



## EFFECT OF INTENSIVE RESISTANCE TRAINING ON SELECTED ANTHROPOMETRIC VARIABLES AMONG ATHLETES IN KERALA

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### Abstract

The purpose of study was to find out the effect of intensive resistance training on selected anthropometric variables among athletes in Kerala. The subjects were tested for four anthropometric variables namely Calf girth, Thigh girth, Biceps girth and Chest girth. An anthropometrical girth measurement has used to assess the anthropometric variables such as calf girth, thigh girth, biceps girth and chest girth of athletes. There were 20 male athletes from various colleges in Malappuram district participated in the study. To statistically examine the data related to selected variables descriptive statistics and paired t-test was performing using SPSS. The study was useful to know about the anthropometric girth measurements of athletes in Kerala. The study revealed that there is a significant difference in terms of Calf girth, Thigh girth, Biceps girth and Chest girth among athletes in Kerala.

**Keyword:** Calf girth, Thigh girth, Biceps girth, Chest girth, Male athletes, Colleges, Malappuram, Kerala

### Introduction

Maintaining a healthy body weight and level of body fitness is key to healthier and longer life. Overweight and underweight individuals with body fat levels falling at or near the extremes of the fat continuum are likely to have serious health problems that reduce life expectancy and threaten the quality of life. Individuals who are overweight or obese have a higher risk of developing cardiovascular, pulmonary, and metabolic diseases as well as osteoarthritis and certain types of cancer (U.S. Dept. of Health and Human Services 2000). Underweight individuals with low body fat levels tend to be malnourished and have a relatively high risk of fluid-electrolyte imbalances, renal and reproductive disorders, osteoporosis and osteopenia, and muscle wasting (Fohlin 1997; Mazess, Barden, and Ohlrich 1990).

Resistance Training involves the application of elastic or hydraulic resistance to muscle contraction rather than gravity. Weight training provides the majority of the resistance at the beginning, initiation joint angle of the movement, when the muscle must overcome the inertia of the weight's mass. After this point, the overall resistance alters depending on the angle of the joint. In comparison, hydraulic resistance provides a fixed amount of resistance throughout the range of motion, depending on the speed of the movement. Elastic resistance provides the greatest resistance at the end of the motion, when the elastic element is stretched to the greatest extent (Arnheim, 1985).

The term 'resistance training' is also referred to by many as strength training and involves the use of barbells, dumbbells, machines and other equipment for the purpose of improving fitness, appearance, and/or sports performance. Resistance training is an accepted training method for athletes in a variety of sports. With the proper exercise prescription, training goals such as increased muscle strength, muscle hypertrophy, improved body composition and improved sports performance may be achieved. Resistance training should be an important component of all fitness programs from more for strength and power athletes to more for individuals who exercise for the health benefits. Of course, athletes in sports requiring strength and power, such as weight lifting, bodybuilding and sprinting must emphasize resistance training. However many other athletes also benefit from strength training, especially those in sports requiring a high level of muscular endurance (Kumar, 2004).

In particular, resistance training improves the functional performance of the neuromuscular system - the system of muscles and nerve pathways that direct and control movement. Resistance training produces increased strength, superior movement performance and general fitness, including enhanced function of the respiratory, cardiac and



metabolic systems. Other improvements include an increase in muscle mass, strengthening of connective tissue and supportive tissue as well as improvements in posture and physique.

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 practice, competition, and job and leisure activities. One will avoid monotonous over training (neural stagnation) (Cochran and Tom House, 2000).

### Methodology

The purpose of study was to find out the effect of intensive resistance training on selected anthropometric variables among athletes in Kerala. The subjects were tested for four anthropometric variables namely Calf girth, Thigh girth, Biceps girth and Chest girth. To statistically examine the data related to selected variables descriptive statistics and paired t-test was performing using SPSS. The study was useful to know about the anthropometric girth measurements of athletes in Kerala. For the purpose of the study a total number of 20 male athletes were selected from various colleges in Malappuram district, Kerala. The age group of the subjects ranged from 18 to 23 years. The subjects were studying degree and pg students of various colleges in Malappuram district, Kerala.

To measure the anthropometric variables of male athletes from various colleges in Malappuram district, anthropometrical girth measurement will be used.

To obtain the data, anthropometrical girth measurement test was used. The test was administered to the male students of different colleges in Malappuram district. The college management and teachers were requested for getting their students to serve as subjects of the study.

### Data Analysis

To test the data related to selected variables such as Calf girth, Thigh girth, Biceps girth and Chest girth descriptive statistics and paired t-test was performing using SPSS.

Result:

TABLE 1  
DESCRIPTIVE STATISTICS OF POSTTEST ANTHROPOMETRIC VARIABLES OF  
CONTROL GROUP

Variables	N	Mean	SD	MIN	MAX	Range
Calf Girth	10	35.36	1.591	33.6	38.4	4.8
Thigh Girth	10	48.13	1.412	46.8	50.8	4
Biceps Girth	10	28.6	0.884	27.4	29.8	2.4
Chest Girth	10	79.71	1.259	78.4	81.8	3.4



Table 1 reveals that the posttest mean value of Calf Girth among control group was 35.36. The standard deviation was 1.591. The Minimum, Maximum and Range values was 33.6, 38.4 and 4.8 respectively. The posttest mean value of Thigh Girth among control group was 48.13. The standard deviation was 1.412. The Minimum, Maximum and Range values was 46.8, 50.8 and 4 respectively. The posttest mean value of Biceps Girth among control group was 28.6. The standard deviation was 0.884. The Minimum, Maximum and Range values was 27.4, 29.8 and 2.4 respectively. The posttest mean value of Chest Girth among control group was 79.71. The standard deviation was 1.259. The Minimum, Maximum and Range values was 78.4, 81.8 and 3.45 respectively.

