

The Effect of Training Method and Leg Length on The Vertical Jump Result in The Volleyball Maras Bangka Club Athlete

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Article Info

History Articles

Received:
November 2019
Accepted:
October 2019
Published:
December 2020

Keywords:

*depth jump training,
limb length,
maxex training,
vertical jump results*

DOI

<https://doi.org/10.15294/jpes.v9i3.36061>

Abstract

The purpose of this study was to determine the effect of maxex training methods and depth jump exercises and leg length on the vertical jump results in the volleyball athletes of the Maras Bangka club. This research is a quasi-experimental research with a 2x2 factorial design of 20 research samples with a sampling technique using a purposive sampling technique. An instrument of this study was the length of the legs measured by the meter and the results of the vertical jump with the vertical jump test. Data analysis techniques used Analysis of Variance (ANOVA) with SPSS 24 program. The results of this study there is a difference in effect between maxex training and depth jump on the results of vertical jumps in the Maras Bangka club volleyball athletes, there is a difference in the effect of long and short limb lengths on the vertical jump results in the volleyball athletes of the Maras Bangka club, there is an interaction between the training methods and leg length on the vertical jump results in the volleyball athlete Maras Bangka club. The conclusion is that there is an influence between the exercise method and leg length on the vertical jump results in the volleyball athlete Maras Bangka club. Suggestions for the Maras Bangka club, physical conditions need to be considered for achieving optimal results and need to develop more effective and appropriate training programs.

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[p-ISSN 2252-648X](#)

[e-ISSN 2502-4477](#)

INTRODUCTION

The volleyball is a sport game that very popular in the world, how to play it is straightforward, namely by hitting the ball and passing the net back and forth with a certain height (Roesdiyanto, 2014). The volleyball is a team sport that is played by six people per team. According to Winarno and Imam Sugiono (2011) the volleyball game will run well and smoothly if each player has mastered the basic techniques of the volleyball game. In the volleyball game four basic techniques must be mastered by every player, namely passing, smash, block, and service (M. Mubarrok and Sapto Adi, 2017).

Physical conditions must be developed by all the existing components, although in practice, it needs priority to determine which components need to get a larger portion of exercise according to the sport occupied. In improving physical condition, trainers usually provide training which contains several components related to physical conditions consisting of strength, flexibility, speed, agility, and endurance training (Ahmad Hasyim Asy'ari, Sugiharto, and Prapto Nugroho, 2013).

Leg length is the vertical distance between the soles of the feet to the groin, which is measured by standing upright. Leg length is the length between the hips to the soles of the feet. Leg length as a member of the lower limbs has an important role in sports performance. Long limbs will be benefit for the athlete when moving forward so that not much energy is expended. As a member of the lower limbs, the length of the limbs serves as a support for the motion of the upper limbs, as well as a determinant of movements in walking, running, jumping, or kicking (Dian Fakhruzzaman, Zulfikar, Abdurrahman, 2015).

The vertical jump is an upright or vertical jump that is carried out without the prefix with the highest arm reach (Markovic, 2007). The ability to jump to the top is very necessary to serve, smash, or blocked so that if an athlete has a good vertical jump value, the athlete will be able to master the volleyball game well so that athlete performance can be increased. Atmojoyo (2007)

factors that influence vertical jump, namely, proprioception, muscle strength, stabilization, power, and flexibility (Zelliana Aziza, 2015).

