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THE INFLUENCE OF LEMB MUSCLE STRENGTH ON SMASH ABILITY IN THE GAME OF SEPAK TAKRAW IN STUDENTS COACHING EDUCATION DEPARTMENT

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Abstract:

The problem in this research is whether there is an effect of leg muscle strength training on smash ability in the sepak takraw game. Research Objective: To determine the extent of the influence of leg muscle strength on smash ability in the sepak takraw game. Research Hypothesis: There is an influence of leg muscle strength on smash ability in the sepak takraw game. The research method used was an experimental method with treatment in the form of an exercise program given for eight weeks. The population was all 34 fifth semester male students majoring in Coaching Education and a sample of 20 people taken at random, then divided into two groups, 10 people each in the experimental group and 10 people in the control group. Data collection instrument: Smash Test in the Sepak Takraw Sport Branch. The research design used: *randomized control groups pre-tast and post-test design.* Hypothesis testing uses statistical techniques with the t test. From the results of the hypothesis analysis, t observed was 5.83, while the t table obtained from the degrees of freedom $n_{-1} + n_{2} - 2$ was $10 + 10 - 2 = 18$ and the confidence level $\alpha = 0.05$ was 1.73. In accordance with the test criteria, accept Ho if t observations are smaller than t table and reject Ho if t observations are greater than t table. Because t observation is greater than t table, the analysis results show that reject Ho and accept Ha. Research conclusion: Leg muscle strength training given for eight weeks with a frequency of three times a week can improve the smashing ability in the sepak takraw game in fifth semester male students of the Coaching Education Department in 2023.

Keywords: Leg Muscle Strength, Smash Ability, Sepak Takraw

INTRODUCTION

Achieving in a sport is something that is highly desired by athletes, coaches, coaches, and even all members of society, because a person's achievements can raise the honor and dignity of a nation. One of the sports achievements is the game sepak takraw. This game has been competed in Indonesia, although there are still many regions that have not participated in this sepak takraw match. This indicates that the development of the sport sepak takraw has not been evenly distributed in all regions in Indonesia. The game of sepak takraw in its implementation is almost the same as the game of football, because these two types of games have a special characteristic, namely that the feet play the main role in playing the ball, apart from the chest, thighs, head and shoulders. However, in sepak takraw during the game, the ball cannot touch anything other than the player's body other than the hands. This was emphasized by Ucup Yusuf (2001 : 29): that: "If the ball touches the hand, floor or object outside the field, the ball is declared dead.

This game begins with a serve, which is carried out by the tekong to the opponent's court area. Then the players on the opposing team try to play the ball using their feet, head and body parts other than their hands, three times. As a team sport, sepak takraw is played on a rectangular field with a flat surface, both in an open area (*outdoor*) and in a closed room (*indoor*), which is free from obstacles. Sepak takraw is played by two teams, each team consisting of three players, namely tekong, left apit and right apit with a reserve player. Sepak takraw is a team sport, so the victory of a team is determined by several factors including: (1) mastery of the technique of playing sepaktakraw individually

and (2) good teamwork between players in a team or squad . The more perfect the technical mastery of each player and the cooperation of each team, the better the quality of the game will be.

Judging from the form of the game, sepak takraw requires special skills and abilities, because the game sepak takraw involves all parts of the body, such as kicking using the legs, playing the ball with the head, chest, thighs, shoulders and when smashing.

In relation to the game sepaktakraw, an athlete must master the basic techniques of playing sepak takraw which includes the following techniques: (1) *serve* performed by tekong, (2) cradling, (3) *smash* , (4) *heading* and (5) *block* . Of the various basic techniques, the smash technique is very important for a sepak takraw athlete to master without ignoring other basic techniques, because the smash technique in the sepak takraw game is a deadly weapon and can produce points if owned and mastered well by a person. athlete.

An athlete's ability to smash in the sepak takraw game is not just formed, but there needs to be continuous, systematic and sustainable training and there needs to be a training program that can support smashing ability. Apart from that, an athlete's smash in the sepak takraw game cannot be separated from the components of physical condition such as: leg muscle strength, muscle explosive power, speed, agility, flexibility, endurance, balance, accuracy, reaction and coordination.

Skills in playing good football must also be supported by good physical condition. According to Sajoto (1995: 10) there are ten components of physical conditions used in sports, including: 1) strength , 2) endurance , 3) *muscular* endurance , 4) speed (*Speed*) . , 5) *flexibility* 6) agility , 7) coordination , 8) balance , (9) *accuracy* , 10) *reaction* .

