

Article

The Predictive Role of Morphological Indicators in Enhancing Volleyball Players' Sports Performance

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Abstract: The leading factors in the formation of physique or somatic status in various types of sports are the total dimensions of the body, its mass composition components. The somatic substantiation of sports skills in individual types and directions of sports is not constant. Views on this issue change as the technique of performing individual exercises improves, the rules of competitions are modernized with the use of new models of sports equipment. However, it is possible to determine the specialty to which an athlete belongs by his physique, since the main factors of somatic status are characteristic for each sports specialty.

Keywords: Somatic, Stature, Component, Role, Hypertrophy, Scoliosis, Thoracic Kyphosis.

Introduction

The level of functional readiness is defined as the current state of the athlete's body, characterized by a certain level of movement qualities and functional development [1]. From a medical point of view, in order to assess the state of all the main functional systems of the body before and after physical exertion and during recovery, a comprehensive medical examination is used, which allows us to draw conclusions not only about the athlete's health status at the system level, but also about the functional state of organs and systems before and after exertion [2].

One of the most important tasks of the volleyball training system is to evaluate the parameters of all types of training of qualified volleyball players, to develop a methodology for the targeted development of the necessary movement qualities and functions of athletes [3]. Based on this, it was found that there is no information in the literature on the assessment of the interaction between the indicators of the functional state of volleyball players and the technical training of qualified volleyball players [4].

Materials and Methods

It is possible to determine the specialty of an athlete by his height, since the main factors of somatic status are characteristic for each sports specialty. For example, for sprinters, factor I is the total body size, factor II is the composition of body fat mass, factor III is the ratio of body size to body length, and factor IV characterizes the development of muscle mass of the body [5]. The morphological criteria

for qualifying for sports in this type of sport correspond to the established signs of height for volleyball. In sports where the main role is played by the longitudinal and transverse dimensions of the body, issues of height are mainly resolved during the selection process and during sports orientation. Volleyball players, like basketball players, are quite tall [6]. For example, among the 72 medalists of the Munich Olympics, the average body length of volleyball players was 190.8 cm, and among the other 72 participants - 185.5 cm. However, within one sport, there are significant differences in body structure. Even within one sport, differences in body structure can be seen [7]. For example, if we take the assessment of somatic status taking into account the role of the game in volleyball, then high sportsmanship is demonstrated by athletes with a height of 210-215 cm and 170 cm. The number of such differences is proportional to the number of specializations in sports [8].

Result and discussion

We analyzed the body composition of 16-17-year-old volleyball players. For them, the average height was 176.58 cm, sigma - 6.11, body weight - 65.31 kg, sigma -7.90, chest circumference - 85.13 cm, sigma -5.62 [9].

The Table 1. front line players are taller and less well-proportioned than the back line players. The balance of their height is disturbed by unilateral hypertrophy of the leading arm muscles, as well as scoliosis and severe thoracic kyphosis. The high sigma deviation values indicate that the total body size indicators can still change and increase their significance. The description of the length of the arms and legs and their composition indicates that volleyball players have long arms and legs [10]. For example, the average length of the arms was 77.50 ± 2.0 , and the length of the legs was 93.15 ± 3.60 cm. Among the circumferences, a high degree of variability is observed in the following anthropometric indicators: in the abdominal circumference, sigma - 6.67, in the neck circumference, sigma - 4.02. A moderate level of variability was characteristic of hip and calf circumferences, with standard deviations ranging from 3.25 to 3.62 [11].

Table 1. Assessment of the physical development of qualified volleyball players.

Anthropometric characteristics – n=65	Average	Standard deviation	Variation
Body length	175.58±0,75	6.11	0.04
Body weight	65.31±0,95	7.90	0.12
Chest circumference	85,13±0,70	5.62	0.06
Arm length	77, 50±0,69	2.0	0,12
Shoulder length	34,93±0,72	4.90*	0.17
Shoulder length	27,85±0,51	4.15*	0.15
Palm length	20,59±0,19	1.55	0.08
Leg length	93,15±0,71	3.60*	0,15
Thigh length	47.83±0,40	3.29*	0.07
Calf length	44.38±0,49	4.03*	0.09
Head circumference	56.00±0,78	1.40	0.11
Neck circumference	36.57±0,49	4.02*	0.11
Abdominal circumference	75.75±1,18	3.67*	0.12
Thigh circumference	52.99±0,33	3.25*	0.10
Hip circumference	36.89±0,34	3.62*	0.07
Shoulder circumference	25.20±0,64	2.60	0.08
Shoulder circumference	23. 54±0,32	2.79	0.10
Shoulder width	41.93±0,26	2.12	0.05
Transverse diameter of the chest	26.57±1,08	1,82	0.26
with a sharp edge	27.25±0,21	1,40	0.10
Sagittal diameter of the chest	19.68±0,32	1,20	0.09

Distal part of the shoulder	6.98±0,17	1,40	0.22
Distal thigh	9,60±0,20	0,60	0.15
Distal part of the thigh	7,50±0,18	0,30	0,20
Fat layers - ZPP - posterior surface of the shoulder	7.61±0,28	2.85	0.37
Curacao fat layer	8.39±0,25	2.13	0.25
Fat layer on the abdomen	8.11±0,38	3.01	0.38
The back surface of the thigh	8.39±0,33	2.74	0.33

The indicators of fat deposits on the shoulders, under the shoulder blades, and on the buttocks have slightly higher values. The largest values of subcutaneous fat were determined on the back of the shoulder – 2.42 mm, sigma – 2.35, and on the buttocks – 2.37 mm, sigma – 3.09. However, this does not indicate superiority, but rather a deficiency in the physique of volleyball players. Excess adipose tissue in volleyball players is the result of the influence of exogenous factors, primarily the inadequacy of the applied loads or the excess of calories in food [12]. The structure of the physique of volleyball players indicates that the biological maturation process in them is not completed, which is reflected in their total dimensions – body mass, body length, and chest circumference [13]. Their sigmoid deviations are high, reflecting the variability of their anthropometric indicators [14]. The indicators of partial sizes, in particular, the length of the segments of the arms and legs, differ significantly from those of 15-17-year-old adolescents who do not engage in sports. We analyzed the sigmoid deviations of anthropometric indicators. They can be divided into 4 groups according to the degree of variability of their indicators [15].

Conclusion

Currently, in the field of physical education and sports, the study of the reserve capabilities of athletes is carried out using modern biomechanical and morphological methods. In the process of age-related formation of athletes, the issues related to age characteristics for the realization of their morpho-biomechanical and functional potential remain unresolved.

As a result, differences were identified when assessing the physical development of volleyball players performing various game roles in the team. According to the nature of the variability of the characteristics, 3 categories of anthropometric characteristics with high, medium and low levels of variability are distinguished.

Much attention is paid to physiologically oriented studies with the use of new approaches and methods to increase physical performance and a significant increase in the volume of training loads. In this section, a functional assessment of volleyball players was carried out, their reserve capabilities were predicted, and their functional state was assessed taking into account the game role.

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