



REVIEW ARTICLE

RESEARCH TRENDS IN FOOTBALL TRAINING FOR YOUNG PLAYERS IN THE LAST 15 YEARS: BIBLIOGRAPHIC ANALYSIS

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Abstract

The objective of this paper is to evaluate the research trends in football training for young players under 18 years old in the last 15 years.

Materials and methods. This was a bibliometric analysis and systematic review study. Articles published since 2008 were searched for by the keywords "Football Training" and "Football Exercise" using a comprehensive strategy on SCOPUS research journal databases. There were 1,053 articles with 4802 citations mined on October 17th, 2023. Thereafter, 217 articles were selected for further analysis by using VOS Viewer computer software.

Results. The United Kingdom (67), The United States (60), and Spain (41) were the three countries that had the most publications in football training. There were 6 keyword clusters that reflected various research focuses on football training for younger players. Based on the top 10 most cited references in football training for younger players, there were several major themes that covered various aspects of the research trend and development in the last 15 years, i.e. (1) Factors in the Development of Young Football Players, (2) Tactical Analysis and Collective Behavior in Small-Sided Games, (3) Game Intensity and Activity Profile in Young Football Players, (4) Plyometric Training and Its Effects on Preadolescent Players, and (5) Injury Prevention and Neuromuscular Training in Adolescent Football Players.

Conclusions. Football research for under-18 players has grown rapidly. This research trend shows that football requires not only physical and technical skills, but also social and mental aspects. Further research can be directed toward understanding and integrating holistic aspects of football coaching, including the development of non-physical skills, such as leadership, teamwork, and conflict resolution. Further investigation into the use of technology in football coaching, such as video analysis, sensor-based performance measurement, and artificial intelligence applications to provide deeper insight into player progress.

Keywords: football training, bibliometric, young player, sports science.

Introduction

One of the most popular sports in the world is football (Hansen et al., 2013). This is due to the dynamic nature of

football, which allows players to switch between defensive and attacking positions (Serghei et al., 2021). Football is a team sport in which participants make physical contact with one another (Mohr et al., 2022). In addition, playing football calls for a variety of athletic abilities (Ramírez-Campillo, Henriquez-Olguín, et al., 2015), mental, tactical, and technical acuity (Ferrete et al., 2014). The process of teaching football is intended to help players improve their technical, physical, tactical, and mental skills (Asadi et al., 2018).

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The cornerstone of the football game is technical ability (Olthof et al., 2015). This covers moves including dribbling, passing, kicking, controlling the ball, and using both feet while playing (Coutinho et al., 2023). It is through systematic and consistent practice that young players are guided to master these abilities (Campolettano et al., 2016). In football, being in good physical shape is crucial (Cvetković et al., 2018). Moreover, strengthening, speed, endurance, flexibility, and coordination can all be achieved through physical exercise (Negra et al., 2017). This aids players in enduring lengthy and difficult battles (Makhlouf et al., 2018).

Coaching football also include studying game strategies (Nakonechnyi et al., 2023). Basic ideas like playing position, team formation, attack, defense, and playing strategy must be understood by players (Bolotin & Bakayev, 2017). This entails being able to read the game and making wise choices (McGuckian et al., 2020). Football is a game where mentality is very crucial (Kozina et al., 2019). Gamers need to develop their ability to regulate their emotions, stay focused, boost their confidence, and handle pressure (Fernandez-Gonzalo et al., 2010). Additionally, coaches can offer guidance on effective communication, motivation, and rebounding from setbacks (Figueres et al., 2014).

Coaching football frequently entails attending games and competitions (Bettega et al., 2023). This allows players to use the abilities and information they acquire in practical settings (Alesi et al., 2015). Additionally beneficial to mental growth and experience coping with game strain is competition (Hendry et al., 2014). Excellent facilities and knowledgeable supporters are essential components of a successful football coaching program (Prasetya & Argantos, 2019).

