



The Effect of Tabata Training and High Intensity Interval Training toward the Increasing of Strength, and Speed

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Abstract

A good physical condition is crucial to support achieving maximum performance, so proper training is needed, such as Tabata Training and High Intensity Interval Training. The aims of this study are to examine and analyze the different effects of those training on increasing strength and speed. This study used a "randomized group pretest and posttest design". The population in this study was male students of PKO FIO UNESA 2016, amounting to 160 students. The sampling technique used was random sampling with a sample of 30 students. The 30 students are divided into 3 groups, namely the group of Tabata Training, High Intensity Interval Training and, the control group. This type of research was a quasi-experimental, with a quantitative approach. The data were collected by measuring some techniques, such as measuring strength by using a back and leg dynamometer to measure limb muscle strength and measuring speed by using a 30-meter run. The data were analyzed by using MANOVA technique, with α 0.05. The results showed that the effect of Tabata training toward increasing strength with a value of $p = 0.000$, the effect Tabata training toward the increasing speed with a value of $p = 0.000$, then the effect of high intensity interval training toward the increasing strength with a value of $p = 0.000$, the effect of high intensity interval training toward the increasing speed with a value of $p = 0.000$. Based on the result of the two trainings result, it concluded that high intensity interval training is better than tabata training in increasing strength and speed.

Keywords: *Tabata Training; High Intensity Interval Training; Strength; Speed*

Introduction

Sport is well-known by all levels of society ranging from the old, young and even children or so-called as novice players. Sport is known as hobby and has diverse branches including volleyball, football, athletics, basketball, court tennis, table tennis and etc. Besides, sport is also a skill that can be used as a means to link between talents and achievements. To achieve maximum performance, it requires many factors, one of which is excellent physical condition.

Physical condition is very important for athletes to get *the best performance* in sports (Kusnanik & Rattray, 2017). *The best performance* is needed to achieve maximum performance, but to achieve maximum performance; athletes must understand how he trained and what must be trained. Sometimes,

most athletes want to get high achievement but they do not understand how to practice properly and correctly. There are athletes who have trained well but the form of training did not meet the bio-motor components needed in the sport they are involved in, so that the physical components that should be able to help technical perfection and the maximum achievements are not well-attained.

An athlete should understand more about the form of training that is carried out to improve which targeted bio-motor components and how to elevate the results obtained. Once the athlete chooses the wrong form of training, the results would not be as the expected. Therefore, an athlete must be able to properly decide in choosing the form of training related to the bio-motor components to improve his performance. In addition, to achieve those goals, it is better to choose appropriate training program in accordance with principle and theory. In arranging the proper training program, an athlete should notice onto the training principles such as the principle of specificity, overload, individualization, progressive, variety, and etc. (Isnaini, 2019).

During the training process, the athletes should also be programmed properly and be aware of training principles according to the theory such as the principle of overload, intensity of training, quality of training, multilateral development, positive thinking, variety of training, individualization, goal setting and error correction (Bompa, 2009).

Efforts to improve physical abilities and escalate the bio-motor performance must be supported by a good training program and meet the principles of training. If the training program is well-organized then the expected results will be achieved. Currently, there are various types of cardiovascular training development, and the most effective are *Tabata Training* and *High Intensity Interval Training (HIIT)*. Tabata training is a training formula introduced by Izumi Tabata in 1996 based on a 2:1 ratio represents the training work time and rest time.

Through Tabata training, a coach can improve one's physical condition and provide an assessment (evaluation) of the shortcomings and progress of the training process. According to Rich (2013), the advantages of Tabata training are burning fat, increasing the athlete's metabolism during and after training, being effective and efficient in its implementation, improving the anaerobic and aerobic systems and being able to be used for various activities. In addition, according to Sumpena, (2017) the Tabata method is a method that utilizes the ratio between training and rest (high-intensity pauses). In the training process, this method lasts for 4 minutes with details of the time of sports activities within 20 seconds and 10 seconds (2:1) for rest time, and it is repeated until the time of 4 minutes running out.

Based on the results of several recent studies, it is stated that after doing a circuit training consisting of two programs, namely using own body weight and an aerobic program, it is proven that Tabata can improve health level, cardiorespiratory, and muscular fitness. Furthermore, Breet Klika and Chris Jordan (2013; p. 11) stated that High Intensity Interval Training is an efficient exercise to help reduce body fat, increase insulin sensitivity, increase VO₂ max and muscular fitness.

