.615$; $p < 0.001$), confirmada igualmente pela correlação de Spearman ($\rho = 0.622$; $p < 0.001$). Os resultados sugerem que atletas com melhor desempenho na condução de bola tendem igualmente a apresentar melhor desempenho em tarefas relacionadas com o passe, reforçando a importância do controlo de bola e da coordenação motora no desenvolvimento técnico de jovens futebolistas.

Keywords: futebol de formação; condução de bola; passe; controlo de bola; coordenação motora.

Relação entre a Flexibilidade e a Agilidade em Jovens Futebolistas

Estudo correlacional no escalão de juniores

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Resumo

Introduction

Este estudo correlacional, realizado no âmbito da Licenciatura em Desporto do Instituto Politécnico de Setúbal, analisou a relação entre a flexibilidade da cadeia posterior e a agilidade em 2¹ futebolistas juniores (Sub-19) do Charneca de Caparica Futebol Clube.

Methods

Para a recolha de dados, utilizou-se o teste "Senta e Alcança" (com a Caixa de Wells) para medir a flexibilidade em centímetros, e o "Teste T" para avaliar a agilidade em segundos.

Results and Conclusions

Os atletas registaram uma média de 29 cm no teste de flexibilidade e de 9,37 segundos no circuito de agilidade. Os resultados revelaram uma correlação linear negativa forte e estatisticamente significativa entre as duas capacidades ($r = -0,732$; $p < 0,001$). Isto demonstra que os jogadores com maiores níveis de flexibilidade alcançaram os tempos mais baixos (melhor desempenho) no teste de agilidade. Biomecanicamente, uma maior extensibilidade dos isquiotibiais e da zona lombar parece otimizar a eficiência do movimento nas travagens e mudanças rápidas de direção. Apesar das limitações do estudo, como a amostra reduzida e a impossibilidade de definir uma relação direta de causa-efeito, os dados reforçam a pertinência de integrar o treino regular de flexibilidade nos programas de preparação física do futebol de formação.

Keywords: Futebol; Agilidade; Flexibilidade; Juniores; Teste T; Senta e Alcança

Treino de Força Máxima: Fundamentos Fisiológicos, Métodos de Aplicação e Impactos no Desempenho

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Resumo

Introduction

O treino de força máxima constitui uma das metodologias mais relevantes no âmbito da preparação física, do rendimento desportivo e da promoção da saúde, caracterizando-se pela utilização de cargas elevadas, geralmente superiores a 85% de uma repetição máxima (1RM). O presente trabalho teve como objetivo analisar os fundamentos fisiológicos, as adaptações neuromusculares e estruturais, bem como os principais métodos de aplicação do treino de força máxima, através de uma revisão narrativa da literatura científica disponível nas bases de dados PubMed e Scopus. A evidência científica analisada demonstra que o treino de força máxima promove adaptações neurais expressivas, incluindo aumento do recrutamento e sincronização das unidades motoras, melhoria da coordenação intramuscular e intermuscular e aumento da frequência de disparo neural. Paralelamente, observam-se adaptações estruturais relevantes, sobretudo ao nível da hipertrofia miofibrilar, associada ao aumento das proteínas contráteis e à maior capacidade de produção de força. Verificou-se ainda que a aplicação sistemática deste método contribui para melhorias significativas na taxa de desenvolvimento de força, estabilidade articular, eficiência mecânica e desempenho motor em diferentes modalidades desportivas. Além do contexto competitivo, o treino de força máxima apresenta benefícios importantes na saúde e funcionalidade, particularmente na prevenção da sarcopenia, manutenção da autonomia funcional e redução do risco de lesões e quedas em populações adultas e idosas. Contudo, a literatura destaca que a eficácia e segurança desta metodologia dependem de adequada periodização, controlo das variáveis de treino e supervisão técnica qualificada. Conclui-se que o treino de força máxima representa uma ferramenta fundamental para otimizar o desempenho neuromuscular e funcional, assumindo um papel central tanto no desporto de alto rendimento como em programas de exercício orientados para a saúde e qualidade de vida.

Methods

A evidência científica analisada demonstra que o treino de força máxima promove adaptações neurais expressivas, incluindo aumento do recrutamento e sincronização das unidades motoras, melhoria da coordenação intramuscular e intermuscular e aumento da frequência de disparo neural. Paralelamente, observam-se adaptações estruturais relevantes, sobretudo ao nível da hipertrofia miofibrilar, associada ao aumento das proteínas contráteis e à maior capacidade de produção de força. Verificou-se ainda que a aplicação sistemática deste método contribui para melhorias significativas na taxa de

desenvolvimento de força, estabilidade articular, eficiência mecânica e desempenho motor em diferentes modalidades desportivas.

Results and Conclusions

Além do contexto competitivo, o treino de força máxima apresenta benefícios importantes na saúde e funcionalidade, particularmente na prevenção da sarcopenia, manutenção da autonomia funcional e redução do risco de lesões e quedas em populações adultas e idosas. Contudo, a literatura destaca que a eficácia e segurança desta metodologia dependem de adequada periodização, controlo das variáveis de treino e supervisão técnica qualificada. Conclui-se que o treino de força máxima representa uma ferramenta fundamental para otimizar o desempenho neuromuscular e funcional, assumindo um papel central tanto no desporto de alto rendimento como em programas de exercício orientados para a saúde e qualidade de vida.

Keywords: força máxima, treino de força, adaptação neuromuscular, rendimento desportivo, hipertrofia muscular.

Fundamentos Científicos da Hipertrofia Muscular: Uma Revisão das Variáveis de Treino e Estratégias de Adaptação

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Resumo

Introduction

A hipertrofia muscular, caracterizada pelo aumento do diâmetro das fibras musculares induzido pelo treino de força, assume um papel central na performance desportiva, na saúde metabólica e na prevenção de alterações funcionais associadas ao envelhecimento, como a sarcopenia. O presente estudo teve como objetivo analisar os fundamentos científicos da hipertrofia muscular, com enfoque nas variáveis de treino, mecanismos fisiológicos de adaptação e estratégias nutricionais associadas ao crescimento muscular. Para tal, foi realizada uma revisão narrativa da literatura científica baseada em artigos originais, revisões sistemáticas e meta-análises indexadas nas bases de dados PubMed e Scopus.

