SOMATOTYPE AND BODY COMPOSITION OF ADOLESCENT BADMINTON PLAYERS IN KERALA

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ABSTRACT

Purpose: The athletes succeeding in certain sports have distinctive body characteristics that differ according to the demands of the type of sports. The present study attempted to evaluate the somatotype and body composition of the adolescent badminton players in Kerala state and compare it with the overseas counterparts. Methods: 30 male badminton players were chosen from various districts in Kerala state as the subjects of the study. Their mean age was 17.6 ± 1.7 years, height 165.5 ± 5.3 cm and weight 63.5 ± 4.9 kg. Anthropometric measurements included skinfolds (triceps, subscapular, suprailliac, abdomen and calf), bicondylar breadths (humerus and femur) and girths (biceps and calf). Percent Body Fat was calculated using the formula prescribed by Faulkner J.A. while somatotype assessed using the Heath-Carter method. Results: The badminton players of this study fell into the somatotype category of balanced mesomorphs with a score of 3.0 - 4.1 - 2.5. Their mean body fat percentage was 11.4 ± 1.3% and average total weight of fat was 7.3 ± 0.8 kg. It was also found that their body fat% is higher than their overseas counterparts. Key words: Badminton, Somatotype, Body Fat, Lean Body Mass.

INTRODUCTION

How man varies in physique has been an important topic in the course on human population biology. Over the years the relationship between physique and sports performance has been substantially studied and well established and generally accepted by researchers and practitioners in this field. The measurement of body composition of athletes was of interest since the early 1940s when Wellem and
Behnke first measured the body composition of All American collegiate football players and demonstrated that these players are overweight by normal height and weight standards but not obese (Welhem and Behnke 1942).

Anthropometric profiles of elite athletes provide insight into the requirements for competing at top level in particular sports. 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) and physique (somatotype) can significantly influence athletic performance (Carter 1984).

Percent body fat (% fat) has been defined as the percentage of total weight that composed of fat (Gutin 1980, Corbin & Lindsay, 1997). Lean Body Mass (LBM) refers to all the body tissues like muscles, bones etc. excluding the stored deposit fat. That means LBM is the total body weight minus the weight of the stored fat (Matthew 1980). The somatotype is a description composed by the individual’s physique and it is defined by a set of three components: the endomorphy, which is the greasy component; the mesmorphy, which is related to the muscular component and presents the solidity and “square” body aspect, and the ectomorphy in which it predominates the linearity and the fragility of the body (Powers SK, Howley ET. 2000).

Studies of body composition in certain sports indicated that athletes who were very lean but heavy because of a well-developed musculature were superior in performance in certain competitive sports activities, such as football, weight lifting and shot put (Bullen, 1971). On the other, long-distance swimming, water polo and synchronized swimming are sports where certain 'Optimal' level of body fat is required. The low density of fat gives it buoyancy characteristics, which is advantageous in their respected sports.

Tanner (1964) has pointed out that without the required physique an athlete is unlikely to reach a high level of success. In other words somatotype and body composition can reveal a lot about one’s capacity to succeed in particular sports. The present study analyzed several anthropometric variables with a view to establishing the current anthropometric characteristics of male adolescent badminton players from Kerala state, India, and compared the data with their overseas counterparts.
METHODS

30 male adolescent badminton players from various districts of Kerala state, India, aged between 15 to 18 years (mean age = 17.6, SD = 1.71) were chosen as the subjects of the present study. Their mean height was 165.5+/-5.31cm and weight 63.5+/-4.92kg. All were in competition or training for competition at the time of data collection.

The anthropometric measurements taken are skinfold thickness of triceps, supraspinale, subscapular, calf and abdomen; biceps and calf circumference and femur and humerus breadths. Skinfold measurements were taken using Skin-fold caliper with constant tension, Vernier Caliper was used for assessing breadths and steel measuring tape used for measuring circumferences. The method of Heath and Carter, which is based on the Sheldon's somatotype classification, was applied to determine the somatotype characteristics of the subjects (Heath B and Carter J, 1967). The body composition variables were determined by using the following formulas.

\[
\%\text{ Body Fat or PBF} = (\text{triceps + subscapular + suprailiac + abdominal skinfolds } \times 0.153) + 5.783 \quad \text{(Faulkner J.A. (1968))}
\]

\[
\text{Total Weight of Fat} = \frac{(\text{Weight } \times \text{ percent of fat})}{100}
\]

\[
\text{Lean Body Weight or LBW (kg)} = (\text{Total Body Weight – Total Weight of Fat})
\]

Statistical Analysis

Basic statistical descriptive parameters such as mean and standard deviation have been calculated for the analysis of the data.

RESULTS

The anthropometric measurements of the subjects were presented in Table 1. The average height of the badminton players in this study is 165.5cm and weight 63.5kg. Among skinfold measurements, the highest value was found in abdominal skinfold (11.4mm) while the least value observed at calf skinfold (7.3mm). The average biceps girth of the subjects was 30.1cm
and calf girth 34.2 cm while the average values of humerus and femur breadth was 6.78 cm and 9.48 cm respectively.

