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Anthropometric profiling of high school basketball players

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Abstract
Background: Anthropometric measurements play a vital role in talent identification through the measurement of various segments, size and shape of the body. It will further help in specifying what kind of sport is most suitable for a particular individual.
Methods: The study is a descriptive type with single cross sectional design. The purposive sampling technique has been used to select the sample of the study. The sample consists of Fifty basketball players ages range between 14 and 16 years.
Results: The results indicated that ectomorphs (50%) showing the characteristics like Naturally Skinny, Long arms/legs, Small bones, Small Waist followed by the mesomorphs (32%) showing the characteristics like Medium to Big Joints, Small Waist, Nice Broad Upper Back/Shoulders, whereas 16% are endomorphs.
Conclusions: The results revealed that the majority of the basketball players was ectomorphs and mesomorphs. A very less percentage were in endomorphs category.

Keywords: Anthropometric, mesomorphs, ectomorphs and endomorphs

Introduction

Anthropometric measurements play a vital role in talent identification through the measurement of various segments, size and shape of the body. It will further help in specifying what kind of sport is most suitable for a particular individual. Training has been accepted as a highly specialized science. Physical Education scientists are striving to understand the various factors affecting skeletal and muscular activities, during a variety of human movements with the help of electromyography and are engaged in analyzing the biomechanics of the performance of top athletes by focusing their attention on the analysis of sports skills. they are consistently studying the factors like strength, limb length, mass, inertial proportions, angular and linear velocities that influence these movements, to get better insight into the complexities of human motion and performance.

Kinanthropometry is an emerging scientific specialization concerned with the application of measurement to appraise human size, shape, proportion, composition, maturation and gross function. It is a basic discipline for problem-solving in matters related to growth, exercise, performance and nutrition. The area has been defined as the quantitative interface between anatomy and physiology. It puts the individual athlete into objective focus and provides a clear appraisal of his or her structural status at any given time, or, more importantly, provides for quantification of differential growth and training influences. Without an understanding of the growth of children and youth and their structural evolution, selection of talent and monitoring of training is largely a matter of sophistry and illusion. Kinanthropometry provides the essential structural basis for the consideration of athletic performance.

Comparison of body types

Ectomorphic: characterized as linear, thin, fragile, lightly muscled, flat chested and delicate; described as *cerebrotonic* inclined to desire isolation, solitude and concealment; and being tense, anxious, restrained in posture and movement, introverted and secretive. (Kamlesh, 2011) [4]
Mesomorphic: characterized as hard, rugged, rectangular, athletically built with well-developed muscles, thick skin and good posture; described as *somatotonic* inclined towards

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physical adventure and risk taking; and being vigorous, courageous, direct and dominant. (Kamlesh, 2011) [4]

Endomorphic: characterized as round and soft with under-developed muscles and having difficulty losing weight; described as *viscerotonic* enjoying food, people and affection; having slow reactions; and being disposed to complacency. (Kamlesh, 2011) [4]

Method and Procedure
Fifty basketball players from were selected from Chandigarh Basketball Training Centre, New Public School, Chandigarh whose ages range between 14 and 16 years. There was no performance criteria laid down by the researcher for the selection of subjects. The subjects who have involved themselves in regular basketball playing and training from or before the commencement of the new session that is 2015-16 were selected for the study. The subjects who were comfortable in giving the measurement were selected for the study. Only male subjects have been selected for the study. Any kind of social, mental, physical, environmental and genetic background or milieu of the subjects was not considered.

Tool Used
The standard ISAK full Performa had been used for the collection of the data, which contains 42 measurements variables. A somatotype graph was for the purpose of the plotting the somatotypes of the players. The study was carried out for the description of the anthropometric profiles of the subjects. Therefore the variables required for the particular purpose were selected.
The following variables were taken for the study:
- Height
- Weight

Girths
- Arm (relaxed)
- Arm (flexed)
- Calf (maximum)

Skinfold measurement
- Biceps
- Triceps
- Subscapular
- Iliac crest
- Supraspinale
- Abdominal

Breadths (bi-epicondylar)
- Humerus
- Femur

Statistical Analysis
The obtained data were subjected to statistical processing on computer with Statistical Package for Social Science (SPSS) version 16.0. The values of x-axis and y-axis on somatotype chart were calculated manually by the formula and the body mass index (BMI) was calculated with the help of a scientific calculator facilitated with conversion of units.

Analysis of Data and Results
Analysis of data
For this purpose, fifty male basketball players from Chandigarh Basketball Training Centre at New Public School, Chandigarh, Sector-18 whose ages ranged between 14 and 16 years were selected as subjects. The random sampling technique was used to attain the objectives of the study. The anthropometric variables of the subjects like height, weight, skinfold measurement, girths and breadths (of bones) were recorded in order to obtain the somatotyping of the subjects.

Results
The lowest, highest and mean values of all the recorded measurements are depicted in the tables below.
Table 1.1 shows the measurement of the heights of the subjects recorded in cm. Table 1.2 shows the weights of the subjects were recorded in Kg. Table 1.3 manifests the measurements of the girths and bone breadth recorded in cm. Table 1.4 gives a description of the eight skinfold measurements of the subjects recorded in mm.

