



HEALTH & PERFORMANCE

CONGRESS



ABSTRACT BOOK



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Free communications – Oral 1

Date: 11th September

Time: 13h15-14h15

Room: CAMPEÕES EUROPEUS

Theme: Sports Science

Moderator: João Viana

Order of the presentation:

OC 1 THE EVOLUTION OF EXTERNAL MATCH DEMANDS BY POSITION IN A PROFESSIONAL FOOTBALL CLUB FROM UNDER-12 TO THE FIRST TEAM

Aitor Ugarte

OC 17 ANALYSIS OF THE EFFECT OF NEUROMUSCULAR TRAINING DURING RAMADAN ON PHYSICAL PERFORMANCE AND THE OCCURRING OF INJURIES IN YOUNG MOROCCAN ELITE PLAYERS (U17-U19)

Ali Belamjahad

OC 28 THE EFFECTS OF TWO TRAINING METHODS, LINEAR AND CHANGE OF DIRECTION SPRINT TRAINING VS. SMALL SMALL-SIDED SOCCER GAMES ON PHYSICAL PERFORMANCE IN YOUNG ELITE FEMALE MOROCCAN SOCCER PLAYERS

Abdelwahid Aboulfaraj

OC 4 SPRINT DISTANCES COVERED DURING SOCCER MATCHES ACCORDING TO DIFFERENT THRESHOLDS.

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OC 18 PERFORMANCE FLUCTUATIONS DURING THE MENSTRUAL CYCLE IN ELITE FEMALE FOOTBALL PLAYERS: A COMPREHENSIVE ANALYSIS

Guilherme de Sousa Pinheiro

OC 27 THE RELATIONSHIP BETWEEN GOALS AND HIGH-INTENSITY EFFORTS IN HANDBALL GAMES

Catarina Bajanca

OC 01 THE EVOLUTION OF EXTERNAL MATCH DEMANDS BY POSITION IN A PROFESSIONAL FOOTBALL CLUB FROM UNDER-12 TO THE FIRST TEAM

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Introduction

Understanding the path from the youngest academy team to the first team is the basis of player development programs. The aim was to describe the external load demands of match-play by position in all the male teams of a professional football club.

Methods

External load data for 205 male players from all the teams of Athletic Club [U(under)12, U13, U14, U15, U16, U17, U19, Third, Second and First teams] were collected in a total of 94 11-a-side matches using 10 hz GPS devices (Apex, Statsports). Effective playing time and GPS variables (total distance, distance >19.8 km/h, max speed, number of accelerations >3 m/s² and number of decelerations <-3 m/s², normalized to match duration) were compared between teams by calculating standardized differences based on Cohen's d. Comparisons were performed separately in central defenders, central midfielders, lateral defenders and midfielders, and forwards.

Results

The percentage of effective playing time was highest in the youngest age-groups. Only first team lateral defenders and midfielders produced substantially more distance >19.8 km/h and accelerations and decelerations than most of their academy counterparts, observing an increasing pattern with increasing playing level. In the rest of positions, first team players did not tend to show higher results than academy players. In general, players U16 and above showed higher distance >19.8 km/h, max speed, and number of accelerations and decelerations than those younger, while higher total distances were found in younger teams.

Discussion

Match demands appear to be more influenced by playing position than by playing level. The increasing trend with increasing playing level observed in lateral defenders and midfielders suggests that monitoring and developing the high-intensity capacities of these players is important in relation to future success. In the rest of positions, many increases coincided with the end of the growth spurt, thus, the need to account for the growth and maturation characteristics of players. Nonetheless, these results might be influenced by many factors (effective playing time, opposition, playing style, coaching), and are likely to be context dependent.

Conclusions

The evolution of match demands through the different teams of a football club is determined by playing position. Lateral defenders and midfielders were the only ones showing playing level-related increases, highlighting the importance of physical indicators for training and assessing future first team potential in these players.

OC 17 ANALYSIS OF THE EFFECT OF NEUROMUSCULAR TRAINING DURING RAMADAN ON PHYSICAL PERFORMANCE AND THE OCCURRING OF INJURIES IN YOUNG MOROCCAN ELITE PLAYERS (U17-U19)

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(1) Club RSB

Introduction

The intermittent fasting period of Ramadan is a sensitive and physically fragile period, during which the technical staffs adopt strategies in order to adapt to this period, some reduce the volume of the sessions, some lower the intensity of the sessions and others reduce the volume and intensity for fear of injuring players, which can negatively influence physical performance and cause injuries in the post-Ramadan period.

Objectives

The aim of this study is to study the impact of a neuromuscular program on physical performance and the occurrence of injuries after the fasting period of the month of Ramadan.

Materials and Methods

Forty young soccer players U17/U19 from an elite football club participated in the study. Goalkeepers were excluded from this study. Players were randomly assigned to two groups: Control Group (CG, n=20) and Neuromuscular Group (NG, n=20). The CG group followed a training program identical to the period before Ramadan, with a reduction in training volume of 15min/session. The NG group followed a 4-week neuromuscular training, two times a week including a warm-up, strengthening exercises, plyometrics, agility and dynamic stability. All players had participated in the technical/tactical training sessions.

All participants received a daily diet defined by a nutritionist to ensure adequate fluid and nutrient intake during the break-up period.

Result

The basal values of all measured parameters showed no significant differences between CG and NG. Significant improvement in physical performance in the NG group compared to the CG group for the 10 and 30m sprint ($p < 0.001$, $0.08 < d < 2.85$), T-test with and without the ball ($p = 0.001$, $0.77 < d < 1.03$), SJ ($p = 0.001$, $d = 4.04$), CMJ ($p = 0.001$, $d = 2.21$), YoYo L1 ($p = 0.005$, $d = 0.67$) and RSSA ($p = 0.007$, $d = 0.46$). For 5m ($p = 0.067$, $d = 2.16$) and LSPT test ($p = 0.407$, $d = 1.08$) we observed a maintenance of performance in the NG.

Conclusion

Our results show that a 4-week neuromuscular training during the intermittent fasting period of Ramadan maintains and improves physical performance and seems to reduce the occurrence of injuries in young Moroccan elite football players.

OC 28 - THE EFFECTS OF TWO TRAINING METHODS, LINEAR AND CHANGE OF DIRECTION SPRINT TRAINING VS. SMALL SMALL-SIDED SOCCER GAMES ON PHYSICAL PERFORMANCE IN YOUNG ELITE FEMALE MOROCCAN SOCCER PLAYERS

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Context and objective: Women's soccer is steadily gaining in popularity. In the field of scientific soccer research, a number of studies have elucidated the physical characteristics of female players worldwide. However, due to the small number of African female players, studies on this population are rare. The aim of this study was to compare the effect of two training methods, aimed at developing sprinting, linear sprint training with change of direction (LCDS) compared to short match training (SSG, [2vs2 and 3vs3]) on anthropometric characteristics, physical performance, agility as well as certain soccer skills in young Moroccan elite players.

Materials and methods: Twenty-eight young female soccer players volunteered to take part in this study, playing in the championship during the 2022/2023 season, aged under 15 (U15, 15.4 ± 0.4 years old), body mass index (BMI, $22.3 \pm 6.1 \text{ kg/m}^2$) and under 17 (16.7 ± 0.2 years old), BMI ($22.3 \pm 5.5 \text{ kg/m}^2$). Fourteen players in each group performed either LCDS or SGG during 4 weeks, 3 sessions per week, these players. The players underwent the same testing program before (T1) and after (T2) the training period. Anthropometry (body mass and body composition), soccer-specific endurance test (Yo-Yo Intermittent Recovery Test Level 1; YYIRT1), muscular strength (counter movement jump [CMJ]; squat-jump [SJ]), Agility (T test with and without the ball) and performance in sprint performance (20m sprint with 5, 10 and 20m splits) were measured.

