



## EFFECTIVENESS ANALYSIS ON CIRCUIT TRAINING METHOD ON ENDURANCE OF FOOTBALL PLAYERS

Ananda Yogi Saputra<sup>1</sup>, Adi S<sup>2</sup>

Universitas Negeri Semarang<sup>1,2</sup>

[anandayogi09@students.unnes.ac.id](mailto:anandayogi09@students.unnes.ac.id)<sup>1</sup>, [adis@mail.unnes.ac.id](mailto:adis@mail.unnes.ac.id)<sup>2</sup>

### Article's Info

#### Article's History:

Received February 2025

Accepted March 2025

Published May 2025

#### Keywords:

Circuit, Training,  
Endurance

### Abstract

The reason of this inquiry is to see into the utilize Analysis of Inclusive In circuit training for endurance football players. The PRISMA guidelines for precise audits and meta-analyses were taken after in this audit examination. The consider must be distributed inside the earlier five a long time, from January 2020 to July 2024. Within the look strategy, the taking after watchwords are utilized: (1) Circuit (2) Training (3) Endurance. The search engines Scopus (a large, multidisciplinary database of peer-reviewed literature: scientific journals, books, and conference proceedings). The topic of this inquiries about as an entire gotten 422. Contains 161 articles which are at that point taken 10 significant articles. Analysis of circuit training exercises in increasing the endurance of soccer players in this study obtained data in Scopus and then processed it into a research analysis with the topic circuit training, endurance, and soccer with a total of 422 search results and 161 articles with the right topic and 10 articles taken as material for the analysis of this research. This study aims to analyze the effectiveness of the circuit training method on improving the endurance of soccer players. Endurance is an important component in modern soccer, which requires players to maintain high performance throughout the match. The circuit training method was chosen because of its time efficiency, exercise variety, and relevance to the physical demands of soccer. This study concludes that the circuit training method is effective in improving the endurance of soccer players, and can be an efficient and effective alternative in soccer training programs. The results of this study indicate that circuit resistance training significantly improves muscular strength endurance. Resistance training has strong evidence to improve athletes' physical fitness, including benefits related to competitive ability and performance. Training methods to improve physical strength in soccer refer to training goals related to improving soccer players' endurance or physique. Training strategies have been shown to promote soccer player achievement because these exercises can improve the player's physical and endurance which increases the player's achievement. The circuit training method to improve physical strength in football sports refers to training related to improving endurance or physical football depending on the importance of sustainability for excellent football players and even experts to improve their physical performance and achievements in the game. In addition to doing circuit training, there are a number of other factors that football players must take into account if they want to improve their physical antibodies, namely by doing high-intensity training for a long time or by doing high-intensity training to boost the athlete's physical strength performance.

## INTRODUCTION

Football may be a complex wear of cooperation and competition, a shared space whose objective is to kick the ball into the inverse objective more times than the restriction (guță & orănescu, 2023). Football exercises may be specifically related to the playing position of the players on the field; so, football players create their particular physical characteristics based on the requests of person positions (ferasat, 2021). Football may be a isolated frame of excitement for the community, numerous think that the climate without football some of the time gets to be boring. Essentially, football speaks to cherish where everybody truly needs to see their icon players, football clubs and a few styles of football (fairy, 2022). Football is a complex sport involving cooperation and competition, with players creating physical characteristics based on their positions. It is a shared space with a shared objective, and many believe that without football, the world becomes boring. Football speaks to community and appreciation for icon players and clubs. Football is a sport that requires a complex combination of technical, tactical and physical conditions. Among the important components of physical condition, endurance plays a significant role. Football players must be able to maintain high performance during the game, including long races, sprints and recover quickly. The circuit training method (circuit training) has long been recognized as an effective approach to improving various aspects of physical form, including sustainability. Circuit training associated with a series of training stations is designed to train different muscle groups and energy systems in sequence with minimal rest.

This study aims to analyze the effects of pulse training methods on muscle and football improvement. By measuring parameters such as VO2 Max and muscle Endurance, this study will provide scientific evidence on the effectiveness of circuit training in the context of football.

