

## Study of Anthropometric Measurements and Physical Fitness Components to the Performance of Cricket Players

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**Abstract:** *Anthropometric qualities and somatosensory profile give data about essential groundworks of an individual concerning the devices of engine capacity. Cricket is most well known sports in India yet not very many studies have been carried out on unambiguous anthropometric attributes of the cricketers. Thus, the present review was done to investigate the particular anthropometric and somatotype qualities of the cricket players as indicated by their areas of specialization. An all out 60 male cricketers with the mean time of  $17.58 \pm 2.09$  yrs were characterized into three classes and absolute 13 Anthropometric parts including somatotype profile have been assessed. Bowlers have more prominent level, more noteworthy arm length for useful at season of bowling conveyance. The somatotype attributes of the batsmen are 2.8-3.9-3.3, trailed by bowlers (2.8-3.8-3.4) and all-rounders (2.9-3.8-3.5). Generally speaking, these somatotype attributes of the cricketers have a meso-ectomorphic physical make-up (2.8-3.8-3.4). The current review features that the locale level cricketers of West Bengal have mesomorph constitution followed by ectomorph.*

**Keywords:** *Anthropometry, Body Structure, Cricketers, Somatotype.*

### I. Introduction

Physical fitness is a general concept and is defined in many methods via specific scientists. Physical fitness is mentioned right here in two predominant classes: fitness associated Physical fitness and anthropometric measurements. Despite some overlap between these classifications, there are essential variations, as described under. Health related physical fitness is defined as fitness associated with some issue of health. This form of Physical fitness is broadly speaking encouraged by means of an individual's workout habits; for this reason, it's far a dynamic nation and can exchange. Physical characteristics that represent health-related physical fitness include energy and staying power of skeletal muscular tissues, joint flexibility, body composition, and endurance. Anthropometric measurements are noninvasive quantitative measurements of the body. Consistent with the centers for ailment manage and Prevention, anthropometry affords a treasured evaluation of nutritional reputation in children and adults. Normally they're used within the pediatric population to evaluate the overall fitness reputé, nutritional adequacy, and the growth and developmental sample of the kid. Growth measurements and normal boom styles are the gold standards by way of which clinicians assess the health and nicely-being of an infant. In adults, body measurements can assist to evaluate health and nutritional status and destiny disorder risk. These measurements can

also be used to determine frame composition in adults to help decide underlying nutritional popularity and diagnose weight problems.

The middle elements of anthropometry are peak, weight, head circumference, body mass index (BMI), frame circumferences to evaluate for adipose (waist, hip, and limbs), and skin fold thickness. In step with the yank Academy of Pediatrics and the kid health and disability Prevention (CHDP) program health assessment tips, correct serial anthropometric measurements can assist discover underlying clinical, dietary, or social problems in children. Abnormal anthropometric measurements, especially in the pediatric population, warrant similarly evaluation. Anthropometric measurements also

can check body composition in athletes; this has been proven to optimize the aggressive performance of athletes and to help discover underlying medical issues, together with eating problems.

The notoriety of cricket in India, explicitly in West Bengal state has been expanded in jumps furthermore, limits, despite the fact that the game is excluded from the Olympic games. The fact that it makes it understood ubiquity arrives at sky limit in most republic nations. From financial mark of view, Cricket, in any event, being well known in a portion of the nations, can likewise measure up not exclusively to soccer, yet additionally to tennis and boxing. Notwithstanding the above realities, the logical examinations on cricket are rare when contrasted with soccer, tennis and cricket, where logical examinations are bounty. Not at all like different games, Cricket is being sorted in three fundamental

disciplines/ occasions, like 5 days cricket, ODI or on one occasion cricket restricted to 50 overs and the most recent T20, the 20 over-cricket. The interest of each discipline might differ. Build or anthropometric profile can be characterized as efficient estimations of size, shape furthermore, extent of the human body. Somatotype, the essential piece of build is the delicate marker for sports people and individuals from varying backgrounds with respect to their actual development what's more, dietary attributes. Explicit actual attributes or anthropometric profiles demonstrate whether a competitor would be reasonable for the opposition at the most elevated level in a particular game.

