

SOMATOTYPES PARTICULARITIES OF THE HIGH STUDENTS FROM PROFILED GROUPS IN SWIMMING

(Preliminary communication)

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Abstract

The sample of the study are 49 high students listed in the profiled groups of the “sport by choice – swimming” discipline at the Technical University – Sofia. For implementing the objective and the tasks of the study, the following methods of study are applied: survey study and theoretical analysis of specialized literature, anthropometry, calipermetry and the Heath-Carter method (1980). The variational analysis is applied to define the average values and variability of the somatotype components. The analysis shows that, although the non-stability of the somatotype components, the average somatotype for the higher students from the profiled groups in swimming at the higher schools in Bulgaria can be defined as mesomorph-ectomorph. It means that the higher students-swimmers are characterized, as a whole, by low level of the fat tissue development and the inner organs as well as by a satisfactory level of the muscle-skeleton apparatus development and the linear sizes.

Keywords: *anthropometric characteristics, adipose tissue; muscle-skeleton apparatus, Heath-Carter method, endomorph somatotype, mesomorph somatotype, ectomorph, somatotype, variational analysis,*

INTRODUCTION

The development of the body is a rather complicated biological process. The individual genetic potentialities and adaptability of the somatotype symptoms under the impact of various kinds of motive activities are determining factors in that process (Тотева, 1991, 1992).

Studies show that the striving of the scientists (Тотева, 1979; Carter, 1981; Farnosi, 1987; Slanchev & Toteva, 1984; Тотева, Димитрова & Илинова, 2002; Tzarova, Mavrudieva & Krasteva, 2008 and Църова, 2013) is directed towards finding a somatotype suitable for each kind of sport which is to cooperate for the good physical capability.

According to Toteva (1992), each basic component of the somatotype (endomorph, mesomorph, ectomorph) considers the individual height of the persons under study. These three types are rarely met in pure state (Петков, Тотева, Мазнев & Димитрова, 2012). Mixed types are formed in greater part of the cases:

- balanced endomorph;
- mesomorph endomorph;
- mesomorphed endomorph;
- endomorphed mesomorph;

- balanced mesomorph;
- ectomorphed mesomorph;
- mesomorph-ectomorph;
- mesomorphed ectomorph;
- balanced ectomorph;
- endomorphed ectomorph;
- endomorph-ectomorph;
- ectomorphed endomorph;
- central.

Слънчев (1998) and Църова-Василева (2013) have more considerably studied the dependence between the somatotype and the physical capability.

Chatziconstantinou & Poulmentis (1987) compare the separate components of the somatotype of athletes of various qualifications and have established that in relation to the endomorphed component, with a few exceptions (for the football players and high jumpers), the differences are not substantial. The champions for all disciplines (with the exception of the long distance runners) are distinguished by high mesomorphy. The ectomorphed component does not differ considerably as well, and here football and water polo are the exceptions.

Studying the somatotype indicators of 19 years

old junior women football players, Stefanov, Atanasov, & Maznev (2004) define the average somatotype of the groups as endomorphed mesomorph, which is close to the central somatotype; yet the individual results show great differences between the girls and define the non-homogeneous of the group. The research like this have Стефанов, Мазнев & Русимов (2002).

The comparison of the various swimming disciplines proves the above mentioned statement. The somatotype particularities of the swimmers are studied by Тотева, Изов & Каменов, (1989), Петков, Тотева, Косев, Георгиев, Илинова, Петкова & Пенчева (1989) and Църова-Василева (2013).

Researches on the somatotype of grown up athletes carried out Футекова (1990), Тотева (1992) and Tzarova, Mavrudieva & Krasteva (2008).

Longitudinal somatotype studies of high students from non-specialized in sport high schools are made by Тотева (1992), who defines an average somatotype of the aggregate as mesomorph-endomorph. With the same contingent are worked also Ухейши (2005), Štefanková & Brtková, 2008, Църова-Василева (2013) and Църова (2013).

The *objective* of the present study is to define the somatotype particularities of high students from profiled groups in swimming at the beginning of their teaching at the high school.

METHODS

The study is made during the period September – November 2011.

Object of the study are the physical education and sport lessons at non-specialized in sport high schools in Bulgaria.

Subject of the study are the components of the somatotype of high students from profiled groups in swimming.

Contingent of the study are 49 high students listed in the profiled groups of the “sport by choice – swimming” discipline at the Technical University – Sofia.

For implementing the objective and the tasks of the study, the following *methods of study* are applied: *survey study and theoretical analysis of specialized literature, anthropometry, calipermetry and the Heath-Carter method (1980).*

In order to define the somatotype of the high students under study, data are taken by 6 morphological indicators and 4 plicas as follows:

- straight height;
- weight;
- girdle of the right brachium at maximally contacted m. biceps brachii;
- girdle of the right shank;
- biepicondyle diameter of os humeri d.;
- biepicondyle diameter of os femoris d.;
- plicas of:
 - triceps brachii d.;
 - subscapular d.;
 - supriliac d.;
 - os cruris d.

