Effect of Box Jump Training With Interval Training Method 1:2 and Interval 1: 3 Against Increasing the Power

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Abstract

The aim of this study was to determine whether there was a difference between the effect of the training box jumps with interval training method 1:2 and the training box jump with interval training method 1:3 to the increase in power. The method used was a quasi-experiment study design with pre-test post test group design. The subjects of this study were students majoring 2009 class of sports coaching education between the ages of 19-20 years , amounting to 24 people. The collected data is the result of the initial test and final test using the Test Power Power (Force plate/Accu Power Vertion 1.3).

Analysis used t-tests on paired sample t-test. The results in group 1 (treated the box jump with interval training method 1:2) between the data pre-test and post-test showed that the value of (t = 10.514) and a probability value (p = 0.000 < 0.05). In group 2 (treated the box jump with interval training method 1:3) between the data pre-test and post-test shows that the value of (t = 17.952) and a probability value (p = 0.000 <0.05). Group 1 and group 2 shows that the value of (t = 12.070) and a probability value (p = 0.000 < 0.05). Conclution Training box jump performed by method of interval training 1:2 and 1:3 could significantly improve the power capability and training box jump with interval training method 1:2 and 1:3 gave significantly different effect on the power.

Key word: Box Jump, Interval Training

Introduction

In general, almost all sports require a physical power, especially sports games for example basketball, football, volleyball, hockey, badminton, etc, which played out in the form of individual and team. The physical power can be achieved through training, with regard to the principles of training and accuracy in choosing the type of exercise or training method.

In examination of the training, there are four aspects that must be considered in an effort to achievement of an athlete is the physical aspect, techniques, tactics, and mental aspects (Bompa, 1994; Harsono, 1988). The physical condition of the sports games are generally divided into two parts, consisting of the general physical condition (general physical conditioning) and specific physical conditions (specific conditioning) adapted to the characteristics of each sport. Good physical condition can only be achieved through hard practice and how the practice is not quite so alone, but must be specially prepared in accordance with the needs of each sport he participated in (Fox , 1993) .

In some sports games, such as movement and block in the volleyball smash, slam-dunk and jump shot in basketball, and jump-smash in badminton, the physical elements of the dominant use of reactive power or the landing and take-off power, then the quality of the power limb should really be considered as the most important motor skills (Bompa, 1993).

In an effort to improve the physical condition of many methods that can be used, but the methods of practice which leads to increased endurance capacity is interval training. Within 12 weeks, the length of interval training and short interval training can physiologically improve endurance capacity, but with a short interval training is more effective to increase anaerobic capacity, so exercise with short intervals may be recommended for the physical preparation for field hockey players and sports teams another high-intensity considers that aerobic and anaerobic capacity is important (Stagno KM, et al, 2004).

For some sports such as football, badminton, hockey, basketball, rugby, tennis courts, and so forth, interval training methods may be more appropriate than the method of continuous exercise. Because the method of interval training can improve

aerobic power and improve cardiorespiratory endurance without reducing its effect in increasing the anaerobic power (Sport Fitness Advisor, retrieved July 8, 2009). The advantage of this interval training can accurately determine the load, can see progress quickly (boost energy and physical conditions and can be done more efficiently).

The exercise that leads to physical conditions, one of them is a plyometrics workout. There were a lot of variety of plyometric exercises included depth jumps, cone jumps, box jumps, jump rope, and much more. A good exercise is one that resembles the actual needs of the energy system. Training methods that lead to anaerobic energy systems development is of interval training. Until now there has been obtained specifically what kind of interval training method that can improve the physical condition necessary and in accordance with the sport in question. For this reason the study was conducted.

Objectives

The aim of this study was to determine whether there is a difference between the effect of the training box jumps with interval training method 1:2 and the training box jump with interval training method 1:3 to the increase in power .

Methods

The method used in this study is a quasi-experimental methods. Research design randomize the group pre test post test design (Nasir, 2003). Using a quasi-experimental method because the researcher can not control all the outside studied fariabel that can affect the results of the research, such as: the length of time to sleep, food intake of each subject every day, other activities outside the research is conducted activities, and so on.

Subject

The subjects in this study were male student class of 2009 sports coaching education between the ages of 19-20 years, amounting to 24 people. The subjects were divided into two groups by random. Each group consisted of 12 people. Group 1 was treated Box Jump with interval training method 1:2 while the group 2 was treated Box Jump with interval training method 1:3.

