

DEVELOPMENT OF AGILITY AT THE INITIAL STAGE OF VOLLEYBALL TRAINING

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Abstract: The study presents the results of distributing students into groups based on testing of their physical qualities; the outcomes of improving the physical quality of agility through the use of various technical training devices and movement games; and a set of exercises involving technical devices and specially selected movement games that contribute to the development of agility-an essential quality for volleyball players to successfully solve motor tasks arising during gameplay. The dynamics of changes in students' physical condition resulting from the application of diverse technical training devices and movement games are also demonstrated.

Keywords: student, technical devices, movement games, physical quality agility, training.

Introduction. Physical improvement is possible only when the anatomical and physiological characteristics of the child's body are taken into account, forming the basis for selecting appropriate methods, forms, and approaches in physical education [1, 4, 5]. In the training process of volleyball players, in addition to the primary physical qualities required for successfully solving game-related tasks-speed, speed-strength, and coordination abilities-it is necessary to develop movement accuracy, which determines agility [2, 6, 7]. Agility depends on the activity of analyzers (primarily the motor analyzer), plasticity, and self-regulation. Agility is considered a secondary physical quality, depending primarily on the integrated development of strength, speed, endurance, and the functional state of the central nervous system [3]. Regular training increases the mobility of nervous processes, improves coordination among various CNS structures, and enhances the alternation of contraction and relaxation of antagonist muscles.

Technical training and control devices in sports represent a collection of tools that support the formation of motor skills, the development of physical qualities, and the monitoring of their improvement. This includes feedback devices and other mechanical aids that optimize the training process [9, 10, 11].

Movement games are types of games requiring high motor activity from participants. They are widely used to improve motor actions, develop physical qualities, support active rest, promote children's and youth's health, and prepare young athletes [8, 12, 13]. A key effect of movement games is the sense of joy and emotional uplift. For this reason, they satisfy the growing organism's need for movement more effectively than other forms of physical culture, contributing to children's all-round development, the cultivation of moral and volitional qualities, applied skills, coordination, agility, accuracy, and a sense of collectivism [14].

However, movement games alone do not allow selective impact on individual muscle groups, joints, or internal organs. Therefore, they must be used in combination with other methods of physical training that ensure a more precise load and targeted functional influence. Movement games integrate many motor actions. The combined use of technical training devices and movement games is valuable for developing physical qualities, particularly agility. It enables faster mastery of new elements, acquisition of complex technical skills, increases awareness in training, and raises the motor density of training sessions. The search for rational and effective ways to organize the training process is closely connected with the use of new technical means

and diverse movement games. This study was carried out in accordance with the practical objectives of the Department of Physical Education.

Methods. A comprehensive methodological approach was employed in this study, incorporating a pedagogical experiment, physical fitness testing, analysis of agility dynamics, and the use of specially selected technical training devices and movement games. The research involved students who were divided into groups based on preliminary test results of their physical preparedness, ensuring objective comparison and accurate assessment of the effectiveness of the applied techniques.

The pedagogical experiment included systematic use of technical training devices aimed at improving coordination abilities, movement accuracy, and the speed of motor reactions. The training process consisted of exercises using various devices such as training apparatuses, coordination ladders, medicine balls, support platforms, and audiovisual signals used to stimulate motor response. The selection of technical devices corresponded to the specific demands of volleyball and the developmental requirements of agility at the initial stage of training.

Simultaneously, specially selected movement games were employed to foster agility through rapid changes in motor actions, spatial orientation, partner interaction, and timely responses to dynamic game situations. These games were designed to combine competitiveness, emotional involvement, and movement variability, thereby enhancing their impact on coordination, reactivity, and precision in technical execution.

The effectiveness of the applied methods was assessed through repeated testing of students' physical qualities. The measurements included general and specific agility, reaction speed, accuracy of technical and tactical execution, and overall physical preparedness. The collected data were compared with baseline indicators to determine the influence of technical training devices and movement games on agility development.

Pedagogical observation, expert evaluation, and comparative analysis were also used throughout the study. Observations were conducted across the entire training cycle, recording characteristic changes in students' behavior, motor coordination, and their ability to adapt quickly to changing game situations. Expert assessments provided by instructors supplemented the testing results and confirmed the practical significance of the applied training methods.