Compound training to improve change of direction and vertical jump performances in young novice soccer players, which are unfamiliar with structured and advanced strength and plyometric training (Trecroci et al., 2020). The intensity-controlled total-body Circuit Training convention consolidated into a standard soccer preparing program is compelling for improvement in physical wellness execution in prepubertal soccer players (Boraczyński et al., 2021). Continuance preparing plays a essential part in football execution, forming players' cardiovascular wellness and metabolic alterations (Farooque et al., 2023). Compound training improves change of direction and vertical jump performances in young novice soccer players. Intensity-controlled total-body Circuit Training is effective for physical wellness in prepubertal players, while continuous training forms cardiovascular wellness and metabolic changes. Modern football requires players to have high endurance. The intensity is accordingly increased, with regular sprints, long distance races and rapid changes, making cardiovascular and muscular endurance a determining factor in performance. Players are able to maintain high performance throughout the match with important tactical and strategic advantages. The circuit training method has long been recognized as an effective approach to improving various aspects of fitness, including endurance. By involving a series of exercise

stations designed to work different muscle groups and energy systems in sequence, circuit training offers time efficiency and training variety relevant to the physical demands of soccer.

The comes about of (Ferasat, 2021) this inquire about as it were center on the physical characteristics of players per position or per person, not as a group furthermore. The impediment of this investigate is that the advancements made utilizing circuit preparing and plyometric preparing strategies as it were centered on expanding quality, not perseverance tirelessness at (Farooque et al., 2023). That point the following impediment is that this investigate on expanding perseverance as it were employments a test of elite class child soccer players, not proficient soccer players. The research focuses on physical characteristics of players per position or person, not as a group. It has limitations, such as focusing on improving quality rather than perseverance, and using elite class child soccer players instead of proficient players. Although the potential benefits of circuit training have been recognized, its effectiveness in improving recovery in soccer players requires dedicated research. The variation in current circuit training programs, as well as the differences in demands between amateur and professional players, raise questions about optimal training parameters. The results of this study should provide practical suggestions for soccer coaches and players in designing effective recovery training programs. In addition, this study also contributes to scientific development in the field of sports training, especially soccer, by providing new information on creative training

methods.

In the context of football, sustainability is not only related to the ability to cover long distances, but also to being able to create repeated sprinting times, quick changes and quick recovery between high intensity activities. This reflects the requirements of a dynamic and complex match, where players must be able to adapt quickly to different situations. Circuit training provides great flexibility in designing training programs. Training stations can be customized to target specific muscle groups and energy systems, such as the aerobic and anaerobic systems. In addition, variations in exercises can be increased by using equipment such as resistance bands, cones and plyometrics, which can increase the effectiveness of the workout. One of the challenges of this research is to identify the optimal circuit training parameters for soccer players. Parameters such as training time, intensity, frequency and type of sport must be carefully considered to ensure that the training program provides maximum results without causing excessive fatigue or risk of injury. In addition to improving physical endurance, the study will also take into account the psychological aspects of circuit training. Different and difficult exercises can increase players' motivation and compliance with the training program, which can improve the overall training effect. The results of this study will contribute significantly to the world of football, both amateur and professional. By providing evidence-based guidelines for vascular training, this study can help football coaches and players design more effective and efficient training programs, thereby improving performance and reducing the risk of injury.