From the components of physical condition above, strength plays an important role in smashing. Therefore, this component of physical condition, namely strength, needs special attention in every exercise and preparation of a training program. Meanwhile, strength itself is the ability of muscles to generate tension against a resistance. Harsono (1988: 176) In the game of sepak takraw, especially in smashing, the muscles that are very influential are the leg muscles so these muscles must be trained so that the muscles become strong. Leg muscle strength is an element of physical ability that makes a person able to withstand loads or resistance using physical contractions.

Leg muscle strength in every sport is very much needed, especially in sepak takraw, especially when doing smashes. So in smashing towards the target, maximum strength is also required. If an athlete does not have maximum muscle strength then of course what is hoped for to achieve a high achievement will not be realized. This is as stated by Hairi and Sajoto quoted by I Putu Gede Adiatmika (2002:23) that: "Strength (*strength*) is a component of physical condition, which concerns the issue of an athlete's ability to use his muscles to receive loads within a certain working time."

Judging from the two theories above, one component of physical condition, in this case strength, is really needed by an athlete in a game, especially in sepak takraw. In this case, the correct smashing technique really determines the success of a team during a match. Apart from that, to get accurate and good smashes, special and repeated practice is also needed so that the result of the practice will be the ability to do good smashes. In the sepak takraw game, strength is really needed to support the performance of sepak takraw athletes in smashing in the sepak takraw game, the very dominant supporting element is physical readiness, especially the factor of leg muscle strength.

According to the author's observations in the sepak takraw lecture, even when playing, there are still many students who are not able to smash hard and make high jumps when smashing so that many smashed balls hit the net. This is because the player or student does not have leg muscle strength so that when smashing the ball does not hit the intended target. If this problem is ignored and given attention then excelling in the sport sepak takraw will be impossible.

1. The essence of Smash in the Sepak Takraw Game

Smash is one of the basic techniques that is important for every sepak takraw player to master, because this basic technique is one of the finishing techniques which aims to kill the ball in the opponent's area. This is as stated by Ratinus Darwis and Penghulu Basa (2001: 69) that: "Smash or *rejam* (Malaysian term) is the most important work movement and is the final movement of the attack work movement."

Failure to smash the ball into the opponent's field will give the opponent the opportunity to counterattack or the ball will die in their own field or leave the field of play. On the other hand, a successful smash will result in points or points for the attacking team or the opportunity to move the ball again if the opponent takes the kick or serve. Here it is clear that both wings need to have good smash skills. For this reason, it is very important that the two pincers are trained well so that they have good smashing abilities or *skills .*

Sm ash is done with the following basic attitudes and movements:

a. A player performs a samsh when the bait ball is on the edge of the net by swinging his legs above his head and directing them towards the opponent's area.
b. The function of the smash is as a means of attack for the ball in the opponent's area.

The important things to pay attention to when smashing are: 1) Focus your attention on the ball, 2) Don't hesitate to smash, make the right decision, 3) Determine where the smash will be directed, 4) Jump to a sufficient height according to your needs if it needs to be higher so that the smash is perfect, 5) Hitting the ball is done at the highest jump, 6) Don't touch the net/net when smashing, 7) Eyes are directed at the ball.

In a game of sepak takraw or other sports competitions, each player/team wants to win. To achieve victory in a sepaktakraw match, the ability to smash is very necessary. The ability to smash is the main requirement for every sepak takraw player, especially for apit players.

According to the Ministry of Education and Culture, in the book on playing sepak takraw (1984: 27) that: "The aim of a smash should be focused on controlling the opponent's play or defense so that we can arrange solid attacks against them so that the team gets points. "Therefore, smashes should be done in various ways so that the opponent will disrupt the smash that we will do next."

Thus, it is clear that the ability to smash really determines victory in the game and needs special training. This is made clear in the sepak takraw playing book which states that "smash is an important and main work movement, and winning points will only be obtained by the team that successfully smashes.

2. Leg Muscle Strength

Leg muscle strength in every sport is very much needed, especially in sepak takraw, especially when doing smashes. So, in smashing hard towards the target, maximum strength is also required. If an athlete or player does not have maximum muscle strength, then of course what is expected to achieve a high achievement will not be realized. This is as stated by Hairi and Sajoto as quoted by I Putu Gede Adiatmika (2002, : 23) that: "Strength *is* a component of physical condition, which concerns the issue of an athlete's ability to use his muscles to receive loads over time. certain work. In the sepak takraw game, strength plays a very important role in doing work, because when we do work, in this case doing smash skills, the muscles will contract.

Leg muscle strength referred to here is the ability of the muscles to receive loads while working, where this ability is produced by muscle contractions in the legs.

According to Mochamad Sajoto (1988: 57) that: "Physical condition is a complete unit of components that cannot be separated, both in terms of improvement and maintenance. This means that every effort to improve physical condition must: develop all these components. Although prioritization needs to be done (what components need to receive a larger portion of training than other components)."