Coaching football also entails assessing and tracking player development (Deprez et al., 2015). This enables athletes to pinpoint their areas of weakness and establish developmental objectives (Brechtot & Flepp, 2020). In addition to the technical and physical aspects, teaching football ethics is crucial (Práxedes et al., 2016). Fair play, sportsmanship, and consideration for both opponents and teammates are examples of this (Mills et al., 2012). Football coaching is a continuous process that needs the families, coaches, and players to be committed (Eather et al., 2020).

Football players can maximize their abilities and potential through this methodical and thorough technique, propelling them to new heights in the sport (O'Connor et al., 2018). Good football coaching also helps create a strong foundation for the future of the sport of football as a whole (Akenhead & Nassis, 2016). However, football coaching doesn't just apply to elite athletes, it also applies to all age levels and skill levels (Balyi et al., 2013). This means that everyone could thrive in the sport they love. A lot of research related to football training has also been carried out, but the trend for younger players is still not focused and still not contextual enough to be directly implemented by coaches. This bibliometric research aims to see the development of research trends in football training for young players under 18 years of age in the last 15 years with the following research question:

1. To analyze the football training for young players under 18 years old's research trends in the last 15 years.
2. To analyze the countries that contributed to football training for young players under 18 years old's research trends in the last 15 years.

3. To analyze the pattern of keyword clusters in football training for young players under 18 years old's research trends in the last 15 years.
4. To analyze the top 10 cited publications in football training for young players under 18 years old's research trends in the last 15 years.

Materials and methods

Materials for analysis

There were 1,053 articles from Scopus that were mined on October 17th, 2023. Therefore, 217 articles were selected for further analysis by using VOS server computer software. There were 10 articles selected as the most cited articles which were selected for this systematic review.

Organization of the study

This type of research is a Bibliometric Analysis and Systematic Review. Article searches were carried out using a comprehensive strategy on SCOPUS research journal databases. The keywords used are "Football Training", "Football Exercise", and "Football Academy". Furthermore, the exclusion criteria were journals published in the last 15 years from 2023.

Methods of analysis

For standard operationalization, this study follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).

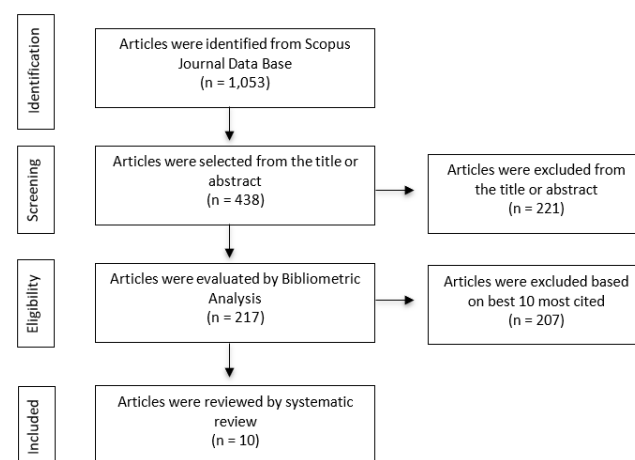


Fig. 1. PRISMA flowchart of the article selection process

Results

Research Trend of Football Training for Young players Under 18 Years Old in the Last 15 Years

The research trends of football training for young players under 18 years old in this literature review are presented in Table 1. The number of publications (f) fluctuates from year to year, with notable variations. However, the total number of citations (Total Cited) tends to increase gradually over

Table 1. Document of Football Training Research for Young players Under 18 Years Old in the Last 15 Years

Year	f		Total Cited		Average Cited	
2008	4		152		78	
2009	3		170		86.5	
2010	6	21	364	1313	185	667
2011	5		126		65.5	
2012	3		501		252	
2013	8		472		240	
2014	7		319		163	
2015	15	52	527	1933	271	992.5
2016	11		371		191	
2017	11		244		127.5	
2018	21		445		233	
2019	25		453		239	
2020	32	144	463	1556	247.5	850
2021	33		163		98	
2022	16		27		21.5	
2023	17		5		11	
Total	217		4802		2509.5	

the years, reaching its peak in 2020 with 463 citations. In 2015, there was a substantial increase in the number of publications (15) compared to the previous year. This year also stands out for receiving the highest total citations (527), signifying significant academic recognition.

