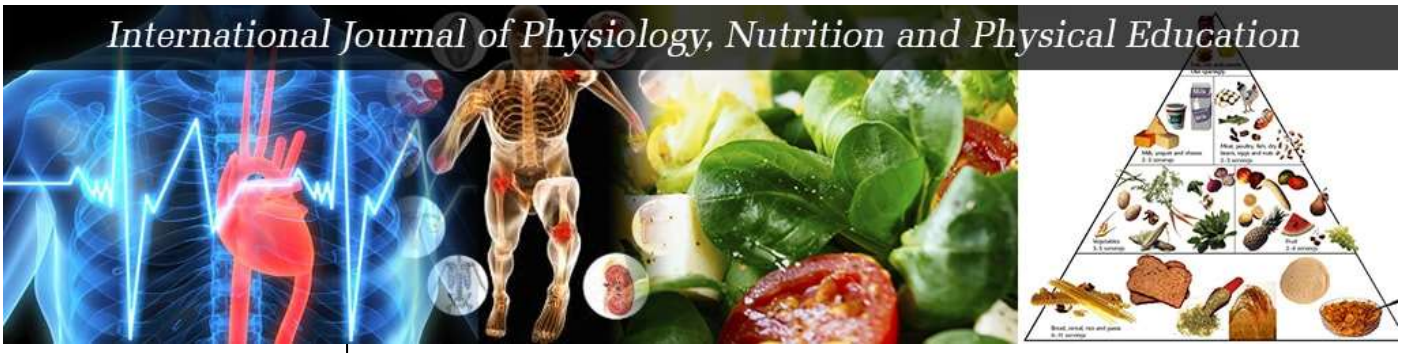

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Morphological characteristics of elite male cricket players

Dr. Chandu Gurappa Lamani

Abstract
The purpose of the study is to investigate somatotype components of four different age group cricket players of Goa. A total of two hundred (200) male state level cricket players in the following age groups *viz*., Under-14 N= 50, Under-16 N= 50, Under-18 N=50, and Under-22 N=50 participated as the subjects in the study. Standard procedures were followed for taking 17 anthropometric measurements. The three components of the somatotype were derived using revised Heath-Carter somatotype methods. The hypotheses of the study were tested by SANOVA procedures. When four groups were compared to each other the result demonstrated that all four groups were significantly different from each other in their somatotype components. It was concluded that cricket players of different age groups showed "specialized" body dimensions and physique at various stages of their age group. The relationships established in this study strongly suggest that coaches include specific morphological tests in their fitness programs and they should further be used in team selection processes as they are strong indicators for success and will make the selection process more objective.

Keywords: Somato-type, special ANOVA, cricketers

Introduction

Cricket is an international team sport that requires significant physical preparation in order to complete long hours of competitive play to achieve a success. Movement patterns in the game are characterized as intermittent and continuously changing responses to different batting and bowling situations. Morphological characteristics, such as body form, can influence the effectiveness of such responses, as has been observed in other team sports. Therefore, anthropometric profiles may contribute to understanding a player's suitability, particularly at high standards of play. In fact, morphological characteristics of players have become a major field of interest for many trainers and sports scientists. Previous reports have shown that body structure and morphological characteristics are important determinants of performance in many sports and certain physical impressions such as body composition (body fat, body mass, muscle mass, etc.) and physique can significantly influence athletic performance. Some of these researchers have studied the relationship between morphological characteristics and physical performance in order to evaluate the effect of physical predisposition on the choice of sport and the influence of training on the morphological characteristics (Lamani, Chandu. 2015) [2].

Cricket is a sport which requires all players to field and bat and is supported by a set of skills that define a player's role which will contribute to the accomplishment of the team. According to research studies, most successful athletes have the appropriate structures with their performance task; therefore, assessment of the variability between these structures and tasks will enhance our understanding of the aspects of human physique. Research literature indicates that, batsmen tend to be smaller and lighter than bowlers and it is actually very hard to generalize about the body type that characterizes cricket players. Sachin Tendulkar (5'-5"), Gundappa Vishwanath, (5'-5"), Sunil Gavaskar (5'-5") and Brian Lara (5'-8") were all mesomorphic. Fast bowlers of early 2000s of the world, Ian Bishop, Courtney Walsh, Glen Mac Grath, Angus Fraser, Allan Donald, Shoaib Akhtar, and Courtly Ambrose, however, tend to tower over six feet, with a balanced ectomorphy. During 2000s all-conquering Australian cricket team, majority of the players were a combination of mesomorphic-ectomorph in their body type (Chandu Lamani., 2018) [4].

The purpose of this study

1. To study and compare the three Somatotype components of Under-14, Under-16, Under-18 and Under-22 cricket players of Goa.

