
EUROPEAN FOOTBALL

C O N G R E S S

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BOOK OF ABSTRACTS

Editors:

João Valente-dos-Santos, Xurxo Dopico-Calvo, Gert Vande Broek, Pavel Háp

**“BRIDGE THE GAP BETWEEN SCIENCE
AND FOOTBALL PRACTICE”**



Palacký University
Olomouc

EUROPEAN FOOTBALL CONGRESS 2023

13-14 April, Lisbon, Portugal

BOOK OF ABSTRACTS

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PREFACE

JORGE PROENÇA MARTINS

**Dean of the Faculty of Physical Education and Sport
Lusófona University, Lisbon, Portugal**



It is with great satisfaction that I greet and congratulate all the entities and people participating in this Project and, in particular, the organization of this European Football Congress, recognizing the meaning and the institutional and social dimension of the University in the study of Football, as well, the role of Lusófona University (10 years ago, despite being subjected to various conceptual resistances, we created the first Masters degree in Football - from Training to High Competition).

This being an event essentially focused on technical and scientific dimensions of Football, allow me to highlight what, being omitted, cannot fail to be present: the Football sociocultural dimension. Football has the unique ability to, in behaviors and decisions, individually and collectively taken by people and institutions, highlight one of the most sensitive and delicate issues in today's society - the complex relationship between competitiveness and solidarity, passion and rationality, and the fundamental reference that must regulate it: the need and respect for the other. Only in this way, as in any other human activity, will technical and scientific knowledge in Football contribute to the dignity of those who practice it and all its agents.

In this remarkable moment, I want to make present all those who, in the University and or in the field, contributed for a change that brought us here, leaving the deserved recognition and thanks, and remembering some of the pioneers of this fantastic path - Jesualdo Ferreira, Carlos Queiroz, Vitor Frade, and Júlio Garganta. And a final reference to the hundreds of coaches, especially the alumni of this University, who in Portugal and in the world seek to dignify Football and their coach role.

Welcome and a fraternal hug.

É com enorme satisfação que saúdo e felicito todas as entidades e pessoas que participam neste Projeto e, em particular na organização deste Congresso Europeu de Futebol, reconhecendo o significado e dimensão institucional e social da Universidade no estudo do Futebol e, bem assim, o papel da U. Lusófona (mesmo sujeitos a resistências conceptuais várias, há 10 anos criámos o primeiro Mestrado em Futebol-da Formação à Alta Competição).

Tratando-se de um evento essencialmente focado em temáticas da dimensão técnico-científica do Futebol, permitam-me relevar o que, sendo omissis, não pode deixar de estar presente: a dimensão sociocultural do Futebol e a singular capacidade de, nos comportamentos e decisões, individuais e coletivas de pessoas e instituições, evidenciar uma das questões mais sensíveis e delicadas na sociedade atual - a complexa relação entre competitividade e solidariedade, paixão e racionalidade, e a referência fundamental que há-de regulá-la: a necessidade e respeito pelo outro. Só assim, tal como em qualquer outra atividade humana, o conhecimento técnico e científico no Futebol contribuirá para a dignificação de quem o pratica e de todos os seus agentes.

Neste momento marcante, quero tornar presentes todos quantos, na Universidade e no campo, contribuíram para uma mudança que aqui nos trouxe, deixando o merecido reconhecimento e agradecimento, e lembrando alguns dos pioneiros deste fantástico percurso - Jesualdo Ferreira, Carlos Queiroz, Vitor Frade e Júlio Garganta. E uma referência final às centenas de treinadores, em especial aos ex-alunos desta Universidade, que em Portugal e no mundo procuram dignificar o Futebol e a sua função.

Bem-vindos e um fraterno abraço.

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Special Guests



Paulo Bento

Professional Football Coach
South Korea National Team, Chongqing Liangjiang Athletic, Olympiacos, Cruzeiro Esporte Clube, Portugal National Team, Sporting CP.



Professor Neca (Manuel Gonçalves Gomes)

Professional Football Coach
Coach / Assistant Coach:
Rio Ave Futebol Clube, Club Sport Marítimo, Boavista Futebol Clube, Gil Vicente, Sport Lisboa e Benfica, Sporting Clube de Braga, Portugal (2002), Maldivas (2004-2006)



Miguel Cardoso

Professional Football Coach
Coach: Rio Ave FC, AEK Atenas, Celta de Vigo, FC Nantes



Joaquim Evangelista

Portuguese Professional Football Players Union President (SJPF)
Member of the National Sports Council
FIFPro – World Players Union Member, on behalf of SJPF
Member of the UEFA – Professional Football Strategy Council

TABLE OF CONTENTS

Program	08	13th APRIL 2023
	09	14th APRIL 2023
	10	Oral Presentations
Keynote Speakers	12	João Valente-dos-Santos
	13	Michal Botek
	14	Carlos Lalín Novoa
	15	Gert Vande Broek
Invited Speakers	16	Mário Simões
	17	Tomaz Morais & Miguel Henriques
	18	Jakub Beneš
	19	David Prycl
	20	Carlos Lago Peñas
	21	Alexis Padrón Cabo
	22	Bart Reynders
	23	Stef Van Puyenbroeck
Oral Poster	25	Oral
	31	Poster

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2 0 2 3



PROGRAM 13th APRIL 2023

Thursday Auditorium - Artur Agostinho

08h00	10h00	Registration & Welcome Coffee
10h00	10h30	Opening Session
10h30	11h30	Keynote #1 Rethinking Youth Football Player Development Implications and Recommendations João Valente-dos-Santos (FEFD-UL)
11h30	12h10	Invited Session #1 Off-Season & In-Season: Developing Physical Qualities Outside the Club Environment Mário Simões (THE PEAK)
12h10	12h50	Invited Session #2 Sporting CP Player-Centred Approach: Winner at the European Club Association (ECA) Awards 2021 in the Football Training Category Tomaz Morais (Youth Academy Director at Sporting Clube de Portugal) & Miguel Henriques (Youth Football Press Officer at Sporting Clube de Portugal)
13h00	14h30	Lunch & Poster Presentations Lunch at the Congress Venue Informal Poster Presentations
14h30	16h00	Oral Presentations Oral presentation #1 to #6
16h00	16h30	Coffee Break
16h30	17h10	Invited Session #3 Strategy of SK Sigma Olomouc in Training Youth Players for Professional Football Jakub Beneš (President of SK Sigma Olomouc MŽ)
17h10	17h50	Invited Session #4 Complex Diagnostics and Controlled Selection and Development of Football Players David Prycl (BALUO Application Centre)
17h50	18h50	Keynote #2 New Challenges for Performance and Recovery Enhancement through Molecular Hydrogen Administration in Football Michal Botek (FPC-PUO)
19h00		Leisure time

PROGRAM 14th APRIL 2023**Friday Auditorium - Artur Agostinho**

08h30	09h00	Welcome Coffee
09h00	09h40	Invited Session #5 Performance Analysis in Football. How to understand Collective Behaviour and Team Performance Carlos Lago Peñas (FESS-UV)
09h40	10h20	Invited Session #6 Distribution and Management of External Load through Football-Specific Drills over the Competitive Microcycle Alexis Padrón Cabo (FSSPE-UAC)
10h20	11h20	Keynote #3 Criteria and Exercise Design during the Sports-Related Functional Rehabilitation of Injured Football Players Carlos Lalín Novoa (AS Roma)
11h20	11h50	Coffee Break
11h50	13h15	Oral Presentations Oral presentation #7 to #12
13h15	14h30	Lunch & Poster Presentations Lunch at the Congress Venue Informal Poster Presentations
14h30	16h00	Special Guests You Want to be a Football Coach? Critical Success Factors Professional Football Coaches and the Portuguese Professional Football Players Union President
16h00	16h40	Invited Session #7 The Coaching Compass: A Tool to Analyze and Reflect on Coach Behaviors Bart Reynders (FMRS-KU Leuven)
16h40	17h10	Coffee Break
17h10	17h50	Invited Session #8 Know Yourself: The Role of Personality Traits in Sports Coaching Stef Van Puyenbroeck (FMRS-KU Leuven)
17h50	18h50	Keynote #4 Coaching the Coaches: When Science Meets Practice Gert Vande Broek (FMRS-KU Leuven)
18h50	19h30	Awards & Closing Ceremony

ORAL PRESENTATIONS

PROGRAM 13th APRIL 2023 / Thursday Auditorium - Artur Agostinho

14h30	16h00	Oral presentation #1 to #6
Oral presentation #1	DEVELOPMENT OF AN OBSERVATIONAL INSTRUMENT TO EXAMINE THE FOOTBALL GOALKEEPER IN CORNER KICKS: AN EXPLORATORY STUDY	Rebello-Gonçalves R
Oral presentation #2	COMPOSITION ANALYSIS OF MULTIFACTORIAL PEAK INTENSITY PERIODS IN ELITE FOOTBALL: DIFFERENTIATING PEAK KINEMATIC AND MECHANICAL MATCH DEMANDS	Yousefian F
Oral presentation #3	ASSESSMENT OF BODY COMPOSITION, LOWER LIMBS POWER, AND ANAEROBIC POWER OF SENIOR FOOTBALL PLAYERS IN PORTUGAL: DIFFERENCES ACCORDING TO THE COMPETITIVE LEVEL	Tereso D
Oral presentation #4	GENDER DIFFERENCES IN COLLECTIVE BEHAVIOUR PATTERNS OF CORNER EXECUTIONS: AN EXPLORATORY ANALYSIS OF STATSBOMB DATA FROM THE FIFA WORLD CUP'S AND UEFA EURO'S COMPETITIONS	Caldeira L
Oral presentation #5	GROWTH AND MATURATION IN YOUTH FEMALE FOOTBALL PLAYERS	Martinho DV
Oral presentation #6	EFFECTS OF MANIPULATING THE NUMBER OF PLAYERS AND GAME RULES ON THE PHYSICAL, TECHNICAL AND TACTICAL PERFORMANCE OF YOUTH FOOTBALL PLAYERS (U-9): A MULTIDIMENSIONAL APPROACH	Torrado P