Measurement

The data collected in this study is the result of the pre-test and post-test of Power. Measuring instrument used to measure power is the Power Test (Force plate/Accu Power Vertion 1.3). How to use the tool and perform the test is as follows :

1. Prepare the tool force plate.
2. Insert the USB plug into the computer.
3. Insert the power supply cord into a power outlet (220 volts).
4. Insert the RJ 45 plug into force plate.
5. Enable Power Accu software.
6. Let the tool for approximately 20 minutes so that all the sensors are on the warm and the working temperature.
7. Enter the patient name, id, and the type of test to be performed. Test Time can be set to follow the default, or it can also be set as needed.
8. Perform zeroing (Zero Force Plate).
9. Perform the measurement of the sample weight (Weight Subject). Depending on the types of tests performed, measurements can be carried too heavy a load (Loaded Weight).

10. Click start test, the sample is instructed to perform activities according to the type of tests performed (eg, vertical jump, standing broad jump, or lift weights/dumbbells).
11. After the test is finished, analyze the results of tests and do not forget to do data storage (save data).
12. To see the comparative data or data from previous samples, click on the file, patient, and select the data subject by the name of the subject that has been previously saved.

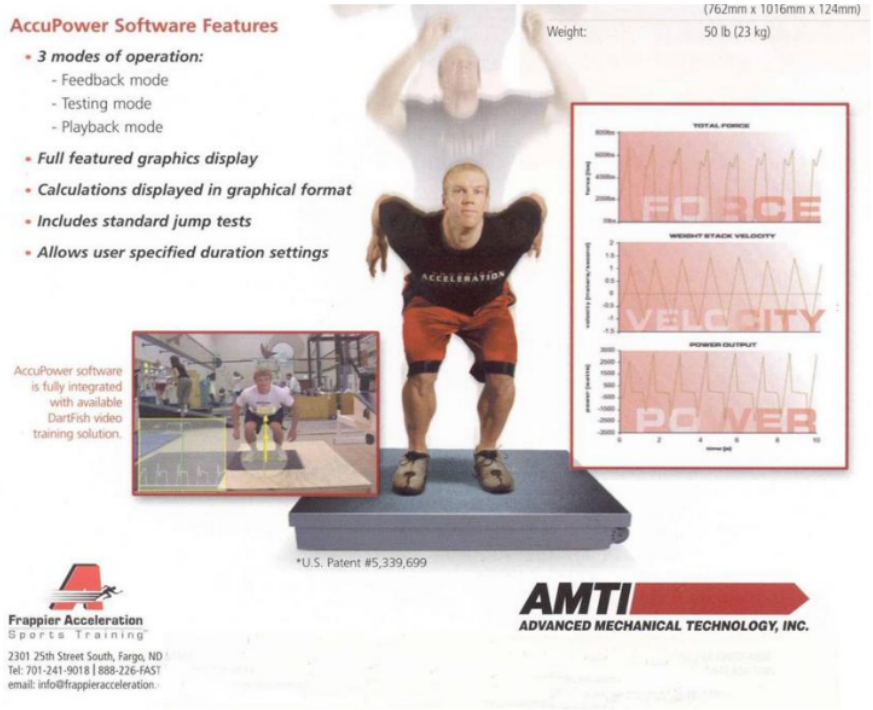

Figure 1. Force plate / Accu Power Version 1.3

Treatment

After the subjects were divided into 2 groups, the next step is to give treatment in each group. Group 1 was treated with a box jump with interval training method 1:2 and group 2 was treated box jump with interval training method 1:3. The implementation, the subject standing on a box with a length of 50 cm, width 50 cm, height 40 cm, then jump up and down a box with two feet together backwards, sideways or laterally left and right always return to the top of the box. Each return to the top of the box count 1 (one) and carried out continuously for 15 seconds with the number of repeat 16-18 times, this is called one repetition. Leap backwards, laterally right and left aside in accordance with the instructions of the wizard. Exercises performed between 4 to 5 repetitions and as many as 3 to 5 sets. Resting between repetition for interval training method 1:2 is 30 seconds and for interval training method 1:3 is 45 seconds, while the rest between sets is 5 minutes, and the rest is kind of passive rest.

