ASSESSMENT OF SOMATOTYPE IN INDIVIDUALS INVOLVED IN SOCCER PLAYING AT DIFFERENT POSITIONS

Ayan Chatterjee^{1, 2*}, Sandipan Chatterjee¹, Neepa Banerjee³ & Shankarashis Mukherjee³

> ¹Human Performance Analytics and Facilitation Unit University of Calcutta 92 Acharya Prafulla Chandra Road, Kolkata 700 009; India ² School of Health Care Rishihood University Sonipat, Haryana ³Public Health Analytics Unit West Bengal State University Barasat, West Bengal *Corresponding author email: ayan4189@yahoo.com

Abstract

Total tribal population in India is 10.43 crore, consisting 8.6% of the total population. Santhals are one of the largest tribal communities inhabiting states of West Bengal., Bihar. Jharkhand. On the other hand, physical activity has been considered as the basic need for every work and particularly in team sports. Keeping this in view the present study has been undertaken in 43 Santhal males, of age range 18-26 years, involved in regular soccer playing, to compute the somatotyping characteristics and to find out whether there is any variation in such scoring among individuals playing at different positions. Anthropometric measurements included body weight, stature, skinfold thickness, breadths, girths. Somatotyping scores also calculated. Results of the study concluded that defenders and midfielders had high mesomorphic component whereas individuals, playing at forward position, possessed the highest ectomorphic component.

Keywords: Anthropometry, somatotype, body composition, physical fitness

Introduction

High-performance sport is constantly searching for ways to improve results, win competitions and break records. Searching, identification and orientation of talents are considered a concern in high-performance sport¹. Soccer is a team sport that depends heavily on aerobic endurance and short-term, high intensity intermittent activities² needing high levels of performance, combined with high levels of technical and tactical skills, with particular physical and physiological characteristics³. The best performances are observed for individuals who have

the anatomical and morphological characteristics favorable for specific sport⁴. Thus, body morphology is an important factor for both the identification of sports talents and the development of professional athletes⁵. Somatotype is a tool that can be used in the talent identification for specific sports in which individual may get advantage. It also allows the development of specific training programs which differs between sports, positions and game requirements for individuals. Monitoring of several anthropometric parameters in young sports persons of different ages indicated that physical activity was beneficial to health, prompting a decrease in fat mass and an increase in muscle mass. In this backdrop the present study has been undertaken to compare the anthropometric profile, body composition and the relative dominance of Endomorphy (relative fatness), Mesomorphy (relative musculo-skeletal robustness) and Ectomorphy (relative linearity) status between the individuals receiving training in football and sprinting.

Methodology

Initially institutions imparting training in football and sprinting were approached and required permission was obtained. All participants were males. Individual consent was taken from all participants after verbal explanation of the purpose of the experiment. The inclusion criterion was that the participants should have a minimum physical training experience of three years and practice regularly for at least an hour for six days in a week. 43 male individuals (aged in the range 18 - 26 years) belonged from Santhal tribe group. Information about age (year), period for which individuals are receiving physical training (year) were recorded in predesigned schedule. To describe the physical characteristics and somatotype of the participants - stature, body weight, four skinfolds (triceps, subscapular, supraspinale, medial calf), two bone breadths (humerus and femur), and two circumferences (biceps and calf) measurements were used. Stature was measured to the nearest 0.1 cm using an anthropometric rod and body weight to the nearest 0.1 kg using a pre calibrated weighing scale, with the participants wearing no shoes and light clothing. Skinfold measurements were taken to the nearest 0.2 mm using a skinfold caliper. Biepicondylar breadth of the humerus (cm) and Biepicondylar breadth of the femur (cm) were measured to the nearest 0.1 cm using a spreading caliper. Body mass index (BMI) was calculated from measured stature and body weight data. Bicep circumference (cm) and calf circumference (cm) were measured to the nearest 0.1 cm using a non-elastic tape. All measurements were taken from the right side of the body by the same observer according to the procedures described in the Anthropometric Standardization Reference Manual⁶. Percentage of Bone and body water was measured by using hydration scale. The three somatotype components, endomorphy, mesomorphy, and ectomorphy were calculated⁷. Each component was rated on a scale of 1-7. Obtained data were tabulated for further statistical analysis and the chosen level of significance being 0.05.

