THE EFFECTS OF THE TRAINING METHOD OF SUPER SET AND COMPOUND SET WITH RESTING INTERVALS OF 30 AND 120 SECONDS BETWEEN THE SETS TOWARDS HEALTH RELATED FITNESS

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Abstract

The present research studies and tests the effects of the training methods of super set and compound set with resting intervals of 30 and 120 seconds between the sets towards health related fitness involving cardiorespiratory endurance (VO_2 Max), flexibility, muscle strength (leg, back), muscular endurance (upper body, abdomen), and body composition (% fat).

This is a quasi-experimentalwith the 2^2 factorial experimental design. The population of this study was males S1 students of Sports Science department (IKOR) of FIK UNY year 2014. The samples were aken using the purposive sampling method. The instruments used in this study were the *Multistage Fitness Test (MFT) Field Tests, sit and reach tests, sit up, push up, leg and back dynamometer,* and O*mron Karada Scan Body Composition Monitor*.Data analysis techniques in this research are the normality test, homogeneity and box tests as the prerequisite tests. Multivariate analysis (MANOVA) using the 2^2 factorial was used to test the hypothesis.

The result of Multivariate tests shows a significant influence proven by the Sig. value of <.05 (P<.05). The Sig. values of the training methods was .001, of the resting intervals between the sets was .000, and interactive methods with resting intervals between the sets was .002. The result implies that there were significant differences in the four treatment groups towards the dependent variables involving cardiorespiratory endurance (VO_2 Max), flexibility, muscle strength (leg, back), muscular endurance (upper body, abdomen), and body composition (% fat). The most effective training method which improves cardiorespiratory endurance (VO_2 Max) and flexibility as well as decreasing % fat was the super set method with 30 seconds resting intervals between the sets. The most effective training method which improves muscular strength (leg and back) was the compound set method with 120 seconds resting intervals between the sets. The most effective training method which improves the muscular endurance (upper body and abdomen) was the compound set method with 30 seconds resting intervals between the sets.

Keywords: weight training, super sets, compound sets, intervals between sets, VO_2 Max, flexibility, muscular strength, muscular endurance, body composition

INTRODUCTION

Effective training is a way to achieve physical fitness, though there are some training basic principles that should be fulfilled to achieve more optimal physical performance. In addition, there are also some training components and the capability to carry out the training programme in accordance with the training principles, components, and proper dosages.

Weight training is one of the physical exercises performed with the aid of a weight both from within and from outside the body, which is composed programmatically to increase the muscle ability and work productivity. The current phenomena related to weight training is that people do weight training to increase the muscle mass as bodybuilding. Yet, the most important criteria of physical fitness are cardiorespiratory endurance (VO_2 Max), muscle strength,

muscular endurance, flexibility, and body composition, not merely on the muscle mass and the athletic-looked body. It is in accordance to Werner (2010: 15) who states that health related fitness consists of several components, i.e. cardiorespiratory endurance, muscle strength, muscular endurance, flexibility, and body composition.

Holviala, et al. (2012: 1342) argues in their research that relative changes in maximal oxygen intake on a bicycle ergometer test (VO_2 Max) after 21 weeks of strength and endurance training periods both on the training group and the control one with the increases of VO_2 Max of 12.5% in the endurance training and 9.8% on the combination of endurance and strength trainings with P<.001.Avila (2010: 523) states that the combination of medium intensity resistance training on weight loss exercise programmes can significantly reduce body fat mass and composition of the mid-thigh, strength, and muscle quality in adults who are over-weight and obesity than in older people. Sekenendiz's (2010:3038) core strength training with *swiss-ball* can improve strength, endurance, flexibility and balance in women. Baechle (2014:1) affirms that weight training will be able to increase muscular strength, muscular endurance, neuromuscular coordination, and bone density (preventing osteoporosis).

From the above opinions, it can be said that weight training can increase health related physical fitness. The proper weight-training programmeshould be drawn upby regarding the basic principles and components of the training. The selection of proper training methods can also affect the success rate of training programme. In addition, the resting intervals between sets need to be considered because it is associated with the energy use during the weight training. In short, the researcher aims to analyze the influence of the training methods of super sets and compound sets with the resting intervals between sets of 30 and 120 seconds towards the health related fitness involving cardiorespiratory endurance (VO_2 max), flexibility, muscular strength (legs, back), muscular endurance (upper body, abdomen), and body composition (% fat).

METHODS

The super sets training method is a weight training conducted to train the opposing agonic-antagonistic muscles with the training dose of frequency: 3 times per week, intensity: 50-70% 1RM, the number of sets: 2-4 sets, reps: 15-25 repetitions, resting intervals between sets of 30 and 120 seconds. It is performed using Chest press-Pull down, Butterfly-Rowing, Leg extension-Seated leg curl, Leg press-Lying leg curl, Arm curl-Triceps pushdown , Low pulley curl-Triceps extension, Abdominal – Lower Back, High Pulley Crunches-Deadlifts.The compound set weight training is undertaken to train a group of specific muscles with the dose of frequency: 3 times/week, intensity: 50-70% 1RM, the number of sets: 2-4 sets, reps: 15-25 repetitions, resting intervals between sets of 30 and 120 seconds and is done using different tools

such as a Chest press-Butterfly, Pull down-Rowing, Leg extension-Seated Leg press, leg curl-Lying leg curl, Arm curl curl-Low pulley , Triceps pushdown-Triceps extension, Abdominal-High Pulley Crunches, Lower Back-Deadlifts.