Cricket is grouped into three areas of specializations based on ranges of abilities, similar to batsmen, bowlers and all-rounders in certain examinations, Wicket-Guardians are likewise delegated one more sort of specialization. In this review, the wicket-keepers have been remembered for batsmen since they are the defenders as well as batsmen. As per Baskrik et al. (1986). Customary actual work might achieve changes in body organization and muscle to fat ratio percent. In a concentrate on the build and body structure of Olympic style sports competitors. Infer that the competitors are both conceived and made. "The essential design" should be introduced for the chance of being a competitor to contend. Legitimate body assists the competitors with coming to at the high degree of achievement that estimation of anthropometric parts alongside level also, age further developed the forecast cutthroat execution in sports. As per standard active

work, during youth, came about in a positive impact on the body piece and heartperseverance. It is show that anthropometric profile including level and weight of world class competitors' assume huge part in elite execution. Assessment of these factors extends the evaluation of morphological qualities which can fundamental in relate body construction and sports execution of first class competitors Level is advantageous for bowling like bob, length in cricket. Ordinary actual work adjusts anthropometric qualities and the somatotypes of kids. Based on past writing, anthropometric qualities of an individual proposes a significant job in any games including cricket. This might be achieved by the way that anthropometric attributes of the cricketers are meager in World writing. Thus, the current review has been completed to investigate

i) The anthropometric qualities of the cricketers as indicated by their range of abilities of specializations.

ii) The somatotype profile of the cricketers with areas of specializations

iii) The distinctions, if any, as indicated by the specializations, since, there are smidgen of deviations in preparing the batsmen, bowlers and all-rounders

## **II. Research Methodology**

Absolute 60 area level male cricketers of West Bengal with the mean time of  $17.58 \pm 2.09$  years partook in this review, with areas of specialization bunches as batsmen (N=20), bowlers (N=20) and all-rounders (N=20). The workers who taken part in region competition with a preparation time of least two years were chosen for the review from two significant clubs where the top region level players of West Bengal come for preparing. The current review was supported by the Establishment's

moral council. Every one of the workers have been welcomed and informed about the study and composed assent was gotten. The information were gathered under regular climate in morning meeting between 7 am. To 11 am. A sum of 13 physical and anthropometric parts were estimated following strategy of ISAK rule . All information estimated in three-fold with the middle score utilized for the estimation by a similar specialist, who holds an ISAK level license Weight and standing level were taken by Dr. Trust (USA) (Model: Outright Helpful) electronic individual weighing scale and stadiometer (Vittico) separately with exactness of 100 g and 0.1 cm. All skinfold thickness was estimated utilizing the Harpenden (Baty Worldwide) skin crease calipers-CE 0120 with 0.2 mm precision. Length and circuit were surveyed by Anthropometric Tape (Cescorf-2m) of 1 mm exactness. Sliding caliper was utilized for bone broadness with exactness of 1 mm. Every one of the estimations were taken from right half of the worker body. BMI of the gathered information (table no.2) is determined by weight in kg/level in  $m^2$  and level of fat was finished by Durnin and Womersley forecast condition, 1974 ;{ level of fat=Intercept-(incline  $\times$  log(X))} where X =sum of four skinfolds (biceps, rear arm muscles, sub scapular and suppicant)] agreeing age factor [20]. BMR was anticipated from 66+ (13.7  $\times$  weight, kg) + (5.0  $\times$  height,cm)- (6.8  $\times$  age, y).

The Heath-Carter recipe [17, 21] has been utilized for somatotype computation and arrangement. The formulae are as follows:

#### A. Endomorphic component

$- 0.7182 + 0.1451 \times \sum SF - 0.00068 \times \sum SF^2 + 0.0000014 \times \sum SF^3$   $\sum SF$  = (sum of skinfold thickness of triceps brachii, subscapular, and superior iliac)  $\times$  [170.18/height (cm)] This is called height corrected endomorphy.