Methods

Para tal, foi realizada uma revisão narrativa da literatura científica baseada em artigos originais, revisões sistemáticas e meta-análises indexadas nas bases de dados PubMed e Scopus.

Results and Conclusions

A evidência analisada demonstra que o volume de treino constitui uma das variáveis mais determinantes para a hipertrofia muscular, verificando-se superioridade dos protocolos de múltiplas séries relativamente aos de série única. Adicionalmente, a frequência semanal de treino igual ou superior a duas sessões por grupo muscular, a aplicação sistemática da sobrecarga progressiva e a realização de séries próximas da falha muscular revelaram-se estratégias eficazes para maximizar as adaptações hipertróficas. Os resultados também evidenciam que os mecanismos responsáveis pela hipertrofia envolvem predominantemente tensão mecânica, stress metabólico e ativação da síntese proteica muscular. A nível nutricional, o consumo adequado de proteína, particularmente no período pós-exercício, mostrou-se essencial para potenciar a recuperação muscular e estimular os processos anabólicos. Paralelamente, fatores relacionados com a recuperação, nomeadamente a qualidade do sono e a gestão da fadiga, assumem relevância determinante na otimização das adaptações ao treino. Conclui-se que a hipertrofia muscular resulta de uma interação multifatorial entre estímulo mecânico, estratégias nutricionais e recuperação adequada, sendo fundamental uma prescrição individualizada das variáveis de treino para maximizar a composição corporal, a funcionalidade física e o desempenho desportivo.

Keywords: Hipertrofia muscular, Treino de resistência, Síntese proteica, Variáveis de treino, Recuperação.

análisis de la diferencia entre un profesional y un principiante en la técnica

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Resumo

Introduction

El presente trabajo se centra en el análisis biomecánico de la marcha atlética, una disciplina deportiva caracterizada por la ausencia de fase de vuelo y la necesidad de mantener la rodilla extendida en el momento del contacto con el suelo. Estas exigencias técnicas convierten a esta modalidad en un gesto motor complejo, donde la precisión y la eficiencia del movimiento resultan fundamentales tanto para el rendimiento como para el cumplimiento del reglamento. Desde una perspectiva biomecánica, se llevó a cabo un análisis cinemático, centrado en la descripción del movimiento sin tener en cuenta las fuerzas que lo producen, mediante el estudio de variables como los ángulos articulares, la velocidad y la aceleración. El objetivo principal de la investigación fue comparar la ejecución técnica de la marcha atlética entre un atleta profesional y un sujeto no entrenado, con el fin de identificar posibles diferencias en el patrón de movimiento.

Methods

Para ello, se analizaron dos sujetos adultos jóvenes mediante grabaciones de vídeo realizadas con un dispositivo móvil, manteniendo una distancia constante y utilizando una referencia en el suelo para la calibración. El análisis se llevó a cabo mediante el software Kinovea, lo que permitió estudiar las diferentes fases del gesto (contacto con el suelo, apoyo medio y despegue), así como cuantificar los ángulos articulares en cada una de estas.

Results and Conclusions

Los resultados obtenidos muestran que existen diferencias entre ambos participantes, especialmente en la extensión de la rodilla durante el contacto y el apoyo medio, donde el atleta profesional presenta un patrón más acorde con las exigencias técnicas de la marcha atlética. No obstante, en otras variables, como el movimiento del codo o el tobillo, las diferencias no son especialmente significativas, lo que indica que el sujeto no entrenado es capaz de reproducir parcialmente el gesto técnico. En conclusión, este estudio pone de manifiesto que, aunque la experiencia influye en la correcta ejecución del gesto, las diferencias no siempre son drásticamente marcadas en todas las variables analizadas, especialmente en un estudio con un número reducido de sujetos. Asimismo, se destaca la utilidad del análisis cinemático como herramienta fundamental para la evaluación del movimiento y la mejora del rendimiento deportivo.

Keywords: marcha atlética, biomecánica, análisis del movimiento, técnica deportiva

Efeitos da creatina monoidratada no desempenho de resistência em uma população treinada

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Resumo

Introduction

Há evidências robustas de que a suplementação com creatina monoidratada pode melhorar o desempenho em exercícios de alta intensidade de curta duração em atletas. No entanto, o efeito da suplementação com creatina monoidratada no desempenho aeróbico e seu papel durante atividades aeróbicas ainda são controversos.

Methods

A estratégia de busca desta revisão sistemática e meta-análise foi elaborada seguindo as diretrizes PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), e as bases de dados PubMed/MEDLINE, Web of Science e Scopus foram exploradas desde sua criação até 19 de maio de 2022. Apenas ensaios clínicos experimentais em humanos, controlados com um grupo placebo, que avaliaram os efeitos da suplementação com creatina monoidratada no desempenho de resistência em uma população treinada, foram analisados nesta revisão sistemática e meta-análise. A qualidade metodológica dos estudos incluídos foi avaliada utilizando a escala PED (Physiotherapy Evidence Database).

Results and Conclusions

Um total de 13 estudos satisfizeram todos os critérios de elegibilidade e foram incluídos nesta revisão sistemática e meta-análise. Os resultados da meta-análise agrupada mostraram uma alteração não significativa no desempenho de resistência após a suplementação com creatina monoidratada em uma população treinada ($p = 0,47$), com um efeito negativo trivial (diferença média padronizada agrupada = $-0,07$ [intervalo de confiança de 95% $-0,32$ a $0,18$]; $I^2 = 34,75\%$). Além disso, após a exclusão dos estudos não distribuídos uniformemente em torno da base do gráfico de funil, os resultados foram semelhantes (diferença média padronizada agrupada = $-0,07$ [intervalo de confiança de 95% $-0,27$ a $0,13$]; $I^2 = 0\%$; $p = 0,49$).

Keywords: A suplementação com creatina monoidratada mostrou-se ineficaz no desempenho de resistência em uma população treinada

Eficácia da Suplementação Proteica no Aumento da Massa Muscular e Desempenho Físico

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Resumo

Introduction

A suplementação proteica é amplamente utilizada por praticantes de exercício físico com o objetivo de melhorar a massa muscular, força, recuperação e desempenho físico. Este estudo tem como principal finalidade analisar a eficácia da suplementação proteica no aumento da massa muscular e na melhoria do desempenho físico em adultos saudáveis praticantes de atividade física regular.

