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BODILY COMPOSITION AND BODY TYPES OF TEENAGE TENNIS PLAYERS IN GREECE- A STUDY

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Abstract: *This article focuses on an assessment of the overall health and bodily condition of teenage tennis players in Greece. The researcher attempted to assess the different body types and characteristics and the impact they have on the performance of young tennis players. In this study, the focus is places on young tennis players, through a comparison of real data, in an effort to discover similarities and differences in the bodily composition and body types of athletes aged 12-16 years in Greece who have chosen tennis as their sport of preference and trained by coaches. The results have been analyzed with the use of SPSS.*

Key words: *ideal body type, athletes, data, sports, tennis*

1. Introduction

The In recent decades, there has been strong academic interest in anthropometric features, body composition and body shape in the various competitive sports. It has been assumed that there are certain physical attributes in many sports, such as a specific "ideal" anthropometric profile, that can be used to assess whether a player is fit to compete at the highest level in specific sports [14].

The quantification of morphological features in relation to the body structure of select athletes can become the key to their preparation and training. However, one cannot solely rely on those criteria to train or even select athletes [7].

Anthropometric measurements are considered to be important for assessment as they are easy fast non-intrusive, highly reliable and require no specialized equipment. They are indirect methods of body composition assessment which together with bioelectric consolidation analysis are tools for assessing the nutritional status and are widely applied [9].

2. Objectives

This article focuses on an assessment of the overall health and bodily condition of

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teenage tennis players in Greece, fifteen in total, with the use of scales, lipometric devices and exercises to measure their performance in their sport to assess the correlation between body type, physiological condition and BMI indexes with their ability to perform. The researcher attempted to assess the different body types and characteristics and the impact they have on the performance of young tennis players. However, in some professions, bodily composition plays an important role in the success of the person in a particular task. Professional sports and gymnastics are a clear example. In this study, the focus is places on young tennis players, through a comparison of real data, in an effort to discover similarities and differences in the bodily composition and body types of athletes aged 12-16 years in Greece who have chosen tennis as their sport of preference and trained by coaches.

The main limitation of this study is that results should be considered as a benchmark and not a mandatory model for better preparation. In this way, the results presented can be used as a reference standard but should be interpreted with caution according to the individual characteristics and needs of each. Finally, similar studies in the future would help specialists to better prepare their athletes.

3. Material – Literature Review

Survey data show that the body type and anthropometric characteristics of athletes are related to the type of sport they are referring to. There is also a relationship between high sport performance and body features such as high body stature, low body fat and high muscle mass [15].

Anthropometry is a field of natural anthropology, which in turn is a branch of wider science called ethnology. The role of anthropometry is important in sports science and physical education. The anthropometric features are the measurement of height, weight and proportion sizes that include the total size and size of members of the human body [1].

In the late 19th century, Hitchcock, the pioneer in this field, carried out measurements of parameters such as age, height, weight, chest perimeter, arm circumference, bar, and functional lung capacity [10]. Looking at the roots of Medicine, it is reported that Hippocrates determined two body types, the lances and the rounds. As [19] report, the separation of body styles is based on the German, Anglo-Saxon, and French faculties, each of which distinguishes the body types and distinguishes them accordingly [19] that the calculation of the fat percentage by the method of dermatophytes is part of the anthropometic methods of analysis, and it is done with specific instruments assessing the dermatrophymeters at specific points of the body such as triceps, biceps, hyperglyphs and osteoplasia.

Anthropometry, apart from anthropologists, paleontologists, forensic scientists, endocrinologists, commentators and pediatricians, is also useful in the science of physical education and sport. Measurements of stature and body weight are a reference framework for the calculation of physiological parameters (such as relative oxygen intake), while dermatospace measurements are used to calculate body composition. Many researchers suggest that anthropometric characteristics are related and affect athletic performance [12].

Diaczuk [6] investigated the importance of high sport performance and found that it depends on body height, length, upper and lower limbs, and palm length. Pokrajac, et al. [20], correlating the physical characteristics and the motor skills of athletes of different racing levels, found significant differences in both areas, commensurate with the athletic level of the athletes. In 1994, Bajos [2] in a similar survey, compared his own results with that of Pokrajac, M.[20], demonstrating the difference in the level of racing of certain athletes between the countries of Greece and Yugoslavia [16].

According to the measurements and the results of their research, the percentage of subcutaneous fat and the body weight of teenagers and young Greek handball players are factors that can positively alter the VO2 max of these athletes. Similar references can be made to other parameters of athletic performance indicate that the body type statistically influences the athletic position of the athletes on the field. However, although the anthropometric characteristics are related to the components of a match, they do not necessarily determine who will win or lose this fight [3].

