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ORIGINAL ARTICLE

ANALYSIS OF RESISTANCE TRAINING ON STRENGTH AND POWER PARAMETERS

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Abstract:

The purpose of the present research was to find out the analysis of resistance training on strength and power parameters. To achieve this purpose, thirty men students were selected randomly as subjects. They were assigned randomly into three experimental groups. Group I underwent low intensity resistance training and group II underwent medium intensity resistance training group of fifteen each. The two groups were tested on selected dependent variable such as leg strength and back strength and explosive power before and after the treatment. The data pertaining to the variables in this study were examined by analysis of covariance (ANCOVA). Two experimental groups' namely low and medium intensity resistance training groups have achieved significant improvement on strength and power parameters. In view of improvement in strength and power parameters was concerned, the medium intensity resistance training was best training when compared to low intensity resistance training.

KEY WORDS:

Resistance Training, Strength and Power.

INTRODUCTION

The best and fastest way to learn a sport is to watch and imitate a champion. Tactics, fitness, stroke ability, adaptability, experience, and sportsmanship are all necessary for winning. By nature, human beings are competitive and ambitious for the excellence in all athletic performance. Not only every man but also every nation wants to show their supremacy by challenging other nations. Thus, this challenge stimulates, inspires and motivates all the nations to sweat and strive to run faster, jump higher, throw farther and exhibit greater strength, endurance and skills. This can only be possible through scientific, systematic and planned sports training as well as channelling them into appropriate games and sports by finding out their potentialities. At the time of competition, the players realize the importance of these qualities, especially the physiological qualities and the training values when under pressurized situations. Successful athletes understand athletic programme and the real reason behind their efforts.

Improved performance is undoubtedly the most common idea associated with resistance training. A complete per-body training program improves the body in all areas of importance: strength, power, flexibility, and endurance. Performance can be enhanced in a specific area or across the board, depending on the goals. An-all encompassing program will increase the strength of the entire body, improve the power output for performing specific movements, increase the endurance capacity, and allow for greater flexibility or range of motion in all the body joints. Resistance training is useful to develop strength. It focuses on selecting particular exercises, performing specified repetitions for each exercise, and using specific amounts of weight for each lift. Resistance training over time causes a general increase in the number, diameter, and density of collagen fibres. Elastic levels increase, proportionate to the gain in muscle strength, to maintain joint integrity.

Based on the personalized goals, one will use heavy, medium or light training days – predicated on one's tolerance. One will mix and match amounts of weight with the number of repetitions based on one's

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practice, competition, and job and leisure activities. One will avoid monotonous over training (neural stagnation) (Cochran and Tom, 2000). Strength training for power production is composed of (a) sport exercises with added resistance and (b) assistance exercises the latter are directed toward the development of (a) maximal strength, (b) rate of force development, (C) dynamic strength (the muscular force generated at a high velocity of movement) and (d) force produced in stretch-shortening (reversible) muscle action the proportion of exercises from these groups should be determined individually for each athlete and should change when the athlete's status changes (Zatsiorsky,1995). Top performance in most disciplines in athletics requires the athlete to optimize his/her strength capacity. The same of course, is true in the sport of weightlifting. There, the relatively closed movements and controllable environment that characterized the sport facilitate the study of both biomechanics and training principles and thus the science of the sport is quite advanced. An Olympic medallist in weightlifting, who now coaches, seeks to make the connection between the contemporary forms of training in weightlifting and athletics, particularly in the area of general strength development (Koch, 2005).

METHODOLOGY

The investigator selected 30 male students randomly from Department of Physical Education, Annamalai University, Chidambaram, Tamilnadu, India. Selected subjects were divided into two experimental groups. The age of the subjects were ranged from 19 to 25 years. Leg and back strength was measured by using leg dynamometer and explosive power was measured by conducting the vertical jump test. The collected data analyzed by analysis of covariance (ANCOVA).

TRAINING PROGRAMME

During the training period, the experimental groups underwent their respective training programmes for three days per week on alternate days for twelve weeks in addition to their regular programme of the course of study as per their curriculum. Group I underwent low intensity resistance (LITG) training (45% to 55% of 1 RM) and group II underwent medium intensity (MITG) training (55% to 70% of 1 RM) programme (i.e. Knee extension, leg curl, bench press, military press, half squat, leg press and dead lift). Before the commencement of the experimentation and at the middle of the training period (after fifth week), the investigator recorded the 1RM tests for training subjects. The duration of training session was one day with 50 minutes approximately, for the excluding warming up and cool down.

ANALYSIS OF DATA

The pretest and posttest random group design was employed as experimental design for the study. Prior to and after the training Programmed the subjects were tested and Collected data on leg strength, back strength and explosive power. The Collected data were analyzed statistically by analysis of covariance (ANCOVA). The level of significance was fixed at 0.05 level of confidence. Analysis of covariance on selected variables of LITG and MITG have been given in table I.

