



Analysis of Squat Training In The Sport Of Football: Systematic Literature Review

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ABSTRACT

This study aims to examine the implementation of squat training in football performance analysis. This review adhered to the PRISMA guidelines for systematic reviews and meta-analyses. The studies included were published within the last five years, from January 2020 to July 2024. The following keywords were used during the search process: (1) Squat; (2) Football. The Scopus research journal database was utilized for conducting the literature search. The theme of this research as a whole obtained 549. Contains 214 articles which are taken from 10 relevant articles. Conclusion: Analysis of squat training in the sport of football includes balance stability, strength, technique game tactics, advantages of integration with other exercises, increasing leg muscle strength, and improving the performance of passing kicks and shooting.

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Training;
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AUTHORS' CONTRIBUTION

A. Conception and design of the study;
B. Acquisition of data;
C. Analysis and interpretation of data;
D. Manuscript preparation;
E. Obtaining funding

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INTRODUCTION

Football can be defined as a form of short-term multidirectional high-intensity activity such as acceleration, deceleration, change of direction, tackling, jumping and technical skills (Abade et al., 2021). Footballer performance is influenced by strength is one of the many variables that influence performance (David et al., 2022). In the sport of football, flexibility is very influential in preventing injuries if the flexibility is good the athlete's performance will also be good (Adi S et al., 2023). Professional football athletes need a constant preference for the dominant foot (Patil & Babu, 2023). In modern, football, it is very important to have fast and highspeed movements for example, running and jumping, so that you can improve (Sagelv et al., 2020). Based on the conclusion of the paragraph above, it is factors that influence the performance of professional football players, one of which is very important to support a player's performance on the field. To



be more effective and precise in the game, athletes must have a consistent preference for the dominant foot. The ability to perform fast movements such as running and jumping, is essential for modern football players to play well. Therefore, improving strength, speed and technical skills is essential to support a player's performance and success in competition.

Athletes who engage in squat exercises not only enhance their strength, leading to better performance, but also lower the likelihood of injuries by strengthening the ligaments, tendons, cartilage, and muscle connective tissues, thus improving safety before reaching tissue limits (Case et al., 2020). Young football players have better balance and quite good athletic performance when they perform a combination of squat and plyometric exercises with light weights (Chnini et al., 2024). Young football players' muscle strength can be improved with squat exercises with modest to moderate weights and a 10% speed loss (Rojas-Jaramillo et al., 2024). The conclusion of the text is also squat training can benefit athletes, especially young football players, in a variety of ways. This exercise enhances muscle strength and athletic performance while also decreasing the risk of injury by reinforcing ligaments, tendons, cartilage, and connective tissue. Additionally, performing squats and plyometric exercises with light weights and proper speed can further boost muscle strength.

In the study, Sagelv et al., (2020) load barbell and flywheel free-weight kicks and squats increase running speed and high jumps. Further in the research (Fonseca et al., 2022). plyometric exercises and semi-squats increase vertical jump, peak muscle strength, and relieve muscle soreness. As for research from (França et al., 2022). The explosive strength of the lower body, particularly in squat jumps, plays a significant role in determining the speed and agility of adolescent male football players. In conclusion, squatting exercises and their variations contribute to enhancing football players' strength, speed, agility, and vertical jump, as well as boosting lower body explosiveness. This study was conducted to address the limitations of previous research and offer improvements.

The research study is literature and systematic review. The article search was conducted using an extensive approach through the SCOPUS research journal databases, with the keywords "Squat" and "Football."

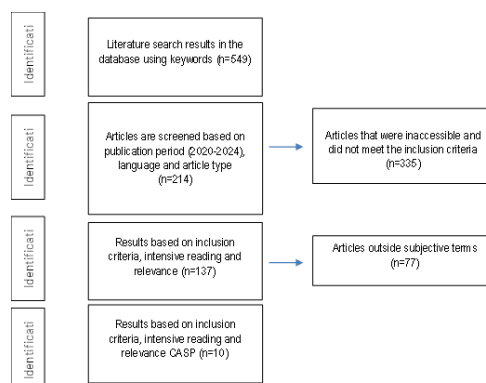
METHODS

A "Systematic Literature Review" is a research method that relies on literature to apply a thorough and reproducible approach in summarizing the most reliable studies related to a particular question (Višić, 2022).

Study Participants

The terms "Squat" and "Football" The search was conducted on articles published in the Sinta (Science and Technology Index) and Scopus collections (Science Citation Index Expanded; Social Science Citation Index; Arts & Humanities Science Citation Index) spanning the period from 2020 to 2024. PRISMA 2020 represents a significant

revision of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement, emphasizing comprehensive and precise reporting in systematic reviews (Page et al., 2021).



Study Organization

The literature review examined several variables, including (a) yearly trends in articles published from 2020 to 2024; (b) distribution of publications based on the first author's institution; (c) the number of authors; (d) research fields (such as workshops, healthcare, administration, learning, or a mix of these; (e) the category of research (including experimental, descriptive, correlational, or other types); and (f) the average citation count for each publication.

Statistical Analysis

This review focused on the title, abstract, and keywords of articles, as these elements provide sufficient information to determine the core value of the article for review and analysis. This study exclusively included articles with open access, as the researchers intended to make their research findings accessible to the public. The choice research was based on specific inclusion and exclusion criteria to ensure that only relevant was considered for a discussion on the topic.