Results: According to the two-factor MANOVA (group and time), the test of the inter-subject and post-hoc effects showed significant improvements (p -value < 0.05), of the performances of the two groups U15 and U17. The U15 group demonstrates better improvements compared to the U17 sprint 5m, 10m and counter movement jump without arms (CMJSB) respectively (p -value < 0.01 , $\eta^2 = 0.14$), (p -value < 0.02 , $\eta^2 = 0.11$) and (p -value < 0.03 , $\eta^2 = 0.09$), on the other hand the U17 group has shown significant improvements in speed over 20m (p -value < 0.01 , $\eta^2 = 0.16$). Anthropometric measurements, weight, height, mass and body composition and performance measures of cardiorespiratory endurance specific to football, agility, are not significant for both groups.

Conclusion: The result of this study showed that the training with the two methods induced a significant variation in the physical qualities and football skills in young female footballers during one month of training. These improvements don't seem to be explained solely by biological maturation alone.

OC 04 SPRINT DISTANCES COVERED DURING SOCCER MATCHES ACCORDING TO DIFFERENT THRESHOLDS.

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Introduction

Within the different players displacements, sprints receive higher attention, because they are linked with decisive match situations (such as goals) (Faude et al., 2012) and higher injury risk due to the explosive component (Schuermans et al., 2017). However, sprint efforts are usually classified with arbitrary thresholds without considering the players' individuality (Sweeting et al., 2017). This study compared the most common absolute sprint threshold (> 25.2 km/h) (Gualtieri et al., 2023) with relative and individualized thresholds (> 70%, > 75%, > 80%, > 85% and > 90% of peak match speed).

Methods

Twenty elite players were monitored with GNSS equipment during the thirty-four Portuguese league matches. Peak match speed was retrieved as the maximal speed reached during the full season for each player, and distances were collected when speed passed the absolute and the relative threshold. Mean \pm SD of peak speeds and distances covered were calculated, and Pearson correlation (r) and mean paired differences analysis were performed to analyze relationships and differences between thresholds.

Results

Peak match speed was 32.9 ± 1.4 km/h. Correlations between the absolute and relative thresholds vary from very strong (>70%: $r=0.84$, $p<.001$; >75%: $r=0.89$, $p<.001$; and >80%: $r=0.88$, $p<.001$), strong (>85%: $r=0.79$, $p<.001$), and moderate (>90%: $r=0.59$, $p<.001$). Overall, the >75% (ES: 0.23 [90% CI: 0.17, 0.30]) and the >90% (ES: -1.65 [90%CI: -1.81, -1.51]) relative thresholds presented the smallest and largest differences, respectively, with the absolute threshold. However, differences were found between positions: smallest and largest differences for the >80% (ES: -0.03 [90% CI: -0.14, 0.08]) and >70% (ES: 2.50 [90% CI: 2.13, 2.99]), respectively, relative thresholds.

Discussion and Conclusions

Although absolute speed thresholds allow comparisons within and between players and teams (Hunter et al., 2015), using this strategy can compromise match load individualization (Gualtieri et al., 2020). Of the relative thresholds, the >75% and the >80% thresholds presented the higher correlation with the absolute threshold. Considering that the sprint threshold is usually the highest speed threshold used during the monitoring process (Gualtieri et al., 2023), the absolute threshold can potentially overestimate players efforts, by counting distances covered at intensities < 80% of the individual peak match speed. Practitioners are therefore encouraged to use relative and individualized thresholds to account for players capabilities, and real-scenario characteristics, as this strategy allows an individualize approach of the players' demands monitoring process.

OC 18 PERFORMANCE FLUCTUATIONS DURING THE MENSTRUAL CYCLE IN ELITE FEMALE FOOTBALL PLAYERS: A COMPREHENSIVE ANALYSIS

Guilherme de Sousa Pinheiro(1); Felix Hanika(1); Jana Hubel(1); Varley Teoldo Costa(2)
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Introduction

The hormonal fluctuations during the menstrual cycle have the potential to influence exercise performance in female athletes. This study aimed to analyze the changes in running performance and cardiovascular response during the menstrual cycle in elite female football players.

Methods

This study had a retrospective observational design. 22 female professional football players from a German first division team were included. This study respected all the standards established by the Declaration of Helsinki. Data collection lasted for 9 weeks (46 training sessions) using FIFA certified GNSS devices (Kinexon Sports & Media GmbH, Munich, Germany). The external load variables analyzed were total distance covered, distance covered per minute (m/min), distance covered in five speed zones in absolute terms and per minute and the number of speed zone entries for speed zone 4 and 5 in absolute terms and per minute. Internal load measures, such as average heart rate and the time in two HR-zones (Zone 1: $\geq 85\%$ HRmax and $< 95\%$ HRmax; Zone 2: $\geq 95\%$ HRmax) were also recorded. The menstrual cycle phases were self-reported by the players.

Results:

The analysis of external load measures showed a general pattern of performance fluctuation throughout the menstrual cycle. Running performance increased and peaked in the follicular or early luteal phase, followed by a marked drop in the late luteal phase. Performance then increased again in the premenstrual phase. However, these differences were not statistically significant ($p=0.970$ to $p=0.128$). Cardiovascular response exhibited similar patterns, with an increase in heart rate during the early luteal phase and a decrease in the late luteal phase. None of the internal load analyzes was statistically significant ($p=0.741$ to $p=0.168$). Discussion:

Although statistical significance was not achieved, our findings suggest that running performance and cardiovascular response may fluctuate across the menstrual cycle in elite female football players. The late luteal and menstrual phases appeared to impair running performance the most, while cardiovascular response might be compromised in the late luteal phase.

Conclusion:

The menstrual cycle did not have a statistically significant effect on running performance in this sample of elite female football players. However, the observed patterns of performance fluctuation provide valuable insights for future research. Further investigations with larger sample sizes, more precise cycle phase determination methods, and additional physiological parameters are needed to better understand the relationship between the menstrual cycle and athletic performance in female football players.

OC 27 THE RELATIONSHIP BETWEEN GOALS AND HIGH-INTENSITY EFFORTS IN HANDBALL GAMES

Catarina Bajanca(1,2); Daniel Carrilho(2); Duarte Araújo(2)

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Introduction

Handball is an intermittent team ball sport characterised by short, intense actions that require demanding fitness levels to perform multiple high-intensity efforts. In handball matches, the effectiveness of a team is a direct reflection of the success in shooting actions towards the opponent's goal and the degree of effectiveness demonstrated in defending the opposing team's offensive actions. Since the number of scored goals is the determining factor that distinguishes winners from losers, understanding the relation between these critical match events and high-intensity actions can contribute to a better understanding of the situational determinants of handball performance (Pueo et al., 2022).

Methods

Local Positioning System (LPS) data were analysed from three matches (two group phase and one knockout stage matches) of an elite Portuguese male handball team participating in the European Handball Federation (EHF) European League in the 2022/2023 season. Data were processed and high-intensity efforts were calculated by combining the number of sprints from 15km/h to 18km/h, sprints above 15km/h, sprints above 18km/h, accelerations and decelerations. Video match analysis was conducted to register the team's scored and conceded goals. Pearson correlation (r) analysis was performed to analyse relationships between high-intensity efforts and goals scored and conceded.

Results

Correlations between scored and conceded goals and high-intensity efforts varied from weak to moderate depending on the analysed matches. In each of the analysed matches, we found moderate correlations between goals and all high-intensity efforts. The correlation between conceded goals and high-intensity efforts was positive and moderate for match 1 ($r=0,50$) and match 3 ($r=0,52$) and weak for match 2 ($r=0,40$). Correlation between scored goals and high-intensity efforts was positively moderate for match 2 ($r=0,51$), weak for match 1 ($r=0,30$) and very weak for match 3 ($r=0,25$). Analysis of each type of effort was conducted, with sprints from 15 to 18km/h showing the highest correlations with scored and conceded goals ($0,30 < r < 0,66$).

