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Research Article

Comparison Effects of Three Burden Methods Using Maximum Burdens in Increasing the Maximum Strength and Muscle Hypertrophy Non-Athlete Men

Mohammadbagher Forghani Ozrudi*

Young Researchers and Elite Club, Islamic Azad University, Iran

***Corresponding author:** Mohammadbagher Forghani Ozrudi, Young Researchers and Elite Club, Qaemshahr Branch, Islamic Azad University, Qaemshahr, Iran

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Abstract

The purpose of this investigation is comparing the effects of three admitting models using maximum admits in increasing the maximum strength and hypertrophy of unexercised men in the muscles of arm forth. Statistical sample of this investigation are 45 non-athlete male students of Mazandaran University of Science and Technology of the Department of Public Physical Education. Maximum strength and the mass of muscles in the sample was measured using the maximum repeating test in moving arm form by Haler or measured using the arm, before and after the match. Then, the samples were grouped in 3 empirical groups (15 per groups). They exercised for 8 weeks, 3 sessions per week, and 75 minutes per session. The data were analyzed by variance and (LSD) by using SPSS20 software ($p \leq 0.05$). There was no meaningful difference among 3 models; normally pyramidal, Counter-pyramidal, and Flat-pyramidal in increasing the shape of arm forth. Also, there was a meaningful difference between two methods, pyramids and flat-pyramid after the test. There was no meaningful difference among the methods between counter-pyramidal and flat-pyramidal. So, we can suggest that when the purpose is increasing the muscle, we can use every method, but if the purpose is increasing the strength, it is prefer to use flat pyramidal method.

Keywords: Maximum admit; Maximum strength; Hypertrophy; Admitting model; Non-athlete male

Introduction

Power is affecting sports performance assist the body in maintaining healthy skeletal-muscle, preventing disease and abnormalities of the skeletal-muscle and reduced muscle injury, arthritis patients is essential. Several variable effectiveness of a resistance training exercise to achieve optimum results in increased power set [1,2]. Generally, different methods, in strength exercises, have two important purposes: increasing the maximum strength and increasing the muscle size (hypertrophy). The exercises with high intensity (80-90% of a maximum repeat), less repeating (2 to 8 repeats), and long intervals (2 to 5 minutes), is done for increasing the maximum strength and mid-high intensity exercises (70 to 80 percent of a maximum repeat), more repeating number (8 to 15) and shorter intervals (30 seconds to 2 minutes), to increase the size or hypertrophy of muscles [3,4]. It is noted that we cannot separate different protocols in strength exercises, but we can say that every purpose is used as a main purpose in every program, so the results of these exercises for increasing strength and hypertrophy different with. The recommendations of American Collage (ACSM), National strength committee (NSCA) and other researchers, but (ACSM) introduced maximum admits (80-100% of IRM) as intensity range of exercise for increasing strength and maximum admits (70-100% of IRM) as intensity range of exercise for increasing hypertrophy [4]. Most studies which recommend using maximal admits for increasing strength [4-6], believe that using maximal admit, we can exercise units [7]. Despite, [8] suggested that matching the muscular strength using maximal admittance (80-85% of IRM) is very important. This is important because neurotic homogenization in plays an important role in improving muscular strength and it is prior to hypertrophy for an identified period although movement activity increases in the last repetition, when the man is tired [9]. Several studies which recommended resistance exercise for increasing muscular strength and also physical collage in America and national committee, have recommended using maximal burden as an optimal method for increasing the maximal strength [4,6,10,11]. As it mentioned above, our purpose is comparing 3 different methods of resistance exercise on the strength and hypertrophy of muscles in non-athlete men.

Materials and Methods

This study is semi-empirical and it is performed as a field study. 45 male are chosen randomly, who were non-athlete male students

of Mazandaran University of Science and Technology of the Department of Public Physical Education, but they did not exercise by halter. They were known by the correct techniques in haltering after measuring their weight and their height. Before this period, all of them attended in resistance exercises with mid-intensity (40-60% of 1RM) for 8 weeks (2 sessions per week) with 3 minutes intervals, to consider their physical, matches and preparation in maximal burdens [12]. In this period, we used the movements for supporting the main parts of body for movement and also central part of body. Then, their maximal strength was measured by maximal repetition test (1RM), by halter. Also, it is measured the size of arm by a meter. Then, the circumstance of arm was calculated by Ferrisencho (1974) method. The circumstance of muscles of arm (mm)=[circumstance of arm (mm)-the thickness of skin wrinkle on the arm (mm)]. Also, the skin wrinkle on the arm was measured by Lange Calibration. Then, the samples were grouped into 3 exercise groups, based on their maximal strength; first group (15 people, pyramidal), second group (15 people, contrary pyramidal), third group (15 people, flat pyramidal). In this period, the scale of was the same for all three groups by this formula: (sets* Repetitions* % RM) [13]. Then, they exercised for 8 weeks, 3 sessions per week, and 75 minutes per session. The group pyramidal performed in 5 times with the intensity of (80, 85.5, 90.3, 95.2, 100.1%), the group contrary pyramidal in 5 times with the intensity of (100.1, 95.2, 90.3, 85.5, 80.7%), and the group flat pyramidal in 6 times with the intensity (80.5, 4*90.2, 85.5%) [14]. Also the interval duration for each group among times was 3 minutes and among movements was 2 minutes. After 8 weeks, the program of main exercise (maximal strength) and the muscular size of them were measured. After getting data, we used descriptive statistics to determine the central dispersal index. After extracting the data, descriptive statistics for the central scattering parameters (mean and standard deviation) was used. Part of the inferential tests, ANOVA and post-hoc test (LSD) to determine differences between groups using the software SPSS20 in significance level ($p<0.05$) were used.