RESULTS AND DISCUSSION

Result

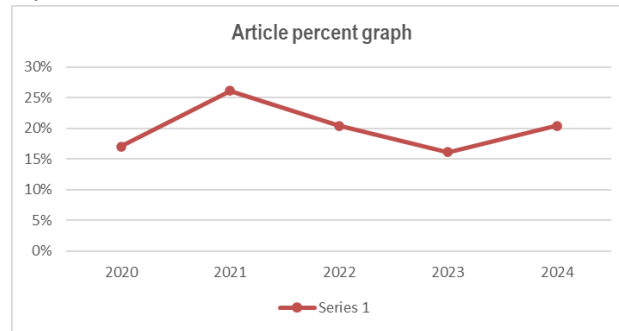
The table below presents the overall count of publications released within the specified time frame. It highlights the number of articles published each year, providing a comprehensive view of the trends over the selected period.

Table 1.
Changes in the annual publication count

Publication Years	Articles	Percentage
2020	24	17%
2021	37	26,1%
2022	29	20,4%
2023	23	16,1%
2024	29	20,4%
Total	142	100%

The number of publications has experienced notable growth across various periods, as illustrated in table 2. Specifically, there was a significant rise in article

scientific publications during the years 2020, with 24 articles published, followed by 37 articles in 2021. In 2022, the count slightly decreased to 29 articles, but it rebounded in 2023 with 23 articles and remained steady in 2024 with another 29 articles. This trend highlights a consistent expansion in research output over the years, reflecting increased academic interest and production in the field.



Based on the literature, the analysis applicable to squat exercises is presented in the following table:

Table 2.
Literature Analysis

Topic	Sample	Result
Barbell Squat Relative Strength as a Predictor of Lower Limb Injuries in College Athletes (Case et al., 2020).	Female volleyball and softball athletes	The relative strength potential of the 1RM (One Repetition Maximum) back squat.
Can a single heavy load back squat set improve post-activation performance, such as three-point explosion and sprinting, in third-division American football players? (Bielitzki et al., 2021).	Football players	Improve short-distance running performance.
The Impact of Plyometric Training on Speed, Agility, and Jump Performance: Plyometric Training's Effect on Speed, Agility, and Jumping Ability (BUZDAGLI et al., 2022).	Football players	Improving jumping performance and speed
Predictors of Speed and Agility in Adolescent Male Football Players (França et al., 2022).	Football athletes from the age groups of under-19, under-17, and under-15	Lower body explosive strength measured through SJ (squat jumps)
The impact of hyperbaric oxygen therapy on recovery following a football match in young players: a double-blind, randomized controlled trial (Gušić et al., 2024).	Football players	Improve the performance
Assessing movement quality in youth footballers: The relationship between hip and lower limb movement screen and functional movement screen (Sikora & Linek, 2022).	Elite male football (football) players	Improve the performance

Topic	Sample	Result
Isokinetic back training is more effective than core stabilization training on pain intensity and sports performances in football players with chronic low back pain: A randomized controlled trial (Nambi et al., 2020).	Football players	Improve pain intensity and sports performance.
Differences in Squat Jump, Linear Sprint, and Change-of-Direction Performance among Youth Football Players According to Competitive Level (Keiner et al., 2021).	Football players	Improve the performance
Maximal Strength, Sprint, and Jump Performance in High-Level Female Football Players Are Maintained with a Customized Training Program During the COVID-19 Lockdown (Sagelv et al., 2020).	Football players	Improve the performance.
Acute Effects of ACL Injury-Prevention Warm-Up and Football-Specific Fatigue Protocol on Dynamic Knee Valgus in Youth Male Football Players (García-Luna et al., 2020).	Football players	Increasing DKV (Maximum VO ₂ consumption power) in their performance

Discussion

When relative volume loads were used in back squat exercises both heavy and light loads increased strength proportionally in men and women (Valenzuela-Barrero et al., 2023). For the back squat exercise, one absolute incremental loading session is required to measure the load velocity profile (Gomes et al., 2024). To estimate daily 1RM in the back squat, the quadratic model created using the combined method had the highest predictive validity (Thompson et al., 2021). It can be concluded that the strength of men and women can be increased through back squat exercises with relatively heavy or light weights. To estimate daily 1RM, a combined quadratic model is best, but the load velocity profile requires absolute incremental loading sessions.

Enhancing the physical performance of young football players is more effectively accomplished through skill training at maximum intensity rather than through small-scale games (Karahan, 2020). The physical performance of youth football players is affected by biological maturity, body composition, and the training stimuli they receive (Abarghouejinejad et al., 2021). The performance of early adolescent football players is improved with integrative neuromuscular strength training during the season, it increases speed, strength, jumping ability, and change of direction ability (Panagoulis et al., 2020). So, neuromuscular strength training and high-intensity exercises can enhance the physical abilities of young football players, influenced by their biological maturity and physical composition.

The explosive strength of their lower body, especially in the squat jump, largely determines the speed and agility of adolescent male football players (França et al., 2022). When compared to the horizontal squat jump, the upright squat jump produces a much greater peak power output (Ferley et al., 2023). Over fifteen weeks, the experimental program was able to increase the explosive strength of teenage boys' lower limbs, including squat jumps (Radulović et al., 2022). It can be concluded that it is proven that a fifteen-week training program increases the explosive strength of the lower body of young men. Upright squat jumps produce greater peak power than horizontal squat jumps.

CONCLUSION

The conclusions of research of analysis of squat training in the sport of football based on literature searches show that squat training can improve performance (shooting and passing), back squat training with relatively heavy or light weights, increasing physical performance strength, increasing lower body explosive power because previous research has limitations, it is hoped that future research can build an effective training program.

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