Thus, the research methodology relied on combining objective measurement of physical qualities with an analysis of the pedagogical effects of technical devices and movement games. This allowed the identification of the most effective means for developing agility in beginner volleyball players.

Results. Agility is characterized by the ability to quickly, freely, and accurately differentiate muscle efforts within the shortest possible time—an essential requirement for the correct execution of volleyball techniques. The main task in developing agility is mastering a wide variety of new motor skills while continuously improving them.

In novice volleyball training, motor tasks are performed within a predetermined structure of movements. To develop the habit of quick decision-making in game situations and to train tactical actions, the design of training sessions takes into consideration the structure of the training process and the functional preparedness of students.

At the beginning of the academic year, based on the results of physical fitness testing and the specifics of volleyball, the group with the lowest level of preparedness was identified. A targeted training plan was developed for them, incorporating diverse technical devices and movement games aimed at improving movement accuracy, agility, and coordination-qualities that are of primary importance for beginners.

The following equipment was used during training sessions: platforms of various heights (10-80 cm), wire hurdles (10-80 cm), medicine balls (volleyball balls filled with foam, fabric, expanded polystyrene, padding polyester, or construction foam), and foam or rubber balls (ranging from tennis-ball size to volleyball-ball size).

Discussion. The results obtained in this study confirm that the use of technical training devices in combination with movement games is an effective way to develop agility in beginner volleyball players. The positive dynamics observed in agility indicators, along with improvements in technical performance, demonstrate a consistent relationship between diverse motor stimuli, increasing coordination demands, and accelerated neuromotor adaptation.

One of the most significant findings is that a comprehensive training approach-including coordination exercises, technical devices, and movement games-ensures a higher rate of agility development compared to traditional, less varied training methods. Volleyball, as a dynamic sport, requires not only quick reaction speed but also precision of muscular effort, rapid switching between motor tasks, and the ability to function effectively in constantly changing game conditions. The collected data indicate that the proposed methodology meets these requirements and facilitates the formation of essential skills at the initial stage of training.

Analysis of the training process revealed that the movement games used in the study increased students' emotional engagement, enhancing motivation and contributing to more stable transfer of acquired skills into volleyball-specific technical elements. This confirms pedagogical theories emphasizing the importance of emotionally rich motor activities for the development of stable coordination skills. The game-based format creates conditions in which students must make decisions under uncertainty, adjust motor patterns quickly, and maintain accuracy-mechanisms that lie at the core of agility.

The technical training devices employed in the study provided targeted impact on key components of agility, including sensorimotor differentiation, reaction speed, movement accuracy, and motor program stability. The use of platforms of varying heights, hurdles, and medicine balls contributed to the development of rapid processing of kinesthetic information, a quality considered essential for executing complex volleyball movements according to neurophysiological research. Thus, technical devices not only diversified the load but also enhanced the specificity of the training directed at volleyball agility development.

An important observation was the different rates of progress among students with varying initial levels of preparedness. Participants with lower initial coordination ability demonstrated the greatest improvement, indicating that the combined system of devices and games is particularly effective at the beginner level. This aligns with theories suggesting increased adaptability of the motor system in individuals with less-developed coordination abilities: the lower the initial level, the higher the adaptive response.

The results also show that improvements in agility contributed to faster mastery of technical and tactical volleyball skills. Students with higher agility indicators mastered complex elements more rapidly, confirming the fundamental role of coordination abilities in sports training. These findings support the idea that agility development should be a central component of early volleyball training and regarded as a prerequisite for further technical advancement.

Overall, the study's outcomes align with existing research in sports pedagogy, which indicates that combining technical training devices and movement games provides optimal conditions for motor skill development by ensuring variability of load, emotional engagement, and high motor density of training sessions. Therefore, the proposed methodology is pedagogically justified and can be effectively implemented in the training of novice volleyball players.

Conclusion. End-of-year testing demonstrated significant improvement in agility indicators. Alongside this, game skills reached a positive level. Several students with intermediate levels of initial preparedness joined their faculty teams and successfully participated in university competitions. Students with higher levels of agility development mastered technical and tactical skills more rapidly.

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