



Effectiveness of Plyometric Training on Improving Handball Shooting

Accuracy: A Systematic Literature Review

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Abstract

Study purpose. This study examines the effectiveness of plyometric training on improving handball shooting accuracy.

Materials and methods. In this study using a prism flow diagram and using the PICO method data collection technique. By collecting national articles through google scholar, crossrev and scopus obtained through the help of the "Publish or Perish" application.

Result. Based on the literature review collected by the researcher, it can be concluded that plyometric training has a significant effect on improving shooting accuracy in various sports. It optimises muscle strength, speed and coordination through explosive movements, which are essential for improving shooting performance. Plyometric not only improves physical abilities such as strength and jump height, but also improves technical skills in shooting more accurately and effectively. Therefore, the integration of plyometric training in athletes' training programmes is highly recommended to achieve optimal shooting results.

Conclusion. 1). Plyometric training has a significant effect on improving shooting accuracy in various sports. 2). It optimises muscle strength, speed and coordination through explosive movements, which are essential for improving shooting performance. 3). Plyometric not only improves physical abilities such as strength and jump height, but also improves technical skills in shooting more accurately and effectively. Therefore, it is important to choose the right training programme for athletes to achieve optimal shooting results.

Keywords: Plyometric Exercise, Shooting, Handball.

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Introduction

Sport is an important activity that humans must do in order to obtain a healthy body, the definition of sport itself is an activity of physical activity that contains the nature of the game and contains a struggle with oneself, others, and nature that has a specific purpose (Setiyawan, 2017), one of them is game sports such as football, handball, futsal, and basketball which are currently very popular with all circles. This game sport is usually often competed both nationally and internationally (Sapta et al., 2017), so it is necessary to master basic techniques

and tactics well (Sugiono et al., 2024). Technical training is part of a sport that in its implementation requires dexterity. Proficiency or mastery of basic techniques makes an athlete who has reliable skills in a sport.

The definition of Shooting itself is an effort made by a player to put the ball into the opponent's basket/goal with the aim of obtaining as many numbers or scores as possible (Farhan et al., 2023). Shooting is an attempt to move the ball from one place to another using the foot (Sanusi et al., 2022). When good shooting skills are possessed, the chance to win the match will be even greater (Belli et al., 2022). Shooting accuracy is an important skill in various sports such as basketball, futsal, football, and handball. This skill not only determines a team's success in scoring, but also affects the overall strategy of the game. High Shooting accuracy allows players to capitalise on opportunities more effectively, providing a competitive advantage in matches. Various training methods have been developed to improve shooting accuracy, ranging from basic technique training to more specific and intensive training. The selection of the right training method is very important (Starni, 2023) to achieve significant improvement in Shooting skills. One of the prominent training methods in recent decades is plyometric training.

According to (Juntara, 2019) Plyometrics are exercises or repetitions that aim to link speed and power movements to produce explosive movements. (Alfonsius Pattisina & Hamidie, 2023) posits Plyometric exercise is a specialised training methodology largely supported by scientific literature. Such methodology is a widespread form of physical conditioning that involves jumping exercises using the stretch shortening cycle muscle action. The stretch-shortening cycle can be summarised as an increase in the ability of the nervous system and muscles to produce maximal force in the shortest possible time. Plyometric exercise is indeed one of the most appropriate forms of exercise in increasing the explosive power of leg muscles that are carried out systematically, repeatedly, continuously and over a long period of time (Agusri et al., 2021). Which means that plyometric exercise is a type of exercise that aims to increase muscle strength and speed through explosive and rapid movements. It involves rapid muscle stretch-contraction cycles, known as stretch-shortening cycles. The main benefits of plyometric training include improved muscle strength, speed, coordination, and elasticity of muscle tissue, all of which contribute to improved athlete performance.

Plyometric training compared to other training methods, such as weight training, shows advantages in terms of dynamics and explosiveness. Plyometric is more effective in stimulating various sports activities that require fast and explosive movements, such as jumping and running. This makes it a more suitable training method to improve shooting accuracy. The integration of plyometric training in a player's training programme can provide significant results in improving shooting accuracy. Based on existing research results, training programmes that include plyometric exercises can be designed to meet the specific needs of each sport and improve overall athlete performance. Therefore, it is important for coaches and athletes to understand and implement plyometric exercises in their training routines.

Materials and Methods

Search Strategy

In the data collection stage, the author collects national articles through google scholar, crossrev and scopus with the search engine "Publish or Perish", the author collects articles with the publication year 2019 to 2024, for journal renewal the author searches journals with a scale of the last 5 (five) years, the PICO method is a method that the author applies in searching articles to reveal new findings (Mashud et al., 2022).

