The 3rd International CUA Graduate Students Symposium

University of Mohaghegh Ardabili

June 5-6, 2016

سومین سمپوزیوم بین‌المللی دانشجویان تحصیلات تکمیلی دانشگاه‌های عضو اتحادیهٔ قفقاز

دانشگاه محقق اردبیلی

16-17 خردادماه

The Effect of Submaximal Exercise Combined with Weight Training and Muscle Hypertrophy Limits Blood Flow to the Arm

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Abstract

Increase muscle size for most people is a goal for fitness that many people act in any way to increase muscle size. American college and many researchers suggested exercises is caused hypertrophy But submaximal exercises with restriction of blood flow can also cause muscle hypertrophy? Which method is better performance? The aim of this study was to evaluate the effect of combined strength and submaximal exercise congestion on the hypertrophy of the muscles of the arms reaction students physical education city Meshgin Shahr. Methods: 24 students selected randomly and were divided into four groups of six that one group students with 20%1RM with restriction of blood flow(cut off blood flow to the arm with a tourniquet during move), two group with 20%1RM, three group with 70%1RM , four group without doing any exercise (control group) were selected. sessions of three weeks each with three sets of ten repetitions were. They were the pre-test and post-test and data using spss software and repeated measure ($P \leq 0.05$) and ANCOVA analysis was performed to remove the Type I error. Results showed that in one group ($P = 0.145$), two group ($P = 0.811$), three group ($P = 0.061$) and four group (0.363) were that there was no significant impact. But increasing muscle size were observed in groups of three and one that the people who worked with 70% of one repetition maximum was evident.

Keywords: hypertrophy, submaximal exercise, limits blood flow, weight training

1.Introduction

Resistance Training activities are being incorporated in nearly all comprehensive exercise programs. While most health and fitness professionals recognize the acute program variables utilized in Resistance Training activities (sets, reps, intensity/load, volume, rest, exercise selection, exercise order, etc.) One of the most important research and propose to increase muscle mass and strength by America College (ACSM) is that the minimum weight and pressure to increase strength and muscle mass 65 to 70% of one repetition maximum (1 RM) is. The new method used to increase muscle size and strength exercises are very low intensity loads (20% 1RM) with limits blow follow. A growing body of research has demonstrated the effectiveness of exercise (low-intensity resistance training) combined with blood flow restriction for increased muscular strength and hypertrophy.

Blood flow restriction as an accessory to a variety of different exercise modes(lowintensityresistance exercise)has recently become a popular research topic.
Hypothetically speaking, the potential mechanisms for these adaptations may Include, hypoxia induced additional or preferential recruitment of fast-twitch muscle fibers, greater duration of metabolic acidosis via the trapping and accumulation of intr amuscular protons (H+ ions) and stimulation of metaboreceptors, possibly eliciting an exaggerated a cute systemic hormonal response. external pressure-induced differences in contractile mechanics and sarcolemma deformation, resulting in enhanced growth factor expression and intracellular signalling , metabolic adaptations to the fast glycolytic system that stem from compromised oxygen delivery, production of reactive oxygen species that promotes tissue growth, such gradient-induced reactive hyperemia after removal of the external pressure, which induces intracellular swelling and stretches cytoskeletal structures that may promote tissue growth, and activation of myogenic stem cells with subsequent myonuclear fusion with mature muscle fibers and etc (3). Low-intensity (20 –50% of 1 RM) resistance training, combined with restricted venous blood flow from the working muscle (Kaatsu resistance training), may provide an alternative training method to the traditional high-intensity resistance training programs currently being used(4). In recent years, a number of publications have reported that Kaatsu resistance training can result in significant and rapid increases in muscle hypertrophy (5,6,7). A previous study reported that increased leg circumference, an index of muscle swelling, was more pronounced in blood flow restriction than in non- blood flow restriction immediately after low- intensity knee extension exercise(8). Because blood flow restriction requires the use of an elastic cuff that is placed at the proximal end of the limbs, the restricted blood flow is only applicable to appendicular muscles. Consequently, previous blood flow restriction training

BMI	*Weight (kg)*	*Height(cm)*	*Age(year)*	*Subjects Features*
23.91±3.85	*75±10*	*172±9*	*16.5±0.5*	*20%1RM with Restriction of blood flow*
22.86±5.82	*7405±6.5*	*176±6*	*16.5±0.5*	*20% 1 RM*
22.96±4.44	*71±11*	*172.5±7.5*	*16.5±0.5*	*70% 1 RM*
20.91±4.01	*64.5±14.5*	*171.5±6.5*	*16.5±0.5*	*Without any exercise*

studies have focused on the physiological adaptations of appendicular muscles. However, the effect of low-intensity blood flow restriction training on non-flow-restricted trunk musculature has not been explored. Our previous study indicated that neuromuscular activity during low-intensity blood flow restriction bench press exercise increases not only in the blood flow restricted arm muscle (triceps brachii) but also in non-restricted chest muscle (pectoralis major) compared with same exercise without blood flow restriction (12).

Method

A quasi-experimental methods that for this the effect of the independent variable (submaximal exercise with blood flow restriction) in the experimental group on the dependent variable (maximum strength and arm size) was measured with pre-test and post-test. The sample of the study, 24 students were Meshgin shahr city school physical education that randomly selected and randomly divided into 4 groups of 6 student where Group 1 Exercises 20% of one repetition maximum per person with restricted blood flow, group 2 with 20% of one repetition maximum any individual, group 3 with 70% of one repetition maximum for each student, group 4 without any resistance training for 3 weeks and 5 days a week and each session 3 repeat 10, In the biceps with dumbbells and only trained with the right arm. 48 hours ago maximal strength and size right arm, height, weight, age as one repetition maximum test was measured as before.

Table 1 Separation of categories

After three weeks of training were taken again after the test . According to the normal distribution (Kolmogorov-Smirnov test) were used for the analysis of parametric tests and to changes within the group and between groups and between pre- and post-test by repeated measures was used for the condition existed sphericity and a significant degree of pre and post-test groups, in one group (P = 0.145), two group (P = 0.811), three group (P = 0.061) and four group (0.363) were that there was no significant impact. Statistically significant difference was set at $p \leq 0.05$.

3.Results and Discussion

One of the most important concerns of athletes increase muscle mass and non-athletes and those looking for a suitable organ is the ACSM is very useful recommendations that the intensity of 65% to 70% of one repetition maximum pressure to increase muscle mass is at least as well as many studies have shown that high intensity 65% of one repetition maximum increases muscle size. So can you see by limiting blood and very low-intensity exercise the same results can be achieved than 70% of maximal strength training achieved? Practice with 20% of one repetition maximum by limiting blood flow to the muscles of the arm with a tourniquet When Hyprtrfy no significant effect on motor performance. The findings show that the restriction of blood flow with submaximal exercise and high intensity workouts and ACSM recommend that a minimum intensity to increase to 65 to 70% of one repetition maximum in three weeks would not be. But training with the nearest group to 20% of one repetition maximum was at 70% of one repetition maximum. Perhaps if we continue the exercises

for a longer time than the significance level is significant. Although the training was not significantly limit blood flow levels (p = 0.145) but this method can be used in the course of the training is to increase muscle mass.

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