ORAL PRESENTATIONS

PROGRAM 14th APRIL 2023 / Friday Auditorium - Artur Agostinho

11h50 13h15	Oral presentation #7 to #12	
Oral presentation #7	BREAKING DEFENSIVE STABILITY IN FOOTBALL	Carrilho D
Oral presentation #8	THE EFFECT OF A 12-WEEK YOGA PROGRAM ON BILATERAL SYMMETRY, AGONIST AND ANTAGONIST STRENGTH OF LOWER LIMBS, PERFORMANCE, HEALTH AND WELL-BEING OF PROFESSIONAL FOOTBALL PLAYERS	Pereira AA
Oral presentation #9	BODY COMPOSITION AND BONE CHANGES ACROSS A SPORTS SEASON IN MALE ADOLESCENT ATHLETES FROM DIFFERENT MECHANICAL LOADING SPORTS	Costa DC
Oral presentation #10	TEACHING AND LEARNING FOOTBALL IN PHYSICAL EDUCATIONAL CLASSES: COOPERATING TO WIN LEARNING OPPORTUNITIES	Bom L
Oral presentation #11	EFFECT OF IN-SEASON TRAINING AND RELATIONSHIP OF MATURITY OFFSET WITH FITNESS OUTCOMES OF YOUTH FOOTBALL PLAYERS	Maia J
Oral presentation #12	WHAT DID YOU EXPECT? INVESTIGATING THE ROLE OF ATHLETES' EXPECTATIONS FOR PARTICIPATION IN DEVELOPING PERCEPTIONS OF CONTROLLING COACH BEHAVIOR	Van Meervelt K

KEYNOTE SPEAKER

João Valente-dos-Santos
Youth Player Development



Rethinking Youth Football Player Development: Implications and Recommendations

Football remains the world's most popular form of sport and an integral part of the social and cultural fabric of society in many countries. In recent decades, there has been a remarkable expansion of sports sciences both as an academic discipline and as a field of applied practice.

Towards a knowledge update and to reflect on how improved scientific understanding can translate into a meaningful impact in football, an evidence summary of the (i) Coimbra Youth Football Study, (ii) Flemish Football Study, (iii) Ghent Youth Football Project, (iv) Londrina Youth Football Project, (v) Porto Youth Football Study, and (vi) Santa Catarina Youth Football Study, will be presented and discussed.

The content of the keynote is grounded into three main topics, although the overall focus has narrowed somehow to concentrate more specifically on how science can help to develop football players.

Part I provides an in-depth description of characteristics of youth football players. Most of the research is focused on elite male football players and, unfortunately, there is far less published work involving alternative population groups.

Part II addresses issues related to growth and maturity impact on performance and whether players may be included or excluded from elite development programmes. A complementary overview on how different components of fitness may be measured using standard field- and laboratory-based measures will be provided.

Part III consider some of the practical and conceptual issues underpinning the early identification of talented young players. The shift for cross-disciplinary and longitudinal approaches are exposed to examine how elite players are best identified and developed.

In this regard, talent identification and selection approaches in youth football have been increasingly implemented and are becoming a central topic of debate by coaches, practitioners, clubs, and sports scientists over the last 20 years.

Coaches are among the main agents responsible to make decisions about the future of young players within a talent identification and development (TID) program - "coach's eye". The coach's eye-based evaluation in isolation may be limited in a multifactorial and highly complex process such as the identification and selection of a young talent.

The fact that potentially skilled, but biologically later-maturing athletes are less likely to be selected into talent development programmes can represent a failure of TID in football. To overcome maturation selection biases, maturation independent TID are suggested to include less mature, but talented athletes, more frequently.

While the development of these models has enabled coaches to appreciate the interaction between growth, maturation, and training, our understanding of the trainability of youth requires more research, reflected by the current lack of a longitudinal empirical evidence base. Although a considerable number of existing development models are designed to optimize sporting talent towards a senior level, a pertinent question that practitioners must ask is: should we only be interested in developing elite young athletes?

Finally, reflections upon the translational impact of sports sciences at the youth player development will be done, concluding with some implications for current practice.



KEYNOTE SPEAKER

Michal Botek
Exercise Physiology

New Challenges for Performance and Recovery Enhancement through Molecular Hydrogen Administration in Football

Molecular hydrogen (H_2) is considered as a strong selective antioxidant, and as an anti-inflammatory, ergogenic, recovery facilitating, and signaling agent. Health and performance benefits resulted from the H_2 supplementation caused the growing interest in sports sciences, coaches, and athletes over the past two decades.

The main aim of our H_2 research group was to assess the ergogenic and recovery enhancing capability of H_2 administration across different modes of exercise and athletic populations. A special attention was focused on the question whether H_2 supplementation induces positive outcomes in the running performance within repeated sprint ability protocol as well as if H_2 demonstrates the ability to improve a post-match recovery in elite football players. In addition, it has not been well-defined a dose-response curve for H_2 administration yet. Based on our current research data we could provide a supplementation guideline for H_2 application in the training periods and competitions. All our H_2 studies were designed as randomized, double-blinded, placebo-controlled cross-over trials. H_2 supplementation was applied via hydrogen rich water (HRW) intake, and HRW exerts the following characteristics, $pH = 7.9$, oxidation-reduction potential = -652 mV, and the concentration of dissolved H_2 was 0.9 ppm. The supplementation strategy and dose of HRW varied across studies depending on the specific mode of exercise and exercise protocol design.

An ergogenic effect of HRW intake was found for the following modes of exercise. There was $\sim 2\%$ improvement in running time during the last 30 m sprint of 15x30m sprints in professional football players. HRW intake also elicited better muscle function during the last 20 repetitions of lunges that were performed 8% faster compared to placebo group. Our further studies showed that HRW significantly reduced exercise and post-exercise lactate response and alleviated delayed onset of muscle soreness within 24-hr recovery after harmful strength training and the football match, respectively. On the contrary to mentioned, we also found no ergogenic effect of H_2 supplementation in well trained track and field runners who carried out the running to exhaustion at maximal aerobic speed. Taken together, the magnitude of the H_2 benefits is more likely a dose-, age- and performance level dependent. Therefore, one would expect a considerable higher profit from the H_2 supplementation in older, low-trained (currently underperformed) athletes rather than in younger well-trained athletes.

To conclude, H_2 is a healthy safe gas which is not included on the prohibited list of WADA. Moreover, there is no evidence showing any risk related to overdose by using H_2 . The repeated HRW intake (before, during, and after exercise) seems to be very effective strategy how to boost performance and to improve the recovery in athletes.



KEYNOTE SPEAKER

Carlos Lalín Novoa

**Physical Preparation, Football
Reeducation and Readaptation**



Criteria and Exercise Design during the Sports-Related Functional Rehabilitation of Injured Football Players

The Sport Functional Re-education of the injured player is a process that covers from the moment the player suffers injury until he joins a normalized training with the team. It represents a complex process in which different professionals, from a multidisciplinary perspective, must communicate and design their intervention strategies. The player could join the team's training as soon as possible in the most appropriate, safe and progressive way. This process can be structured in five phases: physiotherapy rehabilitation, specific sports rehabilitation, return to training, return to competition and, finally, return to performance. Particularly, in the specific-sport Rehab period, it will be important to design a planning and methodological organization indicating periods, phases, objectives and exercises functional progressions design criteria, along with players' evolution throughout the intervention. The person in charge of this phase should be a sport-functional rehab coach (a physical trainer specialized in prevention, re-adaptation and re-training of the injured player), to increase his functional capacity and sport performance. During this process, we must distinguish two fundamental periods along with their respective sub-phases: 1. physical-sports re-adaptation (sub-phase of "approximation" and

"orientation"), and 2. re-training (sub-phase of "pre-optimization" and "optimization"). According to this methodology, the criteria for exercise's design and functional progressions must consider four fundamental and contextual variables: player, injury, training model and the specific characteristics of football. In addition, those must be adjusted to the exercise prescription variables related to the mechanism of injury, internal and external load parameters, psycho-social aspects, among others. In the specific-sport rehabilitation sub-phase, exercises should focus on developing basic and advanced motor skills and physical-functional capacity of the injured player. During the re-training period, the objective should prioritize the design of exercises that allow improvements and optimization of functional adaptations to the specific demands for the training movements. Finally, it will be important to establish the criteria for controlling and monitoring the functional evolution and exercise progressions of the player. According to this methodology, it would be necessary to select those functional tests regarding to the contextual variables and exercise prescription, letting us to take consensual decisions related to the player's return to training and competition.





KEYNOTE SPEAKER

Gert Vande Broek
Sports Coaching, Group
Dynamics, Sport Psychology

Coaching the Coaches: When Science Meets Practice

This session will provide an overview of research on coach leadership and its effect on motivational and group dynamical outcomes in sport teams, conducted under the supervision of Prof. G. Vande Broek in the Physical Activity, Sport and Health Research group from KU Leuven (Belgium). Framed within a broad range of coaching experiences at the highest elite level, Gert Vande Broek will present several scientific studies on topics such as coach-related and situational antecedents of coaches' perceived justice, coaches' behavioral dynamics,

and the potential impact of positive (e.g., correcting teammates) and negative (e.g., bad-mouthing others) voice behavior in sport teams. Furthermore, an assessment tool that is used in training and coaching high potential coaches in Belgium will be introduced. This tool enables coaches to gain insight into their personal coaching profile and related pitfalls or strengths. This instrument can also be used to reflect upon how your coach behavior might shift to more directive or autonomy-providing and even chaotic coach behaviors due to situational or personal factors.

