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The Effect of Training Method and Arm Length on Spike Back Attack Ability in Junior Athletes of Bina Taruna Semarang Volleyball Club

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Abstract

The purpose of this study was to analyze the difference in the effect of hanging ball training methods and self-throwing ball training methods, above-average arm length and below-average arm length, and whether there is an interaction between training methods and arm length on the ability of spike back attacks in junior volleyball athletes. This study used an experimental method with a 2x2 factorial design. The population in this study was 25 junior athletes of Bina Taruna Semarang volleyball club. The sample of this study was 20 athletes taken by purposive sampling technique. The instruments in this study used an anthropometer and a Robert E Laveaga spike test. Data analysis in this study used the ANOVA test (two-way) followed by the Tukey test with a significant level of $\alpha = 0.05$. The results of the study are as follows: (1) There is a difference in the effect between the training method (hanging ball and self-throwing ball) on the ability of spike back attack, as evidenced by the calculated F value of 9.308 with a significance of 0.008. (2) There is a difference in arm length (above average and below average) on the ability to spike back attack, as evidenced by the calculated F value of 6.231 with a significance of 0.024. (3) There is an interaction between the training method (hanging ball and self-throwing ball) and arm length (above average and below average) on the ability of spike back attack, as evidenced by the calculated F value of 6.231 with a significance of 0.024.

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INTRODUCTION

One of the sports included in the category of achievement sports is volleyball. Volleyball is a sport that is very popular and widely known by people in Indonesia and even the world, this is in line with the existence of volleyball sports matches in every national and international event such as PON, SEA GAMES, ASIAN GAMES, and even the Olympics. According to (Firmansyah et al., 2020) Volleyball is one of

the most popular sports in society because there are some simple aspects and does not require large amounts of money. Volleyball is a sport that is carried out by volleying the ball in the air through the net / net so that it can fall inside the opponent's court to find victory playing (Anwar et al., 2020).

Basic technical skills must be possessed, learned, and mastered to be able to master volleyball in accordance with volleyball technique principles (Wahyudi, 2017). There are 4 (four) basic techniques in volleyball games, namely passing, service, spike or smash, and blocking. The focus of this research is the spike technique. Spike is a dynamic movement and requires good coordination. According to (Challoumas et al., 2017) Volleyball attacks ('spikes') are highly technical and unique overhead movements performed repeatedly at high frequencies, which can reach up to 40,000 times in a year by professional players, therefore spikes are the main weapon for scoring points in volleyball games.

One type of spike that is often used is a back attack or an attack from the attack line. Back attack is one type of spike that is carried out from behind the attack line or three-meter line. Spike from behind (back attack) is quite effective in providing additional value in volleyball matches, because it can outwit the opponent's block by prioritizing the speed of the ball on the opponent's court because of the distance of the ball from the far net, so that the ball falls in the back area of the opponent's court (Kumalasari, 2017). In addition, spike back attacks are used to train power spikes because they are far away so they require more power to do so, this type of spike is also commonly given to novice or junior players to practice spikes in the hope that the net as a barrier farther from the ball so that crossing the ball is easier. According to (Kristriawan &; Sukadiyanto, 2016) the technical spike back attack is very rarely used, especially among juniors, most attacks are carried out from the front of the attack line, but this type of spike really needs to be given to provision to a higher level.

The lack of evenly distributed ability in junior athletes must be given a variety of forms of exercise so that they are easy to understand and perform independently. The unstable abilities of junior athletes must be balanced with programmed and continuous training. Varied training provides more motivation for athletes to be more enthusiastic about training, because training is an activity that is carried out programmatically towards certain goals (Alnedral, Padli, &; Sari, 2020). The hanging ball training method is a variation of the exercise used to train the timing of volleyball shots, so that the ball can be directed to the opponent's area precisely. Hanging ball training is carried out continuously until athletes get used to hitting high balls (Fathul &; Rejeki, 2021).

The practice method using the ball thrown alone is one option to practice spike strokes in volleyball games. This exercise can be done independently by athletes who have the aim of training movement coordination, timing, and power spikes. The implementation is almost the same as the jump service movement, so it is very easy for junior players to do (Wicaksana &; Rachman, 2018).

