



The Effect of the Combination of Resistance Band and Plyometric Training on the Shooting Accuracy of Women's Futsal Players

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History Article

Received April 2026

Approved April 2026

Published vol 13 no 1 2026

Keywords

Futsal Shooting Accuracy;
Band Resistance Training;
Plyometric Training

Abstract

The low shooting accuracy of female futsal players shows that the training program implemented has not been able to fully integrate aspects of physical condition and technical skills optimally, thus having an impact on the effectiveness of the final finish in game situations. This problem requires a more specific, structured, and contextual approach to training in accordance with the requirements of movement in futsal. This study aims to analyze the effect of the combination of resistance band and plyometric training on improving the shooting accuracy of female futsal players. The research method used a quantitative approach with a pre-experimental design in the form of a pretest-posttest design of one group to assess changes in ability before and after treatment. The subjects were all female futsal players of Student Activity Unit of the University of Education Indonesia Sumedang which were determined through total sampling techniques. The research instrument used a target-based futsal shot accuracy test to objectively measure the level of shot accuracy. Data analysis was carried out through descriptive statistics to describe the initial and final conditions, as well as inferential statistics including normality tests, paired t-tests, and regression analyses to test the significance of differences and treatment contributions. The results of the study showed an increase in shooting accuracy after being given a training program, as indicated by an increase in the pretest average of 17.47 to 21.35 in the posttest, as well as a significance value of $0.001 < 0.05$ so that the research hypothesis was accepted. These findings indicate that the combination of resistance bands and plyometric exercises is effective in improving shooting accuracy by improving movement control, stability, strength, and body coordination. Therefore, it can be concluded that this joint training program has a positive impact and contributes to the development of sports training science through a more integrated and applicable training approach.

How to Cite

Purnama, I. K., Lengkana, A. S., & Alif, M. N. (2026). The Effect of the Combination of Resistance Band and Plyometric Training on the Shooting Accuracy of Women's Futsal Players. *Journal of Physical Education, Health and Sport*, 13 (1), 574-580.

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INTRODUCTION

Futsal is a fast-growing sport and is very popular, especially among students. It is played in a relatively small space and is characterized by its fast and dynamic nature, requiring players to have excellent technique, tactics and physical fitness. In modern futsal, the success of a team depends not only on strategy but also on the ability of each player to apply basic techniques effectively. Shooting is one of the most important basic techniques in futsal (Atmojo, 2018). Shooting is the ability to kick the ball into the goal with the aim of scoring a goal. The success of a team in futsal is greatly influenced by how well players take advantage of the opportunities that arise. Therefore, accurate shots are essential because of the player's ability to direct the ball precisely to the desired target. In addition to strength, mastery of technique, coordination of movements, and the ability of players to adjust the direction and angle of the kick to the position of the goal and the goalkeeper are factors that affect the accuracy of the kick. (Anam et al., 2018).

Players are required to shoot accurately in limited space and time during fast-paced games. Shooting accuracy depends not only on basic shooting techniques but also on body stability, balance, and eye-foot coordination. Players with high shooting accuracy tend to make better use of opportunities, even when under pressure from opponents or in less than ideal positions. However, in reality, many futsal players, especially college students, struggle to produce accurate shots for game situations on the field (Mahanani, 2021). Unstable shots, loss of balance, and poor coordination are some of the main causes of this problem. The quality of a player's shot when directing the ball to the target is directly affected by this condition. In addition, current training techniques usually focus less on improving shooting accuracy and more on general training aspects. This training does not directly integrate shooting techniques with physical conditioning, such as muscle strength and explosive power, preventing players from optimizing their shooting accuracy (Arianta et al., 2025).

Shooting movements in futsal biomechanically consist of many different movements, starting from the starting position, the position of the supporting legs, the swing of the legs, and then contact with the ball and the follow-up. Each phase of the movement must be well coordinated to produce the most accurate shot. Basic kicking techniques aren't the only factor that affects kick accuracy; Support leg

stability, foot swing control, and body position and balance during kicks are also important. Despite the pressure of the game, players with precise shots can direct the ball right to the target. As a result, exercises that improve motor control, balance, and overall coordination are essential (Ahmadi, 2025). Resistance band training is one of the training methods that can be used. This exercise uses an elastic device that provides resistance during movement, improving muscle control and joint stability. This helps to improve the quality of movement. Resistance bands can help players improve the direction of leg swing and body stability when shooting futsal by teaching movement patterns similar to kick techniques (Alfikri, 2025).