From the above it is concluded that anthropometry is intertwined with physical activity. For example, children who participated in sports programs appeared to be thinner and develop a body with less body fat to a larger extent than other grown adults [21]. It is therefore understood that anthropometric features and body type are factors that affect athletic performance. The purpose of this paper is to contribute to the dissemination of knowledge of anthropometry and body type issues and to contribute to the training of physical education teachers and coaches both in school and athletic sport with a view to the appropriate selection of talents per sport.

4. Methods

4.1. Design

The main instruments used for the collection and review of data were scales, a Harpender type dermatometer and a measuring tape. The main instruments used for the collection and review of data were scales, a Harpender type dermatometer and a measuring tape. An assessment of skin thickness and composition is important for an accurate estimation of the body fat percentage for all people. This measurement measures the thickness of the subcutaneous tissue at certain points of the body. The organ with which subcutaneous fat is measured is called dermatropilometer. The most important measurements of the dermatophytes include the underlying muscles, superlative, biceps, and triceps. Base of defined tables and depending on age and sex, the percentage of body fat comes out. A single aspect is usually measured, and its thickness is compared with tables and curves that exist according to gender, age, and skeleton size [4].

4.2. Participants

The sample of the study consisted of fifteen (15) participants – nine (9) boys and six (6) girls with an average age of 13.7 years (Fixed Deviation = 2.1 years). The anonymity of the subjects will be preserved to avoid ethical dilemmas as the participants are under age. For this paper, the participants are identified with the use of numbers (1, 2, 3, …, 15) for the purpose of comparison and analysis.

4.3. Measure

The main characteristics assessed were a) the fat of the athletes, which was measured in two ways (dermatophytes and lipometric scales), b) the length of the bony bone, c) the length of the femur, d) the peripheral count, e) the athlete's body, f) his/her height, g) the weight and, h) the basic BMI metabolism.

4.4. Procedure

First of all, participants were asked to take place in a measurement of the following:

- Body weight
- D.Sc.
- Height
- Bust of the biceps
- Triceps
- Skin of the abdomen
- Thigh thighs
- Skin galloping
- Body fat
- Fatbioelectricity

(with scale)

- Brace bone length
- Femur length
- BMI

Differences between lipometry with dermatophytes and lipometry with bioelectric scales were tested.

Weight is considered to be important in the assessment of an athlete's overall physical health as it affects the performance of the athlete. Also, the weight measurements are important in the equation for determining Maximum Oxygen consumption and in the estimation of the Body Mass Index (BMI). Weight is further necessary for [11]:

- finding the fat mass.
- the correlation of adipose tissue to muscle mass.
- assessing the level of body hydration during or after the exercise.

The body weight measurement is done with precision scales (0.1kgr) and the use of light clothing.

Body height is a prerequisite for engaging in some sports. Also, it participates in the body mass index (BMI) equation. The measurement procedure is carried out with a precision meter (accuracy 0.1cm), and with the unskilled and fully tangled wall.

The **Body Mass Index (BMI)** that is frequently used in similar studies is a very useful tool for assessing body fat in relation to the weight of each individual. The BMI was calculated as follows: weight by height squared (the weight in kilograms (kg) and height in meters (m)[5].

For most people it is a valid indicator. The index does not directly measure body fat, but research has shown that it is well related to the direct measurement of human fat as measured by water immersion, or the DEXA (Dual Energy X-Ray Absorptiometer) method. BMI is not always applicable to certain categories of athletes (eg high-powered sports). At an individual level it can be used as a tool, but it does not constitute a diagnosis of a person's health [8].

When it comes to adults, the following applies:

a) If BMI is less than 18.5 then the person is underweight (this is associated with malnutrition, eating disorders, etc.).
b) If the BMI is from 18.5 to 24.9 then the individual has a normal weight.
c) if the BMI is from 25.0 to 29.9 the person is overweight

and

d) if the BMI is above 30.0 it indicates obesity [17].

4.5. Statistical Analysis

The statistical analysis of the data was done with the SPSS version 17 statistical package. The results of the survey showed that there were no significant differences between forehand, backhand, and serve, but neither between the age groups. Significant positive correlations with coaching age and significant correlations with several weight and fat variables were observed. Significant differences in height, abdominal dermatology, and scales were observed. Most sample athletes were obese.

