

The Effect of Angle Hop and Squat Jump Exercise on Leg Power in Futsal

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Abstract - This study aims to determine the effect of angle hop and squat jump exercises on leg power in Futsal Extracurricular participants at Al-Azhar 18 Grand Wisata High School. The method used in conducting this research is an experimental method with a purposive sampling technique. The sample in this study amounted to 12 people from a total population of 21 people. Based on the results of research and data analysis, it can be concluded that: (1) training angle hop has a significant effect on leg power (2) training squat jump has a significant effect on leg power. (3) There is no difference in the effect of exercises angle hop and squat jump on leg power.

Keywords: *angle hop, squat jump, leg power*

I. INTRODUCTION

The futsal game has become a sport with the level of passion which is almost equivalent to that of soccer. For the past 5 years, national or international futsal has been in the spotlight of men, even to women. Even though futsal has been established for a long time in 1930 in Uruguay, it has only been a while that futsal has a pretty good rating. From children to the elderly, futsal is almost a necessity of life which must be done since it is very pleasant and healthy. Futsal in Spanish means soccer in the room, so it is a soccer game carried out indoors [1]. This game itself is carried out by five players per team, which is different from conventional soccer, with eleven players per team. The size of the pitch and the size of the ball are smaller than the size used in outdoor soccer. The aim is to get the ball into the opponent's goal, by manipulating the ball with the foot. In addition to the five main players, it can have a reserve player.

Futsal itself has the characteristics in which it combines individual skills which make the audience interested, team working which becomes the determining factor in finishing the opponent's goal calmly, as well as it has high mobility. Sometimes a poor finishing becomes a boomerang for a team that is trying to gain a full point. It will be difficult for a team to be left behind since the beginning. There are a lot of worries in players such as how to defend, how to carry out attacks which are far more effective, and most importantly how to do the finishing in order to catch up with the opposing team.

From the problems described above, it can be noted that the result (finishing) is a determinant of whether a team can carry out attacks effectively. Weak energy or strength in the legs can be a factor which greatly affects the outcome of the opponent's hard kick. By considering this, the researcher tries to apply a training program to trainees, so that it can help in finishing the futsal game. Finishing is very important in

attacking the opponent's goal to get the point or goal to be superior to the opponent. However, if a team or school does not have a good finishing, it will be increasingly difficult to win. Therefore, finishing is highly considered for several clubs and schools in order to carry out attacks optimally and get full points or victory. The researcher considers that in finishing the players must have the leg power get the point. Therefore, it is necessary to improve the quality of leg power to be more effective in carrying out attacks against opponents, both in training, testing, and even competition.

Some of the problems above often occur in high schools, and high Al-Azhar 18 Grand Wisata Senior High School is the main objective of the researcher that attempts to increase the power of the kick as well as find out the effect of treatment towards the power quality in performing kicks to the opponent's goal. Lack of power (on the legs) can cause ineffectiveness in attacking the opponent's goal. It is required various forms (items) of exercise to signify the leg muscle explosive power towards the results of the trainee's kick to improve the ability of the ball shooting. Comparing the two types of exercise tested is done as an effort to see which result of the exercise that influences improving the quality of the leg power of Al-Azhar 18 Grand Wisata high school athletes.

The forms of the exercise are angle hop and a squat jump. Both exercises are equally influential in increasing leg muscle explosive power. The angle hop exercise is a good exercise to strengthen the legs and the front of the thigh, while the squat jump exercise is more or less the same exercise with the angle hop exercise which is to strengthen the legs, front thighs and rear thighs. The two exercises above, when associated with an increase in kick results, they are highly related since the main factor in a hard kick is having adequate power. If an athlete has enough and good power to place the ball at a goal point which becomes the target, the kicker will get easier to place the ball.

The researcher is very interested in examining the two forms of exercise mentioned above so that the title proposed by the researcher is "The Comparison of Angle Hop and Squat Jump Exercise towards the Leg Power Results on Participants in Futsal Extracurricular of Al-Azhar 18 Grand Wisata Senior High School".

