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The Effect of Low versus High Load Resistance Training on Selected Health Related Physical Fitness on Weight Lifters

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Abstract:

This study was to examine the effects of low versus high load resistance training on selected health related physical fitness on weight lifters. Body composition cardio vascular endurance and muscular strength testing measure were recorded in meal weight lifters (N=22, age 20-23 years before and after 8 week low versus high load resistance training. Body composition assessment include 'BMI' test and 3 site skin folds test for body fat percentage and cardio vascular endurance test 12minute run test and step test, for strength test 1RM test and squat test for upper body strength and lower body strength respectively. A comparison was made using pared sample 'T' test. Significant improvement was made skin fold calipers and BMI test ($p<0.05$), 1RM test($p<0.05$), squattest($p<0.05$) and cupper test ($p<0.05$),step test ($p<0.05$). Generally based on mean value the respondent 8 weeklow versus high load resistance training on some selected health related physical fitness of weight lifters there were little difference between high load and low load resistance training on some selected health related physical fitness and HLR training have a greater significant improvement on body composition and strength performance. But LLR training has a great significant improvement on cardiovascular fitness.

Key words:Physical fitness, high load, low load,resistance training

1. INTRODUTION

1.1. Back ground of the Study

Resistance training has been well accepted as the primary mode of exercise to enhance muscular fitness. The American College of Sports Medicine (ACSM) recommends performing 8–12 repetitions to muscular fatigue for general health ([1]), whereas the National Strength and Conditioning Association (NSCA) recommends performing repetitions of 10–12 with 65–85% of onerepetition maximum (1RM) to maximize hypertrophy and repetitions of 1–5 with greater than 85% of the 1RM to maximize strength development ([2]).

Resistance training (RT) program variables is necessary to maximize physical fitness (3), (4). The intensity of load used, often delineated by repetition ranges within various loading zones, is widely considered amongst the most important of these variables. Training with heavy loads at or near an individual's 1 repetition maximum (RM) necessarily results in fewer repetitions completed when compared to training with lighter loads at lower intensities. Consistent with the concept of a strength-cardiovascular endurance continuum, the following loading strategies have been proposed to maximize physical fitness adaptations: a low-repetition loading zone (1-5RM) maximizes muscular fitness; and a high-repetition loading zone (15+RM) maximizes cardiovascular fitness (5).The volume of RT also has been shown to play a role in physical fitness improvement. There is a positive relationship, whereby greater RT volumes are associated with greater increases physical fitness (6) and muscle hypertrophy (7). Volume load (VL), defined as the product of the total number of repetitions performed for an exercise and the corresponding amount of load, is affected by the loading zone employed; progressively higher VLs are seen as loading proceeds to the right of the strength-endurance continuum (8). Thus, a substantially greater number of sets are required to equate volume load between lower and higher loading zones.

1.2. Method

22 men weight lifters (mean ±SD; age 21.3±1.05 years, height 1.64±.08 meter. All participants were informed of the potential risks and benefits and provided written

informed consent and parental consent prior to participation. During the first week of the study, participants performed the baseline testing Protocol, followed by an 8-week training program the final week consisted of the post-testing protocol.

Procedures First the researcher obtained the ethical clearance from concerning body and meets the participants of the study, during the familiarization session; participants were informed all procedures and familiarized with all performance measured. Before the participants were started the training program the participant were got awareness not exercise for at least 24 hours prior to each trial. Next to this the participants were performed pretest process at base line week 0 and muscular strength variables, cardiovascular endurance and body commotion were measured. Then the participants were grouped randomly into control and experimental group. After that both groups were going to start resistance training.

Testing was conducted at the same time of day for both pre- and post-testing sessions. Anthropometric data such as age, height, weight, body mass index (BMI), and 3-site skin fold assessment, cardiovascular endurance and strength performance was recorded first.

Body fat percentage assessment

The athletes' height and weight were taken at the start of the testing sessions using a studio meter followed by skin fold measurement using Skin fold Calipers performed all pre- and posttest-skin fold assessments to ensure validity. All measurements were made on the right side of the body, with the subjects in the standing position. A 3-site method for males was used chest, calf and thigh) following standard ACSM skin fold testing procedures.

Performance Testing Procedures

Following anthropometric measurements, the athletes performed a 5-minute general warm-up consisting of dynamic movements and sub maximal running intervals. The athletes were given a 5-10 minute rest period between each performance test, and were encouraged to drink water as needed during the testing sessions.

Table 1 testing and training schedule

Week 1	Week 2-9	Week10
Pre test	intervention program	Post test

Table 2 samplelow load resistance training for the first month

	Monday	Wednesday	Friday	Sunday
Week 1 (40%)	Shoulder pres3x15 Squat 3x25	Dead lifts (3 x 14) Pushup 3x16	sit up 3x25 Dead lifts (3x 16)	Shoulder pres3x15 Squat 3x25
Week3 (45%)	Shoulder pres3x12	Dead lifts (3 x 12 rep	sit up 3x20	Shoulder pres3x12
	Push up3x14	Pull-ups (18-20 reps	Squat 3x20	Pusup3x14
Week3 (50%)	Shoulder pres3x10	Dead lifts(3x 10)	sit up 3x15	Shoulder pres3x10
	Pusup3x12	Pull-ups (15-17 reps	Squat 3x15	Pusup3x12
Week4 (55%)	Shoulder pres3x6	Dead lifts (3 x 6 rep	sit up 3x12	Shoulder pres3x6
	Pusup3x10	Pull-ups (13-15 reps	Squat 3x13	Pusup3x10

Training load was increase progressively in each week based on individual ability trainees were increased to progress by 2-4 Ibs weekly each lift. Lifts that were performed more than 2 times per a week if the athletes unable to perform properly at the chosen the load were decreased until the lift could properly performed the training volume remained the same in 8 week period.

