

Effect of isotonic and isometric trainings on leg strength of male volleyball players

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■ ABSTRACT

The purpose of the study was to find out the effect of six weeks isotonic and isometric training on leg strength of male volleyball players. To achieve this purpose, 60 male volleyball players of Kottayam district were selected from the total strength of 150 at random as subjects for this study. They were randomly divided into three groups and each group consisted of twenty subjects. Group I under went isotonic training, group II under went isometric training, group III was the control group. Maximum strength (leg strength-Leg dynamometer) was measured as pre-test results and after six weeks training same was measured as post results. It was concluded that the isometric training produced significant increase in leg strength as compared to isotonic training.

■ **Key Words** : Leg strength, Isotonic training, Isometric training, Volleyball players

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Resistance training is a form of strength training in which effort is performed against a specific opposing force generated by resistance (*i.e.* resistance to being pushed, squeezed, stretched or bent). Exercise is isotonic if a body is moving against a force Edmonds (1984) and Edward O'Relly (1987). Exercises are isometric if a body part is holding still against the force. Resistance exercise is used to develop the strength and size of skeletal muscles. Properly performed, resistance training can provide significant functional benefits and improvement in overall health and well-being.

Statement of the problem:

Determining the effect of different methods of strength training on different strength related variables are useful research objectives and that have drawn the attention of the investigators. The present scientific study is an effort to explore and suggest the best scientific method for the development of leg strength. The investigation was conducted to explore the effect of isotonic and isometric training on leg strength among male volleyball players.

■ METHODOLOGY

Selection of variables:

The researchers had gone through the available literature and had discussions with various experts before selecting variables. The availability of technique for the purpose of analysis, feasibility, reliability of the procedure and the outcome were excessively taken care before finalizing the variables. After analyzing the various factors associated with the present study, criterion variable leg strength was selected.

Experimental variables:

The experimental variables used in the present study were isotonic strength training and isometric strength training.

Though many methods prevail to develop the strength, the role of progressive strength training is an undisputed one. A lot of researchers had been carried out on the effects of progressive strength training, but still the bone of condition is about the different strength and duration to get the maximum benefit. Experts differ in their views based on their studies;

most of the strength training studies have been carried out in foreign countries using the sophisticated equipments and devices available there. Hardly few explorations have been made in India, the area of effective strength training and its effects on strength and body composition of variables. In this context, the investigators made an attempt to analyze the effect of two different progressive strength trainings on two different group.

Collection of data:

The data in maximum strength were collected by administrating leg lift with dynamometer. Pre-test data were collected two days before the training programme and post-test data were collected two days after the training programme.

Statistical techniques:

The analysis of covariance (ANCOVA) was used. If the “F” ratio was found to be significant for adjusted post-test means, Scheffe's test was applied as a post-hoc test to determine which of the paired difference was significant. In all cases to test the significance, 0.05 level of confidence was utilized.

■ OBSERVATIONS AND DISCUSSION

The finding of the present study have been discussed in detail as under:

Maximum strength (leg strength):

The pre and post-test data on leg strength of the isotonic group, isometric group and control group were analyzed

statistically and results are shown in Table 1 as analysis of covariance for pre and post data on leg strength of isotonic, isometric and control group.

It is clear from Table 1 that the pre-test of leg strength for isotonic group was 52.45, isometric group was 52.24 and control group was 52.66. The obtained F ratio 0.69 was less than the required table value of 3.22 required for the significance, so, there was no significant difference among the three groups. The post-test of leg strength for isotonic group was 57.12, isometric group was 59.41 and control group as 52.58. The obtained F ratio 7.68 is higher than the required table value of 3.22 required for the significance, so, there was a significant difference among the three groups. The adjusted post-test of leg strength for isotonic group was 57.64, isometric group was 60.32 and control group was 52.62. The obtained F ratio 34.91 is higher than the required table value of 3.22 required for the significance, so, there was a significant difference among the three groups.

The result of this study showed that there was a significant difference between the three groups on leg strength. Further to determine which of the paired means had a significant difference, Scheffe's test was applied and the results are presented in Table 2.

The results of Table 2 showed that both isotonic group and isometric group improved the performance of leg strength due to the respective training programmes but there was no significant difference between the experimental groups. Salter (1995) also observed the effect of muscle strength of maximum isometric and isotonic concentrations at different repetition rates.

Table 1: Analysis of covariance for data on leg strength of isotonic, isometric and control group

	Isotonic group	Isometric group	Control group	Source of variance	Sum of squares	d.f.	Mean squares	“F” ratio
Pre-test								
Mean	52.45	52.24	52.66	Between	9.04	2	4.52	0.69
S.D.	2.78	2.63	2.54	Within	272.15	42	6.48	
Post-test								
Mean	57.12	59.41	52.58	Between	285.12	2	142.56	7.68*
S.D.	3.12	3.52	2.86	Within	779.52	42	18.56	
Adjusted post-test								
Mean	57.64	60.32	52.62	Between	315.62	2	157.81	34.91*
				Within	185.32	41	4.52	

Table 2: Scheffe's test for the difference between the three groups on leg strength

Variables	Adjusted post-test means			Mean difference	Confidence interval at .05
	Isotonic group	Isometric group	Control group		
Leg strength	57.64		52.62	5.02*	3.46
	57.64	60.32		2.68	3.46
		60.32	52.62	7.7*	3.46

Conclusions:

The isometric training produced significant increase in leg strength as compared to isotonic training.

The results on leg strength assessed through leg lift with dynamometer presented in Table 1, proved that there was a significant difference between post-test means and the adjusted means. Thus, comparing to control group, isotonic group and isometric group significantly improved the leg strength. Scheffe's post hoc analysis presented in Table 2 proved that isometric group was better than isotonic group in improving the leg strength.

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