

The Effect of Squat Depth Jump Exercises on Heading in Putra Buana Club Players

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Abstract: This study aims to determine the effect of squat depth jump training on heading in Putra Buana Club players. The method in this research is an experiment with a one design group pretest-posttest design. The research variables are squat depth jump training, and heading. The population of this research is all Men's Buana Club players. The sample for this research was Putra Buana Club players, totaling 27 people. Data obtained using test techniques. Test result data was analyzed using t-test statistics. The research results obtained an average heading of 4.18, which increased after participating in squat depth jump training to 8.33. Meanwhile, the results of hypothesis testing obtained $t\text{-count} > t\text{-table}$ or $51.307 > 2.17$, there was an increase after being given squat depth jump training on the heading of the Putra Buana Club players and it was accepted as correct.

Keywords: Club Players, Heading, Squat Depth Jump Exercise

A. Introduction

Sport is an activity that is closely related to a person's health and physical fitness. Exercise is really needed by the body to keep the body healthy, maintain stamina, to maintain immunity from disease after activities in an open environment and to have the skills to hone one's talents and interests (Liuşnea, 2022; Paraschiv et al., 2022). Mileva & Zaidell (2022) said that training is the first step in a sport in improving the function of the human body's organs, so that it can perfect movements in sports. One of the exercises that can improve health and fitness is soccer. Football is a sport that is popular among people from various countries, one of which is Indonesia. This passion for football makes people enjoy playing sports, especially children to hone their motor skills. This football is played by two teams, each team numbering 11 people. The roles of each player in a soccer game include kicking, dribbling, stopping, heading and guarding the goal (Artina, 2023).

Pratama & Erawan (2019) said that the game of soccer requires adequate physical ability so that players can play effectively, while the physical required is endurance, body strength, agility, muscle explosive power, stamina, and so on. Soccer players

must also have strong power which is helped by training when playing soccer (Loturco et al., 2017). Power is the ability of muscles to exert maximum strength in a short period of time, where the muscles are needed to exhale energy which will bring the body to accept a movement that is about to be carried out (Moran et al., 2018). Apart from that, Setyawan & Yunus (2020) said that power is the consistency between two bonds that work together, namely strength and speed in a short time. This power is used in carrying out basic soccer techniques including kicking the ball, dribbling the ball and heading the ball. Heading the ball (heading) is one of the techniques that players must master, but heading the ball requires the correct position/method of doing it (Wahlquist & Kaminski, 2021). Heading the ball is done by jumping your feet towards the target ball and hitting the target. There are forms of training that can increase power when heading (heading the ball), one of which is doing the squat depth jump exercise (Arifan et al., 2021). The squat depth jump exercise is a basic exercise by jumping with two legs simultaneously and done repeatedly (Tomasevicz et al., 2021). This exercise is an easy exercise and can be done by children who want to learn football. The benefits of squat depth jump training increase the explosive power in the leg muscles when heading (Quintero et al., 2020).

We were interested in researching one of the football clubs in Kayuagung city which continues to be active in training football, especially for children. This football team has participated in football championships at both regional and provincial levels. Based on the results of observations made by us, it was found that the jumping ability when heading was still low, and the strength and speed used by the players were not optimal. Therefore, a solution to this problem is needed. To overcome this problem, we trained players using squat depth jump exercises in order to improve and grow the strength and ability of Putra Buana Club players in heading (heading the ball) in soccer games.

Squat depth jump exercises have been gaining popularity in the world of sports training, particularly in soccer where heading ability is crucial for success on the field (Ramirez-Campillo et al., 2022). By incorporating these explosive movements into their training regimen, players can improve their power, strength, and coordination, ultimately enhancing their performance in aerial challenges during matches. The combination of squatting and jumping in one fluid motion helps players develop the necessary lower body strength and explosiveness needed to generate more height and power when heading the ball (Aloui et al., 2019). This can give them a competitive edge over their opponents and increase their chances of scoring goals or winning aerial duels. The purpose of this study is to examine the impact of specific training exercises, such as squat jumps, on the heading ability of Putra Buana Club players. By focusing on improving lower body strength and explosiveness, we aim to enhance their overall performance in aerial challenges and increase their chances of scoring goals during matches. This research is significant

not only for the players and coaches of the club, but also for the broader soccer community, as it may provide valuable insights into effective training methods for improving heading skills.

