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The Application Of Reverse Periodization Model For Improving Leg Muscles Power Ability

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Abstrak

Reverse periodization is a training plan that starts with high intensity and low volume, and gradually decreases the intensity and increases the volume, or maintains the intensity and increases the volume depending on the sport. The purpose of this study was to determine the Implementation of the Reverse Periodization Model to Increase Leg Muscle Power Ability. The research method used is an experimental research method using the One Group Pre-Test Post-Test Design. The data collection technique was carried out by giving an initial test/pre-test to one experimental group. The study was conducted for 4 weeks with 12 meetings. The implementation of this study used a circuit training method with 12 forms of exercise. The population in this study were 20 trained and active UPI Women's Futsal UKM athletes. The sample used was 14 athletes using a purposive sampling approach. The test instrument used in this study was the vertical jump test. The data analysis test used the paired sample t-test with the IBM SPSS computer application version 25.0. The results of the analysis showed that there was a significant difference between the pretest and posttest on the vertical jump test variable with a sig value. (2-tailed) of 0.002 < 0.05. From the research data, it can be concluded that there is a significant effect of the application of the reverse periodization model on increasing the power capacity of leg muscles.

Keywords: Reverse periodization, Explosive power capacity, Leg muscles

INTRODUCTION

Training planning is a branch of theory that is oriented to practice, periodization which means "dividing seasonal programs into smaller training periods and cycles" which is an important part of every training theory (Issurin, 2010). The implementation of training planning must also be in accordance with existing training principles and training norms, to break down training into smaller, more manageable segments, usually comprehensive,

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covering the training process in certain training phases (Edition, 2019). Periodization of training with well-structured training periods designed to stimulate certain physiological adjustments (eg, VO2max) performance quality in a certain sequence that is considered optimal for performance development. There are many periodization models that can be applied by coaches to train trained athletes and elite athletes besides traditional periodization, namely non-traditional models. Traditional training periodization is generally used in strength sports coaching to optimize peak physical performance for major competitions with gradual changes in volume and load (Fleck, 2011). While non-linear periodization is based on the concept that changes in volume and load are more frequent (daily, weekly, biweekly) to allow for longer recovery periods because lighter loads are performed more often (Lorenz & Morrison, 2015).

In the application of periodization, it varies for untrained athletes, trained athletes and elite athletes so that it is flexible and adjusted to the physical condition of the athlete. In the condition of trained and elite athletes, one of the periodization models can be used, namely reverse periodization, where the training program starts with high intensity and low volume, and gradually the intensity decreases and the volume increases, or the intensity is maintained and the volume increases depending on the sport (Restes et al., 2009, Gonzalez-rave and Sortwell, 2013, Javier, 2019). Reverse periodization involves focusing on shorter, more intense workouts and then layering longer aerobic workouts as the race approaches (Martín et al., 2020). With proper planning, it can improve physical abilities to support the athlete's performance. Improving an athlete's physical abilities in each physical component is different, for example, training to increase strength is different from training to increase speed, and not all sports must have the same dominant physical components (Yuliandra et al., 2020).

There are several basic physical components that are trained in each sport, namely flexibility, speed, strength, and endurance. One of the important physical components that is needed to increase muscle endurance to overcome the load during exercise is strength. The main purpose of strength training in sports is to improve specific and relevant athletic activities inherent in each sport (Silva et al., 2015). One of the physical components of strength needed in sports is power. The physical component of power affects an activity that requires explosive movement, the combination of strength

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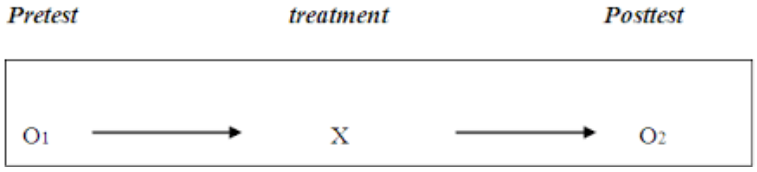
and speed plays an important role in most sports skills (Priyanto & Ndayisenga, 2020). In sports, power plays an important role, one of which is in the leg muscles.

