

The Effect of Isotonic Training and Isometric Training on Upper Passing Ability in the Game of Volleyball

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A. Conception and design of the study; **B.** Acquisition of data;
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ABSTRACT

This study aims to determine the effect of isotonic training and isometric training on the ability to pass the top in the game of volleyball. The population and sample are 60 students of SMA Negeri 5 Makassar. Sampling techniques in research based on clusters. The data analysis technique used is a t-test at a significant level of 95%. By looking at the existing problems, the results of the scores obtained from data processing showed that: There was a significant influence of passing practice on the reflection of the wall on the ability to pass the top in the ball game in students of SMA Negeri 5 Makassar ($t_o = 11,635 > t_t = 2,045$). There was a significant effect of isometric training on the ability to pass the top in the game of volleyball in students of SMA Negeri 5 Makassar ($t_o = 11,919 > t_t = 2,045$). There was a significant difference in the influence between isotonic training and isometric training on the ability to pass the top in the game of volleyball in students of SMA Negeri 5 Makassar ($t_o = 10,145 > t_t = 2,000$).

Keywords : Exercise; Isotonic; Isometric; Upper passing; Bolavoli.

INTRODUCTION

If sports are discussed in a scientific context, then various characteristics must also be disclosed in general. This concept provides a fundamental perception of the breadth and depth of the existence of sports if it is to be studied further. But scientifically in developing sports (Hammado & Sahabuddin, 2019), perhaps in a holistic nature will reveal part of the field of sports science (Sahabuddin, 2020). Human development today, seen through the field of sports, appears and more and more humans are developing sports (Sahabuddin, 2018b). Volleyball is a form of sport that is very specific and has absorbed a lot of attention from the people in South Sulawesi (Sahabuddin, Hakim, et al., 2022). Starting from urban areas to remote rural areas, both men and women as well as the old and young generations and children. Because the form of sport the game of volleyball has been known to be very popular (Sahabuddin et al., 2021). With the vibrancy of volleyball, it appears that volleyball is very popular not only on the island of Java but also in various cities in Indonesia, including in South Sulawesi (Erawan et al., 2023). Apart from that, the game of volleyball has a certain attraction so it attracts the attention of many people to do it (Sahabuddin, 2019). With the

popularity of the sport of volleyball, of course, there are quite a lot of enthusiasts so the possibility of achieving achievements in the game of volleyball can be realized (Sahabuddin, Sudirman, et al., 2022).

The technique is a way of doing or carrying out something to achieve a certain goal effectively and efficiently, technique in the game of volleyball can be interpreted as a way to play the ball efficiently and effectively following the applicable game rules to achieve an optimal result (Sahabuddin et al., 2020). Techniques in the game of volleyball consist of basic techniques and advanced techniques (Sahabuddin, 2018a). The basic technique in the game of volleyball that is in question in this study is the passing technique of volleyball. The passing technique of volleyball is one of the techniques that is widely used in the game (Sahabuddin & Hakim, 2019). Passing is passing the ball to one's teammates in a squad with a certain technique as the first step to organizing an attack. The basic passing technique of volleyball is distinguished by the bottom passing technique and the passing technique (Prasetia & Sin, 2019) bag. Passing the ball is passing or passing the ball with the field of contact of the fingers when both arms are raised and the direction of movement of the ball is at a height above the head (Nugraha & Yuliawan, 2021). The upper passing technique can be done with various variations because the direction and movement of the ball are different (Siregar et al., 2021).

The implementation of the top pass can be done with various variations, although they all depart from the same basis (Mushofi, 2017) That is, it always starts from the front and the direction of the ball moving upwards. Therefore, it is usually called a normal pass or forward pass (Noviyanto & Hidayat, 2017). Regarding normal passing, this has the benefit of passing the ball to be followed by an attack (smash) by his friend to the opponent's field (Hary, 2019). Apart from the main benefit, namely passing to be followed by a smash or attack well, the movement of the ball is carried out with rhythm in the game (Afdi et al., 2019). Setting the rhythm of the game is one of the strategies to win the game (Hendriawan & Indahwati, 2019). The technique of passing up forward can be said that upper passing requires the right positioning, for that it needs calmness (Rohendi, 2019), the ball should be at a certain desired height, avoiding damping.

The reality that is always found in the field is that in the implementation of coaching, there are often doubts about choosing the right form of training to be used to achieve an achievement. Training is one of the most important strategic factors in the coaching process to achieve maximum quality of achievement in a sport.

The training provided is not always directed only at the development of technical skills, but the development of physical exercise is very necessary. In this case, four aspects are necessary for achieving maximum achievement, namely the physical aspect, the technical aspect, the tactical aspect, and the mental aspect. In connection with this, the physical aspect is made a problem by looking at the situation in the school. According to the problems that have been raised, for those who are still lacking in physical terms, of course, special physical exercise is needed, such as for students at SMA Negeri 5 Makassar. For this reason, the researcher thinks that to get the automation and effectiveness of movement in the basic technique of upper passing, it is necessary to do physical exercise. In this case, the exercises chosen are isotonic exercises and isometric exercises.

