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Effect of Resistance Training with Whey Protein Isolates and Whey Protein Concentrate Supplementation on Muscular Power and Muscular Strength among Sub Junior National Weightlifter

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Abstract

The purpose of the study was to find out the effect of resistance training with Whey Protein Isolates and Whey Protein Concentrate Supplementation on Muscular power and Muscular strength among Sub Junior National Weightlifter. For this purpose, thirty weight lifters were selected at random from the Army sports institute, Pune. Their age ranged between 12 and 16 years. The selected thirty weight lifters were randomly assigned into three groups namely, resistance training with whey protein isolates supplement group (RTWPIG), resistance training with whey protein concentrate group (RTWPCG) and placebo group (PG) each consisting of ten subjects. The subjects were given resistance training with whey protein supplementation for a period of twelve weeks. The subjects were tested Muscular power and Muscular strength through using medicine ball throw and 1RM. After the experimental period, the collected data was analysed by using analysis of covariance. The level of significance was fixed at 0.05 level. The results showed that the twelve weeks of resistance training with varied nutritional supplementation had a significant improvement on the Muscular power and Muscular strength. Resistance training has been shown to improve not only the force production of a muscle, but also muscular power and strength. In addition to intense training, a proper nutrition program is also responsible for maximizing the performance of strength and power athletes.

Keywords: Resistance Training, Whey Protein, Muscular power, Muscular strength.

Introduction

Exercise training of particular kinds clearly has a dramatic impact on muscle morphology and function compared with the effects of weight lifting and distance running on fiber type diameters and proportions or mitochondrial density. It is no surprise that different modes of training, aimed at increasing the performance of particular kinds of muscular activity (or, in bodybuilding, simply muscle mass) have differential effects on muscle protein metabolism. Resistance exercise training is well known to result in hypertrophy of the trained muscles (Luthi, et al 1986).

Proper nutrition is an important consideration for athletes who seek to maximize performance. No diet directly increases strength, power, or aerobic endurance, but an adequate diet allows athletes to train and compete to the best of their ability. The physiological needs of competitive athletes often require diets that are quite different from a sedentary individual's diet. The ideal diet for an athlete depends upon many different factors including age, body size, gender, genetics, and environmental training conditions, as well as training duration, frequency, and intensity. Therefore, requirements vary greatly between, as well as within, different athletic groups and the best diet for any given athlete is one that is individualized for that specific athlete.

Different sports place unique metabolic requirements on bioenergetics systems, and these differences alter the nutritional requirements among athletes involved in various types of strength and power sports. Particularly important to strength and power athletes are increasing lean muscle mass that translates into functional sport-specific strength, increasing power and speed over short distances and increasing explosiveness. These goals typically drive athletes to seek various options in their training methodologies to maximize the training stimulus. In addition to intense training, a proper nutrition program is also responsible for maximizing the performance of strength and power athletes. More specifically, precise nutritional supplementation provides the impetus for maximizing lean muscle mass, power, speed, and explosiveness. Therefore, any nutritional program (including sports supplements) that enhances lean muscle mass, power,

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speed, and explosiveness, when combined with a proper training program, should translate into improvements in exercise and sport performance.

Protein supplementation and athletic performance have shown positive effects from proteins of various sources. However, only limited research is available on comparisons between various protein sources and changes in human performance. Hence, the aim of investigation is to find out the effect of resistance training with Whey Protein Isolates Supplement (WPI) and Whey Protein concentrate Supplement (WPC) on performance of Muscular power and Muscular strength of the weight lifters.

Methods and Materials

For this purpose, thirty weight lifters were selected at random from the Army sports institute, Pune. Their age ranged between 12 and 16 years. The selected thirty weight lifters were randomly assigned into three groups namely, resistance training with whey protein isolates supplement group (RTWPIG), resistance training with whey protein concentrate group (RTWPCG) and placebo group (PG) each consisting of ten subjects. The subjects were given resistance training with whey protein supplementation for a period of twelve weeks. The subjects were tested Muscular power and Muscular strength through using medicine ball throw and 1RM test. After the experimental period, the collected data was analysed by using analysis of covariance. The level of significance was fixed at 0.05 level.

