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Comparative Study on Lower limb length and Upper limb length of 12-16 Years Boys

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Abstract

In this article the author has tried to observe the comparative changes on lower and upper limb length of 12- 16 years boys. The subjects of this study were from the school Naihati Narendra Vidyaniketan, 24 Parganas (N), WB,India. Thirty male students for each age group i.e, one hundred and fifty students for five age categories were selected randomly.The criteria measured in this investigation were height, weight, lower limb length and upper limb length. The data were analyzed by using Analysis of Variance to observe significant differences among the five age categories. Significant results were found among all parameters.

Keywords: Lower limb length, upper limb length, height, weight, 12- 16 years boys.

Introduction

'Evolution', the most natural phenomenon occurs in this material world through thousands, millions or crores of years. From unicellular living organism man only has achieved this biped position among the mammals through this evolution. Although the internal physiological organism maintaining the earlier status. The change of anatomocal position of different parts of the body, only erects the physiological imbalance and thus it required the proper balance and coordination. A growing child exhibits a gradual change in appearance and shape. Body weight shows a steady increase until about the sixth of seven years of life when it is less than 50% of adult value. From seven to eleven years it almost marks time and so increases very little. From about eleven years onwards body weight again shows a regular increase until maturity. This increase is represented by a steady gain in standing height or stature; which in the first place is the result of the increase of leg growth although arm maturity precedes leg maturity. The variation of the speed of growth between one body part and another is regulated so that each part reaches its size, proportional to the role it has to play in the body's physiology at the correct time. Tanner opined when studying physical development, meet some difficulties. With young children often the short ones grow more slowly; yet in adolescence the taller ones grow more slowly, and the shorter ones grow rapidly for a longer period of time. These types of changes in growth rates tend to accentuate the great variability of children's body measurement.

The Purpose of the study: i. Determine the lower limb length status of 12, 13, 14, 15 and 16 years male students. ii. Assess the upper limb length status of the five age group. iii. Analyse and compare the age category wise differences for lower and upper limb length among the 12 to 16 years students.

Methodology

Subjects: The subjects were selected randomly from Naihati Narendra Vidyaniketan, a Govt. Sponsored school of 24 Parganas (N), WB,India. Thirty male students of each age category i.e., one hundred and fifty male students were selected randomly in this study. On the basis of admission register of the school and according to the birth certificate of the subjects the date of birth were confirmed and recorded. The boys selected for the study were habitats of the districts of 24 Parganas (North) of West Bengal, India. About 60% of the subjects in each group were from rural areas of Naihati, 24 Parganas(N) and the remaining were from urban or Semi-urban locality. The Socio economic condition of the subjects was more or less same but variation in daily routine and culture due to regional peculiarities was evident. The foods habits, habitual, physical and leisure time activity and some other minute details could not be controlled and was beyond the scope of the study. However, there was not much variation in general health which was within the normal range.

Criterion Measured: Height (cm), Weight (kg),) Lower limb length (cm) and upper limb length (cm) were measured by stadiometer, weighing machine and standard measurement technique respectively.

Statistical Procedure: The Standard Statistical procedure had been adopted for analyses and interprets the data collected through various standard tests and measurements. Most of the statistical analysis was computed through computer application by using the ASP Package (Advance Statistical Program).

Results and Discussion

Discussions were done on the basis of the obtained results and compared with available literatures from various sources.

Table-1
Mean and Standard Deviation of height among 12-16 yrs age group

Age grp.(yr.)	Mean	SD
12	145.24	6.46
13	150.92	12.94
14	151.04	5.96
15	155.95	5.61
16	160.12	4.37

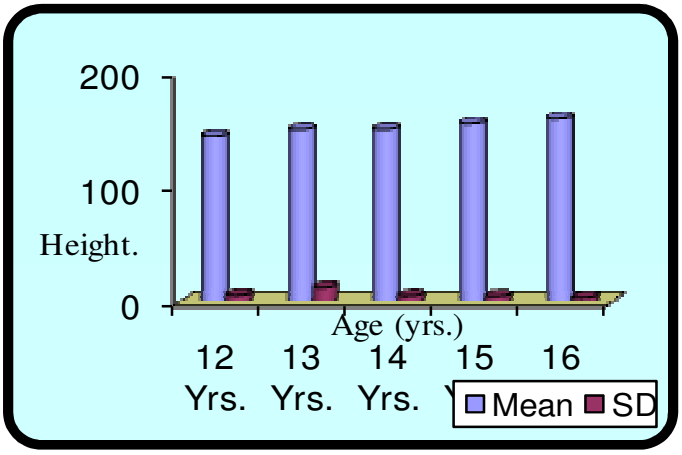

Figure-1
Graphical Representation of Mean and SD of Height for 12-16 yrs. group

Table-2
ANOVA among the five age groups for height (cm)