INVITED SPEAKER

Mário Simões

Strength and Conditioning and High Performance Training



Off-Season & In-Season: Developing Physical Qualities Outside the Club Environment

Football is changing over time. Modern football is increasingly demanding, with the number of competitions increasing, the recovery time between efforts decreasing as well as the opportunities to train.

Aware of these new challenges, athletes have sought to respond more efficiently to demands, not only in terms of training but also in mastering and controlling auxiliary factors such as nutrition, sleep and the use of various strategies with the aim of recovering faster and reduce the risk of injury (exposure to cold, heat, massage...). These competitive changes are reflected not only in the competitive period but also in the preparatory period, where most top clubs, for marketing and financial reasons, carry out several trips and games/tournaments during that period. This implies that the player must present himself in good condition in order to be ready to train and play, often at the end of the first week of training and with long trips involved (jet lag, poor recovery...). In addition, this is a period when players try to “earn” a place in the team and therefore, an injury or poor preparation can jeopardize their aspirations.

During the off-season, many athletes take advantage, especially the final part (2 weeks before returning

to clubs) to prepare for the demands of returning to training. In this sense, together with the athletes, taking into account their characteristics and requirements of the sports and specific position, we organize a preparation plan that allows, above all, to prepare the structure for the loads to which they will be submitted. The plan includes field training with the ball (individual and small groups), linear and multidirectional speed, strength/power and the development of energy systems.

After returning to clubs and as competitions approach, some players feel the need to carry out more individualized work. This phenomenon is more frequent in less used players and in players with a history of injury. The main objective of the work we carry out with these athletes throughout the season, preferably together with the clubs, is to ensure that the athletes are available to train and play and obviously has very different characteristics from the work carried out in the off-season.

This type of work is essentially marked by the characteristics and expectations that athletes have when they come to us and by the heterogeneity in the clubs’ responses to these new times and partnerships.





INVITED SPEAKER

Tomaz Morais

Leadership, Motivation, Training and Team Management



INVITED SPEAKER

Miguel Henriques

Sports Journalism and Sports Management

Sporting CP Player-Centred Approach
 Winner at the European Club Association (ECA) Awards 2021 in the Football Training category

Attending the primacy of the sports factor and aiming to create a sustainable project, Sporting Clube de Portugal focused the research and development efforts on people, creating a structure and a team directed to develop and implement a new scientific and technological development approach. To address this purpose, a macro-project of strategic importance for the club was created: The Player Centred Model. This revolutionary approach to youth football is in development since 2018/2019 and seeks to develop and consolidate a new integrated and multidisciplinary approach, developing football talent, based on knowledge and scientific approaches. The centralization of this formative model on the player (and not on the team) is a reflection of what Sporting is as a club. In all clubs, there is a particular esteem for the athletes formed internally, but in Sporting this characteristic is a differentiating factor, which is being enhanced, both sportingly and economically.

This methodology is designed so that the players can have adaptability and the ability to transit between different competitive contexts in a fluid and

agile way, without interrupting or hazarding their progressive training course. A formative process of sports development in which the focus is integral growth as a player and human being in and out of the “4 lines”. This model is sustained by some principles, that must be respected:

- Shared leadership and daily teamwork;
- Well defined game model and cross training methodology;
- Education as a man of integrity in life and on the field;
- A multidisciplinary vision with 8 support areas;
- Geo recruitment strategy and talent evaluation player.

Bearing in mind that each athlete has their own characteristics and needs, that need to be addressed individually, this requires the development of an individual strategy, translated in an individual development plan (PDI) for every player and a special integration plan (PEI) for players from specific contexts. This strategy is supported by different programs such as the high potential players and goalkeepers, and the Bodyfit and Winfit players.



INVITED SPEAKER

Jakub Beneš

Football Club Management



Strategy of SK Sigma Olomouc in Training Youth Players for Professional Football

SK Sigma Olomouc is one of the best youth clubs in the Czech Republic. According to FAČR (Czech Republic Football Association) statistics the club is consistently among TOP 3 clubs in preparing players for national teams or professional football. The club is also highly ranked in UEFA statistics monitoring the transition to men's professional football in Europe. A long-term plan of educating young players in the club consists of selecting the players and working with their individual potential. This concept is applied from U7 category up to B-team and the club's goal is to integrate as many players as possible into the A-team squad or to sell them to youth or senior categories to European competitions. The club's concept of player education is based on monitoring, diagnostics,

and individual approach to players, both in fitness and mental terms. In U13 category the club begins with a detailed diagnostics of movement potential. Controlled monitoring of the training process from the U14 category helps us to observe the laws associated with large differences in the players' biological age. Starting from U16 category up to B-team the most talented players can be included to a TOP group project. This project takes extreme care of the players and creates the most professional conditions for them to open up their sports potential and is closely connected with the Faculty of Physical Culture, Palacký University, which provides additional services for these players. The result of this cooperation should be a player in professional competitions in Europe.





INVITED SPEAKER

David Prycl
Motor Diagnostics

Complex Diagnostics and Controlled Selection and Development of Football Players

Presentation of the comprehensive approach of the BALUO Application Centre, FTK UP to the management of the entire training process with emphasis on “healthy growth and development under control”. This approach brings unique possibilities for training football players and includes special test batteries that allow to diagnose specific needs and abilities of individual players. The data from these tests and the specific and non-specific training itself are then combined into an online training platform (training diary) to record the plan and reality in training load in order to reach the players’ full potential with regard to injury prevention. The superstructure online platform then evaluates player data from training sessions and matches. Using good practice examples, we describe the controlled selection of players for the football

academy from the U13 category onwards with respect to biological age (‘biobanding’). We will also present the work with the top selection of the best players of Sigma football club. We will show how AC BALUO, FTK UP helps coaches to identify the strengths and weaknesses of individual players, for maximum individualization and development of the potential of the best players. Finally, we will present an example of working with national teams. We will show how BALUO helps within the workload of the WU17 national players, optimizing training plans and maximizing the performance of the players in the following matches. Our presentation will show the benefits and effectiveness of this approach to training football players and its benefits to player and whole team development.



INVITED SPEAKER

Carlos Lago Peñas

**Match Analysis, Performance in
Team Sports, Football Performance**



Performance Analysis in Football. How to understand Collective Behaviour and Team Performance

Whenever he was asked a question that was too long or too difficult to understand, the renowned Luis Aragonés, coach of the Spanish National Football team, Atlético de Madrid or F.C. Barcelona, among other teams, often demanded that journalists simplify things. Short and played to the foot, he would say. Not a bad way to figure things out. In football and in life, short and clear messages usually outweigh overly long reflections.

The coaching job requires something more than a deep knowledge of the game and the mastery of a few tasks to present to the players. Let's not overstate the difficulty of this job. It is also important to have a remarkable mastery in many other skills that must do with knowing how to teach the game. I'm talking about things like knowing how to give the players the

right information, how to properly manage clashes when they arise, how to adjust players, or how to have control over one's body language. Yet we know less about all these things. Much time is spent in coach education on knowing the game very well, but less effort is put into learning what needs to be done on the pitch to make our athletes better. I very much like this idea that a coach is only as good as his players after training. It is the players who make the coach good. Being able to coach is something more than knowing a lot about football. That's the goal of this presentation. It presents several tips to train better in football and team sports. My desire is to give the coaches simple strategies to make their players better.



INVITED SPEAKER

Alexis Padrón Cabo

Performance Analysis in Football/GPS

Distribution and Management of External Load through Football-Specific Drills over the Competitive Microcycle

Global Positioning Systems (GPS) technology is commonly used to monitor and record external load in professional football. Typically, this microcycle structure has been divided into three phases: recovery, acquisition/optimization, and tapering. The appropriate management of daily external load has been considered a central issue in optimizing microcycle programming. Scientific evidence has established that football players should be trained based on the physical demands of match play to prevent injury and optimized match performance. Specifically, the football-specific drills provide physical trainers a tool to simulate physical and technical-tactical stimuli similar to real game situations. In consequence, strength and conditioning coaches need to understand how to modulate external

load across the competitive microcycle structure, and design football-specific drills to properly stimulate external load metrics depending on the phase and day of the microcycle. From this perspective, a large number of variables can be manipulated according to the aim of each football-specific drill. During the training sessions using football-specific drills, the manipulation of multiple constraints such as field dimensions, number of players and game rules have been widely used to manage the external load. Therefore, practitioners should control football-specific drills configuration to improve tactical behaviors, and simultaneously prepare football players for the physical and physiological requirements of football matches.

INVITED SPEAKER

Bart Reynders

**Sports Coaching, Group Dynamics,
Sport Psychology**



The Coaching Compass: A Tool to Analyze and Reflect on Coach Behaviors

Coaches help athletes to improve their physical, mental, technical and strategic skills. Dealing with different situations, coaches need to learn how to adjust and improve their own behavior. For this purpose, becoming aware of and reflecting upon your own behavior as a coach has become an essential competence of (top) coaches.

Based on “The Coaching Compass” (Delrue et al., 2019) we are able to classify and graphically present a wide range of coaching behaviors within a two-dimensional circumplex, with the horizontal axis representing the level of need-supportive coaching behavior and the vertical axis representing the level of coach directiveness. Within this structure, all behaviors are segmented into four more general coaching styles and eight more specific approaches (i.e. clarifying, guiding, attuning, participative, awaiting, abandoning, domineering, and demanding) Based on this circumplex structure, the Coach

Compass serves as a reflection tool. It also enables coaches to obtain their own coach profile. Of course, coaches should not be pinned down to one unique approach. Coaches may very well display a combination of behaviors, depending on the situation. Hence, the first and major ambition of this tool is to increase self-awareness of the coach and optimize his or her behavior in order to boost performance and team functioning. Endorsed by M-Factor, we strive to optimize coach education and integrate this tool within coaching programs within “Vlaamse Trainersschool”, thereby targeting coaches at all levels in Flanders.