Table 3 samplehigh load resistance training for the first month

	Monday	Wednesday	Friday	Sunday
Week 1 (70%)	Shoulder pres3x8 Squat 3x20	Dead lifts (3 x 8) Pushup 3x8	sit up 3x15 Dead lifts (3 x 8)	Shoulder pres3x8Squ at 3x20
Week 2 (75%)	Shoulder pres3x6	Dead lifts (3 x 8 rep	sit up 3x15	Shoulder pres3x6
	Push up3x7	Pull-ups (10-15 reps	Squat 3x15	Pusup3x7
Week3 (80%)	Shoulder pres3x6	*Dead lifts(3x 6)*	sit up 3x10	Shoulder pres3x6
	Pusup3x6	Pull-ups (10-15 reps	Squat 3x10	Pusup3x6
Week4 (85%)	Shoulder pres3x5	Dead lifts (3 x 5 rep	sit up 3x8	Shoulder pres3x5
	Pusup3x5	Pull-ups (10-12 reps	Squat 3x8	Pusup3x5

CHAPTER FOUR

4. Result and Discussion

Table 1mean values of pretest and post test result of low load resistance training

No	Variables	Types of test			mean dif
			Pre test	Post test	
1	Body composition	body mass index	21.2±0.47	20.9±0.47	-0.3
		Percent of body fat (%BF)	25.6±0.53	25.1±0.4	-0.5
2	Strength	1RM bench press test	0.9	1	0.1
		Squat test	74.8±1.34	77.3±1.25	2.5
3	Cardiovascular fitness	step test	111.20±5.2	90.80±1.6	20.4
		Cupper test	2061.4.± 9	416.6±6	55.2

As we observed in the above table the mean values in low load resistance training group of body mass index for bodycomposition assessment was 21.2±0.47 to 20.9±0.47 and in Percent of body fat was 25.6±0.53 to25.1±0.4 from pretest to posttest respectivelyand in strength performance test for upper bodystrength 1RM bench press test was 0.9±0.2 to 1±0.3 and in Squat test for lower body strength was 74.8±1.34 to 77.3±1.25 cupper test 2061.4.± 93.0 to 2416.6±62.3 and from pre to post test andthere were a significance change from pretest to post test on the improvement of body composition, strength performance and cardio vascular fitness in an LLR training group on 8 week high and low load resistance training group at p<0.05

Table 2pretest and post test result of high load resistance training

No	Variables		Types of test		Mean dif
			Pre test	Post test	
1	Body composition	Body mass index	21.6±0.54	21.28±0.43	-0.32
		percent of body fat (%BF)	25.8±0.45	25.2±0.36	-0.6
2	Strength	1RM bench press test	0.9 ±0.4	1.4±0.3	0.5
		Squat test	76.4±1.34	81.6±3.19	.2
3	Cardiovascular fitness	step test	111.20±5.2	90.20±5.16	21
		cupper test	2044.6±64	2293.8±27	249

As we observed in the above table the mean values in high load resistance training group of body mass index for body composition assessment was 21.6±0.54 to 21.28±0.43 and in Percent of body fat was 25.8±0.45 to 25.2±0.36 from pretest to posttest respectively and in strength performance test for upper body stren1RM bench press test was0.9 ±0.4 to 1±0.3and in Squat test for lower body strength was 76.4±1.34 to 81.6±3.19 and also in cardio vascular fitness test step test was 111.20±5.2 to 90.20±5.16 and also in cupper test was 2044.6±64 to 2293.8±27 from pre to post test andthere were a significance change from pretest to post test on the improvement of body composition, strength performance and cardio vascular fitness in an LLR training group on 8 week high and low load resistance training group at p<0.05.

Table 3 mean differenceof pretest to post test of both high load and low load resistance training

No	Variables	Types of test	Mean difference for (LLR)	Mean difference for (HLR)
1	Body composition	Body mass index	-0.3	-0.32
		Percent of body fat (%BF)	-0.5	-0.6
2	Strength	1RM bench press test	0.1	0.5
		Squat test	2	5.2
3	Cardiovascular fitness	Step test	20.4	21
		cupper test	355.2	249

As we observe and compared in the above table there was some significant difference in high load resistance training than low load resistance training on body composition test it means that mean difference of LLR training of BMI= -0.3 and -0.32 in HLR training, body fat percentage in LLR training was -0.5 and in HLR training -0.6 in strength performance 1RM bench press test for upper body strength in LLR training was 0.1 and in HLR was 0.5 and also squat test for lower body strength in LLR training was 2 and 5.2 respectively. In case of cardiovascular fitness test step test in LLR training was -20.4 and in HLR training -21 but in cupper test 355.2 and 249 meter in LLR training and HLR training respectively. Generally from the above table there

were little difference between high load and low load resistance training on some selected health related physical fitness and HLR training have a greater significant improvement on body composition and strength performance. But LLR training has a great significant improvement on cardiovascular fitness.

Conclusion

The finding of this study showed that there were little difference between high load and low load resistance training on some selected health related physical fitness and HLR training have a greater significant improvement on body composition and strength performance. But LLR training has a great significant improvement on cardiovascular fitness. Based on the above finding in all variables both group alternative hypotheses accepted and null hypothesis rejected.

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