SV	SS	df	MS	F
Bet. Grp.	3582.66	4	895.67	14.93**
With. Grp.	8461.27	141	60.01	
Total	12043.93	145		

* Sig. at 0.05 levels ** Sig. at 0.01 levels, NS –Not significant.
$F_{0.05\,(4,141)} = 2.44$, $F_{0\cdot01\,(4,141)} = 3.46$

Height: Table 1 shows 13 years group boys were relatively higher in height and 16 years boys were highest in height among the group. 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[1]. Grassi et al. studied the relations between aerobic fitness and somatic growth of Italian adolescents and found that standing height was significantly increased with age[2]. Comparing and considering the findings of other researchers with the findings of this investigation it may be concluded that 12 years boys were relatively smaller in height than others and 16 years group were relatively higher mean height than other four groups.

Table-3
Mean and Standard Deviation of weight among 12-16 yrs Age group

Age grp. (yrs.)	Mean	SD
12	35.84	7.44
13	42.58	10.40
14	38.03	6.43
15	40.18	4.24
16	49.07	4.97

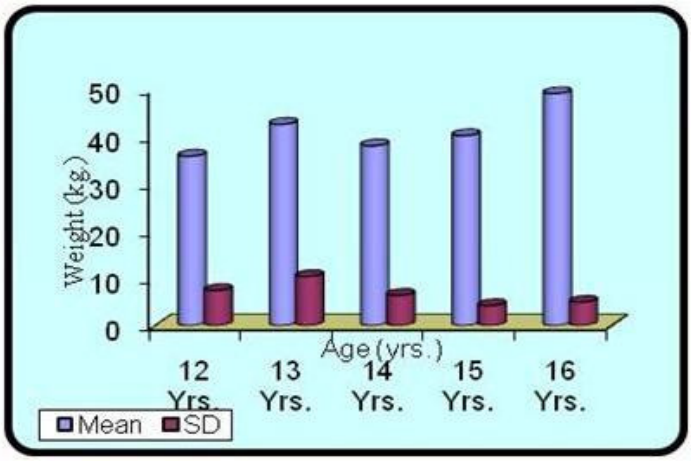

Figure-2
Graphical Representation of Mean and SD of Weight for 12-16 yrs. group

Table-4
ANOVA among the five age groups for weight (Kg)

SV	SS	df	MS	F
Bet. Groups	2850.87	4	712.72	14.24**
With. Groups	7058.42	141	50.06	
Total	9909.29	145		

Weight: This study reveals that weight increases with the increment of age except 13 years group. Barabas and Eiben observed that 10, 11, 12 years old Hungarian boys carried the weight of 36.16, 35.39 and 39.49 Kg[3]. 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[1]. Shephard had shown that the average body mass of 10, 11 and 12 years boys as 32.6, 35.2 and 38.3 Kg[4]. Rarick and Smoll reported from their study of childhood and adolescents that height, weight and physique showed relatively stable growth trends from 7 to 12 years of age and from childhood years to 17 years[5]. So except 13 years boys, the present study was in close relation 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 technique it appeared that 13 years boys had significantly higher body weight than other three groups except 16 years age group.

Lower limb Length

Table-5
Mean and Standard Deviation of Lower limb Length among 12-16 yrs age group

Age grp.(yrs.)	Mean	SD
12	75.88	4.18
13	78.66	4.38
14	78.24	4.12
15	80.04	3.44
16	82.24	2.55