In this session, the focus will be on the development, structure and purpose of the Coach Compass. In addition, the potential for different “on-field” applications within coaching programs will be highlighted.



INVITED SPEAKER

Stef Van Puyenbroeck
Sports Coaching, Group Dynamics,
Sport Psychology

Know Yourself: The Role of Personality Traits in Sports Coaching

People's personality traits determine their feelings, thought patterns and behavioural preferences. This means that personality plays an important role in coaches' functioning in two ways. First, this means that coaches' personality traits at least partly determine how they will most likely behave in specific situations. For example, some coaches will be more likely to avoid conflicts while other coaches will address issues immediately. Second, as a coach you will also encounter athletes with very different personalities. Some athletes might be confident and remain focused under pressure, while others might get easily nervous and distracted. Some other athletes might be really dutiful and always hard-working, while others might often get caught slacking and need to be frequently pushed by their coach to fulfil their tasks.

In other words, it is crucial that coaches are aware

of their own and their athletes' personality traits in order to improve their athletes' performance and functioning in the most optimal way. To date, Big Five Personality Traits, which consists of Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism, is one of the most scientifically proven personality typologies. Within this session, we will elaborate on the characteristics of these traits and 1) how they might affect athletes' behaviour or emotions, and 2) how these traits could affect your behaviour as a coach. After this session, you should therefore be able to make a reflection based on your personality traits as a coach and become aware of potential pitfalls and strengths regarding your behaviour. In this way, you can keep reflecting upon how you approach your players and keep improving as a coach.

ORAL | POSTER PRESENTATIONS

ABSTRACTS



TEACHING AND LEARNING FOOTBALL IN PHYSICAL EDUCATION CLASSES: COOPERATING TO WIN LEARNING OPPORTUNITIES

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BACKGROUND/AIM

The National Physical Education Curriculum (NPEC) [1] defines Football as a core subject matter of primary and secondary schooling, with three levels of learning progression: Introductory, Elementary and Advanced. The NPCE emphasizes Futsal adapted competitive forms designed to promote cooperative learning of introductory-level skills. However, we must overcome the tendency to organize Futsal scrimmages that are inadequate to offer the opportunities to learn (OTL) needed by introductory-level pupils. This qualitative research process aims to evaluate our methodological proposal for teaching football in PE aligned with the NPCE.

METHODS

The study had PE class observations and semi-structured interviews with teachers of the 2nd and 3rd cycles. The first phase objectives were to identify the class practices of 17 teachers, and to select the 2nd phase participants. We had 8 teachers applying our proposal, based on NCPE specifications and references -- two passing games: first the 3v1; when succeeding consistently, the 4v2+2. The criterion skills were off-the-ball moves, receiving, ball control, passing, and the defense positioning. We used the Team Games authentic assessment approach [2] focused on offensive continuity and completion. The abstracts of the observations and interviews were revised by the teachers before analysis.

RESULTS

All the teachers in the 1st phase used the scrimmage 5v5 as the main “team practice”. Five teachers of the 2nd phase evaluated our proposal as adequate to enhance OTL. Those teachers reported various degrees of improvement in both engagement and specific skills by all introduction-level students. Secondly, six teachers highlighted the cooperating behavior of the leading players supporting teammates actions. We identified two difficulties that limited OTL: the behavior of some leading players that were not competent or cooperative enough to sustain the intended dynamics; the defensive pressure on the player receiving the ball and trying to pass.

CONCLUSIONS

The first phase supported the hypothesis that the NPEC guidelines need to be better understood and applied, according to recent research evidence and education policy. We confirmed that selective Futsal scrimmages can block learning opportunities for most students. The second phase showed promising evidence to develop a cooperative learning trend aiming to enhance introductory-level OTL.

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GENDER DIFFERENCES IN COLLECTIVE BEHAVIOUR PATTERNS OF CORNER EXECUTIONS: AN EXPLORATORY ANALYSIS OF STATS BOMB DATA FROM THE FIFA WORLD CUP'S AND UEFA EURO'S COMPETITIONS

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BACKGROUND/AIM

The interest in both women football and performance analysis are growing at an extreme rate in the last decade. Anthropometric and physiological differences may lead to natural adaptations in the way female teams play, being expected to occur differences when compared to men's [1]. Previous studies have been able to identify individual variables, such as physiological performances or technical abilities, where these differences do occur. Recently, some authors, by relating variables, were able to identify patterns that could differentiate genders at the individual performance level [2]. Yet, few articles in the analysis of tactical performance allow a comparison of the women's collective behaviour patterns with the more studied men's variety. This can lead to a misuse of the general information imported from studies and practitioners knowledge of men's game.

METHODS

Data collected and made available from StatsBomb [3] are an excellent source of multidimensional data, integrating 43 different types of events and their contextual information. The data used in this study refers to corner kick set-pieces and was obtained at the FIFA World Cups 2018 (Men, 578 corner kick events) and 2019 (Women, 465), and from UEFA Euro 2020 (Men, 461) and 2022 (Women, 326) [3]. This dataset describes each corner kick event using both quantitative (e.g., length and angle of the corner kick) and qualitative variables (e.g., type and outcome of the corner kick).

RESULTS

Preliminary analysis of the corner kicks execution patterns show interesting results of the way both genders tend to use this set piece to obtain advantage in the game. Notably, the unequal use of the left and right foot to take the corner, with women using mostly the right while men divide their use. The corner kick ball speed also presents statistically relevant differences between genders and competitions (although smaller between Women competitions).

CONCLUSIONS

The richness of the dataset and its preliminary analysis suggest that the use of multi-variable analysis can bring more insights of how collective behaviours patterns emerge and clarify differences between genders. Those finding may allow practitioners to adjust their methods to the specific necessities of women's football.

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BREAKING DEFENSIVE STABILITY IN FOOTBALLCarrilho D¹, Couceiro M^{1,2}, Brito J³, Araújo D¹¹ CIPER, Faculdade de Motricidade Humana, Universidade de Lisboa, Cruz-Quebrada – Dafundo, Portugal² Ingeniarius, Lda., Coimbra, Portugal³ Portugal Football School, Federação Portuguesa de Futebol, Portugal

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BACKGROUND/AIM

Compound performance indicators in football have low perceived value among practitioners possibly due to insufficient translation towards practice [1]. The continuous adjustment of players to key properties of the match environment captures their emerging interactions with environmental constraints and towards functional goals, providing performance analysis that is based on decision making and more translatable to practice [2]. We aimed to measure attacking performance as the ability to break defensive stability which is predicated on coordinated actions among defenders to maintain structural balance. We hypothesized that breaking stability was achieved by moving the ball closer to the defensive centroid.

METHODS

Optical tracking (x, y) data from football matches (n=4) of the 2018 FIFA World Cup were separated in ball possession sequences (n=576). Defensive stability was defined using the distribution of synchronization measures obtained by defender-ball-goal angles submitted to cluster phase analysis [3]. The Synchronization Break Index measured synchronization drops below the level of stability, caused by the attacking team ball movements. Synchronization was associated with ball distance to the defensive centroid using linear regression.

RESULTS

Distribution analysis showed that synchronization (r') had a relative frequency of 67.8% towards high values ($0.8 \leq r' \leq 1$), defining instability as $r' < 0.8$. Linear regression showed significant results using the ball distance to the defensive centroid to predict synchronization [$R^2 = 0.50$, $F(1, 12204) = 12500$, $p < 0.001$].

CONCLUSIONS

Defensive stability was maintained by the adaptability of the defensive structure to the actions of the attacking team. The attacking team was able to break stability by moving the ball between the defensive structure.

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BODY COMPOSITION AND BONE CHANGES ACROSS A SPORTS SEASON IN MALE ADOLESCENT ATHLETES FROM DIFFERENT MECHANICAL LOADING SPORTSCosta DC^{1,2,3}, Valente-dos-Santos J⁴, Sousa-e-Silva P^{1,2}, Martinho DV^{1,2}, Duarte JP^{1,2}, Tavares OM⁵, Castanheira JM⁵, Oliveira TG², Abreu S⁶, Leite N⁷, Agostinete RR⁸, Fernandes RA⁸, Courteix D³, Coelho-e-Silva MJ^{1,2}¹ FCDEF, University of Coimbra, Coimbra, Portugal² CIDAF (uid/dtp/04213/2020), University of Coimbra, Coimbra, Portugal³ CRNH, AME2P, Université Clermont Auvergne, Clermont Ferrand, France⁴ CIDEFES, Lusófona University, Lisboa, Portugal⁵ Coimbra Health School, Portugal⁶ CIAFEL, University of Porto, Porto, Portugal⁷ Department of Physical Education, Federal University of Parana, Curitiba, Brazil⁸ LIVE, Department of Physical Education, Sao Paulo State University (UNESP), Presidente Prudente, Brazil

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BACKGROUND/AIM

Participation in sports is viewed as prominent form of physical activity among male adolescent athletes [1]. This study aimed to assess intra-individual body composition and bone changes in male adolescent football players and swimmers across a sports season period.

METHODS

The study recruited 40 male adolescent athletes who played either football (n = 20) or swimming (n = 20), (mean: 12.57 ± 0.37 years). Participants were followed for a period of 12 months. Stature and body mass were measured, and their areal bone mineral density (aBMD), lean soft tissue, and fat tissue were assessed using DXA. Food intake was estimated using a questionnaire, and their training variables were monitored. Repeated measures ANOVA was used to compare the effects of the two sports and the intra-individual variation over time (time moments: TM1, TM2).