## METHOD

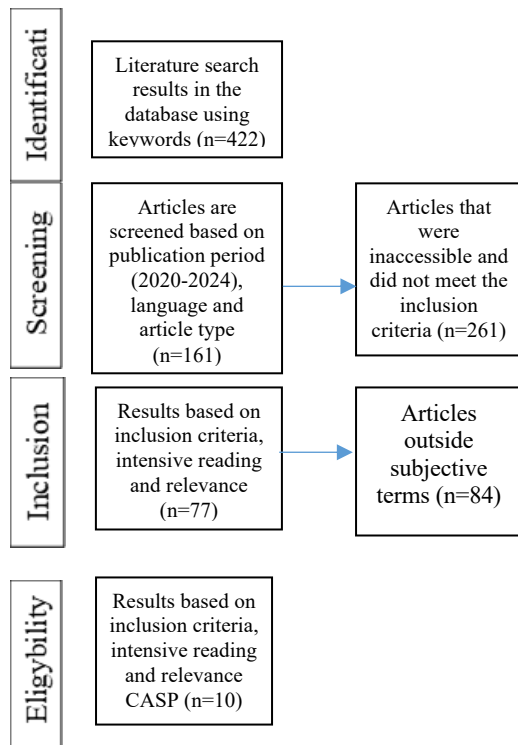
Systematic Literature Review research” refers to a group of studies on data collection techniques or research subjects investigated using various library resources, such as books, encyclopedias, scientific journals, magazines, and documents (Rumini et al., 2024). Researchers used the literature research method, which means collecting data from books, journals, articles, magazines, and the internet on the subject of the relationship between flexibility training and sports performance (Adi et al., 2023). Both systematic literature reviews and desk research are rooted in the need to understand and summarize existing knowledge. Both aim to provide a comprehensive overview of a topic, identify gaps in research, and develop a theoretical framework. However, systematic literature reviews have a narrower and more structured focus, often used to answer a specific research question, while desk research is more exploratory and can cover a wide range of topics. Systematic literature reviews follow a strict protocol, including definition of inclusion and exclusion criteria, comprehensive literature searches, critical assessment of study quality, and structured data synthesis. This process is designed to minimize bias and ensure transparency. On the other hand, literature research is more flexible in its methodology, allowing researchers to adjust search and analysis strategies according to the needs of the study. However, literature research still requires a systematic and analytical approach to ensure the validity and reliability of the findings.

Both methods rely on a variety of written sources, such as books, scholarly journals, articles, magazines, and documents. However, a systematic literature review tends to be more selective in its selection of sources, focusing on empirical research that is relevant to the research question. Library research can include a variety of sources, including theoretical, historical, and philosophical sources, which provide a broader context for the topic being studied. Analysis and synthesis are essential steps in both research methods. In a systematic literature review, analysis often involves extracting quantitative and qualitative data from selected studies, followed by narrative synthesis or meta-analysis to produce a comprehensive summary. In library research, analysis is more interpretive, focusing on identifying key themes, patterns, and relationships between sources. Synthesis involves combining information from multiple sources to build a coherent argument or theoretical framework. Systematic literature reviews are often used in health, education, and social sciences to evaluate the effectiveness of interventions, identify best practices, and provide a basis for evidence-based decision-making. Library research has broader applications, including theory development, policy analysis, and historical studies. Both contribute to the development of knowledge and a better understanding of various phenomena.

### Study participants

The words “endurance” and “football” were looked for in distributed articles from the Scopus Collection (Science Quotation Record Extended; Social Science Quotation List; Expressions & Humanities Science Quotation

List) from the a long time 2020 through 2024.



As appeared within the stream graph (Figure 1), a add up to test of 10 articles was gotten from a add up to of 17,538 articles by following to the Favored Detailing Things for Orderly Audits and Meta-Analysis (PRISMA) rules (Moher, Stewart, et al., 2020). Amid the stages of recognizable proof, screening, appropriateness, and incorporation.

The taking after factors were taken under consideration within the bibliometric investigation:(a) The yearly drift of articles distributed between 2020 and 2024; (b) the dispersion of distributions at the institution of the primary creator; (c) the number of creators; (d) the subject region (preparing, wellbeing, administration, instruction, other, or blended); (e) the sort of consider (exploratory, clear, correlational, other); and (f) the normal number of citations per article.

## Study organization

The taking after factors were taken under consideration within the writing audit: (a) The yearly slant of articles distributed between 2020 and 2024; (b) the dispersion of distributions at the institution of the primary creator; (c) the number of creators; (d) the subject region (preparing, wellbeing, administration, instruction, other, or blended); (e) the sort of consider (test, expressive, correlational, other); and (f) the normal number of citations per article.

## Statistical analysis

Article titles, abstracts, and watchwords were centered as these were adequate to create a solid and adequate center of articles for advance utilize and investigation. As it were open get to articles were included in this audit consider since the creators of this audit did not wish to avoid anybody who did not have get to to their inquire about. The taking after incorporation and avoidance criteria were conveyed to infer as it were pertinent considers managing solely with a specific point.