TABLE 2  
 DESCRIPTIVE STATISTICS OF POSTTEST ANTHROPOMETRIC VARIABLES OF  
 EXPERIMENTAL GROUP

Variables	N	Mean	SD	MIN	MAX	Range
Calf Girth	10	36.14	1.13	34.8	37.6	2.8
Thigh Girth	10	48.29	0.957	47	49.6	2.6
Biceps Girth	10	28.85	0.787	27.8	29.8	2
Chest Girth	10	80.49	1.225	78.6	81.8	3.2

Table 2 reveals that the posttest mean value of Calf Girth among experimental group was 36.14. The standard deviation was 1.13. The Minimum, Maximum and Range values was 34.8, 37.6 and 2.8 respectively. The posttest mean value of Thigh Girth among experimental group was 48.29. The standard deviation was 0.957. The Minimum, Maximum and Range values was 47, 49.6 and 2.6 respectively. The posttest mean value of Biceps Girth among experimental group was 28.85. The standard deviation was 0.787. The Minimum, Maximum and Range values was 27.8, 29.8 and 2 respectively. The posttest mean value of Chest Girth among experimental group was 80.49. The standard deviation was 1.225. The Minimum, Maximum and Range values was 78.6, 81.8 and 3.2 respectively.

TABLE 3  
 PAIRED SAMPLE T TEST FOR CALF GIRTH OF CONTROL GROUP AND  
 EXPERIMENTAL GROUP

Group	Pretest mean	Post-test mean	T	Sig
Control	34.92	35.36	9.24	0.000
Experimental	35.54	36.14	16.43	0.000

Table 3 indicates that the calculated t value 9.24 is higher than the table t value of 2.26 at 0.05 level of significance with 9 degree of freedom. Hence there was a significant difference between pre and post test score in calf girth of control group. The calculated t value 16.43 is higher than the table t value of 2.26 at 0.05 level of significance with 9



degree of freedom. Hence there was a significant difference between pre and post test score in calf girth of experimental group.

TABLE 4:  
PAIRED SAMPLE T TEST FOR THIGH GIRTH OF CONTROL GROUP AND EXPERIMENTAL GROUP

Group	Pretest mean	Posttest mean	T	Sig
Control	47.63	48.13	15	0.000
Experimental	47.63	48.29	12.18	0.000

Table 4 indicates that the calculated t value 15 is higher than the table t value of 2.26 at 0.05 level of significance with 9 degree of freedom. Hence there was a significant difference between pre and post test score in thigh girth of control group. The calculated t value 12.18 is higher than the table t value of 2.26 at 0.05 level of significance with 9 degree of freedom. Hence there was a significant difference between pre and post test score in thigh girth of Experimental group.

TABLE 5  
PAIRED SAMPLE T TEST FOR BICEPS GIRTH OF CONTROL GROUP AND EXPERIMENTAL GROUP

Group	Pretest mean	Posttest mean	t	Sig
Control	28.21	28.6	10.3	0.000
Experimental	28.25	28.85	23.23	0.000

Table 5 indicates that the calculated t value 10.3 is higher than the table t value of 2.26 at 0.05 level of significance with 9 degree of freedom. Hence there was a significant difference between pre and post test score in biceps girth of control group. The calculated t value 23.23 is higher than the table t value of 2.26 at 0.05 level of significance with 9 degree of freedom. Hence there was a significant difference between pre and post test score in biceps girth of experimental group.

TABLE 6  
PAIRED SAMPLE T TEST FOR CHEST GIRTH OF CONTROL GROUP AND EXPERIMENTAL GROUP

Group	Pretest mean	Posttest mean	t	Sig
Control	79.25	79.71	15.05	0.000
Experimental	79.74	80.49	7.56	0.000

Table 6 indicates that the calculated t value 15.05 is higher than the table t value of 2.26 at 0.05 level of significance with 9 degree of freedom. Hence there was a significant difference between pre and post test score in chest girth of



control group. The calculated t value 7.56 is higher than the table t value of 2.26 at 0.05 level of significance with 9 degree of freedom. Hence there was a significant difference between pre and post test score in chest girth.

### Conclusions

Subjects for the study were 20 male athletes from various colleges in Malappuram district, Kerala. The age ranges shall be 18 to 23 years. The data was analyzed using descriptive statistics such as Arithmetic Mean (AM), Standard Deviation (SD), minimum, maximum and range in order to get basic idea about the data distribution. Paired t test was used to find significant difference of anthropometric variables of college athletes after ten week intensive resistance training.

With in the limitations of the study and on the basis of the results obtained the following conclusions may be drawn. It is concluded that there was a significant improvement exists on calf girth of college male athletes after intensive resistance training.

In case of thigh girth, paired t test revealed that the calculated t value is higher than the table t value at 0.05 level of significance with 9 degree of freedom, we conclude that there was a significant improvement exists on calf girth of college male athletes after intensive resistance training.

It is concluded that there was a significant improvement exists on biceps girth of college male athletes after intensive resistance training.

The paired t test revealed that the calculated t value is higher than the table t value at 0.05 level of significance with 9 degree of freedom, we conclude that there was a significant improvement exists on chest girth of college male athletes after intensive resistance training.

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