Isotonic exercise is a method or exercise program that is characterized by shortening and lengthening when muscles contract (Martin et al., 2022) or muscle contractions where the fibers shorten and elongate while tension is in the muscles (Kuncoro, 2021). Isotonic exercise is a method or exercise program that is characterized by when the muscles contract to shorten and sometimes to lengthen or contract muscles where the fibers shorten while

there is tension in the muscles (Urahman & Hidayat, 2019). The method or program of exercise isotonicly is contained in his book Fox (1984): "... repetition maximum is defined as the maximal load a muscle or muscle group can lift a given number of times before fatiguing". The form of isotonic exercise used is push-ups (Hakim & Isaac, 2021). The implementation of this push-up movement can be carried out with various variations of movements as stated by Wayne Dvan Huss (1987) said that: "The movements that occur in this push-up movement are flexion, extension, abduction, and adduction". Thus, the push-up movement aims to build the strength of the arm and shoulder muscles (Arif et al., 2021).

Isometric training is a method or training program that is characterized by when the muscles contract and do not experience shortening and lengthening or constriction of the muscles where the fibers do not shorten while there is tension in the muscles (Permani et al., 2022). Muscle contraction is where the fibers do not shorten while tension is occurring in the muscle (Khoirudin et al., 2023). It can also be said that an isometric contracted muscle is where the muscle stretches but there is no change in length in the muscle fibers in question (Zamroni et al., 2023). The form of exercise used in isometric training is the front raise exercise.

These two forms of training have the same goal, namely to get automated movements against the upper passing movement technique in the game of volleyball. However, in its implementation it is different, an isotonic exercise is a form of exercise with shortening and lengthening muscle contractions, in this case, the form of exercise chosen is push-up exercise, while isometric exercise is a form of exercise that contracts with no shortening or lengthening, in this case the form of exercise used is front raise. The implementation system of both forms of training is adjusted to the planned training program (Alfani et al., 2023).

METHODS

In experimental research, it is necessary to choose an appropriate design following the demands of the variables contained in the research objectives. The design in this study is: a "Randomized Sample Pretest and Posttest Group Design". Population is an individual who is used as the object of research". From this understanding and looking at the problems contained in this study, all male students of SMA Negeri 5 Makassar. The sample in this study is 60 male students of SMA Negeri 5 Makassar. Where the sample consists of several classes, each class is selected by random sampling by lottery and then 60 research objects are selected, then a pretest of upper passing ability in the game of volleyball is held. The method of dividing groups is based on pretesting the ability to make an upper pass in a ball game which is first arranged according to the ranking and then divided into two groups of the same by the "Machid ordinat" technique. The techniques and tools used in data collection have been prepared before collecting or collecting data. The data obtained is from the results of the instruments used in the passing test in the ball game. The research data in the form of upper passing ability in the game of volleyball from both experimental groups, both the initial test and the final test were analyzed by statistical calculation using the t-test at a significant level of 95%.

RESULTS AND DISCUSSION

Result

Descriptive data analysis

The results of the descriptive data analysis whose calculations are listed in the attachment can be described as follows:

Table 1.
 Results of descriptive data analysis

Group	Descriptive	Initial test	Final test
(A) Isotonic Exercises	N	30	30
	Σx	171	285
	Σx^2	1153	2847
	\bar{X}	5,7	9,5
	Sd	2,4379	2,1564
(B) Isometric Training	N	30	30
	Σx	165	252
	Σx^2	1093	2284
	\bar{X}	5,5	8,4
	Sd	2,4866	2,3608

Sample normality testing

The results of the sample normality test in this study used the chi-squared method at a significant level of 95%. Group A, which was given isotonic exercises, obtained an observation chi-squared value = 4.8218 smaller than the table's chi-squared value at a significant level of 95% = 11.070. Therefore, it can be concluded that the data in group A is normally distributed. Meanwhile, the results of the normality test of the sample in group B who were given isometric exercises showed that the observed chi-squared value = 7.0308 was smaller than the chi-squared value of the table at a significant level of 95% = 11.070. So it can be concluded that the data in group B is normally distributed.

Sample homogeneity testing

In the homogeneity test of the sample whose calculation is indicated in the attachment, the F-test is used at a significant level of 95%. From the results of the calculation, it was obtained that the value of F observation = 1.04 was smaller than the value of F of the table at a significant level of 95% = 1.86. Therefore, from the results of the calculation, it can be concluded that the two groups of exercises, namely isotonic exercises and isometric exercises, are homogeneous.

Results of hypothesis testing

There is an effect of isotonic training on the ability to pass the top in the game of volleyball in students of SMA Negeri 5 Makassar.

The results of the data analysis in the attachment obtained an observation t-value = 111.635 greater than the t-value of the table at a significant level of 95% = 2.045. Then H_0 is rejected and H_1 is accepted, meaning there is a difference between the initial test and the final test. Thus, it can be concluded that there is a significant influence of isotonic training on the ability to pass the top in the volleyball game of SMA Negeri 5 Makassar students.