FINDINGS AND DISCUSSION

Multivariate Tests showed significant effects with the Sig. value of < 0.05 ($p < 0.05$). The Sig. values of the training methods was .001, of the resting intervals between the sets was .000, and interactive methods with resting intervals between the sets was .002. The result implies that there were significant differences in the four treatment groups towards the dependent variables involving cardiorespiratory endurance (VO_2 Max), flexibility, muscle strength (leg, back), muscular endurance (upper body, abdomen), and body composition (% fat).

The super set combination method with the resting intervals of 30 seconds between sets effectively improves cardiorespiratory endurance (VO_2 max) because physiologically the resting intervals of 30 seconds between sets can only recover 70% of ATP, enabling the body to use the energy in aerobic as energy to do the training properly. Weight training using the Chest press, retractors, arm extension, quadriceps, abdominal curl-ups, elbow flexion and extension, lower abdominals for 4 sets and imposition of 10 RM for 6 weeks caused a significant increase in VO_2 max ($t = 7.978$, $p < 0.01$), (Shelvam, 2014:695). In addition, this method is also effective to increase the flexibility because during the training, the muscle group extensions are the movement of opposing agonist and antagonistic muscles resulting in the increase in flexibility of the muscles. It is in line with Santos, et.al. (2010:314) stating that alternative weight training and agonist/antagonist training performed every day for 8 weeks, 3 sets, 10-12 reps per set, except for abdominal exercises performed 3 sets of 15-20 reps, can increase strength and flexibility with $p < 0.05$. Other results showed that the method of the super sets combinations with the resting intervals of 30 seconds is also effective for decreasing % fat since there are quite short intervals and the total treatment time is about 60 minutes allowing the body to use energy from existing fat metabolism in the body. Yavari, et.al.(2012: 137) suggests that the weight training of bench press, seated row, shoulder press, chest press, lateral pull down, abdominal crunches, leg press, leg extension, triceps pushdown, seated curls and bicep exercises performed 2-3 times per week with an intensity of 60%-80 1 RM, carried as many as 3 sets and 8-10 reps with resting intervals of 90-120 seconds between the sets can give significant influence towards the decrease of % fat with the p values of < 0.01.

The compound set method with the resting intervals between sets of 30 seconds effectively improves muscle endurance (the upper body and abdomen). Physiological, when performing weight training with the compound set method, the movement occurred repeatedly

on a group of the same muscles by using different tools. The number of repetitions and the short resting intervals between the sets causes the muscle work maximal and repetitively, so that the ability of a muscle to work repeatedly without being fatigued can be trained properly. Besides, the energy used is as much as 70% of the ATP-PC recovery, allowing the body to use the energy in aerobic. Weight training with 6-12 reps and weights of 40-60% 1 RM can increase muscle endurance on the significance level of $p< 0.05$ (Arazi, 2011:114-115). It is similar to Manikandan's (2014:10-11) opinions stating that weight training with medium intensity (65-85%) performed 3 times per week for 12 weeks can give significant effects towards the muscular endurance with the significance level of $p< 0.05$.

The compound set method with the resting intervals between sets of 120 seconds effectively improves muscle strength because the resting intervals of 120 seconds will recover 84% of ATP and PCr, allowing the muscle to be able to use the energy of ATP and PCr as much as 84% at the time of the next movement. In fact, the ATP and PCr recovery will be 100% after 3-5 minutes resting, so that the best resting interval to train your maximum strength should be of more than 3 minutes. In addition to the long resting intervals, training the muscle strength should also consider the intensity of the exercise because maximum increasing muscle strength should be performed with the intensity of 70%-80% of 1 RM for the medium level, 80%-90% of the 1 RM for the level of weight, 90%-100% of the maximum load for the RM 1 and above 105% of 1 RM for super-maximal (Bompa, 2015:128). Allegretti, et.al. (2014:102) suggest that weight training periodization linear with the intensity of 65%-95% 1 RM applied to weight lifters can increase muscle strength significantly during the bench press by 30%, squat by 33%, and deadlift by 76.9%.

CONCLUSION

The training methods of super set and compound set with resting intervals of 30 and 120 seconds between the sets have the significant effects towards health related fitness involving cardiorespiratory endurance (VO_2 Max), flexibility, muscle strength (leg, back), muscular endurance (upper body, abdomen), and body composition (% fat). The most effective training method which improves cardiorespiratory endurance (VO_2 Max) and flexibility as well as decreasing % fat was the super set method with 30 seconds resting intervals between the sets. The most effective training method which improves muscular strength (leg and back) was the compound set method with 120 seconds resting intervals between the sets. The most effective training method which improves the muscular endurance (upper body and abdomen) was the compound set method with 30 seconds resting intervals between the sets.

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