Method Of Strengthening Arm Muscles Against The Ability Of The Tennis Flat Service Stroke (Experimental Study In Students Of Muhammadiyah University Of Surakarta)

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Abstract.
The purpose of this study is to Method of Strengthening Arm Muscles Against the Ability of the Tennis Flat Service Stroke (Experimental Study in Students of the Muhammadiyah University of Surakarta). Arm muscle strength is a component of the physical condition needed in the implementation of some court tennis techniques such as the implementation of flat service techniques. In the sport of court tennis, the ability of service is indispensable, and the quality of a player's service is affected by the quality of the arm muscles. To be able to perform a good and precise punch requires an element of strength from a group of muscles that support the movement. Of the many, the most dominant muscles are the arm muscles. This study aims to Find Out the Effect of Arm Muscle Strengthening Exercise Methods on The Ability of Flat Tennis Court Service Punches in UMS Tennis UKM players. experimental methods. The design of this study uses One Group Pretest and Posttest Design with arm muscle strength instrument test using pushup techniques and service skills using the Hewitt Tennis Achievement Test. The population using UMS Tennis Court UKM students amounted to 50 people. the sample consisted of 13 Students of UMS Tennis Court UKM. Purposive sampling techniques have certain conditions. Variable pushups increased in number from pretest 182 and posttest 213 with an average of 14 to 16.4 meaning an increase in the number of values by 31 and an average of 2.4, Variable service increased in number from 123 to 207 and an average of 9.47 to 15.9. This means that there is an increase in the number of values of 84 and an average of 6.43, this is supported by the results of the hypothesis that shows that the value of sig. 2-tailed) of pretest and posttest pushup is 0.000 while sig value. 2-tailed) of pretest and posttest service is 0.000. Sig value. (2-tailed) push-ups < 0.05 meaning there is a significant difference between pretest and posttest, while sig values. (2-tailed) service < 0.05 means that there is a significant difference between pretest and posttest. So it can be concluded that there is an influence of arm muscle strengthening exercise methods on the ability of flat tennis court service punches in players of the Muhammadiyah University of Surakarta, so the hypothesis of this study is accepted.

Keywords: *arm muscle strength, push-ups, tennis services.*

I. INTRODUCTION

In modern times, humans cannot be separated from the sport, the sport is already very popular in this life, tennis is a sport that is widely loved and popular among the entire community, Tennis is one form of sport that use tools, namely rackets and balls. *The International Tennis Federation* as an independent organization seeks to

introduce tennis to the world [1]. According to Suryono stated the purpose of people playing tennis includes getting pleasure, fulfill the desire to move, maintain body health, and achieving achievements [2].The basic techniques in the game of tennis are; *Serves, Groundstrokes, forehand, backhand, volley, and overhead stroke.* Said to play well and correctly various types of punches must be mastered, achieve optimal achievement as expected [3].

Said the technique of tennis is very important so that there needs to be special coaching to produce an effective and efficient punching motion [3]. Therefore, an understanding of the basic techniques in the game of tennis is needed to achieve effective and efficient performance to achieve optimal achievement.Serve is one of the techniques in the game of court tennis that has a big impact on achievement and helps the achievement of points. According to (Nurhidayat et al., 2020, 42)Originally the service was only considered as a hitter to put the ball into the opponent's area as a sign at the start of the match.With a strong and accurate serve the player can start the attack to urge the opponent. And also service is the initial capital that must be mastered. It can be concluded that the service is an initial blow directed to the opponent's area as a sign of the start of the match whose goal is to start the attack by making a strong and accurate service to press the opponent.