Methods

A metodologia consistiu numa revisão da literatura baseada em artigos científicos indexados no PubMed e noutras plataformas de relevância, com foco em estudos publicados nos últimos 10 anos.

Results and Conclusions

Os estudos selecionados indicam que a suplementação proteica pode contribuir significativamente para a hipertrofia muscular, aumento de força e recuperação, especialmente quando associada ao treino de resistência e a uma alimentação adequada. No entanto, os resultados variam de acordo com fatores como o tipo de proteína consumida, intensidade do treino, ingestão proteica diária e características individuais. O whey protein foi identificado como um dos suplementos mais eficazes devido à sua rápida absorção e elevado valor biológico. Em conclusão, a suplementação proteica pode representar uma estratégia nutricional importante para otimizar o desempenho desportivo e o desenvolvimento muscular, quando integrada numa alimentação equilibrada e num programa de treino adequado.

Keywords: Suplementação Proteica; Massa Muscular; Força; Desempenho Físico; Recuperação.

Efeitos dos Suplementos Alimentares no Desempenho Atlético de Jogadores de Futebol de Elite

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Resumo

Introduction

A suplementação alimentar tem assumido um papel cada vez mais relevante no futebol profissional, sendo amplamente utilizada com o objetivo de otimizar o desempenho físico, acelerar os processos de recuperação muscular e reduzir a fadiga associada às elevadas exigências competitivas da modalidade. O presente trabalho teve como principal objetivo analisar a evidência científica relativa aos efeitos da suplementação alimentar em jogadores de futebol de elite classificados nos níveis Tier 4 e Tier 5.

Methods

Para tal, foi realizada uma revisão narrativa da literatura científica, incluindo cinco estudos focados nos efeitos de suplementos como cafeína, creatina, proteína e bebidas contendo hidratos de carbono e eletrólitos.

Results and Conclusions

Os estudos analisados demonstraram que a suplementação com cafeína pode melhorar o desempenho em ações de sprint, potência muscular e capacidade de repetição de esforços de alta intensidade. Relativamente à creatina, observaram-se benefícios consistentes na força muscular, agilidade, potência e recuperação entre ações repetidas, características fundamentais no contexto competitivo do futebol. A ingestão de proteína revelou efeitos positivos na recuperação muscular e na redução do dano muscular, particularmente durante períodos com elevada densidade competitiva e jogos consecutivos. Paralelamente, bebidas contendo hidratos de carbono e eletrólitos mostraram-se eficazes na manutenção das reservas energéticas, equilíbrio hidroeletrólítico e prevenção da fadiga durante o exercício prolongado. Contudo, alguns estudos apresentaram resultados inconsistentes, sugerindo que a magnitude dos efeitos ergogénicos pode variar em função de fatores individuais, como estado de treino, dose administrada, timing da suplementação e contexto competitivo. Conclui-se que a suplementação alimentar pode representar uma estratégia eficaz para melhorar o desempenho físico e a recuperação em jogadores de futebol de elite, desde que integrada num programa de treino estruturado e acompanhada por orientação nutricional especializada. A individualização das estratégias de suplementação parece ser determinante para maximizar os benefícios ergogénicos e reduzir potenciais efeitos adversos.

Keywords: Suplementação alimentar; Futebol profissional; Desempenho físico; Jogadores de elite; Hidratação.

Diferença de resultados nos testes de agilidade T-Test e Illinois entre atletas de futebol nascidos no 1.º semestre e no 2.º semestre, no escalão de Juvenis.

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Resumo

Introduction

A agilidade é uma das capacidades físicas determinantes no desempenho no futebol, estando diretamente relacionada com a capacidade de mudar rapidamente de direção, reagir a estímulos e executar ações motoras com eficiência. Entre os testes mais utilizados para avaliar esta capacidade destacam-se o T-Test e o Illinois, ambos amplamente reconhecidos pela sua validade na avaliação da agilidade em atletas. Atletas nascidos no 1.º semestre tendem, frequentemente, a apresentar vantagens físicas e motoras em relação aos nascidos no 2.º semestre, o que pode influenciar o seu desempenho em testes físicos e, conseqüentemente, as oportunidades de progressão desportiva. Deste modo, este trabalho tem como principal objetivo analisar e comparar os resultados obtidos nos testes de agilidade T-Test e Illinois entre atletas de futebol do escalão de Juvenis do Grupo Desportivo e Recreativo “O Sindicato”, tendo em conta o semestre de nascimento. Esta avaliação contribui para uma melhor compreensão do impacto da idade relativa na avaliação da agilidade em jovens futebolistas.

Methods

O presente estudo segue um desenho quantitativo, de natureza transversal, com o objetivo de comparar o desempenho em agilidade entre dois grupos de jovens futebolistas, de acordo com o semestre de nascimento. Participantes: A amostra será constituída por jogadores de futebol do escalão de Juvenis (Sub- 17) do Grupo Desportivo e Recreativo “O Sindicato”. Os participantes serão divididos em dois grupos: atletas nascidos no 1.º semestre do ano (janeiro a junho) e atletas nascidos no 2.º semestre (julho a dezembro). Todos os participantes deverão estar em atividade regular e sem lesões no momento da recolha de dados. Instrumentos e testes: A agilidade será avaliada através de dois testes padronizados: T-Test – utilizado para avaliar a capacidade de deslocamento multidirecional (frente, lateral e trás); Teste de Illinois – utilizado para avaliar a velocidade e agilidade com mudanças de direção em percurso com obstáculos. Serão utilizados cones, para delimitar os testes; e um cronómetro, para contar os tempos. Procedimentos: A recolha de dados será realizada durante uma sessão de treino previamente agendada. Antes da aplicação dos testes, todos os participantes realizarão um aquecimento padronizado, composto por corrida ligeira, alongamentos dinâmicos e exercícios de mobilidade. Cada atleta realizará ambos os testes nas mesmas condições. Para cada teste: - Serão permitidas duas tentativas; - Será registado o melhor tempo (em segundos); - Será garantido um período de descanso adequado (2–3 minutos) entre tentativas, de forma a evitar fadiga. Os testes serão realizados na mesma superfície (por

exemplo, relvado sintético) e em condições ambientais semelhantes, garantindo a consistência dos dados.