5. Results and Discussions

Table 1, below, shows the distribution of participants based on age.

Age Distribution of Participants Table 1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1,00	6	40	40	40
	2,00	9	60	60	100
	Total	15	100	100	

Bodily characteristics

In table 2, one can see the physical and bodily characteristics, on average, for the total sample of the research:

Physical and Bodily Characteristics for the total sample Table 2

According to the research findings, an average of 1/3 of the athletes are obese (BMI > 30)		**Fre-quency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Normal BMI (18,5–24,9)	8	53,3	53,3	53,3
	Underweight (BMI < 18,4)	2	13,3	13,3	66,7
	Obese (BMI > 30)	5	33,3	33,3	100,0
	Total	15	100,0	100,0	

Fat of athletes

Also, measuring the fat of the athletes, reveals that the overall fat percentage of the teens was above the normal range for their age, sex and BMI levels.

Group statistics

Also, for the entire group, the findings have as follows:

Results for the entire group Table 3

			BMI			
			Normal	Underweight	Obese	**Total**
Sex	1,00	Count	6	2	1	9
		% within Sex	66,7%	22,2	11,1	100
	2,00	Count	2	0	4	6
		% within Sex	33,3	,0	66,7	100
Total		Count	8	2	5	15
		% within Sex	53,3	13,3	33,3	100

Results for body types Table 4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1,00	6	40	40	40
	2,00	9	60	60	100
	Total	15	100	100	

It appears that the findings are more accurately assessed when they are compared between the two different age groups- over and less than 14 years of age (group 1 and group 2).

It also appears that the female subjects are more likely to be obese that the male, however, statistically, the percentage is not absolute and there can be no clear conclusion as to whether a teenage girl is more likely to be obese compared to a boy, when it comes to practicing tennis.

Results based on age Table 5

			Sex		**Total**
			1,00	2,00	
Age_Gr	1,00	Count	3	3	6
		% within Age_Gr	50,0	50,0	100
	2,00	Count	6	3	9
		% within Age_Gr	66,7	33,3	100
Total		Count	9,	6	15
		% within Age_Gr	60,0	40,0	100

Results based on sex Table 1

	N	Min.	Max.	Mean	S. D.
F_Hand	15	4	8	6,33	1,047
B_Hand	15	4	8	6,80	1,146
Serve	15	3	9	5,67	1,345
Sum	15	4,33	8,33	6,2667	1,06309
Valid N (listwise)	15				

It appears that:

1) The sample is varied.
2) Different ages are associated with different findings.
3) Age plays an important role.
4) Male participants have different skin thickness than females.
5) The mean average is not indicative of the body type and composition of all participants.
6) Participants aged 12-14 years have different measurements and values than older athletes.

The body type and anthropometric characteristics of athletes in team sports are related both to the type of sport and to the sporting position. This can be considered to be logical, since each sport has different requirements and particularities in body shape and anthropometric characteristics both in

general and in particular in each race position [13]. One could, in fact, say that body stitch, upper limb length and body weight should be related to specific racing positions within the sport itself. This is also the reason why the anthropometric characteristics differ between athletes of different sports [18].

Comparing the two extreme age groups of the sample (six individuals up to 13 years and nine individuals over 14 years of age), regardless of gender, there were significant differences in Height, Weight, Skin_4, and Fem_Len (Femoral Bone Length). Specifically, younger athletes had a higher percentage of obesity. Differences in BMI, Skin_3 (Throat), Hum_Len (Brain Bone Length) and Circumf (Body Fat) are similar indications but are not considered statistically significant.

Finally, the results showed that eight of the athletes who participated in this study were mesomorphic type, two in the ectomorphic class and five in the intramodal class.

6. Conclusions

To date, few studies have looked at the physical characteristics of tennis players. This study aimed to describe anthropometric features, body composition and body shape in a homogeneous sample (according to their performance) in young tennis athletes. The results of the survey showed that there were no significant differences between the participants in their performance according to their body type. One third of the athletes who were reported to be obese are due to some peak values observed during lipometry, whose values are not significantly related to the other variables, but this did not seem to affect their performance.

The statistically significant correlations have been expected and already known from other studies as illustrated in the literature review of the present article. In particular, athletes were obese compared to athletes. The differences observed in Skin_5 (Gastrocnemius) and HumLen (Brain Bone Length) can be considered as indications of similar differences but cannot be credited as statistically significant. Similarly, the differences observed in the distribution of BMI classes are indicative of the fact that most athletes in the sample were obese than athletes, but this cannot be considered statistically significant.

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