## RESULT AD DISCUSSION

### Result

The success of a circuit training program depends not only on the intensity and variety of exercises, but also on the optimization of recovery and nutrition. Circuit training, especially those involving weights, creates metabolic stress and muscle microtrauma that require adequate recovery. Coaches need to emphasize the importance of adequate rest, optimal hydration, and balanced nutrition to support the recovery process. Adequate protein intake is essential for muscle repair and growth, while carbohydrates are needed to replenish muscle glycogen depleted during training. Active

recovery techniques such as dynamic and static stretching, massage, and aquatic therapy can also be integrated to accelerate recovery and reduce the risk of injury. Additionally, education on stress management and sleep quality can assist players in improving their recovery capacity. To increase the relevance of circuit training programs to match demands, coaches need to apply the principle of specific training. This means that circuit training should be designed to mimic the movements and physical demands that players face during a match. Match analysis can be used to identify movement patterns, training intensities and physical demands that are specific to different player positions. For example, defenders may require more focused training on strength and muscular endurance for aerial duels and tackling, while wingers may require more focused training on speed and agility for dribbling and crossing. By integrating match analysis into circuit training programs, coaches can ensure that the training is relevant to match demands and helps players improve their performance on the pitch.

When designing a circuit training program, it is important to apply the principle of periodization, which is the division of a training program into distinct phases with specific objectives. Periodization allows the athlete to gradually increase the training load and intensity, while allowing sufficient time for recovery and adaptation. For example, a general preparation phase may focus on developing aerobic endurance and basic strength, while a specific preparation phase may focus on developing muscular strength endurance and higher training intensities. The competition phase may focus on maintaining fitness and optimizing performance. The principle of

periodization also helps to prevent overtraining, which can lead to chronic fatigue, injury, and decreased performance. In addition to physical aspects, psychological aspects also play an important role in the success of a circuit training program. A varied and challenging circuit training can increase player motivation and adherence, which in turn can improve the overall effectiveness of the training. Coaches need to create a positive and supportive training environment that encourages players to actively participate and develop their potential. Motivational techniques such as goal setting, positive feedback, and rewards can be used to increase player motivation. In addition, coaches need to pay attention to psychological aspects such as stress levels, anxiety, and self-confidence of players, and provide the necessary support to help players overcome psychological challenges that may arise during the training program.

In addition to a structured training program, it is important to pay equal attention to recovery and nutrition. Circuit training and other high-intensity training can put significant stress on a player's body, so optimal recovery is essential to prevent injury and promote adaptation. Coaches should ensure that players receive adequate rest, adequate hydration, and a balanced diet to support the recovery process. Recovery techniques such as massage, aquatic therapy, and stretching exercises can also be integrated into a training program. Additionally, education about proper nutrition, including optimal carbohydrate, protein, and fat intake, can assist players in maintaining energy and building muscle. In this digital age, technology can be an invaluable tool in improving the effectiveness of soccer training programs. The use of wearable devices such as heart rate

monitors, GPS, and motion sensors can provide objective data on player performance, such as distance traveled, speed, acceleration, and heart rate. This data can be used to analyze player performance in detail and identify areas for improvement. Additionally, the use of fitness tracking applications and video analysis software can assist coaches in monitoring player progress, designing personalized training programs, and providing accurate feedback. By leveraging technology and data analysis, coaches can make more informed decisions in designing and adjusting training programs, thereby maximizing player potential.

The following table appears the entire number of distributions distributed amid the chosen time period. Year distributed.

**Table 1.** Evolution of the number of publication per year

Year of publication	Number of articles	Percentage
2020	13	16,8%
2021	14	18,1%
2022	13	16,8%
2023	14	18,1%
2024	23	29,8%
Total	77	100%

Different time periods can be seen within the advancement of the number of distributions, as portrayed in table 1. To begin with, there has been a stamped increment in logical yield from 2020 (13 articles), 2021 (14 articles), 2022 (13 articles), 2023 (14 articles), 2024 (23 articles).

Concurring to the writing, the investigation that can be connected in plyometric works out is appeared within the table:

Title/source	Sample	Result
Longitudinal study on the development of speed, leg explosive power, aerobic endurance, and technical skill of young football players in talented and non-talented categories: implications for talent identification? (Primasoni et al., 2024).	Football players	Improve to athlete performance
Combined effects of speed-endurance and speed training on speed performance in youth soccer players (Suksai & Chidnok, 2024).	Football players	Improve to athlete performance
Differences between circuit training using a ball and not using a ball on increasing power, strength, and cardiovascular endurance in football athletes (Amiq et al., 2024).	Football players	Improve to cardiovascular endurance
Effect of circuit and interval methods on the agility and VO2max of PORPROV football players in Pati Regency in terms of leg muscle endurance (Badawi & Nasrulloh, 2023).	Football players	Increase to the endurance
The effect of isolated or combined small-sided games and speed endurance training on physical performance parameters in young soccer players (Akdoğan et al., 2021).	Football players	Increase to the endurance
Effects of high-intensity interval training in men soccer player's physical fitness: A systematic review with meta-analysis of randomized-controlled and non-controlled trials (Manuel Clemente et al., 2021).	Football players	Increase to the endurance
Effect of exercise type and body mass index on cardiovascular endurance in football players (Muryadi et al., 2023).	Football players	Improve to the cardiovascular endurance

Are two different speed endurance training protocols able to affect the concentration of serum cortisol in response to a shuttle run test in soccer players? (Vitale et al., 2020).	Football players	Improve to the performance
Effect of small-sided game versus high-intensity interval training method in increasing anaerobic endurance in youth football athletes (15-17 years) (Ansori et al., 2024).	Football players	Increase to the endurance
The effect of maximal aerobic speed training combined with small-sided games on performance parameters in soccer (Yüksel et al., 2023).	Football players	Improve to the performance

## Discussion

### *Improve the performance football players*

Our positive comes about show that circuit preparing with center works out shows up to be a great procedure for execution advancement in grown-up soccer players. Combining circuit training and core training is a highly effective strategy for developing performance in adult soccer players. However, to maximize its benefits, coaches need to design a structured and progressive training program. Circuit training should include a variety of stations that target different components of fitness, such as cardiovascular endurance, muscular strength, and agility. Meanwhile, core training should focus on strengthening the stabilizer muscles, with an emphasis on functional movements relevant to soccer. It is important to periodically evaluate the player's progress and adjust the training program to suit individual needs. (Belli et al., 2022). Endurance training has solid evidence of improving the

physical fitness of athletes, including benefits related to ability and competitive performance. The crucial role of resistance training in improving athletes' physical fitness and competitive performance. In the context of modern, high-intensity football, coaches need to prioritize specific resistance training. This can include high-intensity interval training (HIIT), fartlek training, and match simulations. In addition, coaches should consider player variables such as baseline fitness level, age, and injury history when designing training programs. Standard physical preparation alone is not enough; training programs must be designed to mimic the physical, cognitive, and tactical demands of a real football match. (Sun, 2023). Standard physical preparing alone in moving forward the physical, cognitive, and multitasking execution of proficient soccer players (Staiano et al., 2022). Player variables have the most prominent impact on the physical and specialized execution of AF players. Therefore, personalization of training is key to achieving maximum performance improvements. Coaches need to conduct a comprehensive assessment of each player, including biomechanical analysis, physiological measurements, and psychological evaluations. This information can be used to design a training program tailored to the individual's needs and potential. In addition, the integration of technologies such as GPS, motion sensors, and video analysis can provide objective data on player performance, allowing coaches to make more informed decisions in designing and adjusting training programs. (Wing et al., 2023). Combined preparing with maximal high-impact speed, little field recreations, and as it were maximal oxygen consuming speed successfully progresses the oxygen consuming capacity and



common execution of soccer players (Arslanoğlu et al., 2024). The conclusion that we will draw from the inquire about over is that the circuit preparing preparing strategy is demonstrated to be able to move forward the execution of football players since this preparing can make strides the player's physical and perseverance which makes the player's execution increment.

#### ***Improve the cardiovascular endurance***

Noteworthy impact of the circuit bodyweight preparing strategy on expanding cardiovascular perseverance. However, to achieve optimal results, coaches need to design an integrated training program that is tailored to the specific needs of the player. Circuit strength training should include a variety of exercises that target different muscle groups and energy systems, with an emphasis on exercises that mimic specific movements in soccer. In addition, it is important to pay attention to the intensity, duration, and frequency of training, as well as providing adequate rest periods to allow for recovery and adaptation. The use of technology such as heart rate monitors and GPS can assist coaches in monitoring training intensity and providing accurate feedback to players. (Yuniana et al., 2024). The comes about uncovered that the soccer players were within the great run of cardiovascular continuance. However, it is important to note that cardiovascular endurance levels can vary depending on individual factors. Therefore, coaches need to conduct regular physical assessments of players, including cardiovascular endurance testing, to identify each player's strengths and weaknesses. This information can be used to design personalized training programs, tailored to the individual's needs and ability level. In addition, coaches need to consider factors such as age, injury history,