Furthermore, Sajoto (1988: 58) argues that: "Muscle strength is the ability of a muscle or group of muscles to do work, by supporting the load it lifts". Seeing this, it is necessary for a sepak takraw athlete to pay attention to the strength of their leg muscles, because in performing smash skills, the leg muscles play a very important role in carrying out work, namely holding the weight by supporting one leg when performing the smash. Supporting on one leg means the weight of the support increases. Therefore, this is where the importance of leg muscle strength that a sepak takraw athlete needs to have in smashing towards the right target. So, in order to smash hard towards the target, maximum strength is also required. If an athlete does not have maximum muscle strength then of course what is expected to achieve a high performance will not be realized. Ngurah Nala (1998: 6) also states that: "Strength *is the ability of* the body's skeletal muscles to contract or exert maximum tension in receiving loads when carrying out activities."

Thus, leg muscle strength is the ability of the muscles to receive a load within a certain time, where this ability is produced by muscle contractions in the legs, these contractions arise to carry out a shot towards the target.

Some of the leg muscles involved in smashing include: *tensor facialata muscle, thigh abductor* muscle , *gluteus maximus muscle, vastus lateralis* muscle , *sartorius* muscle , *anterior tibialis* muscle , *rectus femoris muscle,* gastrocnemus *muscle,* proneuslongus *muscle,* soleus muscle *, digitorumlongus* muscle *,* medial and lateral thigh muscles.

RESEARCH METHODS

The method used in this research is the experimental method. The operational objective of this research was to test the extent of the influence of leg muscle strength on smash ability in the sepak takraw game in Semester V Students of the PKO FIK Unima Department. The variables in this research consist of two variables, namely; Independent variable: leg muscle strength. Dependent variable: smash ability.

Leg muscle strength is a student's ability to carry out forms of exercise to increase leg muscle strength. The forms of training include: rope skipping and half squad, increasing the amount of load day by day according to the child's individual development. The ability to smash with the outside of the foot in this study is the ability of the child to try to smash 10 times onto the opponent's court which has been given a score. The total score obtained for 10 smashes is the test result and is the score of the test child. Refers to an experimental design using *randomized control groups pre-test and post-test design.* With the following design: The research design used in this research is " *randomized pre-test and post-test control group design."* ". As follows :

Group	Pre-Test	Treatment	Post-Test
A	Y_1	X	Y_2
B	Y_1	-	Y_2

Note:
R = Random
A = Experimental Group

B = Control Group
Y_1 = Initial Test for both groups
Y_2 = Final test for both groups
X = Treatment

RESULTS AND DISCUSSION

In accordance with the statement stated previously, this research involves two variables, namely one independent variable and one dependent variable. However, to find out the research results as a result of variables manipulated by the researcher, or as a result of other variables, the research needs to use a control group.

A. Data Presentation

Table I
Smash Ability Test Results
Experimental Group

No	T_1	T_2	$T_3 = T_1 - T_2$
1	27	33	6
2	28	31	3
3	19	33	4
4	26	31	5
5	30	35	5
6	16	22	6
7	23	27	4
8	29	32	3
9	26	32	6
10	27	32	5
10	**251**	**308**	**47**

Table II
Smash Ability Test Results
Control Group

No	T_1	T_2	$T_3 = T_1 - T_2$
1	27	27	0
2	27	30	3
3	24	26	2
4	26	27	1
5	22	24	2
6	25	28	3
7	24	27	3
8	28	27	- 1
9	29	30	1
10	25	28	3
Qty	**257**	**274**	**17**

Table III
Gain Score of Experimental Group
And Control Group

No	Experimental Group X_1	Group Control X_2
1	6	0
2	3	3
3	4	2
4	5	1
5	5	2
6	6	3
7	4	3
8	3	- 1

9	6	1
10	5	3
N = 10	**Σ = 47**	**Σ = 17**

To obtain statistical quantities that will be used in data analysis, the average score, sum of squares, and standard deviation are calculated. From the two groups using the FX – 3600P calculator, the calculation results were obtained as follows:

Table IV
Gain Score Statistics
Both Groups

Experimental Group	Control Group
N = 10 $\Sigma X_1 = 47$ $SD_1 = 1.1$ $SD_1^2 = 1.21$ $\bar{X}_1 = 4.7$	N = 10 $\Sigma X_2 = 17$ $SD_2 = 1.42$ $SD_2^2 = 2.02$ $\bar{X}_2 = 1.7$

B. Data Processing

To test whether leg muscle strength training has an influence on the smash ability in the sepak takraw game among male students in the fifth semester of the Coaching Education Department in 2013, analysis was used using the t test statistical technique for two independent samples. To determine the appropriate statistical technique for testing research hypotheses, it is necessary to test the analytical requirements that must be met, namely normality and homogeneity tests.