Basically, futsal sport is not much different from soccer. In a way, futsal is a mini version of soccer itself. When soccer is done off the field, futsal is done in the room [2]. Futsal is an interesting sport since the changing situation of the game very quickly. This game is played by 5 (five) players and includes a goalkeeper. Futsal is a game which has two

systems, namely static and dynamic. A team must be able to play with a tempo or intensity which is fast enough to destroy an opponent's defence so that the opponent's defense can be solved.

The goal itself is to enter the opponent's goalball and get as many points as possible by teamwork. In addition, each team can have a reserve player to make substitutions. Unlike the soccer game which is only limited to 3 people in making changes in one match, futsal is given the freedom to make changes continuously in one match. The basic technique used in futsal game is relatively not much different from soccer games [1]. However, there are still some differences due to the relatively small field factor and a flatter surface which causes differences in the use of techniques. For futsal players, skills, in general, include (1) Basic technique of passing, (2) Basic technique controlling, (3) Basic technique of dribbling, and (4) Basic technique of shooting a ball which must be mastered by the player.

Power is the result of strength and speed. Individuals who have power are people who have a high degree of muscle strength, a high degree of speed, and a high degree of skill in combining speed and strength [3]. Hence, it can be concluded that there is a relationship between the elements of strength and speed. However, different from strength, power is explosive. Power is also different from speed since, in speed, it does not require strength but rather requires explosive power. The sequence of power training should be given after the athlete has trained the elements of strength and speed first. But basically, every form of strength and speed training, both always involve the element of power — speed and strength training interplay [3]. The manifestation of the motion of power is always explosive.

Power is strongly influenced by strength and speed, and strength can be affected by the condition of muscles which can be formed by human activities outside of training. Besides, strength training also affects the implementation of training and sports competitions in which with good strength, injury can be avoided. Legs are from the base to the lower thighs. The function of the legs is as a means of moving the feet to be able to walk, run, and jump. Legs in the futsal game are very influential on passing, shooting, and making good defensive movements. Training refers to other terms in English which contain several meanings such as practice, exercise, and training [4]. Some of the terms, after being applied in the field, they seem to have the same activity, namely physical activity.

The definition of training stated by many experts is varied, but there is an element of compatibility which is always contained in the definition of training that is that in exercising a person can develop his abilities even better by making the training planned, systematic, progressive, and sustainable in order to get optimum results. Training is a systematic process of exercise or workout, which is done repeatedly, with more and more increasing the amount of exercise or workload [4].

The aim of the training, in general, is to assist coaches, trainers, and sports teachers in applying conceptual abilities and skills to see the improvement of students' potential in achieving the best performance. The principle of training has

an important role in the physiological and psychological aspects of students. In studying and applying the principles of this training must be careful, and requires accuracy, accuracy in the preparation and implementation of training programs.

Understanding the principles of training will support efforts to improve the quality of training that will be provided during the training program. Therefore, it is important in a team or club to have the principles of training as a guide that later must be obeyed by the students to achieve a maximum result and the principles of training must be applied consistently in order not to ruin the results of the training program that will be given. The training component is a key or important thing which must be considered in determining the position and training load [3]. The training component is used as a reference in seeing whether the goals and objectives of the training have been achieved and implemented. The error in determining the component that will be given can affect the results of the training objectives and will not have a positive impact on the athlete's body.

The intensity of the training is a very important component to be associated with the quality in the training program items that will be given at the time of training. The volume of training is the quantity (amount) in each item of the training program, which makes the main component of getting good quality and is used as a reference as a significant increase. The density of training is the net time taken in conducting a training program or which is independent of recovery time and intervals. The density of training indicates the density of a loading (stimulation) in doing a training program. The frequency of training is the number of face-to-face sessions in a period of 1 week. The more frequencies requested the more frequent meetings that are held to training in achieving maximum results.