The three components of the somatotype are defined on the base of the indicated morpho-functional indicators:

- *endomorph*, which evaluates the relative development of the adipose tissue;
- *mesomorph*, characterizing the relative muscle-skeleton development;
- *ectomorph*, characterizing the relative linearity of the body.

The *variational analysis* is applied to define the average values and variability of the somatotype components.

RESULTS

As it is mentioned in the Methodology, the Heath-Carter method (Carter & Heath, 1980) is applied to define the somatotype of the high students under study.

The analysis of the results (*table 1*) shows that as a whole, a very weak endomorphy (0,2) is observed for the high students from the profiled groups in swimming at the beginning of the teaching at the high school.

It results from the lower degree of fat deposits of the students and their higher height. A proof about that is the fact that in comparison with Тотева’s (1992) study where she points out an average height of the students at the same age of 175,2 cm, the average height of our students is 179,47 cm and something more – the average percentage of the body fat of our group under study, practicing swimming within the obligatory lessons in physical culture and sport at the higher school (13,89%), is lower than the norm for the population of their age

Table 1. Average values and variability of the somatotype basic components for the high students-swimmers at the beginning of the teaching

№	Indicators \ Parameters	n	X	S	V
1.	Endomorphy	49	0,2	0,18	108.78
2.	Mesomorphy	49	3,3	3,03	91.86
3.	Ectomorphy	49	3,0	1,62	54.79

and is a little bit high above the upper limit of the same indicator for the athletes (according to Петков, Тотева, Мазнев & Димитрова, 2012).

Mesomorphy, as a whole, is also low (0,1) although for about 14% of the basketball players, the mesomorphy coefficient is within the frames of 4,1 and 6,4 and can be considered as high. According to us, that can to a greater degree be explained by the weakly developed muscle mass and to a smaller degree – by the insufficient massiveness of the skeleton of the persons under study.

The third component of the somatotype – ectomorphy is as a whole moderate (3,2). For some of the boys anyhow (9,80%), it is very well manifested and takes a value within the frames of 5,5 and 6,9 units. The comparatively well manifested ectomorph component, as a whole shows considerable values in the relationship $height^3/\sqrt{weight}$, as well as prolonged segments and proportions of the body of the high students - basketball players under study.

Figure 1 provides good visual picture about the relative shares of the basic somatotypes observed for the high students from the aggregate under study.

It is seen from the figure that for nearly half of the students in the aggregate (48,98%), the ectomorphed mesomorph is the basic, followed by the mesomorphed ectomorph (20,41%) and the endomorphed ectomorph (16,33%). The other three basic somatotypes observed for the swimmers have got much lower relative shares – between 2,04% and 8,16%.

On the base of the basic somatotypes mentioned hereinabove, the *average somatotype* for the higher students–swimmers at the non-specialized in sport higher schools in Bulgaria can be defined as *mesomorph-ectomorph* (0,2 - 3,3 – 3,0). That means that the profiled groups in swimming studied by us as a whole list higher students characterized by low level of the fat tissue development and the inner organs as well as a satisfactory level of the muscle-skeleton apparatus development and the linear sizes.

But the analysis of *Table 1* shows that the components of the somatotype are not stable. Proof about that are the coefficient values of variation V, which are

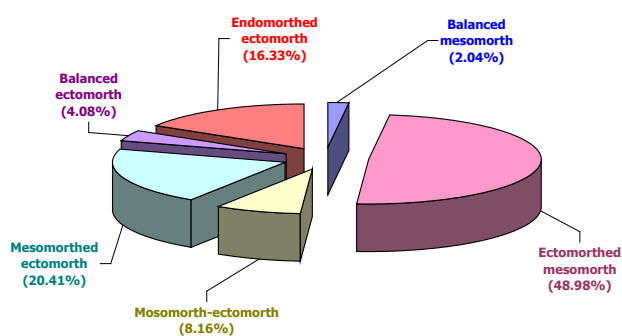


Fig.1. Relative shares of the basic somatotypes observed for the students-swimmer at the beginning of the teaching

higher than the critical (50%) and consequently, the aggregate under study is not homogeneous as to the symptoms mentioned hereinabove.

It can also be seen from the table that the ectomorphed component is relatively most stable which, as has been already mentioned, bears information about the linear sizes of the body. Greatest are the differences in relation to the degree of the fat deposits referenced to the height of the students from the profiled groups in swimming, i.e. according to the components of the endomorphy.

This fact is fully explained having in mind that the listing in the profiled groups is pursuant to the wish of the students only. Consequently, it can not at all be spoken about the availability of specific abilities for practicing swimming and effecting any selection of the students when forming the groups.

CONCLUSIONS

1. Although the non-stability of the somatotype components, the average somatotype for the higher students from the profiled groups in swimming at the higher schools in R. of Bulgaria can be defined as *mesomorph-ectomorph*.

2. The higher students-swimmers are characterized as a whole by low level of the fat tissue development and the inner organs as well as by a satisfactory level of the muscle-skeleton apparatus development and the linear sizes.

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