RESULTS

Table – I
ANALYSIS OF COVARIANCE ON STRENGTH AND POWER PARAMETERS OF LOW INTENSITY AND MEDIUM INTENSITY TRAINING GROUPS

Parameters	LITG	MITG	Source of variance	Sum of squares	df	Mean squares	'F' ratio
Leg Strength	93.65	101.61	Between	464.67	1	464.67	26.34*
			Within	476.29	27	17.64	
Back Strength	88.29	95.58	Between	389.516		389.516	14.64*
			Within	718.161		26.599	
Explosive Power	45.57	49.29	Between	103.677	1	103.677	8.39*
			Within	333.714	27	12.359	

*Significant at 0.05 level of confidence *P<0.05
(The table value required for significance at 0.05 level with df 1 and 27 is 4.21)

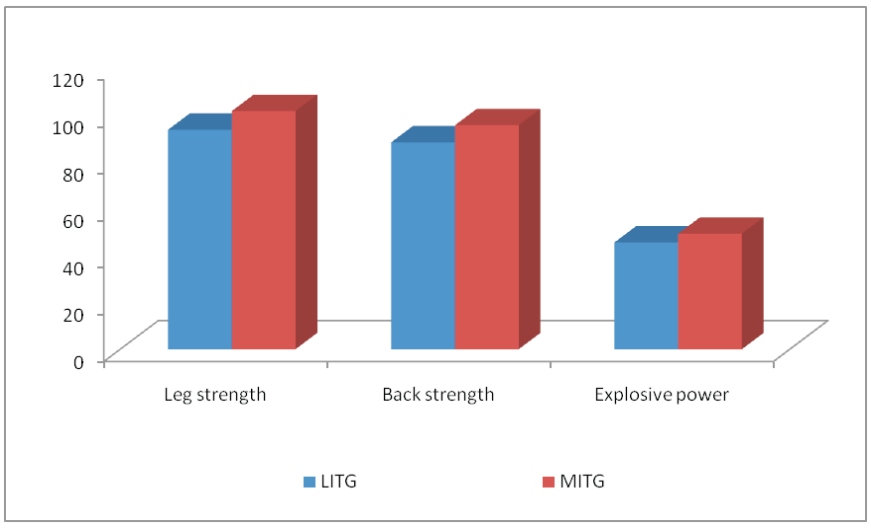
The adjusted post-test means on leg strength of low intensity training and medium intensity training groups are 93.65 and 101.62 respectively. The obtained 'F' ratio value of 26.34 on leg strength is greater than the table value of 4.21 required for significance at 0.05 level of confidence with degrees of freedom 1 and 27.

The adjusted post-test means on back strength of low intensity training and medium intensity training groups are 88.29 and 95.58 respectively. The obtained 'F' ratio value of 14.64 on back strength is greater than the table value of 4.21 required for significance at 0.05 level of confidence with degrees of freedom 1 and 27.

The adjusted post-test means on explosive power of low intensity training and medium intensity training groups are 45.57 and 49.29 respectively. The obtained 'F' ratio value of 8.39 on explosive power is greater than the table value of 4.21 required for significance at 0.05 level of confidence with degrees of freedom 1 and 27.

The results of the study showed that there were significant improvements in strength and power parameters between the pre and post test of the experimental periods. The result of the study implied that medium intensity resistance training group (MITG) has got more improvement of strength and power parameters when compared to LITG.

Figure – I
3-D COLUMN DIAGRAM SHOWS THE ADJUSTED POST TEST MEAN VALUES ON STRENGTH AND POWER PARAMETERS OF LOW INTENSITY AND MEDIUM INTENSITY TRAINING GROUPS



DISCUSSIONS

The results of the study may be depends upon the following points. Different load assignments result in different outcomes. High intensities (above 80% of IRM) produce more strength and power gains than do lower intensities (below 80% of IRM), which tend to produce more hypertrophy and endurance (local muscular) gains (Baechle, 1994). Heavy – resistance strength training ultimately produces a greater maximum force; the greater force production comes at a cost in time of application. Rate of Force Development (RFD) is of prime importance in the efficient conversion of horizontal kinetic energy to vertical impulse. With allowances for the specific nature of individual jumps there is still much commonality (Kerin, 2002).

CONCLUSIONS

From the analysis of the data, the following conclusions were drawn.
Due to the influence of low and medium intensity resistance training improve the leg strength and back strength.
After twelve weeks of low and medium intensity resistance training improve the leg strength, back strength and explosive power
Future research may also benefit from long term resistance practice studies. The current research looks only strength and power parameters changes in acute time frames.
The results of the study may be recommended to the coaches and physical educators to adopt these findings to improve the strength and power parameters.

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