#### B. Mesomorphic component

$= 0.858 \times \text{breadth of bi-epicondylar humerus} + 0.601 \times \text{breadth of bi-epicondylar femur} + 0.188 \times \text{corrected girth of upper arm} + 0.161 \times \text{corrected girth of calf} - \text{height} \times 0.131 + 4.5$  Corrected value is [value - (1/10 skinfold thickness)]

#### C. Ectomorphic component

The ectomorphic component is the difference according to the value of the height-weight ratio (HWR,  $HWR = \text{height} / 3 \sqrt{\text{weight}}$ ) is also known as Ponderal index (PI).  $HWR \geq 40.75 = 0.732 \times HWR - 28.58$   $38.25 < HWR < 40.75 = 0.463$

$\times HWR - 17.63$   $HWR \leq 38.25 = 0.1$  (or recorded as  $\frac{1}{2}$ )

The formula marked on the somatotype chart (2-D) is as follows:  $X = \text{Ectomorphic component} - \text{Endomorphic component}$   $Y = 2 \times \text{Mesomorphic component} - (\text{Endomorphic component} + \text{Ectomorphic component})$

**Table-1: Anthropometric of the cricketers**

Sl. No.	Variables	Equipment	Measuring units
1	Body Weight	Weighing scale	Kilogram
2	Standing Height	Stadiometer	Centimetres
3	Biceps skin fold	Harpenden (Baty International) skin fold callipers-CE 0120	Millimetres
4	Triceps skin fold		
5	Subscapular skin fold		
6	Suprailiac skin fold		
7	Medial calf skin fold		
8	Humerus breadth	Moore and Wright (MEB-528)	Centimetres
9	Femur breadth		
10	Upper Arm Circumference	Anthropometric Tape (Cescorf-2m)	
11	Maximum Calf Circumference		
12	Leg Length		
13	Arm Span		

### III. STATISTICAL ANALYSIS

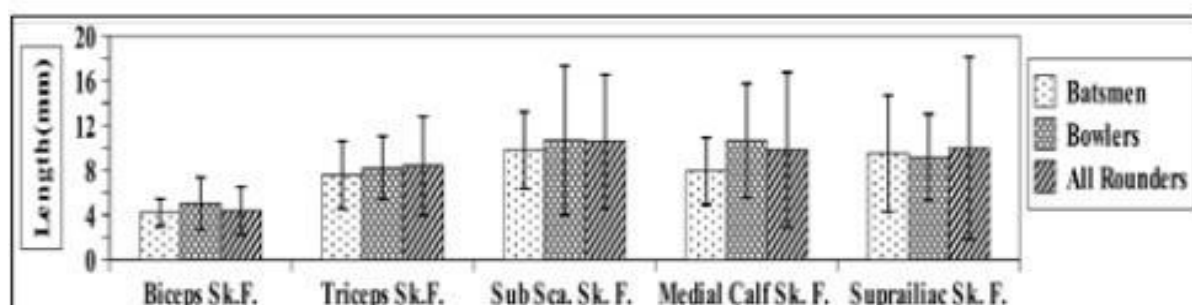
Statistical analyses were finished by utilizing Gnumeri Bookkeeping sheet. Anderson-Sweetheart Ordinarieness Test was finished to comprehend the circulation design and as indicated by the nature of the circulation design, one wayANOVA was applied for assurance of level of importance. The degree of Graphic insights of anthropometric qualities of cricketers are introduced in Table 2. Level, Weight and level of muscle versus fat of bowlers are somewhat higher than their different partners, yet not altogether. Other physical qualities are practically comparable. Normal BMI of all cricketers is around 20 and explicit gatherings are similar to the complete gathering. No massive contrasts in all actuality do exist among three particular gatherings.

