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HANDBALL PLAYERS' AGILITY AND ITS OTHER CONNECTION WITH KINEMATIC FACTORS

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Human movement activity, its size, intensity, coordination and efficiency are ultimately determined by the formation of all physical qualities in a proportional ratio. Therefore, the purpose, essence and meaning of each movement, no matter what kind of activity or sport, its execution at one or another intensity is interrelated with all physical qualities. In turn, each physical quality, for example, the speed of jumping, is determined by the proportional development of other physical qualities. For example, in handball, jumping from a standing position or running to attack from a certain zone is based on a simple reaction, movement (running) speed, absolute and explosive power of the legs, fast inertial power of the body and hands, and aerodynamic power. In addition, the repetition of the jump during the game requires the endurance of the jump, the quality of agility to pass from one zone to another zone to shoot or block, and the flexibility to bend the body back and write quickly (in the attack shot and the strong jump shot). . In modern handball, the intensity of the game is becoming more and more intense, the rapid movement of 7 players on the field (40x20m), the rapid movement of one game method and the rapid transition to another method, and of course the increasing competition, do not only require physical qualities to be proportional and highly formed, but also pays attention to the improvement of all psychological qualities (attention, memory, perception, thinking, consciousness, quick perception of the situation, differentiation, decision-making, etc. For this, it is necessary to regularly develop the psycho-functional capabilities of the athlete based on specific exercises. Only then will there be quality and effectiveness in all the methods of jumping games, and there will be a chance to complete them with a profitable result.

In modern handball, most of the skills executed (such as jumping to score, passing while jumping, striking, and blocking) are performed "in the air." Therefore, the effectiveness of executing these skills depends not only on technical mastery but also predominantly on jumping ability and jump endurance. The development of these qualities has been a significant and extremely important topic expressed in the works of many researchers and in scientific literature related to handball practice.

In particular, A.A. Ratnikov has shown that the "explosive" method is preferable for developing the speed-strength qualities of skilled handball players through vertical jumping. According to him,

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using this method in developing "explosive" strength yields good results, but such training should be conducted three times during the 10-12 weeks prior to competitions.

Based on their research, A.G. Abalyan and A.A. Ratnikov indicate that the special physical qualities ensuring the performance of handball players are determined by two factors at the stages of the training period: speed-strength preparation and the mixed factor of preparation (speed and endurance). In the first stage, their proportion is 83.3%. Here, speed-strength preparation ranks first, while speed preparation ranks second. In the second stage, the proportion is 93.2%, and in the third stage, it reaches 100%. In these stages, speed and speed endurance should be in first place, while speed-strength preparation should rank second.

A novel methodology aimed at developing jumping ability has been proposed by V.Ya. Ignateva and I.V. Petrachyova, who tested this methodology on young handball players. They categorize handball players into four groups based on the length of their body segments:

1. Children with short calves and long thighs and torso;
2. Children with long thighs and torso and short calves;
3. Children with long calves and short thighs;
4. Children with short calves and long thighs and torso.

Taking these morphological characteristics into account, each group of children engages in various specific jumping exercises, and after a certain period, the effectiveness of these exercises is evaluated. The effectiveness was observed in the sense that the best indicators (vertical jump height, jumping power, and timing) were recorded among children in the first group.

For many years, skilled handball players have achieved scientifically and practically significant results regarding jump endurance. In particular, it is noted that high-level handball players jump between 306 to 600 times during a game to execute strikes and block shots. The most frequent jumps throughout the entire game correspond to striking (142 times). The number of jumps for blocking is 122, and there are more jumps for striking (113 times).

Observations have shown that the number of jumps performed during a single training session is less than the number of jumps made in a competition. The results obtained emphasize the necessity of using specialized jumping exercises, both with and without a ball, based on technical skills during training, and indicate that the number of these exercises should exceed the number of jumps performed in competitions by 1.5 to 2 times.

As mentioned above, the quality of jumps during the game is significant not only in terms of quantity but also in how high they are executed. Therefore, it is crucial to develop this quality from the initial stages based on effective exercises. Improving jumping ability and jump endurance yields better results not only from specialized exercises but also from various equipment and trainers. For instance, a jumping expander or a jump box can enhance jumping ability and endurance. The jump box consists of sections that can be set at various heights. Generally, the exercises performed to improve jumping ability include:

- jumping from one leg and two legs,
- jumping over obstacles,
- vertical jumps combined with attacking strikes.

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Exercising with a jumping expander develops jumping ability. In this case, the expander is attached to a wall and the floor, and the athlete jumps to touch a suspended ball. During the exercise, it is essential to ensure that participants use the equipment correctly and perform the exercises accurately. Consistent execution of the aforementioned exercises plays a crucial role for young handball players. Therefore, it is advisable for handball players (athletes) to maintain a consistent pace when developing jumping power and agility.

It Is also worth noting that athletes should focus their jumping power and agility movements toward a specific target. Handball players must jump accurately to execute an attacking strike or pass while avoiding interference with teammates during blocking.

In addition, increasing jumping ability in young handball players can also be achieved through various physical activities and folk games both in and out of school settings. Jumping ability and jump endurance play not only a vital role during gameplay but also closely support the execution of technical skills with agility and the ability of the handball player to change positions throughout the game. Various situations arise during the game that require players to think quickly and accurately while blocking or striking.

Below are the initial and post six-month training indicators for horizontal jumps performed from a standing position and running by boys and girls aged 10-12 who have just started engaging in sports.

Table 1 shows the normative indicators expressing the speed-strength and jumping ability qualities specific to young handball players.

From the analysis of the literature mentioned above, it is evident that jumping ability and endurance are of particular significance for effectively executing most skills performed in modern handball competitions (such as scoring, striking, blocking, receiving, and passing). The importance of these qualities increases even more in games that last for two halves.

Table 1:

Average Physical Fitness Indicators of Young Handball Players

Tests	Age of participants			
	10 y.o	12 y.o	14 y.o	16 y.o
30 m run (m/sec)	4,50	4,00	3,70	3,60
Abalakov jump (cm)	45,8	49,0	46,3	68,3
Long jump (cm)	198	206	235	260
Running long jump (cm)	339	421	450	459
Medicine ball throw (m)	8,22	12,70	13,21	13,62
60 m run (m/sec)	8,90	7,90	7,70	7,20

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The development of jumping qualities aimed at various goals is achieved through traditional exercises. Despite this, not enough attention is paid to the application of jumping exercises in more challenging conditions. There is almost no information in the literature about performing jumping exercises under the influence of circular accelerations. Therefore, this topic is relevant and requires investigation based on research.

It is crucial to start developing the ability to jump and pass the ball from the initial training stage, meaning that shaping these abilities in 11-12-year-old children yields good results. At this age, performing skills that involve jumping without jumping does not produce the intended results. In other words, teaching a skill and then retraining it in a different way is a very difficult process. Therefore, it is necessary to start teaching skills such as jumping to score, passing, receiving, shooting, and blocking from the initial training stage.

Thus, the development of explosive strength and jump endurance should begin from the initial preparation stage, creating opportunities for the progressive development of these qualities in a consistent manner.

This means that special physical qualities play a significant role in the preparation of highly skilled handball players and the improvement of their fundamental game skills.

Resume: This article discusses the opportunities for developing special physical qualities that ensure the effectiveness of handball players during games and enhance their sports skills.

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