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Improving Arm Muscle Power in Basketball Through TRX Suspension Training

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ABSTRACT

One of the important physical components in the game of basketball is power, which can be achieved by using the muscles ability to produce maximum strength in a short time. The aim of this study was to determine the effect of TRX suspension exercises on increasing arm muscle strength in basketball. The method used is an experiment using the One-Group Pretest-Posttest Design. This research was conducted on UPI women's basketball UKM athletes with the total sampling method. The data collection technique was carried out by conducting a pre-test on 15 people as samples. The instrument used to measure the power ability of the arm muscles is the two-hand medicine ball put test. After that, the samples were given the TRX suspension training treatment. Then carry out the post-test using the instrument for the two-hand medicine ball put test. The data analysis technique uses parametric statistics with normal and homogeneous-oriented samples. The results of the hypothesis test stated that T count was greater than T table, meaning that the research hypothesis was accepted, specifically that TRX suspension training exercises had a significant effect on arm muscle power. The research recommendation is that TRX suspension training exercises can be used as an alternative to train arm muscle power.

Keywords : basketball; TRX suspension training; arm muscle power

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INTRODUCTION

Basketball is one of the big ball games played by two teams with the aim of getting as many balls into the opponent's ring as possible. The more a team puts the ball into the opponent's ring, the more likely the team is to win (Rustanto H., 2015; Risjanna, M. R., et al., 2022). Basketball is a game with a fast and dynamic tempo, so it requires extra physical readiness. With a field size of 28 x 15 metres, played by 10 people on the court with a duration of 4 x 10 minutes plus 5 minutes of overtime if there is an equal score after 4 x 10 minutes, this basketball game requires players to be able to maintain their abilities and skills consistently during matches (Dias, et al., 2016).

There are three basic techniques in the game of basketball: shooting, passing, and dribbling. Shooting is the movement of putting the ball into the ring; passing is the movement of throwing the ball; and dribbling is the movement of dribbling by bouncing the ball to the floor. In the game of basketball, effective and efficient movements need to be based on good basic technical skills. The quality of this basic technique is very dependent on the physical abilities of a basketball athlete. Physical condition training is a process of developing the ability to perform physical movement activities that is carried out systematically and increases gradually to maintain or increase the degree of physical fitness in order to achieve optimal physical work ability (Yudiana, et al., 2012). The aspect of physical condition is a unified whole of components that cannot be simply separated, either in improving or maintaining physical condition. The basic physical component consists of strength, endurance, power (explosive power), speed, flexibility, agility, balance, and coordination (Wanena, 2018). In a basketball game with quite complex movement skills, many body contact movements are made suddenly, quickly, and strongly. Therefore, a component of good physical condition is needed in order to produce maximum motion and reduce the risk of injury. A good training process must comply with training principles.

One of the important physical components in basketball is power, or explosive power. This can be achieved by using maximum strength in a short time. Power is directly proportional to muscle strength, so the size of the power is affected by the size of the muscle strength. Power is a combination of the strength and speed of dynamic and explosive muscle contractions that are carried out to the fullest. The ability to power arm muscles is one of the foundations for achieving achievements in basketball (Mariati & Rasyid, 2019). Regular, measurable, and continuous training will result in changes in the structure and ability of muscle contractions because almost every movement and technique requires explosive arm movements. Muscle strength training generally uses external loads, such as gym machines or free weights, which are carried out continuously.

In the modern era, science and technology in the world of sports are not left behind, so there are forms of exercise that are practical but do not reduce the meaning of fitness. There are various forms of physical exercise that can be applied to improve physical fitness, one of which is TRX suspension training. A member of the US Navy Seal team named Randy Hetrick was the first to develop a suspension training model with a tool in the form of a Total Body Resistance Exercise (TRX) rope as a tool for soldiers to train to stay fit while on duty. On progress, TRX has transformed from a global brand in physical training and the industry leader in functional fitness into a wellness lifestyle brand supported by various communities, consumers, and fitness trainers. Suspension training is a combination of dynamic and static exercises performed by suspending certain body parts with ropes to improve stability and coordination of muscle groups (Dawes, 2017). In recent years, it has attracted a great deal of attention from researchers, trainers, and athletes for its positive effects on muscle strength and function. exercise using your own body weight with a rope made of nylon, 3.8 cm wide and 230–330 cm long.