**Table 2: Elementary characteristics of the cricketers according to theirspecialization (Mean ±**

Variables	Batsman	Bowler	All rounder	Total
No. of Volunteers	20	20	20	60
Age (years)	18.05±2.44	17.50±1.64	17.20±2.12	17.58±2.09
Height(cm)	164.96±6.49	167.28±6.29	161.32±7.43	164.52±7.09
Weight(kg)	54.52±6.48	57.25±9.03	51.92±12.80	54.56±9.87
Body Fat (%)	12.90±3.81	13.54±4.16	12.96±5.59	13.13±4.52
BMI	20.12±1.95	20.41±2.78	19.78±3.81	20.07±2.91
BMR	1514.12±103.55	1567.73±141.91	1466.88±195.56	1516.51±154.85

BMI: body mass index, BMR: basal metabolic rate. \*Significant at  $p < 0.05$

SD)

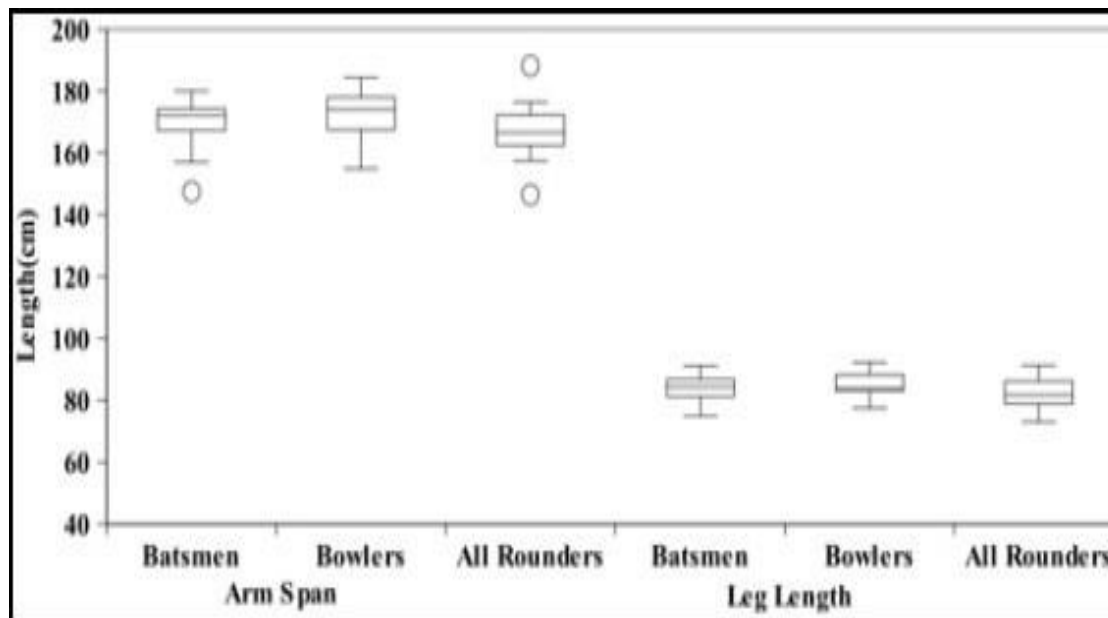


**Figure 1: Graphical portrayal of skinfold factors**

It is seen that there is no huge distinction among three gatherings in skinfold thickness from fig. no 1. The mean also, SD upsides of five skinfold thicknesses don't contrast importance has been fixed at  $p = 0.05$

### IV. Results

The essential actual qualities of three gathering volunteers are displayed in Table 2. Information are addressed as Mean  $\pm$  SD. Figure 2 uncovers that arm length have anomaly in both side of all rounder and batsman just for negative side. The leg length information are assembled into the inter quartile range for all gatherings. It is seen that no tremendous contrasts exist among the three specialization gatherings.



**Fig 2: Boxplot of Arm Range and Leg Length of the cricketers as indicated by their specialization.**

Table 3 delineates information about other actual parts. Lean weight, upper arm peripheries, greatest calf gatherings, arm range and leg length of the bowlers are most elevated followed by the batsmen and the all-rounders, yet no tremendous contrasts exist among them.

