Training of Superset System Power and Set System to Improve the Strength of Limb

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Abstract: The purpose of this study is to determine the effect of strength training using weight training system and the difference made by superset and set to increase strength of limbs. This research used experimental method with weight training using superset and set systems to increase strength of limb. Instrument used in this study was 3 hop test. The samples used were 10 people using saturated sampling technique and divided into two groups by ABBA method. Based on data processing and data analysis, the authors concluded that strength training using this weight training system gives effect to the increase of strength of limb.

1 INTRODUCTION

Negra (2016) explains that the capacity of soccer players to produce a variety of crackdowns and explosive actions (ie, running, jumping, and changing directions) greatly affects the outcome of football matches. In some sports, athletes are demanded to have good power, especially in futsal sports where legs are dominant and they are needed to form power. As described by DeWeese et al., Part 1 (2015) the training process illustrates the incorporation of many factors that provide for athlete enhancement. The futsal coaches at the high school level generally only train the techniques, tactics and cardiovascular endurance. In fact, according to Naser (2017) who argues about the futsal sport, that futsal players need to have a large resilience capacity, repetitive sprint ability, and leg strength, while the technical aspects include high-level shooting and passing capability and good agility and coordination. Though basic plyometric exercises using a jump rope tool can be an alternative training to form power. As described by Lum (2016), plyometric training is a form of explosive force exercise that uses explosive motion, the ability to produce large amounts of rapid power without directing athletes into a form of strength training (weight training). There are several systems in strength training using weight training. Satriya (2014) on Method and System of Weight Training, says it consists of: Set system; Super set; Split routines; Multi pindage; Burn out; Pyramid system.

DeWeese et al., Part 2 (2015) explains that, there is little doubt that the method employed makes a significant difference in physiological adaptation and performance resulting from a strength training program. Harsono (2016) describes the exercise of a set system by doing some repetition of a form of exercise, followed by resting, and then repeating the repetition as before with two or three sets. Furthermore, the superset system implementation is, performing a combination form of opposite muscle exercises, which is, after performing the first form of exercise, it is continued with the second form of second exercise. Regarding the superset system, Maia et al (2015) also adds that the antagonist-agonist training method (in supersets) differs from traditional structured training, where all the same series of exercises are usually done in succession, before the execution of all sequences for subsequent exercises and so on. It is closely related to the problem proposed by Scudese et al (2015) that, 'some investigations have shown that manipulation of methodological variables as distinct as other periods between sets, will trigger different responses to neuromuscular, as well as metabolic and hormonal systems. DeWeese et al., Part 2 (2015)

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states that periodization provides a basic framework in terms of fitness and schedule phases, while programming involves making decisions related to the number of repetitions, sequences, intensity of training and training, volume, and level of development.

Fabricia (2015) states, based on literature that has been considered better in understanding the changes in limbs after power training programs, it contributes to the development of more effective training methods in football. Previous studies manipulated the intensity of the exercise by modifying the heavy load, while the volume was modified by the number of repetitions of each set and the number of sets performed. Brentano (2016) says that, to increase the intensity of the exercise, manipulation between sets / exercises for muscle groups is involved. DeWeese et al., Part 1 (2015) states that, the training process is closely related to positive performance improvement, therefore the process must be: appropriate stimulus for adaptation; appropriate means of assessing progress (monitoring); and additional means beyond set and repetition (ie the stimulus) includes a scheduled recovery phase, so that the recovery adaptation is optimized. Supported by background and some relevant research results on the basis of both reasons, this weight training system allows to obtain results of increased limb power, however empirically this system has not been tested. This research is intended to answer the question, whether the practice using superset system and system set will give effect to increase power limb?

2 METHODS

2.1 Participants

The target populations were 10 people from the Futsal Extracommunity Team of Thayyibah Hayat Integrated High School of Sukabumi City. Samples with saturated sampling approach were 10 people. Consequently, training programs to promote high explosive power such as power generation in youth should be considered a priority, Negra (2016).

2.2 Procedures

The method that writer used in this research was experimental method with one-group pretest-posttest design according to Sugiyono (2013). After the data obtained (initial test), then the ranking to divide the two groups using a matching technique with zigzag or abba system was conducted. Research was carried out from July 27 to September 21, 2015, 3 meetings per week with a total of 21 meetings and monitored directly by the author as a coach in the treatment. Direct monitoring is very important, because according to Barcelos (2017) that, in this sense it is well accepted that training monitoring is essential to optimize performance and reduce the risk of muscle injury especially among high performing futsal players. Also before performing the weight training exercises of the superset system and set system that will be exhausting and at risk of injury, all samples are required to thoroughly warm up each limb with the author's direction as a trainer. In accordance with the opinion of Nogueira (2016) that, Players warm up 10 minutes before the physical performance test, which consists of stretching and jogging at a comfortable pace.