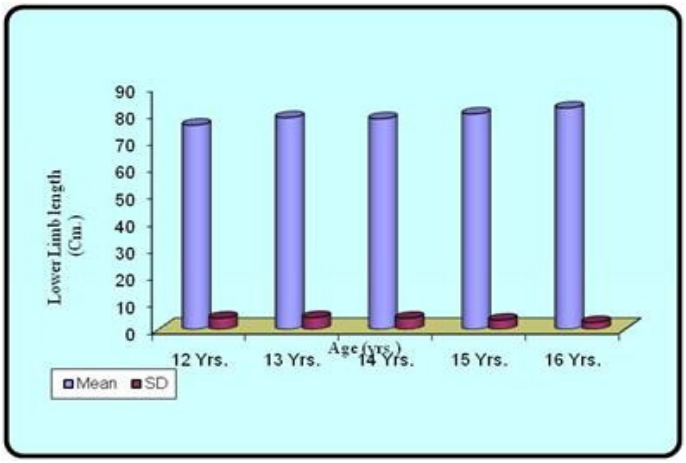

Figure-3
Graphical Representation of Mean and SD of Lower limb length for 12-16 yrs. group

Table-6
ANOVA among the five age groups for Lower limb length

SV	SS	df	MS	F
Bet. Grp.	618.85	4	154.71	10.64**
With. Grp.	2050.55	141	14.54	
Total	2669.41	145		

Table 5 represents that the mean score of lower limb length increases with the increse of age. After statistical treatment it was observed that F value 10.64 was significant at both the levels. Higher the age higher was the lower limb length. 16 years boys were relatively be higher than other four groups.

Upper limb length

Table-7
Mean and Standard Deviation of Upper limb Length among 12-16 yrs. age group

Age grp.(yrs.)	Mean	SD
12	69.24	3.14
13	73.94	4.64
14	72.81	2.96
15	75.50	2.81
16	77.49	2.03

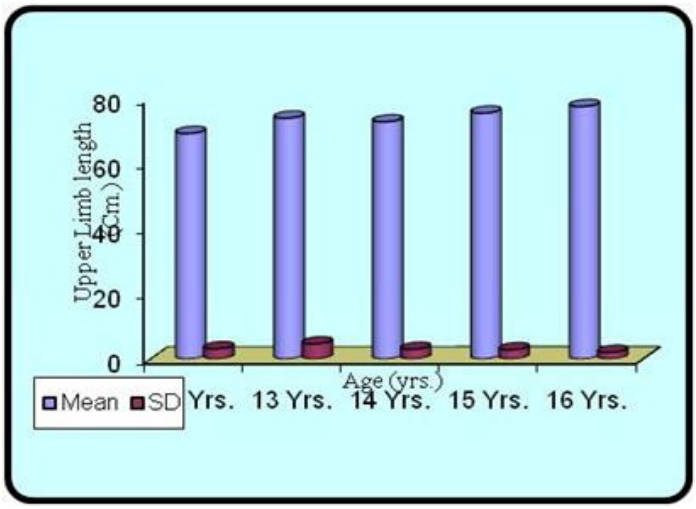

Figure-4
Graphical Representation of Mean and SD of Upper limb length for 12-16 yrs. group

Table-8
ANOVA among the five age groups for Upper limb length

SV	SS	df	MS	F
Bet. Grp.	1093.28	4	273.32	25.92**
With. Grp.	1486.54	141	10.54	
Total	2579.83	145		

From table-7 it was found that mean scores of Upper Limb length of 13 years boys was relatively higher than both 12 and 14 years boys. It was observed that 12 years boys had lower upper limb length and 16 years boys had higher upper limb length. Croney reported that the arm maturity preceded leg maturity [6]. Therefore, it may conclude that the Upper Limb length was close relation to the age of the subjects except 13 years age group. Mean scores of upper limb length were statistically different.

Conclusion

Though Socio economic condition, variation in daily routine, culture due to regional peculiarities and other factors like foods habits, habitual, physical and leisure time activity were not considered in this study but on the basis of the findings of the study it may conclude that significant difference exists among the five groups in all parameters and it increases with the increment of age. Maximum spurt was observed in 13 years age group. 16 years group were higher lower and upper limb length. It may due to age factor.

Recommendations: i. This investigation was only for male students; the same can be done with female students also. ii. Further investigation may be made using different or selected parameters other than those used in the article. iii. Similar study may be done using large samples and different age categories. iv. Similar study may be conducted using the same or other

parameters of Indian and foreign subjects. v. Similar observation may be conducted using tribal and non tribal boys and girls considering valid tests from each Districts of West Bengal and Other States in India. vi. This study may help to prepare norms on height, weight, lower and upper limb length for different age categories on the basis of valid tests, on boys / girls of each district of West Bengal for proper evaluation.

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