Results and Conclusions

No grupo do primeiro semestre ($n=7$), a média dos melhores tempos foi de 9.96 segundos no T-Test, e de 14.86 segundos no Illinois Test. No grupo do segundo semestre ($n=8$), a média dos melhores tempos foi de 10.22 segundos no T-Test, e de 15.33 segundos no Illinois Test. Observa-se, portanto, uma diferença média de cerca de 0.26 segundos no T-Test, e 0.47 segundos no Illinois Test, a favor dos atletas nascidos no primeiro semestre. Os resultados mostram uma vantagem dos atletas nascidos no primeiro semestre do ano em ambos os testes de agilidade. Esta diferença, embora relativamente pequena em termos absolutos, é relevante no contexto do futebol deste escalão de Juvenis, onde décimos de segundo podem influenciar percepções de desempenho, seleção e progressão entre escalões. A explicação mais provável para esta diferença está no efeito da idade relativa (Relative Age Effect). Em escalões de formação como o Sub-17, atletas nascidos entre janeiro e junho podem ter até 11–12 meses adicionais de desenvolvimento biológico em comparação com colegas nascidos no final do ano. Essa diferença, numa fase em que o crescimento e a maturação neuromuscular ainda não estão totalmente estabilizados, pode traduzir-se em melhor coordenação, maior velocidade de reação e superior capacidade de aceleração e mudança de direção. A maior diferença observada no Illinois Test (cerca de 0.47s) em comparação com o T-Test (cerca de 0.26s) pode sugerir que tarefas mais complexas e com maior número de mudanças de direção amplificam ligeiramente as diferenças entre grupos com diferentes níveis de maturação. O Illinois, por exigir maior controlo corporal e eficiência nas transições de direção, pode ser mais sensível a pequenas vantagens físicas e técnicas. Ainda assim, é importante sublinhar que as diferenças observadas não são suficientemente grandes para indicar um “grupo claramente superior”. Existe sobreposição entre atletas dos dois grupos, com vários jogadores do segundo semestre a apresentar resultados iguais ou melhores do que alguns do primeiro semestre. Isto reforça a ideia de que, dentro do mesmo escalão, o desempenho é altamente individual e depende não só da idade relativa, mas também de fatores como o nível de treino e experiência, composição corporal, qualidade técnica de movimento, coordenação e controlo motor e motivação e maturação individual. Em contexto de formação, estes resultados suportam a necessidade de uma avaliação mais individualizada dos atletas, de modo a evitar uma interpretação excessivamente dependente do mês de nascimento. Embora exista uma tendência estatística favorável aos atletas do primeiro semestre, o desempenho individual continua a ser o fator mais determinante para o rendimento real em campo.

Keywords: Agilidade; Teste-T; Illinois; Futebol; Semestre; Performance.

Caracterización del modelo competitivo en atletas masculinos de parabadminton SH6

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Resumo

Introduction

El parabadminton es una adaptación del bádminton para atletas con discapacidad y cobró mayor visibilidad tras su inclusión en los Juegos Paralímpicos de Tokio 2020. Sin embargo, aún existen pocos estudios sobre la modalidad, especialmente en la clase SH6. El análisis del rendimiento es fundamental para comprender los patrones técnicos, tácticos y temporales y apoyar las decisiones del entrenamiento.

Methods

Se trata de un estudio descriptivo, cuantitativo y observacional. Se analizaron los partidos de semifinales y final del Campeonato Mundial de Parabadminton 2022 de la clase SH6 masculina mediante análisis notacional en video con el software Lince Plus. Las variables estudiadas fueron medidas temporales, frecuencia de golpes y desenlaces en puntos ganadores y errores no forzados.

Results and Conclusions

Se analizaron 1.713 golpes en ocho juegos. Los partidos mostraron alta intensidad y un juego intermitente, con mayor frecuencia de golpes que en el bádminton convencional. Los golpes más utilizados fueron net-lift, clear, drop-shot y net-shot. Los errores no forzados ocurrieron con mayor frecuencia que los puntos ganadores, lo que indica que la precisión es decisiva en el rendimiento de la clase SH6.

Keywords: Parabadminton; SH6; análisis del rendimiento; análisis notacional; deporte adaptado

Relação entre o nível de envolvimento no jogo e o desempenho em atletas de futebol no escalão de traquinas

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Resumo

Introduction

O presente estudo tem como objetivo analisar se atletas com maior envolvimento no jogo, apresentam melhor desempenho em contexto de jogo essencialmente focando-se em duas turmas de vários atletas do escalão de traquinas (6-8 anos).

Methods

O presente trabalho caracteriza-se como um estudo observacional de natureza descritiva e correlacional

Results and Conclusions

Conclui-se que existe uma relação evidente entre a influência dos atletas e a sua participação efetiva no jogo. Os jogadores classificados com alta influência demonstraram maior capacidade de intervenção nas diferentes fases das partidas, apresentando valores superiores em ações ofensivas, defensivas, dribles, golos e assistências.

Keywords: futebol juvenil, análise de desempenho, envolvimento do jogador, estudo observacional, desempenho técnico-tático, desenvolvimento do jogador.

Concordancia interevaluador e intraevaluador en la medición goniométrica de la extensión de la rodilla después de un entrenamiento con volante de inercia en mujeres no entrenadas.

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Resumo

Introduction

Es muy habitual que las personas sin experiencia en el entrenamiento con volante de inercia sientan molestias desde la primera sesión debido al dolor muscular tardío (DOMS), que también provoca rigidez muscular y una reducción de la amplitud de movimiento (ADM). En este sentido, el goniómetro es una herramienta de medición muy útil para evaluar esta disminución de la ADM. Sin embargo, para que estas mediciones resulten útiles en la práctica profesional, es esencial que los instrumentos demuestren niveles adecuados de fiabilidad entre diferentes evaluadores y en mediciones repetidas realizadas por el mismo evaluador. Por eso, el objetivo de este estudio fue evaluar la fiabilidad inter e intraevaluador de las mediciones de extensión de la rodilla (F_J) utilizando un goniómetro.