Resistance Training Protocol

All subjects participated in a supervised, periodized resistance training session three days per week, per week for a total of twelve weeks. Prior to the workout, subjects performed a standardized series of stretching exercises. The participants then performed 3 sets of leg press, bench press, and military press, pull-ups, bent over rows, barbell curls and extensions. Immediately following the workout, subjects consumed 40 grams of Whey Protein Isolates Supplement (WPI) and Whey Protein concentrate Supplement (WPC) respectively. The program was designed to train all major muscle groups using mostly compound movements for the upper and lower body. The programmed, non-linear training split was divided into hypertrophy days consisting of 8–12 RM loads for 3 sets, with 60–120 seconds rest and strength days consisting of 2 to 5 RM loads for 3 sets for all exercises except the leg press and bench press which received 5 total sets. Weights were progressively increased by 5% when the prescribed repetitions could be completed. All training sessions were closely monitored by the researchers to ensure effort and intensity was maximal each training session.

Results on Muscular power and Muscular strength

The results presented in the table I shows that the pre and post test scores of resistance training with whey protein isolates supplement group (RTWPIG), resistance training with whey protein concentrate group (RTWPCG) and placebo group on Muscular power and Muscular strength. The obtained pre test F value of 0.82 and 1.81 respectively was lesser than the required table value of 3.35. The obtained post test F value of 3.54 and 6.91 respectively was greater than the required table value of 3.35. Hence, it was proved that there was significant improvement in Muscular power and Muscular strength among sub junior national weight lifters due to resistance training with whey protein supplementations.

Table I. Computation of Analysis of Covariance on Muscular power and Muscular strength (Scores in Kg)

VARIABLES	TEST	CTWPI GROUP	CTWPC GROUP	PLACEBO GROUP	SV	SS	df	MS	F
Muscular power	Pre Test	70.40	70.30	68.20	B	30.87	2	15.43	0.82
					W	508.10	27	18.82	
	Post Test	76.80	76.20	72.20	B	125.07	2	62.53	3.54*
					W	476.80	27	17.66	
	Adjusted	76.08	75.58	73.54	B	34.12	2	17.06	14.19*
					W	31.25	26	1.20	
	Mean Gain	6.40	5.90	4.00					
Muscular strength	Pre Test	93.20	92.30	92.20	B	6.07	2	3.03	1.81
					W	45.30	27	1.68	
	Post Test	105.30	103.40	101.50	B	72.20	2	36.10	6.91*
					W	141.00	27	5.22	

	Adjusted	105.09	103.49	101.62	B	54.53	2	27.26	**5.22***
					W	135.90	26	5.23	
	Mean Gain	12.10	11.10	9.30					

*Significant at 0.05 level of confidence for 2 and 27 (df) = 3.35, 2 and 26 (df) = 3.37

The statistical analysis on adjusted mean values using ANCOVA revealed that there was significant difference existed among resistance training with whey protein isolates supplement group (RTWPIG), resistance training with whey protein concentrate group (RTWPCG) and placebo group on Muscular power and Muscular strength since the obtained adjusted mean F value 14.19 and 5.22 was greater than the table value of 3.37 at 0.05 level. Since the F value was significant, the results were subjected to post hoc analysis using Scheffe's confidence interval test. The results were presented in Table II.

Table II. Scheffe's Confidence Interval Test Score on Muscular power and Muscular strength (Scores in Kg)

VARIABLE	PLACEBO GROUP	CTWPI GROUP	CTWPC GROUP	Mean Difference	CI
Muscular power	73.54	76.08		**2.54***	1.02
	73.54		75.58	**2.03***	
		76.08	75.58	0.51	
Muscular strength	101.62	105.09		**3.46***	2.12
	101.62		103.49	1.87	
		105.09	103.49	1.60	

***Significant**

The post hoc analysis of obtained ordered adjusted means proved that there was significant differences existed between resistance training with whey protein isolates supplement group (RTWPIG) and placebo group in Muscular power and Muscular strength. There was significant difference between resistance training with whey protein concentrate group (RTWPCG) and placebo group in Muscular power and there was no significant difference Muscular strength. There was no significant difference between treatment groups, namely resistance training with whey protein isolates supplement group (RTWPIG) and resistance training with whey protein concentrate group (RTWPCG). The pre test, post test and ordered adjusted means are presented through bar diagram for better understanding of the result of this study in figures.

