17 - SOMATOTYPE AND ANTHROPOMETRIC PROFILE OF YOUTH FOOTBALL PLAYERS

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INTRODUCTION

The human body has several types of measures, such as linear measurements that are represented by lengths, the area measurements, such as body surface area and volume measures such as lung capacity. There proportionalities between various body measurements that change depending on the state of growth, development and who also suffer influences of gender. However, a combination of measures such as weight and height, have a range that lets you check the status of individual subnutrition, normal, overweight or obese (ROSE et al., 1984; RICARDO; Araújo, 2002).

In addition to measures of body composition (body fat, lean body mass), an excellent of the structure, composition and shape of the human body refers to the technique of somatotype. This technique constitutes an extremely useful resource for analysis of changes in the shape and body structure as a function of training, or by the physical demands of the activity in question (CARTER, 2005).

In summary, somatotype seeks to describe the three-dimensional conformation of the individual morphology expressed in three basic components: the first, the endomorph, portrays the participation of the body fat amount of in the individual, the second a mesomorph, reports the influence of development musculoskeletal and third component, the ectomorphy to quantify the linearity aspect of physical type (De GARAY, 1974).

Originally described by Sheldon in 1940, from the use of numerical scales, allowed a more objective analysis of body composition, somatotype technique has undergone several changes over the years. In the 60s, Heath and Carter proposed a technique to estimate anthropometric somatotype. Since then, this is the method most used due to the simplicity in data collection and low margin for error (CARTER, 2005).

Worldwide use of the somatotype technique is widespread in an attempt to investigate the relationship between body type and athletic performance in various sports (CARTER, 1968; RAHMAWATI et al. 2006). National studies have also been conducted with the same objective in some sports (JUNIOR et al. 2006; QUEIROGA et al. 2005).

Thus, it is observed that body composition is an important aspect to the athlete's fitness level in any sport, because fat excess can decrease athletic performance (MARQUES at al. 2000). Besides impair sports performance of an athlete, a high level of body fat is related to the incidence of chronic degenerative diseases such as diabetes and hypertension (DEMINICE & ROSE, 2009). Therefore, aim of this study was to determine the somatotype and anthropometric profile of Youth category footballers.

METHODS

This study characterized as a cross-sectional according to Gil (1996). The procedures used in this study follow the Resolution 196/96, the National Health Council of Brazil, which deals with humans research procedures. To conduct this study were selected 22 players of Operário Ferroviário Football Club from the Youth category in Ponta Grossa city, Paraná state.

Anthropometric variables, weight and height, were measured according to the description of Gordon et al., (1991). To measure the height, we used a stadiometer with a measurement scale by 0.1 cm. The total body weight was measured using an electronic scale Tanita Model A-80, with precision of 100g.

The skinfolds thickness were measured as follows: triceps, subscapular, suprailiac and calf, as indications of Benedetti et al. (2003) using a skinfold caliper type Cescorf with 0.1 mm precision. Were also measured two bone diameters (biepicondiliano, bicondiliano) obtained according to the standardization of Harrison et al. (1991), with a metal calipers model Mitutoyo and two girths (contracted arm and calf) were collected with a flexible tape measure, (Cardiomed, Brazil), the standardization proposed by Callaway et al. (1991).

Relative body fat calculation (% BF) was employed to Siri equation (1961) {%BF = [495/body density(g/ml)] – 450}. The body density (Dens.) was calculated from the use of the regression model that uses the sum of the three skinfold thickness (PETROSKI, 1995). Dens. = 1,10726863-0,00081201*(ST TR + ST SE + ST SI + ST PM)+0,00000212*(ST TR + ST SE + ST SI + ST PM)2 - 0,00041761*(Idade).

The somatotype was determined according to the procedures of De Rose et al, (1982) following anthropometric method proposed by Heath and Carter (1967). For comparison, somatotype was categorized according to Carter (2002). The somatotype was also plotted on a graph (somatochart), developed by Carter and Heath (1990), in which we calculated the X and Y coordinates values: X = ectomorphy - endomorph, mesomorph Y = 2 x-(+ ectomorphic endomorph).