Methods

Se reclutaron 15 mujeres sin experiencia previa con entrenamiento resistido ni con equipos de volante de inercia. Se realizaron dos visitas al laboratorio. En la primera visita, se llevó a cabo una sesión de entrenamiento en la mesa flexora con volante de inercia, compuesta por 4 series de 10 repeticiones con una carga de inercia de 0,05 kg·m² y 1 minuto de descanso entre series. La segunda visita tuvo lugar 48 horas después de la sesión de entrenamiento, en la que se llevó a cabo la evaluación del ADM mediante goniómetro. La evaluación fue realizada por dos evaluadores de forma alterna: el evaluador «A» realizó dos mediciones, el evaluador «B» realizó dos mediciones y, por último, el evaluador «A» realizó dos mediciones. Las mediciones se realizaron con las voluntarias en decúbito dorsal sobre una camilla y, a continuación, se les pidió que realizaran la extensión de las rodillas.

Results and Conclusions

La concordancia intraevaluador se calculó utilizando la media de las dos mediciones iniciales realizadas por el evaluador «A» con la media de las dos mediciones finales. La concordancia entre evaluadores se calculó utilizando la media de las primeras mediciones del evaluador «A» y la media de las mediciones del evaluador «B». Se empleó el

coeficiente de correlación intraclass (CCI) con un intervalo de confianza del 95 % (IC95 %) y el coeficiente de variación (CV). En la evaluación entre evaluadores, la variable flexión de la rodilla presentó una fiabilidad moderada (CCI = 0,518; IC 95 %: 0,044–0,831) con un CV del 2,63 %, al igual que la evaluación intraevaluador donde presentó también una fiabilidad moderada (CCI = 0,466; IC 95 %: 0,144–0,809) con un CV del 2,58 %. En conclusión, los resultados sugieren que la medición puede verse influida por el evaluador y, por lo tanto, sería aconsejable reforzar la estandarización del procedimiento.

Keywords: Dolor muscular de aparición tardía, entrenamiento resistido, rigidez.

Exercício Físico e Saúde no Adulto Jovem: Desenvolvimento e Prescrição de um Programa de Treino de 12 Semanas para Hipertrofia, Aptidão Física e Bem-Estar

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Resumo

Introduction

O exercício físico regular constitui uma das estratégias mais eficazes para a promoção da saúde, prevenção de doenças crónicas e melhoria da qualidade de vida ao longo da idade adulta. O presente trabalho teve como objetivo desenvolver e fundamentar um programa de exercício físico direcionado para um adulto jovem saudável, integrando princípios atuais de prescrição do exercício e evidência científica relacionada com os benefícios da atividade física.

Methods

Foi realizado um estudo de caso envolvendo um indivíduo do sexo masculino, com 25 anos de idade, praticante recreativo de Taekwondo e com experiência prévia em treino de força. Após uma avaliação inicial do estado de saúde, composição corporal e aptidão física, foi desenvolvido um programa de treino com duração de 12 semanas. A intervenção incluiu três sessões semanais de treino de força orientadas para hipertrofia muscular, melhoria da mobilidade articular e desenvolvimento da aptidão física geral, complementadas por trabalho cardiovascular e exercícios de estabilidade postural.

Results and Conclusions

A prescrição do exercício foi baseada nos princípios da individualização, especificidade e sobrecarga progressiva. Durante as primeiras seis semanas foram utilizadas intensidades entre 65 e 75% de uma repetição máxima (1RM), evoluindo posteriormente para 75–85% de 1RM, acompanhadas por ajustamentos no volume e nos períodos de recuperação. O programa integrou exercícios multiarticulares e uniarticulares distribuídos pelos principais grupos musculares, promovendo adaptações neuromusculares e funcionais. A literatura científica analisada demonstra que a prática regular de exercício físico está associada a melhorias da composição corporal, aptidão cardiorrespiratória, saúde metabólica, função cognitiva e bem-estar psicológico, contribuindo igualmente para a redução do risco de doenças crónicas e mortalidade prematura. Conclui-se que programas de exercício físico individualizados e cientificamente fundamentados constituem uma estratégia eficaz para otimizar a saúde, a funcionalidade e a qualidade de vida de adultos jovens fisicamente ativos.

Keywords: exercício físico; prescrição do exercício; adulto jovem; hipertrofia muscular; aptidão física; saúde.

Fundamentos do Treino de Força Máxima: Aplicação Prática na Prescrição do Exercício para Adultos Iniciantes

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Resumo

Introduction

A força máxima constitui uma das capacidades físicas fundamentais para o desempenho motor, funcionalidade e saúde ao longo da vida. O desenvolvimento desta capacidade exige uma prescrição de exercício adequada, baseada em princípios científicos que garantam simultaneamente a eficácia do treino e a segurança dos praticantes, particularmente em indivíduos com reduzida experiência prévia. O presente trabalho teve como objetivo analisar os fundamentos fisiológicos e metodológicos do treino de força máxima e aplicar esse conhecimento na elaboração de um programa de treino estruturado para adultos iniciantes.

Methods

A metodologia integrou uma revisão narrativa da literatura baseada em artigos científicos recentes sobre treino de força, adaptações neuromusculares e prescrição do exercício, complementada pelo desenvolvimento de um plano de treino estruturado com duração de 12 semanas. O programa foi organizado em fases progressivas que respeitaram os princípios da individualização, especificidade e sobrecarga progressiva.

Results and Conclusions

O plano iniciou-se com uma fase de adaptação anatómica destinada à aprendizagem técnica e preparação músculo-tendinosa, evoluindo posteriormente para fases de desenvolvimento da força base e, finalmente, para estímulos específicos de força máxima. Foram integrados exercícios multiarticulares e complementares para promover um desenvolvimento equilibrado dos principais grupos musculares, sendo a intensidade monitorizada através da frequência cardíaca de reserva e da progressão sistemática das cargas de treino.