Materials and Methods

Subjects for the study were cricket players of Goa Under-14, Under-16, Under-18 and Under-22 years of age (N=50 in each group). The sample was purposively selected. These subjects studied in various Schools, Colleges or were employees in various departments of Goa Board and Goa University, but were active in cricket participation with regular coaching/ training in their respective regional coaching centres.

Variables

Below mentioned anthropometric, and body composition measurements were obtained during each testing session. The measurements were all recorded in the metric system. Necessary content was obtained from all Coaches and Managers of the respective clubs to test their players and obtain data (Marfell Jones, 1982). Standard procedures were followed for taking 09 anthropometric measurements. (Table 1).

Table 1: List of Anthropometric Variables Measured and recorded

Sr. No.	Variables	Units
01	Stature (Standing Height)	Cm (to last 0.5cm)
02	Body Weight	Kg (to last 0.5kg)
03	Sub scapular Skinfold	mm
04	Supraspinale Skinfold	mm
05	Triceps Skin fold	mm
06	Medial Calf Skinfold	mm
07	Biepicondylar Hummers width	Cm (to last 0.5cm)
08	Tense Arm Girth	Cm (to last 0.5cm)
09	Calf Girth	Cm (to last 0.5cm)

Statistical Analysis

Somato type components were computed as follows

A) Endomorphy was obtained by finding sum of skin fold Triceps, Sub scapular, and Supraspinale skin fold (SSf) using the following formula:

Endomorphy = $0.1451x(-0.00068\ SSf^2 + 0.000014\ SSf^3 - 0.7182)$

B) Mesomorphy component was obtained from the following equation.

Mesomorphy = 0.858(E)+0.601(K)+0.188(A)+0.161(C)-0.131(H)+4.5

Where
E = Hummers Breadth (cm);
K = Femur Breadth (cm);
A = Corrected arm girth: [Arm girth (cm) – triceps sf / 10) (mm)]
C = Corrected Calf Girth: [Calf girth (cm) – (Medial Calf sf /10) (mm)]; and
H = Height (cm)

C) Ectomorphy component was obtained from the reciprocal of the Pondural Index X Reciprocal of Ponderal Index = $h/(w^3)$ or h (w-0.333)
If RPI is greater than 40.75,

Ectomorphy = 0.732 RPI – 28.58

If RPI was equal t or less than 40.75 and greater than 38.25,

Ectomorphy = 0.463 RPI – 17.63

If RPI was equal to or less than 3825, a minimal Ectomorphy rating of 0.1 was assigned.

One way somatotype analyses of variance was used to compare the somatotypes of all four groups as a whole. Special analyses of variance called SANOVA, which uses somatotype attitudinal distances within and between groups, as explained in Carter, *et al*. (1983) was employed. For the purpose of analyses a SWEAT technologies somatotype calculation and analysis software was used for computation. To test the hypothesis, the level of significance was set at 0.01.

Results of the Study

Table 2: Somatotype Mean and Standard deviation of U-14, U-16, U-18 and U-22 Cricket Players of Goa

Age Group	Endomorphy Mean & SD	Mesomorphy Mean & SD	Ectomorphy Mean & SD	F-Ratio
Under-14	4.48 ± 1.27	3.68 ± 1.36	2.73 ± 1.04	18.2*
Under -16	5.44 ± 0.99	3.21 ± 1.14	3.32 ± 0.98	
Under-18	4.40 ± 1.29	4.55 ± 1.31	2.77 ± 0.97	
Under -22	4.11 ± 1.30	5.60 ± 0.97	2.71 ± 1.16	

*<0.01

The somatotype values obtained (Table no 2) reveal that in U-14 player's endomorphy is the dominant component followed by mesomorphy and ectomorphy. The U-16 group is characterized by dominant endomorphy followed by ectomorphy and mesomorphy. In U-18 group mesomorphy is the dominant followed by endomorphy and ectomorphy. In U-22 group Mesomorphy is the dominant component followed by endomorphy and ectomorphy. U-14 players seem to be more of mesomorphic-endomorphic, U-16 group players seem to be Ectomoprhic-endomorphic, while U-18 and U-22 groups seem to be endomorphic-mesomorphic. The obtained F- value (18.2) is significant at 0.01 level of confidence. The significant F-Ratio obtained indicated that four groups significantly differ in their mean somatotype. The significant levels for difference between means obtained upon post-hoc analyses U-14, U-16, U-18 and U-22 cricket players are given in table no 3. The combined Somatotype chart mean and standard deviation of Under-14, Under-16, Under-18, & Under-22 cricket players of Goa is illustrated in the figure no 1.