RESULTS

Regarding food intake, the two groups did not differ. Football players completed an average of 63 ± 31 training sessions (95 ± 47 hours), while swimmers completed 248 ± 28 sessions (390 ± 56 hours) of training. The analysis of aBMD showed a significant effect of sport-associated variation ($F = 5.254$, $p < 0.01$; $\eta^2 = 0.35$) and 12-month increments, especially in the lower limbs ($F = 97.238$, $p < 0.01$; $\eta^2 = 0.85$). For the lean soft tissue (LST), there was a very large effect of intra-individual variation ($F = 223.043$, $p < 0.01$; $\eta^2 = 0.92$) and a moderate effect of sport ($F = 7.850$, $p < 0.01$; $\eta^2 = 0.41$).

CONCLUSIONS

Puberty is a period that is extremely relevant for developing bone mass. Although swimmers showed higher training volume and LST values at baseline and in the second measurement, football players presented greater accrual on aBMD during the 12-month period.

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EFFECT OF IN-SEASON TRAINING AND RELATIONSHIP OF MATURITY OFFSET WITH FITNESS OUTCOMES OF YOUTH FOOTBALL PLAYERS

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BACKGROUND/AIM

The effect of in-season training on physical fitness characteristics in young football players must be clearly understood [1, 2]. According to the literature [3], early-matured players are recognized as more talented, and late-maturing are systematically excluded in talent development programs. In fact, early-maturing players generally perform better in physical fitness tests than late-maturing players. In accordance, this study aimed (i) to evaluate the impact of in-season training on the fitness of young male football players aged 12 and 13 years during the 2018-2019 season (2nd phase – 4 months), and (ii) to identify correlates of fitness outcomes with maturity offset.

METHODS

Twenty Under-13 male football players (age, 12.6 ± 0.5 years; body mass, 44.1 ± 8.6 kg; height, 1.55 ± 0.1 m) participated in the study. Players were evaluated regarding their maturation (maturity offset), and physical fitness (i.e.: handgrip strength – HG; running velocity in 5-, 10- and 20-m; agility – Zig Zag test; squat jump – SJ; countermovement jump – CMJ; Abalakov – ABK; standing broad jump; sit-ups; push-ups; medicine ball throw – MBT; aerobic capacity – VO2max). Paired sample t-tests and Cohen's d effect sizes were used to analyze in-season changes in performance outcomes (pre- vs. post-test). Bivariate correlations were used to determine the existence of relationships between maturity offset and physical fitness outcomes.

RESULTS

In-season training observed a significant improvement in football players' (i) agility (ES = 0.76); (ii) running velocity in the 5-m distance (ES=0.20); (iii) height, velocity, and power in vertical jumps (SJ, ES = -0.36, -0.27, -0.31; CMJ, ES = -0.31, -0.30, -0.28; ABK, ES = -0.19, -0.24, -0.31); and (iv) MBT (ES = -0.39). Maturity offset was significantly correlated with HG (pre-, r = -0.702; post-, r = -0.600), power of vertical jumps (SJ - pre-, r = -0.787, post-, r = -0.766; CMJ – pre-, r = -0.747, post-, r = -0.726; ABK - pre-, r = -0.685, post-, r = -0.684), and MBT (seated, pre-, r = -0.798, post-, r = -0.678; standing, pre-, r = -0.675, post-, r = -0.687), even controlling for chronological age.

CONCLUSIONS

In-season training improved football players' agility and power outcomes. Furthermore, the present findings show the importance of maturity offset with improvements in physical fitness outcomes, especially strength, and power, suggesting the need to include these parameters in training.

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GROWTH AND MATURATION IN YOUTH FEMALE FOOTBALL PLAYERS

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BACKGROUND/AIM

Growth and biological maturation are implicit in talent identification, selection, and development models of youth football participants. Although the number of female football participants tended to increase during the last decade, the literature is mainly centered on males. This study aimed to assess the growth and maturity status of adolescent female players.

METHODS

The sample included 441 players aged 10.08-16.73 years. Stature and body were measured. Fat mass percentage (%FM) was estimated by using two skinfolds. The Fels method was used to assess skeletal age. Subsequently, players were grouped as late, average or early maturing based on the difference between chronological age (CA) and skeletal age (SA).

RESULTS

Mean stature approximated the 50th percentiles in all competitive age groups, while mean weight fluctuated between 50th and 75th percentiles. Fat mass ranged 18.0 %-28.2%. The percentage classified as skeletally mature increased with competitive age groups (under-13: 0%; under-15: 8%; under-17: 49%).

CONCLUSIONS

Youth football in Portugal organized two competitive CA groups for females: juniors (under-19) and seniors (> 19 years). Consequently, participation with boys is the solution for many young girls to train and compete. Data contrasting males and females show that during adolescence, they differ considerably in terms of body size and maturity status. In addition, a considerable percentage of female players was classified as mature at under-17 years old. Considering the preceding, two important conclusions emerge from this study: female football claim age-specific competitive groups, and the senior level should be adjusted to a lower age.

THE EFFECT OF A 12-WEEK YOGA PROGRAM ON BILATERAL SYMMETRY, AGONIST AND ANTAGONIST STRENGTH OF LOWER LIMBS, PERFORMANCE, HEALTH AND WELL-BEING OF PROFESSIONAL FOOTBALL PLAYERS

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BACKGROUND/AIM

Football can generate musculoskeletal imbalance in the dominant and non-dominant sides, increasing the injury risk. Symmetry between the dominant and non-dominant lower limbs in professional footballers is important to limit injury risk [1]. Yoga may enhance mentality, emotional management, balance, strength and mobility [2]. We analysed the effect of Yoga on bilateral symmetry, agonist and antagonist strength, performance, health and well-being of professional footballers.

METHODS

A convenience sample of footballers (n=21; Under-23; Age: 19.0±1.9 years; Height: 182.5±6.0 cm; Body mass: 75.6±5.7 kg) participated voluntarily and were randomly placed in Experimental (EG; n=11) or Control (CG; n=12) groups. After anthropometric measurements and the scheduled training, all were evaluated: Y balance and tensiomyography, EG before and after 12 weeks of Yoga training [24 Yoga sessions after football training: prānāyāma (breathing), āsana (psychophysical), yoganidra (relaxation), samyama (e.g., concentration, meditation)]. Mixed factor ANOVA were used to assess main and interaction effects (group x time). Effect sizes were calculated using partial eta squared (η^2).

RESULTS

The EG demonstrated improvements from pre- to post-test ($p < 0.05$). Yoga show time interaction effects, with improvements after the intervention, in contraction velocity of vastus medialis [$F(1,16) = 5.037$, $p = 0.039$; $\eta^2 = 0.24$, Power = 0.56] and biceps femoris [$F(1,16) = 11.371$, $p = 0.005$; $\eta^2 = 0.49$, Power = 0.88]. However, there were no group by time interaction effects on Y Balance, symmetry right/left and agonist/antagonist limbs.

CONCLUSIONS

Yoga did not have a deleterious impact on right/left symmetry and agonist/antagonist limbs and had an improving effect on some speed contraction of some muscles and may be a positive effect on the health and well-being of footballers.

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DEVELOPMENT OF AN OBSERVATIONAL INSTRUMENT TO EXAMINE THE FOOTBALL GOALKEEPER IN CORNER KICKS: AN EXPLORATORY STUDY

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BACKGROUND/AIM

Corner kicks are considered important moments for the outcome of a football match [1], but little attention have been previously paid to the goalkeeper-related performance during this set piece. This study aimed to develop an observational instrument to analyze the goalkeeper-related performance in corner kicks.

METHODS

A group of five goalkeeper coaches were involved in the discussion of the observational instrument, after an initial literature review was conducted. Three main criteria were included: crossing contextual variables, crossing development actions, and goalkeeper-related actions [1-3]. For each one of the established criteria, sub-criteria were accordingly defined. Finally, categories and corresponding definitions were detailed. Data included the observation of 110 corners of a Liga 3 club, during 22 matches.

RESULTS

A finalization was observed in 33.3% of the corners, but only 4.5% resulted in a goal. The ball trajectory was commonly a direct inswing (43%), through the air (86.8%). Corners were delivered to central and front post areas most frequently (8a = 36.8%; 9a = 21.9%). Six or more attackers were predominantly used (93%), but defenders won the ball more often (49%), while the goalkeeper touched the ball in 16.7% of the times. Usually, the goalkeeper assumed a position in the central third of the goal (3a = 77.2%), with the feet diagonally oriented (90.4%). The most common technical action was the save (13.2%), with the ball being secured at the first attempt in 13.2% of the times, while the jump was the most observed physical action (15.8%).

CONCLUSIONS

The present study provides a novel approach regarding the goalkeeper-related performance in a specific match event. This information can be used by goalkeeper coaches, players, and the entire technical staff to guide goalkeeper-specific training sessions and match preparation. The reliability and validation of the observational tool by an independent group of experts is advised for future studies.

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ASSESSMENT OF BODY COMPOSITION, LOWER LIMBS POWER, AND ANAEROBIC POWER OF SENIOR FOOTBALL PLAYERS IN PORTUGAL: DIFFERENCES ACCORDING TO THE COMPETITIVE LEVEL

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BACKGROUND/AIM

During a football game, the most diversified stimuli occur all the time, the physical condition level plays a determinant role, and there may be variations according to the competitive level. In this sense, the present study aimed to verify differences in body composition, lower limbs power, and anaerobic power, comparing senior football players of different competitive levels.

METHODS

Participants were 81 players belonging to six football teams, aged between 18 and 35 years, with a mean age of 23.14 ± 4.23 years, who were divided into three distinct competitive levels: Elite, Sub-Elite and Non-Elite. The players performed bioimpedance evaluations on a Tetrapolar InBody 270 scale (body composition), the Countermovement Jump (CMJ) through the ChronoJump (lower limbs power), and Running Anaerobic Sprint Test (RAST) (anaerobic power).