Results

Table 1 shows the main and SD of maximal strength (kg) and the muscular size (mm) of the samples before and after the test.

Table 1: The main and SD of maximal strength (kg) and the muscular size (mm) of the samples before and after the test.

Variable Group	Pyramidal		Contrary-Pyramidal		Flat- Pyramidal	
	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest
Maximal strength	17.93±4.16	23.7±4.82	18.13±4.52	25.53±4.15	17.53±5.82	28.63±5.48
Muscular size	212.41±15.03	214.61±15.2	217±35.01	220.07±34.69	218.2±28.39	224.27±27.69

Table 2: The results of one way variance to compare maximal strength, and the muscular size (mm) in pre-test and post test.

Variations Source		Total of Squares	DF	Total Main	F	Meaning Level
Pretest arm forth (1RM)	Inter group	2.8	2	1.4	0.057	0.945
	Intra group	1029.9	42	24.521		
	Total	1032.7	44			
Pretest arm forth (1RM)	Inter group	186.544	2	93.272	3.962	0.027
	Intra group	988.867	42	23.544		
	Total	1175.411	44			
Muscular size Pretest Arm forth	Inter group	279.632	2	139.816	0.186	0.831
	Intra group	31616.67	42	752.778		
	Total	31896.3	44			
Muscular size posttest arm forth	Inter group	704.424	2	352.212	0.48	0.622
	Intra group	30823.69	42	733.897		
	Total	31528.12	44			

Table 3: The result of LSD to determine the place and the difference of maximal strength in post test (kg).

Group I	Group J	Average Variation (I_J)	SD	Meaningful Level
Pyramidal	Contrary-pyramidal	-1.83	1.77	0.307
	Flat-pyramidal	-4.93	1.77	0.008
Contrary-pyramidal	Flat-pyramidal	-3.1	1.77	0.087

As it shows in Table 2, according to the statistics and the least meaningful level of table, there is a meaningful difference between post test marks in maximal strength (kg) ($F=3.962$, $p<0.027$) with $p<0.05$, but the evidence and the least meaningful level of the table did not show any meaningful difference between the marks in post test in muscular size (mm) ($F=0.480$, $p<0.622$) with $p\leq0.05$.

To understand the difference of maximal strength among groups in post test (kg) of arm forth, we used LSD according to the Table 3, there is a meaningful difference between 2 methods, pyramidal and flat-pyramidal methods ($p<0.008$).This difference

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is in the maximal strength in the post test of arm forth movement ($p<0.05$), but there is no meaningful difference between pyramidal method with contrary pyramidal ($p<0.307$) and contrary pyramidal with flat- pyramidal ($p<0.087$).

Discussion and Conclusion

The findings of the first study showed that there is no meaningful difference among 3 pyramidal, contrary-pyramidal and flat-pyramidal models in increase the muscular size of arm forth. This fining is according to the findings of Chesnut & Decherti (1999), Wernbom et al. [15]. Although the 3 groups used difference methods, all of them exercised the same. Of course comparing the variation average in muscular size of arm forth (mm) shows that the flat pyramidal group (6.70) increase more than 2 other pyramidal (2.2) and contrary pyramidal (3.70) groups. One probable reason is the more times of flat pyramidal group (6 times) comparing to the 2 other groups (5 times). According to the second finding of study, there is a meaningful difference in maximal strength of arm forth in post test in the pyramidal and flat pyramidal group. This result is according to the Bompa [12] result. The best model to obtain maximal strength is the flat pyramidal model. The physiologic of flat pyramidal model is good that muscular-nervous matches are made by fixed burden without creating disorders in body. One reason for this is choosing the more numbers of flat-pyramidal group (6 times), comparing to the pyramidal group (5 times). The fans of using maximal burden believe that the model of special movements (movement with high move) is not obtained by lifting light to mid-weighs and we should use maximal burden [16]. Also there is no meaningful difference among pyramidal, contrary-pyramidal and flat-pyramidal methods. One reason for deciding one of these methods, pyramidal, contrary-pyramidal is using the similar burden. About the effects of these two methods, last studies reported paradoxical results. One important reason for this is because of individual difference, stimulus, their feeding and also the differences in the intensity, size and the kind of exercise and finally the muscular groups in the exercise. So, according to the finding we can say that when the purpose of exercise is the increase in muscular size, we can use all these three models, but when the purpose is the increase in maximal strength, using flat pyramidal model is better than pyramidal one, and also we can use both pyramidal and contrary pyramidal method, but we should consider that using maximal burden with every method needs that the person is prepared in physical education, so it is suggested that the beginner use the light to mid-weighs.

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