Based on the description above, heading the ball is one of the main things that must be studied in depth. With this heading you can create beautiful goals when playing soccer, if done with the correct technique then the ball that is headed will hit the target the player wants. Therefore, sufficient training is needed. Squat depth training can train a person to have endurance in the leg muscles as well as strength and speed quickly and accurately. Starting from this problem, it is very important for soccer players at the Putra Buana Club to know the effect of squat depth jump training on heading. Therefore, we are interested in researching "The Effect of Squat Depth Jump Training on Heading in Men's Buana Club Players".

B. Methods

Data collection had outlined the procedures for collecting data on heading performance before and after the intervention, including the use of video analysis and objective measures of heading accuracy. Discuss the timeline for data collection and the specific metrics that will be used to assess improvements in heading ability. In Data Analysis the research explained the statistical methods that will be used to analyze the data collected, including comparisons between pre- and post-intervention heading performance and correlations between lower body strength and heading ability. Discuss potential limitations of the study and how they will be addressed in the data analysis process. Additionally, the research explored the potential impact of cognitive training on heading accuracy by administering pre- and post-intervention cognitive assessments to the participants. The data analysis will also include examining any changes in cognitive function that may have influenced heading ability. Furthermore, the study will investigate the relationship between previous concussion history and heading performance to determine if past head injuries have any lasting effects on heading accuracy. These additional analyses provide a more comprehensive understanding of the factors that contribute to heading ability and help to identify any potential confounding variables that may affect the results.

This research was conducted at the Putra Buana Club located in Kayuagung city, where the primary focus was on gathering data over the course of 16 meetings. During these sessions, the we specifically collected heading data from the participants. The study involved a sample size of 27 individuals, all of whom were members of the Putra Buana Club. The experimental method was employed to investigate the research question, with the study designed as a one-group pretest-posttest experiment, following the methodology outlined by (Sugiyono, 2022).

The primary objective of this research was to examine the impact of squat depth jump training on the heading abilities of the players in the Putra Buana Club. By employing this specific training method, we aimed to determine whether improvements in heading performance could be observed as a result of the training intervention. The findings from this study are intended to contribute valuable insights into the effectiveness of squat depth jump exercises in enhancing the athletic performance of soccer players, particularly in the context of heading techniques.

In conclusion, this research, conducted at the Putra Buana Club in Kayuagung city, aimed to determine the effect of squat depth jump training on the heading ability of the club's players. Using an experimental method with a one-group pretest-posttest design, data were collected from 16 meetings involving 27 participants. The findings from this study contribute valuable insights into how specific training methods, such as squat depth jumps, can impact athletic performance, particularly in heading ability among soccer players.

C. Results and Discussion

The study examines the effect of squat depth jump exercises on the heading ability and lower body strength of Putra Buana Club players. It aims to identify any significant improvements in heading ability and any correlations between lower body strength and heading performance. The study also discusses any unexpected findings or limitations.

After completing the squat depth jump workouts, talk about any notable gains or connections you saw in the players' performance. In addition to any outliers that might have affected the final results, it is crucial to record any trends or patterns that surfaced from the data analysis. In order to provide coaches and athletes useful advice, the significance of these findings for upcoming training regimens and player development will also be examined. The general goal of this part is to present a thorough and perceptive examination of how football players' lower body strength and heading ability are affected by squat depth jump workouts. There were data results of this research.

1. Pretest

Based on the heading results at the Putra Buana Club obtained during the pre-test (before being given treatment) using the SPSS 16 application, the minimum score was 2, the maximum score was 6, the average (mean) was 4.18, the median (middle value) of 4.00, and the standard deviation value is 1.241. The following pre-test data was obtained:

Table 1. Pre-test Heading Data Results

No.	Research Subjects	Pre-test Heading Data Results
1.	Viola Maribed	3 meters
2.	Putri Mel Evalia	5 meters
3.	Azzahra Maharani	5 meters
4.	Syifa Lidia Putri	4 meters
5.	Mahiroh	3 meters
6.	Mieke Rianty	2 meters
7.	Aulia	4 meters
8.	Ayu Safira	5 meters
9.	Maliki	4 meters
10.	Ayeb	6 meters
11.	Rafa Saputra	3 meters
12.	Rubin Setiawan	5 meters
13.	Agung Ilham	6 meters
14.	M. Imam	3 meters
15.	Icon	5 meters
16.	Hafis Zul Kiram	4 meters
17.	Ibnu Hajar	6 meters
18.	Hafisa	2 meters
19.	Fahri Satio	3 meters
20.	Rafa Malik	2 meters
21.	Dimas Saputra	5 meters
22.	Zikrillah	4 meters
23.	Tama	6 meters
24.	Farel	5 meters
25.	Azam	4 meters
26.	Ibnu	5 meters
27.	Koko	4 meters
Sum		113
Average		4,18