The average number of citations per publication (Average Cited) showcases substantial variability, indicating the impact and reception of publications in different years. While the number of publications remained relatively consistent from 2016 to 2019, the total number of citations steadily increased, indicating an increasing impact of the work. The average number of citations per publication in 2020 is the greatest (247.50), indicating that the influence and caliber of articles in that year were very notable. In 2021, there was a notable decline in the average number of citations per publication, which deviates significantly from prior trends.

The dataset's lowest average citations per publication occurred in 2022 and 2023 as a result of large increases in both the total number of citations and publications. In conclusion, this table emphasizes how academic research is dynamic and has differing degrees of influence and acknowledgment depending on the year. The average number of citations per publication, total number of citations, and changes in publication numbers offer important insights on how the body of scholarly work in the subject is changing. In this academic setting, it might provide a foundation for additional analysis and research evaluation.

Research conducted between 2008 and 2012 about football training for young players under the age of eighteen (2012) found that a significant portion of the research focused on injury aspects, particularly ligament injuries. In order

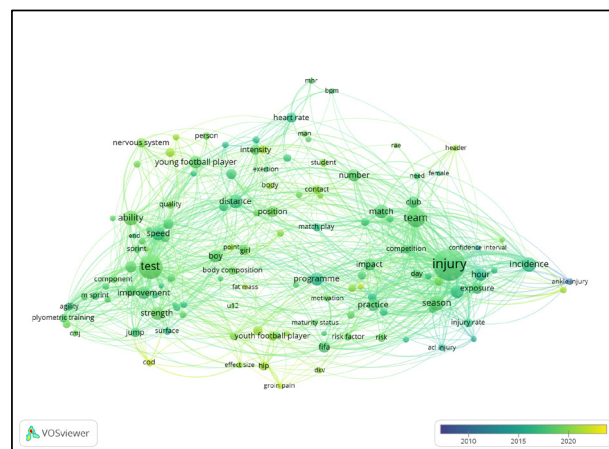


Fig. 2. Football Training Research Trends over the Past 15 Years for Young Players

to determine the elements impacting the growth of young football players, Mills et al. (2012) conducted interviews with coaches. They placed a special emphasis on awareness as a fundamental component. Conversely, a cluster randomized controlled trial was carried out by Walden et al. (2012) to assess the efficacy of neuromuscular training in lowering the incidence of knee injuries among female teenage football players. During this time, there was a shift in study focused on figuring out how to lower the risk of injury that young football players suffer in order to enhance their health and playing experience.

Between 2013 and 2017, the focus of research switched to different types of fitness regimens for young players. Studies on plyometric training in preadolescent athletes, including those by Michailidis et al. (2013) and Ramírez-Campillo, Burgos, et al. (2015), demonstrate the considerable performance gains that may be achieved with this kind of training. The need to create training regimens that take into account the developmental traits of young football players is highlighted by the growing body of knowledge regarding the training modalities that are most suitable and advantageous for these players at this age.

From 2018 to 2023, more research will be conducted on the neurological system, physical capabilities, and body composition as supporting factors in performing basic technical training. Studies conducted during this time period, like Kilding et al. (2018), concentrate on the efficacy of training regimens that can aid in the growth of young athletes, not just in terms of fundamental skills but also in bolstering areas such as the neurological system, physical capabilities, and body composition. This study sheds new light on the value of a comprehensive approach to training young football players in order to maximize their development and minimize injuries, laying the groundwork for a successful future in the game.

Country Contributed to Football Training Research for Young Players Under 18 Years Old in the Last 15 Years

Table 2 offers a thorough summary of the top 10 nations that, throughout the past 15 years, have significantly advanced the field of football training research for young

Table 2. Top 10 Countries Contributed to Football Training Research for Young Players Under 18 Years Old in the Last 15 Years

Country	f	Total Cited	Average Cited
United Kingdom	67	1596	831.50
United States	60	1220	640.00
Spain	41	852	446.50
Australia	33	579	306.00
Germany	29	626	327.50
Italy	26	417	221.50
Switzerland	21	541	281.00
Denmark	20	550	285.00
Portugal	19	617	318.00
Poland	18	108	63.00
Total	334	7106	372.00

players under the age of 18. It provides information on the volume and significance of research done in each of these countries as well as the typical number of citations for each article. The United States and the United Kingdom have been the leading countries in football training research for players under the age of eighteen. These two countries, with 67 and 60 publications, respectively, have demonstrated a constant commitment to this topic.