Discussion and Conclusions

Results showed an association between scored and conceded goals and high-intensity efforts in the three handball matches analysed. Future research should focus on better understanding these associations by including matches of an entire season and applying methods of analysis that can capture the complex nature of the handball match.

References

- Pueo, B., Tortosa-Martínez, J., Chiroso-Rios, L. J., & Manchado, C. (2022). Throwing performance by playing positions of male handball players during the European Championship 2020. *Scandinavian Journal of Medicine and Science in Sports*, 32, 588–597.

Free communications – Oral 2

Date: 11th September

Time: 13h15-14h15

Room: TAÇA LATINA

Theme: Mix

Moderator: Manuel Resende Sousa

Order of the presentation:

OC 16 ADAPTATION AND DEFENSIVE STABILITY IN FOOTBALL TEAMS

Daniel Carrilho

OC 23 ARTIFICIAL INTELLIGENCE IN FEMALE FOOTBALL: ANALYZING SUCCESSFUL LINE BREAKS PASSING EVENTS AND HOW THEY ARE ASSOCIATED WITH DENSITY ZONES

Sofia Ferreira

OC 24 “OFFENSIVE TRANSITIONS IN FOOTBALL AS A DECISIVE WAY TO OBTAIN GOALS IN TOP, MARGINAL AND EMERGING LEAGUES.” - PARTE 1

Pedro Eusébio

OC 9 FUELING THE GUT OF FEMALE ATHLETES – THE ROLE OF DIET AND EXERCISE: A REVIEW

Mariana Costa e Silva

OC 21 DO NOT RUN OVER DISTAL MUSCLE-TENDON T-JUNCTION INJURY - A CASE REPORT

Frederico Miguel Pereira Costa

OC 2 PATELLAR TENDINITIS: A LONG JUMP UNTIL THE ATHLETE'S RETURN TO COMPETITION. CAN PLATELET-RICH PLASMA INJECTIONS HELP?

Maria Pires

OC 16 ADAPTATION AND DEFENSIVE STABILITY IN FOOTBALL TEAMS

Daniel Carrilho(1); João Brito(2); Duarte Araújo(1)

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Introduction

Intra-team coordination in the defensive phase of the football match is predicated on the positional adaptation of defenders to key events of the match (e.g., teammates ball, goal, attackers). Defenders adapt to compensate each other so the team can keep effectively functioning in changing match conditions. In this study we measured defensive stability based on the task-oriented behavior of defenders, captured by their position in relation to the ball and the goal.

Goal

Our aim was to measure the adaptability of the defensive team structure, according to attacking ball movements, with the achievement of a defensive performance goal, i.e., to prevent the attacking team from progressing with the ball towards the goal.

Methods

Positional (x, y) data from football matches ($n=4$) of the 2018 FIFA World Cup were separated into ball possession sequences ($n=576$). In each sequence an attacking team and defensive team were identified. Defensive synchronization (r') was measured by submitting Defender-Ball-Goal angles (DBGA) to cluster phase analysis. Analyzing the distribution of each synchronization timeseries allowed us to define a threshold ($r' = 0.83$) that separated stability from instability. We captured attacking ball movements that caused synchronization drops below the threshold (instability) and calculated the time that the defensive team took to return to stability. Stability return time was associated with the attacking team progress towards the goal, with the ball, (space gained).

Results

Pearson correlation results showed a moderate positive correlation between stability return time and space gained, $r(791) = .46, p < .001$. Linear regression results showed that space gained was somewhat determined by stability return time, $R^2 = .21, F(1, 791) = 213, p < .001$.

Discussion

The coupling between the defenders and key properties of the match environment was captured through DBGA and allowed us to measure synchronization as a team function guided by defensive team performance goals. Stability return time was positively associated with the space gained towards the goal, with the ball, by the attacking team. Considering the complexity of the football match, results showed that a faster return to stability helped prevent the attacking team from progressing with the ball towards the goal during an instability window. These results highlighted the importance of adaptable collective behavior in the defensive sub-phase of the football match.

Conclusions

Football practice tasks should stimulate compensatory actions according to changing match conditions to develop adaptability and intra-team coordination.

OC 23 ARTIFICIAL INTELLIGENCE IN FEMALE FOOTBALL: ANALYZING SUCCESSFUL LINE BREAKS PASSING EVENTS AND HOW THEY ARE ASSOCIATED WITH DENSITY ZONES

Sofia Ferreira(1); Duarte Araújo(1); João Brito(2)

(1) Faculdade Motricidade Humana (2) Federação Portuguesa de Futebol

Introduction

Technological developments brought new opportunities for sports performance analysis. For example, the application of tracking systems in football allowed for a deeper analysis of the spatial-temporal behavior of players, from which new performance indicators could be developed (e.g., stretch index, team centroid, heatmaps, or surface area). These indicators have provided new insights about the behavior of players and particularly of groups and teams. However, the association between these variables and performance is still not clear. Importantly, artificial intelligence allows for a deeper look into meaningful spatial-temporal patterns not identified by previous analysis. One key aspect that needs further clarification is the association between line breaks through passes and subgroups configuration in football.

Goals

We aimed to analyze line breaks through passes and its association to players grouping or ungrouping during a match through a new spatial-temporal variable called density zones (DZ). DZ captures the dynamic emergence of subgroups of players based on interpersonal distances, uncovering what the spatial-temporal circumstances characterizing line breaks through passes are.

Methods

Positional data (x, y) and match events data of one match from *Play-off Tournament for the FIFA Women's World Cup Australia & New Zealand 2023* were considered in this study. Line breaking passes were identified through events data and positional data were used to compute DZ. This new spatial-temporal variable was developed by means of a machine learning technique called *hierarchical agglomerative clustering algorithm* and calculations were performed per second. DZ's properties such as area and team's ratio (i.e., teammates vs. opponents) were also considered when comparing successful vs. unsuccessful line breaks.

Results

Exploratory results showed that DZ dynamically change its number during periods of 15' of match time ($\mu = 4 \pm 1,07$), as also its area ($\mu = 6691,57m \pm 2698,49m$). Line breaking passes occurred mainly when players were inside a DZ and the ratio between possession team players and opponent team players > 1 in the specific DZ where the player with ball possession was located. Configurations with 3v3 players were the most prevalent situations for line breaking passes.

Discussion

These findings suggest the occurrence of specific type of contexts when a completed line break passing event occurs, and thus, when passes can create more instability for the team without the ball.

Conclusions

In conclusion, the new variable (DZ) characterized occurring groups of players and, when its properties (area and team's ratio) indicated line breaking successful passes.

OC 24 "OFFENSIVE TRANSITIONS IN FOOTBALL AS A DECISIVE WAY TO OBTAIN GOALS IN TOP, MARGINAL AND EMERGING LEAGUES." - PARTE 1

Pedro Eusebio(1); Rui Marcelino(2)

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(1st Part) Introduction

It is essential to understand the role that offensive transitions (OT) have in the normal course of the game, in obtaining goals or in the final result of the games. It is also relevant to understand if these moments are connected or are relevant for certain leagues than others.

Goals

The research aims to understand the impact of OT in obtaining goals in all different groups of leagues. The investigation will seek to understand where the goals come from, focusing attention on the importance of goals obtained through direct OT and positive outcomes as result of them in different leagues.

