

COMPARATIVE STUDY ON THIGH GIRTH AND CALF GIRTH OF 12-16 YEARS BOYS

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ABSTRACT

In this study an attempt has been made to find out the comparative changes on Thigh Girth and Calf Girth of 12 to 16 years boys. The subjects of the present study were selected randomly from the school of Naihati Narendra Vidyaniketan, 24 Pgs (N), WB. Thirty students of each age group's i.e.; 150 boy's students were randomly selected for this purpose. The criteria measured in this article were height, weight, Thigh Girth and Calf Girth. The data on the height, weight, Thigh Girth and Calf Girth were analyzed by applying ANOVA to find out significant differences if any between the five age groups. Significant results were found in height, weight, Thigh Girth and Calf Girth.

Key Words: Thigh Girth and Calf Girth and Age Group.

INTRODUCTION:

Examination of data on young athletes shows that successful athletes have somatotype quiet similar to those of outstanding older athletes. Morphological characteristics have an important role to play in the performance of various physical activities. Research findings shows that performance is significantly related to body weight, height, arm length, thigh and calf circumference and other parameters. Sexual maturation should be used to assess the extent of biological growth and development and the individual nutritional needs of adolescents in place of chronological age. Children grow at different rates at different ages, and different children also develop at different rates, so there will be early and late developers. Not only are the rates of growth different, but also the changes in the body proportions can vary, and this will directly affect the ability to perform. A sound knowledge of processors of growth and development will enable coaches and physical education teachers who are working with children, to organize the

training programs that will be more beneficial to the children from a physical and psychological perspective.

THE PURPOSE OF THE STUDY:

- 1) To observe the height and weight status of 12 - 16 years boys.
- 2) To observe the Thigh and Calf Girth status of the said group of boys.
- 3) To analysis and compare the age wise differences, if any, the height, weight, Thigh and Calf Girth among the 12 - 16 years boys.
- 4) To study the relationship between height, weight, Thigh and Calf Girth of the said age group boys.

METHODOLOGY:

Subjects-

The subjects of the present study were selected randomly from the school Nailhati Narendra Vidyaniketan, 24 Pgs (N), WB. Thirty students of each age group's i.e. total 150 boy's students were selected for this purpose. According to facilities available and on the basis of contact with the school authorities the subjects were selected randomly.

Criterion Measured-

Parameters	Measured by
1) Height (cm)	Stadiometer
2) Weight (kg)	Weighing machine (Portable)
3) Thigh Girth (Cm)	Standard measurement technique
4) Calf Girth (Cm)	Standard measurement technique

Statistical Procedure-

The data on the height, weight, Thigh and Calf Girth were analyzed by applying ANOVA to find out significant differences if any among the age groups.

RESULTS & DISCUSSION:

Discussions were made on the basis of the findings of the present study and compared with available literatures. The level of significance to assess the statistical values obtained was set at 0.05 and also 0.01 level of confidence.

Height

Table-1: Mean and SD of height (cm.) among the five groups (12, 13, 14, 15 & 16 year's boys).

Age of subjects	Mean	SD
12 years	145.23	6.45
13 years	150.91	12.93
14 years	151.03	5.95
15 years	155.94	5.60
16 years	160.10	4.35

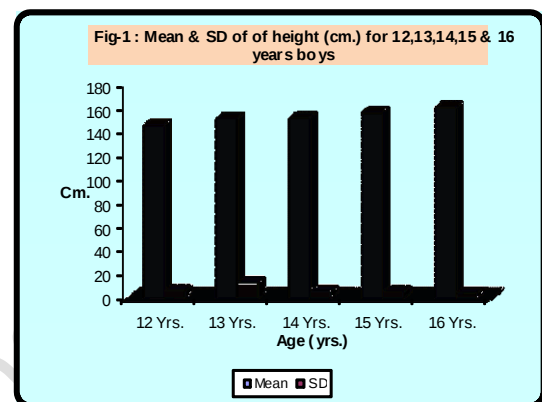


Table-2: Analysis of variance among the five age groups for height (cm.)