A literatura analisada demonstra que o treino de força máxima promove adaptações neurais relevantes, incluindo aumento do recrutamento de unidades motoras, melhoria da coordenação intermuscular e incremento da capacidade de produção de força. Adicionalmente, a aplicação sistemática de programas progressivos de treino está associada a melhorias da funcionalidade, desempenho físico e composição corporal. Conclui-se que programas de treino cuidadosamente estruturados, progressivos e individualizados constituem uma estratégia eficaz para promover ganhos significativos de força máxima em indivíduos iniciantes, reduzindo simultaneamente o risco de lesão e favorecendo a adesão ao exercício físico.

Keywords: força máxima; treino de força; adaptação neuromuscular; sobrecarga progressiva; prescrição do exercício; desempenho físico.

Hipertrofia Muscular e Desenvolvimento da Força: Aplicação dos Princípios da Periodização na Prescrição do Exercício

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Resumo

Introduction

A hipertrofia muscular e o desenvolvimento da força constituem objetivos centrais dos programas de treino orientados para o desempenho físico, composição corporal e saúde. A otimização destas adaptações depende da manipulação adequada das variáveis de treino, nomeadamente volume, intensidade, frequência e proximidade à falha muscular. O presente trabalho teve como objetivo analisar os fundamentos científicos associados ao treino de hipertrofia e força e aplicar esse conhecimento na elaboração de um programa de exercício estruturado para um atleta jovem com predominância de características neuromusculares associadas à velocidade.

Methods

A metodologia integrou uma revisão da literatura sobre mecanismos de hipertrofia muscular, métodos de treino de força e estratégias de periodização, complementada pelo desenvolvimento de um programa de treino com duração de 12 semanas. O plano foi concebido para um atleta de 21 anos com perfil físico equilibrado, contemplando uma periodização ondulatória organizada em fases de introdução, acumulação de volume, intensificação e taper. As cargas utilizadas variaram entre 60% e 85% de uma repetição máxima (1RM), ajustadas de acordo com os objetivos específicos de cada fase do programa.

Results and Conclusions

Os resultados da literatura analisada indicam que a hipertrofia muscular é influenciada principalmente por três mecanismos fisiológicos: tensão mecânica, stress metabólico e dano muscular. A combinação estratégica destes estímulos, associada à utilização predominante de exercícios multiarticulares e a períodos planeados de recuperação (deload), permite maximizar as adaptações anabólicas e reduzir o risco de fadiga excessiva, overtraining e lesão.

Conclui-se que a aplicação de princípios científicos de periodização e prescrição do exercício constitui uma abordagem eficaz para promover ganhos simultâneos de força e hipertrofia muscular. Programas individualizados, progressivos e devidamente estruturados potenciam as adaptações neuromusculares e contribuem para a otimização do desempenho físico em atletas jovens.

Keywords: hipertrofia muscular; treino de força; periodização; tensão mecânica; prescrição do exercício; adaptações neuromusculares.

Periodização do Treino de Força e Hipertrofia: Aplicação da Monitorização da Carga e dos Princípios de Progressão em Praticantes Intermédios

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Resumo

Introduction

A periodização do treino de força constitui uma estratégia fundamental para maximizar as adaptações neuromusculares, promover ganhos de hipertrofia e reduzir o risco de lesão. A manipulação sistemática das variáveis de treino, incluindo intensidade, volume e recuperação, permite otimizar o desempenho físico e minimizar fenómenos de estagnação associados à acomodação biológica. O presente trabalho teve como objetivo desenvolver e fundamentar cientificamente um programa periodizado de treino de força direcionado para um praticante intermédio, integrando conceitos contemporâneos de monitorização da carga e desenvolvimento da força muscular.

Methods

A metodologia baseou-se na construção de um perfil antropométrico e funcional representativo, obtido a partir da média dos dados dos participantes do grupo, complementada por uma revisão da literatura científica sobre treino de força, hipertrofia muscular, monitorização baseada na velocidade (Velocity-Based Training – VBT) e prevenção de lesões. O programa foi estruturado em 13 semanas, seguindo uma progressão organizada em fases de adaptação anatómica, hipertrofia, força elevada, força máxima, pico de força e recuperação ativa.

Results and Conclusions

A prescrição contemplou uma evolução gradual da intensidade, desde aproximadamente 50% até 100% de uma repetição máxima (1RM), acompanhada por uma redução progressiva do volume e aumento dos períodos de recuperação. Particular atenção foi atribuída ao reforço da cadeia posterior e à correção de desequilíbrios musculares, identificados através do rácio isquiotibiais/quadríceps. A integração de exercícios multiarticulares, associada à monitorização da intensidade através da velocidade de execução, procurou potenciar simultaneamente as adaptações estruturais e neurais.

A literatura analisada demonstra que a combinação de princípios de periodização, controlo da fadiga e monitorização objetiva da carga constitui uma abordagem eficaz para o desenvolvimento da força e hipertrofia muscular. Conclui-se que programas progressivos e individualizados, suportados por estratégias de monitorização modernas, permitem otimizar o desempenho físico, melhorar a segurança do treino e potenciar adaptações sustentáveis em praticantes de nível intermédio.

Keywords: treino de força; hipertrofia muscular; periodização; velocity-based training; monitorização da carga; desempenho físico.

Treino Híbrido para Competição Hyrox: Aplicação dos Princípios da Periodização e da Prescrição do Exercício

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Resumo

Introduction

O Hyrox tem emergido como uma das modalidades de fitness híbrido com maior crescimento internacional, combinando corrida de resistência e exercícios funcionais de elevada exigência metabólica. O desempenho nesta modalidade depende da integração eficiente das capacidades aeróbias, anaeróbias, neuromusculares e da tolerância à fadiga acumulada. O presente trabalho teve como objetivo desenvolver e fundamentar cientificamente um programa de treino periodizado destinado à preparação competitiva de um atleta de Hyrox, recorrendo aos princípios contemporâneos da fisiologia do exercício e da prescrição do treino.

Methods

A metodologia integrou uma revisão narrativa da literatura baseada em evidência científica relacionada com exercício físico, treino combinado, desempenho em modalidades híbridas e estratégias de periodização. Com base na caracterização de um atleta masculino de 21 anos, com experiência prévia em corrida e treino funcional, foi desenvolvido um programa de treino com duração de 12 semanas, estruturado em quatro mesociclos progressivos: Fundação e Acumulação, Força Resistente e Desenvolvimento do Limiar, Especificidade e Simulação Competitiva, e Tapering.