The results of the evaluation of the vertical jump test on the Maras Bangka club volleyball athletes, it is known from 26 volleyball athletes of the Maras Bangka club there are 3 good category athletes (51-60), 6 moderate category athletes (41-60), 6 moderate category athletes (31-40), 11 less category athletes (21-30). Based on the data that has been described, the results of vertical jumps in volleyball athletes at the Maras Bangka club are still relatively low. The observations of researchers at the Maras Bangka club, some athletes still have difficulty in smash and block because they do not have a high vertical jump, this is seen during training. When participating in the regional championships held in Belinyu, players during smashes and block, where the height of the jump is still inferior to the opponent as for the other factors, including the lack of understanding of athletes about techniques and tactics in doing smash and block, some athletes have less playing hours playing, physical condition exercises are applied. Athletes revealed that physical training is done using skipping and squat jump exercises without any other variation of the exercise. The training program that has been implemented has not shown optimal results so that the athletes who follow the training are still low and need to be improved. The solution to solve the problem of vertical jump at Maras Bangka club is to increase its explosive power. Increased results of the vertical jump can be done by providing exercises in the form of maxex exercises and plyometrics exercises. According to Johansyah Lubis (2016), maxex training is a new method that combines maximum work with training to produce explosive power. The exercise is dynamic weight training with weights to produce maximum power. While plyometric training is a form of exercise that is commonly done by athletes in increasing muscle power. Plyometric is a form of exercise that combines strength (strength), power (power), and by focusing on speed (speed) (Patel, 2014).

Based on the theories that have been put forward, maxex training or plyometrics exercises

aim to improve the results of the vertical jump. In increasing the vertical jump results that must be considered are explosive power development exercises, thus the good vertical jump results are obtained not only from good technical mastery but also are influenced by good physical conditions, one of them is explosive power. Researchers hope that Maras Bangka's club athletes can improve the results of vertical jump jumps so that it will be easier to smash and block in volleyball games.

METHODS

This type of research is quantitative research with quasi-experimental methods that aim to compare two different treatments to research subjects with factorial design techniques. Factorial experiments are experiments that almost or all levels of a factor are combined or crossed with all the levels of each of the other factors that exist in an experiment (Sudjana, 2005). The design of this study is the two-factor design. The treatments are arranged in such a way that each individual can be a subject together in two different factors, each of which consists of several levels, Dantes in Nita (2017). The data in this study were arranged in a research design framework with a 2x2 factorial design.

The population is the whole subject of research (Arikunto, 2010). According to Sugiyono (2015) population is a generalization area that consists of objects or subjects that have certain qualities and characteristics determined by research to be studied and then withdrawn conclusions (Hartono, 2011). Populations with certain characteristics are finite and infinite. The population is all volleyball players at the Maras Bangka club, totaling 26 athletes. Arikunto (2006) says that the sample is "part or representative of the population under study". The sample size used was 20 male athletes obtained by purposive sampling technique. According to Sugiyono (2015) purposive sampling technique that is a sampling technique based on certain considerations. The independent variables in this study are maxex exercise and depth jump exercise, the attribute variable in this

study is leg length, while the dependent variable is the result of a vertical jump. The instrument used in this study was the measurement of leg length using a meter tool. The vertical jump results are measured with a vertical jump test. The analysis prerequisite test data collection technique with the normality test is intended to find out that the sample comes from normally distributed populations. Testing data normality with SPSS is done by applying the Kolmogorov Smirnov technique (Candiasa, 2010) which is assisted with an SPSS 24 computer program with a significant level $\alpha = 0.05$. Furthermore, the homogeneity test is intended to show that two or more sample groups come from populations that have the same variance. The data analysis technique used to test the hypothesis of this study is by using a two-way analysis of variance (Two Way Anova). According to Arikunto (2006) two-way analysis of variance (ANOVA) is a research data analysis technique with factorial design with two factors. The conclusion whether H_0 is accepted or rejected is obtained by interpreting the significant value in the test table between-subject effects from the analysis of variance through the SPSS 24 for windows program. The criteria used in concluding is that if the probability of error $p < 0.05$, then H_0 is rejected, H_1 is accepted.

RESULTS AND DISCUSSION

This study aims to determine the results of vertical jumps on Maras Bangka club volleyball athletes. This study was conducted to analyze the effect of the exercise method and leg length on the vertical jump results in the volleyball athletes of the Maras Bangka club. Before conducting the data analysis technique using ANOVA, in this study, several prerequisite tests must be conducted, namely the data normality test and the variance homogeneity test.