Forehand and *backhand* will later cause many types of punches, especially from the position of the body and racket position that will cause various effects of the type of punches when crossing the ball after being hit, by understanding the technology that will be used when applied how to apply in the game it will be done, in the game of tennis the court does not only rely on the strength of the body alone in addition to having to think about the concept and skill of the game, from the skill of regulating the level of emotions at the time of play and the skill of regulating rhythm in the game, the movements that must be understood are basic in the game of court tennis from the beginning if basic movements have been done then other techniques will be easy to do. Basic movement movements need to be dictated because basic movements have important capital for the interests of developing high *skills* in the game of court tennis.The training method according to Prayadi a design of the process of activities involving the adaptation of living things, therefore it can be said that the training method is a regular and directed training design that focuses on a particular exercise to achieve the desired or maximum results [5].

Common exercise methods are often used in various fitness centers or by athletes who want to develop their fitness with the following exercise methods: *Plyometric* exercises, *HIIT (high-intensity interval training),* and other modern training methods are examples of popular training methods. Variations in exercise and selection of forms of exercise will keep students motivated and fresh in adaptation. This is what motivates athletes to expand their research into innovative approaches with the same goal of better results [6]. *Traditional push-ups, plyometric push-ups, and incline push-ups,* for example, are all the same type of preparation for *arm*

performance, but they are all done in different ways so that the movements are not monotonous and students remain eager to practice. According to support success in improving the physical condition of athletes carried out and expected, it is necessary to prepare consistent and stable training in the sense that it does not change from one measurement time to another through the study of science [7]–[13].

Skills in the game of tennis is a measure of maturity to perform basic movements in the game of court tennis effectively and accordingly so that skills are an important structure to help achieve high achievements, to be able to play court tennis properly and well it takes skills to form a good game, it needs to be understood if often playing the game in the wrong way or undisciplined in a game, it will be difficult to get the highest achievement, in playing court tennis requires proper movement and discipline in training to fight for the highest achievement.An athlete who has the motivation for high performance will certainly try and work hard to develop his playing skills, especially in mastering the basic movement skills of court tennis that he is good at, to understand the motivation that athletes have required surveying and observation or questioner on the field during training.

Training has several areas, namely technical training, tactical training, psychological training, and physical training, physical training has the goal to train strength, speed, body organization, and flexibility in an athlete over a certain time, technical training is a training method that prioritizes mastery of certain skills, learning methods tend to focus on sports achievement in teaching, tactical training emphasizes that the training is important. Playing must be able to understand the concept of strategy in the appropriate tennis game to improve the quality of a game that aims to make athletes able to solve a tactical problem in a court tennis match by using some technical side in the actual match, psychological training has the aim to train the psychological strength of the athlete at the time of the match with the actual opponent, to get the best performance the athlete must be trained. well and given all four aspects of the exercise to achieve maximum achievement.

The nature of arm muscles according to Mursalim namely muscle strength is one of the physical components that are a very important role in supporting the success of human activities [14][15]–[22]. Strength is one of the important functions that must be owned by an athlete because every movement in sports requires muscle strength in addition to other elements [23][24]–[27]. explain that strength training can use internal weights or inner loads and use external weights or outside loads. According to Hidayat explained weight training is a strength training program using prisoners given by shoulder press, dumbbell, and barbell curl weights [28].

II. METHODS

This type of research is experimental research using experimental methods. This research design *uses One Group Pretest and Posttest Design* with arm muscle strength test instrument using *pushup* techniques and service skills using the *Hewitt*

Tennis Achievement Test This study was conducted for 6 weeks with a time of examination according to the UKM Tennis Courttrainingschedule, the study began on July 9, 2021, to August 14, 2021, with meetings three times a week, where the study used the Tennis court of the University of Muhammadiyah Surakarta, starting from the Pre *Test,* treatment and post-test stage.

The writing used in this study is entirely using students of the University of Muhammadiyah Surakarta in the sport of UKM Tennis Court numbering 50 people. The sample consisted of 13 students of the University of Muhammadiyah Surakarta in the UKM Tennis Field Sports With *Purposive Sampling* taken are serious students or worthy of being a research sample that has criteria such as, 1. UMS students who are active in UKM Tennis Court, 2. Healthy and Spiritual, 3. Have the intention of following the treatment given.