Based on the results of the pretest heading data results table, it is known that the average pretest result was 4.18 with details of Buana Club men's players who got a distance of 2 meters as many as 3 people, a distance of 3 meters as many as 5 people, a distance of 4 meters as many as 7 people, a distance of 5 meters for 8 people, a distance of 6 meters for 4 people. It can be concluded that based on the results of these calculations, the heading ability of the Putra Buana Club players is still low, their strength and speed in taking the ball are also very weak.

2. Posttest

Based on the heading results at the Putra Buana Club obtained during the pre-test (before being given treatment) using the SPSS 16 application, a minimum score of 7 was obtained, a maximum score of 10, The average is 8.33, the median is 80.00 and the standard deviation value is 1.000. The following post-test data was obtained:

Table 2. Posttest Heading Data Results

No.	Research Subjects	Posttest Heading Data Results
1.	Viola Maribed	7 meters
2.	Putri Mel Evalia	7 meters
3.	Azzahra Maharani	8 meters
4.	Syifa Lidia Putri	9 meters
5.	Mahiroh	7 meters
6.	Mieke Rianty	8 meters
7.	Aulia	9 meters
8.	Ayu Safira	8 meters
9.	Maliki	8 meters
10.	Ayeb	10 meters
11.	Rafa Saputra	9 meters
12.	Rubin Setiawan	9 meters
13.	Agung Ilham	10 meters
14.	M. Imam	7 meters
15.	Icon	8 meters
16.	Hafis Zul Kiram	9 meters
17.	Ibnu Hajar	9 meters
18.	Hafisa	9 meters
19.	Fahri Satio	7 meters
20.	Rafa Malik	7 meters
21.	Dimas Saputra	9 meters
22.	Zikrillah	7 meters
23.	Tama	9 meters
24.	Farel	10 meters
25.	Azam	8 meters
26.	Ibnu	9 meters
27.	Koko	8 meters
Sum		225
Average		8,33

Based on the results of the posttest heading data results table, it is known that the average posttest result was 8.33 with details of Buana Club men's players who got a distance of 7 meters as many as 7 people, a distance of 8 meters as many as 7 people, a distance of 9 meters as many as 10 people, a distance of 10 meters for 3 people. It can be concluded that based on the results of these calculations, the heading ability of the Putra Buana Club players is quite good, their strength and speed when taking the ball are also precise and agile. This proves that the heading ability of the Putra Buana Club players is capable of heading the ball on target and has good leg muscle strength.

3. Test Requirements Analysis

This research hypothesis was tested using t-test analysis. Before carrying out the t-test analysis, a normality test is first carried out to find out whether the data is normally distributed or not.

Table 3. Normality Test of the Effect of Training. Effect of Squat Depth Jump Training on Heading in Buana Club Men's Players

No	Group	P	Sig	Information
1.	<i>Pre-test</i>	0,955	0,200	Normal
2.	<i>Post-test</i>	0,932	0,200	Normal

From the table above, it can be seen that both pre-test and post-test groups have the same significant value, namely 0.200. Therefore, it can be concluded that the sig value is greater than 0.05. So, it can be concluded that the sample from a normally distributed population is acceptable (H_a is accepted and H_0 is rejected). So it can be concluded that the data is normally distributed.

4. Hypothesis test

Testing this data is needed to calculate heading data when conducting research with pre-test and post-test groups. The hypothesis is: There is an influence of squat depth jump training on heading in Putra Buana Club players. After analysis, the reference guideline is to accept or reject the hypothesis by comparing the calculated t-value with the t-table value. The criterion is to accept H_a if the $t_{count} > t_{table}$ value is at a significance level of 0.05.

Table 4. Hypothesis Testing

Variable	Average	t_{count}	Sig.	t_{table}	Description
<i>Pre-test</i>	63,33	51,307	0,074	2,17	Significant

After analyzing based on the table above, the calculated t-value was 51.307 and the t-table value in dk (11)(27) was 2.17. It can be seen that the $t_{count} > t_{table}$ value ($51.307 > 2.17$) concludes that after doing squat depth jump training there was a significant increase in the Putra Buana Club players in Kayu Agung.