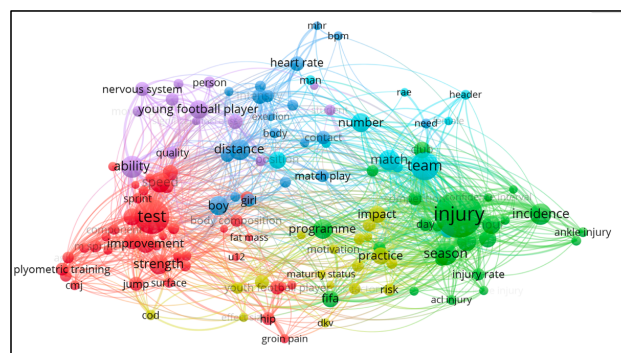
The UK shines out when it comes to both the quantity of articles and the overall number of citations (1596). This suggests that their research has had a significant influence on youth football training. The UK has the highest average citation rate (831.50) among all countries, and their publications have the highest average citation rate as well. This implies that their body of work is not just substantial but also quite important in the academic world.

The global spread of football research is also dominated by several major football countries such as Spain, Australia, Germany, Italy, and Portugal. They made significant contributions, each with a noteworthy average citation rate, indicating the global importance of their research efforts. In addition, Switzerland and Denmark make appearances in the top 10, indicating their dedication to youth football training research. Their average citation rates of 281.00, 285.00, and 318.00, respectively, underscore the quality and influence of their work. Poland, with 18 publications and an average citation rate of 63.00, ranks as the 10th contributor. While it has fewer publications compared to the leading countries, its research has made a significant impact within its niche.

Overall, there are 334 authors and 372 average citation rates for the top 10 countries combined is emphasizing the significance of football training research for young players under 18 on a global scale. The top 10 countries were dominated by European and American continent countries. In Asia and Africa continent, there are China (16 authors) and Tunisia (12 authors) as the top countries with the most authors in football training research publications. The data serves as a valuable resource for understanding the international scope and importance of research in this field, making it an essential reference for academics, policymakers, and sports enthusiasts.

Keyword Clusters Pattern in Football Training for Young Players Under 18 Years Old's Research Trend in the Last 15 Years

Research on football training programs for young players under 18 years of age over the last 15 years has several 6 keyword clusters that reflect various research focuses. The first cluster, involving words such as agility, balance, body composition, and CMJ, indicates that research at that time has mostly discussed the physical and agility aspects of young players. Research with a focus on developing physical abilities and balance is the center of attention for improving the performance of young football players. The second cluster highlights injury issues, especially those related to ACL injuries, knee injuries, ankle injuries, and injury burden. This research explores risk factors and injury rates to improve the safety and health of child football players. In this cluster, research is more focused on injury risk analysis and effective prevention strategies.

**Fig 3.** Keyword Cluster Pattern in Football Training Research for Young players in the last 15 years

The third cluster focuses on football training and its impact on heart rate, training intensity, physical activity, and football training in general. By highlighting the physiological aspects of football training, research in this cluster aims to better understand the extent to which it can influence the health and fitness of young players. The fourth cluster addresses the psychological and social context in the development of child football players. Involving words such as childhood, coaching practice, maturity status, motivation, and risk factor, research in this cluster tends to investigate non-physical factors that influence player development.

The fifth cluster, consisting of words such as ability, effectiveness, experiment, nervous system, and indicator, describes research that focuses more on the evaluation and assessment of training programs. The focus of research in this cluster is more related to how effective certain training programs are in improving abilities and measuring certain performance indicators in young football players. The sixth cluster includes words such as male, female, goalkeeper, position, and team, indicating that research also pays attention to the differences and characteristics between male and female players, the role of goalkeeper, player position, and teamwork in the context of training programs for young players under 18 years old. In all, these five clusters reflect the diversity of research efforts to investigate and improve football training programs for youth players.