In line with the Tabata training, the type of exercise that is considered to be able to significantly contribute in elevating the strength and speed is High Intensity Interval Training. High Intensity Interval Training (HIIT) is a type of cardiovascular exercise that combines high-intensity exercise with moderate or low-intensity exercise in a certain time interval. For example, High Intensity Interval Training is to combine sprint training with jogging, such as: 60 seconds of jogging, then after 60 seconds, continue sprint training for 30 seconds, and so on. This type of exercise can be done anywhere and anytime, such as on jogging track or in the gym with treadmill equipment.

High Intensity Interval Training is very effective because High Intensity Interval Training can enhance heart performance which has an impact on the body's metabolism which also enhances sharply. Metabolism here deals with the body's ability to turn fat into energy. In addition to metabolism increases during exercise, the metabolism also increases at rest so that the body remains in burning fat condition at rest.

Methodology

This research conducted on the quantitative approach. In term of the objective, this research includes to applied research, and implemented quasi-experimental as the research method. The treatment group is measured by providing training method in the form of Tabata Training and High Intensity Interval Training to increase strength and speed.

Result and Discussion

The results of the strength measurement test data with the number of samples $n = 30$ were carried out before and after treatment (Tabata training and High Intensity Interval Training). The description of the results of the average and standard deviation (SD) data can be seen in the table as followed:

Table 1 Description of strength test results (Kilograms)

Variable	Average \pm SD (Kg)		
	<i>Tabata</i>	<i>High Intensity Interval Training</i>	Control
<i>Pretest</i>	144,80 \pm 29,03	134,95 \pm 20,01	139,05 \pm 21,67
<i>Post test</i>	164,85 \pm 25,19	166,70 \pm 17,96	141,95 \pm 22,57

The data on the above table described the result of the strength measurement of the pre-test results of the Tabata Training group is in the amount of 144.80 ± 29.03 Kg, the High Intensity Interval Training group is in the amount of 134.95 ± 20.01 Kg and the Control group is in the amount of 139.05 ± 21.67 Kg. Then after the treatment (training) a post test is carried out and the results of the Tabata group increases in the amount of 164.85 ± 25.19 Kg, the High Intensity Interval Training group is in the amount of 166.70 ± 17.96 Kg and the Control group is in the amount of 141.95 ± 22.57 Kg. For more details, a description of the strength variable was presented in the following figure.

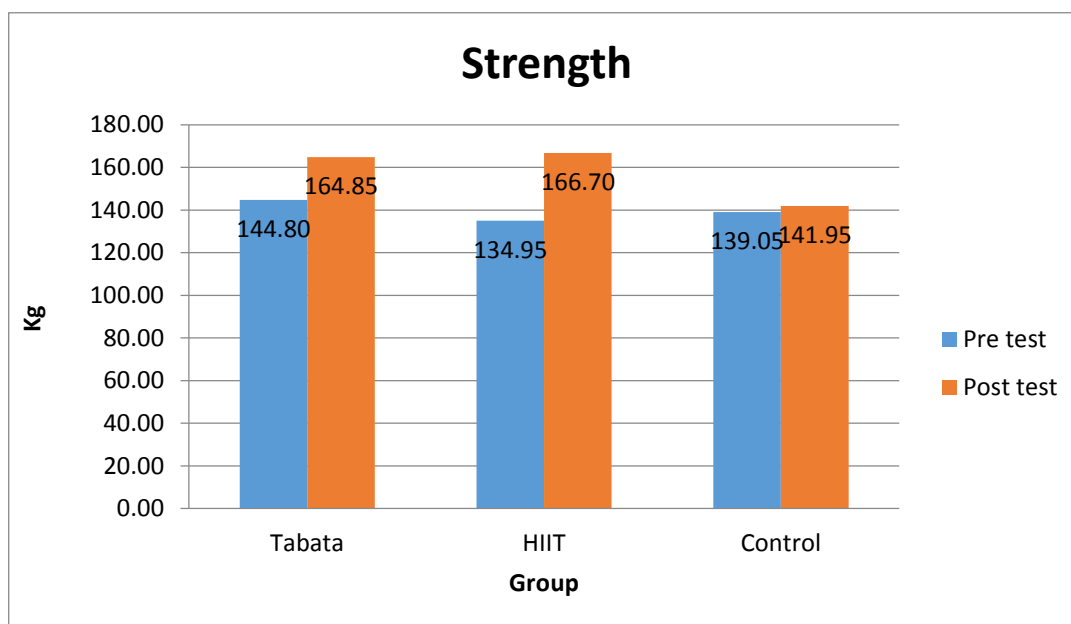


Figure 1: The strength average of before and after treatment in the Tabata, High Intensity Interval Training and Control group.

