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**OPTIMIZATION OF HANDBALL TRAINING AT
JUNIOR LEVEL THROUGH COMPLEMENTARY
MEANS OF PREPARATION**

**DOCTORAL THESIS
ABSTRACT**

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Introduction

Handball is one of the most popular sports in Romania, and as a discipline, it studies the game from the point of view of its history, tradition and evolution, interconnection with other disciplines, as well as aspects related to the instructional and educational process. The research undertaken in recent years has led to widening the theoretical foundations of this discipline.

These trends are based on creative research, conducted by specialists from different countries, regarding the improvement of all components of the specialized preparation system: the organizational, technical and material, and particularly the scientific and methodical bases.

Motivation for choosing the theme

We chose the topic *Optimization of handball training at junior level through complementary means of preparation* because we aimed to highlight the importance of adapting classical training means to the modern trends in handball and also the importance of their diversification by using complementary means to optimize performance capacity at junior level.

Theoretical, methodological and operational framework of the research

According to the requirements of Regulations on the organization and development of doctoral studies at UNEFS, the thesis is structured in three parts as follows: Part I, *General theoretical and methodological framework of the topic addressed and its importance in the current scientific context*, dealing with the theoretical foundations necessary to clarify the preliminary research steps described in Part II, *Preliminary study on the application of complementary means in handball training at junior level*, and the experimental ones presented in Part III, *Contributions to the modernization of preparation in handball at junior level by using complementary means*.

Part I represents the *theoretical and methodological foundation* of the research. Thus, specialists from the countries with a tradition in handball, with strong national championships and good results in international competitions, have understood that, to face the demands of modern handball, it is necessary to restructure the conception about preparation and to associate classical, specific methods with complementary means, which supplement and make preparation more efficient.

Several generations of coaches, who have successively tried to innovate in the field of sports training, convey the current knowledge through specialized works resulting from the cumulated evolution of findings drawn from research.

Grehaigne and Fayol emphasize that “innovations, changes made by a team or a coach in the way of playing or the development of training programs, when efficient, are always adapted subsequently (with a few minor differences) by most other teams”.

Similar studies on the role of coordination abilities or their components were also conducted by other specialists addressing the topic in the light of various sports disciplines, such as volleyball, hurdling and gymnastics. Among them, we mention: Dragnea A. and Bota A. (1999), Tudor V. (1999), Șerbănoiu S. (2002), Dragnea A. et al. (2006), Grigore V. et al. (2007), Macovei, S. (2007).

According to Bon (2007), power and coordination are basic abilities to practice performance handball, and exercises for the development of these capabilities must be designed in a way that facilitates the development of all types of coordination and power, especially at junior level.

In the case of juniors, when using the so-called natural types of movement that involve working with the own body weight, the intensity of effects on the coordination ability can be changed by modifying and adapting the sport specificity to the conditions of practice.

The authors Tudor V., Moanță A., Ghițescu G. and Trișcaș N. (2006) show that the educational process can be influenced by using appropriate methods and means for the development of coordination abilities and can stimulate the interest of pupils/athletes and positive attitudes towards physical exercise, in general, and towards the physical education classes and training, in particular.

“Handball is a sports game included in the category of games invented to meet the need of humans for search, change, novelty. Through its quality of sports game, it occupies a well-deserved place in the subfield of sports education and, implicitly, of sports civilization and culture”.

Currently, research is being carried out on the efficiency of new methods and means used in the education and sports training process at junior level; there are being developed new structural models of the effort specific to training and competition across the various multiannual stages of preparation, all of this to be able to respond positively to the challenges of modern handball.

The preparation of juniors is multilateral and must ensure the athlete a stable mobile structure.

Regarding the theme chosen by us for this research, the way in which specialists consider the contribution of coordination abilities to the game of handball differs according to the evolution of the game.

In this study, we stress the need to introduce in the preparation of athletes complementary means representing a basis for the creation of spectacular but also original and efficient technical and tactical executions, which must be part of the technical background of any handball player prepared for top performance.

Introducing complementary means in the athletic preparation for the development of coordination abilities (as in this study), in all stages of the preparatory period (the precompetitive, competitive and recovery ones), may help avoid the negative emotional states felt by the athlete throughout the entire period of competition.

