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The Effect of Squat Jump and Split Squat Jump Plyometric Training on Leg Power in Soccer Athletes

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Abstract

The purpose of this study was to determine the Effect of Squat Jump and Split Squat Jump Plyometric Exercises on the Leg Power of Football Athletes, with the research design applied in this study was "two groups pretest-posttest design". Group I was given squat jump treatment and group II was given split squat jump treatment. The location of this study was carried out at Al-Ma'soem High School, JL. Raya Cipacing No. 22, Jatinangor District, Sumedang Regency, West Java. The population in this study amounted to 20 people who were divided into two groups that would be given squat jump and split squat jump training actions. Samples were taken using a total sampling technique, where all populations would be samples in this study. The instrument used in this study was a vertical Jump test instrument, the test serves to measure individual leg muscle power. The test was carried out during the pretest and after being given posttest treatment. This data was processed using SPSS 22. The results of this study Sig from the squat jump and split squat jump groups was 0.000 which means less than 0.05. Furthermore, the squat jump group demonstrated a greater improvement compared to the split squat jump group. These findings indicate that both plyometric training methods are effective in enhancing lower-limb explosive power. In conclusion, squat jump and split squat jump exercises can be implemented as effective training strategies to improve leg muscle power in football athletes, providing valuable insights for coaches in optimizing training programs.

How to Cite

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INTRODUCTION

Football is a sport where in each match there are 2 teams, each team consists of 11 players with different positions (Rohman, 2019). Posisi cabang olahraga sepak bola meliputi, The positions of the sport of football include, Goalkeeper, 2 center backs, left back, right back, 2 center midfield, left midfield, right midfield and 2 center forwards, each position has different challenges and levels of difficulty in each match situation (Pratama & Erawan, 2019). This sport has a very high intensity in each match, because each player will fight for the ball which allows for hard collisions between players. Therefore, football players must have good physical, technical, tactical, and psychological conditions. These aspects will help athletes achieve the best performance in each match. This can be achieved by athletes through programmed training that is in accordance with training norms (Qotimah et al., 2024) . In soccer athletes there are several basic techniques that must be mastered, these basic techniques are divided into 2 parts, namely, (Basic techniques without the ball) Jumping, running, feinting and (Basic techniques with the ball) passing, shooting, dribbling and heading (Yudanto & Nurcahyo, 2020).

To achieve maximum skill, athletes must be in optimal physical condition, especially in the legs. To achieve optimal physical condition, athletes are required to undertake physical training with a measured and serious training program (Styawan & Yunus, 2015). Physical condition itself contains several components such as strength, speed, flexibility, and endurance. The physical components of strength include power, speed strength, maximum strength, and strength endurance (Yuliana, 2023). In soccer, leg muscle power is a crucial factor, as it significantly influences an athlete's success rate in each movement (Nugraha et al., 2024). Power is a combination of strength and speed, where muscles are required to exert maximum force in a very short time. Leg muscle power can be defined as the ability of the leg muscles to exert all their energy in a very short time (Yanti et al., 2021). There are various methods available for increasing leg muscle power, one of which is plyometric training.

Plyometric training has long been used by many coaches and athletes to increase explosive power. Plyometrics itself is believed to enhance the stretch-shortening cycle by reducing the transition duration between the eccentric and concentric phases (Caulfield, 1999). According to (Purnomo & Firma Ditha, 2018) plyometrics is a good training method for developing leg muscle power. A crucial factor in developing leg muscle power is increasing the athlete's vertical jump height. Plyometrics are exercises characterized by powerful muscle contractions resulting from a rapid dynamic loading response from the involved muscles (Utomo, 2018). Many forms of plyometric training can be used, but this study only used two: squat jumps and split squat jumps (Hardovi, 2019).

Squat jump is a form of exercise by linking both hands behind the head, then jumping from a half-squat position to a standing position and landing in the starting position (Santosa, 2015). Split squat jump is a variation of the squat jump exercise that aims to build explosive power in the leg muscles. Both forms of exercise are closely related to increasing leg muscle power, because they focus on the lower body (Oneal & Wiriawan, 2025). The main principle in plyometric training is to use different training intensity and load for each athlete, because basically each individual has different body abilities. In the sport of soccer, this training method is very useful for athletes in increasing the explosive power (power) of leg muscles to support every movement performed, in addition to that, the plyometric training method has also been widely used in other sports, especially sports that require physical power components (Johan Ahmat Farizi et al., 2023).

In badminton, plyometric training methods have been shown to significantly impact athletes. A study by (Shalahudin & Sifaq, 2023) found that plyometric training methods, including split squat jumps and squat jumps, significantly impact leg power and speed in badminton athletes. Therefore, this was the reason why researchers conducted a study entitled "The Effect of Squat Jump and Split Squat Jump Plyometric Training on Leg Muscle Power in Soccer Athletes." The sample used in this study was extracurricular athletes from Al-Ma'some High School in Sumedang Regency. The aim was to determine whether there was a significant effect of squat jump and split squat jump plyometric training on leg muscle power in soccer athletes, as well as to examine the differences between each training method. This is expected to inform coaches' considerations in selecting the appropriate training methods and methods for athletes, as well as to assist athletes in increasing leg muscle power.

Although plyometric training has been widely used in soccer development, the novelty of this study lies in its focus on comparing the effectiveness of two commonly used training methods, namely squat jumps and split squat jumps,

in increasing leg muscle power in adolescent athletes. Previous studies tended to assess the effects of plyometrics in general, without distinguishing the specific contribution of each type of training to increasing explosive ability directly related to the movement requirements of soccer. Therefore, this study provides a new perspective by directly examining the differences in the effects of these two methods, so that the results can be used as a consideration for coaches in selecting the most appropriate and efficient form of plyometric training to improve athlete performance.

