

ABSTRACT

**OPTIMIZING THE PHYSICAL CONDITION OF JUNIOR
BASKETBALL PLAYERS (U15) THROUGH SPECIFIC AQUATIC
ACTIVITIES**

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Basketball is considered one of the most popular and widely practiced sports worldwide. In modern basketball, there are periods of maximum intensity effort interspersed with short intervals of submaximal effort, owing to the fast-paced nature of the game and frequent transitions. moreover, the game involves complex movements, regulation constraints, and interactions with opponents. The performance of junior basketball players significantly relies on their physical condition. This is the result of a well-structured training program and effective physical recovery.

The motor structure of basketball requires meticulous analysis by every basketball coach to prevent training errors that might hinder the achievement of training and performance objectives.

Junior basketball players under the age of 15 (U15) are undergoing puberty, a period marked by psycho-physiological changes and significant alterations in their physical development. This stage includes a growth spurt that affects both height and weight during the early phases of puberty. Training U15 junior basketball players, at this stage, should not only focus on teaching correct technical-tactical procedures and improving motor skills but also emphasize promoting harmonious physical development and healthy bodily functions, with special attention to posture and potential functional disturbances associated with this age group.

At junior level of training, premature specialization, lack of creativity in training, and the tendency to rely solely on basketball-specific exercises can lead to overuse of certain

muscle groups, negatively impacting the physical and mental well-being of young basketball players.

It's worth noting that athletes can enhance specific motor skills by incorporating different training methods or participating in other sports from which they can greatly benefit.

Water represents an unfamiliar environment for basketball players, and when they engage in activities in a different setting than the typical indoor sports hall, the adaptation and integration efforts required by the body are substantial. This effort leads to a series of physiological changes, the intensity of these changes directly proportional to the differences between the aquatic environment and the reference parameters.

Throughout the training process, it is essential to consider the gradual incorporation of both specific and non-specific training methods and means. The present research, titled "Optimizing the Physical Condition of Junior Basketball Players through Specific Aquatic Activities," seeks to introduce innovative approaches to the training process by integrating new aquatic activities into training sessions. These activities primarily aim to enhance motor and functional capacity while achieving optimal mental balance and fostering harmonious physical development.

Understanding the morpho-functional and psychological characteristics of each junior athlete with whom a coach works is another critical aspect in preventing training mistakes, such as overexerting the body, which may result in unwanted injuries.

Sports injuries are a significant concern in basketball due to their frequency and the associated medical, sports-related, social, and legal consequences. Identifying the causes of injuries in basketball practice is crucial for implementing early prevention measures.

Swimming and aquatic exercises promote the harmonious development of all muscle groups, with a particular focus on relieving paravertebral muscles and strengthening joint ligaments, thereby reducing the risk of injuries. These activities also offer favorable effects on joint health and represent low-impact exercises. Swimming contributes to alleviating discomfort and pain associated with specific conditions, enhancing joint functionality, leading to improved flexibility and coordination, and supporting psychomotor development. Additionally, due to its high energy expenditure, swimming stimulates fat burning, aiding in weight management.

Aquatic exercises come with minimal risk of injury, and by creatively utilizing water resistance and buoyancy to engage in low-impact activities that combine exercise effectiveness with entertainment, they prove suitable for athletes at all levels of fitness. Over

time, they contribute to enhancing various aspects of physical fitness, including muscular strength and endurance, aerobic capacity, joint flexibility and mobility, and body composition, while positively influencing coordination.

Coaches must possess an understanding of the physiological and anatomical characteristics of junior athletes, as well as fundamental principles of hydrostatics and hydrodynamics, to effectively work with athletes in an aquatic environment. Movement in water benefits from hydro-mechanical effects that facilitate segmental displacement.

In the first section, "Theoretical Foundation of the Research Topic," a thorough literature review was conducted to analyze and interpret the theoretical underpinnings supporting the scientific approach and to stress the advantages of employing aquatic training methods and techniques tailored to the biological characteristics of junior players for enhancing basketball players' physical condition.

After reviewing the literature, it became evident that no research highlighted the effectiveness of utilizing specific aquatic means to improve the physical condition of junior basketball players at the U15 level. Consequently, this prompted the development and implementation of the second part of the research, "Preliminary Study on Optimizing the Physical Condition of Junior Basketball Players through Specific Aquatic Activities."

The second part, conducted through preliminary research, aimed to gather coaches' opinions on the training process's approach, the significance of physical condition among junior basketball players, and the importance and benefits of incorporating aquatic exercises into their training regimen.

A questionnaire comprising 20 multiple-choice items was electronically distributed to 54 coaches and specialists in the basketball field. The results of the questionnaire demonstrated unanimous agreement among all coaches that technical-tactical training is intrinsically linked to the athlete's physical condition. Physical condition plays a pivotal role and exerts a profound influence on performance, with junior basketball injuries primarily attributed to inadequate physical condition and fatigue.

Through aquatic gymnastics and swimming exercises, the back muscles can be strengthened, and basketball players' posture can be corrected. Systematic engagement in aquatic activities can enhance the physical and mental condition of junior athletes while relieving tension through the utilization of aquatic plyometric exercises, all without imposing undue stress on the joints of junior athletes during their pubertal period. Consequently, hypothesis one has been validated.

Notably, a staggering 94.4% of the coaches expressed willingness to incorporate swimming sessions and aquatic activities into the training programs of junior basketball players.