Part II, the *preliminary research*, represents a starting point for a broader study related to the modernization of handball training at junior level by introducing complementary training focused on gymnastics and injury prevention techniques. The purpose pursued consists in the development of coordination components, psychomotricity and suppleness.

The methodology used by us appeals to means from the gymnastics field, to techniques for the selective engagement of musculoskeletal system and for injury prevention, their addressability being the development of coordination components, psychomotricity and suppleness.

Preliminary research hypothesis

The rigorous programming of complementary training sessions in planning preparation and of complementary means in handball-specific workouts can contribute to increasing the efficiency of preparation.

The preliminary study was conducted within the School Sports Club 6 (CSS6) of Bucharest, together with the coach Morari Ileana, on women's junior 2 team of the club.

The program was carried out between November 2010 and May 2011, a period during which the team of CSS6 Bucharest participated in Women's Junior 2 National Championship.

The experiment was applied in the handball sports hall of CSS6 Bucharest.

The subjects, 13 female handball players aged between 15 and 16 years, completed a complementary preparation and psychological assistance program, in parallel with the specific one.

Experimentally, it was developed a complementary-type preparation program, which was associated with the specific training of women's junior 2 team of CSS6 Bucharest.

The planning and designing of complementary preparation programs were achieved depending on the competition schedule of matches played in Women's Junior 2 National Championship, therefore the focus was only on the competitive period.

To assess the obtained results, we used the system of trials evaluating the level of sports training components (general and specific physical preparation, technical and tactical preparation, mental preparation, theoretical preparation), proposed by the Romanian Handball Federation.

From the very beginning of our research, it was established the battery of trials which, in our opinion, could help us assess accurately the test results.

Considering the coordination ability as a psychomotor ability, we selected, among the psycho-diagnosis methods, a test battery non-specific to handball.

We chose to track the development of general coordination, sensorimotor coordination and agility.

Following this experiment, we realized that the use of exercises for the development of coordination abilities has led to an improvement of individual technique and an increase in the ability of female players to make the difference between the pace of the game and the tempo of the game.

We think that the introduction of complementary exercises specifically addressing the coordination-related issues represented a beneficial and attractive activity, which has contributed to developing motricity and increasing the girl players' confidence in their own potential.

However, this experiment has shown that the assessment of coordination ability should be more accurate, which involves changing the test battery.

Selecting and conducting laboratory tests on the recommendation of specialists in the field will certainly lead to more conclusive results.

Given the results obtained from tests and trials, we can state that the preliminary study hypothesis has been confirmed.

Part III, the *experimental research*, was conducted from June 2012 to May 2013 within the School Sports Club 6 (CSS6) of Bucharest, on women's junior team of the club.

The research subjects were:

- the experimental group, made up of 16 female handball players aged between 15 and 18 years, from the School Sports Club 6 of Bucharest;
- the control group, represented by the members of women's junior team Media of Bucharest, 16 in number, aged 15 to 18 years.

Both the researched team and the control team were participating in Women's Junior National Championship.

Objectives of the research

■ To identify psychomotor coordinates specific to female handball players in this age category, tracking the coefficients that highlight the development of qualities necessary to practice performance handball: estimating distances, estimating travel speed, resistance to fatigue, vigilance during the game compared to the reaction time, which provides the coefficient of performance.

■ To increase performance capacity of female handball players, juniors aged between 15 and 18 years.

Research hypotheses

The use of complementary means in handball training can lead to optimization of specific preparation by improving the coordination components of performance capacity in female junior handball players.

Underlying hypotheses

Hypothesis 1: the implementation of complementary preparation methodology, achieved in parallel with the specific one, can represent a strategy for the optimization of training towards increasing its efficiency and attractiveness.

Hypothesis 2: the identification and highly efficient exploitation of motor and psychomotor qualities lead to increased opportunities to make the training process more efficient and, at the same time, to increased efficiency at the individual and sports team levels.

Hypothesis 3: the handball-specific trials represent an indicator for assessing the performance capacity of female athletes.

Hypothesis 4: the computerized trials and tests, namely the *Dynamic Tracking Test* (TUD), *Topographical Memory Test* (ML), *Vigilance, Resistance to Monotony Test* (VRM), represent an indicator for the efficiency of attention, resistance to fatigue, reaction time, ability to form the cognitive map for optimal travel and also an indicator for the learning ability.