Table 3. Top 10 Cited Publications in Football Training Research for Young players Under 18 Years Old in the Last 15 Years

No	Author	Total Cited	Research purposes	Methods	Results
1	(Waldén et al., 2012)	292	To evaluate the effectiveness of neuromuscular training in reducing the level of knee injury in adolescent female football athletes.	Stratified cluster randomized controlled trial with clubs as the unit of randomization.	Based on Cox Regression analysis, there was a 64% reduction in knee injury rate. There was no significant reduction in secondary outcomes.
2	(Mills et al., 2012)	155	Identify factors that influence the development of football athletes at a young age	Interviews study with 20 coaches contacted who met the criteria, 10 agreed to participate in the study representing a 25% sample of all academies that currently function in English football.	The identification results show that awareness is the basic element for a young athlete to develop to a professional level.
3	(Folgado et al., 2014)	147	To identify how tactical collective behavior varies with age in different small-sided game formats.	Experimental study with Thirty youth players (mean 9 SD; age 10,539 1.81) participated in this study, divided by age group: 10 players U9 (age 8,590.53); 10 players U11 (age 10,490.52) and 10 players U13 (age 12,790.48)	Length and width ratio and centroid distance are useful measures of tactical performance in small-sided games in youth football.
4	(Mendez-Villanueva et al., 2013)	138	To quantify match play intensity distribution in young football players in relation to age, playing position and physical fitness.	Correlations study with 103 highly trained young players (Under13 to Under 18) during 42 international club games.	There was a correlation between max aerobic speed (MAS) and the furthest distance traveled above MAS for all positions except striker. Heart rate (HR) did not differ across positions and age groups.
5	(Randers et al., 2010)	128	Aimed to examine the activity profile, heart rate, and metabolic responses in an untrained male and female small-sided football game. In addition, it also looked at the effect of the number of players in a small-sided football game.	Experimental study with untrained males (UM, n=26) and females (UF, n=21), young players aged 9 and 12 years (C9+C12, n=75), as well as homeless (HM, n=15), middle-aged (MM, n=9) and elderly (EM, n=11) men.	Small-sided football games have the potential to physiologically adapt and improve performance through regular practice for different types of study groups.
6	(Michailidis et al., 2013)	122	This study aimed to determine whether preadolescent boys exhibit plyometric trainability or not.	Experimental Approach to the Problem	These data indicate that (a) prepubertal boys exhibit considerable plyometric trainability, and (b) when football practice is supplemented with a PT protocol, it leads to greater performance gains.
7	(Häggglund et al., 2013)	113	To evaluate team and player compliance with an NMT program in adolescent female football and to study the association between compliance and acute knee injury rates.	Prospective cohort study based on a cluster randomized controlled trial on players aged 12–17 years with 184 intervention teams (2471 players) and 157 control teams (2085 players).	Players with high compliance with the NMT program had significantly reduced ACL injury rates compared with players with low compliance. Significant deterioration in team and player compliance occurred over the season.
8	(Deprez et al., 2015)	109	To determine the influence of anthropometry, physical performance, and motor coordination on dropping out of professional football training programs and future contract status.	There were 2-study approaches conducted. In both the same methods, we used an experimental approach to the problem.	Anthropometric characteristics, maturity, fitness and motor coordination were successful in predicting the future careers of youth football players.