The second preliminary study aimed to design, develop, and implement a program of specific aquatic exercises. This training model was proposed for implementation within U15 junior male basketball teams to optimize player behavior by fostering the development of physical components required to fulfill game tasks. It also aimed to assess the effects on the physical condition of these athletes.

The research was conducted with the U15 junior male teams of the ABC Galactica Braşov Sports Club. In the preliminary experiment, 20 athletes participated, organized into two groups: an experimental group that underwent a specific aquatic activity program and a control group. Anthropometric measurements and motor capacity assessments were employed for this study.

Statistically significant differences were observed in terms of thoracic elasticity and frontal trunk mobility. Upper limb strength improved, and the disparity in strength between the non-dominant and dominant hand diminished. Positive outcomes were also noted in the standing long jump test following the implementation of the aquatic plyometric program.

The primary conclusion drawn from the preliminary experiment is that it corroborates the overarching hypothesis. The selection and implementation of aquatic means tailored to the pubertal age and the specific demands of basketball contributed to improvements in the physical condition of the players.

The results from the pilot experiment confirmed the effectiveness of training systems geared towards optimizing the physical condition of junior basketball players, thereby substantiating the working hypotheses.

In light of the preliminary and experimental research outcomes, it is advisable to continue investigating this extensive phenomenon concerning somatic, motor, and functional changes brought about by the utilization of aquatic programs designed for basketball training. This approach alters the training environment, making lessons more appealing to junior players.

Furthermore, planning and conducting experimental research, as outlined in "Optimizing the Physical Condition of Junior Basketball Players through Specific Aquatic Activities," are deemed necessary. The primary aim of this research is to implement training methods and means specific to the aquatic environment, attuned to the biological

peculiarities of junior athletes, ultimately fostering improved physical condition in basketball players.

The experimental research endeavors to make a unique contribution to enhancing the physical condition of junior basketball players through specific aquatic means. It comprises several objectives, including:

1. Enhancing aerobic resistance and cardio-respiratory capacity;
2. Developing upper limb and back muscle strength,
3. Fostering lower limb strength and endurance;
4. Improving upper body mobility in 13-14-year-old junior basketball players;
5. Facilitating the harmonious physical development of young athletes by promoting proper posture and balanced overall body alignment.

To carry out the experimental research, several hypotheses were tested:

1. Implementing a training model that incorporates aquatic methods and techniques into the training program will enhance overall lower body strength.
2. The proposed program will facilitate the development of upper body muscle strength, contributing to a well-rounded physical development.
3. Implementation of the proposed program will lead to increased upper body mobility and flexibility in basketball players.
4. The intervention in sports training, involving aquatic exercises, will enhance the functional capacity parameters of U15 basketball players.

To conduct the preliminary and experimental research, various research methods were utilized, including literature review, pedagogical observation, interviews, experimentation, measurements, evaluations, statistical analysis, and graphical representation.

The research samples for the basic research comprised 24 players aged 13-14 from the ABC Galactica Braşov Sports Club's U15 National Basketball Championship team. These players were divided into two groups: an experimental group consisting of 12 athletes (8 born in 2005 and 4 born in 2006) with swimming skills, participating in a specific aquatic program, and a control group comprising 12 athletes (8 born in 2005 and 4 born in 2006) who did not possess swimming skills and followed a different training regimen.

The research team conducted their activities with the experimental group at the Olympic Complex in Braşov, which featured a large pool (50 meters in length and 2 meters in depth), a smaller pool (15 meters in length and 1.2 meters in depth), and an outdoor sports

field. In contrast, the control group conducted their training sessions in a gym or on the sports field at School no. 19 in Braşov.

The research encompassed anthropometric measurements, functional tests, and motor ability assessments, both at the commencement and culmination of the study. The evaluations incorporated six anthropometric measurements (height, weight, body mass index, chest circumference, chest elasticity, bichromial diameter), two functional capacity tests (vital capacity measurement and the Ruffier test), and four motor ability tests (upper limb muscle strength, standing long jump, plyometric jumps using Optojump, and frontal trunk flexibility measured by the Hettinger System, evaluating spinal and coxofemoral mobility in flexion).

The research culminated in the development of a training program comprising over 120 training modules, executed over a 10-month period. This program aimed to enhance the physical condition of junior basketball players, considering their age and training level.

The program incorporated various aquatic activities, including swimming, aquatic plyometrics, aquacircuit, aquagym, and aquastretching.

- Swimming, with its unique processes and tools, targeted the development of aerobic and anaerobic endurance and both upper and lower body strength.
- Aquatic plyometric training, conducted in water, aimed to generate rapid and powerful movements, emphasizing strength in speed mode and reducing joint impact during landing. The circuit training method in water combined strength-building exercises with resistance. Aquagym and aquastretching activities utilized water's unique properties to enhance movement amplitude and incorporate stretching into the warm-up and cool-down phases of training.

In conclusion, the operational approach undertaken confirmed the overarching hypothesis: selecting and implementing aquatic training programs tailored to the pubertal age and the specific requirements of basketball significantly improved the physical condition of junior basketball players. Additionally, hypotheses related to strength development, upper body mobility, and functional capacity improvements were validated.

The diversity of methods, means, and materials specific to aquatic environments led to improvements in motor and functional capacity among basketball players. The programs designed for swimming, aquatic plyometrics, aquacircuit, aquagym, and aquastretching encouraged greater involvement among junior basketball players due to the variety of activities, their attractiveness, and the unique training environment.

Establishing an effective training strategy for junior basketball players through aquatic methods could serve as a model for instructors, educators, and basketball coaches specializing in youth development.