Methods

-The sample of 1151 games (n=3497goals) from the season 2020-21 of nine national leagues:

- Top Leagues (TL): Spanish, Italian, German Leagues
- Marginal Leagues (ML): Portuguese, Netherlands, Russia leagues
- Emerging Leagues (EL): Qatar, Saudi Arabia, UAE leagues

Goals were characterized as a result of:

- non-offensive transition (NT)
- direct offensive transition (OT)
- set pieces (SP)
- positive outcome (POS OUT)

Results

Top Leagues obtained 53% of the goals due the influence of OT, 43% to Marginal Leagues and 42% Emerging Leagues.

Estimations:

- Top Leagues is estimated 0.28 more goals (95% CI [0.12;0.44]) and (95% CI [0.14;0.41]) per OT than in the Emerging Leagues and Marginal Leagues.
- Between Emerging Leagues and Marginal Leagues, it is not expected differences between them (95% CI [-0.15;0.16]).
- Top Leagues are estimated 0.03 more goals (95% CI [-0.05;0.11]) per POS OUT than in Emerging Leagues, and 0.09 goals (95% CI [0.02;0.16]) than in Marginal Leagues.
- Between Emerging Leagues and Marginal Leagues, it is expected that there will be 0.06 more goals (95% CI [-0.03;0.14]) in Emerging Leagues than in Marginal Leagues.

Discussion

- Goals by OT have a greater impact on Top Leagues when compared to Marginal Leagues than in Emerging Leagues. Also, OT are more likely to occur in Top Leagues. The lack of difference between Marginal Leagues and Emerging Leagues are certainly related to several factors.
- The Top Leagues are more competent in scoring goals by POS OUT than Marginal Leagues and Emerging Leagues.

Conclusions

- OT has a tremendous impact on goalscoring on Top Leagues directly or indirectly

OC 09 FUELING THE GUT OF FEMALE ATHLETES – THE ROLE OF DIET AND EXERCISE: A REVIEW

Mariana Costa e Silva(1); Rute Borrego(2); Lino Mendes(2)

(1) Sport Lisboa e Benfica (2) Lisbon School of Health Technology of the Lisbon Polytechnic Institute (ESTeSL-IPL)

Introduction

Studies investigating the interaction between gut microbiota and diet and exercise performance in athletes have gradually increased. Given the potential impact of diet and exercise on the human gut microbiota modulation, it is of extreme relevance to understand the role of the athlete's diet and exercise routine on the gut microbiota. Since very few studies have exclusively characterized the gut microbiota of healthy women or female athletes, data regarding direct associations between female athletes' gut microbiota and dietary factors and exercise remain to be characterized. The aim of the current review is to characterize the influence of diet and exercise on the gut microbiota of female athletes.

Methods

A literature search was conducted for all studies investigating the influence of diet and/or exercise on the athlete's gut microbiota published from 1 January 2012 to 15 June 2022 using PubMed, Web of Science and EBSCO. A total of 206 articles were obtained using PRISMA's steps, but only 9 articles met the selection criteria.

Results and Discussion

The present review shows that a diet rich in complex carbohydrates and fiber and moderate in protein and fats combined with exercise, has a positive impact on the composition of the female athletes' gut microbiota. Findings suggests that exercise promotes a greater microbial diversity and richness on athletes, which can be variable with variations on exercise volume and intensity and more resilient to exercise-induced adaptations. The gut microbiota composition seems to be different between sexes, which may be related to oestrogen concentrations. However no differences between the effect of dietary factors and exercise training on male and female athletes' microbiota were observed. Supplementation with probiotics stimulates the multiplication of bacteria contained in them (Bifidobacterium, Lactobacillus) and may improve metabolism and increase immunity. The consumption of prebiotics may also have beneficial effects on bone health and the gut microbial environment of female athletes.

Conclusions

The female and male gut microbiota seems to be different, through the influence of sex hormones. Until now, studies do not report differences between the effect of dietary factors and exercise training on male and female athletes' microbiota. Supplementation with probiotics and prebiotics has also shown promising results in female athletes, although more studies are needed to prove its effectiveness in gastrointestinal symptoms and athletic performance. Further studies involving exclusively female athletes are needed for a better understanding of the mechanisms involved on the female gut microbiota modulation.

OC 21 DO NOT RUN OVER DISTAL MUSCLE-TENDON T-JUNCTION INJURY - A CASE REPORT

Frederico Miguel Pereira Costa(1); Hugo Couto Amorim(1); Mafalda Oliveira(1); David Reis(1); Tiago Moreira(1)
(1) CHUSJ

Introduction

Hamstring muscle injuries are the most common injuries in running and kicking sports, most involving the biceps femoris (BF). Recurrence is common, and half of BF reinjures occur at distal muscle-tendon T-junction (DMTJ). The BF DMTJ injury is a unique clinical entity due to its complex anatomy and dual innervation. Those injuries have a particularly high recurrence rate, even after a long rehabilitation period.

Case Presentation

30 years old female, practicing athletics for 3 years. During an interval training session involving 300m sprints, she experienced sudden pain in the posterolateral region of her left thigh. Physical examination revealed tenderness of the distal posterolateral region of the thigh, pain during stretching, and resisted knee flexion. Ultrasound examination indicated a rupture in the distal region of the long head of the BF.

She refrained from running for 2 weeks and engaged in training on a bicycle, gradually regaining mobility. Running was gradually reintroduced, and she returned to competition 2 months later, with a recurrence of symptoms during a 3000m race. Subsequent MRI revealed a "slightly thickened appearance of the distal aspect of the musculotendinous junction of the long head with the short head of the biceps femoris, suggesting sequelae of a previous rupture" and "evidence of edema and a fluid layer extending to the superficial fascia, suggestive of an acute/subacute strain."

She stopped running for 4 weeks, resumed the rehabilitation program, and a follow-up ultrasound examination showed "subacute sequelae of partial rupture of the DMTJ, associated with a marginal lateral peripheral myofascial injury at the interface of the two heads (mixed zip)". At 6 weeks of reevaluation, ultrasound showed "progression in the organization and maturation of the scar tissue".

The rehabilitation program included ultrasound therapy, stretching, mobility exercises, progressive strengthening, and posteriorly plyometrics. She gradually returned to running, without recurrence of symptoms.

Discussion

Anatomy and biomechanics of the biceps femoris muscle predispose to DMJT injury. An accurate initial characterization plays an important role. These high-risk muscle injuries could benefit from radiologic evaluation and follow-up, to determine the extent and severity of injury and scar tissue maturation, once DMTJ's timing of recovery and return to play could be challenging.

Conclusion

This case provides a report of a DMTJ of the biceps femoris, including diagnostic procedures and therapeutic approaches. Increased awareness of these injuries will enable health professionals and athletes to make informed decisions about diagnosis, rehabilitation, and return to play.

OC 02 PATELLAR TENDINITIS: A LONG JUMP UNTIL THE ATHLETE'S RETURN TO COMPETITION. CAN PLATELET-RICH PLASMA INJECTIONS HELP?

Maria Pires(1); Revelino Lopes(1); Ivone Rodrigues(1); Francisco Neves(2); Ana Néri Fialho(1)
(1) CHUA - Hospital de Faro (2) CHUA - CMR-Sul

Introduction

Patellar tendonitis (PT) also known as jumpers' knee is an insertional tendinopathy that most commonly affects the patellar tendon origin on the inferior pole of the patella. As an overuse syndrome of the patellofemoral extensor unit, it is associated with repetitive, high quadriceps loading: happens most often in basketball, volleyball, and track and field athletes. The typical history of PT is that of an insidious onset of anterior knee pain that develops during or soon after repetitive running or jumping activities. Conservative management is considered the first line of treatment, but its low efficacy leads to chronicity of clinical manifestations. Peritendinous injections, such as platelet-rich plasma injections (PRP) have been increasingly discussed in this condition.