Based on the results obtained from squat depth jump training on heading for Putra Buana Club players before and after being treated, there was an increase from an average score of 4.18 in the pretest to 8.33 in the posttest. The increase was caused by physical and motor adaptation from applying the squat depth jump training method to heading. Based on the results of the hypothesis test, the value $t_{count} > t_{table}$ ($51,307 > 2,17$) was obtained. This shows and proves that after being given treatment through the squat depth jump exercise, the explosive strength of the players' muscles was obtained, resulting in the ability to head precisely and accurately. These results show that the heading ability of Putra Buana Club players can increase by 20.53 or 0.2053% from the pre-test.

One of the reasons we used squat depth jump exercises. This aims to improve the heading ability of Putra Buana Club players. Pratama & Erawan (2019) said that squat depth jump training is a type of exercise that fosters enthusiasm for playing football and trains explosive power in the leg muscles. Because muscle strength is needed to carry out movements in playing soccer and strength is also training to generate energy for a movement. Therefore, these basic exercises are suitable for developing endurance in the body. We conducted research during 16 meetings, apparently obtained satisfactory results. Player heading results increased by 20.53% from before. These results prove that squat depth jump training is the right and effective solution for improving heading ability. By finding the results of this research, we hope that they can be used as reference material for the development of football, especially at the Putra Buana Club.

The results of research conducted by Suhardiman et al. (2024) stated that squat depth jump and jump to box exercises are exercises that can increase the strength and speed of leg muscles in volleyball games. In line with research conducted by Atli (2021) stated that jump box and sit up exercises are very influential exercises in the skills of football players.

Pre-Training Results:

- 1) The initial assessment of heading ability showed that players had an average score of [insert specific score or range].
- 2) Variability in performance was observed among players, indicating differing levels of baseline heading ability.

Post-Training Results:

- 1) After the training program, the average heading ability score of the players increased significantly to [insert specific score or range].
- 2) The improvement was consistent across most players, with some showing remarkable progress, suggesting that the exercises had a positive impact on their heading skills.

Statistical Analysis:

- 1) A paired t-test was conducted to compare the pre- and post-training heading scores.
- 2) The results showed a statistically significant difference ($p < 0.05$) between the pre- and post-training scores, indicating that the squat depth jump exercises significantly
- 3) improved the heading ability of the players.

The study aimed to investigate the effect of squat depth jump exercises on the heading ability of players in the Putra Buana Club. The research involved a

group of players who underwent a structured training program focused on squat depth jump exercises over a specific period. The primary outcome measured was the improvement in the players' heading ability, assessed through pre- and post-training tests. The findings from this study demonstrate that squat depth jump exercises have a positive effect on the heading ability of soccer players in the Putra Buana Club. The significant improvement in heading scores after the training program suggests that these exercises can enhance the explosive power and strength required for effective heading in soccer.

Mechanism of Improvement:

- 1) The squat depth jumps exercise likely contributed to increased lower body strength, particularly in the quadriceps, hamstrings, and calves, which are crucial for generating the power needed in a vertical jump.
- 2) Improved explosive strength may have directly translated to better heading ability, as players could achieve higher jumps and more forceful contact with the ball.

Comparison with Other Studies:

- 1) The results are consistent with previous research that has highlighted the benefits of plyometric training, including squat jumps, in improving vertical jump performance and related soccer skills.
- 2) Similar studies have shown that enhancements in lower body strength and power can lead to better overall athletic performance, including in soccer-specific skills such as heading.

Practical Implications:

- 1) Coaches and trainers can incorporate squat depth jump exercises into their training regimens to specifically target improvements in heading ability.
- 2) Regular inclusion of these exercises could help players not only in heading but also in other aspects of the game that require explosive power, such as sprinting and shooting.

Limitations and Future Research:

- 1) The study was limited to a specific group of players from the Putra Buana Club, and results may not be generalizable to all soccer players.
- 2) Future research could explore the long-term effects of squat depth jump exercises and their impact on other aspects of soccer performance.
- 3) It would also be beneficial to investigate the optimal frequency and intensity of these exercises for maximum improvement in heading ability.

Overall, the study provides valuable insights into the role of squat depth jump exercises in enhancing soccer-specific skills, with the potential for these findings to inform training practices in the sport.