and level of competition when designing training programs, to ensure that the training program is safe and effective. (Halder & Rahaman, 2022). Concluded that the circuit training exercises given for 12 meetings for 4 weeks had an effect on increasing the aerobic endurance of the soccer extracurricular students at SMA Negeri 1 Ketapang with an increase of 3% (Pamungkas & Hardika, 2023). The discoveries recommend comparative impacts initiated by both SSG and HIIT on moving forward perseverance execution and VO2max. Comparing the effects of SSG and HIIT on improving endurance and VO2max provides valuable insights into effective training approaches for soccer players. Coaches need to consider the advantages and disadvantages of each training method, as well as the player's preferences and needs, when selecting the most appropriate training method. SSG offers advantages in terms of relevance to match demands and tactical skill development, while HIIT offers advantages in terms of time efficiency and rapid improvement in cardiovascular capacity. Coaches can integrate both training methods into their training programs, adjusting the frequency, duration and intensity of training according to the phase of the season and training goals. In addition, it is important to monitor the player's response to training and make necessary adjustments to ensure that the training program remains effective and safe. (Clemente et al., 2023). The comes about ready to take from the investigate over are that circuit preparing can moreover increment the cardiovascular continuance of football players

#### ***Increase endurance football players***

The results of the study showed that the Muscular strength endurance was significantly

improved due to the circuit and circuit weight training. However, to maximize the benefits, coaches need to adopt a personalized approach. This involves a comprehensive assessment of each player's muscular strength and endurance, as well as a thorough understanding of the physical demands of their position on the field. Based on this assessment, coaches can design a customized circuit weight training program, selecting appropriate exercises, weights, repetitions, and sets. It is also important to consider factors such as age, injury history, and fitness level when designing a training program. (Vadivel & Maniazhagu, 2022). Standard soccer preparing programs can be supplemented with Circuit Training to make strides sprinting, bouncing and COD execution. Longer Circuit Preparing length ( $\geq 8$  weeks) shows up to be ideal in progressing the physical capacities of soccer players. Proficient players and players. Therefore, coaches need to design a structured and progressive circuit training program, with gradual increases in intensity, duration, and complexity of the exercises. The training program should include a variety of exercises that target different components of fitness, such as strength, endurance, speed, agility, and flexibility. In addition, it is important to monitor the player's progress periodically and make necessary adjustments to the training program. The use of technology such as fitness tracking apps and wearable devices can help coaches monitor player performance and provide accurate feedback. (Thapa et al., 2021). SSG's exploratory 4vs.4+GK preparing program, connected to U18 soccer players, brought about in noteworthy advancements in physical and useful parameters (Zaharia et al., 2023). These comes about recommend that the incorporation

of center quality preparing in SSG periodization is exceedingly successful for moving forward speed and strength-based conditioning in youthful soccer players. Coaches need to design training programs that combine both methods effectively, with an emphasis on drills that mimic the demands of the game. SSG can be used to develop tactical skills, decision-making and cardiovascular fitness, while core training can be used to strengthen stabiliser muscles and improve stability, balance and coordination. It is also important to create a positive and supportive training environment that encourages players to actively participate and develop their potential. (Arslan et al., 2021). He conclusion from the investigate over states that circuit preparing or combination preparing is compelling in expanding the perseverance of football players.

## CONCLUSION

The circuit training method in an effort to increase physical endurance in the sport of football refers to training objectives related to increasing the endurance or physique of a football player which is based on how important endurance is for elite and even professional football players to improve their physical performance and performance during matches. taking place. Apart from doing circuit training, there are several other factors that football players must pay attention to if they want to improve their physical endurance condition, namely by doing high interval intensity training or doing high intensity training so that it can encourage the athlete's physical endurance performance to increase. Circuit training method is effective in improving endurance capacity of soccer players. Significant improvements were seen in cardiovascular endurance parameters (e.g., VO2 max) and muscular endurance after

circuit training program was implemented. Circuit training has been shown to be an efficient and effective method to improve endurance, which is an important component of modern soccer performance.