Arm length also has a very important role with the results of volleyball spikes. This is because the spike movement is an arm swing movement that stems from the base of the arm in providing punch strength when the arm hits the ball (Nasuka &; Priambodo, 2017). Having a longer lever will be more advantageous when hitting the ball. With good coordination when doing a spike, it will add accuracy to the direction of the ball speed.

Looking at the results of the video analysis of the 15-year age group match of the Bina Taruna club, it also shows that the spike back attack has been used in carrying out attacks both from position 6 and position 1, but the results carried out are not optimal, this happens because the power spike carried out is still low and the direction of the attack is less directed to cause the attack to be easily anticipated by the opponent. The results of interviews with coaches also stated that the form of exercise given was a lot of direct contact with the ball or drilling methods.

Based on the description above, it is necessary to test whether the two training methods can improve the ability of spike back attack in volleyball games in junior athletes of the Bina Taruna Semarang club.

METHOD

This study is a type of experimental research with a 2 x 2 factorial design with the population used being junior athletes of the Bina Taruna Semarang volleyball club. The population in this study was junior athletes of Bina Taruna Semarang club which amounted to 25 people.

The sample of this study was taken by purposive sampling technique based on the characteristics set by researchers totaling 20 people. The sample was measured in arm length with a measuring instrument by the officer. The sample was divided into two groups, namely group A and group B consisting of 10 athletes who had arm length above average and 10 athletes who had arm length below average. Then the treatment was given to each group.

Samples in groups A and B were each given the same training method, namely the hanging ball practice method and the self-throwing ball practice method. The exercises provided apply the principles of exercise and the systematics of exercises. The frequency of exercise is 3 times a week for 4 weeks. After completion of treatment, each group did a post-test.

FINDINGS AND DISCUSSION

Findings

Description of the results of pre-test and post-test data analysis of spike back attack ability in volleyball games in junior athletes of Bina Taruna Semarang club who have arm length above average and arm length below average. The results of the description of the data on the hanging ball training method group and the ball thrown by themselves athletes who have an arm length above the average and an arm length below the average are presented in the table as follows.

The first hypothesis reads "there is a difference in the influence between the hanging

ball training method and the ball thrown by itself on the spike back attack ability of junior players of the Bina Taruna Semarang club". The following are the results of the calculation of the analysis of variance using SPSS 22.

Table 1. Univariate Test Dependent Variable: Training Method

Source	Sum Of Squares	Df	Mean Square	F	Sig.
Training Method	151.250	1	151.250	9.308	.008

From the results of the ANOVA test, it was found that the F value was 9.308 and the significant p value was 0.008 < 0.05, meaning that based on the decision it was acceptable. Because there is a significant difference in influence. Based on the results of the analysis, hanging balls with an average of 39 are higher or better than self-thrown balls of 29. The post-test difference is 10. This research hypothesis states that "there is a difference in the effect between hanging ball training methods and self-thrown balls on the spike back attack ability of junior players of Bina Taruna Semarang club", has been proven.

The second hypothesis reads "there is a difference in the effect between above-average and below-average arm length on the spike back attack ability of junior players of Bina Taruna Semarang club". The following are the results of the analysis calculation using SPSS 22. More details can be seen in the following table.

Table 2. Univariate Test Dependent Variable: Arm Lengh

Source	Sum Of Squares	Df	Mean Square	F	Sig.
Arm Lenght	101.250	1	101.250	6.231	.024

From the results of the ANOVA test, it was found that the F value was 6.231 and the p significant value was 0.024 < 0.05, meaning that based on the decision it was acceptable. Because there is a significant difference in influence. Based on the results of the analysis, type III sum of square gets a value of 101,250 with df 1 and for mean square gets a value of 101,250. This research hypothesis states that "There is a Difference in the Effect between Above Average and Below Average Arm Length on the Results of Spike Back Attack of Junior Players of Bina Taruna Club Semarang", has been proven.

The third hypothesis reads "there is an interaction between practice (hanging ball and self-throwing ball) and arm length to the spike back attack results of junior volleyball". The following are the results of the analysis calculation using SPSS 22. More details can be seen in the following table.