Results and Discussions

In Table 1, the sample size (n), age (year), playing experience (year) have been presented in AM \pm SD form.

| Variables | Defenders | Midfielders | Forwards |
|------------------------------------|------------------|-----------------|-------------|
| Sample size (n) | 15 | 16 | 12 |
| Age^ (yrs) | 21.5 ± 2.11 | 20.8 ± 2.32 | 20.5 ±2.07 |
| Stature [^] (cm) | 164.2 ± 5.22 | 163.9 ± 6.08 | 166.5 ±5.02 |
| Body weight^(kg) | 54.4 ± 2.41 | 57.5 ± 6.90 | 56.9 ±4.70 |
| BMI^ (kg. m ⁻²) | 22.2 ± 2.4 | 22.5 ±1.8 | 21.6 ±2.7 |

Table 1: Basic Profile of the Study Participants

Data were represented in AM \pm SD, ^ns

Body composition variables of study participants have been presented in Table 2.0.

Table 2: Body composition profile of study participants

| Variables | Defenders | Midfielders | Forwards |
|-----------------|-----------------|---------------|-----------------|
| Body fat (%) | 13.9 ± 3.04 | 16.2 ± 4.76 | 15.0 ± 2.98 |
| Body Muscle (%) | 45.1 ± 2.90 | 47.4 ± 2.30 | 462 ± 2.56 |
| Σ4Skf (mm) | 36.9 ± 10.7 | 36.7 ± 12.8 | 37.8 ± 9.5 |
| Bone (%) | 15.4 ± 1.51 | 14.9 ± 0.99 | 15.9 ± 0.96 |
| Body Water (%) | 59.1 ± 3.73 | 62.7 ± 2.49 | 60.5 ±3.18 |

Data were represented in AM \pm SD, ^ns

Somatotyping score in terms of Endomorphy, mesomorphy and ectomorphy score of study participants has been presented in Figure 1.0.



**P<0.01

Fig. 1: Comparison of Endomorphy, mesomorphy and ectomorphy score of the study participants

Specific anthropometric characteristics are needed to be successful in certain sports events. Process whereby the physical demands of a sport lead to selection of body types best suited to that sport is known as "morphological optimization"⁸. While measuring body composition, the total body weight is divided into two components: Lean Body Weight and Fat Body Weight. Physical characteristics and body composition have been known to be fundamental to excellence in athletic performance⁹. Specific athletic events require different body types and weights for maximal performance. Today it has been widely accepted by the experts that top performance in sports is achieved if an athlete possesses the basic anthropometric characteristics suitable for the event. There are numerous factors which are responsible for the performance of a sportsman. The physique and body composition, including the size, shape and form are known to play a significant role in this regard. At present, sportsman for superior performance in any sports is selected on the basis of physical structure and body size. Soccer is a game where standard physical characteristics with height and weight are required for good performance. Due to concept of total football in modern soccer, most of the players except the goal keeper possessed very similar height and weight irrespective of positions like forward, midfielder and defender etc. Soccer is a game where talent is an important factor. But apart from talent in skill, body type or somatotype, which is determined by the human genotype, is an important factor for good performances besides other physiological demands. Soccer is a game where mesomorphic component is an important factor for strength with a prevalence of ectomorphic components. Thus, an ectomorphic mesomorph body type is more desirable for speed and endurance with strong muscle power. For a game like soccer where muscle strength with speed and endurance plays an important role for performance based skills. This could be reflected in different studies where male soccer players were distributed over much of the mesomorphic sector of the somatochart⁷. In the present study individual playing as defender and forwards in the soccer team were - Ectomorphic mesomorph. Individual playing as midfield in the soccer team were - Endomorphic mesomorph. The findings of the present study regarding the somatotype score of individuals playing as a midfielder in the soccer team was in agreement with the findings of the previous study¹⁰. Finding regarding somatotype score of individuals playing as a forward and as a defender position also in agreement with previous study ¹¹. The endomorphic component is closely related to adipose tissue, it has a negative influence on performance. Fat tissue is unable to contract and develop force and, therefore, it represents additional body weight during the 90 minutes of the game, and causes unnecessary expenditure of energy, which may lead to earlier fatigue during the game¹². More importantly, endomorphic inclination may be regarded as an indicator of under-training. Therefore, it is important to regularly control body fat content and undertake somatotype assessment. Low endomorphy with high ectomorphic component helps to dissipate greater amount of heat through evaporation. The findings of the present study regarding the somatotyping score of individuals in agreement with the findings of another study which reported that, somatotype of professional soccer players is within the mesomorphic sector on the somatochart¹¹⁻¹². Similar observation has been found in previous studies ¹³.

Conclusion

From the present study it may be concluded that, somatotyping score of defenders and forwards were Ectomorphic mesomorph whereas Midfielders were Endomorphic mesomorph.

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