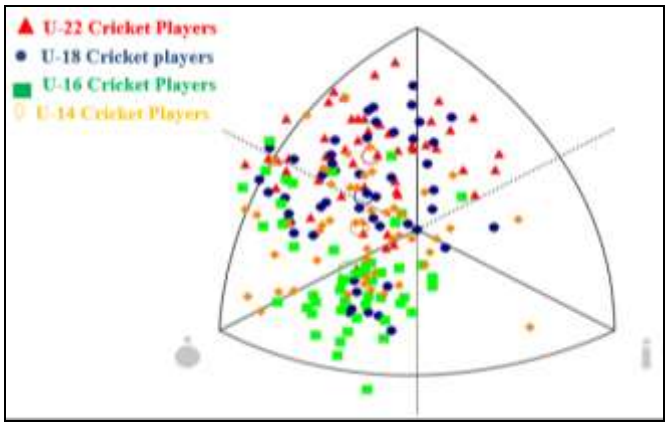

Fig 1: Combined Somatochart of U-14, U-16, U-18 and U-22 cricket players

Table 3: Post-Hoc Analysis of Somatotypes of Under-14, Under-16, Under-18 and Under-22 Cricket Players of Goa

Actual Group Mean & SD	Under -14	Under -16	Under-18	Under-22
Under-14 4.48 – 3.68 – 2.73 1.27 – 1.36 – 1.04		F=8.8*	F=04.32*	F=22.45*
Under-16 5.44 – 3.21 – 3.32 0.99 – 1.41 – 0.98			F=19.27*	F=49.68*
Under-18 4.40 – 4.55 – 2.77 1.29 – 1.31 – 0.97				F=07.18*
Under-22 4.11 – 5.60 – 2.71 1.30 – 0.97 – 1.66				

* $p > .01$

The post-hoc analyses of Somatotype of all six groups found significant

The findings in the present study were the importance of the body characteristics of the Goan elite male Cricket players. Knowledge of the physical characteristics of cricket players can provide insight into those individual factors that influence the players' competition performance and, as a consequence, are considered in the selection of players to a specific game plan. Indeed, it seems that there's a significant difference in morphological characteristics between the four groups of cricket players under study.

The table No-2 of somatotypes of four groups exhibited that U-16 age group players are having higher mean value in endomorphic and ectomorphic component, while U-22 age group players exhibited higher mean value in mesomorphic component. The F-ratio was found significant between the groups. Investigation of post-hoc tests revealed that all the six groups were having significantly different mean in somatotype at 0.01 probability level.

Discussion

It was speculated that the somatotype characteristics have generally been distinct when athletes reached adulthood. Between the age group of 12 to 16 years might not be an optimal age for them to establish the typical somatotype characteristics. They may become more pronounced as they reach adulthood and compete in higher level competitions. When we observe endomorphy mean scores of U-14 and U-16 age group cricket players they are higher than the U-18 and U-22 age group cricket players. The present results agree with those obtained by Malina R.M., (2004) who suggested that young players tend to present a higher body mass in relation to stature during formal training. This difference can be explained by the process of growth that occurs during the first two decades of life. This may also be because of the less intensive training pattern, and not having enough knowledge about diet and nutrition, participation in lower level of competitions. In U-22 age group player's mesomorph component was found higher than the others because their pubertal growth might have already completed and their muscle mass was more pronounced because of the training process includes strong contractions of the muscles that lead to increase muscle mass and proper knowledge of diet and nutrition. This might have contributed to their higher mesomorphic mean score.

Conclusion

When four groups were compared all the four groups were significantly different from each other in their somatotype components. U-14 and U-16 group players had dominant endomorphic component, while U-18 and U-22 group players had dominant mesomorphic component. 16 and below age group players might not be an optimal age for sportsman to achieve the required physique for the sports as they will be still in the growth stage, the somatotype scores of these two groups are not identical as expected, but 16 years and above groups showed more balanced physique which is required for the competitive sports. Still, we may conclude that in the beginning of their playing period the sportsmen were more endomorphic, and then after going through intensive training and participating in higher competitive level of competition their body typing were found to be more mesomorphic.

Further, it was concluded that somatotype, may be key factor in the process of talent identification in cricket. According to specialists, cricket is a dynamic team sport and, therefore, the determination of body build profiles may become a key factor in assessing players' capabilities in regard to their fitness levels and efficiency during performance. It seems that somatic differences between player positions in young players does not play a key role as in adult players. Coaches should not pay attention to the body typing of the young cricket players while selecting the young players.

The present study demonstrates that by considering a variety of morphological characteristics and performance characteristics, which are believed to be advantageous for competition, and the conditioning training of cricket players, we may be able to enhance the ability of selection of the best possible cricket players for a competitive team. The morphological characteristics of the cricket players can be studied according to their positions played on the team to plan individualized training regimens.

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