Results and Conclusions

A prescrição contemplou três sessões semanais de elevada densidade de treino, integrando trabalho aeróbio, treino de força, exercícios funcionais específicos e estratégias destinadas ao desenvolvimento da capacidade de compromised running, considerada determinante para o desempenho em Hyrox. A intensidade do treino foi monitorizada através da frequência cardíaca de reserva, utilizando a fórmula de Karvonen, permitindo uma individualização mais precisa dos estímulos fisiológicos.

A literatura analisada demonstra que a combinação estruturada de treino aeróbio e treino de força produz adaptações superiores na aptidão física global quando comparada à utilização isolada destas metodologias. Conclui-se que programas periodizados, baseados em evidência científica e ajustados às exigências específicas da modalidade, constituem uma estratégia eficaz para otimizar o desempenho competitivo e responder às elevadas exigências fisiológicas e funcionais do Hyrox.

Keywords: Hyrox; treino híbrido; periodização; prescrição do exercício; treino concorrente; fisiologia do exercício.

Exercício Físico e Hipertensão Arterial: Aplicação dos Princípios da Prescrição do Exercício para a Promoção da Saúde Cardiovascular

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Resumo

Introduction

A hipertensão arterial constitui um dos principais fatores de risco modificáveis para o desenvolvimento de doenças cardiovasculares, estando associada a elevados níveis de morbilidade e mortalidade em todo o mundo. A prática regular de exercício físico é atualmente reconhecida como uma das estratégias não farmacológicas mais eficazes para o controlo da pressão arterial e para a promoção da saúde cardiovascular. O presente trabalho teve como objetivo desenvolver e fundamentar cientificamente um programa de exercício físico direcionado para um adulto jovem com hipertensão arterial, integrando recomendações internacionais de prescrição do exercício.

Methods

A metodologia combinou uma revisão narrativa da literatura científica com a elaboração de um plano de treino periodizado de 12 semanas. O programa foi desenvolvido para um indivíduo do sexo masculino, com 23 anos de idade, excesso de peso ligeiro e diagnóstico de hipertensão arterial grau I. A intervenção foi estruturada em três fases progressivas: adaptação ao exercício, desenvolvimento da condição física e consolidação das adaptações, integrando treino aeróbio, treino de força e exercícios de mobilidade.

Results and Conclusions

A intensidade do treino foi individualizada com base na frequência cardíaca de reserva e progressivamente aumentada ao longo do programa. O treino aeróbio incluiu caminhada, passadeira, bicicleta ergométrica e elíptica, enquanto o treino de força foi realizado com cargas moderadas, respeitando as recomendações de segurança para populações hipertensas. A literatura analisada demonstra que a combinação de exercício aeróbio e treino de força promove reduções clinicamente significativas da pressão arterial, melhorias da aptidão cardiorrespiratória, aumento da força muscular e benefícios relevantes na composição corporal e qualidade de vida.

Conclui-se que programas de exercício físico individualizados, progressivos e baseados em evidência científica constituem uma estratégia eficaz para o controlo da hipertensão arterial e para a redução do risco cardiovascular, reforçando o papel do exercício físico como componente essencial na promoção da saúde e do bem-estar.

Keywords: hipertensão arterial; exercício físico; saúde cardiovascular; treino aeróbio; treino de força; prescrição do exercício.

Exercício Físico e Nutrição: Uma Abordagem Integrada para a Promoção da Saúde e Qualidade de Vida

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Resumo

Introduction

O exercício físico e a nutrição constituem pilares fundamentais na promoção da saúde, prevenção de doenças crónicas não transmissíveis e melhoria da qualidade de vida. O aumento global do sedentarismo, aliado à adoção de padrões alimentares inadequados, tem contribuído significativamente para o agravamento dos principais problemas de saúde pública, reforçando a necessidade de estratégias integradas que promovam estilos de vida saudáveis. O presente trabalho teve como objetivo analisar a evidência científica relativa aos efeitos combinados do exercício físico e da nutrição na saúde humana, bem como discutir a sua aplicação prática no contexto da prescrição do exercício.

Methods

A metodologia baseou-se numa revisão narrativa da literatura científica sobre exercício físico, nutrição e promoção da saúde, complementada pela elaboração de uma proposta de prescrição de exercício estruturada e progressiva. Foram analisadas evidências relacionadas com os efeitos do exercício ao nível cardiovascular, músculo-esquelético, metabólico e psicológico, assim como o impacto de intervenções nutricionais na composição corporal, função imunitária, qualidade do sono e controlo do risco cardiometabólico.

Results and Conclusions

Os resultados da literatura demonstram que programas que combinam exercício físico regular e estratégias nutricionais adequadas promovem benefícios superiores aos obtidos através de intervenções isoladas. Esta abordagem integrada encontra-se associada a melhorias da aptidão física, da composição corporal, dos níveis de atividade física, da qualidade da alimentação e da autonomia funcional. Adicionalmente, os efeitos positivos parecem particularmente relevantes em populações específicas, incluindo idosos, estudantes universitários e indivíduos com doenças crónicas.

Conclui-se que a integração entre exercício físico e nutrição representa uma estratégia eficaz para otimizar a saúde e prevenir doenças ao longo da vida. A implementação de programas individualizados, seguros e sustentados, baseados em evidência científica, constitui uma ferramenta essencial para promover ganhos significativos em funcionalidade, bem-estar e longevidade.

Keywords: exercício físico; nutrição; promoção da saúde; prescrição do exercício; qualidade de vida; estilo de vida saudável.

Desenvolvimento da Força, Potência e Capacidade Anaeróbia: Prescrição Individualizada de Exercício para Otimização do Desempenho Físico

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Resumo

Introduction

A avaliação funcional constitui um elemento fundamental na prescrição individualizada do exercício, permitindo identificar limitações físicas, definir objetivos específicos e otimizar as adaptações ao treino. O presente trabalho teve como objetivo desenvolver um programa de exercício físico baseado numa avaliação multidimensional das capacidades neuromusculares, cardiorrespiratórias e funcionais de um adulto jovem fisicamente ativo.