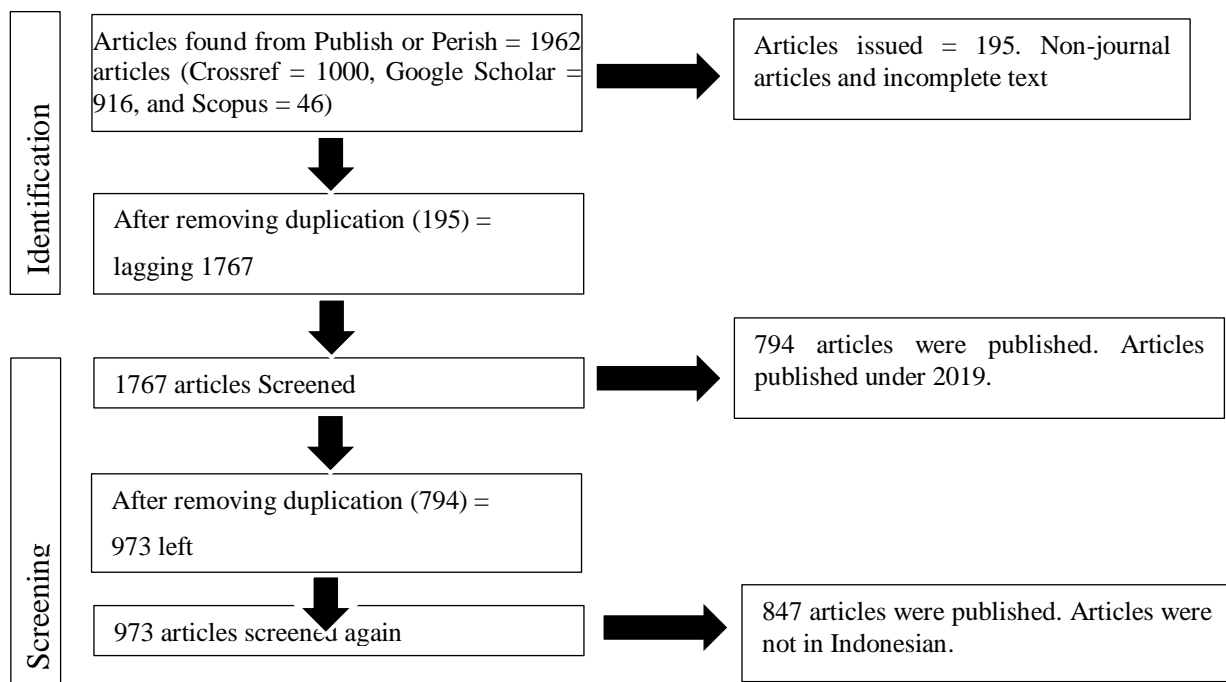
Selecting Studies

The author can collect the required articles Next, the author performs data extraction. the reference that the author uses in this method is to use the Inclusion and Exclusion criteria

so that the data becomes more specific, and if the author finds an article that does not match, the data will be extracted (Ratih & Susanna, 2018) with the criteria then it will be aborted description of the method for exclusion: (a) Research reports (theses, theses, dissertations) and books; (b) Under the last 5 years (<2019); (c) Outside the Indonesian language; (d) Not plyometric training on shooting; (e) Not a sport that uses shooting techniques; (f) Does not have DOI. Furthermore, the inclusion criteria used are: (a) Research articles from the last 5 years (2019-2024); (b) Indonesian language; (c). Plyometric Training on Shooting; (d) Sports that use shooting techniques; (e) Has DOI; (f). Improved shooting accuracy with plyometric training.

Procedure

In the search through Publish or Perish with the type of database selected CrossRef, Goggle Scholar, and Scopus. Researchers found 1962 articles from crossref 1000 articles, google scholar 916 articles, and scopus 46 articles. The articles found were then processed and analysed through several stages of filtering based on the inclusion and exclusion criteria method. First of all, researchers excluded 195 articles because they did not come from journals or complete research results but there were articles from thesis research results, generic, and books. There were 1767 articles which were then excluded again 794 articles because they were published under 2019 or under the last 5 years. 973 articles were left out and 847 articles were excluded because they were not in Indonesian. Left behind 126 articles that will be seen for the quality of their content, of which 104 articles were excluded because the research variables and scope of discussion were not focused on the context of plyometric training which then after further study there were sports that did not use shooting techniques and the author returned to exclude 6 articles so that 16 articles were left behind. Then at the final stage, the author found that 9 articles did not have a DOI in the article. So that the remaining 7 articles meet the requirements to be included as a sample and will be included as research data for review, this search follows the Systematic Review and Meta-Analysis (PRISMA) guidelines. PRISMA is a tool used to report the results of systematic reviews and meta-analyses. The use of PRISMA does not require ethical review and is considered reliable as it is sourced from high-quality journals (Gustian et al., 2024). for more details related to the process of filtering existing articles until the final stage can be seen in the flow chart in figure 1.



