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Issues of formation of physical work ability and its functional components in young volleyball players

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Annotation: The article analyzes the issues of physical activity and the formation of its functional components in the training process of young volleyball players and describes the results of research to improve the training of young volleyball players in major sports.

Keywords: Physical Fitness, Work Ability, Component, Endurance, Sports Training, Exercise, Physical Qualities, Game Loads.

The high level of development of modern volleyball as a sport has made it one of the most effective means of comprehensive physical development. It is known that modern volleyball places high demands on the functional state of the body, the physical qualities of a person. The load on the players of strong level teams is very high. Meetings between skilled teams last from 2 to 2.5 hours. Studies have shown that playing volleyball is characterized as work done at the limit of maximum and submaximal stresses. Thus, during an intense game, a volleyball player's heart beats up to 200 times or more.

Therefore, regular and serious exercise in this sport requires athletes to perform extremely large, extremely intense loads, requiring athletes to have highly developed physical and psycho-functional capabilities. Today, the sport of volleyball is developing rapidly in many countries around the world.

Although volleyball is one of the most popular sports in our country, the fact that our athletes do not achieve high results in international sports shows that there are many mistakes and shortcomings in the system of training volleyball players, because we cannot achieve our goals without developing special skills in training young volleyball players. This is one of the current problems in the system of training highly qualified athletes in volleyball.

The physical training and technical-tactical components and their application program have been pedagogically improved due to the development of 39 new specialized physical and technical-tactical exercises for the effective formation of physical training and technical-tactical components of special working ability in volleyball players aged 15-16.

One of the most important conditions of sports pedagogy is the development of physical qualities, training in technical and tactical movements, their formation and adaptation of functional capabilities to the load, depending on the age, sex and level of training. In volleyball, it is customary to train in health groups from 5 to 8 years, and from 9 to 11 years in training groups. Training in training groups for 12-16 year olds, transfer to sports skills improvement group from 15-16 years old is included in the program of Children and Adolescents Sports Schools. Admission of junior volleyball players of the same age group to higher sports skills development groups or professional volleyball teams and in-depth specialized training aimed at game functions (ampula) has been introduced. There is other information in this regard. For example, A.V Belyaev grouped volleyball players of different ages a little differently:

8-10 years - primary preparatory group;
10-12 and 12-14 years - training group;
14-16 and 16-18 years - sports improvement;
Ages 17-18 and older - a group to improve higher sports skills.

However, although such programs for BOSMs have been officially introduced, although the age grouping of children is done by passport age, in fact most biological age is taken into account in this matter. This means that the competition for talented volleyball players from the age of 15-16 will serve as a test bridge for professional volleyball. However, it is important to use differentiated (or standardized) load volumes and severity based on the physical and functional components of work ability, especially speed-

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strength endurance, jumping, and jump endurance, in adolescents working in sports improvement groups or professional volleyball teams. It is known that "endurance" is a comprehensive integral concept, which includes the qualities of speed, strength, jumping, coordination (agility) and flexibility. The meaning of the term endurance is the ability to function for a long time without reducing work activity and overcoming fatigue.

The level of endurance is determined by the following factors:

- functional capabilities of the organism;
- the ability of functional organs to consume O2;
- functional capacity of the heart;
- functional capacity of vascular activity;
- Adaptation of muscles to long-term aerobic and anaerobic activity or hypoxic stagnation;
- Increased energy reserves in the body;
- formation of technical skills;
- willpower.

In the process of long-term sports training, the training of volleyball sports resources for professional volleyball should be gradually increased in a "wave" manner, based on didactic principles. When children reach the age of 15-16, they should be physically, technically, tactically and psycho functionally matured at the level of normative requirements and model indicators for these age groups.

It should be noted that the volume of workload allocated for all types of training (physical, technical and tactical) in the training program for the preparation of sports reserves in volleyball is 312-416 hours for the primary training group (3 years), 1040 hours for the training group (5 years), 1456 hours (3 years) for the sports improvement group and 1664 hours for the higher sports skills improvement group. Exactly 15-16-year-old teen volleyball players have an annual workload of 1,040 hours. This means that the volume of downloads will increase by 208-416 hours when 15-16-year-old volleyball players are involved in the sports improvement group (1248-1456 hours), and 624 hours when they are involved in a high sports skills group or a professional team.

As can be seen from the volume of workload, it is important to emphasize the effective development of physical qualities and the formation of technical and tactical skills in the preparation of young volleyball players for professional teams, as well as the effective design of their psycho-functional capabilities. However, in the sources published in this direction, opinions or research results on the formation of physical qualities or physical and functional components of work ability on an integrated basis are very limited. This problem has been studied in some sports (football, basketball, and handball) as a fundamental tool in improving the effectiveness of physical and technical-tactical training of functional capabilities in the preparation of sports reserves.

In the field of volleyball training, the scope of research on such topics is very limited.

Based on the results of his research, M.I Popichev emphasizes that in order to use exercises that develop jumping in young volleyball players, their body joints should be divided into four groups according to their length:

1 - Children with short stature, long hips and body;
2 - Children with long hips, body and short legs;
3 - Children with long legs and short legs;
4 - Short hips, long stature and long hips.

