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## **Effect of the Weight Training Period on the Increase in the 100 Meter Run in Indonesian NPC Athletes**

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### **Abstract**

The population and samples in this study were all 10 sprint athletes in the Indonesian National Paralympic Committee (NPC) 10 men. The sampling technique uses purposive samples, as it takes into account the characteristics of the sexes. The quasi-experimental method with a quantitative approach, as for the design of this study using pretest-posttest one group design. Data analysis techniques use descriptive statistics and inferential statistics. Descriptive analysis aims to describe the characteristics of this study while inferential analysis uses paired one sample test (t<sub>test</sub>) at a significant level of  $\alpha = 0.05$ , and overall data analysis uses the SPSS program version 26.0. The results of this study can be concluded that the period of laden training can increase the running speed of 100 meters of Indonesian NPC athletes. However, it is necessary to conduct further research taking into account the training environment, psychological factors of athletes, and other physical condition factors associated with the improvement of the 100-meter run of Indonesian National Paralympic Committee (NPC) athletes.



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## INTRODUCTION

Athletics is one of the oldest sports, it can be said that from ancient times until the existence of humans on this earth athletics already existed, because the movements contained in athletics, such as walking, running, jumping, and throwing are movements carried out by humans in their daily lives (Lumintuarso, 2015). Therefore, it is not an exaggeration to say that athletics is the mother of all sports.

Athletics consists of several kinds consisting of throwing, jumping, and running (Hermawan & Tarsono, 2017; Nanang Mulyana, 2017). Of the several kinds of branches contested, there is a prestigious number to compete, namely the 100 Meter sprint run. Although the sprint has several numbers including the 200, 400, and 4x100 Meter Relay, the most prestigious number is the 100 Meter run. Running is a number that is contested both at the regional, provincial, and international levels.

As written by Paulus Pesurnay from Zimmermann in several writings the ability of speed is divided into 3 (three) components, namely the ability of maximum moving speed carried out in the same pattern of motion (cyclical) also called the terminology 'speed', the ability of maximum speed of motion in the pattern of motion to change direction or often referred to as agility ability, and the ability of maximum speed of motion in reaction-action patterns or 'action-reaction' which is commonly referred to as quickness (Delgado-Floody et al., 2019; Engel et al., 2018; Fachrezzy et al., 2021; Tabata, 2019).

In its achievement, athletics is still not biased to develop quickly, especially in the regions due to inadequate nurseries and infrastructure

in the region. Especially the short-distance running at the regional level has decreased significantly, it is all biased in terms of the matches that follow. Because training speed takes longer to increase compared to training endurance.

Efforts that can be made to help improve speed ability are to increase their endurance ability through anaerobic endurance training and strength training through speed-strength (power) training. However, to achieve or go to these abilities, you must first go through several stages (periods) which we know as bio motor periodization so that each of them provides support and supports each other's achievements, by going through several exercises including strength training to build a strong muscle foundation to get maximum results.

One of the ways to support the improvement of sports performance is high performance which requires a specific biological profile with extraordinary motor abilities and the psychological nature of athletes (Jariono & Subekti, 2020). The quality of an individual's physical condition is an important asset in sports whose nature requires physical quality, as a consideration of the main criteria for achieving good achievements. Similar to efforts to achieve achievements in sports carried out by non-disabled athletes, coaches also often face problems in finding the best training method to apply to Paralympic sports (Croft et al., 2010). Experts and coaches must be able to recognize the fundamental elements according to the characteristics of a particular sport so that they can recruit and provide the right training methods for athletes with disabilities in the future. One method of identifying the fundamental element

or dominant physical component is to analyze anthropometry and motor abilities both related to fitness and athlete skills (Malone et al., 2012)

There are several methods for increasing speed training including power strength and endurance strength. Where in its application the exercise must go through structural stages which begin with anatomical adaptation first so that in carrying out the program there is no overcompensation caused by the unprepared muscles in receiving advanced weighted exercises. Talking about strength training, if we are going to train it, we must know and understand the muscles and the function of the motion of each joint so that we can maximize training.