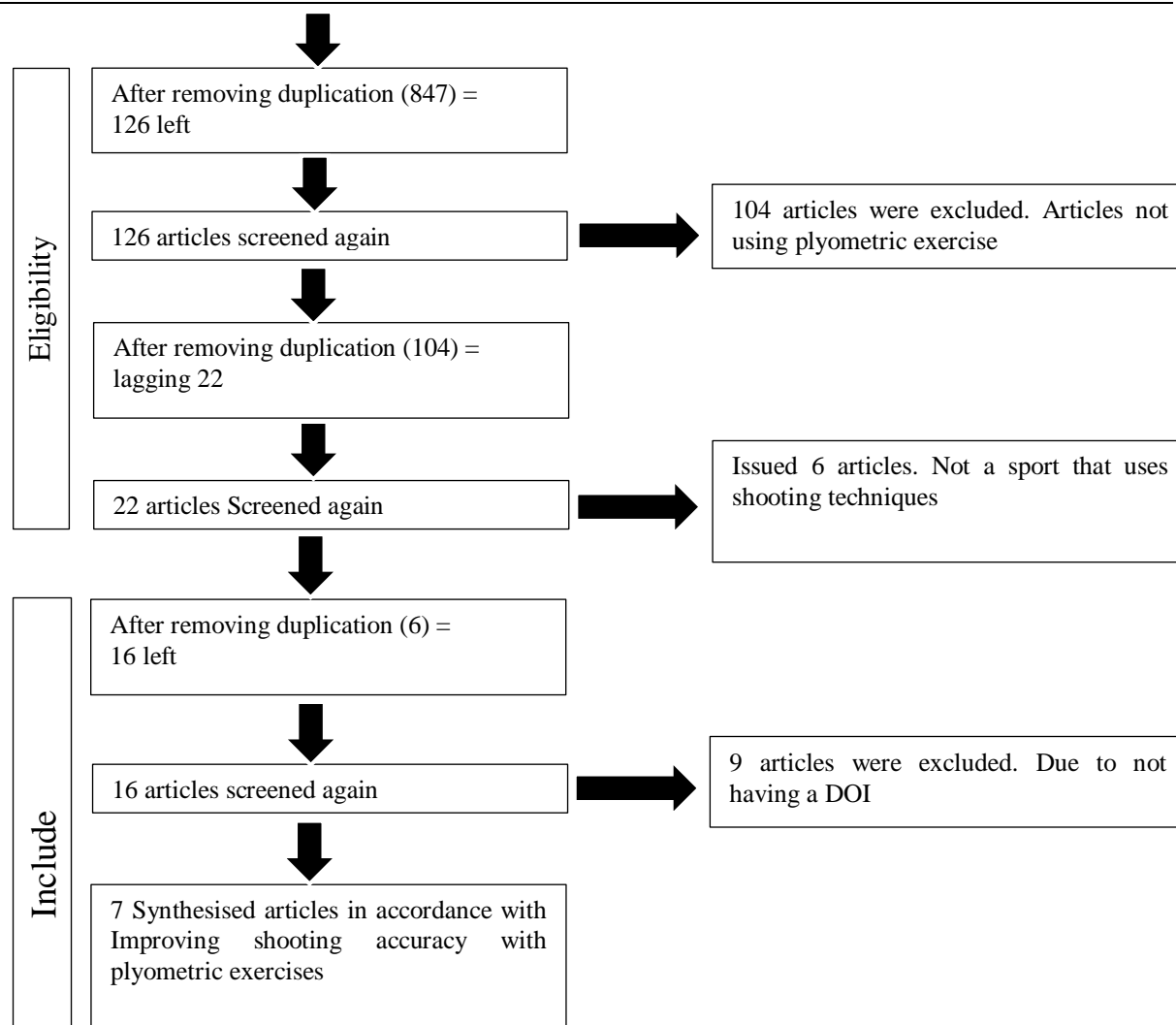


Figure 1. Study selection PRISMA flow diagram

Results

The results of the study should be presented in tables and described in a logical order. From the results Through the selection process based on the existing stages, when the author conducted an analysis of the articles to ensure that the articles actually met all the criteria used in the research data, the authors found 7 eligible articles with appropriate descriptions, including 3 handball sports articles and 4 articles related to similar sports as shown in Table 1.