1. Testing the normality of different value data.

The Lilifors test is a normality test to determine whether the sample data obtained comes from a normally distributed population or not.

From the calculation results in the table, the highest difference value is Lo = 0.1557. With n = 10 and significance level α = 0.05, we get L tab = 0.2580. So Lo < L tab. By accepting Ho, it can be concluded that the treatment group's 60 meter running speed sample data comes from a normally distributed population.

1. Testing the Normality of the Experimental Group Gain Score Data

To test whether the sample is normally distributed, testing is carried out using the Lilliefors Test.

From the calculations, the highest difference or L observation is obtained, which is 0.1389. Based on the critical value at α = 0.05 with n ; 10 found L table worth 0.258. So L observation is smaller than L table, namely 0.1389 < 0.258. Based on the test criteria, if $L_o \leq L_t$ then Ho is accepted. Thus the test conclusion is; The experimental group data in this study came from a normally distributed population.

2. Testing the Normality of Control Group Gain Score Data

To test whether the sample is normally distributed, testing is carried out using the Lilliefors Test.

From the calculations, the highest difference or L observation is obtained, which is 0.1819. Based on the critical value of α = 0.05 with n : 10, the L table is found to be 0.258. So L observation is smaller than L table, namely 0.1819 < 0.258. Based on the test criteria, if $L_o \leq L_t$ then Ho is accepted. Thus the test conclusion is; The control group data in this study came from a normally distributed population.

3. Homogeneity Testing

To test the equality of variances of the research sample population, the formula is used: $F = \frac{Variansterbesar}{Variansterkecil}$

From the calculations, the F observation is 1.67. Based on the table of critical values of the F distribution on α ; 0.05 with dk as denominator 9 and numerator 9, worth: 3.18. So F observation is smaller than F table. Based on the test criteria, if $F_0 \leq F_t$ then Ho is accepted which means rejecting H_a. Thus it can be concluded that: The variance of the two populations where the research samples came from is homogeneous.

Based on testing the analysis requirements (normality and homogeneity tests), it turns out that the requirements for analyzing research hypotheses meet the requirements. Therefore, research hypothesis testing can be continued.

2. Homogeneity Testing

To test the equality of variances of the research sample population, the formula is used:

$$F = \frac{\text{Varians terbesar}}{\text{Varians terkecil}}$$

From the calculations, the observed F is 1.84957. Based on the critical table of the F distribution at α = 0.05, with dk in the denominator 9 and numerator 9, the F table is obtained at: 3.18. Because Fo < F tab. This means accepting Ho and rejecting Ha, so it can be concluded that the variances of the two measurement groups (treatment group and control group) have the same variance (homogeneous).

3. Research Hypothesis Testing

The hypothesis that will be tested in this research is that the average smash ability of the experimental group is better than the average smash ability of the control group. To test this hypothesis means comparing the average smash ability of the experimental group after receiving treatment in the form of leg muscle strength training for eight weeks and the average smash ability of the control group, then the formula is appropriate using the t test with the same variance.

C. DISCUSSION

In the analysis of hypothesis testing, the observed t is obtained at 5.83, while the t table obtained from the n-1 + n2 – 2 degrees of freedom is 10 + 10 – 2 = 18 and the confidence level = 0.05 is 1.73. In accordance with the test criteria, accept Ho if t observations are smaller than t table and reject Ho if t observations are greater than t table. Because t observation is greater than t table, the analysis results show that Ho is rejected and Ha is accepted. Thus, the conclusion of the analysis is: the average smash ability of the experimental group is greater than the average smash ability of the control group. This means that the increase in smashing ability is truly the result of treatment in the form of leg muscle strength training given for eight weeks, and not the result of other factors or other variables.

CONCLUSION

From the results of data analysis using statistical analysis, it shows that the research hypothesis states that: the average high school ability of the experimental group that was given training for eight weeks was higher than the group that was not given training. This was proven to be true by rejecting Ho because t calculated was greater than t table and accepting the statistical hypothesis which means that the average smash ability of the experimental group was better than the smash ability of the control group.

Thus, the conclusion of the research is that leg muscle strength training given for eight weeks with a frequency of three times a week can improve the smashing ability in the sepak takraw game in fifth semester male students of the Coaching Education Department in 2023.

SUGGESTION

Through this research it is recommended:

1. To improve smashing ability, it is recommended to increase leg muscle strength.
2. Conduct further research regarding this problem by involving other factors that influence it.
3. Conduct research on this issue in another place, at a different time and involving a larger sample.

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