Comparison of leg Anthropometry among school going children

Manas Banerjee*

*Department of Basic Science and Humanities, University of Engineering and Management (UEM) B/5,
Plot No. III, Action Area - III, Newtown, Kolkata 700156*

The purpose of the study was to compare the leg Anthropometry among the school going children belonging to different age groups. Stratified Random Sampling was used to select One hundred twenty school going children, age ranging between eleven to sixteen years for the study from Stepping stone school (high), Rishra, West Bengal. The students were further divided into three groups of forty students each according to the age groups i.e. Group A (11-12 years), Group B (13-14 years) and Group C (15-16 years).The Anthropometric measurements included Thigh Girth, Mid Thigh Girth, Calf Girth, Ankle Girth, Upper Leg Length, Lower Leg Length, Foot Length and Foot Breadth measured by Flexible steel tape, Anthropometric tape and Sliding calipers. The data of leg Anthropometric collected on One hundred and twenty School going children belonging to different age groups were statistically analyzed through Analysis of Variance (ANOVA) to find out the significant difference among the school going children belonging to different age groups at 0.05 level of significance. The Anthropometric measurements such as Thigh Girth, Mid Thigh Girth, Calf Girth, Ankle Girth, Upper Leg Length, Lower Leg Length, Foot Length and Foot Breadth showed significant differences among the school going children belonging to different age groups.

PACS numbers:

I. INTRODUCTION

Anthropometry has a rich tradition in sports sciences and sports medicine. Though, in different times, different terms were used like dynamic anthropometry, sports anthropometry, biometry, physiological anthropometry, anthropometrica, kinanthropometry etc. by scientists to establish some relationships between the body structure and the specialized functions required for various tasks (Koley, 2006). Anthropometry is a very old science which relates to the study of human body measurement for use in anthropological classification and comparison. There may be length, breadths, girth as well as more common measure such as stature, mass and skin fold thickness (Saha and Bag, 2008). Anthropometric Measurements consists of objective measurements of structure and functions of body. The measurements of the structure include such items as weight, total height, and the width, the depth and the circumference of the chest (Goswami and Abraham, 2010). For performance excellence, in any activity, Anthropometric measurements, Physical fitness and psychological profiles of sports participants are three important factors besides technical & tactical efficiency and intellectual soundness. The physique of an athlete is considered to be an important determinant of success in many sports, and in top level sport there would appear to be a tendency for individuals to gravitate towards the event to which they are anthropometrically best suited (Garay et. al, 1974; Hirata, 1966; Housh et. al, 1984; Reilly et. al, 1981; Singh and Sandhu, 1982 and Tanner, 1964). In the past, child anthropometric measurements have been used to assess the growth and health status of children, particularly in developing countries or regions with populations at risk for child malnutrition (Gorstein and Akre, 1988). At the population health level this information is very important. Cross-sectional surveys of child anthropometric data could help define health and nutritional status for purposes of program planning, implementation and evaluation (Dieticians of Canada, 2004). It would help in form the development of standards and regulations regarding automotive safety devices and enhance the appropriate and proper use of these devices. A system to monitor and collect child anthropometric data on a regular basis would address the need for current or longitudinal information on the physical attributes of the child population. In addition, children?s organizations and others concerned with the safety, health, development and growth of children would benefit from this type of data. The information could assist in the identification of health trends, dietary requirements and supplements, as well as in the development of consumer products and injury prevention programs. Accordingly the present project was planned to gather information about Anthropometric measurements. Leg Anthropometry among the school going children belonging to different age groups will provide more accurate information on the developmental process of children. To our knowledge, Leg Anthropometric data available on the school going children belonging to different age groups is rare and incomplete. Therefore, the purpose of this study was to compare the leg Anthropometry among the school going children belonging to different age groups.

II. METHODOLOGY

One hundred twenty school going children, age ranging between eleven to sixteen years for the study from Step-

*Email: manas.banerjee@uem.edu.in

TABLE I:

ANALYSIS OF VARIANCE OF THE MEAN OF THIGH GIRTH AMONG THE SCHOOL GOING CHILDREN BELONGING TO DIFFERENT AGE GROUPS

Source of Variance	DF	Sum of Square	Mean Sum of Square	F-Value
Between groups	2	672.69	336.34	14.52*
Within Groups	117	2709.53	23.16	

*Significant at 0.05 level of confidence

Tabulated $F_{0.05}$ (2,117) = 3.09

PAIRED ADJUSTED FINAL MEANS DIFFERENCES IN THIGH GIRTH AMONG THE SCHOOL GOING CHILDREN BELONGING TO DIFFERENT AGE GROUPS

Group-A (11-12 years)	Group-B (13-14 years)	Group-C (15-16 years)	Mean Difference	Critical Difference
41.82	45.30		3.48*	
	45.30	47.58	2.28*	2.13
41.82		47.58	5.76*	

*significant at 0.05 level of confidence.