Table 3 (continued)

No	Author	Total Cited	Research purposes	Methods	Results
9	(Ramírez-Campillo, Burgos, et al., 2015)	109	The aim of the study was to compare the effects of bilateral, unilateral, or combined bilateral and unilateral plyometric training (PT) on muscle power output, endurance, and balance performance adaptations in young football players.	Experimental Approach to the Problem	The current study showed that bilateral, unilateral, and combined bilateral and unilateral PT ensured significant improvement in several muscular power and endurance performance measures in young football players. However, the combination of unilateral and bilateral drills seems more advantageous to induce superior performance improvements.
10	(Kilding et al., 2008)	92	The aim of this study was to determine the suitability and effectiveness of “The 11” for younger football players.	Experimental study with twenty-four [12 experimental (EXP), 12 control (CON)] young football players (age 10.4 ± 1.4 yr) participated.	Given the observed improvements in the physical abilities and the perceived benefits of “The 11”, it would appear that a modified version of the program is appropriate and should be included in the training of young football players, for both physical development and potential injury prevention purposes, as well as to promote fair play. To further engage young football players in such a program, some modifications to “The 11” should be considered.

Top 10 Cited Publications in Football Training Research for Young players Under 18 Years Old in the Last 15 Years

Based on the research data that has been presented, we can identify several major themes that cover various aspects of the development and understanding of the world of football, especially for young players. The following are five major themes that can be drawn from the research results.

Factors in the Development of Young Football Players

The studies by Mills et al. (2012) and Deprez et al. (2015) offer comprehensive understanding of the elements that are crucial to young football players' development. In order to learn more about the elements thought to be important in the player development process, Mills et al. decided to interview coaches. The study's findings support the notion that awareness is a prerequisite for young athletes to succeed at the professional level. Insight into elements like mindset, drive, and commitment that are essential in developing good athletes is given by coaches.

Conversely, studies conducted in 2015 by Deprez et al. broadened this view to incorporate motor coordination, physical performance, and anthropometric measurements as indicators of future success in young athletes. Through the use of experimental techniques, this study demonstrates how young football players' future careers can be predicted by their anthropometric traits, maturity level, degree of fitness, and motor coordination. This research offers a compre-

hensive understanding of the variables that football teams and academies might consider while molding and developing their young potential by integrating these various facets. These results could significantly impact initiatives aimed at enhancing youth football player development programs.

Tactical Analysis and Collective Behavior in Small-Sided Games

Folgado et al. (2014) research significantly advanced our knowledge of collective behavior and tactical analysis in the setting of small-sided football games for young players. This study investigates differences in collective tactical performance using particular factors by involving three distinct age groups. The findings demonstrated that the centroid distance and pitch length to width ratio emerged as helpful metrics in evaluating and comprehending the dynamics of small-sided play at various age levels. These results shed light on how tactical comprehension changes with age and could serve as a foundation for the creation of training regimens that are more beneficial at particular developmental stages.

Furthermore, this study can offer a more profound understanding of the tactical components that should be prioritized in the instruction and growth of young football players. Coaches are able to create training regimens that are more suited to the individual development stages of their players by seeing how behavior changes collectively as individuals age. A solid foundation for the development

of young players' football potential can be laid by providing an appropriate training environment that enhances their collective decision-making and football skills. This can be achieved through the use of in-depth tactical analysis.

Game Intensity and Activity Profile in Young Football Players

Mendez-Villanueva et al. (2013) and Randers et al. (2010) conducted studies on game intensity and activity profiles in young football players that offer detailed insights into the way that young players react to different activities during football games. Mendez-Villanueva et al. (2013) found a link between maximal aerobic speed (MAS) and highest distance traveled above MAS for all playing positions, with the exception of striker, using 103 highly trained youth football players. Furthermore, young players, youth, and adult men participated in small-sided football games as part of Randers et al. (2010) research. Randers et al. (2010) found that regular practice of tiny football games can lead to physiological adaptation and improved performance for various study groups.

This study advances our knowledge of how young football players' bodies react to the intensity of a game and adjust accordingly. These two studies provide valuable insights into the intensity distribution and activity profile during play, which may be used to inform more targeted and efficient training plans for young football players. These results may also have a significant impact on how young football players manage their health and exercise regimens, assisting coaches and coaching staff in creating workout plans that take into account the players' unique physiological and physical makeup.