Suggestions:

1. For Football Coaches: (a) football coaches are advised to include circuit training methods into their routine training programs, circuit training programs need to be specifically designed; (b) taking into account the needs and ability levels of the players; (c) exercise variations need to be considered to maintain player motivation and prevent boredom.
  - The use of aids such as resistance bands, cones, and plyometric boxes can be integrated to increase training effectiveness.
  - Periodic measurements of endurance parameters need to be carried out to monitor player development.
2. For Football Players:
  - Football players are advised to actively participate in circuit training programs.
  - Players need to maintain consistency and discipline in following the training program.
  - Players need to pay attention to correct movement techniques to prevent injury.
  - Players need to maintain adequate nutritional intake and rest to support the recovery process and training adaptation.
3. For Further Research:
  - Further research needs to be conducted to explore the effect of circuit training on

other aspects of football performance, such as speed, agility, and strength.

- Research needs to be conducted involving a larger and more diverse sample group, including players from various levels of competition.
- Research needs to compare the effectiveness of different types of circuit training programs and different training parameters.
- Further research can be conducted using modern technology, such as performance measurement tools and video analysis, to obtain more accurate and comprehensive data.

## REFERENCES

- Adi, S., Soenyoto, T., & Ramadhan, I. (2023). LATIHAN KELENTUKAN TERHADAP PERFORMA OLAHRAGA: SEBUAH TINJAUAN PUSTAKA SEPAK BOLA, FUTSAL, BULUTANGKIS DAN RENANG. *Bajra: Jurnal Keolahragaan*, 2(2 SE-Articles), 40–47. <https://doi.org/10.5281/zenodo.8385206>
- Akdoğan, E., Yılmaz, İ., Köklü, Y., Alemdaroğlu, U., & Cerrah, A. O. (2021). The effect of isolated or combined small-sided games and speed endurance training on physical performance parameters in young soccer players. *Kinesiology*, 53(1), 78–85. <https://doi.org/10.26582/k.53.1.10>
- Amiq, F., Setijono, H., & Anugrah, S. M. (2024). Differences between circuit training using a ball and not using a ball on increasing power, strength, and cardiovascular endurance in football athletes. *Fizjoterapia Polska*, 2024(3), 105–113. <https://doi.org/10.56984/8ZG020AVLR>
- Ansori, M. K., Sudarko, R. A., Primasoni, N.,

