



ANALYSIS OF THE CHARACTERISTICS OF PHYSICAL DEVELOPMENT OF FEMALE VOLLEYBALL PLAYERS

R. Arsova*

Department „Physical Education and Sports“, University of National and World Economy (UNWE),
Sofia, Bulgaria

ABSTRACT

Discovering and selecting sports talents in volleyball is the main and most difficult task for specialists in this sport. In the initial selection, and then in monitoring the physical and technical development of the athletes, coaches rely on the morphoanthropometric features and indicators characteristic of the model of a highly qualified athlete in volleyball. The rapid pace of development of sport, which is characterized by ever closer specialization in individual sports, requires a deepening of knowledge about the structure of the human body. It is very important that the training work is aimed at individualization of training programs, in accordance with the anthropometric, physiological and psychosocial characteristics of each athlete. The purpose of this study is to develop a characteristic description of the state of anthropometric data of 15-18 year old female volleyball players. The analysis on the established average values and variability of the indicators for anthropometry characterizes the studied group as homogeneous. Minor differences are the reason for some sign dissipation in the indicators "Weight" and "Thigh circumference". The characteristic level of the female players is at a satisfactory level compared to the anthropometric criteria in volleyball.

Key words: volleyball, anthropometry, girls, physical development

INTRODUCTION

Volleyball is one of the most attractive sports in the world, which is developing at a really fast pace. A prerequisite for achieving high results is the timely identification of sports talents. The scientific approach in gathering information about physical development, motor and functional abilities can provide guidelines for the selection of young athletes for the right sport, as well as reaching a high technical level of training. Discovering and selecting sports talents in volleyball is the main and most difficult task for specialists in this sport. In carrying out the initial selection, and then in the process of monitoring

the physical and technical development of the players, the coaches rely on the morphoanthropometric features and indicators characteristic of the model of a highly qualified athlete in volleyball.

In order to achieve higher efficiency of the training impact, it is necessary for the applied exercises to be in accordance with the peculiarities of the physical development of the young athletes.

A number of authors have worked on the problem of the level and condition of the anthropometric characteristics of volleyball players (1-6). In their research, many of them identify anthropometric indicators as a major factor in both motor skills and sports - technical improvement. Signs of physical development are a necessary indicator for coaches in the implementation of various

*Correspondence to: Ralitzia Arsova, Department „Physical education and sports“, University of national and world economy (UNWE), Sofia, Bulgaria 1700, Sofia, Studentski grad, e-mail: rali.arsova@abv.bg, rali.arsova@unwe.bg, Mobile phone: (+359) 887215964,

training programs designed to improve the level of all aspects of sports training.

In a scientific study of the functional state of futsal players, the authors also examine the body structure of players, which is related to their potential for performance in a particular sport (7). Petar Ivanov (8) in his research considers the results achieved in modern sport as a complex combination of genetic factors and environmental influences. His research explores the possibilities of early genetic testing for the right choice of sport by children and pupils; on this basis, an attempt has been made for a different view of hereditary qualities which, together with the appropriate age and interest, are considered a factor determining the suitability of adolescents for training.

It is extremely important that the training work is aimed at individualization of training programs, in accordance with the anthropometric, physiological and psychosocial characteristics of each athlete.

METHODS

Data concerning volleyball athletes (aged between 15 and 18) playing in leading clubs in the country were taken for the needs of this research; the data cover 13 main signs of physical development.

The following indicators were taken into account to establish the anthropometric characteristics of the athletes:

- Hight
- Weight
- BMI

- Height with outstretched arm (stretch)
- Stretch (horizontal)
- Upper limb length
- Lower limb length
- Lower leg length
- Foot length
- Thigh circumference
- Lower leg circumference
- Knee circumference
- Hip circumference

The purpose of this study is to present the state of anthropometric data of 15-18 year old female volleyball players from the leading clubs in the country.

In order to achieve the mentioned goal we formulated the following task: to make a structural analysis of female volleyball players in terms of physical development as a function of anthropometric characteristics.

Research methods: testing; mathematical and statistical method - variation analysis through the SPSS program.

RESULTS ANALYSIS

The observed contingent is divided into two groups, depending on the age of the competitors, for the needs of the study:

- 15-16 year olds;
- 17-18 year old.

The results of the variational processing of the initial data for the physical development of the athletes from each of these groups are presented in **Tables 1 and 2**.