RESULTS

Based on the competitive level analysis, we verified that the players present body composition values similar to each other regardless of the competitive level in which they play. Concerning the performance evaluations, we verified that the elite players present higher values of highest jump ($p = 0.012$; $d = 0.76$, moderate; and $p = 0.022$; $d = 0.71$, moderate) and maximum force produced ($p = 0.05$; $d = 0.64$, moderate; and $p = 0.002$; $d = 1.00$, moderate), together with higher values of anaerobic power ($p < 0.001$; $d = 2.43$, very large; and $p < 0.001$; $d = 2.22$, very large), compared to the others.

CONCLUSIONS

We can thus conclude that there is a homogeneity regarding the body composition of football players, regardless of their competitive level; in turn, elite players show better performance indicators in all variables.

EFFECTS OF MANIPULATING THE NUMBER OF PLAYERS AND GAME RULES ON THE PHYSICAL, TECHNICAL AND TACTICAL PERFORMANCE OF YOUTH FOOTBALL PLAYERS (U-9): A MULTIDIMENSIONAL APPROACH

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BACKGROUND/AIM

Football is a complex activity, where players performance is dependent on the interaction between their own capabilities and skills, their colleagues, and opponents, and context of play. These constraints promote specific physical, technical, and tactical performance adaptations in young football players [1]. There's few evidence about the influence of manipulating some game rules.

This study analyzed the influence of manipulating both the number of players - 5x5 vs 7x7 - and one game rule, specifically the way the match was restarted after the ball was out of bounds – regular by a throw in, modified by a kick in or dribble in - on physical, technical and tactical variables of under-9 (U-9) football players.

METHODS

Twenty eight U-9 years players (28 boys; 8.44 ± 0.52 years) participated in a tournament with four game formats (5x5 regular; 5x5 modified; 7x7 regular; 7x7 modified). A total of three games in each format were video recorded, with the duration of thirty minutes each. Positional data were collected by a GPS system and a multidimensional approach was used [2]. Analysis of variance (ANOVA) was used.

RESULTS

The results showed an effect of game format in passing distance ($F=11.757$; $p<0.001$), distance to closest opponent when passing ($F=11.316$; $p<0.001$), attack time ($F=8.274$; $p<0.001$) and time in numerical superiority ($F=5.422$; $p<0.005$). Specifically, 5x5 modified generates higher values than 5x5 regular (pass distance and distance to closest opponent when passing, $p<0.001$; attack time and time in numerical superiority, $p<0.005$). Higher values were also found in the attack time and time in numerical superiority in 7x7 modified in comparison with 5x5 regular ($p<0.001$ and $p<0.005$, respectively). Number of shots ($F=3.787$; $p<0.05$) and dribble/feints ($F=3.821$; $p<0.05$) performed by defenders was also different between game formats. In this positional status, the 5x5 modified seems to promote more dribble/feint than 7x7 regular ($p<0.05$).

CONCLUSIONS

The manipulation of the way the match was restarted seems to influence the technical and tactical performance and should be considered in development programs for young Football players.

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WHAT DID YOU EXPECT? INVESTIGATING THE ROLE OF ATHLETES' EXPECTATIONS FOR PARTICIPATION IN DEVELOPING PERCEPTIONS OF CONTROLLING COACH BEHAVIOR

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BACKGROUND/AIM

While autonomy-providing strategies have been frequently reported to result in beneficial athlete outcomes using isolated coach or athlete reports, some research also points towards possible maladaptive outcomes of participative coach behavior (e.g., provision of choice and inviting for input). This project delved deeper into the effective use of participative coach behavior by building on Implicit Leadership Theory (ILT – [1]). ILT suggests that the effectiveness of coach behavior should primarily be investigated by using coach-athlete dyads as followers have specific expectations of their leader which can alter perceptions of leadership behavior. Therefore, this project investigated how a discrepancy between athletes' expectations for participative coach behavior and coach-rated participative coach behavior was related to athletes' perceptions of controlling coach behavior.

METHODS

61 coaches and 654 athletes originating from different team sports participated in the study. Participative and controlling coach behavior were defined using the circumplex model on coach behavior [2]. Data analysis was conducted using Polynomial Regression with Response Surface Analysis (PNR RSA).

RESULTS

PNR RSA revealed that a discrepancy between athletes' expectations for participative coach behavior and coach-rated participative coach behavior was related with increased perceptions of domineering coach behavior.

CONCLUSIONS

This study showed that the effectiveness of coach behavior depends on the expectations of athletes. Coaches should consider athletes' expectations when deciding whether they involve athletes in the decision-making process as providing both more and less participative coach behavior than expected is related with perceptions of controlling coach behavior. In the event that athletes' expectations are unrealistic or coaches have to deflect from the coaching style that is preferred by the athlete, coaches could provide athletes with rationale for their coaching style to manage athletes expectations.

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COMPOSITION ANALYSIS OF MULTIFACTORIAL PEAK INTENSITY PERIODS IN ELITE FOOTBALL: DIFFERENTIATING PEAK KINEMATIC AND MECHANICAL MATCH DEMANDS

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BACKGROUND/AIM

A comprehensive understanding of the most intense periods (MIP) in elite football is critical for designing training to ensure optimal athlete preparation for competition [1-3]. The aim of this study was to characterize the composition of the 5-min kinematic (5'MIPk; running distance) and mechanical (5'MIPm; acceleration/deceleration) peak periods during match play.

METHODS

Global positioning system (GPS) data were collected during 45 matches in the Swedish First Division over two seasons (n=329 observations). The 5'MIPk period consisted of the maximum total distance covered concurrently at 15-19.8 km·h⁻¹ (RUN; running), 19.8-25.2 km·h⁻¹ (HSR; high-speed running), and ≥25.2 km·h⁻¹ (SPR; sprinting). The 5'MIPm period consisted of the maximal average magnitude of concurrent high acceleration (ACC3; ≥3 m·s⁻²) and deceleration (DEC3; ≤ -3m·s⁻²) demands. Compositional analysis of 5'MIPk and 5'MIPm periods was based on absolute and relative (percentage of 5-min period) magnitude and duration, and number of efforts of the constituent, as well as moderate-intensity running (< 15 km·h⁻¹), low acceleration (ACCLow; < 3 m·s⁻²) and deceleration (DECLow; >-3 m·s⁻²), performance variables.

RESULTS

A finalization was observed in 33.3% of the corners, but only 4.5% resulted in a goal. The ball trajectory was commonly a direct inswing (43%), through the air (86.8%). Corners were delivered to central and front post areas most frequently (8a = 36.8%; 9a = 21.9%). Six or more attackers were predominantly used (93%), but defenders won the ball more often (49%), while the goalkeeper touched the ball in 16.7% of the times. Usually, the goalkeeper assumed a position in the central third of the goal (3a = 77.2%), with the feet diagonally oriented (90.4%). The most common technical action was the save (13.2%), with the ball being secured at the first attempt in 13.2% of the times, while the jump was the most observed physical action (15.8%).

CONCLUSIONS

The results of this study demonstrate that the compositions of peak kinematic and mechanical periods are distinguished by absolute and relative parameters of specific performance variables. The detailed characterization of the respective peak periods allows coaches to design bespoke training sessions targeting specific locomotor activities and the design of 5'MIP in standardized settings to assess individualized physiological response and fatigue development to each MIP based on match demands.

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STUDY OF BODY COMPOSITION AND MOTOR SKILLS OF FUTSAL ATHLETES OF DIFFERENT COMPETITIVE LEVELS

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BACKGROUND/AIM

The aim of this study was to verify whether there are differences in the body composition, functionality, lower limbs power, agility and cardiorespiratory capacity in futsal players, comparing athletes by competitive level.

METHODS

The athletes (n=84) were divided in three groups: Group Elite (n=29), Group Sub-Elite (n=29), and Group Non-Elite (n=26). Anthropometric variables were analyzed through a bioimpedance scale (Inbody 270) and functionality are analyzed through a Functional Movement Screen battery. The power of the lower limbs with the Abalakov jump, the agility with zigzag agility test and the cardiorespiratory capacity through Futsal Intermittent Endurance Test [1].

RESULTS

Anthropometric data from futsal athletes revealed a homogeneity in relation to the variables analyzed, regardless of the level of competition in which they operate [2]. In performance variables, the power of the members functionality [3] was considered a discriminating factor of the level of the competitiveness of athletes, having the elite group athletes presented the best values in the vertical jump.

CONCLUSIONS

We concluded that there were no differences in relation to the body composition of the athletes, however the athletes of higher levels, as a rule, present better performances in physiological aspects, results that can be explained by the fact that there is a better periodization in terms of training with more intense loads and more complex competitive calendars, thus resulting in a greater specialization of these athlete.

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RELATIONSHIP BETWEEN THE PROPORTION OF DIGITS IN YOUTH FOOTBALL: COMPARISON BETWEEN ELITE AND NON-ELITE PLAYERS

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BACKGROUND/AIM

Finger length is associated with prenatal testosterone and oestrogen levels. The influence of exposure to foetal hormones becomes apparent in the length of the 2nd digit (2D) and the 4th digit (4D). Thus, 2D:4D can be considered a putative biomarker of prenatal testosterone and oestrogen levels, and their organisational effects on the organisation, structure and function of the cardiovascular, musculoskeletal and central nervous systems. It is also assumed as a biomarker for successful competitive performance [1]. The aim of this study was to analyse the finger length and ratios, in young male football athletes according to the competitive level.

METHODS

The sample comprised 70 male Portuguese football players (15.1±0.63 years of age). Anthropometry and finger length (X-ray) was measured. Descriptive statistics were calculated and independent t-test and d-cohen were used to compare players by competitive level (local, n=35; regional elite, n=35).