- Widodo, H., & Anggraeni, E. (2024). Effect of small-sided game versus high-intensity interval training method in increasing anaerobic endurance in youth football athletes (15-17 years). *Pedagogy of Physical Culture and Sports*, 28(5), 353–359. <https://doi.org/10.15561/26649837.2024.0503>
- Arslan, E., Soylu, Y., Clemente, F., Hazır, T., İşler, K., & Kilit, B. (2021). Short-term effects of on-field combined core strength and small-sided games training on physical performance in young soccer players. *Biology of Sport*, 38, 609–616. <https://doi.org/10.5114/biol sport.2021.102865>
- Badawi, A., & Nasrulloh, A. (2023). Effect Of Circuit And Interval Training Methods On The Agility And Vo2max Of Porprov Football Players In Pati Regency In Terms Of Leg Muscle Endurance. *Physical Education Theory and Methodology*, 23(4), 499–504. <https://doi.org/10.17309/tmf.2023.4.02>
- Belli, G., Marini, S., Mauro, M., Maietta Latessa, P., & Toselli, S. (2022). Effects of Eight-Week Circuit Training with Core Exercises on Performance in Adult Male Soccer Players. *European Journal of Investigation in Health, Psychology and Education*, 12(9), 1244–1256. <https://doi.org/10.3390/ejihpe12090086>
- Boraczyński, M., Boraczyński, T., Gajewski, J., Kamelska-Sadowska, A. M., Gronek, P., & Laskin, J. (2021). Effects of Intensity Modulated Total-Body Circuit Training Combined with Soccer Training on Physical Fitness in Prepubertal Boys after a 6-Month Intervention. *Journal of Human Kinetics*, 80(1), 207–222. <https://doi.org/10.2478/hukin-2021-0102>
- Clemente, F., Moran, J., Ramirez-Campillo, R., Beato, M., & Afonso, J. (2023). Endurance Performance Adaptations between SSG and HIIT in Soccer Players: A Meta-analysis. *International Journal of Sports Medicine*, 45, 183–210. <https://doi.org/10.1055/a-2171-3255>
- Fairy, P. E. (2022). *Perfect education fairy*. 45–53.
- Farooque, S., Mitra, M., & Das, P. K. (2023). Effect of 12-week endurance training on biochemical parameters in elite football players: A comprehensive analysis. *Journal Sport Area*, 8(3), 388–395. [https://doi.org/10.25299/sportarea.2023.vol8\(3\).13856](https://doi.org/10.25299/sportarea.2023.vol8(3).13856)
- Ferasat, R. (2021). Investigation of Biomechanical and Anthropometric Variables of Football Players According to Their Playing Position: Review Article. *Journal of Sport Biomechanics*, 6(4), 2–13. <https://doi.org/10.32598/biomechanics.7.1.5>
- Guță, E. L., & Orănescu, D. (2023). Highlighting the Aspects of Differentiation Between the Tactics and the Specific Technique of the Football Game. *The Annals of Dunarea de Jos University of Galati Fascicle XV Physical Education and Sport Management*, 2, 126–134. <https://doi.org/10.35219/efms.2023.2.13>
- Manuel Clemente, F., Ramirez-Campillo, R., Nakamura, F. Y., & Sarmento, H. (2021). Effects of high-intensity interval training in men soccer player's physical fitness: A systematic review with meta-analysis of randomized-controlled and non-controlled trials. *Journal of Sports Sciences*, 39(11), 1202–1222. <https://doi.org/10.1080/02640414.2020.1863644>
- Muryadi, A. D., Rahayu, T., Setijono, H., & Rahayu, S. (2023). Effect of exercise type and body mass index on cardiovascular endurance in football players. *International Journal on Disability and Human Development*, 22(3), 273–279. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85175162191&partnerID=40&md5=0f21bb9fb8cbc2f2e718b6e934cf4799>
- Pamungkas, W. C. A., & Hardika, N. (2023). Pengaruh Latihan Circuit Training Terhadap Daya Tahan Aerobik Pada Kelas Ekstrakurikuler Sepak Bola SMA Negeri 1 Kabupaten Ketapang. *Journal Sport Academy*. <https://doi.org/10.31571/jsa.v1i2.29>

- Primasoni, N., Santoso, N., Arjuna, F., Asmara, M., & Soenyoto, T. (2024). Longitudinal study on the development of speed, leg explosive power, aerobic endurance, and technical skill of young football players in talented and non-talented categories: implications for talent identification? *Retos*, 59, 1026–1033. <https://doi.org/10.47197/retos.v59.104615>
- Rumini, Adi, S., & Kusuma, D. W. Y. (2024). The Mechanics of Speed: A Systematic Literature Review on Athletic Sprint Techniques. *Physical Education Theory and Methodology*, 24(6 SE-Review Articles), 990–996. <https://doi.org/10.17309/tmfv.2024.6.17>
- Suksai, P.-E., & Chidnok, W. (2024). Combined effects of speed-endurance and speed training on speed performance in youth soccer players. *Gazzetta Medica Italiana Archivio per Le Scienze Mediche*, 183(3), 133–136. <https://doi.org/10.23736/S0393-3660.23.05116-1>
- Trecroci, A., Duca, M., Formenti, D., Alberti, G., Marcello Iaia, F., & Longo, S. (2020). Short-Term Compound Training on Physical Performance in Young Soccer Players. *Sports*, 8(8). <https://doi.org/10.3390/sports8080108>
- Vitale, J. A., Povia, V., Belli, E., Lombardi, G., Banfi, G., & La Torre, A. (2020). Are two different speed endurance training protocols able to affect the concentration of serum cortisol in response to a shuttle run test in soccer players? *Research in Sports Medicine*, 28(2), 293–301. <https://doi.org/10.1080/15438627.2019.1635131>
- Yüksel, Y., Cerrah, A. O., Taşcıoğlu, R., Akdoğan, E., Gürol, B., & Yılmaz, İ. (2023). THE EFFECT OF MAXIMAL AEROBIC SPEED TRAINING COMBINED WITH SMALL-SIDED GAMES ON PERFORMANCE PARAMETERS IN SOCCER. *Kinesiology*, 55(2), 349–358. <https://doi.org/10.26582/k.55.2.14>