Table 1. Average values and variability of the signs of physical development in 15-16-year-old female volleyball players

| № | Indices/Parameters | X | S | V | min | max |
|-----|------------------------------|--------|------|-------|-------|-------|
| 1. | Hight | 177,41 | 5,78 | 3,26 | 165 | 194 |
| 2. | Weight | 66,00 | 8,22 | 12,45 | 47 | 80 |
| 3. | BMI | 20,93 | 2,05 | 9,81 | 15,35 | 24,69 |
| 4. | Height with outstretched arm | 228,45 | 8,74 | 3,83 | 215 | 257 |
| 5. | Stretch (horizontal) | 178,55 | 7,94 | 4,45 | 165 | 205 |
| 6. | Upper limb length | 76,86 | 3,23 | 4,20 | 72 | 87 |
| 7. | Lower limb length | 103,62 | 4,78 | 4,62 | 97 | 117 |
| 8. | Lower leg length | 50,41 | 2,47 | 4,90 | 46 | 57 |
| 9. | Foot length | 26,03 | 1,42 | 5,45 | 23,5 | 30 |
| 10. | Thigh circumference | 56,45 | 7,62 | 13,50 | 45 | 90 |
| 11. | Lower leg circumference | 37,38 | 2,41 | 6,45 | 31 | 42 |
| 12. | Knee circumference | 36,79 | 1,93 | 5,26 | 31 | 40 |
| 13. | Hip circumference | 100,48 | 5,69 | 5,66 | 85 | 110 |

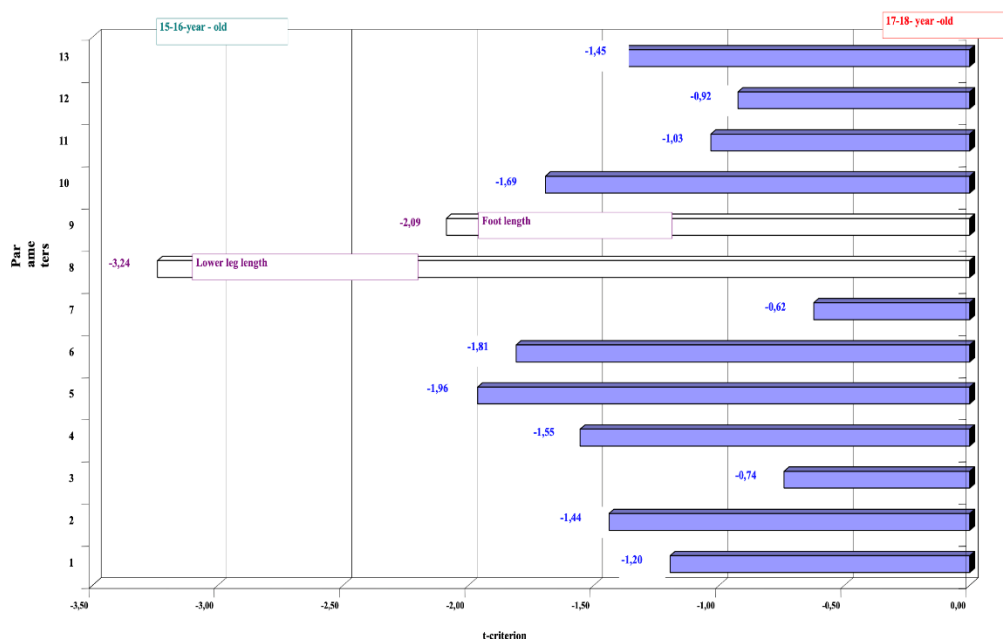
Table 2. Average values and variability of the signs of physical development in 17-18-year-old female volleyball players

| № | Indices/Parameters | X | S | V | min | max |
|-----|------------------------------|--------|-------|------|-------|-------|
| 1. | Hight | 175,39 | 6,94 | 3,95 | 164 | 194 |
| 2. | Weight | 63,25 | 5,97 | 9,44 | 51 | 74 |
| 3. | BMI | 20,56 | 1,64 | 7,96 | 17,58 | 24,17 |
| 4. | Height with outstretched arm | 224,50 | 10,38 | 4,63 | 210 | 254 |
| 5. | Stretch (horizontal) | 174,43 | 7,91 | 4,53 | 162 | 192 |
| 6. | Upper limb length | 75,14 | 3,93 | 5,23 | 69 | 84 |
| 7. | Lower limb length | 102,79 | 5,32 | 5,18 | 94 | 118 |
| 8. | Lower leg length | 47,82 | 3,53 | 7,38 | 43 | 57 |
| 9. | Foot length | 25,30 | 1,20 | 4,76 | 23 | 28 |
| 10. | Thigh circumference | 53,86 | 2,82 | 5,24 | 48 | 60 |

A comparative analysis of the results of the two age groups was performed to achieve the goal and implement the tasks of this research,. This analysis allows to determine the degree of significance of the observed differences between the average levels of the studied signs in the two groups.

The comparative analysis of the results of the 15-16-year-old and 17-18-year-old volleyball players (**Figure 1**) shows that in all the studied signs of physical development the girls from the

lower age group have an advantage. The figure shows that the values of Student's comparative t-criterion in 11 of the studied signs are in the range between 0.62 and 1.96. This gives grounds with a high guarantee probability ($P_t \geq 95\%$) to accept as correct the zero hypothesis, according to which the differences between the average levels of signs of physical development of 15-16-year-old and 17-18-year-old female volleyball players are insignificant and can be explained by random causes.