Source of variance	SS	df	MS	F
Between Groups	3582.66	4	895.67	14.93**
Within Groups	8461.27	141	60.01	
Total	12043.93	145		

* Sig. at 0.05 levels

** Sig. at 0.01 levels, NS –Not significant.

$$F_{0.05 (4,141)} = 2.44, \quad F_{0.01 (4,141)} = 3.96$$

Higher the age higher was the height. Teeple and Massey (1976) had shown that the average height of 10, 11 and 12 years old boys were 143.6, 147.6 and 152.4 cm respectively. Grassi et al. (2006) studied the relations between aerobic fitness and somatic growth of Italian adolescents and found that standing height was significantly increased with age. Comparing the observation

of other leading researchers with the findings of the present study it may be concluded that 12 years boys were relatively smaller in height than other four groups.

Weight

Table-3: Mean and SD of weight (Kg.) among the five groups (12, 13, 14, 15 & 16 year's boys).

Age of subjects	Mean	SD
12 years	35.83	7.43
13 years	42.57	10.39
14 years	38.02	6.41
15 years	40.17	4.23
16 years	49.06	4.96

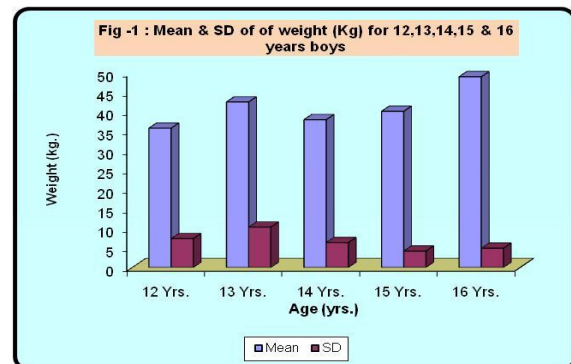


Table-4: Analysis of variance among the five age groups for weight (Kg.)

Source of variance	SS	df	MS	F
Between Groups	2850.87	4	712.72	14.24**
Within Groups	7058.42	141	50.06	
Total	9909.29	145		

Barabas and Eiben (1993) observed that 10, 11, 12 years old Hungarian boys carried the weight of 36.16, 35.39 and 39.49 Kg. *Teeple and Massey (1976)* found that the mean weight of 10, 11 and 12 years old boys were as 36.3, 39.5 and 44.3 Kg. respectively. *Shephard (1982)* had shown that the average body mass of 10, 11 and 12 years boys as 32.6, 35.2 and 38.3 Kg. Higher the age, higher was the body weight. So except 13 years boys, the present study was in close proximity to other researchers. It may further be inferred that body weight was related to the age of the subjects. Analyzing all the relevant data and statistical treatment it appeared that 13 years boys had significantly higher body weight than other three groups except 16 years boys.

Thigh Girth

Table-5: Mean and SD of Thigh Girth (cm) among the five groups (12, 13, 14, 15 & 16 year's boys).

Age of subjects	Mean	SD
12 years	40.32	3.98
13 years	44.18	5.87
14 years	41.18	5.00
15 years	37.85	1.27
16 years	39.02	1.56

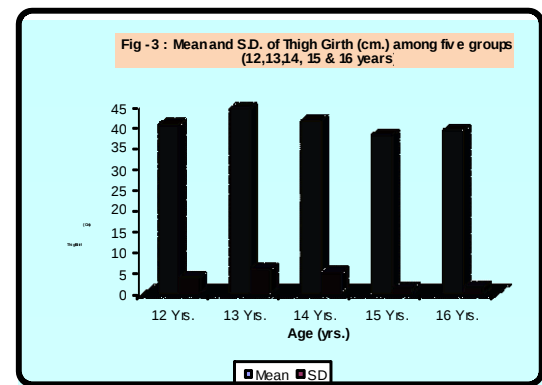


Table-6: ANOVA among the five age groups for Thigh Girth (cm.)

Source of Variation	SS	df	MS	F
Between Groups	688.18	4	172.04	10.60 **
Within Groups	2289.07	141	16.23	
Total	2977.24	145		

It was observed that thigh girth of 12 years boys was significantly lower than that of 13 and 14 years boys but for 15 and 16 years boys thigh girth was lower than that of 12,13,14 years. Maximum thigh girth was observed in 13 years boys. *Slaughter et al. (1982)* observed that mean thigh girth of 9.0-9.9, 10.0-10.9 and 11.0-11.9 years old American boys were 39.6, 42.6 and 43.9 cm. respectively. *Banerjee et al. (1990)* observed that higher thigh girth have positively correlated with performance than any other measurements in physical dimension. Comparing to the other studies it may be concluded that American boys were higher in thigh girth than Bengali boys. In the present study thigh girth of 15 & 16 years was lower than 12 years, 13 years & 14 years of boys.