Case Presentation

A 24-year-old female athlete competing in long and high jump presented with right knee pain in a secondary hospital physiatry consultation in late December 2020. She was diagnosed with PT, based on history of repeated jumping, pain at the origin of the patellar tendon and thickening of the patellar tendon on the ultrasound. A physiotherapy program with strengthening exercises focusing on the quadriceps and extracorporeal shockwave therapy was initiated. She was also advised to reduce the training load, to avoid overloading activities and to use bracing in her workouts. On the 3rd month of physiotherapy she was reobserved, without any significant improvement. NSAID treatment with etoricoxib was started and laser therapy was added, with no further improvement. Due to persistent pain she received three PRP injections (with 3 weeks apart between them) in October and November 2021, followed by a new rehabilitation program. By March 2022, she was finally able to return to her athletics training with no limitations.

Discussion

Although there are several treatment options for PT, no single method has proven to result in rapid and consistent recovery. We highlight a clinical case of refractory pain to several modalities of conservative treatment that was responsive to PRP, which may have a prominent role in the treatment of PT.

Conclusions

This condition is a significant source of morbidity, with the average duration of substantial pain and reduced knee function often being described in literature as more than a year. Further research is needed to determine if PRP is a consistently effective treatment tool and should focus on the optimal number of injections, the time between them and when to begin physiotherapy.

Free communications – Oral 3

Date: 12th September

Time: 13h15-14h15

Room: CAMPEÕES EUROPEUS

Theme: Medicine

Moderator: Rui Domingos

Order of the presentation:

OC 6 GLUTEAL PAIN - DIFFERENTIAL DIAGNOSIS - A NARRATIVE REVIEW

Tomás Caroco

OC 20 SPORTS ACTIVITY AFTER ARTHROSCOPIC TREATMENT OF BANKART LESION

Bárbara Teles

OC 22 PARTIAL ACHILLES TENDON RUPTURE IN AN ELITE FOOTBALL PLAYER

Alexandre Fernandes

OC 3 CLINICAL OUTCOMES AFTER A NEW ARTHROSCOPIC ASSISTED FIXATION TECHNIQUE OF ACUTE ACROMIOCLAVICULAR JOINT DISLOCATION

Raul Alonso

OC 26 BE AWARE, BUT DON'T GET SCARED: VAN-NECK-ODELBERG DISEASE IN A 10-YEAR-OLD ATHLETE

Filipe da Fonseca

OC 14 INJURY EPIDEMIOLOGY IN A SEMI-PROFESSIONAL RUGBY UNION TEAM

Nuno Lopes

OC 06 GLUTEAL PAIN - DIFFERENTIAL DIAGNOSIS - A NARRATIVE REVIEW

Tomás Caroço(1); Júlia Machado Ribeiro(1); Miguel Macedo(1); Rui Madureira(1); Victor Milet(1)
(1) Hospital de Faro

Introduction

The assessment of gluteal pain in athletes is complex due to the diversity of etiologies. To our knowledge, review of gluteal pain differential diagnosis is not available. Our work aims to review gluteal pain prevalence and etiologies.

Methods

A search on PubMed with the term "gluteal pain" was performed [last 10 years + english]. We yielded 81 papers. Confusing and ambiguous medical terms were obtained, such as "deep gluteal space syndrome", "subgluteal syndrome" and "nerve entrapment syndromes". Therefore, a comprehensive review based on this search was not possible. Accordingly, we gathered a list of the most frequent diagnoses of gluteal pain with experts. We searched the diagnoses on PubMed. We described pathologies and differential diagnosis.

Results

The most common causes of gluteal pain are Piriformis syndrome (PS), facet joint arthropathy (FJA), cluneal nerves neuropathy, obturator syndrome, ischiofemoral impingement (IFI), sacroiliac (SI) arthropathy and fibrovascular bands.

Discussion

PS prevalence is controversial and should be considered only when there is hypertrophy of the piriformis, trauma, dynamic impingement of the sciatic nerve, or anatomic variations. Gluteal pain in concurrence with lumbar pain suggests FJA. In FJA, pain is aggravated in the morning, and after prolonged sitting or orthostatism. Clinical examination is crucial, but only medial nerve blocks are diagnostic. Cluneal nerve neuropathy is rare. Neuropathy descriptors are a hint to follow. Maigne syndrome must be considered in athletes with high rotational dorsal-lumbar load. Obturator syndrome is infrequent, and pseudo sciatica must be present. IFI is more frequent in femoral anteversion, pelvic instability, coxa valga and breva and it may be a cause of isolated low gluteal pain. The diagnosis of IFI can be done clinically, with the long stride walk test, a specific test, or through imaging techniques, namely MRI or dynamic ultrasound, a high-sensitivity test to measure ischiofemoral space. SI arthropathy might be related to hyper or hypomobility of the SI joint and is related to past traumatic events. Rheumatic diseases must always be excluded. Hamstrings tendinopathy is a frequent diagnosis in athletes. Fibrovascular bands diagnosis is dependent on an expert radiologist's MRI exam.

Conclusions

There is conflicting evidence regarding the causes of buttock pain. Medical history and clinical examination are essential, but diagnostic nerve blocks/anesthetic infiltrations are frequently required. Walking and running biomechanics may indicate pathology. Myofascial pain is often secondary to arthropathic phenomena, that must be considered.

OC 20 SPORTS ACTIVITY AFTER ARTHROSCOPIC TREATMENT OF BANKART LESION

Bárbara Teles(1); Diogo Constantino(2); André Barros(2); Eduardo Carpinteiro(2)
(1) Hospital Professor Fernando Fonseca (2) Hospital da Luz

Goals

To evaluate the return to sports activity after arthroscopic treatment of traumatic anterior shoulder instability.

Methods

The lesions were characterized by Magnetic Resonance Imaging (MRI) and/or Computed Tomography (CT), and the presence of labral or bone Bankart lesions, presence of Hill-Sachs lesions, on-track or off-track, reverse lesions and additional lesions. Patients with concomitant rotator cuff pathology were excluded. The sports activity prior to surgery and the impact of recurrent glenohumeral dislocation on it were analyzed, as well as the return to its practice in the postoperative period.

Mobility, pain, and strength were evaluated, and the following clinical scores were performed: ISIS (Preoperative Instability Severity Index Score), ROWE score, ASES score (American Shoulder and Elbow Surgeons), VAS and SSV (Subjective Shoulder Value). The surgical procedure was characterized, as well as the number of anchors and type of node used. This is a retrospective study, analyzing data collected pre and postoperatively.

Results

A total of 67 patients were included in the study, subdivided into two groups – one with bone Bankart lesion and the other with labral Bankart lesion. The bone bankarts group had 19 patients, 17 males with a mean age of 33.6 years (age range 16 to 52 years), with an ISIS < 6, and 13 patients had Hill Sachs lesions. Postoperatively, the patients had a mean ROWE score of 90, a mean ASES score of 85%, a mean SSV of 90%, and a mean VAS of 3. The second group consisted of 48 patients with non-bone Bankart lesions, 38 males with an average age of 24 years (age range 15 to 58 years), with an ISIS < 6, and 24 patients with associated Hill Sachs lesions. Postoperatively, the patients had a mean ROWE score of 85, a mean ASES score of 80%, a mean SSV of 86%, and a mean VAS of 4.

Regarding the practice of sports in the first group, 6 patients maintained limitations in activities such as swimming, tennis, and volleyball, and no case of recurrence was identified. In the second group, 16 maintained sports limitation in activities that involved greater request of the glenohumeral joint and presented 4 cases of recurrence, 2 in the context of rugby practice.

Conclusions

In conclusion, both groups presented favorable functional results, with a low recurrence rate compared to previously published data. Regarding sports, in activities involving greater demand of the glenohumeral joint, the patients maintained some degree of limitation.