2.3 Instruments

The instrument used in this was 3 hop tests as one of the tests used to measure strength of limb, Sumpena (2011). Implementation according to Liu (2015) ie, is three phases (jumps) of three (times) jumps are named as hop, step, and jump. Processing is done by using statistic variance.

3 RESULTS AND DISCUSSION

Below is a graph of preliminary and final test results, as well as an increase percentage of each individual in each experimental group A and B. From this graph, it is known that the experimental group A and B with the exercises using the superset system and system set contained the initial Tskor results of pre-test with 3 hops, the final score is the post-test result with 3 hops, then there is the Gain that is the result of the increase from the initial test until the Final test.
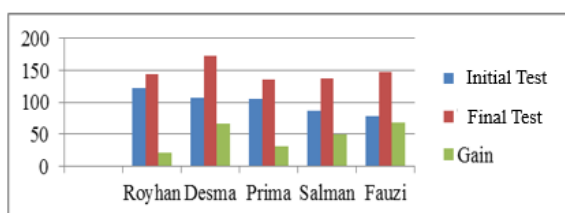
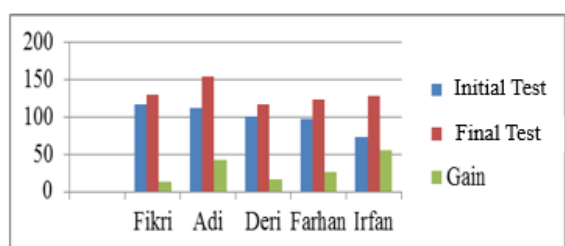Figure 1: increase of experiment group A (superset system).

Figure 2: increase of ekperiment group B (system set).

Furthermore, to be able to know the conclusions of an experimental research that the author has done, the following is the result of data processing and analysis of experimental data group A using superset system and experimental group B using a set system that is known from the initial test (pre-test) until the final test (post -test), can be described in the table.

Table 1: Calculation of average values and standard deviation of limb power test of both groups.

Strength of Limbs						
Group	Initial Test		Final test		Gain	
	X	S	X	S	X	S
Strength Training using the *Superset* system	100	17,5	147,5	15,13	47,5	21,38
Strength Training Using *Set* System	100	16,9	130,6	14,1	30,6	17,7

Initial test results showed results that are not much different between group A and B, this is because the sample has not undergone treatment from researchers. While in the final test for the strength training superset system group, the average is 147.5 with the amount of standard deviation of 15.13 and in strength training system set group, the average is 130.6 and standard deviation of 14.1, both groups experienced enhancement. Then it showed that the gain or difference between the initial test with the final test of strength training superset system group is 47.5 with standard deviation of

21.38. For strength training set system group, the average is 30.6 with standard deviation 17.7. It appears that the strength training group of the superset system has averages and standard deviations greater than in the strength training set system group.

This means that by shortening the exercise time, the athlete gets more strength training and can train more muscles, especially on the limbs, The World of Fitness [Internet] (2016). The condition also means that the continuous training process should be scheduled, so that the next training is exactly in the compensation position of the previous exercise, meaning that the next exercise of the athlete must be in the absence of fatigue due to previous training process according to Satriya (2014), as predicted by the theory of strength training program development towards increased limb power for athletes in Fabricia (2015) and Brentsno (2016). The Inventory analysis starts with the calculation of raw material using Product Structure or Bill of Materials (BOM), and Records Inventory. Costs will be calculated using the Lot for Lot method, EOQ, and POQ.

The Lot for Lot technique adjusts the amount of raw materials ordered by the amount of raw material demand in order to reach 0 storage cost. However, the cost of ordering raw materials will soar due to the ordering process done repeatedly to meet the amount of raw material needs each week. Total inventory cost of Lot for Lot technique is $2,595,975.04.

The total inventory cost generated by the POQ is $2,593,599.45. This technique calculates the interval between ordering and buying raw materials in accordance with the required amount in a given period. With this technique, the cost of ordering and storage costs can be minimized optimally so that the total cost of raw material inventory of pipe with POQ technique is the minimum inventory cost compared to other lot sizing techniques, it can save inventory costs of $11,253.85.

4 CONCLUSIONS

Proper athlete performance development based on the principles of practice will yield positive results. The athlete's achievement refers to the training process that the trainer does to his athlete. One component of the physical condition that must be mastered by the futsal athlete is power. Because it is similar to Ma et al (2017) that, the ability to generate power quickly is the most valuable factor that allows athletes to succeed during the competition. Exercises

using superset method and set system to increase limb power give a positive effect. Both of these methods have strong empirical theories and data, so it will be very well used as one of the methods to improve the strength of limb.

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