Several previous studies have discussed the impact of implementing reverse periodization such as González-Ravé et al. (2022) discussed that reverse periodization is an alternative short-term training in trained athlete conditions. Furthermore, Arroyo-Toledo et al. (2013) and Arroyo-Toledo et al. (2016) showed that reverse periodization is a specific and efficient training strategy for sprinters significantly, then Clemente-Suárez & Ramos-Campo (2019) showed that reverse periodization is an effective strategy in improving technical, aerobic and anaerobic swimming abilities, but in the journal only discusses individual sports and does not explain the anaerobic component specifically. With the limited literature on the application of the reverse periodization model, the author is interested in conducting further studies on the impact of implementing the reverse periodization model on increasing leg muscle power capabilities.

METHOD

The method used in this study is the experimental method with the One-Group Pretest-Posttest Design, namely a research design in which one group is measured or observed not only after the treatment, but also before (Jack R. Fraenkel et al., 2012)



Picture 1 : *Desain Penelitian One Group Pre-Test Post-Test*

The population of the study was 20 female athletes of UPI Futsal UKM, 14 members of the population were used as samples. The sampling technique in this study was purposive sampling. The reason the researcher used purposive sampling was because not all students met the predetermined criteria and there were deficiencies in facilities and infrastructure. The criteria included in this study are as follows:

1. The sample is an active student of UPI's female futsal UKM.
2. The sample is a student who is active in sports.
3. The sample has a trained physical condition.
4. The sample is able and capable of following routine training during the research/meeting.

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The study was conducted at FPOK UPI Padasuka on March 29, 2022 to April 23, 2022. Treatment using reverse periodization was carried out in 12 meetings. Exercise is carried out 3 times a week on Tuesday, Thursday, Saturday. The exercise program carried out is measured according to the results of the initial physical test. The reverse periodization model is the opposite of linear, therefore the intensity starts from high intensity, which is ≥ 80%, fast execution and low volume. In circuit training there are 12 forms of exercise, namely: Step ups, Sit ups, Push ups, Lunges, Back ups, Dips, Jump to box, Leg raise, Medicine ball push, Lateral jump to box, Sit up "V" and Squat thrusts with active rest (back to back). Each movement is done for 30 seconds in the first week, 40 seconds in the second week, 50 seconds in the third week, and 60 seconds in the last week with 30 seconds of active rest done for 3 sets at each meeting. The number of exercise forms starts from 6 forms in the first week, 8 forms in the second week, 10 forms in the third week, and 12 forms in the fourth week adjusted to the intensity and volume. The exercises used to train leg muscle power are jump to box, lateral jump to box, step up, squat thrusts.

The research instrument used to determine the power or explosive power of the leg muscles is the vertical jump or sargent jump test (vertical jump or upright jump) with a validity level of 0.989 and a reliability of 0.99 (Bagaskara & Suharjana, 2019). The results of the vertical jump test measurements have been calculated in watts using the Sayers formula which is stated below:

$$\text{PAPw (Watts)} = 60.7 \cdot \text{jump height(cm)} + 45.3 \cdot \text{body mass(kg)} - 2055$$

Picture 2 : *The Sayers Equation* (Sayers et al., 1999)

The data obtained were then processed and analyzed statistically using SPSS software to determine the homogeneity and normality of the data obtained. The normality test used the Shapiro Wilk test because the number of samples was less than 50. Hypothesis testing used the paired sample t-test.

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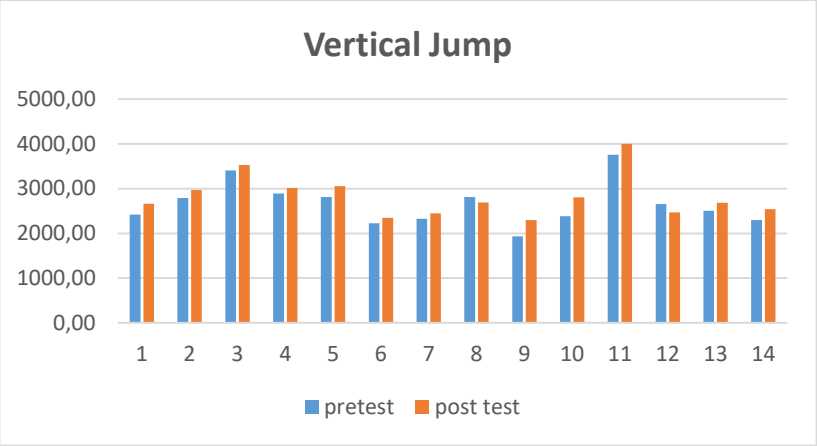
RESULT