Methods

A metodologia integrou a avaliação antropométrica, testes de força e potência muscular, perfil força-velocidade, mobilidade articular e indicadores de aptidão cardiorrespiratória. O participante, do sexo masculino, com 27 anos de idade, apresentava um índice de massa corporal dentro dos valores considerados saudáveis, mas evidenciava limitações ao nível da força máxima, da capacidade anaeróbia e da produção de potência em cargas intermédias. Com base nos resultados obtidos, foi desenvolvido um programa de treino periodizado com duração de 12 semanas, estruturado em quatro sessões semanais.

Results and Conclusions

O plano integrou treino de força para membros inferiores e superiores, trabalho específico da cadeia posterior com ênfase no fortalecimento excêntrico dos músculos isquiotibiais, sessões intervaladas de alta intensidade para desenvolvimento da capacidade anaeróbia e exercícios de mobilidade direcionados para a anca, tornozelo e coluna torácica. A progressão do treino foi realizada através dos princípios da sobrecarga progressiva, periodização linear e ondulatória e estratégias de autorregulação baseadas na perceção subjetiva de esforço (RPE) e compatibilidade com metodologias de Velocity-Based Training (VBT).

Espera-se que a intervenção promova aumentos da força máxima, melhoria da produção de potência em cargas intermédias, desenvolvimento da robustez da cadeia posterior, incremento da aptidão cardiorrespiratória e melhoria da mobilidade funcional. Conclui-se que programas individualizados baseados numa avaliação funcional abrangente constituem uma estratégia eficaz para promover adaptações específicas, melhorar o desempenho físico e potenciar a saúde e funcionalidade a longo prazo.

Keywords: treino de força; potência muscular; capacidade anaeróbia; periodização; avaliação funcional; prescrição do exercício.

Exercício Físico e Hipertensão Arterial: Aplicação dos Princípios da Prescrição do Exercício na Promoção da Saúde Cardiovascular

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Resumo

Introduction

A hipertensão arterial constitui uma das doenças cardiovasculares mais prevalentes a nível mundial, estando associada a um aumento significativo do risco de eventos cardiovasculares, morbilidade e mortalidade prematura. Entre as estratégias não farmacológicas atualmente recomendadas, o exercício físico destaca-se como uma intervenção segura e eficaz para a prevenção, controlo e tratamento da hipertensão. O presente trabalho teve como objetivo analisar a evidência científica relativa à prescrição de exercício físico em indivíduos hipertensos e aplicar esses conhecimentos na elaboração de um programa de treino adaptado.

Methods

A metodologia baseou-se numa revisão narrativa da literatura científica sobre exercício físico e hipertensão arterial, complementada por um estudo de caso. Foi realizada uma avaliação inicial da condição física de um adulto jovem diagnosticado com hipertensão arterial e medicado, a partir da qual foi desenvolvido um programa de exercício com duração de 12 semanas. O plano foi estruturado em três sessões semanais, integrando treino cardiorrespiratório e treino de força, de acordo com os princípios da individualização, progressão e segurança.

Results and Conclusions

A literatura analisada demonstra que o exercício aeróbio regular promove reduções clinicamente relevantes da pressão arterial sistólica e diastólica, enquanto o treino de força complementa estes benefícios através da melhoria da capacidade funcional, da composição corporal e da aptidão muscular. A combinação destas metodologias potencia adaptações cardiovasculares favoráveis, contribuindo para a redução do risco cardiometabólico e para a melhoria da qualidade de vida. Contudo, a magnitude das adaptações depende de fatores como a intensidade, o volume e a frequência do treino, bem como das características individuais dos praticantes.

Conclui-se que a prescrição de exercício físico devidamente estruturada e individualizada constitui uma estratégia terapêutica eficaz no controlo da hipertensão arterial. A integração de treino cardiorrespiratório e treino de força deve ser considerada uma componente essencial dos programas de promoção da saúde cardiovascular e um complemento fundamental à terapêutica farmacológica.

Keywords: hipertensão arterial; exercício físico; prescrição do exercício; treino cardiorrespiratório; treino de força; saúde cardiovascular.

Prescrição do Exercício Físico para Adultos Saudáveis: Desenvolvimento da Força e da Aptidão Cardiorrespiratória através de um Programa Periodizado de 12 Semanas

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Resumo

Introduction

A prática regular de exercício físico constitui uma das estratégias mais eficazes para a promoção da saúde, prevenção de doenças crónicas e melhoria da qualidade de vida ao longo da idade adulta. As recomendações internacionais defendem a combinação de treino cardiorrespiratório e treino de força como abordagem ideal para o desenvolvimento integrado da aptidão física. O presente trabalho teve como objetivo desenvolver e fundamentar cientificamente um programa de exercício físico direcionado para um adulto jovem saudável, com foco na melhoria simultânea da força muscular e da capacidade cardiorrespiratória.

Methods

A metodologia integrou uma revisão narrativa da literatura científica e a elaboração de um plano de treino periodizado com duração de 12 semanas. O programa foi desenvolvido para um homem de 24 anos fisicamente ativo, praticante recreativo de futebol, com composição corporal saudável e experiência limitada em treino de força estruturado. A intervenção foi organizada segundo um modelo de progressão 3:1, alternando períodos de incremento gradual da carga com semanas de recuperação planeada. O programa incluiu treino de força progressivo, evoluindo de uma fase inicial de força básica para uma fase de força submáxima, complementado por treino aeróbio contínuo realizado em intensidade moderada.

Results and Conclusions

A estrutura de treino integrou exercícios multiarticulares para os principais grupos musculares, estratégias de sobrecarga progressiva e monitorização da intensidade através da percentagem de uma repetição máxima (1RM) e da frequência cardíaca de reserva. A evidência científica analisada demonstra que a combinação de treino de força e exercício aeróbio promove melhorias significativas na aptidão cardiorrespiratória, força muscular, composição corporal, saúde metabólica e prevenção de lesões.

Conclui-se que programas de treino periodizados, individualizados e sustentados em princípios científicos constituem uma estratégia eficaz para otimizar a condição física de adultos saudáveis, potenciando simultaneamente adaptações neuromusculares e cardiovasculares relevantes para a saúde e o desempenho físico.

Keywords: exercício físico; adultos saudáveis; treino de força; treino cardiorrespiratório; periodização; prescrição do exercício.