**Table 1. Various anthropometric characteristics of the subjects.**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (cm)</td>
<td>165.5</td>
<td>5.31</td>
<td>156</td>
<td>175</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>63.5</td>
<td>4.90</td>
<td>56</td>
<td>71</td>
</tr>
<tr>
<td>Triceps skinfold (mm)</td>
<td>9.9</td>
<td>201</td>
<td>7.1</td>
<td>14.5</td>
</tr>
<tr>
<td>Suprailiac skinfold (mm)</td>
<td>10.2</td>
<td>1.7</td>
<td>7.7</td>
<td>13.9</td>
</tr>
<tr>
<td>Subscapular skinfold (mm)</td>
<td>9.90</td>
<td>1.3</td>
<td>7.9</td>
<td>12.6</td>
</tr>
<tr>
<td>Abdomen skinfold (mm)</td>
<td>11.4</td>
<td>1.3</td>
<td>8.4</td>
<td>14.7</td>
</tr>
<tr>
<td>Calf skinfold (mm)</td>
<td>7.3</td>
<td>1.2</td>
<td>5.1</td>
<td>9.2</td>
</tr>
<tr>
<td>Biceps girth (cm)</td>
<td>30.1</td>
<td>2.1</td>
<td>31.6</td>
<td>25.4</td>
</tr>
<tr>
<td>Calf girth (cm)</td>
<td>34.2</td>
<td>1.8</td>
<td>36.5</td>
<td>30.1</td>
</tr>
<tr>
<td>Humerus Breadth (cm)</td>
<td>6.78</td>
<td>0.29</td>
<td>6.1</td>
<td>7.3</td>
</tr>
<tr>
<td>Femur Breadth (cm)</td>
<td>9.48</td>
<td>0.52</td>
<td>8.3</td>
<td>9.9</td>
</tr>
</tbody>
</table>

The somatotype and body composition values of the subjects were depicted in table 2. It reveals that the badminton players in this investigation fall into the somatotype category of balanced mesomorphs with a score of 3.0-4.1-2.5. Their mean % body fat was 11.4 +/- 1.3% and total weight of fat 7.30 +/- 0.8 kg. The subjects exhibited an average lean body mass percentage of 88.4 +/- 1.20% and lean body weight of 56.2 +/- 4.29 kg respectively.
Table 2. Somatotype and body composition values of the subjects.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endomorphy</td>
<td>3.0</td>
<td>0.52</td>
<td>2.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Mesomorphy</td>
<td>4.1</td>
<td>0.78</td>
<td>3.0</td>
<td>6.5</td>
</tr>
<tr>
<td>Ectomorphy</td>
<td>2.5</td>
<td>0.64</td>
<td>1.5</td>
<td>4.0</td>
</tr>
<tr>
<td>% body fat</td>
<td>11.4</td>
<td>1.30</td>
<td>8.2</td>
<td>14.8</td>
</tr>
<tr>
<td>Total weight of fat (kg)</td>
<td>7.30</td>
<td>0.80</td>
<td>5.8</td>
<td>10.2</td>
</tr>
<tr>
<td>% lean body mass</td>
<td>88.6</td>
<td>1.20</td>
<td>85.5</td>
<td>91.9</td>
</tr>
<tr>
<td>Lean body weight (kg)</td>
<td>56.2</td>
<td>4.29</td>
<td>51.7</td>
<td>68.5</td>
</tr>
</tbody>
</table>

**DISCUSSION**

The purpose of the study was to analyse the somatotype and body composition of the male adolescent badminton players in Kerala. The results revealed that the somatotype of the badminton players were balanced mesomorphs. Similar results were obtained in another study carried out by Kerry et al. (2003) on South African elite junior badminton players who were categorized as balanced mesomorphs with a somatotype score of 3.0-4.1-3.1. The average body fat percentage of these players was 9.9%. Compared to this, the present study badminton players exhibited higher body fat percentage. Contrary to the present study badminton players, the South Australian players were more ectomorphic and less endomorphic with a mean somatotype of 2.5-4.6-3.2, falling into the category ‘ectomorphic mesomorph’ (Carter and Heath, 1990). The greater height of these players reflects in their higher value of ectomorphy.

In another study the somatotype of the Indonesian young badminton players was found to be ‘central’ with a score of 3.3-3.7-3.7 (Neni et al. 2007) which contradicts the findings of the present study. The Indonesian badminton players were found to be comparatively shorter and lighter than the present study badminton players.
CONCLUSION

The adolescent male badminton players of Kerala under this study were ‘balanced mesomorphs’ with a score of 3.0-4.1-2.5. Their mean body fat percentage was 11.4% while mean weight of fat was 7.3kg and percent lean body mass 88.6%. Compared with South African junior badminton players they were found to possess higher body fat percentage. The present study badminton players were shorter than the South Australian badminton players and at the same time they were taller and heavier than Indonesian youth badminton players.

REFERENCE


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