Table 3. Test Of Betweem-Subjects Effects Dependent Variable: Spike

Source	Sum Of Squares	Df	Mean Square	F	Sig.
Interaction of training methods and arm length	140300.161	1	140300.161	73.275	.000

From the results of the ANOVA test, it was found that the F value was 6.231 and the significant value ρ was 0.024 < 0.05, meaning that the decision was acceptable. The research hypothesis that states that "There is an interaction between training (hanging ball and ball in self-throw) and arm length on the results of spike back attacks of junior players of Bina Taruna Semarang volleyball club", has been proven.

Discussion

Based on testing the hypothesis that there is a significant difference in influence between the hanging ball practice method and the self-thrown ball practice method on the spike back attack ability of junior players. The hanging ball training method is higher (good) than the self-thrown ball training method, this can happen because the position and direction of the ball on the hanging ball is more stable because it is constant at a certain point, in contrast to the ball thrown alone whose position and direction of the ball depends on the ability of the athlete himself.

This finding is supported by several previous studies that reported learning hanging ball spikes affects spike results because it is a technique exercise that can increase spike ability (Fathul &; Rejeki, 2021). Players when training to spike the hung ball will be accustomed to measuring the height of the ball, when he should jump, when he should hit with this calculation the player will make a precise shot and learn to direct the ball as desired, because the player can adjust the area of hand wear with the ball (Sinura et al., 2018).

There is a significant difference in the effect between above-average arm length and below-average arm length on the spike back attack ability of junior players. Above-average arm lengths are higher (good) than below-average arm lengths. Arm length is one of the most important components in volleyball. According to (Setiawan et al., 2022) arm length affects the accuracy of spike results in volleyball. The longer the player's arm, the greater the distance that can be reached when making a swing to attack the volleyball. According to (M. Imran Hasanuddin, 2019) the longer the arm, the higher the contribution made to the smash. More momentum generated from the length of this swing can result in smashes at higher speeds. The length of the arm can also affect the force exerted to the volleyball when performing a smash.

Based on the results discussed in this study that a significant interaction between the

training method (hanging ball and self-throwing ball) and arm length (above average and below average) on the spike back attack ability of junior volleyball club players Bina Taruna Semarang. The results showed that the hanging ball training method was an effective model used for players with arm length above average and the self-thrown ball practice method was an effective model used for players with arm length below average. The interaction between training methods and arm length in volleyball smashes can have a significant effect on a player's performance. Proper and effective training methods can help maximize the potential of players, including those with different arm lengths. The length of the arm is measured from the acromion to the tip of the middle finger, the requirements regarding body size in the form of arm length will be lucky to get the speed of movement of the arm, the bone is an arm with a long lever, then the long and slender muscles will allow fast and wide movement because the arm with a long lever is influenced by the speed of movement and the speed of movement is proportional to the size of the radius of one's arm (Auliya' Insani Basri et al., 2020). In practice, it is important for coaches to provide appropriate corrections and feedback to players based on their arm length. According to (Guntur et al., 2022)proper analysis and data from coaches, can improve spike ability for junior athletes. This will help players perfect their techniques and maximize their potential individually.

CONCLUSION

Based on the results of the research and the results of the data analysis that has been carried out, the following conclusions were obtained:

There is a difference in the effect of hanging ball training methods and self-throwing balls on the spike back attack results of junior players of the Bina Taruna Semarang volleyball club. Overall, the spike back attack results of junior players of Bina Taruna Semarang club who were trained with the hanging ball method were better than those trained with the ball thrown method themselves.

There is a difference in the effect of spike back attack results that have arm lengths above average and below average on junior players of Bina Taruna Semarang volleyball club. Overall, the spike back attack results of junior players of Bina Taruna Semarang club who have an above-average arm length are better than those with below-average arm length.

There is an interaction between the training method and arm length on the spike back attack ability of junior volleyball club players Bina Taruna Semarang; (a) The hanging ball training method is suitable for athletes who have an above-average arm length; (b) The self-throwing ball training method is suitable for athletes who have arm lengths below average.

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