Statistical Analysis

Analysis techniques in this study include the following descriptive analysis of the data, normality test using the Kolmogorov-Smirnoff test. If the normal distribution of data it will be paired sample t-test with a significance level ($p \leq 0.05$). Statistical calculation using the statistical program assistance package for social science (SPSS) version 16

Results

1. Description of Data

The results of measurements and descriptive analysis of data pre-test variable power in the group given exercise box jump with interval training method 1:2 is the number of subjects (n = 12), the minimum value (189.00), maximum value

(310.00), average value (230.58), and the standard deviation (37.36). The results of measurements and descriptive analysis of data pre-test variable power in the group given exercise box jump with interval training method 1:3 is the number of subjects (n = 12), the minimum value (159.00), maximum value (331.00), average value (228.83), and the standard deviation (52.53).

The results of measurements and descriptive analysis of data post-test variable power in the group given exercise box jump with interval training method 1:2 is the number of subjects (n = 12), the minimum value (205.00), maximum value (319.00), the value average (250.67), and the standard deviation (34.41). The results of measurements and descriptive analysis of data post-test variable power in the group given exercise box jump with interval training method 1:3 is the number of subjects (n = 12), the minimum value (207.00), maximum value (412.00), the value average (289.83), and the standard deviation (60.85).

The results of the measurement and descriptive analysis of difference data between a post-test to pre-test (delta) variable power in the group given exercise box jump with interval training method 1:2 is the number of subjects (n = 12), the minimum value (7.00), the maximum value (27.00), the average value (17.00), and the standard deviation (5.80). The results of the measurement and descriptive analysis of difference data between a post-test to pre-test (delta) variable power in the group given exercise box jump with interval training method 1:3 is the number of subjects (n = 12), the minimum value (47.00), maximum value (81.00), the value average (61.00), and the standard deviation (11.77). In summary it can be seen in table 1 below.

Table 1. Description of Data Power Measurement Results In 2 Groups

	N	Range	Minimum	Maximum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
PwrPree1	12	121.00	189.00	310.00	230.5833	10.78471	37.35933
PwrPost1	12	114.00	205.00	319.00	247.5833	10.02380	34.72347
PwrPree2	12	172.00	159.00	331.00	228.8333	15.16067	52.51811
PwrPost2	12	205.00	207.00	412.00	289.8333	17.56625	60.85128
Delta1	12	20.00	7.00	27.00	17.0000	1.67423	5.79969
Delta2	12	34.00	47.00	81.00	61.0000	3.39786	11.77053
Valid N (listwise)	12						

2. Normality Test

Normality test performed on each group of data, both pre-test and post-test on the dependent variable. Normality test is intended to determine whether the distribution of the data in this study are not normally distributed or as a prerequisite parametric statistical tests. statistical test for normality using the Kolmogorov Smirnoff test. The determination of whether or not the distribution of the normal data using a significance level ($\alpha = 0.05$) or ($p < 0.05$). Criteria testing, if the probability value ($p > 0.05$), the distribution of data is considered normal, and if the probability value ($p < 0.05$), the distribution of the data in this study is not considered normal.

Results of normality test of data distribution both in the pre-test group box jump with interval training method 1:2 and with the interval training method 1:3 are presented in Table 2 below.

Table 2. Results of Normality Test Pre -test data

Groups	Dependent variable (power)	Description	Status Normality
Box Jump 1:2	0,520	P > 0,05	Normal
Box Jump 1:3	1,000	P > 0,05	Normal

Results of normality test of data distribution both in the post-test group box jump with interval training method 1:2 and with the interval training method 1:3 are presented in Table 2 below.

Tabel 3. Results of Normality Test Post-test data

Groups	Dependent variable (power)	Description	Status Normality
Box Jump 1:2	0,705	P > 0,05	Normal
Box Jump 1:3	0,986	P > 0,05	Normal

3. T- test

From the calculation of the t-test statistics (paired sample t-test) in group 1 (one) were treated the box jump with interval training method 1:2 between the data pre-test and post-test shows that the value of (t = 10.514) and a probability value (p = 0.000 < 0.05). This indicates that there is a significant effect of training box jumps with interval training method 1:2 to increase power. In group 2 (two) were treated the box jump with interval training method 1:3 between the data pre-test and post-test shows that the value of (t = 17.952) and a probability value (p = 0.000 <0.05). This indicates that there is a significant effect of training box jumps with interval training method 1:3 to increase power. While the between group 1 and group 2 shows that the value of (t = 12.070) and a probability value (p = 0.000 < 0.05). This suggests that

there are differences in the effect of significantly between group 1 and group 2 to increase power.