III. RESULT AND DISCUSSION

A. RESULT

1. Data Description Results

Based on the analysis of *statistical* data, it can be concluded that the *pushup pretest* sample of 13 students has a minimum score of 10, a maximum score of 19, a total of 182, an average score of 14.00, and a standard deviation of 2.80. A sample of *13 students* had a minimum score of 2, a maximum score of 26, a total of 123, an average score of 9.46, and a standard deviation of 6.2.

The *pushup posttest* sample of 13 students had a minimum score of 12, a maximum score of 23, a total score of 213, an average score of 16.38, and a deviation standard of 2.96. The *posttest service* sample of 13 students had a minimum score of 6, a maximum score of 33, a total of 207, an average score of 15.92, and a standard deviation of 7.18. So that it can be concluded that the minimum value, maximum value, the number of values, average value, and standard deviation for *the experimental* group have increased,

2. Prerequisite Test

a. Normality Test Results

Based on the results of *the statistical* normality test, it can be known that the significance values of each variable are 0.941; 0.471; 0.957; and 0.617. This is greater than $\alpha = 0.05$. So it can be concluded that the data results from arm muscle strength tests and services on UMS tennis court UKM are normal distribution.

b. Homogeneity Test Results

Based on the results of *the statistical* homogeneity test, it can be noted that the significance value of X_1 to Y is 0.939, while from X_2 to Y is 0.697. This is greater than $\alpha = 0.05$. So it can be concluded that X_1 against Y and X_2 against Y is equal or homogeneous.

3. Hypothesis Test Results

Based on the statistics above, it can be known that the value of sig. (2-tailed) from pretest and posttest *pushup* is 0.000 while sig value. 2-tailed) of pretest and posttest service is 0.000. Sig value. (2-tailed) push-ups < 0.05 meaning there is a significant difference between pretest and posttest, while sig values. (2-tailed) service < 0.05 means that there is a significant difference between pretest and posttest. It can then be concluded that there is a significant difference between pretest and posttest. Then it can be concluded that there is an influence of arm muscle strength training on the ability of the UMS tennis UKM *flat service,* so the hypothesis of this research is accepted.

B. DISCUSSION

Arm muscle strength is one of the components of physical condition that is a very important need in the implementation of several techniques of court tennis such as the implementation of *flat service* techniques. In the sport of court tennis, the ability of *service* is indispensable, and the quality of a player's *service* is greatly influenced by the quality of the arm muscles. To be able to perform a good and precise punch requires an element of strength from a group of muscles that support the movement. Of the many, the most dominant muscles are the arm muscles.One of the efforts to increase a person's arm muscles is to provide exercises using self-weight with one of his exercises is *the pushup. A pushup* is a form of exercise by using internal weights by doing it is the hand is opened shoulder-wide with the legs close straight and the position of the body upright at the time of doing it.

Where this exercise can help increase the ability of one's arm muscles in particular. On a good court tennis player, good *service* is required to get the starting points.This research aims to find out the influence of *pushup* exercise methods on the ability of *UMS* tennis UKM flat service. Tests used in performing services have similarities with relevant research Hakim using the *Hewitt's tennis achievement test,* This study uses experimental research design by comparing posttest value results and pretest grades between students given treatment. The results of the data analysis obtained showed the level of ability of the UMS Tennis Tennis *flat service* provided treatment had increased [29]. So it can be said that this exercise has an effect in efforts to increase arm muscle strength. This means that the application of *pushup* exercises regularly can improve physical fitness.

IV. CONCLUSION

Based on the results of research that has been done and strengthened by the results of inferential statistical analysis, it can be concluded that arm muscle strength training can improve the *ability of the flat service* of UMS tennis court UKM. This can be seen from the results of hypothesis testing as follows: (i) Variable *pushups* increased in number from pretest 182 and posttest 213 with an average of 14 to 16.4 meaning an increase in the number of values by 31 and an average of 2.4; (ii) Variable

service also increased in number from 123 to 207 and averaged 9.47 to 15.9. This means that there is an increase in the number of values of 84 and an average of 6.43.

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