Plyometric Training and Its Effects on Preadolescent Players

An in-depth understanding of the impact of plyometric training on young football players' performance is provided by studies conducted on preadolescent players by Michailidis et al. (2013) and Ramírez-Campillo, Burgos, et al. (2015). Preadolescent boys demonstrated notable levels of adaptability to plyometric exercise, according to Michailidis et al. (2013), suggesting that this type of training can have a major positive impact on performance. In this regard, Ramírez-Campillo, Burgos, et al. (2015) research further demonstrated that, for young football players, combining bilateral and unilateral plyometric training produced greater increases in a number of muscle performance and endurance indices.

The notion that plyometric training might be an advantageous part of a preadolescent player's training regimen is supported by these results. This study contributes significantly to the understanding of the kinds of training that can have the greatest effects on young football players' physical development and performance by highlighting the advantages of plyometric training and even assessing variations of bilateral and unilateral approaches. For coaches and coaching staff working with preadolescent athletes to enhance their physical capacity and technical skills, this offers a more focused and in-depth perspective.

Injury Prevention and Neuromuscular Training in Adolescent Football Players

Important information about how certain therapies, like neuromuscular training, might reduce injuries in adolescent

football players is provided by Walden et al. (2012) and Hägglund et al. (2013). A cluster randomized controlled trial design was employed by Walden et al. (2012) to assess the efficacy of neuromuscular training in lowering the incidence of knee injuries among female teenage football players. The findings revealed a noteworthy 64% decline in the incidence of knee injuries. While secondary outcomes did not significantly decrease, this study offers a solid foundation for integrating neuromuscular training into youth football player training regimens.

Hägglund et al. (2013) monitored the use of a neuromuscular program in youth football for females and assessed the degree of program compliance among the team and individual players. According to the findings, players who adhered to the program closely reduced their risk of anterior knee ligament (ACL) injuries in comparison to individuals who did not. The conclusion highlights the vital role that preventative interventions play in improving the health and performance of these young football players by suggesting that knowledge of and adherence to neuromuscular training programs can play in lowering the risk of injury in young football players.

Discussion

Football has been the subject of extensive research over the past 15 years, and there has been a notable rise in the number of young players under the age of 18 participating in local leagues and tournaments (Badawi & Nasrulloh, 2023). This growing interest is fueled by player development programs organized by local football federations and investment in football infrastructure (Sanmiguel-Rodríguez et al., 2023). While increased participation provides great opportunities, new challenges arise regarding providing adequate facilities and training to support the development of these young players (Ihsan et al., 2022). Therefore, the role of quality facilities and the development of structured training programs is very important to help young players reach their potential (Nuttouch et al., 2023).

Technical skills, including dribbling, ball control, and kicking ability, are identified as key foundations in football development (Giovanni et al., 2020). Understanding and mastery of these skills are taught through structured and repetitive practice (D'Isanto et al., 2022). Additionally, good physical condition, including strength, speed, endurance, flexibility, and coordination, is recognized as key in supporting a player's performance during long, intense matches (Sulistiyono et al., 2021). Tactical understanding, such as team formation, attack, defense, and strategic decision-making, is also an important focus in player development (Kostiukevych et al., 2020). Mental aspects, including emotional control, maintaining focus, increasing self-confidence, and handling pressure, are recognized as an integral part of football coaching (Godfrey & Winter, 2017).

Matches and competitions are an important stage in player development, providing opportunities for them to apply the skills and knowledge they have learned in real situations (Liu et al., 2016). Quality facilities and experienced support are important factors in successful football coaching (Leite et al., 2023). Evaluation and monitoring of player progress is necessary to identify areas of improvement and set goals (González-Víllora et al., 2015). Apart from the physical and technical aspects, ethical education in football, such as

fair play and sportsmanship, is recognized as important in player development (Kriswanto et al., 2022).

Football coaching is not a stopping process but is ongoing and requires commitment from players, coaches, and their families. Through a structured approach, football players can develop their skills and potential, reach higher levels in the sport, and create a strong foundation for the future of football. By examining research patterns in under-18 football training, bibliometric research brings a useful perspective to the field. Research trends, national contributions, keyword patterns, and most cited publications are all included in the analysis, which offers helpful information for future advancements in the field of football instruction.