Table-7: Mean and SD of Calf Girth (cm) among the five groups (12, 13, 14, 15 & 16 year's boys).

Age of subjects	Mean	SD
12 years	28.09	2.70
13 years	30.48	3.54
14 years	29.93	2.94
15 years	27.25	0.94
16 years	29.25	1.44

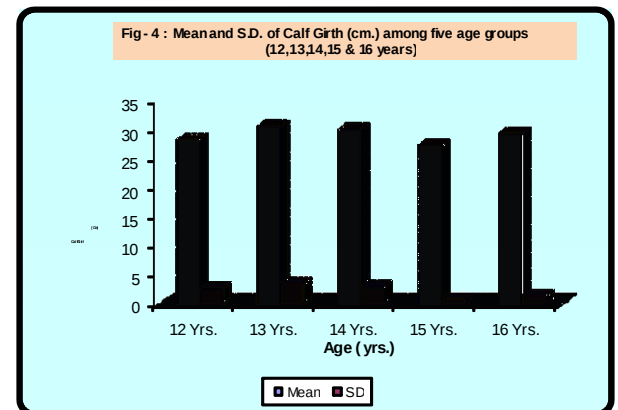


Table-8: ANOVA among the five age groups for Calf Girth (cm.)

Source of Variation	SS	df	MS	F
Between Groups	209.71	4	52.43	8.19 **
Within Groups	902.98	141	6.40	
Total	1112.68	145		

It was found from Table-7 that calf girth of 15 years boys had lower than the other groups and 13 years boys had highest calf girth than 12, 14, 15 and 16 years group. In Table-8 the ANOVA was given and 'F' value was found 8.19 which were statistically significant at 0.05 and 0.01 level. *Banerjee et al. (1990)* observed that higher calf girth have positively correlated with performance than any other measurements in physical dimension when studied on 43 male athletes aged from 14 to 18 years. Analyzing all the relevant data and statistical treatment it appeared 13 years boys had significantly highest calf girth than other four groups.

The age was a very important factor for the growth and development during pre-pubertal stage. From the foregoing discussion of the leading researchers it has also been evident that the growth of body parts and functional capacity of the organs and systems improve rapidly during pre-pubertal stage and each year during this stage results significant improvement in stature. This improvement will have impact on performance. *Banerjee et al. (1990)* observed that higher calf

girth and thigh girth have positively correlated with performance than any other measurements in physical dimension. The major increment in most of the motor quality variables occurred during their maximum spurt in height and weight i.e., between 13 and 16 years of age. In modern sports, the anthropometric measurement and their relationship with various motor abilities is an important guide for coaches and teachers for classification and selection of sportsperson according to their age, growth, ability etc. From this it may be concluded that morphological characteristics have an important role to play in the performance of various physical activities.

CONCLUSIONS:

Height-

- Significant difference existed in height among the five groups and higher the age group, Higher the age higher was the height.
- Height was related to the age of the subjects. 16 years boys were relatively higher than other four groups. Height of the groups may be arranged as $16 > 15 > 14 > 13 > 12$.

Weight-

- Significant difference existed in body weight among the five groups and higher the age, higher was the body weight.
- 13 years boys had significantly higher body weight than 12, 14, 15 years boys group except 16 years boys group.

Thigh Girth-

- Maximum thigh girth was observed in 13 years boys. Thigh girth of 15 and 16 years was lower than 12, 13 and 14 years of boys.

Calf Girth

- 13 years boys had significantly higher calf girth than other four groups and 15 years boys had lower calf girth than the other groups.

RECOMMENDATIONS:

1. The present study was delimited only to male students; the same type of study may be made with female students.
2. Similar investigation may be done using different growth and motor performance parameters other than those used in the study. Psychological and Physiological parameters which were not considered in the present study.
3. Similar study may be conducted on large samples and age groups other than those used in the study.
4. A comparative study can be undertaken using the same parameters of Indian and foreign subjects.
5. Similar study may be done using tribal and non tribal boys and girls.
6. An interested researcher may prepare norms on height and weight, Thigh and Calf Girth for various age group boys on the basis of valid tests, on boys and girls of each district of West Bengal for proper evaluation.

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