For statistical data, was initially used descriptive statistics to group the results in mean values with their respective standard deviation (SD) and the maximum and minimum values.

RESULTS AND DISCUSSION

Table 1 shows the results of anthropometric assessment of the players involved in this research. The maximum value obtained after the establishment of BMI, as can be seen in Table 1, was 24.59 kg/m², a value lower than the cutoff for considering a person who is overweight of 25 kg/m² according to ACSM (2003).

Table 1. Anthropometric profile of Youth footballers.

Variables	Age (years)	Weight (kg)	Height (m)	BMI (kg/m^2)
Average	**18,73**	**68,91**	**1,79**	**21,60**
SD	**0,83**	**5,74**	**0,06**	**1,35**
Maximum	**20**	**78,5**	**1,91**	**24,59**
Minimum	**18**	**57,3**	**1,71**	**19,37**

BMI is widely used in practice with large populations, it is an anthropometric method of fast procedure and low cost which correlates well with body fat and some degenerative diseases incidences (CADDIA, 1998). However, according Barata (1994) this method is inefficient when applied to sports, because sportsmen have large muscle masses. As the football players are involved in high level sport that requires of its practitioners a great fitness level, we determined the percentage of fat players (Table 2), by skinfolds, so that it could accurately determine the body composition.

TABLE 2. Skinfold Thickness and body fat percentage of Youth footballers.

Variables	Triceps	Subscapular	Supra iliac	Fat %
Average	**9,86**	**9,57**	**7,27**	**11,18**
SD	**3,11**	**2,85**	**2,10**	**2,32**
Maximum	**20**	**15**	**13**	**17,57**
Minimum	**7**	**4**	**4,5**	**7,85**

Really the body fat amount is considered a limiting factor in performance, as mentioned previously, so that high-level athletes have low amounts of body fat. An study conducted with Brazilian football athletes conducted by Guerra et al. (2004) observed through the anthropometric method a value of 10.6% fat. The average value of 12.7 ± 1.7% was observed in adult players in Southern Brazil (BARBOSA et al. 2011). These values are similar to those presented by the players involved in this study.

With respect to the fat percentage in football players, the findings in the literature range from 6 to 12%. This large discrepancy could be partly due to different methods used for obtaining these values (AL-HAZZAA et al. 2001; REILLY and DURAN, 2003).

In a study conducted in southeastern Brazil, also involving players from Youth category (U19) showed that the fat percentage was 9.9 ± 1.4% (MORAES et al. 2009). In another study also developed in the Southeast involving the U20 category, it was reported the average fat percentage of 12.3 ± 1.7% (FONSECA et al. 2008). In the study by Barbosa et al. (2011), developed in the southern region of Brazil, in the same region of this study, the fat percentage of players U20 category was 12.3 ± 1.7%. These values agree with the values of this research.

TABLE 3. Somatotype components of Youth footballers.

Variables	**Average**	**SD**
Endomorph	2,5	0,5
Mesomorph	3,6	0,8
Ectomorph	3,3	0,8

Table 3 shows the values obtained for the definition of somatotype of athletes of Youth category. From these values these athletes were classified as mesomorph-ectomorph (2,5-3,6-3,3). Therefore there is a predominance of components and musculoskeletal linear (height) relative to the adiposity component. In somatochart (Figure 1), it is observed that there was a predominance by mesomorph and ectomorph components in the analyzed group of players. In the study by Ribeiro et al. (2007) athletes category U20, also presenting a classification similar to the somatotype this study (2,7-4,5-3,2), in other words a mesomorphic profile. Same conclusion reported by Silva et al. (2008) when evaluating the somatotype profile of footballers, with predominance of mesomorphic component.

The fact that few players analyzed presents itself as one of the main limiting factors by analyzes performed in this study. Important to note that even being reduced, this study works with all players from Youth category by the team analyzed thus further studies should include players from other regions with the same age.