Suspension training can be used for fitness needs such as improving and maintaining general fitness, improving sports performance, and as a rehabilitation or injury prevention tool (Dawes, 2017). TRX suspension training is also a physical exercise that can maintain and increase strength, muscle endurance, balance, stability, muscle coordination, and the core muscles (Suardika & Suparman, 2018). Dynamic movement patterns can build core muscles to keep the body in balance and adjust the movements it makes. Exercises can be started from low to high levels to provide increased loading so that endurance and strength increase. Movements using total body resistance are not limited to the depth range of motion, which is useful for muscle mobility so as to minimise injury in training. Making the training load easy or difficult depends on the position of the feet; the closer the position of the feet is to the anchor point, the more difficult the training load is, and the farther the position of the feet is from the anchor point, the

easier the training load will be (Sugustian, 2019). Therefore, TRX Suspension training can be used as a form of physical training for athletes with various forms of training. So it's no wonder this form of suspension training has become so popular, with an easy concept and a lot of science involved in it. This prompted researcher to observe the matches of the UPI women's basketball UKM team, where during training and matches the athletes had poor arm muscle power. This can be seen from the many shots and passes that do not reach the ring. The dribbling technique with the ball's reflection is still quite slow, and when defending, it cannot steal and rebound quickly. Based on what happened on the field, the researchers suspect that the athlete's ability to perform basic techniques is still low and pays little attention to the strength of the arm muscles. This is what makes the authors interested in conducting further studies on the effect of TRX suspension training on increasing arm muscle power in basketball.

METHODS

The method is an important element in the implementation of a study, where the method used is in accordance with the research problem. The method used is experimental. The research method approach used is quantitative, which is useful for answering research problems related to data in the form of numbers and statistical programmes. The research design to measure changes before and after being given treatment uses a one-group pretest-posttest design (Sugiyono, 2014).

O1	X	O2
Pretest	Treatment	Posttest

Figure 1. One Group Pretest-Posttest Design

The population used was the UPI women's basketball UKM team of 15 people. The sampling technique uses non-probability with the total sampling method. The sample consists of all 15 members of the population who are used as respondents. The research was carried out at the FPOK UPI Padasuka sports hall in Bandung from November 25, 2022, until December 19, 2022. The instrument used was a two-handed medicine ball, which was placed to obtain data on the arm muscle power ability of the sample during the pre-test and post-test (Nurhasan, 2000). The sample did the two-handed medicine ball put test alternately, which was done three times for each person. Then the highest score is taken from the three tests carried out. The research data were processed and analysed to test the research hypothesis. The purpose of data analysis is to simplify data into a form that can be understood and interpreted (Moleong, 2000). The data obtained will be processed using SPSS to determine its homogeneity and normality. The normality test will use the Shapiro-Wilk method. To test the hypothesis, a paired sample t test is used to test whether there is a difference in the mean of the two samples (posttest and pretest), which are paired or related. This test is part of parametric statistics, so the data must be normally distributed.

RESULT

Descriptive analysis is intended to find out, describe, and explain data from independent variables in general or in generalisations by calculating the minimum value, maximum value, mean value, and standard deviation (Sugiyono, 2017). The following are the results of calculations from the data obtained during the pre-test and post-test of the treatment using TRX suspension training.

Table 1. Pretest and Postest Results

	Mean	Minimum	Maximum	N	Std. Deviation
Pre-Test	3.0467	2.60	3.55	15	.33168
Post-Test	3.3060	2.84	3.80	15	.30976

Source: personal data

From the data above, it can be seen that the standard deviation value before being given treatment is 0.331 and 0.309 after being given treatment. The average value of the pre-test and post-test had a significant increase after being given treatment using TRX suspension training. The average value before treatment was 3.04, and after being given treatment, it was 3.30.

Table 2. Average TRX Suspension Training

Group	Gain	N-Gain	N-Gain (%)
Experiment	0.26	0.4077	40.7%

Source: personal data

Based on table 2, the effectiveness of using a method or treatment is determined by calculating the difference between the posttest and pretest scores. It can be obtained that the average gain from TRX suspension training is 0.26, while the average N-gain value shows an increase in understanding or concept mastery with a value of 0.407. It can be concluded that 0.407 is at 0.3 <g < 0.7 in the moderate category. However, in the form of a percentage of 40.7%, it is included in the less effective category.

Data analysis is used to answer the proposed hypothesis. It is necessary to do a prerequisite test for analysis, namely the normality test and homogeneity test.

Table 3. Normality Test

Group		Shapiro-Wilk			Information
		Statistic	df	Sig.	
TRX Suspension Training	Pre-test	.904	15	.108	Normal
	Post-test	.958	15	.652	

Source: personal data

The normality test used is the Shapiro-Wilk test at level α = 0.05. This test can find out if the results of the research data are normally distributed or not. It can be seen in Table 3 that all significant values are < 0.05. It can be concluded that H0 is accepted and H1 is rejected, so the data is declared to be normally distributed.

Table 4. Homogeneity Test

Levene Statistic	df1	df2	Sig.	Information
.585	1	28	.451	Homogeneous

Source: personal data

Table 5. Hypothesis Test

Group	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)	Information
TRX Suspension Training	-.25933	.09528	.02460	-10.542	14	.000	Sig.