The complementary preparation program mainly aimed at the development of coordination abilities, agility and suppleness.

The sets of exercises proposed by us complemented the preparation program of the team and were even present in the structure of an entire workout, depending on the period of preparation.

Implementation of the complementary preparation program took into account the pre-competitive and competitive periods of the team.

Following the conclusions drawn from the first research, we aimed to develop a preparation program based on complementary means and to establish a battery of tests and trials allowing us to assess the results.

The groups involved in the research had the same conditions for performing the tests and trials, namely the CSS6 sports hall and the Psychomotricity Laboratory within the UNEFS.

We mention that, for choosing the battery of tests performed in the UNEFS Psychomotricity Laboratory, we benefited from the guidance of psychologist Predoiu Radu, PhD.

Conclusions

After analyzing the experimental research data, we can conclude that:

Hypothesis 1 has been validated through the results achieved by the experimental group in the two tests (initial testing and final testing).

The increased values of perceptual-motor efficiency coefficient obtained in the *Vigilance, Resistance to Monotony Test* (VRM) by the experimental group, between the initial and final testing, reflect an improvement in the quality of perceptual act (appropriateness in the selection, identification and interpretation of significant information) and the quality of motor act (accuracy, appropriateness in movement performing) for the experimental group subjects.

Hypothesis 2 has been validated through the results achieved by the experimental group in the two tests (initial testing and final testing).

All coefficients analyzed using the tests carried out in the Psychomotricity Laboratory and all results obtained in the handball-specific trials are important for playing the game of handball, but also for improving the technical and tactical actions of female players.

This information can be used by the coach to modify and customize the preparation program in order to optimize it.

Thus, the progress-related benchmarks shown by the test results provide the coach with useful information about their own female players, helping them to design individual training programs.

Hypothesis 3 has been validated through the results achieved in the initial testing and final testing by the experiment group and control group.

Assessing the female athletes in the light of specific trials provides the coach with important data about the development level of motor qualities of their athletes and also helps the coach to guide the girls towards the specific positions for their dominant motor qualities (the winger position is covered by athletes with very good travel speed and a high level of specific endurance, the insider position is covered by athletes with good throw power, the center position is covered by athletes with a high level of agility, and for the goalkeeper position, there are recommended the athletes with good reaction speed and a high level of concentration ability).

The handball-specific trials represent an efficient and accessible assessment method for all coaches.

Hypothesis 4 has been validated through the values of coefficients analyzed for the initial testing and final testing of the experiment group and control group.

Values of the coefficients of topographical memory and performance indicate, by correlation, the level of efficiency that a person can have in activities requiring: memorization of specific information (topographical, auditory, operational types), avoidance of risky decisions, concentration ability, decisional and executive efficiency, concrete situational intelligence, intuitive thinking.

Values of the coefficients of perceptual-motor efficiency, vigilance, resistance to fatigue and performance indicate, by correlation, the ability to cope with an activity which requires: maintaining alertness in a relatively constant action field, which induces the emergence of the habituation phenomenon, psychological preparedness for mitigating the effect of surprise created by unpredictability and the relative variability of significant information, presence of mind, decisional and executive efficiency.

Values of the coefficients of learning, resistance to disturbing factors and time pressure indicate, by correlation, the ability to concentrate, mobilize and stabilize one's attention in dynamic situations, sensorimotor coordination, coordination of manual movements, correct estimation of speed and distance, nervous resistance, frustration resistance, resistance to disturbing factors, temperamental stability.

All coefficients revealed through laboratory tests reflect the necessary development level of psychomotor qualities required by modern handball.

In this study, it has been highlighted the need for introducing in the preparation of athletes complementary means representing a basis for the creation of spectacular but also original and efficient technical and tactical executions, which must be part of the technical background of any handball player prepared for high performance.

Statistical values resulting from the analysis of indicators and coefficients achieved in tests and trials allowed us to obtain valid and significant results, based on which we drew conclusions that could be implemented in the practical activity.

All hypotheses formulated in both the preliminary study and the original research are confirmed, which entitles us to state that the complementary means used by us have influenced the optimization of training for the female junior handball players.

The scientific promotion of our research was achieved through participation in various national and international scientific events, where we submitted papers based on different parts of the thesis, and also through their publication in prestigious journals.