Taking into account these morphological features, the use of jumping exercises, the author admits, gives a progressive result in children belonging to the 1st group. After a certain period of time, their jump height, depressing force increased, and their time decreased. According to a number of authors, in the development of strength types in young volleyball players, it is important to know which technical method of game loads should take into account the group of "muscles" that perform. They showed the muscles of 8 executive organs: 1) wrist flexors; 2) elbow writer; 3) shoulder writer; 4) body wrapper; 5) body writer; 6) writer of numbers; 7) leg writer; 8) bending the toes. In this regard, the authors recommend to take into account the sensitive periods of development of strength types: wrist flexion at 11-12 years, elbow flexion at 12 and 14-15 years, torso flexion at 11-12 and 14 years, torso flexion at 11 and 13 years. At the age of 15, it is thought that the ankle flexors are 11 and 14-16 years old.

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According to A.V Sukhanov, E.V Fomin, L.V Bulikina, in the practice of training volleyball players it is important to take into account the share of each joint in the jumping movement in the development of jumping and jumping endurance (Table 1).

According to E.K Akhmerov, in the long-term training of volleyball players, it is important to use the exercises, taking into account the age and physical capabilities of the participants.

He emphasizes that, especially in the use of strength training exercises, these exercises should be adapted to volleyball-specific techniques, secondly, the effective use of performance-enhancing tools in the exercise intervals, and third, the content, direction and specialization of exercises should be consistent with annual training cycles.

Table 1

Joints in volleyball-specific jumps participation share

N	Body joints	Percentage of body joints involved in jumping (%)
1	The muscles that bend the toes	22
2	The muscles that record the knees	56
3	The muscles that stretch the body	10
4	The neck muscles that lift the head	2
5	Muscles that actively move the arms	10

It is known that in the process of training with 11-14-year-old volleyball players, taking into account the psychophysiological characteristics of children and their morphological capabilities in the use of exercises designed to develop physical qualities and teach technical and tactical actions (methods) leads to progressive results.

The use of year-round physical fitness training exercises in volleyball players should not only be tailored to the purpose of the training sessions and the nature of the competitions planned in the training cycles, but also based on physical abilities that are a priority for players specializing in different game functions. In particular, the ability to pass the ball - 94.6%, endurance to speed - 83.8%, jumping - 59.5%, jumping for attackers - 91.9%, jumping endurance - 86.5%, the speed of the hand during the kick movement - 81.1%, speed for libero - 97.3%, according to experts. The author's research found that the proportion of leading physical qualities in volleyball had different scores. For example, in the first place speed-strength qualities - 6.5 points, in the second - speed - 6.2 points, in the third - endurance - 5.9 points, strength abilities - 5.8 points. He proves the need to rely on such data by the fact that as the tournament period draws to a close, these basic physical abilities in players, especially strikers and passers-by, gradually weaken. In particular, it was found that their strength decreases to 18.9%, speed - to 21.0%, speed - to 22.2%, endurance - to 22.0%. In Libero, triple jump on the ground - 18.1%, speed - 23.0%, vertical jump - 24.1%, speed endurance - 19.4%. In the first stage of the training period - agility-strength qualities, agility and agility, in the second stage - agility-strength, agility, agility and jump endurance; in the third stage - speed, jumping, agility and endurance of speed. During the competition, in the first intermediate stage - speed, jump endurance and agility, in the second stage - speed-strength, agility, in the third stage - agility, jump endurance, in the fourth stage - speed-strength, agility and special jumping.

In modern volleyball, the source of all action is the qualities of strength. In particular, while leg muscle strength is the foundation for the performance of jumping, jumping endurance, and agility-strength qualities, arm muscles provide attack kicking, blocking, ball input, and ball-receiving efficiency. In volleyball practice, jumping movements are mainly performed by stepping on both feet. Poor development of right or left leg strength can negatively affect jumping speed. Insufficient formation of the right or left hand force only forces the leading hand to perform attack blows. The results of the study showed that in 15-16-year-old volleyball players, sitting on the right and left leg, squeezing the dynamometer with the right and left hand showed insufficient muscle strength, while their asymmetric difference was 2.7 times and 1.9 kg at the beginning of annual training, respectively, 3.4 times and 2.6 kg before the race cycles, 2.6 times and 2.7 kg at the end of the race cycles formed. The performance of throwing the ball to the maximum

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distance behind the head with both hands also showed that the explosive power of the hands was poorly developed by the end of the annual training.
Such situations are likely to have a negative impact on the high formation of special work ability.

In volleyball training and competition games, the efforts to reach the ball on time and run at maximum speed in a very fast-changing direction are also important in the effective execution of a certain technical and tactical method. However, studies have shown that the 30 m, 9-3-6-3-9 m and zigzag running speeds, which represent the effectiveness of such movements, are much slower than the normative requirements and model indicators set for 15-16-year-old volleyball players. The running speed recorded in young volleyball players was not marked by any noticeable progressive changes even after the end of the annual training.

In volleyball practice, the effectiveness of all attack strokes and obstructions is determined not only by the technique and tactics of these movements, but also by the height of the jump and the endurance of the jump. Jumping, jumping endurance, speed-strength, agility (coordination ability), endurance, and even flexibility, which are components of volleyball-specific physical activity, are a priority in achieving a sporting form through appropriate exercises in each cycle of the annual training process.

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