**Table 3: Explicit Anthropometric qualities of the cricketers as per specialization shows in the roar noted table (Mean  $\pm$  SD).**

No.	Anthropometric parameters	Batsmen	Bowlers	All-rounders	Total Cricketers
1.	Lean body mass (kg)	47.39 $\pm$ 4.95	49.29 $\pm$ 6.59	44.61 $\pm$ 8.09	47.10 $\pm$ 6.84
2.	Humerus Breadth (cm)	6.53 $\pm$ .24	6.49 $\pm$ .32	6.6 $\pm$ .68	6.54 $\pm$ .05
3.	Femur Breadth (cm)	9.17 $\pm$ .48	9.23 $\pm$ .49	8.81 $\pm$ .81	9.07 $\pm$ .63
4.	Upper Arm Circumference (cm)	25.65 $\pm$ 2.15	26.78 $\pm$ 2.41	24.98 $\pm$ 3.47	25.8 $\pm$ 2.79
5.	Maximum Calf Circumference (cm)	32.00 $\pm$ 2.03	33.32 $\pm$ 3.06	31.72 $\pm$ 3.31	32.68 $\pm$ 2.89
6.	Arm Span (cm)	170.04 $\pm$ 8.04	172.47 $\pm$ 7.60	167.14 $\pm$ 8.63	169.88 $\pm$ 8.26
7.	Leg Length (cm)	83.93 $\pm$ 4.27	85.16 $\pm$ 4.18	81.92 $\pm$ 5.17	83.67 $\pm$ 4.68

\*Significant at  $p < 0.05$

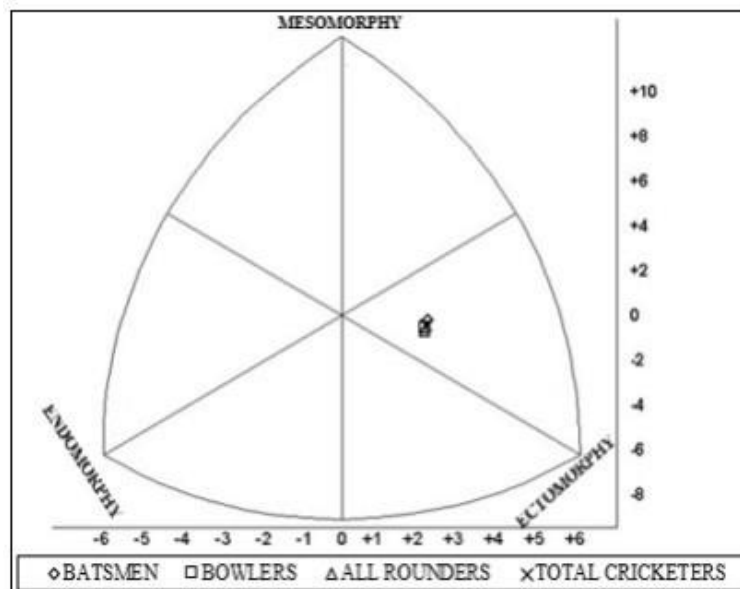
**Table 4: Somatotype attributes of the cricketers as per specialization shows in the howl noted table.**

Variables	No. of Volunteers	Endomorphy	Mesomorphy	Ectomorphy	X	Y
All Cricketers	60	2.84 $\pm$ 1.34	3.82 $\pm$ 1.00	3.38 $\pm$ 1.26	0.52 $\pm$ 2.48	1.43 $\pm$ 2.54
Batsman	20	2.76 $\pm$ 1.17	3.87 $\pm$ 0.78	3.33 $\pm$ 1.13	0.57 $\pm$ 2.18	1.64 $\pm$ 2.06
Bowler	20	2.84 $\pm$ 1.15	3.77 $\pm$ 1.10	3.35 $\pm$ 1.33	0.51 $\pm$ 2.56	1.35 $\pm$ 2.95
All Rounder	20	2.93 $\pm$ 1.68	3.81 $\pm$ 1.13	3.45 $\pm$ 1.38	0.48 $\pm$ 3.03	1.29 $\pm$ 2.65

\*Significant at  $p < 0.05$

Table no. 4 shows that Mesomorph part, everything being equal, are moderately ruling. The endomorph part is low also, mesomorph part is high for three gatherings of the cricketers,

demonstrating a meso-ectomorphic body, despite the fact that no huge contrast has been shown



**Figure 2: Graphical portrayal of Somatotype of various specialization in cricket among these their specific gatherings.**

Figure 2 delineate the somatotype plotting of the batsmen (2.8- 3.9 - 3.3), the bowlers (2.8 - 3.8 - 3.4) and all-rounders (2.9- 3.8 - 3.5). The general qualities of cricketers address the normal plotting in the somatochart with less endomorphic qualities. Every one of them have a meso-ectomorphic physical make-up.