Angle Hop is a form of exercise which aims to improve the quality of leg power in an athlete or student by affecting the hamstring and quadriceps muscles as the target. Angle Hop training is a form of exercise which only uses cones to be used as a distance in making the next leap. This training item serves to develop the power of the muscles of the lower body, especially the wrists, thighs and waist. The results obtained from the training using Angle Hop can improve the ability of the muscles to be better than those before the training is done. How to do Angle Hop training are 1). stand with feet hip-width apart and knees bent; 2). jump forward-right with both feet at an angle of 45° , keeping the body position forward; 3). after landing, jump left at an angle of 45° and continue to be repeated at a certain distance.



Fig. 1. Angle Hop [3]

A squat Jump is a form of exercise which aims to measure the local endurance component of leg muscles. This training is relatively cheap compared to other trainings which require tools since in this training item, no tools are needed at all. The results obtained in this training also have a strong influence on the results of leg repulsion which is one of the items used to develop the quality of leg power.



Fig. 2. Squat Jump [3]

How to do Squat Jump training are 1). the person is in a squatting position with one heel of the foot touching his buttocks, and the other foot is in front, while the two hands are intertwined placed behind the head, foresight; 2). try to jump up so that both legs are straight, and then land with both legs crossed forwards and backwards, so that the buttocks touch the heel of the back foot; 3). perform this movement repeatedly with alternating leg postures, until ones cannot jump again perfectly, as stated above.

II. METHOD

A method is a way used to achieve learning objectives. Research is a scientific way to get data with certain uses, while experiments are research carried out through various experiments. Experimental research is a type of quantitative research which very strongly measures the causal relationship. The method used in this study is the experiment method. Experiments are research methods which have a variety of techniques to determine the results studied or find out the effects on his research. The population is the totality of research that can be in the form of data on humans, animals, plants and objects that have in common to be used as research data [5]. The population in this study is the futsal extracurricular members of the 12 Al-Azhar 18 Grand Wisata Senior High School. In this study, the researcher chose the Purposive Sampling technique as a way of taking subjects. The requirements include (1) Male sex, (2) In good health, (3) Eleventh "XI" and twelve "XII" grade students, (4) Willing to attend treatment or training from the beginning to the end. Finally, the number of samples which can be used for conducting this research is 12 people.

TABLE I. RESULT OF \bar{X} , S AND S² OF THE TWO VARIABLES

Group	Test Type	$\sum x$	\bar{X}	S	Variance (S ²)
A	Pretest	10.6	1.77	0.23	0.053
	Posttest	14.2	2.37	0.29	0.084
	Improvement	3.63	0.60	0.24	0.058
B	Pretest	10.4	1.73	0.18	0.032
	Posttest	13.48	2.25	0.21	0.044
	Improvement	3.08	0.51	0.32	0.102

To test the normality of data, the researcher uses the Liliefors statistical test. The data from each test must be

normally distributed. In the table below, it can be seen the results of testing the normality of data distribution:

TABLE II. RESULT OF DATA NORMALITY TEST

Group	Test Type	L _o Count	L _o Table	Description
A	Pretest	0.162	0.319	Normal
	Posttest	0.159	0.319	Normal
	Improvement	0.250	0.319	Normal
B	Pretest	0.274	0.319	Normal
	Posttest	0.305	0.319	Normal
	Improvement	0.298	0.319	Normal

From the table above, the L_{count} value is smaller than L_{table} at the real level of 0.005, which means all the data is already in a normally distributed state. Therefore, the T-test hypothesis can be implemented. Before conducting the T-test, the test data must first be tested with a homogeneity test. Homogeneity test calculation results from the data of each test can be seen in the table below:

TABLE III. RESULT OF DATA HOMOGENEITY (VARIANCE)

No.	Test Group	F _{count}	F _{table}	Description
1.	Group A (Angle Hop)	1.58	5.05	Homogeneous
2.	Group B (Squat Jump)	1.35	5.05	Homogeneous
3.	Group A & B	1.76	5.05	Homogeneous

From the table above, the distribution of F values at the real level of 0.005 and with a degree of freedom (V1, V2) shows F_{table} of 5.05 which is greater than F_{count}. The test results data for each group can be declared as homogeneously distributed only if F_{count} is smaller than F_{table} (F_{count} < F_{table}). This indicates that both groups have homogeneous distribution in receiving leg power training so that the T-test hypothesis can be continued.