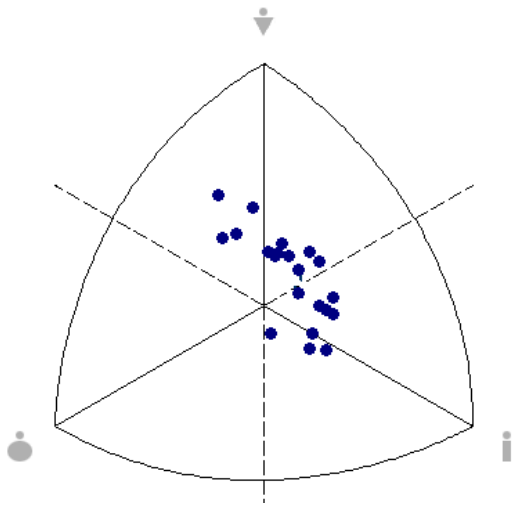


FIGURE 1. Somatochart with individual distribution of Youth Footballers

CONCLUSION

Regarding variables fat percentage and somatotype, this study concludes that the values obtained are within the values described in the scientific literature for this category, even though these individuals are still in the growth process, a fact that should be emphasized in order these values tend to increase with the progression categories. In the case of variable fat percentage, we found the average value of 11%, with respect to their respective category, considering its process of maturation and evolution of systematized training, where it becomes favorable for high performance.

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SOMATOTYPE AND ANTHROPOMETRIC PROFILE OF YOUTH FOOTBALL PLAYERS

ABSTRACT

Further to measures of body composition such as weight, height, fat and lean body mass, an excellent structure, composition and shape indicator of the human body is the somatotype technique. Therefore, the aim of this study is to determine the somatotype and anthropometric profile of the Youth football players. The sample was composed by 22 players, male, with a mean age of 18.7±0.8 years, weight of 68.9±5.7 kg and height of 1.79±0.06 m, to the Operario Ferroviário Footbal Club by Youth category, from Ponta Grossa city, Paraná state. The weight, height, skinfold thickness, body circumferences and breadths variables were collected for the purpose of the body composition and somatotype estimating of the players. Body fat calculation (% BF) was established with the body density using the PETROSKI (1995) equation, followed by the application of the Siri (1961) equation. The somatotype was determined according to Heath and Carter (1967). With the data analysis found that the average body fat percentage of the players was 11.2 ± 2.3%. As for somatotypes, it was observed that the athletes had an average feature classified as mesomorph-ectomorph (2,5-3,6-3,3). In others words, there is a predominance of musculoskeletal and linear components (height) relative to the component adiposity. The low percentage of body fat and muscle predominant component observed in the Youth players involved in this study corresponded to the morphological profile of professional athletes in this sport.

KEY WORDS: football, somatotype, anthropometry.

SOMATOTYPE ET PROFIL ANTROPOMÉTRICO DES JOUEURS DE FOOTBALL DE LA CATEGORIE JUNIOR

RÉSUMÉ

En plus des mesures de composition corporelle comme le poids, la stature, la masse corporelle maigre et grasse, un excellent indicateur dans le sens, des structures et de la composition du corps humain est la technique du somatotype. Ainsi, l'objectif de cette étude est de déterminer le somatotype et le profil d'antropométrique des joueurs de la catégorie junior. L'échantillon a été composé pour 22 joueurs, du sexe masculin, avec l'âge moyenne de 18,7.0,8 ans, le poids de 68,9.5,7 kg et la stature de 1,79.0,06 m, de la catégorie junior de l'équipe du « Operário Ferroviário », de la ville de Ponta Grossa. Les variables de masse corporelle, la stature, l'épaisseur de plis cutanés, des périmètres corporels et des diamètres osseux ont été rassemblées avec le but d'estimer la composition corporelle et déterminer le somatotype des joueurs. Pour le calcul de la graisse corporal (% G) a été utilisée l'équation de Siri (1961). La densité corporelle par l'équation de PETROSKI (1995). Le somatotype a été déterminé conforme Heath e Carter (1967). Avec l'analyse des données il a été vérifié que le centile moyen de graisse des joueurs a été de 8,9 2,2 % ±. Quant au somatotype il a été observé que les athlètes ont présenté une caractéristique moyenne classifié comme : ectomorphe-mésomorphe (2,5.3,6.33). Autrement dit, une prédominance des composants muscle-squelettiques et linéal (la stature), par rapport à la composition de l`adiposité. La basse de centile de graisse corporelle et la prédominance du composant musculaire observé dans les joueurs de la catégorie junior impliqué dans cette étude, il a correspondu profil morphologique des athlètes professionnels de cette modalité.