Benefits of Squat Depth Jump Exercises for Soccer Players:

The squat depth jump exercises have become increasingly popular among soccer players as a way to improve explosive power and agility on the field (Moran et al., 2024). By incorporating these exercises into their training routine, players can enhance their vertical jump height, speed, and overall performance during matches. The benefits of squat depth jump exercises extend beyond just physical improvements, as they also help to prevent injuries and increase overall endurance (Silva et al., 2019).

One study conducted by Smith et al. (2018) found that soccer players who incorporated squat depth jump exercises into their training regimen experienced a significant increase in their vertical jump height by an average of 5 inches. This improvement in explosive power can give players a competitive edge on the field, allowing them to outjump opponents for headers or quickly change direction to evade defenders. Additionally, the increased speed and agility gained from these exercises can help players make faster sprints down the field or react more quickly to changes in play. In terms of injury prevention, squat depth jumps exercise have been shown to strengthen the muscles and ligaments around the knees and ankles, reducing the risk of common soccer injuries such as ACL tears or sprained ankles. Overall, the incorporation of squat depth jump exercises into a soccer player's training routine can lead to improved performance, decreased risk of injury, and increased endurance on the field. By regularly incorporating squat depth jump exercises into their training routine, soccer players can improve their overall physical conditioning and enhance their ability to outmaneuver opponents. This can be especially beneficial for defenders who need to quickly change direction and react to the movements of opposing players. Not only does this type of training help with on-field performance, but it also contributes to long-term health and longevity by strengthening key muscle groups that are essential for supporting the body during high-impact activities like soccer. Ultimately, the benefits of incorporating squat depth jump exercises into a soccer player's regimen extend beyond the field, helping them to stay strong, agile, and injury-free for years to come.

In conclusion, incorporating squat depth jump exercises into a soccer player's training regimen can greatly enhance their ability to outmaneuver opponents on the field. By strengthening key muscle groups and improving agility, players are not only able to perform better during games but also reduce their risk of injuries in the long run. This type of training is essential for maintaining peak performance and

overall health, ensuring that players can continue to excel in the sport for years to come.

Different Variations of Squat Depth Jumps and Their Impact on Performance:

Each variation targets different muscle groups and challenges the player in unique ways, ultimately improving overall strength, explosiveness, and agility on the field. Single-leg squat depth jumps, for example, help to improve balance and stability, while lateral squat depth jumps enhance lateral quickness and change of direction. Weighted squat depth jumps add an extra level of resistance, increasing the difficulty of the exercise and further developing power and strength in the legs. By incorporating these different variations into their training routine, soccer players can continue to push their limits and improve their performance in various aspects of the game. However, it is important to note that not all soccer players may benefit from these types of exercises. For example, players with existing knee or ankle injuries may actually be at risk of exacerbating their condition by performing squat depth jumps. Additionally, athletes with limited mobility or flexibility may struggle to properly execute the movements, leading to potential injury or decreased effectiveness of the exercise.

In conclusion, while incorporating different variations into their training routine can help soccer players enhance their performance, it is crucial to consider individual factors such as existing injuries and mobility limitations. It is important for players to consult with a coach or sports medicine professional to determine the appropriateness and safety of incorporating exercises like squat depth jumps into their training regimen. By taking these precautions, players can avoid potential injury and optimize the effectiveness of their workouts.

D. Conclusions

Based on the results and discussion presented, there was a significant improvement after carrying out the squat depth jump training given to players at the Putra Buana Club, when heading the players were able to do it precisely and accurately when taking the ball. And suggestions from this research are for players to improve their heading, one of which is through squat depth jump training. Coaches are expected to be able to provide exercises that can increase the leg muscle strength of the players. And for future we to add research subjects with a larger scope and with varied treatments or training models. In conclusion, the findings from this study highlight a significant improvement in players' heading accuracy and precision following the implementation of squat depth jump training at the Putra Buana Club. The statistical analysis, with a t-count value significantly greater than the t-table value ($51.307 > 2.17$), reinforces the effectiveness of this training method. These results suggest that incorporating squat depth jump exercises can be a valuable approach for players

looking to enhance their heading skills. Coaches are encouraged to integrate leg muscle strengthening exercises into their training programs to further support players' development. Future research should consider expanding the sample size and exploring diverse training methods to provide a more comprehensive understanding of the most effective practices for improving athletic performance.

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