There is an effect of isometric training on the ability to pass the top in the game of volleyball in students of SMA Negeri 5 Makassar.

The results of data analysis in the attachment obtained an observation t-value = 11.919 greater than the t-value of the table at a significant level of 95% = 2.045. Then H_0 is rejected and H_1 is accepted, meaning there is a difference between the initial test and the final test. Thus, it can be concluded that there is a significant influence of isometric



training on the ability to pass the top in the game of volleyball in the students of SMA Negeri 5 Makassar.

There is a difference in the influence between isotonic training and isometric training on the ability to pass the top in the game of volleyball in students of SMA Negeri 5 Makassar.

The results of the data analysis in the attachment obtained an observation t-value = 10.145 greater than the t-value of the table at a significant level of 95% = 2.000. So H_0 was rejected and H_1 was accepted, meaning that there was a difference in the influence of upper passing ability in the game of volleyball between isotonic exercises and isometric exercises. The group that received isotonic exercises was more effective and efficient in improving the upper passing ability in the game of volleyball compared to the isometric training group. Thus, it can be concluded that there is a significant difference in the influence between isotonic training and isometric training on the ability to pass the top in the game of volleyball in SMA Negeri 5 Makassar students.

Discussion

The first hypothesis was accepted: there was a significant influence of isotonic training on the ability to pass the top in the game of volleyball in the students of SMA Negeri 5 Makassar. According to the results of the t-test data of the initial test and the final test data of the upper passing ability in the ball game in the isotonic training group, it turned out that from the results of the calculation, the observed t-value was greater than the t-value of the table at a significant level of 95%. This proves that the first hypothesis proposed was accepted at a significant level of 95%. The prediction that can be put forward is that providing systematic programmatic isotonic exercises for 24 meetings with details three times a week, it will be able to improve the ability to pass the top in the game of volleyball for students at school. It can be explained that in carrying out or carrying out this isotonic exercise, it has effectiveness when carrying it out. This exercise is directed at the ability to perform muscle contractions for both arms and fingers simultaneously. This means that the performance of the arm muscles contract at the same time because basically in its implementation it is doing an upper pass with both hands at the same time. So that it can form the muscle strength needed in making upper passing in a volleyball game.

The second hypothesis is accepted; There is a significant influence of isometric training on the ability to pass the top in the game of volleyball in students of SMA Negeri 5 Makassar. According to the results of the t-test data of the initial test and the final test data of the upper passing ability in the ball game in the isometric training group, it turned out that from the calculation results, the observed t-value was greater than the t-value of the table at a significant level of 95%. This proves that the second hypothesis proposed was accepted at a significant level of 95%. The prediction that can be put forward is that providing systematic programmatic isometric exercises for 24 meetings with details three times a week, it will be able to improve the upper passing ability in the game of volleyball for students in school. It can be explained that in doing or carrying out isometric exercises it is carried out with pushing movements. So that the arm muscles contract well in making an upper pass in a ball game.

The third hypothesis is accepted; There was a significant difference in the influence between isotonic training and isometric training on the ability to pass the top in the game of volleyball in the students of SMA Negeri 5 Makassar. According to the results of the t-test data of the final test of upper passing ability in volleyball games in the isotonic training

group and the isometric training group, it turned out that from the calculation results, the observed t-value was greater than the t-value of the table at a significant level of 95%. This proves that the third hypothesis proposed was accepted at a significant level of 95%. It can be predicted that these two forms of training have a positive influence or improvement on the ability to pass the top in the game of volleyball, but when compared to the results obtained on the average of the final test and the statistical testing of unpaired t-tests, isotonic exercises are more productive and efficient. Because in doing this exercise it is more directed to the maximum explosive power of the arms, because in its implementation in isotonic exercises, namely there are shortening and elongating movements in its implementation compared to isometric exercises that contract due to the absence of movement so the contraction and muscle function are greater for those who are trained isotonic and the ability of the arm muscles to get stimulated faster and automate movements in making upper passes in the game of volleyball well.

However, in principle, the two exercises, namely isotonic training and isometric training, are training methods that can make a positive contribution to be able to direct students or athletes to spur themselves both in terms of improving basic techniques and in achieving achievements. Therefore, it is hoped that researchers will look for other training methods to be able to better improve the upper passing ability in the game of volleyball which functions as an aid for each sport.

CONCLUSION

Based on the results of the test by looking at the results of the discussion that has been described in the previous chapter, the results of this study can be concluded as follows:

1. There was a significant influence of isotonic training on the ability to pass the top in the game of volleyball in the students of SMA Negeri 5 Makassar.
2. There is a significant influence of isometric training on the ability to pass the top in the game of volleyball in students of SMA Negeri 5 Makassar.
3. There was a significant difference in the influence between isotonic training and isometric training on the ability to pass the top in the game of volleyball in the students of SMA Negeri 5 Makassar. And isotonic exercises are better.

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