MOTS CLÉS: arbitre, football, somatotype, anthropométrie.

SOMATOTIPO Y PERFIL ANTROPOMÉTRICO DE JUGADORES DE FÚTBOL DE LA CATEGORIA JUNIOR

RESUMEN

Además de las medidas de composición corporal como: peso, estatura, grasa corporal y masa corporal magra; un excelente indicador de la forma, estructura y composición del cuerpo humano es la técnica del somatotipo. El objetivo de este estúdio es determinar el somatotipo y el perfil antropométrico de los jugadores de la categoria junior. La muesta fue constituida por 22 jugadores, de sexo masculino, con edad promedio de 18,70,8 años, peso de 68,95,7 kg y estatura de 1,790,06 m, de la categoria junior del equipo Operário Ferroviario Esporte Clube, de la ciudad de Ponta Grossa – Paraná. Las variables de: masa corporal, estatura, grosor de pliegues cutaneos, circunferencias corporales y diametros oseos fueron medidos con la finalidad de estimar la composicion corporal y determinar el somatotipo de los jugadores. Para el cálculo de grasa corporal (%G) se determino la densidad corporal mediante la ecuación de PETROSKI (1995), seguida de la aplicación de la ecuación de Siri (1961). El somatotipo fue determinado de acuerdo con Heath y Carter (1967). Con el analisis de los datos se constato que el percentaje de grasa corporal promedio de los jugadores fue de 11,2±2,3%. Con relación al somatotipo se observo que los atletas presentan un promedio clasificado como mesomorfo-ectomorfo (2,5–3,6–3,3). Es decir, hay un predomínio de los componentes musculo-esquelético y linear (estatura), en relación al componente de adiposidad. El bajo porcentaje de grasa corporal y el componente muscular predominante observado en los jugadores de la categoría junior, que participan en este estudio, correspondió al perfil morfológico de los atletas profesionales en este deporte.

PALABRAS CLAVE: Fútbol, somatotipo, antropometria

SOMATOTIPO E PERFIL ANTROPOMÉTRICO DE JOGADORES DE FUTEBOL DA CATEGORIA JUNIOR

RESUMO

Além das medidas de composição corporal como peso, estatura, gordura e massa corporal magra, um excelente indicador da forma, estrutura e composição do corpo humano refere-se à técnica do somatotipo. Assim sendo, o objetivo deste estudo é determinar o somatotipo e o perfil antropométrico dos jogadores da categoria júnior. A amostra foi composta por 22 jogadores, do sexo masculino, com idade média de 18,70,8 anos, peso de 68,95,7 kg e estatura de 1,790,06 m, da categoria junior da equipe do Operário Ferroviário Esporte Clube, da cidade de Ponta Grossa - Paraná. As variáveis de massa corporal, estatura, espessura de dobras cutâneas, perímetros corporais e diâmetros ósseos foram coletados com a finalidade de estimar a composição corporal e determinar o somatotipo dos jogadores. Para o cálculo da gordura corporal (%G) estabeleceu-se a densidade corporal mediante a equação de PETROSKI (1995), seguida da aplicação da equação de Siri (1961). O somatotipo foi determinado de acordo com Heath e Carter (1967). Com a análise dos dados constatou-se que o percentual de gordura corporal médio dos jogadores foi de 11,2±2,3%. Com relação ao somatotipo, observou-se que os atletas apresentaram em média uma característica classificada como mesomorfo-ectomorfo (2,5–3,6–3,3). Ou seja, existe uma predominância dos componentes músculo-esquelético e linear (estatura), em relação ao componente adiposidade. O baixo percentual de gordura corporal e a predominância do componente muscular observado nos jogadores da categoria júnior envolvidos neste estudo, correspondeu ao perfil morfológico dos atletas profissionais desta modalidade.

PALAVRAS CHAVE: futebol, somatotipo, antropometria