Table 2. Description of Speed test results (seconds)

Variable	Average \pm SD (seconds)		
	<i>Tabata</i>	<i>High Intensity Interval Training</i>	Control
<i>Pre- test</i>	5,01 \pm 0,45	4,96 \pm 0,30	4,94 \pm 0,30
<i>Post- test</i>	4,71 \pm 0,47	4,32 \pm 0,29	4,89 \pm 0,23

The table above represented the description of the strength measurement of the pre-test in the Tabata group of 5.01 ± 0.45 seconds, the High Intensity Interval Training group of 4.96 ± 0.30 seconds and the Control group of 4.94 ± 0.30 seconds. Then, after the treatment (exercise), a post test was done and the results of the decreased speed in the Tabata group were 4.71 ± 0.47 seconds, the High Intensity Interval Training group was 4.32 ± 0.29 seconds and the Control group was 4.89 ± 0.23 seconds. For more details, the description of the power variable presented in the following figure.

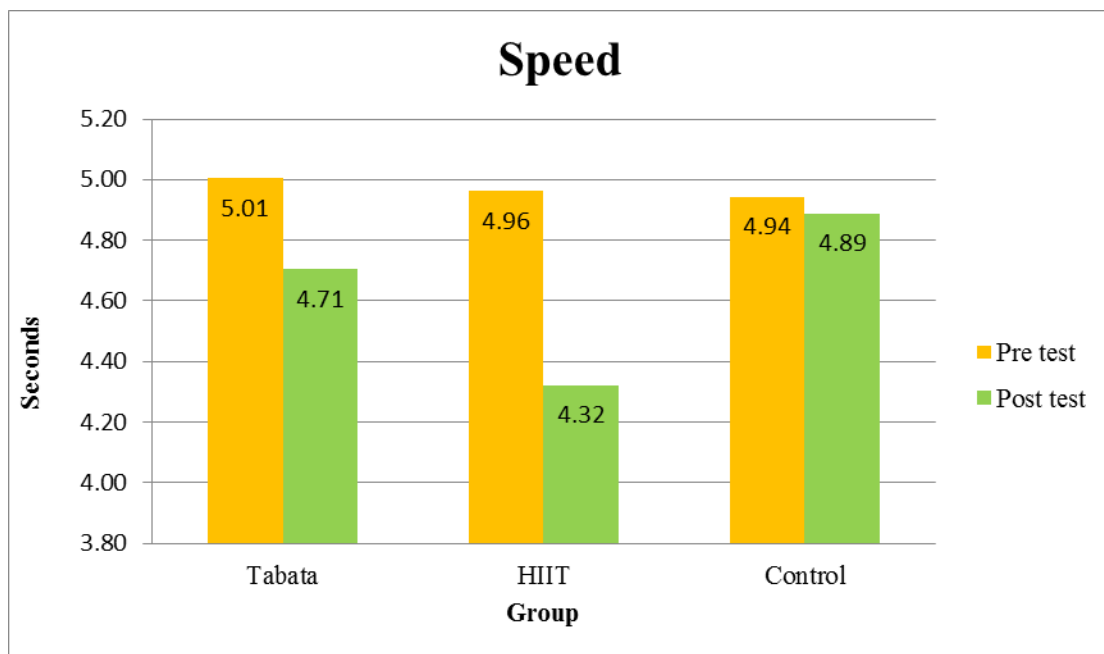


Figure 2: Average speed before and after the treatment in Tabata, High Intensity Interval Training and Control groups.

3. Post Hoc Test

After administering the Manova test then a post hoc test was obtained by using the LSD test on the strength and speed variables. The results of the post hoc test can be seen in the following table.

Table 3. The results of the post-hoc test of the Strength and Speed variables.

Dependent Variable	(I) Group	(J) Group	Sig.
Strength	<i>Tabata (K1)</i>	K2	0,000
		K3	0,000
	<i>High Intensity Interval Training</i>	K3	

	(K2)		
Speed	Tabata (K1)	K2	0,000
		K3	0,003
	High Intensity Interval Training (K2)	K3	0,000

P P<0.05 there is a significant difference

The results of the LSD test on the strength variable showed that there was a significant difference between the Tabata group and the High Intensity Interval Training group ($p=0.000$), the Tabata group and the Control group ($p=0.000$), the High Intensity Interval Training group and the Control group ($p=0.000$).

Furthermore, the results of the LSD test on the speed variable showed that there was a significant difference between the Tabata group and the High Intensity Interval Training group ($p=0.000$), the Tabata group and the Control group ($p=0.003$), the High Intensity Interval Training group and the Control group ($p=0.000$).

Conclusion

Based on the results of data analysis, there was a significant effect of Tabata training and high intensity interval training to increase strength, speed. In conclusion, the High Intensity Interval Training is more effective in increasing athletes' strength and speed Tabata training.

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