Source: personal data

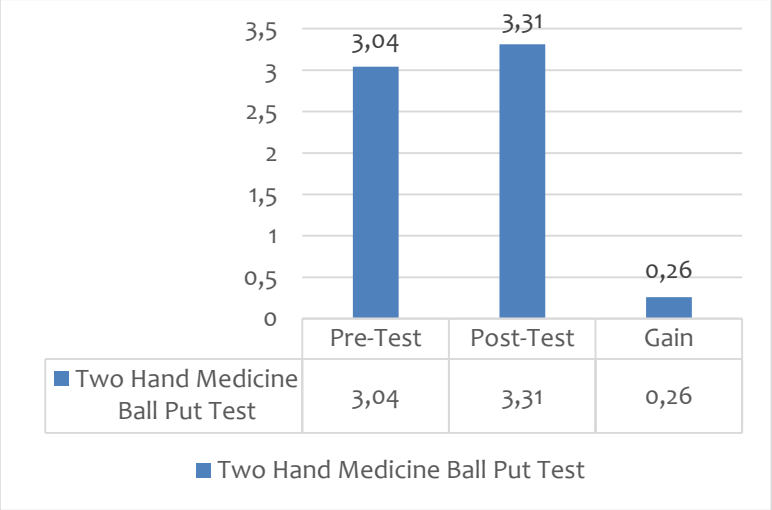

Figure 2. Changes of Two Hand Medicine Ball Put Test Results (Pretest-Posttest)

Based on the analysis of the data, which has homogeneous variance and a normal distribution, the data will be tested using the paired sample t test. Based on the calculation results in the table above, it can be seen that the significance level (2-tailed) is <0.00, which means that H0 is rejected and H1 is accepted. So it can be concluded that there is an effect of TRX suspension training on increasing arm muscle power in basketball. It is also shown in Figure 2 that the results of the average change in the two-hand medicine ball test increased from before being given treatment to after being given treatment by 40.7%.

DISCUSSION

Recognising the importance of physical condition in sports where competition requires mastery of techniques and good physical condition However, the fact that the physical condition of athletes has differences anatomically and functionally In this case, the physiological physical condition used is arm muscle power, which is one of the physical advantages of basketball sports techniques (Mulyo, 2020). Exercise using TRX suspension training in basketball athletes can increase arm muscle power with a 3-week training programme (12 meetings) with 12–14 repetitions, 3–4 sets, 2–5 minutes of recovery time, and a fast training rhythm using a tilt angle of 30° to 45°. This is also supported by the results of the descriptive analysis, where changes in the ability of the arm muscle power can be seen from the average value of gain of 0.26, while the average value of N-gain shows an increase in understanding or mastery of concepts with a value of 0.407 at 0. 3 < g < 0.7 in the medium interpretation category. However, in the form of a percentage of 40.7%, it is included in the less effective category. Based on the results of processing normally distributed data and the results of the paired sample t-test, a significance level of 0.000 0.05 was obtained, so it can be ascertained that training using TRX suspension training has a significant effect on arm muscle power. It can be explained that the effectiveness of using a method has increased to an average value better than before being given the TRX suspension training exercise.

This research is supported by previous research with the treatment programme TRX training after being given treatment for twelve weeks with a frequency of three times per week showing an increase in physical fitness (Suardika I., Kadek., & Suparman, M. 2018). Then, in the research by Jannadine et al. (2020), it was stated that the TRX (Total Body Resistance Exercise) exercise had an effect on the swimming speed of the 50-metre butterfly with a percentage figure of 99.5%. Training is carried out over 6 weeks, with each week the training load or intensity of the exercise increasing from low to high. This training programme is proven to increase the

athlete's swimming speed. The loading will be increased progressively by reducing the angle of inclination, because the smaller the angle of inclination, the more difficult it will be (Nasrulloh & Wicaksono, 2020). Based on the research results, TRX suspension training indirectly trains the endurance and strength of other arm muscles, which affect the ability to perform basic basketball techniques such as chest press exercises that resemble the passing chest pass technique, triceps extension exercises that resemble the overhead pass movement, rebounding, shooting, etc. This is due to the TRX suspension training exercise, which resembles the movements of basic basketball techniques.

CONCLUSION

Based on the analysis of the data and evidence obtained, there are new findings from research conducted on UPI women's basketball and UKM athletes that there is a significant increase in arm muscle power in basketball through TRX suspension training exercises. Recommendations for further research are expected to carry out further research regarding training using TRX suspension training with different methods and different physical elements that are trained.

CONFLICT OF INTEREST

All authors state that there is no conflict of interest in this research.

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