Table 1.1: The lowest, highest and mean heights of the high school basketball players in (cm)

Variable	Highest	Lowest	Mean
Height	185	162	175

The above table (table1.1) shows the highest height that is 185cm and lowest height that is 162 cm of the subjects. The table also manifests the mean of the heights being 175cm.
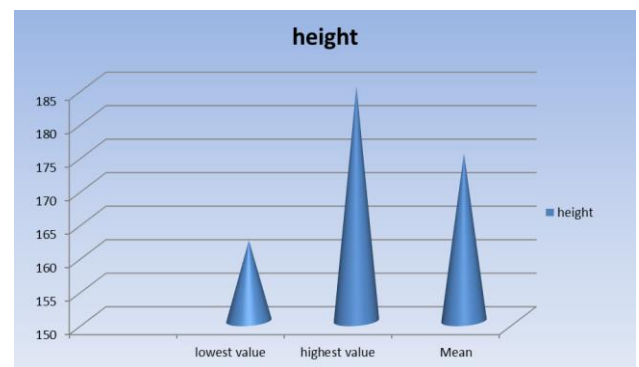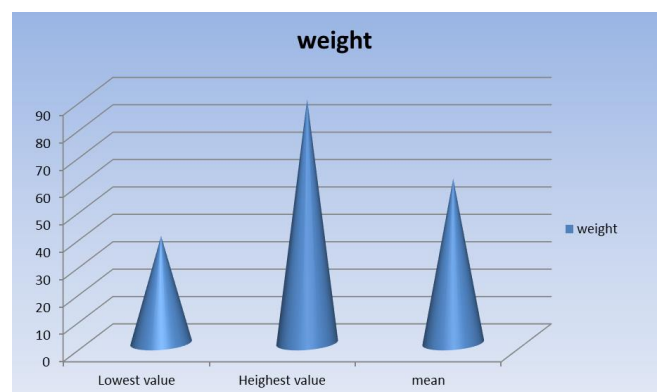

Fig 1.1: Graphical representation of mean heights of the high school basketball players (in cm)

Table 1.2: The lowest, highest and mean weights of the high school basketball players in (kg).

Variable	Highest	Lowest	Mean
Weight	89	39	59.85

The above table (table1.2) shows the highest weight that is 89 kg and lowest weight that is 39 kg of the subjects. The table also manifests the mean of the weights being 59.85.
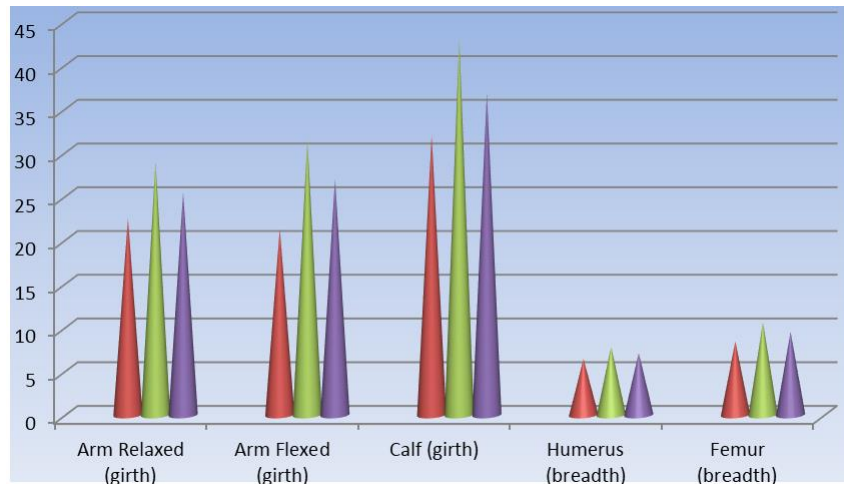

Fig 1.2: Graphical representation of mean weights of the high school basketball players

Table 1.3: The lowest, highest and mean girths and bone breadths of the high school basketball players in cm.

Variable	Highest	Lowest	Mean
Arm (relaxed)	29	18.7	25.5
Arm (flexed)	31.5	21.3	27.1
Calf	43	32.5	36.85
Humerus breadth	7.8	6.6	7.1
Femur breadth	10.6	8.4	9.5