TABLE II:

ANALYSIS OF VARIANCE OF THE MEAN OF MID THIGH GIRTH AMONG THE SCHOOL GOING CHILDREN BELONGING TO DIFFERENT AGE GROUPS

Source of Variance	DF	Sum of Square	Mean Sum of Square	F-Value
Between groups	2	739.5	369.75	19.92*
Within Groups	117	2171.3	18.56	

*Significant at 0.05 level of confidence

Tabulated $F_{0.05}$ (2,117) = 3.09

PAIRED ADJUSTED FINAL MEANS DIFFERENCES IN MID THIGH GIRTH AMONG THE SCHOOL GOING CHILDREN BELONGING TO DIFFERENT AGE GROUPS

Group-A (11-12 years)	Group-B (13-14 years)	Group-C (15-16 years)	Mean Difference	Critical Difference
38.58	42.59		4.01*	
	42.59	44.55	1.96*	1.91
38.58		44.55	5.97*	

*significant at 0.05 level of confidence.

ping stone school (high), Rishra, West Bengal was selected by using stratified random sampling for this study. The students were further divided into three groups of forty students each according to the age groups i.e. Group A (11-12 years), Group B (13-14 years) and Group C (15-16 years).The Anthropometric measurements included Thigh Girth, Mid Thigh Girth, Calf Girth, Ankle Girth, Upper Leg Length, Lower Leg Length, Foot Length and Foot Breadth and were measured by flexible steel tape, anthropometric tape and Sliding calipers

III. STATISTICAL PROCEDURE

The data collected on One hundred and twenty School going children belonging to different age groups was statistically analyzed through Analysis of Variance (ANOVA) to find out the significant difference among the school going children belonging to different age groups at 0.05 level of significance.

TABLE III:

ANALYSIS OF VARIANCE OF THE MEAN OF CALF GIRTH AMONG THE SCHOOL GOING CHILDREN BELONGING TO DIFFERENT AGE GROUPS

Source of Variance	DF	Sum of Square	Mean Sum of Square	F-Value
Between groups	2	320.99	160.5	24.39*
Within Groups	117	771.02	6.58	

*Significant at 0.05 level of confidence
Tabulated $F_{0.05}$ (2,117) = 3.09

PAIRED ADJUSTED FINAL MEANS DIFFERENCES IN CALF GIRTH AMONG THE SCHOOL GOING CHILDREN BELONGING TO DIFFERENT AGE GROUPS

Group-A (11-12 years)	Group-B (13-14 years)	Group-C (15-16 years)	Mean Difference	Critical Difference
27.63	30.12		2.49*	
	30.12	31.59	1.47*	1.13
27.63		31.59	3.96*	

*significant at 0.05 level of confidence.

TABLE IV:

ANALYSIS OF VARIANCE OF THE MEAN OF ANKLE GIRTH AMONG THE SCHOOL GOING CHILDREN BELONGING TO DIFFERENT AGE GROUPS

Source of Variance	DF	Sum of Square	Mean Sum of Square	F-Value
Between groups	2	52.92	26.46	9.91*
Within Groups	117	312.89	2.67	

*Significant at 0.05 level of confidence
Tabulated $F_{0.05}$ (2,117) = 3.09

PAIRED ADJUSTED FINAL MEANS DIFFERENCES IN ANKLE GIRTH AMONG THE SCHOOL GOING CHILDREN BELONGING TO DIFFERENT AGE GROUPS

Group-A (11-12 years)	Group-B (13-14 years)	Group-C (15-16 years)	Mean Difference	Critical Difference
18.68	20.00		1.49*	
	20.00	20.17	0.17*	0.72
18.68		20.17	1.49*	

*significant at 0.05 level of confidence.

IV. FINDINGS

All findings have been tabulated in Table I to Table VIII.