Figure I. Bar Diagram on Adjusted Means of Muscular power

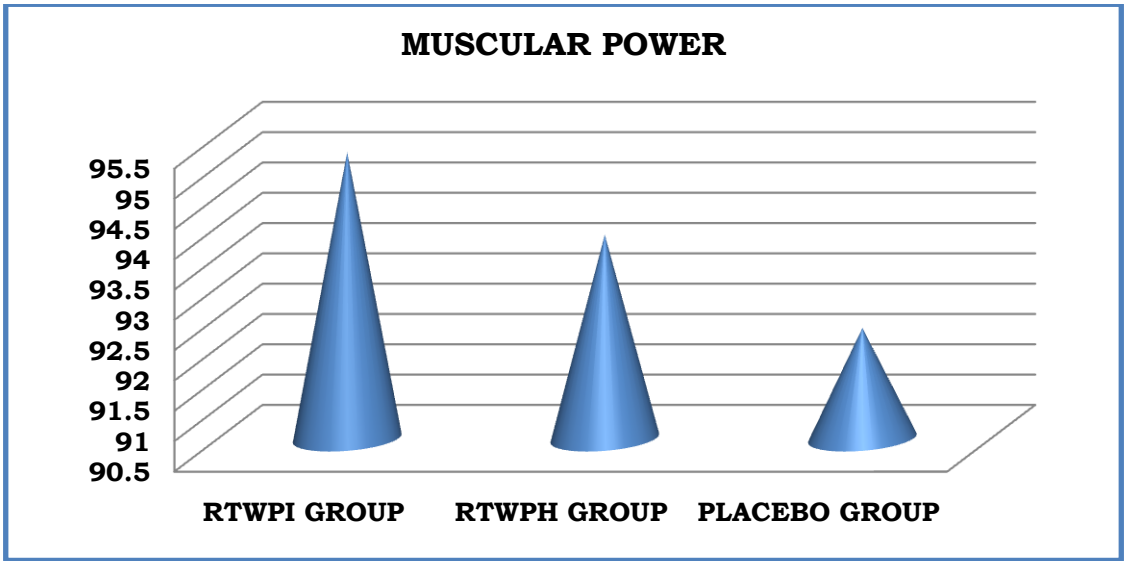
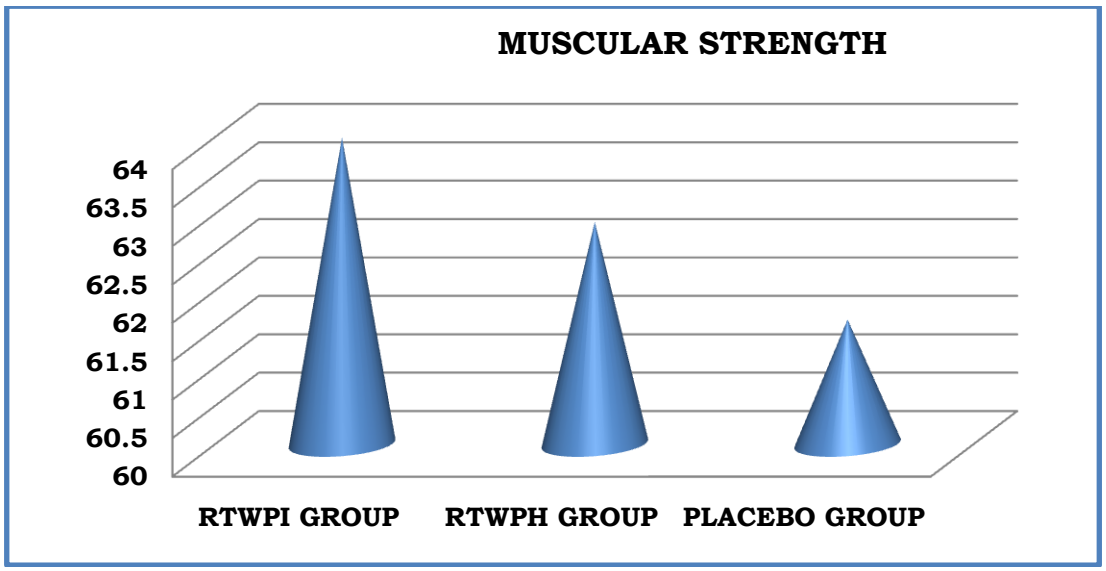


Figure II. Bar Diagram on Adjusted Means of Muscular strength



Discussion and Conclusion

Skeletal muscle is an integral body tissue playing key roles in strength, performance, physical function, and metabolic regulation. It is essential for athletes to ensure that they have optimal amounts of muscle mass to ensure peak performance in their given sport. A combination of resistance exercise and whey protein consumption, results in a synergistic stimulation of muscle protein synthesis.

The results proved that the both whey protein isolate and whey protein concentrate administration post resistance exercise improved indices of body composition and exercise performance of Muscular power and Muscular strength. However, there were no differences between the two groups.

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