The period of burdened training in principle has 4 parts, namely the Principle of overload, the Principles of the progressive prisoner, the Principles of the progressive prisoner, and the Principle of regular training (Bompa & Buzzichelli, 2019). Exercise increased endurance strength and acceleration of strength speed.

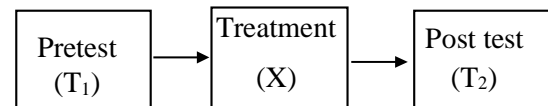
Endurance strength according to (Kharisma & Mubarak, 2020; Nasrulloh, 2015; Rahmad, 2016; Rahman, 2018) is an element of strength that is also much needed in sports, especially in sports that require performance of strength for a relatively long time and with a large number of reps/loops of movement. While the strength of speed is the ability of muscles to resist weights in one effort (Irawan, 2014; Kurnia, 2013; Nasrulloh & Wicaksono, 2020; Shahban, 2019).

Talking about paralympic sports, not only talking about sports science and competition rules but also talking about the wider fairies in this life (Deddy, Whinata, Kardiyanto. Hedi, Setijanto.

Edy, 2020). When it comes to paralympic sports, we must first commit to fostering respect in us for people with disabilities. Not using a rude designation for people with disabilities is one of the manifestations of respect that can be done simply.

## METHODS

The method used in this study is quasi-experimental using the design of pretest-posttest one group design. The design in this study uses one group pretest-posttest design, the design of this study can be seen in the following picture:



**Figure 1.** Research Design

In this research, there are several steps taken, namely " (1) establishing the group of research subjects; (2) carry out a pre-test (T<sub>1</sub>); (3) Give the model treatment of the laden Exercise period; (4) Carry out a post-test (T<sub>2</sub>); (5) look for the average pre-test and post-test scores and compare them between them; (6) find the difference in the difference between the two averages through the statistic k (t-test) method "to determine whether there is a significant effect of the weight training period".

## Participants

The participants of this study were 10 Indonesian NPC athletes with male gender characteristics.

## Sampling Procedures

The sampling technique in this study was total sampling. Total sampling is a sampling technique where the number of samples is equal to the population (Sugiyono, 2017). The sample taken from this study was 10 Athletes.

## Materials and Apparatus

The data collection technique used in this study was test and measurement techniques to obtain 100-meter sprint running data.

## Procedures

The procedures in this study were: (1) the researcher conducted a pretest to determine the initial ability to run 100 meters before the weighted training period was carried out (2) after the pretest was carried out, then the sample was trained using the exercise period of weighted exercise for 8 weeks as many as 16 meetings in 1 week were treated 3 times every afternoon with a duration of 120 minutes of exercise time, and (3) after the implementation of the study was carried out, a posttest was then carried out, to determine the increase in the running speed of 100 meters of Indonesian NPC athletes.

## Design or Data Analysis

Data analysis in this study includes analysis prerequisite tests and hypothesis testing. The prerequisite tests for analysis in this study include normality tests and homogeneity tests. For hypothesis testing using the T-test with a significant level of 0.05. overall data analysis using SPSS software version 26.

## RESULT

### 1. Descriptive Analysis

Descriptive analysis of the data aims to draw in general terms regarding the dissemination of the distribution of the "pretest and posttest" of the 100-meter running speed. A recap of the results of the descriptive analysis of the data can be seen in the figure:

**Table 1.** Descriptive analysis results

Variable	Mean	SD
Pretest	12.33	0.43
Post_test	11.38	0.53 pm

Based on the results of descriptive interpretation in table 1, the difference in the average "pretest and posttest" can be concluded that there is an increase in the pretest and post-test of Indonesian NPC athletes. This was evidenced by 10 samples obtained with the average value of the pretest and posttest of the 100-meter run of 12.33 and 11.38 differences of 0.95 and obtained deviations of 0.43 and 0.53. Thus it can be concluded that the weight training period can increase the running speed by 100 meters on the Indonesian NPC stage.