Table 1. Data Normality Test Results

	Leg length	Kolmogorov-smirnov		
		Statistic	df	Sig.
Vertical jump	Long	.225	10	.162
	Short	.235	10	.126

Based on the normality test in table 1 the data performed using SPSS 24 for windows, obtained a significance value of $0.162 > 0.05$ for the results of vertical jumps with long leg length categories, and a significance value of $0.126 > 0.05$ for results of vertical jumps with the length of the limb is short, so the study sample comes from a normally distributed population. While the homogeneity test can be obtained significance value on the vertical jump variable with a value

of $0.124 > 0.05$ so that based on the results that have been described, it can be concluded that the sample tested can be said to be homogeneous or come from the same sample. After the normality test and homogeneity test, the next step is to test the hypothesis. The research hypothesis test was carried out using SPSS 24 for windows with the Anova test. Hypothesis test results can be seen in table 2 tests of between-subjects effects below.

Table 2. Tests of Between-Subjects Effects Effects of Exercise Method and Leg Length on Vertical Jump Results on the Volleyball Athlete of Maras Bangka Club

Source	Dependent variable	df	Mean square	F	Sig.
Practice	Vertical jump	1	304.200	8.357	.011
Leg length	Vertical jump	1	1036.800	28.484	.000
Exercise * Leg length	Vertical jump	1	217.800	5.984	.026

The first hypothesis test in table 2 shows that the significance value of the effect of maxex training and depth jump on the vertical jump results obtained significance value ($0.011 < 0.05$), so it can be concluded that there is an effect of maxex training and depth jump on the vertical jump results in volleyball athletes in Maras Bangka club.

The second hypothesis test in table 2 shows that the significant value of the effect of the length of the legs of the long and short categories on the results of the vertical jump obtained a significance value ($0.000 < 0.05$) so that it can be concluded that there is a difference in the effect of the length of the legs and short categories on the results of the vertical jump in athletes' volleyball at the Maras Bangka club.

The third hypothesis test in table 2 shows that the significance value of the interaction between the exercise methods and leg length on the vertical jump results obtained a significance value ($0.026 < 0.05$), so it can be concluded that there is an interaction between the training methods and leg length on the vertical jump results.

Maxex and depth jump exercises aim to increase leg muscle explosive power. In line with Andriadi's research in the journal Physical Education and Sport Volume 16 No. 2, December 2017 stated that there was a significant difference in effect between the maxex training

method and the plyometric training method on the ability of soccer's long-distance match ($F_{\text{value}} = 7.40 > F_{\text{table}} = 4.20$). Eknal Yonsa Perikles, Edy Mintarto, Nur Hasan, 2016 in the Journal of Indonesian Sports Science Media states that there is a significant effect of the jump to box, a front box jump and depth jump exercises on the explosive power of leg muscles and speed.

Maxex training and depth jump training both have a positive impact. The maxex training method is better than the depth jump exercise, firstly because maxex training can improve the ability of leg power so that it affects the vertical jump results. This is because, in the implementation of the training given, the maxex training group is given training loads that come from outside. So that the impact on increasing the optimal vertical jump results. For groups of athletes trained with a depth, jump exercises, the results are less than optimal. This is because in the implementation of this method without using the burden that comes from outside, but the burden of the athlete's body weight.

The training method and leg length are both important variables in the effort to improve the vertical jump results in the volleyball athlete Maras Bangka club. These two variables support each other in achieving optimal vertical jump results. In this case, the coach must also pay attention to the physical condition of the athlete to achieve maximum results.

CONCLUSION

Based on the results of the analysis and discussion above, the conclusions of this study are as follows: There is a difference of effect between maxex training and depth jump on the vertical jump results in the volleyball athlete Maras Bangka club. Maxex training is better than depth jump training on the results of vertical jump in the volleyball athlete Maras Bangka club. There is a difference in the effect of the length of the legs of the long and short categories on the results of the vertical jump in the volleyball athletes of the Maras Bangka club. Athletes who have long category leg lengths are better than short category leg lengths on the results of vertical jumps in Maras Bangka club volleyball athletes. There is an interaction between the training methods and leg length on the vertical jump results in the volleyball athlete Maras Bangka club. Maxex exercises and long leg lengths are better for improving vertical jump results in volleyball athletes at the Maras Bangka club.

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