Conclusions

Football research for under-18 youngsters has expanded quickly during the past 15 years. This study demonstrates that football demands not just technical and physical ability but also social, cerebral, and tactical abilities. Football coaching entails routine, systematic practice aimed at fostering fundamental technical abilities, physical fitness, tactical awareness, and mental toughness. A player's growth is greatly aided by competitions and matches, which offer chances to put talents to use in practical settings. Integral components of coaching include holistic teaching, football ethics, and player progress evaluation.

The last fifteen years have seen dynamic research trends, according to bibliometric research data. The number of publications increased significantly, reaching a peak in 2020. Analysis of country contributions shows that the UK and the USA have been the main contributors, with their research having a high impact. Keyword groupings reflect the diversity of research focus, including physical aspects, injuries, psychological aspects, exercise program evaluations, and gender differences.

Further research can be directed toward understanding and integrating holistic aspects of football coaching, including the development of non-physical skills such as leadership, teamwork, and conflict resolution. Further investigation into the use of technology in football coaching, such as video analysis, sensor-based performance measurement, and artificial intelligence applications to provide deeper insight into player progress. Lastly, developing a holistic evaluation method to understand player development based on accountable data.

Acknowledgment

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Conflict of interest

The authors declare that they have no conflict of interest.

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ТЕНДЕНЦІЇ ДОСЛІДЖЕНЬ НАВЧАННЯ ГРИ У ФУТБОЛ МОЛОДИХ ГРАВЦІВ ЗА ОСТАННІ 15 РОКІВ: БІБЛІОГРАФІЧНИЙ АНАЛІЗ

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Авторський вклад: А – дизайн дослідження; В – збір даних; С – статаналіз; D – підготовка рукопису; E – збір коштів

Реферат. Стаття: 12 с., 3 табл., 3 рис., 51 джерело.

Метою цієї роботи є оцінка тенденцій досліджень навчання гри у футбол молодих гравців віком до 18 років за останні 15 років.

Матеріали та методи. Це було дослідження, яке складалося з бібліометричного аналізу та систематичного огляду. Пошук статей, опублікованих із 2008 року, здійснювали за ключовими словами «Навчання гри у футбол» та «Футбольні вправи» з використанням комплексної стратегії в базах даних дослідницьких журналів SCOPUS. 17 жовтня 2023 року було зібрано 1053 статті з 4802 цитуваннями. Після цього 217 статей було відібрано для подальшого аналізу за допомогою комп'ютерного програмного забезпечення VOS Viewer.

Результати. Великобританія (67), Сполучені Штати (60) та Іспанія (41) були трьома країнами, які мали найбільше публікацій із навчання гри у футбол. Було 6 кластерів ключових слів, які відображали різні центри зосередження уваги досліджень навчання гри у футбол молодих гравців. На основі 10 найбільш цитованих посилань за тематикою навчання гри у футбол молодих гравців було виділено кілька основних тем, які охоплювали різні аспекти тенденцій та розвитку цих досліджень за останні 15 років, тобто (1) Фактори розвитку молодих футболістів, (2) Тактичний аналіз і колективна поведінка в іграх неповними складами, (3) Інтенсивність гри та профіль активності молодих футболістів, (4) Пліометричне тренування та його вплив на гравців передпідліткового віку та (5) Профілактика травм і нервово-м'язове тренування у футболістів підліткового віку.

Висновки. Дослідження футболу для гравців віком до 18 років стрімко зростають. Ця тенденція досліджень показує, що футбол вимагає не лише фізичних і технічних навичок, а й соціальних і психічних аспектів. Подальші дослідження можуть бути спрямовані на розуміння та інтеграцію цілісних аспектів тренерства з футболу, включаючи розвиток нефізичних навичок, таких як лідерство, робота в команді та вирішення конфліктів. Для глибшого розуміння прогресу гравців потрібні подальші дослідження використання технологій у тренерстві з футболу, таких як відеоаналіз, сенсорне вимірювання продуктивності та застосування штучного інтелекту.

Ключові слова: навчання гри у футбол, бібліометричний, молодий гравець, спортивна наука.

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