### 2. Prerequisite test

The normality test is used as a prerequisite for a hypothesis test. The normality test using the Kolmogorov-Smirnov Z (KS-Z) test can be seen in the following table

**Table 2.** Normality Test "Pretest and Posttest" 100 Meter Run

Statistics	Df	Sig.	
Pretest	.309	10	.077
Posttest	.299	10	.082

### a. Lilliefors Significance Correction

Based on the results of the data normality test in the histogram image, the normality test value of "pretest and posttest" of 100 meters running speed using Kolmogorov-Smirnov Z (KS-Z) in the data group turned out to be greater than the value of  $\alpha = 0.05$ . Thus it can be concluded that the sample of this study came from a normally distributed population. After the normality test is carried out, then hypothesis testing is carried out.

### 3. Hypothesis Test

**Table 3.** Results of "Pretest and Posttest"  
Data T-Test

Pretest_ Posttest	T-Count	S ig	T-Table (0,05)
100-Meter Running Speed	5.894	.000	1,812

Based on the results of the analysis t-test "pretest and posttest" of the 100-meter running speed of Indonesian NPC athletes in table 3 above obtained a  $t_{\text{count}}$  value of 5,894 and  $t_{\text{table}} (9;0.05)$  of 1.812. Based on these results, it can be concluded that the t\_test between the pretest and posttest increased running speed by 100 meters significantly or  $H_0$  was rejected and  $H_1$  accepted. Thus, it can be concluded that there is a significant influence of the loading training period on the increase in 100-meter running speed in Indonesian NPC athletes. This means that the coefficient can be generalized or can apply to the overall population of NPC Indonesia athletic athletes where a sample of 10 people is taken.

## DISCUSSION

The results showed that from the results of descriptive analysis of data to testing research hypotheses, the loading exercises used had a significant effect on the increase in 100-meter running in Indonesian NPC athletes. Loading training is a supporting element to improve the physical component consisting of strength, speed, agility, coordination, and endurance. Basic principles of weight training four principles must become the basis for compiling a weight training program. The four basic principles are

- Overload principle; Muscle strength is very effectively built when working muscles and muscle groups at more weights. Exercises with weights that are commonly done by muscles only produce general muscle work. The use of excess load will lead to the occurrence of physiological adaptation processes that will lead to an increase in muscle strength
- Progressive prisoners; Since the muscle is given a load that exceeds its ability, the muscle will undergo adaptation
- Progressive prisoners; Since the muscles are given a load that exceeds their ability, the muscles will undergo physiological adaptations where there will be a person increase in muscle strength. If this adaptation process has been achieved, then the work of muscles that previously exceeded the load of their abilities will no longer be overloaded. For this reason, the weight training program must also be based on the principle of progressiveness of the given load. Such increased load additions can be given by increasing the amount of weight of the given load or increasing the number of repetitions
- The principle of regular practice; The weight training program should be arranged in such a way that the weight given should be to the big muscles first and then to the small muscles. The reason corresponds to the normal pattern of movement of the human being, that the small muscle muscles experience fatigue faster than the large muscle muscles. So that the provision of weight training must start with the big muscles and be followed by the small muscles. In addition, the regulation of weight training must also pay attention to the provision of weights to the muscles. It is sought not to give the same exercises in sequence to the same muscles. So that the

muscles that are trained have a recovery agreement before being given further exercises.

This means that to train a short-distance runner, he is not only given sprint speed training but must require training - training on all other components of physical condition such as speed strength training or power strength training and loading exercises to increase running speed to the maximum.

## CONCLUSION

From the results of this study, it can be concluded that the period of exercise used has a significant effect on increasing the 100-meter run in Indonesian national paralympic committee (NPC) athletes.

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