However, plyometrics can also be turned into a type of training that helps improve coordination and accuracy of movements. Exercises that emphasize quick movement response and body control allow players to better manage their timing, maintain balance, and coordinate movements between body parts more efficiently. This is especially important for improving shooting accuracy, especially in dynamic and stressful game situations. It is believed that the combination of plyometric training and resistance bands can improve shooting accuracy due to the nature of both training methods. Resistance band training improves muscle stability and movement control, while plyometric training improves coordination and precise timing (Oktavianus et al., 2024).

Previous research has generally examined only one type of training method separately, resulting in a limited direct examination of the effects of combining the two training methods on shooting accuracy, particularly in female futsal players. In addition, research that specifically examined the application of integrated training approaches to improve shooting accuracy was also very limited (Sinurat et al., 2025). Therefore, this study is very important to determine the effectiveness of a combination of training methods in improving shooting accuracy. The combination referred to in this study is the use of a combination training method that combines resistance band training with plyometric training. This study attempted to integrate both methods into one complementary training program, unlike previous studies that tended to examine them separately.

The study also found a focus on linking training methods directly to specific technical skills, such as shooting accuracy. Previous research has often emphasized improving overall

physical condition rather than its relationship to technical gaming ability. In this study, resistance band and plyometric exercises were designed simultaneously to improve the player's physical abilities such as strength, explosiveness, and stability. In addition, this exercise also aims to improve the player's shooting accuracy. Furthermore, this study uses a functional training approach, which adjusts training to the movement patterns seen when shooting futsal. In this way, each exercise is directly related to the movement patterns that occur during the shoot, making the training more specific and rewarding. Therefore, the training programs used are not common and focus on real game movement requirements (Syawaludin, 2025).

Until now, sports research has rarely focused on female futsal players, especially futsal players. This is important because the anatomical, biomechanical, and training needs of female athletes are different from those of male athletes. Therefore, this research is expected to expand scientific knowledge about the performance development of female futsal players. The research not only incorporates a variety of new training techniques but also offers a more specific, relevant, and contextual approach to improving shooting accuracy. The results of this study are expected to be the basis for the development of better training programs that improve players' ability to accurately direct the ball to the goal (Fasrah et al., 2025).

Shooting ability is an important component of success in futsal, making it the main focus of this research. Scoring goals is crucial, especially in fast-paced and high-pressure matches. However, many futsal players, especially female players from the UPI Sumedang Student Activity Unit (UKM), have difficulty executing accurate shots. This suggests that more organized, systematic, and effective training is needed to improve shooting ability, especially in terms of accuracy. In addition, current training methods may not fully integrate physical conditioning and technical mastery at the same time. As a result, the results achieved may not fully support the actual performance of the game on the pitch. To achieve this goal, training methods are needed that integrate physical and technical aspects in an integrated manner, such as resistance band exercises and plyometric exercises. (Irawan et al., 2024).

One of the important elements in this study is the need for a variety of training methods that are more creative and not monotonous. It is hoped that the use of a combination of exercises

such as plyometrics and resistance bands will increase the motivation of players to practice. Additionally, a variety of well-designed exercises can help players improve motor coordination, body balance, and technical control when shooting. Players can produce stronger and more targeted kicks. This research, on the other hand, is very important because previous research has tended to focus on one type of training method or only on aspects of general physical condition, without linking the training method to specific technical skills, such as shooting accuracy. As a result, there is no comprehensive picture of how effective a combination of training methods is in improving technical performance in futsal. (Fauziyanti, 2024).

Therefore, this research is very important to contribute scientifically to the development of more effective training methods, especially in improving shot accuracy in female futsal players. This study is also expected to provide a more in-depth examination of how the combination of resistance band and plyometric training can affect the direction of the shot, power control, and the consistency of the shot (Ramanto et al., 2025).

METHOD

This study uses a quantitative approach with a pre-experimental design in the form of a pretest-posttest design of one group, which was chosen to examine the effect of a treatment on dependent variables directly without involving the control group. As stated by (Marselino et al., 2025) Pre-experimental designs do not meet the criteria for pure experimentation due to the lack of control and randomization of the subject, but they remain relevant for use in limited field research conditions. In its implementation, the study began with a pre-test to determine the subject's basic abilities, followed by treatment in the form of a combination of resistance band and plyometric exercises, and ended with a post-test to measure the changes that occurred after the intervention. This approach allows for the objective collection of empirical data through numerical measurement and statistical analysis, allowing research results to be scientifically validated (Ahmadi, 2025). In line with this, the sampling technique used is total sampling or saturated sampling, i.e. all members of the population are used as research samples, as explained by (Hidayah, 2025). with the aim of obtaining comprehensive, representative data and minimizing errors in drawing conclusions from a relatively small population. By applying this method, this study focuses on

the analysis of measurable variable changes to produce accurate conclusions regarding the effectiveness of the exercise program implemented.