METHODS

The method used in this study was a true experiment, in which two groups were given different treatments. A true experiment is a study conducted with the aim of determining whether or not the treatment given to the subjects has an effect (Arib et al., 2024). The research design applied in this study was a "two-group pretest-posttest design," where each group received a pretest and a posttest. Group I was given the squat jump treatment, and Group II was given the split squat jump treatment.

This research was conducted at Al-Ma'soem High School, Jl. Raya Cipacing No. 22, Jatinangor District, Sumedang Regency, West Java. The population in this study consisted of 20 students, divided into two groups, each undergoing squat jump and split squat jump training. The sample was taken using a total sampling technique, with the entire population being included in the sample. The instrument used in this study was a vertical jump test, which measures an individual's leg muscle power. The test was administered during the pretest and after the treatment was given, a posttest..

Treatment was given to the subjects 3 times a week, for 6 weeks with an intensity of 50%-70% for 3 sets and a 1-minute rest period. Data collection was carried out by conducting a pretest and posttest using a predetermined instrument. The data analysis techniques used in this study were homogeneity and normality tests as prerequisites for the analysis test, then the data were analyzed using a t-test which aims to compare the average difference between the squat jump group and the split squat jump group.

RESULTS AND DISCUSSION

The purpose of this study was to determine whether the squat jump and split squat jump plyometric training methods had an effect on increasing leg muscle power in soccer athletes at Al-Ma'soem High School, Sumedang. In relation to this research objective, the data obtained from this study were test results measured using a vertical jump test instrument to measure leg muscle power.

Based on the research conducted, the results showed the effect of the squat jump and split squat jump training methods on leg power in extracurricular soccer participants at Al-Ma'soem High School. The study was conducted by administering a pretest and posttest to 20 Al-Ma'soem High School students. The study was conducted from August 8 to September 19, 2025, on the Al-Ma'soem High School field in Sumedang. Based on the Normality Test, Homogeneity Test, and T-test, it can be concluded that the Squat Jump Plyometric Training provided a greater increase in leg muscle power compared to the Split Squat Jump Training..

The normality test was used to determine whether the dependent and independent variables were normally distributed. The results of the normality test are shown, the calculated significance value for the pretest squat jump was 0.201 and the posttest squat jump was 0.693. The calculated significance value for the pretest split squat jump was 0.215 and the posttest split squat jump was 0.333. All calculated significance values were greater than 0.05, indicating a normal distribution of the data.

In the context of developing soccer training, these results indicate that the pretest and posttest squat jump, as well as the split squat jump, can be used as indicators of leg muscle strength before and after treatment. These data suggest that training or treatment can trigger changes, although not exclusively. Therefore, other factors influencing leg muscle strength, such as training frequency, intensity, and execution technique, should also be considered. In practice, these results indicate that split squat jump training significantly contributes to increasing leg muscle power in soccer athletes. However, because its effect is moderate, coaches are advised to combine this training with other exercises for optimal results in developing leg muscle power.

The homogeneity test is used to demonstrate that the sample data groups come from populations with equal variance. The significance value obtained by the Squat Jump group was 0.978, a value greater than 0.05, indicating that the variance of the data group was homogeneous.

This value also indicates that the split squat and squat jump exercises were implement-

ed consistently across all groups of athletes, thus not due to differences in training techniques. This consistency is crucial in ensuring that the effects of the training being measured are truly attributable to the method used.

Overall, the homogeneity test result of 0.740 strengthens the validity of the data and supports further analysis of the impact of split squat jump exercises on increasing leg muscle strength. This data can be used as a basis for decision-making regarding the most optimal training program for soccer athletes.

The t-test is used to determine the influence between the dependent and independent variables used in a study. The results of the t-test are shown in the **Table 1**.

Table 1. T-Test Results

Variabel		N	Correlation	Sig.
Split Squat Jumps	Pretest & Posttest	10	.971	.000
Squat Jump	Pretest & Posttest	10	.991	.000

Based on the data above, it can be seen that the Sig for the squat jump and split squat jump groups was 0.000, meaning less than 0.05. This indicates a significant effect of the training methods on the leg muscle power of Al-Ma'soem High School students.

The significant difference in results between the two methods indicates that while both can increase leg muscle power, different muscle activation methods and movement patterns produce different effects. Squat jumps may focus more on explosive power in a neutral position, while split squat jumps combine strength with elements of balance and stability, which are also important in soccer (Paul & Nassis, 2015; Ramírez-Campillo et al., 2015).

These data underscore the importance of diverse plyometric training in a soccer athlete's physical training program to achieve optimal leg muscle power gains and a balance between explosive power and body movement control (Hammami et al., 2016; Wang & Zhang, 2016). Would you like this discussion to focus on the training aspect or its impact on athlete performance on the field?.

Leg strength plays a crucial role in soccer. This is because many movements require leg strength, such as heading jumps. Good leg muscle strength allows for high jumps to reach the ball in the air. In soccer, the legs dominate every movement an athlete makes, making leg muscle strength extremely important.

Research has shown that plyometric training has a significant impact, meaning it is effective for training leg muscle power in students at Al-Ma'soem High School. Students who received squat jump training experienced greater strength gains compared to those who received split squat jump training.

CONCLUSION

Based on the theoretical description and research objectives, it can be concluded that squat jumps and split squat jumps are two forms of plyometric training that have great potential in increasing leg muscle power in soccer athletes. Both work through an explosive contraction mechanism that supports movement requirements such as sprinting, jumping, and kicking.

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