OC 22 PARTIAL ACHILLES TENDON RUPTURE IN AN ELITE FOOTBALL PLAYER

Alexandre Fernandes(1); Pedro Cunha(2); Júlio Pinto(2); Alexandre Estaca(2); Carlos Duarte(2); Tiago Pereira(3); Miguel Reis e Silva(4)
(1) Hospital de Cascais (2) Casa Pia Atlético Clube - Futebol SDUQ (3) Centro Hospitalar Universitário Lisboa Norte (4) Myalgia Clinic

Introduction

The Achilles tendon (AT) is the largest and strongest tendon in the human body but it is also one of the most commonly injured. Acute partial AT rupture is not always considered as a differential diagnosis and can be misdiagnosed as aggravated Achilles tendinopathy.

The available scientific literature regarding conservative or surgical treatment for partial AT rupture is scarce and currently there is still no consensus about the treatment regimen of this clinical entity, specially at elite level of sport.

In this case report we describe a partial AT rupture in an Elite Football Player, playing in the Portuguese First League, highlighting the Return To Play (RTP) process.

Case Presentation

Male, 34-year-old, professional football player, right-footed, sustained an injury in a training session in his support limb while kicking. The athlete felt a sharp pain in his left AT, but was able to continue the session. At the end of practice, he complained to our medical staff and was evaluated. On examination, he presented pain with resisted plantar flexion and achilles stretching, with a negative Thompson test. An ultrasound and MRI was performed, which showed a partial AT rupture, with about 14% of the cross-sectional area.

A specific and functional rehabilitation program was designed based on the athlete symptoms and muscle biology. Following 7 weeks, the athlete matched the clinical, imagiological and functional criteria to Return To Training, respecting the *control-chaos continuum*. After 1 week of training with the team, RTP clearance was possible after the athlete matched >90% pre-injury gps metrics and was psychologically ready, 8 weeks after injury.

Discussion

A partial AT rupture is defined as a partial discontinuation of the tendon, usually with an acute onset. The traumatic event is thought not to be solely responsible for the tendon rupture and may be a direct effect of mistreated tendinopathy.

The clinical presentation is thought to be unreliable and athletes may maintain the ability to train but not reach maximal loading, typically with pain in the push off phase of running.

The exact prevalence is unknown and differs between cohorts. Based on published literature there is still no clear consensus about the management of partial ruptures of AT, with only a few low-evidence studies regarding conservative and surgical indications.

Conclusions

In this clinical case, we illustrate a successful conservative treatment after a partial AT rupture in an elite football player, enabling RTP 8 weeks after injury.

OC 03 CLINICAL OUTCOMES AFTER A NEW ARTHROSCOPIC ASSISTED FIXATION TECHNIQUE OF ACUTE ACROMIOCLAVICULAR JOINT DISLOCATION

Raul Alonso(1); Luis Pires(1); Pedro Amaro(2)
(1) Hospital da Luz (2) Hospital Beatriz Angelo

Background

Multiple surgical techniques have been described for the treatment of unstable acromioclavicular dislocation injuries. However, consensus on the most adequate procedure is yet not established. This study aimed to evaluate the clinical and radiological results of a single cohort of patients treated with an arthroscopically assisted endobutton coracoclavicular reconstruction and AC suture anchor-button internal brace technique.

Methods

A total of 15 patients were evaluated with a minimum follow-up of two years. The clinical evaluation comprised a complete physical examination of both shoulders and an assessment of shoulder function scores. Bilateral anteroposterior stress views were obtained before and at the time of the last follow-up for radiological evaluation. Additionally, the CC distance and AC distance were measured in both sides.

Results

On average, 98.4 points and 32.6 points were noted in the Constant score and UCLA shoulder scale, respectively. Regarding the Constant score, the contralateral side averaged 96 points. This difference was not statically significant. The average CC difference was reduced from 13 mm preoperatively to 2 mm post-operatively. The average AC difference was reduced from 16 mm preoperatively to 3.5 mm post-operatively. The mean time to return to sport was 3.6 months, and the mean time to return to professional competition was four months.

Conclusion

An arthroscopically assisted endobutton CC reconstruction and AC suture anchor-button internal brace technique with excellent results and good radiological outcomes having a low complication rate has been reported by this study.

OC 26 BE AWARE, BUT DON'T GET SCARED: VAN-NECK-ODELBERG DISEASE IN A 10-YEAR-OLD ATHLETE

Filipe da Fonseca(1); Tiago Cintra(2); Paulo Pinheiro(1); Ricardo Miranda(1); Diogo Simões(1)
(1) Hospital Professor Doutor Fernando da Fonseca (2) Centro de Medicina Desportiva de Lisboa

Introduction

Van-Neck-Odelberg (VNO) disease consists of a rare form of osteochondrosis, which affects the ischiopubic synchondrosis (IPS). Despite being a benign and self-limited condition, it should be included in differential diagnosis of children between 4 and 12 years of age who present with limp, hip pain and/or limited range of motion. Imaging tests are essential for the diagnosis. Pelvic radiography usually shows a unilateral radiopaque lesion in the ischiopubic branch. MRI and/or laboratory tests may be necessary to rule out conditions such as bone tumors or osteomyelitis, which can mimic VNO disease. Management of this disease should be conservative, with symptomatic recovery in two weeks. Prognosis is good and long-term complications are rare.

Case Presentation

We present a 10-year-old female patient who reported a one-month history of limp and pain on the left hip and leg. She had been practicing modern pentathlon for 1,5 years, having no relevant past medical history. On clinical examination, there was posterior leg pain and painful external/internal hip rotation, but range of motion was preserved, and no inflammatory signs were present. The patient underwent a pelvic radiography, which revealed a fusiform radiopaque image in the left ischiopubic branch. Diagnosis of VNO disease was considered and the team decided to follow a conservative approach, with avoidance of all sports-related activity for 2 weeks. Follow-up at 10 days showed significant improvement, as the patient only re-experienced light symptoms once (with immediate recovery). Further evaluation was performed for two months and under a return-to-play protocol, with no symptoms reported.

Discussion/ Conclusions

Limping and hip pain are quite common amongst emergency room admissions in pediatric age. These symptoms may suggest a variety of conditions, which can include growing pains or other musculoskeletal diseases commonly found in children. However, persisting symptoms and/or therapeutic failure might suggest the possibility of a less common disease such as VNO, particularly in the absence of infectious disease or trauma history. Imaging tests – most commonly a radiography – should be performed, with MRI and/or laboratory tests reserved for specific cases. Being aware of the clinical findings associated to VNO disease is key, not only to reassure the patient and the family about the condition as early as possible but also to enable a timely and targeted approach, which can prove of the utmost importance when trying to optimize return-to-play timelines for young athletes.

OC 14 INJURY EPIDEMIOLOGY IN A SEMI-PROFESSIONAL RUGBY UNION TEAM

Nuno Lopes(1); Diana Lima(2); Marta Silva(2); Carlos Banza(3); Joao Burriga(4); André Teixeira(2)

(1) CHULC, Clube de Rugby São Miguel (2) CHULC (3) Clube de Rugby Sao Miguel (4) Clube de Rugby São Miguel

Introduction

Rugby union is a rapidly growing sport globally, with nearly 10 million players across all ages. Known for its physicality, rugby carries a higher risk of injuries compared to other team sports. However, while there is significant research on injuries in international and professional rugby, there's a lack of studies focusing on the semi-professional tier.

Goals

This study aims to address that gap by assessing the incidence, severity, and types of time-loss injuries during matches and training sessions in a semi-professional rugby team. Additionally, the study will compare these parameters between different playing positions (backs vs. forwards).

Methods

A prospective cohort observational study was conducted during the 2022/23 season in a Portugal Divisão de Honra team, representing the highest competitive level of the Portuguese Male Rugby Union system. The study included 42 players from the first team, and injury incidence, severity, burden, location, type, and cause were determined. Injury incidence was reported as injuries per 1000 hours of exposure (match, training, and match+training), and injury burden was reported as total time-loss days per 1000 hours of exposure.