The instrument used in this study was a test of futsal shooting accuracy skills. The test was carried out by kicking the ball from a distance of 10 meters (the second penalty point) towards a goal measuring 2 meters high and 3 meters wide. The objective is divided into nine target areas of varying difficulty, where each area is weighted between 1 and 5. The more difficult the target position, the higher the score will be. Each player is given 10 attempts to shoot without repetition if the ball does not go in or only hits the goal post. Scores are obtained from the accumulated scores of all the experiments. The instrument has been tested with a reliability coefficient of 0.940 according to (Nofriansyah et al., 2024), so it is stated to have a very high level of reliability and is suitable for use in research.

The subjects in this study include all female futsal players from the UPI Sumedang Student Activity Unit (UKM). The sampling technique used is total sampling (saturated sampling), where all members of the population are used as samples in this study, namely 18 people with an average age range of 19 to 21 years. This technique was selected based on the relatively limited size of the population, allowing for more representative and comprehensive data collection (Musfira, 2024). Meanwhile, the object of this study is the ability to shoot futsal as measured before and after training treatment.

The data used in this study is quantitative data obtained from the measurement of shooting accuracy in pre-test and post-test. The resulting data is a numerical score that reflects each player's shot accuracy rate (Saragih et al., 2025). Furthermore, data were processed and analyzed using descriptive and inferential statistical techniques to determine changes in ability before and after treatment, so that conclusions could be drawn about the effect of training provided on improving shooting accuracy.

The data collection process is carried out in two main stages: pre-test and post-test. Pre-tests are conducted to determine the accuracy of a player's initial shot before being given treatment (Firdaus et al., 2025). Next, subjects were given a combination of resistance band and plyometric exercises, which were carried out programmatically over 12 sessions. The frequency of training is three times a week, with each session lasting 90 minutes.

Each session focuses on core exercises, including resistance band and plyometric exer-

cises tailored to futsal shooting movements. The remaining time is devoted to warm-ups, cool-downs, and closing matches, which are designed to maintain motivation, increase player engagement, and apply the results of practice to game situations. This structured and repetitive pattern of training is expected to provide optimal adaptation to improve shooting accuracy. Once the entire training program is completed, the post-test is conducted using the same procedure as the pre-test to determine any change in ability. (Desinta Dhaneswari et al., 2024).

Data analysis in this study was carried out in stages using descriptive and inferential statistical approaches to obtain accurate and comprehensive results. (Putra et al., 2025). In the initial stage, data from the pre-test and post-test are analyzed using descriptive statistics to determine the mean value, standard deviation, and minimum and maximum values, so as to provide an overview of the initial and final ability conditions of the research subject.

Furthermore, before hypothesis testing is carried out, the data is first tested through a prerequisite analysis test, namely the normality test, to ensure that the data is distributed normally and meets the requirements for the use of parametric statistics (Motivation et al., 2024). Once the prerequisites are met, the analysis is resumed using a paired sample t-test to determine if there is a significant difference between the pre-test and post-test results.

The results of this test are interpreted based on a significance value (p-value) with a significance level of 0.05. Furthermore, to find out the extent of the contribution or influence of treatment on the improvement of shooting ability, this study also uses simple regression analysis by examining the determination coefficient (R-square) (Nofriansyah et al., 2024). The R-square value is used to measure the percentage of treatment variables (resistance band and plyometric exercise) in explaining the dependent variable, i.e. shooting accuracy. The higher the R-square value, the greater the contribution of training to improving the player's abilities. The entire data analysis process is carried out using SPSS, so that the results obtained are more systematic, objective, and scientifically accountable.

RESULTS AND DISCUSSION

Table 1. Descriptive Test

	N	Min-utes	Max	Quan-tity	Means	Standard Deviation	Variants
Defend	17	10	27	297	17.47	4,473	20,015
Post-tests	17	16	32	363	21.35	4,061	16,493

Table 1. Descriptive analysis results in **Table 1**, the average pre-test value of futsal shooting ability was 17.47 with a minimum score of 10 and a maximum of 27. After being given a resistance band and plyometric training program, the average post-test value increased to 21.35 with a minimum score of 16 and a maximum of 32. These results indicate an increase in futsal shooting ability after being given training, so that the resistance band and plyometric training program has a positive influence on futsal players' shooting.

Table 2. Shapiro-Wilk Normality Test

	Statistics	df	sig	Information
Loans	0,62	17	.673	Normality
Post	0,15	17	.123	Normality

Table 2. Based on the results of the normality test using the Shapiro-Wilk method in **Table 2**, the pretest significance value was 0.673 and the posttest significance value was 0.123. Since both sig values are > 0.05 , the pretest and posttest data are normally distributed, thus meeting the assumption of normality.