RESULTS

The regional elite group presents lower values in most ratios. We highlight that the average 2D:4D ratio (1.01±0.03) of the regional elite athletes presents lower values than the average 2D:4D ratio (1.03±0.02) in the local athletes [2D:4D ratio: t= 2.79; p<0.007; d=0.66-Moderate].

CONCLUSIONS

The regional elite group has longer fingers. Contrarily, their ratios are smaller, including the 2D:4D which is considered a putative indicator of prenatal testosterone. It leads us to predict that young football players in the regional elite group were exposed to higher intrauterine testosterone levels. The 2D:4D appears associated with variation caused by competitive level and, together with other measures of individual athletic potential, justify its consideration in batteries dedicated to identifying talented athletes.

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AN EXPERIMENTAL DESIGN PROPOSED TO EXAMINE THE INFLUENCE OF THE MENSTRUAL CYCLE ON JUMP PERFORMANCE IN YOUNG FEMALE FOOTBALL PLAYERS

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BACKGROUND/AIM

In recent years, women's football has shown a significant increase in the number of players worldwide. Thus, the concern with the athlete's development has increased the interest of the scientific community, particularly about the impact of the menstrual cycle (MC) on sports performance [1-3], although no clear and consistent effects are reported. The present protocol aims to analyze the influence of the MC on strength indicators in adolescent football players, particularly when examining the variation in vertical jump considering the phase of the MC (follicular phase, ovulatory phase, and luteal phase).

METHODS

The sample will consist of 20 female players, aged between 11 and 17 years (n=20). All participants must have a minimum of 2 years of football experience, have no injuries or complaints in the last 30 days, and experience menarche. Players who use oral contraceptives or another type of hormonal medication, or with changes in the MC will not be considered.

RESULTS

Assessment will comprise anthropometric, body composition, wellbeing, and physiological data, including kinetic and kinematic analysis of jump-related performance evaluated on two force platforms (Bertec force plate, model 4060-05). Vertical jump tests include the squat jump, the countermovement jump and the Abalakov jump. Information will be in three different moments: the menstruation phase (on the 2nd and/or 3rd day of the MC), in the follicular phase (12th and/or 13th day), and in the luteal phase (21st, 22nd and/or 23rd day). The characterization of the MC and confirmation of the phase will be determined by the Menstrual Symptom Questionnaire, and blood samples, with particular interest for the hormones FSH, LH, Estradiol and Progesterone.

CONCLUSIONS

It is envisaged that this methodological design will assist in clarifying some of the divergence around the effects of the menstrual cycle on strength indicators determined by jump-related performance, particularly among adolescent players.

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BONE CHANGES DURING ADOLESCENCE IN MALE ATHLETES FROM SPORTS WITH DIFFERENT MECHANICAL LOADING

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BACKGROUND/AIM

Participation in sports during the crucial years of adolescence represents a crucial role in the adult skeleton. The aim of the present study was to search and summarize the existing knowledge that concerns the study of bone changes regarding content, density, biochemical markers, geometry, and stiffness.

METHODS

The study was registered in the International Prospective Register of Systematic Reviews database (PROSPERO, number CRD42022318977). Four databases were searched for studies between the inception of the database and the 15th of July of 2021. The search target population included healthy, male, and adolescent athletes (10-18 years), interventions that included assessing bone in adolescent athletes and describing its quantitative parameters, and comparisons on studies that included different groups of athletes and/or a control group. The risk of bias for each study was assessed with the Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies.

RESULTS

The final manuscript included 44 articles that met the eligibility criteria. Bone mineral content and bone mineral density (BMD); bone biochemical markers and hormonal profile; bone geometry; and bone stiffness were considered outcomes. In a comparative study, the proximal femur of football players presented significantly higher BMD than swimmers and controls [1]. Football has higher mechanical loading and showed greater concentrations of bone formation markers than swimmers and cyclists [2].

CONCLUSIONS

The bone of adolescent athletes from sports with higher mechanical loading presents positive benefits on content, structure, and metabolism. Sports with lower mechanical loading need longitudinal follow-ups to search for training tools and exercises that help minimize the differences that are present and well described in this systematic review.

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DECISION-MAKING AND UNDERSTANDING TACTICS IN UNDER-14 FOOTBALL PLAYERS

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BACKGROUND/AIM

There are proposals for planning the football teaching and learning process from understanding-based approaches, but these are mainly based on the experience and knowledge of the coaches [1]. In addition, the access of athletes to talent development programs depends on this subjective evaluation of the coaches, so that not all players are always benefited, since this subjective evaluation may not be correct sometimes. For this reason, sports training programs for young people must be based on scientific evidence. Consequently, more studies are needed to deepen the knowledge about the development of decision-making and tactical skills. The objective of this study was to verify the influence of 14 sessions of a training program based on decision-making capacity and tactical learning in 45 Under-14 football (U-14) players.

METHODS

The 14-session training program was evaluated through the TacticUP® online platform [2], in which the perceptual-cognitive and decision-making skills of the players can be evaluated based on the fundamental principles of the game, as well as the effectiveness of the training applied in the development intervention of these skills.

RESULTS

Results showed significant improvements in post-intervention for the quality of decision-making in the intervention group compared to the control group in tactical principles on offensive and defensive skills.

CONCLUSIONS

This study aimed to verify the effectiveness of a football training program to develop decision-making skills in U-14 youth football players. The results showed that the quality of decision making was more developed in the experimental group. This verifies the validity of the training program, since significant improvements are observed compared to the control group in defensive principles outside the center of the play, in defenses and at a general level. Improvements have been perceived in just 14 training sessions, and it is expected that better results would have been achieved if the training program had been prolonged over time.

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COACH WELLBEING: THE NEGLECTED PATH TOWARDS SUCCESS

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Sport coaches have to deal with athlete misbehaviour, performance pressure and have to make difficult and unpopular decisions on a daily basis. Research in organizational and sports contexts has shown that these demands considerably impact leaders' and coaches' behaviour and wellbeing. However, research within the sport context has primarily focused on athletes' wellbeing, thereby mostly neglecting the importance of coach wellbeing.

As coach dropout is a major problem in the Flemish sport landscape, further insights into preventing decreased coach wellbeing are of great importance. In addition, studies show that athletes' wellbeing is greatly influenced by the coach and his or her behaviour. Therefore, we believe that creating more effective coaches through optimizing coach wellbeing will also contribute to athlete wellbeing in the long run. As a result, further developing this domain can have a positive impact on several actors within the sport context (i.e., coaches, athletes, sports clubs).

This short presentation will touch upon the current state of research on coach wellbeing. We will look into the demands that sport coaches face, how they impact coach burnout and dropout, and how we might improve and further study coach wellbeing in the future.

A NOVEL METHOD FOR ASSESSMENT A NETWORK OF COLLECTIVE DEFENSIVE INTERACTIONS IN FOOTBALL

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BACKGROUND/AIM

To better understand the dynamic properties of competitive interactions and to analyze the performance in team sports, the researchers are now using the social network analysis [1]. However, the research is lacking in using the network analyses of defensive interactions, which could enable individual and collective defensive organization to be more effective [2]. The present study developed a novel network method for assessing interactions between players in Football defensive phases of play.

METHODS

The networking method was evaluated using a small-sided and conditioned game (SSCG; GK+7v7+GK) of two halves of 10 min each, interspersed by 5 min intervals of active recovery. The method traced interactions between groups of three players (effective defensive triangulations) as network nodes, weighted according to the number of passes performed by the attacking players.

RESULTS

The high dimensionality obtained in the adjacency matrices of both Teams defensive networks is related to the number of possible defensive connections that a given player can establish with his teammates, during each second of the game. For example, the player assigned with a black circle established five defensive connections (order of numbers was set arbitrarily) with his teammates, resulting in the formation of four effective defensive triangulations in the ninth second of the game. Moreover, a maximum perimeter of 36m (approximately 12m between each defensive player) was established for defining an effective defensive triangle

CONCLUSIONS

The proposed social network analysis method may provide researchers, coaches and performance analysts with relevant information regarding the functional properties of teams in the defensive phase of the game.

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AGREEMENT BETWEEN ESTIMATES OF FAT MASS OBTAINED FROM BIOIMPEDANCE AND ABSORPTIOMETRY AMONG FEMALE ADULT FOOTBALL PLAYERS

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BACKGROUND/AIM

Increased body fatness has been negatively associated with poorer physical performance, particularly in football involving large amounts of covered distance during games. Two methods were used to assess body composition: (i) Bioimpedance (BIA) was used to provide a quick and accurate assessment of body composition; and, (ii) Dual-energy x-ray absorptiometry (DXA) was used to assess fat mass, lean body mass and bone mineral content following relatively simple procedures but is limited to laboratory. This study was aimed to examine the agreement between field and laboratory assessments of fat mass among adult female football players.

METHODS

The sample included 50 female football players aged 15.4-37.8 years. BIA analyzer (Akern, model BIA101, Akern Srl, Florence, Italy) and the specific software recommended by the manufacturer (Bodygram version 1.3 Akern Srl, Florence, Italy) was used passing an electric impedance with very low intensity (800µA) and with a constant frequency (50kHz). During the same day, DXA scans were completed in the laboratory by a certified technician using Lunar iDXA (enCORE version 13,60,033, GE Medical Systems Lunar3030, Ohmeda Drive, Madison, WI 53718 USA).

RESULTS

Mean values for stature and body mass were 161.7±6.1 cm and 58.7±7.6 kg. Predicted absolute fat mass were 16.0±4.7 kg and 16.9±5.2 kg, respectively by DXA and BIA. The two protocols evidenced a nearly perfect correlation ($r=0.932$; 95%CI: 0.883 to 0.961; $R^2=0.869$).