Based on the results of descriptive analysis, the pre-test and post-test data of the vertical jump results had an average of 2657.54 watts before treatment and 2822.30 watts after treatment. It can be seen based on the increase in the results of the vertical jump test, there was a significant increase in the average.



Picture 3 : *Pre-Test* dan *Post-Test Result Graph*

Based on the results of the normality test of the pre-test and post-test data, the significance level values obtained were 0.286 and 0.055> 0.05, so it can be said that the data is normally distributed. Furthermore, the homogeneity test shows a significance level value of 0.935> 0.05, so it can be said that the data obtained has a homogeneous variance. Because the data obtained is normally distributed and has a homogeneous variance, the data will be tested using the paired sample t-test. The results of the paired sample t-test show that there is a significant difference between the pretest and posttest on the vertical jump test variable with a sig. (2-tailed) value on the vertical jump test of 0.002, thus the sig. value is smaller than 0.05, so it can be said that there is a significant effect of the application of the reverse periodization model on increasing leg muscle power capabilities.

DISCUSSION

From the research that has been done, there are findings in the form of data processed through a statistical approach and obtained results from training whose results are known through tests, both initial tests and final tests. Based on the results of the analysis, it shows that the application of the reverse periodization model has a significant

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effect on increasing power ability with changes in the results of the vertical jump test before and after treatment. This is supported by Clemente-Suárez & Ramos-Campo (2019) reverse training periodization has been studied and has an effect on physical fitness, strength training, swimming, and rowing, obtaining increased muscle endurance, maximum strength, and endurance performance. Then according to research by Gonzáles-Rave (2022) it explains that reverse periodization can increase muscle endurance with strength training, although it does not provide superior improvement results but is one of the short-term training alternatives to increase physical ability, especially anaerobic ability in trained athlete conditions. According to Swadesi (Masdar & Wahyuni, 2017) Circuit training is carried out with a rest time of 30 seconds at each post with fast running movements so that breathing must remain balanced in order to keep moving.

In physical training to improve the power component is very necessary because in every sport especially futsal which requires fast and precise movement and kick execution so that it will produce or achieve maximum results. Based on the description above, this study has been proven true by producing data that supports the hypothesis and shows the effect of training before and after using the reverse periodization model on increasing leg muscle power ability, by doing intensive training according to the objectives that support leg muscle power so as to prove that there is a change in terms of increasing leg muscle power from the results of training using the reverse periodization model.

Based on the results, regarding the application of the reverse periodization model to the results of increasing leg muscle power capabilities, it was found that the use of training methods using the reverse periodization model had a significant effect on increasing leg muscle power capabilities. Meaning that there was a significant effect of using the reverse periodization model on increasing leg muscle power. Meanwhile, the use of the circuit training method in the form of jump to box, lateral jump box, step up, squat thrust exercises also had a significant effect on increasing leg muscle power.

CONCLUSION

Based on the formulation of the problem and the results of data processing and findings that have been discussed previously, the results of this study showed that there was a significant increase in the application of the reverse periodization model to increase the ability of leg muscle power. Then from the presentation of the conclusions and

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discussions, various implications and recommendations were put forward so that the research would be useful, including for coaches, many periodization models that can be applied to be given especially to trained athletes by adjusting the needs of their athletes in supporting their best achievements. One of them is by applying reverse periodization to the condition of trained athletes, this is to avoid the possibility of injury. For subsequent authors, in this study, although there was an increase in the physical ability of leg muscle power, the researcher realized that there were still many shortcomings in this study, so it is recommended to conduct further research that can be developed even better.

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