Table 3. Simple paired tests

	Sig.2 tailed	Information
Pretest-Posttest	.001	Significant

Table 3. Based on the results of the paired sample t-test in **Table 3**, the Sig. (2-tailed) value was $0.001 < 0.05$. These results indicate a significant difference between the pretest and posttest, thus the research hypothesis is accepted. Thus, the combination of resistance bands and plyometric training has a significant effect on improving shooting accuracy in female futsal players.

Table 4. N- Gain

N-Gain Value	Category
$G > 0,7$	Tall
$0,3 \leq G \leq 0,7$	Currently
$G < 0,3$	Low

Table 4. Based on the results of the N-Gain analysis on 17 participants, the average value was 0.1024, or 10.24%. Referring to the N-Gain category in the table, this value is considered low because it is in the range of $G < 0.3$. This indicates that the increase in participants' abilities after the intervention is still relatively low.

Based on the results of the research that has been conducted, it was found that there was

an increase in shooting accuracy in female futsal players after being given treatment in the form of a combination of resistance band and plyometric exercises (Wahyuddin & Sidik Siregar, 2024). Thus, this study successfully answered the formulation of the problem that the combination of resistance band and plyometric training has a significant effect on improving shooting accuracy in female futsal players (Mahyuddin, 2025). These findings are in line with previous research that stated that structured and repetitive training programs can provide optimal physical conditions and improve technical performance.

The increase in shooting accuracy that occurred in this study is inseparable from the principle of training conditions which include increasing muscle strength, coordination, and body stability (Febriansyah, 2024). Resistance band training improves muscle control and joint stability, helping players maintain balance while shooting. Plyometric training, on the other hand, helps improve explosiveness and motor coordination through the stretch-shortening cycle (SSC) mechanism, which is essential for producing fast and accurate kick movements (Iba & Faculty, 2024).

Theoretically, shooting accuracy in futsal is influenced by various factors such as muscle strength, eye-foot coordination, balance, and body movement control. The findings of this study support this theory, stating that the improvement in shooting ability occurs due to the integration of physical and technical aspects through training. This is also in line with the view that specialized training that mimics game movements (specialized training) will provide greater skill transfer to technical skills (Alfikri, 2025). Furthermore, the results of this study are also relevant to previous research that showed that plyometric exercises can improve explosiveness and motor coordination, while resistance band exercises are effective in improving muscle stability and control. The combination of these two training methods provides a more comprehensive stimulus than either method alone. Therefore, a training program that combines these two methods can improve the quality of shooting movements, including strength, direction, and consistency (Nathasya, 2024).

From a biomechanical perspective, shooting movements involve coordination between the lead-up phase, leg swing, ball contact, and follow-up. The exercises carried out in this study contribute to improving each of these phases simultaneously. (Nathasya, 2024). Resistance bands control the swing pattern of the legs for better stability and direction, while plyometrics increase

movement speed and time. This combination results in more efficient and accurate shooting movements. Regarding the characteristics of female athletes, the results of this study also show that specially designed training programs can have a significant impact on performance improvement. This is important because female athletes have different physiological and biomechanical characteristics than male athletes, requiring a tailored training approach. This research contributes to the development of a more contextual and relevant training program for female futsal players.

Although the study results showed a significant effect on shooting accuracy (Subakti, 2025).). based on the average N-Gain percentage of 10.24%, this improvement is still considered low. This indicates that, despite the statistically significant change, the resulting improvement in shooting ability is not optimal .

Overall, the results of this study show that the combination of resistance band and plyometric training is an effective method to improve shooting accuracy in female futsal players. Training programs that integrate physical and technical aspects have proven to provide significant improvements, making them a viable alternative training method for futsal development, especially for female athletes (Subakti, 2025). In conclusion, the increase in the average score from 17.47 to 21.35, along with statistically significant results, showed that the combination of resistance band and plyometric exercises significantly improved shooting accuracy. Therefore, this training method can be recommended as an effective strategy to improve technical performance in futsal.

CONCLUSION

Based on the results of the research that has been conducted, it can be concluded that the combination of resistance band and plyometric exercises has been proven to be able to answer the problem formulation while achieving the research goal, which is to improve shooting accuracy in female futsal players. The findings of the study showed an improvement in shooting ability after treatment, which showed that the integration of exercises that combined aspects of strength, explosiveness, stability, and motor coordination had a positive impact on the quality of kick technique, especially in terms of directed cricket, power control, and consistency of shot results. This is in line with the concept of functional training that emphasizes the suitability between the form of training and the pattern of movement in real game situations, resulting in a more specific adaptation to the performance needs of futsal. Thus,

this research contributes to the development of sports coaching science, especially in designing training programs that integrate physical conditions and technical skills, as well as providing scientific studies on the effectiveness of combined training methods in female futsal athletes, which have been limited in research.

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