## V. Discussions

Anthropometric profile, as physiological profile, mirrors the actual capacity of a games individual. In our current review, normal level, B.M.I. of the bowlers are higher than that of batsmen and all-rounders. These discoveries additionally upheld the perceptions on area level and Goa state level players. Build or Anthropometry is connected with capability. Transformation of the physiological frameworks occur in various ways relying upon the preparation and movement in that games. For instance, the physiological variations are unexpected in longdistance runners in comparison to their badminton partners. Additionally, theanthropometry, the design or the somatotype attributes contrast between a long distance runner and a badminton player. Level is useful for bowling like bob, length and better BMI assists with creating the most extreme power during conveyance of the bowling. It is seen that mesomorph part of all the specific bunches are moderately higher than the ectomorph and endomorph parts, demonstrating that the area level cricketers in this study have a meso-ectomorphic physical make-up.

A more drawn out arm length in cricket is significant in handling as well as inpace bowling. In our review, the arm length of the cricketers is similar with those of between area level cricketers of yet lower than world class Australian cricketers . All-rounders in the present review, have generally more noteworthy humerus expansiveness then, at that point, the batsmen and bowlers. It shows that greatest power starting from elbow joint, is used during bowling and application power of the drive at batting in game and during handling. This might be because of the preparation attributes of these

players. Normal femur broadness of bowler has similarly high and assist with creating strength from surface also, keep up with the equilibrium during bowling activity. Bowlers have greatest Arm Range region

that assists with making most extreme scope of movement during pace bowling and furthermore an extraordinary advantage in handling. It is likewise a benefit to keep an extraordinary influence in bowling conveyance and keeping up with great line and length (spot to detect) during bowling. Furthermore, Bowlers have likewise more noteworthy leg length that help to keep up with balance what's more, put together the all out security and keeping up with the most extreme execution over the course of the year.

No massive contrasts exist among endo, meso and ectomorphy parts of the current area level cricketers of West Bengal. Mesomorph part is high trailed by ectomorph and endomorph. The bowlers, batsmen and all-rounders have a meso-ectomorphic build. On the other hand, the between college level cricketers of Uttar Pradesh have an anthropomorphic constitution where the ectomorph parts rule over meso and endomorph parts. The Australian quick bowlers showed a somatotype profile of 2.4- 5.2-2.4 mirroring a meso-ectomorphic constitution. The vast majority of the past investigations uncovered that speed bowlers ruled in mesomorph parts and our review likewise upholds the past discoveries. The world class gathering of hockey players likewise show a meso-ectomorphic body at all the positions. In addition, somatotype of the games people relies upon nationality and racial attributes other than the preparation variations and even a survey has been distributed on nationality and progress in cricket. In our review, batsmen have most noteworthy mesomorph parts, might be for more noteworthy equilibrium,

power and solidarity to help greatest score by hitting limits, scoring runs. Indeed, even the bowlers and all-rounders likewise show a mesomorph physical make-up, proposing greater strength. These somatotype attributes of present area level cricketers and in other studies demonstrate a mesomorph physical make-up followed by ectomorph and endomorph

## VI. Conclusions

Subsequently, the current review features that the anthropometry qualities like somatotype, leg length and arm range may be given an extraordinary search in recognizing future cricket ability. As a result, the regional players become physically stronger and develop better dash run, standing broad jump, hand grip strengths, trunk flexibility and agility test than from the school cricket team players. Future Implications It is suggested from the findings of this study that cricket coaches should focus to improve strength, speed, trunk flexibility and power of the cricket players. The sprint training would be an effective way to improve the strength of leg muscles was related to bowling speed and batting performance of cricket players.

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