CONCLUSIONS

Field and laboratory measurements of fat mass as assessed in the current study allow estimates having an acceptable degree of accuracy and BIA may be adopted for monitoring fat mass in field conditions, particularly if protocols were performed as recommended by the manufacturer.

EFFECTS OF AMBIENT TEMPERATURE ON PHYSICAL, PHYSIOLOGICAL AND COGNITIVE DEMANDS IN FOOTBALL: WHERE DO WE STAND?

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BACKGROUND/AIM

The 2014 World Cup at Brazil exposed players to high temperatures, drawing attention to the need to study and understand the effect that heat has on physical, physiological and anticipatory performance of players [1]. This systematic review examined the effect of ambient temperature on football players who followed an assessment of the impact of physical and physiological demands and anticipation during a football-specific fatigue protocol.

METHODS

The data sources used were Cochrane Library, PubMed, Scopus, SPORTDiscus and Web of Science. The P.I.C.O.S. criteria were: (i) Healthy football players with no sex, age, or competitive level restrictions; (ii) Studies using football-specific fatigue-inducing protocol followed by assessment of anticipatory judgments using temporal and/or spatial occlusion, under controlled temperature conditions; (iii) Comparison groups will be the same as the intervention, but using a different temperature during a football-specific fatigue-inducing protocols; (iv) Outcomes will include measures of anticipation, and/or physical or physiological tests; (v) No limitations regarding study design, as long as two groups exposed to different temperatures were present.

RESULTS

The search initially identified 1,289 titles. However, none of the articles met the P.I.C.O.S. adopted, resulting in a total of zero eligible articles. Therefore, it must be concluded that evidence bases of sufficient scientific quality for the understanding the effect of high temperature on physical and physiological demands and anticipatory judgments of football players is lacking.

CONCLUSIONS

The physical and physiological demands and player's judgment ability are fundamental factors in their performance throughout the game, especially when they are exposed to high temperatures. Therefore, the diagnosis we can reach at the end of this review is that there is a gap in the literature.

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EFFECTS OF GROWTH, MATURATION, AND WORKLOAD ON INJURY RISK IN YOUNG ELITE MALE FOOTBALL PLAYERS

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BACKGROUND/AIM

The long-term athletic development of young male football players represents a long period of preponderant adaptations for the players development. In this sense, it is essential to evaluate and monitor the different modifiable (i.e., workload) and non-modifiable (i.e., growth and maturation) factors during this period. By doing so, academies could more easily develop the physical, technical and tactical qualities, while minimizing injury risk [1], as they (academies) identify and develop young players, with the aim of competing at senior level and obtaining a professional contract [2]. Therefore, the purpose of the present review is to understand the impact of maturation, growth, and workload on the injury risk of youth male football players.

RESULTS

Faster growth rates (i.e., > 0.6 cm from the previous month) and pre or circa peak height velocity (PHV) periods increase injury likelihood [3]. Furthermore, early mature boys seem to be more prone to injuries. Evidence according to associations between workload and injury in young football players is not yet robust, particularly at pubertal ages.

CONCLUSIONS

According to maturation and growing there are three red flags that practitioners should be monitoring monthly (to ensure greater precision) during the pubertal years, to reduce the risk of injury: (i) PHV year, (ii) Growth rates ≥ 7.2 cm/year (0,6cm/month), and (3) Lower-leg growth rate ≥ 3.6 cm/year (0,3 cm/month). To our knowledge, associations between workload and injury are scarce, specially at pubertal years. Therefore, associations between injury risk and workload (internal or external) should be studied. Moreover, the mediation effect of the workload on the association between growth / maturation and injury is not established. This is a gap in the literature that should be addressed.

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PHYSIOLOGICAL CHARACTERISTICS OF FEMALE FOOTBALL PLAYERS: COMPARISON BETWEEN UNDER-19 AND SENIOR AGE GROUPS

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BACKGROUND/AIM

The aim of the study was to compare the physiological characteristics of female football players at Under-19 (U-19) and Senior age groups.

METHODS

Thirty-eight female football players playing in the main team participated in the study: ten U-19 players (age, 16.5±0.8 yr.; height, 161.5±5.0 cm; weight, 57.9±10.1 kg) and twenty-eight Seniors (age, 24.0±2.6 yr.; height, 166.5±6.3 cm; weight, 61.0±7.7 kg). To evaluate the physiological characteristics, the following tests were performed: yo-yo intermittent recovery test level 1 (YYIR1), Illinois agility test, squat jump (SJ) and countermovement jump (CMJ). The YYIR1 test allowed estimating the maximum oxygen consumption. Normality (Shapiro-Wilks test) and homogeneity (Levene's test) were satisfied for a significance level of .05. To compare the groups, the Student's t test (two-tailed) was used (Statistical Package for Social Sciences, version 25.0), with a significance level of $p \leq 0.05$.

RESULTS

U-19 and Senior players presented similar aerobic performance (40.1±2.9 vs. 41.1±5.2 ml.kg⁻¹.min⁻¹, respectively; $p=0.590$). Senior players displayed significantly greater agility (16.6±0.6 vs. 17.2±0.5 s; $p=0.031$), and higher SJ (29.4±4.6 vs. 22.6±4.5 cm; $p=0.001$) and CMJ (30.8±5.2 vs. 24.6±4.4 s; $p=0.003$) scores.

CONCLUSIONS

No differences were found between groups in aerobic performance, contrary to recent studies [1]. However, senior players showed better agility performance and higher levels of explosive and reactive strength. These findings are in agreement with the literature [1] as well as the relationship between strength and speed and change of direction [2]. U-19 female players who play in the main team seem adapted to the level of aerobic performance, however, they have disadvantages in terms of lower limb strength.

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COMPARING PHYSICAL DEMANDS AND SKILL-RELATED PERFORMANCE BETWEEN 1ST AND 2ND HALF IN PROFESSIONAL FOOTBALL PLAYERS

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BACKGROUND/AIM

The aim of the study was to go further into the variation of physical demands between the two halves of official football matches and its respective association with skills-related performance.

METHODS

Professional football players (n=16, age 23.1±3.37 years) playing in the NBL 2022-2023 (Denmark) were monitored with GPS (Statsports) across 14 official matches. Technical-tactical performance was retrieved from Wyscout. We submitted total distance (TD), sprint distance (SD), high-speed running (HSR), and maximal speed (MS-km/h) to a Paired t test. The same was applied to total actions, total passes, forward, back, lateral, and last third passes, dribbles, ball interceptions, defensive, offensive, and aerial duels won.

RESULTS

The search We found significant differences for SD, HSR and MS between halves. Thus, greater distances were covered from the 1st to 2nd half, both in the SD [from 475.65±177.04 m to 342.56±122.02 m] and HSR [from 414.22±151.50 m to 295.59±98.5 m], the same tendency observed in MS [from 30.22±1.92 km/h to 29.22±1.47 km/h].

Additionally, differences were found for successful actions, total passes, back passes and interceptions which decreased from the 1st to 2nd half [from 22.07±8.51 to 18.33±10.40, from 17.39±8.83 to 14.58±10.17, from 3.40±2.12 to 2.49±1.25 and from 2.05±0.92 to 1.59±0.89, respectively].

CONCLUSIONS

The results suggested a decreasing tendency between halves, both at physical demands and skills-related performance, that partiality contradicts previous findings [1, 2]. Except for TD, the variables associated to maximal and submaximal intensities (SD, HSR, and MS) showed a decreasing trend. Further research should envision a better understanding of the connections between physical demands and skill-related performance considering match halves.

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POSSIBILITIES OF USING ARCHETYPAL ANALYSIS IN THE PROCESSING AND EVALUATION OF FITNESS DATA IN UNDER-13 AND UNDER-14 FOOTBALL PLAYERS

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BACKGROUND/AIM

Usage of archetype analysis (AA) in sport using fitness data of young football players in two scenarios. The first scenario is a within-group comparison of athletes against each other with multivariate fitness data for n=57 Under-13 (U-13) football academy players. The second scenario then shows how we can use archetypal analysis over time on a sample of the same n=19 Under-14 football players (U14) over the same data. This study provides valuable information and knowledge on the use of archetypal analysis relative to the current performance level of an athlete or team, to identify good and bad athletes as objectively as possible.

METHODS

A total of 57 footballacademy athletes aged 12.99-13.99 years participated in the follow-up survey and were tested with the test battery. The entire dataset related to the issue of performance monitoring in young football players was based on 69 selected somatic, fitness and functional data. A selected group of athletes who were recruited into the football academy, consisting of 19 boys, were then tested one year later in the U-14 category with the same test battery. Archetypal analysis was used.

RESULTS

Out of n=57 players, n=19 players were selected for the football academy, which is 33.3% of the total number of players. The selected players had an

average archetype 3 value of 0.30 overall. Whereas the non-selected players had an average value of 0.45 for archetype 3. Thus, selected players have 0.15 less archetype 3 value than non-selected players. From the results, it can be seen that the archetype 3 component is at the highest value (0.45) for the non-selected players, whereas the archetype 1 component dominates the selected players (0.45). Based on the results of the logistic regression, we find that as the value of archetype 1 increases, players have a significantly more likely to be selected (OR=52.9; p=0.032) selected for the football academy.

CONCLUSIONS

In this study, the AA method was applied to performance data of football players. Findings from AA for fitness data were confirmed in selected areas of motor and somatic data. The division into three archetypes corresponded in performance in both speed tests and body composition analysis. Better players are classified into archetype 1 and 2, which represent faster players with a lower percentage of fat. As training improves over time, the coefficient alpha improves and there are smaller changes in archetype 1 and 2 while not translating into archetype 3, where we identify weak players. Thus, this analysis could be useful in identifying and developing talented football players and assessing their progress over time. Last but not least, AA is able to identify very accurately the archetype held over time for many data at an early age.

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