Results

During the 2022/23 season, 42 players participated in the first team, with 19 backs and 23 forwards. A total of 79 time-loss injuries were recorded, with the majority being mild injuries (n=40), followed by moderate injuries (n=23). The average time-loss per injury was 19.22 days. The overall injury incidence (match + training) was 11.6 injuries/1000 hours of practice, with match injuries showing a higher incidence than training injuries (168.84 vs. 1.87 per 1000 hours). Injury incidence between forwards and backs was similar. The total injury burden was 223.2 time-loss days/1000 hours of exposure, with forwards experiencing a higher burden.

Discussion: The study's findings revealed a higher match injury incidence than training injuries, aligning with previous literature. This emphasizes the need for implementing prevention programs for players to reduce injury risk. The severity of injuries, with most being mild or moderate, was consistent with recent studies. Lower limb injuries, especially knee injuries, were the most prevalent, indicating areas for targeted injury prevention strategies.

Conclusion

This study contributes valuable insights in injury epidemiology of semi-professional rugby union players. The results underscore the importance of applying prevention programs and highlight the benefits of having a dedicated medical team to support these athletes. By addressing the injury patterns in semi-professional rugby, the study provides a foundation for enhancing player safety and well-being in this sport.

Free communications – Oral 4

Date: 12th September

Time: 13h15-14h15

Room: TAÇA LATINA

Theme: Sports Science

Moderator: Catarina Bajanca

Order of the presentation:

OC 25 “OFFENSIVE TRANSITIONS IN FOOTBALL AS A DECISIVE WAY TO OBTAIN GOALS IN TOP, MARGINAL AND EMERGING LEAGUES.” - PARTE 2

Pedro Eusébio

OC 10 CORRELATION BETWEEN THE PERCEPTION OF DIFFERENT INTENSITIES BASED ON BORG CR-10 SCALE AND HEART RATE IN SWIMMING

Gonçalo Torres

OC 19 ARE THERE DIFFERENCES IN EXTERNAL AND INTERNAL LOAD DURING TRAINING SESSIONS AND MATCHES IN PROFESSIONAL FEMALE FOOTBALL PLAYERS?

Guilherme de Sousa Pinheiro

OC 8 IMPACT OF TECHNICAL-TACTICAL AND PHYSICAL PERFORMANCE ON MATCH OUTCOME IN PROFESSIONAL SOCCER: A CASE STUDY

Benjamin Barthelemy

OC 11 RETHINKING DELIBERATE PRACTICE: FACTORS BEYOND QUALITY AND QUANTITY - A REVIEW AND FUTURE DIRECTIONS

Afonso Julio

OC 25 "OFFENSIVE TRANSITIONS IN FOOTBALL AS A DECISIVE WAY TO OBTAIN GOALS IN TOP, MARGINAL AND EMERGING LEAGUES." - PARTE 2

Pedro Eusebio(1); Rui Marcelino(2)

(1) PhD Student / British School of Jakarta (2) Universidade da Maia

(2nd Part) Introduction

It is essential to understand the role that offensive transitions (OT) have in the normal course of the game, in obtaining goals or in the final result of the games. It is also relevant to understand if these moments are connected or are relevant for certain leagues than others.

Goals

The research aims to understand the impact of OT in obtaining goals in all different groups of leagues. The investigation will seek to understand where the goals come from, focusing attention on the importance of goals obtained through direct OT and positive outcomes as result of them in different leagues.

Methods

-The sample of 1151 games (n=3497 goals) from the season 2020-21 of nine national leagues:

- Top Leagues (TL): Spanish, Italian, German Leagues
- Marginal Leagues (ML): Portuguese, Netherlands, Russia leagues
- Emerging Leagues (EL): Qatar, Saudi Arabia, UAE leagues

Goals were characterized as a result of:

- non-offensive transition (NT)
- direct offensive transition (OT)
- set pieces (SP)
- positive outcome (POS OUT)

Results

Top Leagues obtained 53% of the goals due the influence of OT, 43% to Marginal Leagues and 42% Emerging Leagues.

Estimations

- Emerging Leagues are estimated 0.21 more goals (95% CI [0.33;0.8]) than in Top Leagues and 0.15 more goals (95% CI[0.03;0.27]) than in Marginal Leagues
- Between Marginal Leagues and Top Leagues, it is estimated that there will be 0.06 more goals (95% CI[-0.15;0.04]) in Marginal Leagues.
- Emerging Leagues are estimated 0.19 more goals (95% CI [-0.34; -0.04]) in Emerging Leagues than in Top Leagues and 0.03 more goals (95% CI [-0.13;0.18]) than in Marginal Leagues.
- Between Marginal Leagues with the Top Leagues, it is expected 0.18 more goals (95% CI [-0.29; -0.03]) in ML.

Discussion

- For goals from the SP variable, these are substantially more likely to occur in Emerging Leagues than in Top Leagues and Marginal Leagues.
- Goals obtained by NT it is also verified that the in Emerging Leagues have supremacy in obtaining this type of goals in relation to the Top Leagues.

Conclusions

- Continued attacks are most successful in Marginal Leagues and Emerging Leagues.

OC 10 CORRELATION BETWEEN THE PERCEPTION OF DIFFERENT INTENSITIES BASED ON BORG CR-10 SCALE AND HEART RATE IN SWIMMING

Torres.G(1); Figueiras.T(1); Sousa.A(1)
(1) Universidade da Maia

Introduction

Currently, the most widely used methods for evaluating internal training load (TL) use heart rate (HR) information as a measure of physiological adaptations and exercise intensity (Bellenger et al. 2016). Meanwhile there are few practical methods available for evaluating TL during swimming. Therefore, assessing indirect methods such as RPE (rating of perceived exertion), which is a psycho-physical tool to assess subjective perception of effort during exercise become that much important.

Goals

The purpose of this study is to link RPE production to HR based methods to verify if RPE production is a reliable method to prescribe intensity in practice and monitor physical TL in swimming.

Methods

Eight (4 male, 4 female) well-trained swimmers (mean \pm SD; age 15.8 ± 2.3 years; height: 168.1 ± 8.3 cm and weight: 62.3 ± 10.1 kg) perform 9 bouts of 200m, 3 in each of the front crawl, backstroke and breaststroke techniques while producing an Intensity of 5 (strong), 7 (very Strong) and 9 (extreme) in the CR-10 Borg Scale. Post-Exercise RPE using the CR-10 Borg Scale was questioned and HR was monitored throughout all bouts. Percentual maximum HR (HR-Max %: percentage of maximal value relative to theoretical maximal HR) and percentual medium HR (HR-Med %: percentage of mean value relative to theoretical maximal HR) were analyzed. One way Factor ANOVA, Kruskal Wallis and Pearson's Correlation tests were used ($p < 0.05$).

Results

A very strong correlation between HR-Med % and HR-Max % ($r = 0.893$, $p < 0.01$) was found. Moreover, a strong interactive effect for post-exercise RPE (PE-RPE) in relationship to HR-Med% ($r = 0.729$, $p < 0.01$) and HR-Max % ($r = 0.781$, $p < 0.01$) were found. Intensity produced also showed very strong accordance with PE-RPE ($r = 0.863$, $p < 0.01$) and strong accordance with HR-Med% ($r = 0.691$, $p < 0.01$) and HR-Max% ($r = 0.760$, $p < 0.01$).

Discussion

Although RPE estimation and production appear to be less reliable in adolescents, especially when referring to non-maximal intensities (Chen et al., 2002; Eston & Williams, 1996), our results do not corroborate that. As butterfly is the most demanding swimming technique, it would be important to detect whether RPE estimation of this technique could be overestimated in the future.