Table 1.3 presents the highest, lowest, and mean girths and bone breadths. The girths being Arm (relaxed) shows highest value of 29, lowest 18.7 while the mean is 25.5. Arm (tensed) are recorded as 31.5, 21.3 and 27.1 being highest, lowest and mean respectively. The calf girths were recorded as 43, 32.5 and 36.85 being highest, lowest and mean respectively. Along with the girths, breadths of humerus and femur were recorded. The humerus had highest breadth as 7.8, lowest as 6.6 and mean as 7.1. In case of femur, the breadths were 10.6, 8.4 and 9.5 being highest, lowest and mean respectively.
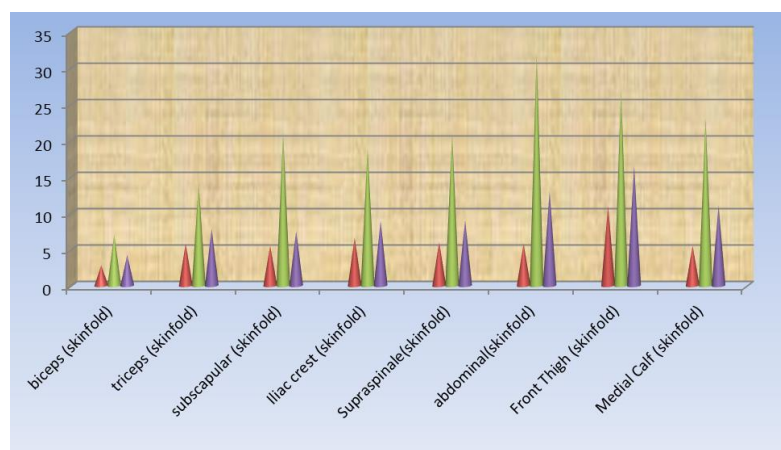

Fig 1.3: Graphical representation of mean girths and bone breadths of the high school basketball players (in cm)

Table 1.4: The lowest, highest and mean skinfold measurement of the high school basketball players in mm.

Variable	Highest	Lowest	Mean
Triceps	14	5.8	7.8
Subscapular	21	5.5	8.7
Biceps	7.0	2.8	4.1
Iliac crest	19	6.6	8.9
Supraspinale	21	6.0	9.0
Abdominal	31	5.8	12.6
Thigh	27.0	11.1	16.30
Calf	5.5	23	10.3

Table 1.4 shows the values of the skinfold measurement of various body portions. These values of these measurements are explained below in the order of highest, lowest and mean. Triceps skinfold measures were 14, 5.8 and 7.8. Subscapular skinfold values were 21, 5.5 and 8.7. Biceps skinfold measurements were 7.0, 2.8 and 4.1. Iliac crest skinfold showed the values as 19, 6.6 and 8.9. The skinfold measures of supraspinale were 21, 6 and 9. The values of abdominal skinfold were 31, 5.8 and 12.6. Thigh skinfolds were 27, 11.1 and 16.30. The eighth skinfold measurement being calf depicted the values as 5.5, 23 and 10.3.
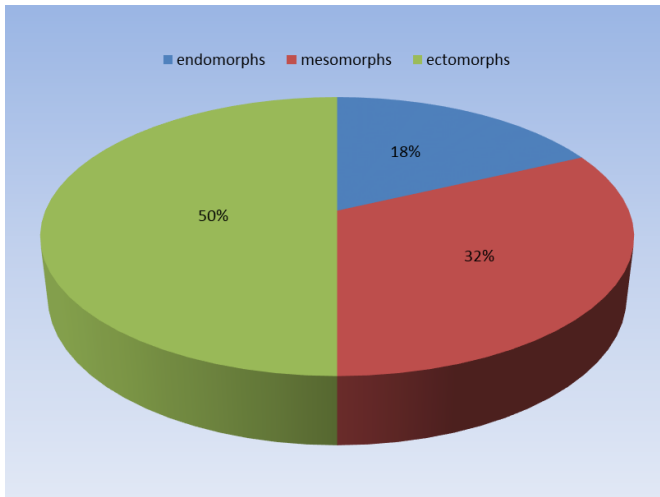

Fig 1.4: Graphical representation of mean of skinfold measurement of the high school basketball players (in mm)

Table 1.5: The presentation of somatotyping of the high school basketball players is shown in the table in percentage

Somatotype	Percentage values
Endomorphs	16%
Mesomorphs	32%
Ectomorphs	50%

The above table depicts the somatotyping of the sample in terms of percentage. The endomorphs were 16% of the total sample followed by 32% mesomorphs followed by 50% ectomorphs.

Fig 1.5: Graphical representation of somatotypes of the high school basketball players (in percentage)

Discussion and conclusion
The findings of the present study depicted that majority of the basketball players who practice at Chandigarh Basketball Association Training Centre at New Public School, sector-18, Chandigarh were ectomorphs as (50%) showing the characteristics like Naturally Skinny, Long arms/legs, Small bones, Small Waist followed by the mesomorphs as (32%) showing the characteristics like Medium to Big Joints, Small Waist, Nice Broad Upper Back/Shoulders, Lean without much work, Muscular, Strong, well developed chest whereas(16%) are endomorphs as they showed the following characteristics like high levels of Body Fat, big boned and large framed, Short Arms/Legs, Rounded Body.

The study of somatotyping of basketball players carried out by Puwar and Upadhya, 2013 revealed that majority of basketball players are Ectomorphs. The mean score of height and weight of basketball players were greater than the mean scores of present study as aforementioned study was done on the age group from 18 to 25 years, which is the period of complete growth whereas the present study was carried out on the age group of 14 to 16 years which is still a period of development.

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