Table 1. Plyometric Exercise Article review presentation

No.	Author and Yea	Objective	Method	Result
1.	(Taufik et al., 2020)	Knowing the impact of plyometric and ladder three point shooting on the results of shooting three points of basketball.	Experiment	<i>shooting three point plyometric provides a significant effect compared to the shooting three point ladder group in athlete training on improving three point shooting results.</i>

2.	(Hartadji et al., 2022)	Knowing the effect of plyometric jump to box training on jump shoot results in extracurricular basketball players.	Experiment	plyometric jump to box training has a significant effect on jump shoot results for extracurricular basketball students.
3.	(Mukti et al., 2023)	Knowing the effect of plyometric training on shooting accuracy in futsal games.	Experiment	plyometric training can improve the ability or accuracy of shooting in futsal games
4.	(Prakarsa & Umar, 2020)	Knowing the effect of variations in plyometric training on the shooting accuracy of soccer players	Quasi-Experiment	There is an Effect of Plyometric Exercise Variations, on Shooting Accuracy of Football Players
5.	(Kristina et al., 2022)	Knowing the Difference in Effect between weight training and plyometric training on handball athletes	Experiment	The results of Flying shoot using Plyometric training are much better than weight training.
6.	(Rohman & Hananto Puriana, 2020)	Knowing the application of the single leg jump training method to prove its effect on the plying shoot ability of handball players.	Experiment	The results prove that the single leg jump training method has an influence on the ability of handball players' plying shoot skills.
7.	(Wicaksono & Sorraya, 2023)	Knowing the effect of squat jump training and burpees on the height of the jump when performing the technique jump shoot technique on handball players	Experiment	There is an effect of squat jump training and burpees on jump height when doing jump shoot techniques on handball players.

Discussion

Plyometric training is a type of exercise designed to increase muscular strength and speed through explosive movements. It utilises rapid muscle stretch-contraction cycles to optimise neuromuscular efficiency. Based on the literature review, it is clear that plyometric training has a significant effect on improving shooting accuracy in various sports such as basketball, futsal, football, and handball. In basketball, research (Taufik et al., 2020) highlighted two types of Shooting three points plyometric and ladder exercises. The results showed that plyometric three point shooting training is superior in improving three point shooting results compared to ladder training. Plyometric emphasises speed and strength, while ladder emphasises speed and movement patterns. (Hartadji et al., 2022) also found that plyometric jump to box training had a significant effect on the jump shoot results of extracurricular basketball students. This exercise increases leg power which is needed for higher jumps and more accurate shots.

In the sport of futsal (Mukti et al., 2023) reported that plyometric training can improve shooting ability and accuracy. Plyometric training improves leg muscle strength and coordination, which are important for producing more targeted shots. Meanwhile, in football, research by (Prakarsa & Umar, 2020) showed that variations of plyometric training have a significant effect on the shooting accuracy of football players. Plyometric training, through explosive movements, strengthens leg muscles and improves coordination of movements, so that players can shoot with more precision. The results of this study confirm that plyometric training is able to improve the quality of shooting techniques in sports that require shooting accuracy and power.

On the other hand, in the sport of handball, (Kristina et al., 2022) identified that plyometric exercises that utilise force and speed against gravity provide significant advantages in jumping, running and throwing activities. This exercise is more dynamic and explosive than weight training, so it can affect the results of flying shoots in handball athletes. (Rohman & Hananto Puriana, 2020) found that the plyometric single leg jump training method has a positive influence on the ability of handball players to perform flying shots. This exercise improves leg muscle strength and coordination, which are essential for the flying shot technique. Research by (Wicaksono & Sorraya, 2023) showed that squat jump and burpees training significantly increased jump height during jump shooting in handball players. These exercises strengthen leg muscles and increase explosive jumping ability, which contributes to shooting accuracy. Based on the above literature review, it can be concluded that plyometric training has a significant effect on improving shooting accuracy in various sports. It optimises muscle strength, speed and coordination through explosive movements, which are essential for improving shooting performance. Plyometric not only improves physical abilities such as strength and jump height, but also improves technical skills in shooting more accurately and effectively. Therefore, the integration of plyometric training in athletes' training programmes is highly recommended to achieve optimal shooting results.

Conclusions

From the results of the article review conducted by the author on 1962 articles focused on 7 articles to be research material so that it can be concluded that: 1) plyometric training has a significant effect on improving shooting accuracy in various sports, 2) It optimises muscle strength, speed and coordination through explosive movements, which are essential for improving shooting performance and 3) Plyometric not only improves physical abilities such as strength and jump height, but also improves technical skills in shooting more accurately and effectively. Therefore, it is important to choose the right training programme for athletes to achieve optimal shooting results.

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Conflict of interest

There is no conflict of interest to declare.

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