Conclusions

Asking your swimmers to produce certain RPE's of 5, 7 and 9 in the CR-10 Borg Scale during practice in front crawl, breaststroke and backstroke appears to be a reliable method to control swimming intensity and TL.

OC 19 ARE THERE DIFFERENCES IN EXTERNAL AND INTERNAL LOAD DURING TRAINING SESSIONS AND MATCHES IN PROFESSIONAL FEMALE FOOTBALL PLAYERS?

Guilherme de Sousa Pinheiro(1); Lucas Wizani(1); Varley Teoldo Costa(2)
(1) Munich, Germany (2) Belo Horizonte, Brazil

Introduction

Optimizing load management in football training is crucial for maximizing performance outcomes and reducing the risk of injuries. While there is extensive research on load demands in male football, less is known about female football. This study aimed to investigate the differences in external and internal load during training sessions and competitive matches in professional female football players.

Methods

Participated 24 female professional football players from a German first division team. Data were collected using FIFA certified GNSS devices (Kinexon Sports & Media GmbH, Munich, Germany) during 147 training sessions and 38 matches over a 37-week period. External load variables analyzed were: total distance (m), distance covered at 13-19 km/h (m), distance covered at 19-23 km/h (m), distance covered at ≥ 23 km/h (m), distance per minute (m/min), distance covered at 13-19 km/h per minute (m/min), distance covered at 19-23 km/h per minute (m/min), number of accelerations and maximum acceleration (m/s^2). Internal load variables were also collected: Average heart rate (HR) (bpm), maximum HR (bpm), time in HR-zone 80-90% (min), time in HR-zone $\geq 90\%$ (min).

Results

No differences were found just for the maximum HR ($p > 0.05$). Minimum differences were found for the maximum acceleration ($\eta^2 = 0.054$ minimum effect) and the time in HR-zone $\geq 90\%$ ($\eta^2 = 0.162$ minimum effect). Moderate effects were found in distance covered at 13-19 km/h ($\eta^2 = 0.526$ moderate effect), distance covered at ≥ 23 km/h ($\eta^2 = 0.320$ moderate effect), distance covered per minute ($\eta^2 = 0.595$ moderate effect), distance covered at 13-19 km/h per minute ($\eta^2 = 0.598$ moderate effect), distance covered at 19-23 km/h per minute ($\eta^2 = 0.304$ moderate effect), the number of accelerations ($\eta^2 = 0.384$ moderate effect) and the time in HR-zone 80-90% ($\eta^2 = 0.360$ moderate effect). Strong differences were found in total distance ($\eta^2 = 0.769$ strong effect) and distance covered at 13-19 km/h ($\eta^2 = 0.758$ strong effect).

Discussion

The findings support previous studies indicating that competitive match load demands are higher than in-season training session load demands in women's football.

Conclusion

The study revealed significant differences in external and internal load demands between training sessions and matches in professional female football players. Understanding these differences can aid practitioners in optimizing training programs. The findings contribute to the limited research available on women's football, emphasizing the need for further investigations in this area.

OC 08 IMPACT OF TECHNICAL-TACTICAL AND PHYSICAL PERFORMANCE ON MATCH OUTCOME IN PROFESSIONAL SOCCER: A CASE STUDY

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Introduction

Team performance is the result of the combination of individual and team technical, tactical, and physical abilities during a soccer match. Match outcome and more globally, championship ranking, is the consequence of the team's performance and therefore is influenced by technical, tactical, and physical parameters. Although the influence of physical variables on match outcome is well understood, the study of which team's technical-tactical behaviors are more related to better soccer performance is still under debate.

Goals

This study aimed to compare physical and modern technical-tactical performance variables between matches with different outcomes over two seasons for a soccer team playing in the French Ligue 2 championship during the 2020/2021 and 2021/2022 seasons.

Methods

Total distance covered during the match, the running distance covered between 20.0 and 25.0 km·h⁻¹, and at > 25.0 km·h⁻¹, accelerations ($\geq 3 \text{ m}\cdot\text{s}^{-2}$), decelerations ($\leq -3 \text{ m}\cdot\text{s}^{-2}$), and several modern technical-tactical variables (expected goals in favor (xG) and against (xGA), expected goals chain in favor (xGC) and against (xGCA) and passes per defensive action (PPDA)) were collected for 71 team matches using a video tracking system and compared according to the match outcome (win/draw/loss).

Results

No significant differences were observed for the different running metrics depending on the match outcome. However, significant differences were observed for xGA (0.70 ± 0.39 vs 1.24 ± 0.59 ; $P_{\text{bonferroni}}=0.004$) and xGCA (5.38 ± 2.78 vs 10.92 ± 6.18 ; $p_{\text{bonferroni}}=0.002$) between wins and losses, respectively. Additionally, there was a weak but significant correlation between xGCA and distance covered in acceleration ($r=0.255$; $p=0.032$) and deceleration ($r=0.237$; $p=0.047$).

Discussion

This study shows that better results of some technical-tactical variables may have an effective impact on the match outcome of professional soccer teams, especially those that allow reducing goal expectancy of the rival team. On the contrary, physical performance seems to be less associated with the match outcome, likely because high running performance values are required in both wins and losses.

Conclusions

From a practical perspective, soccer coaches should implement technical-tactical strategies to increase the teams' expected goal statistics while avoiding opponents' strategies to obtain clear shooting options.

OC 11 RETHINKING DELIBERATE PRACTICE: FACTORS BEYOND QUALITY AND QUANTITY - A REVIEW AND FUTURE DIRECTIONS

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Introduction

In this review, we analyze K. Anders Ericsson's Deliberate Practice Framework (DPF) and its impact on sport expertise, skill acquisition, talent identification, and coaching. We explore research on motivational and resource constraints, debates on deliberate practice's implementation and sufficiency in explaining sport performance. Additionally, we discuss individual differences, heritable qualities, and the role of biological factors like the gut microbiome in skill acquisition (SA). We conclude by highlighting the DPF's thought-provoking nature and its implications for future research and practical applications.

Methods

Biological, psychological, and social circumstances, including COVID-19 lockdowns, can impact opportunities for deliberate practice (DF). Factors such as age, genetics, drug use, stress, smoking, and diet influence the dynamic and individual gut microbiome. DF principles don't fully explain achievement due to life's complexity.

Results

The gut-brain axis is the bidirectional communication system between the gut and the brain. Microorganisms in the gut, collectively known as the gut microbiome, play a significant role in this communication process. They can directly interact with the brain through the vagus nerve and indirectly through the production of neurotransmitters and other metabolites. The gut microbiome composition is influenced by various factors, including age, genetics, drug use, stress, smoking, and diet. Additionally, birth method, feeding practices, pet exposure, antibiotic use, and environmental toxins also contribute to differences in gut microbiota. There is a growing body of evidence linking gastrointestinal symptoms to psychological distress, such as anxiety, depression, and neuroticism.

Discussion

This review highlights the contributions of the DPF to the understanding of (SA) in sports. While the DPF has provided valuable insights, it has limitations in fully explaining skill differences. The role of individual differences and genetic factors in skill development remains unresolved. Nevertheless, the DPF offers valuable insights for learning design, coaching, training load monitoring, and accessibility. It effectively integrates motivation, effort, and resource constraints in long-term athlete development.

In conclusion, this review emphasizes the need for a comprehensive understanding of (SA) and expertise in sports. DF alone is insufficient to explain achievement, and external factors such as COVID-19 lockdowns and childhood circumstances can impact practice opportunities. The quality of practice is influenced by factors like teachers, coaches, program design, social relationships, and culture. Early childhood interests, talent identification, critical periods of development, and individual motivational differences also play significant roles. Furthermore, birth and upbringing influence the composition of the gut microbiota, with exposure to bacteria being a crucial factor.