III. RESULTS AND DISCUSSION

Hypothesis testing result using t-test Group A and Group B is presented in Table 4 and Table 5.

TABLE IV. HYPOTHESIS TESTING RESULT USING T-TEST GROUP A

Test Group	T _{count}	t _{table}	Result
Group A (Angle Hop)	6.78	3.17	Significant

From the table above, group A at the real level of 0.005 is outside the t_{table} interval (t_{count} > t_{table}, 6.78 > 3.17). This indicates a very significant difference after being given the treatment of the Angle Hop exercise to improve the quality of leg power in the futsal extracurricular members of Al-Azhar 18 Grand Wisata Senior High School.

TABLE V. HYPOTHESIS TESTING RESULT USING T-TEST GROUP B

Test Group	T _{count}	t _{table}	Result
Group B (Squat Jump)	3.92	3.17	Significant

Meanwhile, in group B, the t_{count} with a real level of 0.005 is outside the t_{table} interval (t_{count} > t_{table}, 3.92 > 3.17). This indicates a significant difference after being given the treatment of the Squat Jump exercise to improve the quality of leg power in futsal extracurricular participants at Al-Azhar 18 Grand Wisata Senior High School. The hypothesis testing

of the improvement results of group A and B training can be seen in the table below:

TABLE VI. HYPOTHESIS TESTING RESULT USING T-TEST GROUP A AND B TRAINING

Test Group	t_{count}	t_{table}	Result
Group Combination (A and B)	0.26	3.17	Insignificant

Based on the table above, the results of the calculation of the significance test of the two groups shows a t_{count} of 0.26, while the t_{table} value of the real level of 0.05 is 3.17, in which ($t_{count} < t_{table}$). This means that there is no significant difference between angle hop and squat jump training which influence leg power results. This study aims to determine to what extent the angle hop and squat jump exercises affect the leg power in futsal extracurricular students at Al-Azhar 18 Grand Wisata. Data analysis and research results show that there are differences in leg power after doing two exercise items from those previously given treatment.

At the pretest, the average size of group A was 1.77 and group B was 1.73, while at posttest, the average size of group A was 2.37 and group B was 2.25. It turned out that after being treated with exercises, the average abilities of futsal extracurricular members of the Al-Azhar 18 Grand Wisdom Senior High School experienced changes in improvement. Analysis of the standing board jump test shows that there are differences, so this shows that it turns out that angle hop and squat jump training influence increasing the ability of leg power after being given treatment. However, it can be concluded that angle hop training is able to give a better effect (based on the average value of the improvement). The training model taken is that which emphasizes the strength and speed of the leg muscles, so that the ability of students' leg power increases.

Angle hops in this study affect leg power, so it is expected to be an alternative guide to trainers or physical education teachers, especially in Al-Azhar 18 Grand Wisata Senior

High School to improve futsal extracurricular activities. Weak legs in futsal extracurricular members of the Al-Azhar 18 Grand Wisata Senior High School are due to the lack of training focused on leg power, so it is expected that the increased leg power can be used as a reference to carry out futsal extracurricular processes more effectively.

IV. CONCLUSION

Based on the results of the study and the results of statistical calculations on the hypothesis testing of the two forms of exercise, which aims at looking for the results of leg power using the angle hop and squat exercise methods of futsal extracurricular students at Al-Azhar 18 Senior High School, then the researcher can conclude that: (1) Angle hop exercise has a significant effect on the results of the leg power of futsal extracurricular participants at Al-Azhar 18 Grand Wisata Senior High School. This is proven by the results of tests which show that t_{count} is greater than t_{table} , which is $6.78 > 3.17$; (2) Squat jump exercise a significant effect on the results of the leg power of futsal extracurricular participants at Al-Azhar 18 Grand Wisata Senior High School. This is proven by the results of tests which show that t_{count} is greater than t_{table} , which is $3.92 > 3.17$.

There is no significant difference between angle hop and squat jump exercises to improve leg power results. However, it can be concluded that angle hop exercise can have a better effect (based on the average value of increase).

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