DISCUSSION

Box jump is one type of plyometric exercises. Plyometric term was first coined in 1975 by Fred Wilt, an American citizen. Plyometric is derived from the Latin meaning plyo and metrics measurable improvement (Chu, 1998). Based on some of the figures that define the notion of plyometric can be explained as follows: plyometric exercises are exercises that allow muscles to reach maximum strength in a short time. Another name is the plyometric stretch shortening cycle (Chu, 1998; Diallo, 2001). According to Radcliffe and Farentinos (1985) plyometric exercise is an exercise that has specificity, ie muscle contraction which is very strong response and dynamic loading or rapid strain of the muscles involved [12] .

The implementation of box jump is preceded by standing on the box measuring 50 cm long, 50 cm wide, and 40 cm high, then jump up and down the box with two feet together backwards, sideways or laterally left and right always return to the top of the box. Each return to the top of the box is calculated and carried out continuously for 15 seconds (one repetition) by the number of repeat 16-18 times. Direction leap backwards, laterally right and left aside in accordance with the instructions of the wizard.

Subjects in the exercise were directed to follow guides and always jumps back to the top of the box, thus jumping movement of the subject when it hits the floor immediately make the leap to the top of the box. This movement can stimulate the subject of exercise to an increase in power. During the execution of the exercise

heart rate is monitored manually whether in doing the exercises included in the training zone or not. Of the work manually, the subjects entered the exercise zone.

Box jump training given to the subject of the research carried out by the method of interval training. Interval training is an exercise that is spersed between loading exercises with rest periods. In interval training can be done with high intensity and low intensity, depending on the physical condition needs to achieve. Steven M. Cohen (2008) stated that high intensity interval training can be defined as a form of competitions or movements in the short intense exercise performed at intervals followed by low-intensity exercise as a recovery of the interval.

A variety of interval training program that corresponds to the energy system according to Fox (1993), Bompa (1994), Bower (1992) can be seen in the table 4 below:

Table 4. Interval Training Program Model

Major Energy Sistem	Training Time (Min:Sec)	Repetition Per Work out	Sets Per Workout	Repetition Per Set	Work Relief Ratio	Type of Relief Interval
ATP-PC	0 : 10	50	5	10	1:3	Res-Relief
	0 : 15	45	5	9		Res-Relief
	0 : 20	40	4	10		
	0 : 25	32	4	8		
ATP-PC	0 : 30	25	5	5	1:3	Work-Relief (e.g. Light top mild exercise)
	0:40-0:50	20	4	5		
	1:00-1:10	15	3	5		
LA	1:20	10	2	5	1:2	

LA 2 O2	1:20-2:00 2:10-2:40 2:50-3:00	8 6 4	2 1 1	4 6 4	1:2	Work-Relief
O2	3:00-4:00 4:00-5:00	4 3	1 1	4 3	1 : 1 1 : ½	Work-Relief

From the table 4 above can be made form of exercise that is tailored to what the energy system will be developed. This form of exercise should be adjusted to the intensity of work, a long phase of work in progress or distance covered in a working phase.

The analysis showed that in group 1 were given exercise box jump with interval training method 1:2 and group 2 were given exercise box jump with interval training method 1:3 there is a significant difference between the pre-test to post-test on the variable power. Thus it can be preted that the type of exercise box jump with interval training method 1:2 can significantly enhance the ability to power an average increase of 17.00 watts, while exercise box jump with interval training method 1:3 can significantly improve the power capability an average increase of 61.00 watts,

The elements of hysical condition of power, strength, and speed there is a relationship of inter-related and affect positively (Bompa, 1999). As one of the types of exercises that can be used to increase power is plyometric, and one of its kind is the box jump. This is in accordance with the opinion Ebben (2007) which states that if an increase in variables such as speed, jumping ability, and agility is the purpose of the exercise, it is a type of plyometric exercises most suitable. That's because plyometric exercise is an exercise that has specificity, ie a very strong muscle contraction which is the response and dynamic loading or rapid strain of the muscles involved. So

plyometric exercises when applied to interval training method 1:2 and 1:3 can increase the power.

CONCLUSION

Based on these results it can be concluded that the

1. Training box jump is performed by the method of interval training 1:2 and 1:3 can significantly improve the power capability.
2. Training box jump with interval training method 1:2 and 1:3 gave significantly different effect on the power.

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