V. DISCUSSION OF FINDINGS

According to the findings of the study it is revealed that there was significant difference in Leg Anthropometry among the school going children belonging to different age groups (cal F0.05 at 2, 117 degree of freedom are 14.52 (Thigh Girth), 19.92 (Mid Thigh Girth), 24.39 (Calf Girth), 9.91 (Ankle Girth), 28.79 (Upper Leg Length), 52.05 (Lower Leg Length), 25.22 (Foot Length), 14.75 (Foot Breadth) ¿ tab F0.05- 3.09). The researcher was in opinion that such result occurred due to the growing age of the subjects. It is documented that anthropometric dimensions differ by age, time, ethnicity and geographical area. Growth is slow and steady until the onset of puberty, when individuals begin to develop at a much quicker pace. As eleven to sixteen years age group is pre

TABLE V:

ANALYSIS OF VARIANCE OF THE MEAN OF UPPER LEG LENGTH AMONG THE SCHOOL GOING CHILDREN BELONGING TO DIFFERENT AGE GROUPS

Source of Variance	DF	Sum of Square	Mean Sum of Square	F-Value
Between groups	2	517.22	258.61	28.79*
Within Groups	117	1050.81	8.98	

*Significant at 0.05 level of confidence

Tabulated $F_{0.05}$ (2,117) = 3.09

PAIRED ADJUSTED FINAL MEANS DIFFERENCES IN UPPER LEG LENGTH AMONG THE SCHOOL GOING CHILDREN BELONGING TO DIFFERENT AGE GROUPS

Group-A (11-12 years)	Group-B (13-14 years)	Group-C (15-16 years)	Mean Difference	Critical Difference
39.28	42.96		3.68*	
	42.96	44.16	1.2*	1.33
39.28		44.16	4.88*	

*significant at 0.05 level of confidence.

TABLE VI:

ANALYSIS OF VARIANCE OF THE MEAN OF LOWER LEG LENGTH AMONG THE SCHOOL GOING CHILDREN BELONGING TO DIFFERENT AGE GROUPS

Source of Variance	DF	Sum of Square	Mean Sum of Square	F-Value
Between groups	2	758.95	379.47	52.05*
Within Groups	117	853.41	7.29	

*Significant at 0.05 level of confidence

Tabulated $F_{0.05}$ (2,117) = 3.09

PAIRED ADJUSTED FINAL MEANS DIFFERENCES IN LOWER LEG LENGTH AMONG THE SCHOOL GOING CHILDREN BELONGING TO DIFFERENT AGE GROUPS

Group-A (11-12 years)	Group-B (13-14 years)	Group-C (15-16 years)	Mean Difference	Critical Difference
41.33	45.77		4.44*	
	45.77	47.25	1.48*	1.19
41.33		47.25	5.92*	

*significant at 0.05 level of confidence.

adolescent age and as it is recognized as a developing age group for both physical and physiological development.

Kurimoto, 1963, founded in his study boys of fifteen through 18 years changes in growth on many maturity, body size, physique type, strength and motor measures. Most of his tests naturally improve with age during these years. Therefore such Leg anthropometric differences were observed among the school going children belonging to different age groups.

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TABLE VII:

ANALYSIS OF VARIANCE OF THE MEAN OF FOOT LENGTH AMONG THE SCHOOL GOING CHILDREN BELONGING TO DIFFERENT AGE GROUPS

Source of Variance	DF	Sum of Square	Mean Sum of Square	F-Value
Between groups	2	86.76	43.38	25.22*
Within Groups	117	201.03	1.72	

*Significant at 0.05 level of confidence

Tabulated $F_{0.05}$ (2,117) = 3.09

PAIRED ADJUSTED FINAL MEANS DIFFERENCES IN FOOT LENGTH AMONG THE SCHOOL GOING CHILDREN BELONGING TO DIFFERENT AGE GROUPS

Group-A (11-12 years)	Group-B (13-14 years)	Group-C (15-16 years)	Mean Difference	Critical Difference
24.44	25.72		1.28*	
	25.72	26.50	0.78*	0.58
24.44		26.50	2.06*	

significant at 0.05 level of confidence.

TABLE VIII:

ANALYSIS OF VARIANCE OF THE MEAN OF FOOT BREADTH AMONG THE SCHOOL GOING CHILDREN BELONGING TO DIFFERENT AGE GROUPS

Source of Variance	DF	Sum of Square	Mean Sum of Square	F-Value
Between groups	2	18.89	9.44	14.75*
Within Groups	117	75.01	0.64	

*Significant at 0.05 level of confidence

Tabulated $F_{0.05}$ (2,117) = 3.09

PAIRED ADJUSTED FINAL MEANS DIFFERENCES IN FOOT BREADTH AMONG THE SCHOOL GOING CHILDREN BELONGING TO DIFFERENT AGE GROUPS

Group-A (11-12 years)	Group-B (13-14 years)	Group-C (15-16 years)	Mean Difference	Critical Difference
10.21	10.85		0.64*	
	10.85	11.16	0.31*	0.35
10.21		11.16	0.95*	

significant at 0.05 level of confidence

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