**Figure 1.** Significance of the differences between the average levels of the signs of the physical development of 15 - 16 - year - old and 17 - 18 - year - old female volleyball players

The values of the t-criterion at the 8th and 9th indicators are higher than the critical value ($t_{\text{tabl}} = 2,00$), which shows that with respect to the lengths of the lower leg and the foot, the null hypothesis must be rejected and the alternative hypothesis according to which the volleyball players of the lower age group have a

significantly longer lower leg and a larger foot must be accepted as true.

The analysis (**Figure 2**) shows that, in general, both age groups are homogeneous in terms of signs of physical development. This is a prerequisite for high efficiency of training effects.

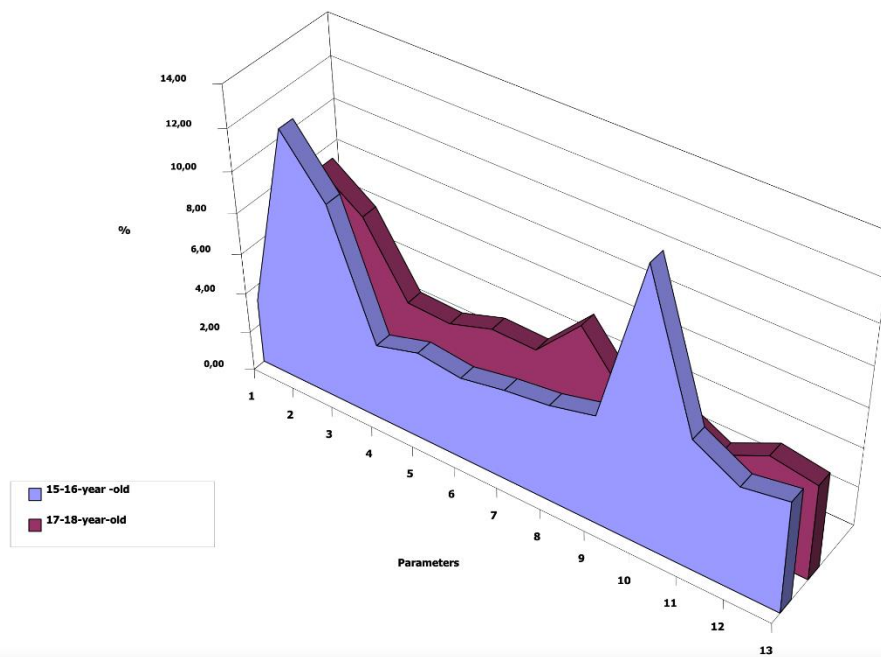


Figure 2. Dispersion of the signs of physical development

CONCLUSIONS

The analysis of the established average values and variability of the indicators for anthropometry characterizes the studied group as homogeneous. Minor differences are the reason for the dissipation of the signs indicating "Weight" and "Thigh circumference".

The level of the players is at a satisfactory level compared to the anthropometric criteria in volleyball. The teams that have won prizes in the state championships at this age stand out with a good level of anthropometric characteristics while the teams ranked outside the top four are clearly lagging behind in this respect.

REFERENCES

1. Antonova, V., D. Michailov. Relationships between some anthropometric indicators and the technical readiness of seventh grade students studying volleyball. *Sport and science, extraordinary edition* № 5, 2007.
2. Arsova, R. Strength training of young volleyball players. Monograph. PC - UNWE, Sofia, 2019, ISB4.
3. Bozhkova, A., G. Dyakova. Investigation of motivation of students towards motor activity classes. *STUDIA UNIVERSITATIS BABEȘ-BOLYAI, EDUCATIO ARTIS GIMNASTICAE*, Volume 58 (LVIII), 1, p. 57-64, ISSN (online) 2065-9547, 2013.

- ARSOVA R.
4. Bozhkova, A., I Ilieva, I Stoilov, S Bazelkov .
Collective sports in higher schools, Publishing
house Artgraph , ISBN 978-954-9401-83-7,
S., 2014
 5. Tsarova, R., R. Krasteva. Features in the
physical development of the best 14-15 year
old Bulgarian basketball players. *Sport and
science, Extraordinary edition № 5,2007.*
 6. Zhelyazkov, Ts. & Dasheva, D. Fundamentals
of sports training. Sofia: Bolid-Ins, pp. 85-89,
2017. N 978-619-232-202-1.
 7. Gadzev. M., I. Stoilov., V. Tsvetanov.
Functional examination of futsal players.
International Journal Knowledge, Skopje,
2020, *Scientific papers*, Vol. 38. 6., ISSN
2545-4439
 8. Ivanov, P., The role of the genetic prerequisites
and abilities of each athlete in the choice of
sport. *International Scientific Conference
"Contemporary Trends, Problems and
Innovations in Physical Education and Sports
in Higher Education"*, Sofia, Publishing
complex - UNWE, 2017, / 106-110 /, ISBN
978-954-644-943-6B
 9. Gigova, V. Statistical methods in physical
culture. Students educational notes from mas-
ters degree of NSA. NSA, 2009.