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**Abstract of the doctoral thesis:
STUDY REGARDING THE PREPARATION OF HANDBALL
PLAYERS SPECIALIZED ON THE WING POSITION**

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Keywords: handball, preparation, wing players, senior, planning, periodization, physical and technical-tactical preparation models, developing of motor skills, improving the technical-tactical baggage, perfecting the relations between playing court couples.

Introduction

The PhD thesis is presented on 325 pages, having attached references comprising a total of 155 titles. The thesis contains 270 pages itself, the other 55 pages being found in a separate publication, which includes 14 annexes.

In developing the thesis, we proposed to approach issues regarding efficientizing the evolution of handball players specialized on the wing position and their active involvement in the handball game.

The research brings to the forefront a number of current elements of originality as the selection, planning and verification of some sets of instructional means of physical and technical-tactical nature and regarding recovery after efforts.

The players specialized on wing position have anthropometric particularities which reminds of the speed runners in athletics. From the motor point of view, a wing possesses acceleration speed and agility superior to the other players from a handball team in order to excel in fast break actions or in one on one actions against opponents with superior anthropometric particularities.

Due to the low number of actions a wing player has during a handball game, compared to other positions of the handball court, increased efficiency is required to their throws.

In the past years it is noticed an improvement of the active involvement of the wings in their team's strategies, both through actions with ball, but especially after improving the actions without ball, by surprising breakthroughs into spaces created among opponents.

Such actions can only be performed with great efficiency on a background of increased effort capacity, where speeds under strength, coordination or power are decisive.

Cooperation and collaboration of court couples has also a crucial role in the level of involvement of the wing players.

The wings benefits of a reduced space while playing the 4th phase of offence, where these players are to be found in the corners of the handball court, the shooting angle being often very small. Because of this, there it is required a need for a high explosive strength, precision and velocity.

The issues previously presented are raising the problem of an individualized character of the preparation, in order to rich a maximal development of the qualities needed by the players specialized on the wing position.

Increasing the playing performance efficiency of the wing players is just one step towards the evolution of the team playing performance. Looking at the current conditions and requirements of elite handball, we believe this step is crucial.

Research directions:

- Generalization of scientific and methodological literature regarding the handball game, but mostly regarding the complex preparation of the players in accordance with the specifics of the position occupied on the field;
- Identification of aspects regarding physical and technical-tactical behavior of the players specialized on the wing position so physical and technical-tactical preparation models can be developed, planned and implemented for female handball teams of the Romanian National Championship. This research proposes an approach of the preparation that focuses on increasing the performance capacity by developing motor skills specific for the wing players, conducting the offence and defense phases with enhanced safety indices, as well as improving the collaboration of court couples. Another issue brought to the forefront of our study is to include post effort recovery as a constitutive part of the training program, as the training process;
- Elaboration a model for annual planning for women handball teams, senior level, after completing the experimental activity.

Motivation for the choice of theme

We have chosen the topic entitled "Study regarding the preparation of the players specialized on wing position" from the desire to growth the exploitation of the Romanian wing players' potential which still shows gaps.

Due to the vast experience accumulated by practicing high performance handball and participating directly in the all the aspects of the training process: physical (general and specific), technical- tactical, theoretical, psychological and not least the post effort recovery, being in permanent contact with elite handball players from Romania and all over the world, I can highlight the particularities of the specific preparation of the wing players.

Part 1: Theoretical foundation of thesis, which includes 5 chapters: **Chapter 1:** Background regarding approached theme, scientific approach and its importance; **Chapter 2:** Generalities regarding the evolution and characteristics of handball game; **Chapter 3:** Modern handball training – conceptual issues; **Chapter 4:** Model and modelling in the game of handball; **Chapter 5:** Conclusions and original elements drawn from the theoretical aspects of the study.

The conclusions drawn from the theoretical aspects of the study are:

1. The most obvious trends in the evolution of handball around the world it is observed within the dynamics of the game, aspect confirmed by the almost total disappearance of the 3rd phase of offence and defense, in the mean time the appearance of fast middle throw after a goal and the increased use of 1st and 2nd phase of the offence;
2. The situations required by the dynamic of the handball game have need of women handball players with superior development of their motor skills, on the background of a great mental preparation. Under these circumstances, the total preparation of a handball player, focused on all its components: physical, technical, tactical, theoretical and psychological requires optimal planning that can conduct to the achievement of the desired performances;
3. There are noticeable the efforts and attempts of our country to raise to the level and requirements imposed by the elite handball all over the world, but mistakes and shortcomings of the system can still be seen. Those can be removed only through a logical analysis and self-criticism of the reality within the teams, clubs, national teams, federation we are affiliated to, in order to find the best and most effective ways and means to guide us to an advanced and modern view of the game of handball, based on all components of the preparation;
4. A woman handball player covers during a game a mean distance of 4002 ± 551 m with an average heart rate that presents values of 171 ± 7 bpm for the active time of playing (without breaks, time-outs, time spent on the bench). These values differ from one position of the court to another. The wing players covers the longest distance from all the players of a team, with the highest running speed: 4086 ± 523 m; 5.44 ± 0.29 km/h (Michalisk L. B. et al., 2014);
5. The role a wing player has inside of her team have increased simultaneously with trends' evolution of the handball game;
6. Effort's individualization inside of the trainings is another topical issue. Requested tasks must match the effort capacity of each player. This is quite doable, taking into consideration that a specific task is solved by some handball players with minimal effort, while others are using medium or even maximal efforts. The presence of individualized training

partly solves this problem, by performing specific exercises with players specialized on the same position, the same anthropometrical, physical, functional particularities;

Part II: Preliminary research regarding the efficient implementation of a physical training program for the players specialized on the wing position includes three chapters. **Chapter 6:** *Methodological operational approach of the preliminary research;* **Chapter 7:** *Activity's organisation of the preliminary research;* **Chapter 8:** *Conclusions of the preliminary research, original elements and proposals for the basic experiment.*

The aim of the preliminary research is to establish an instructional project regarding the preparation of the players specialized on the wing position, identifying strategies focused on physical preparation during the competition period. Also, the preliminary research was designed with the idea of checking the instruments after initial and final evaluation.

Preliminary research hypothesis:

The selection and application of some methods and means which refers to general and specific physical preparation elaborated according to the specific tasks of the wing position, to individual particularities of each player, and to the characteristics of the competition period, are positively influencing the wing players' physical condition.

The methods used in the preliminary research were: bibliographic study, guided observation method, experimental method, evaluation tests method, graphical representation method, statistical-mathematical method (mean, standard deviation, the coefficient of variance, mean error, T student test).

The evaluation tests applied were: 10-yard acceleration test, Illinois test, Shark Skill test and 30 – 15 IFT test.

Conclusions of the preliminary research:

1. Election of evaluation tests that folds on the demands imposed on handball players in general and wing players in special, is very important in planning the future preparation;
2. Evaluation of the level of the motor skills specific to the handball game offers the opportunity to a proper planning and conducting of physical preparation, in accordance with the particularities of each player and with the competition phase characteristics;
3. Planning the trainings which addresses to strength development using additional weights require previous preparation, without whom the intervention would be risky and could lead to sever injuries;
4. The wing players included in the preliminary research weren't used to work with additional weights, so our intervention regarding strength development included means based on the own body weight of each

player and helping materials like elastic band, gymnastic bank, fitball or TRX;

5. After applying the physical preparation program on the wing players included in the experimental group, according to their particularities and the specific of the competition phase, improvements were recorded to all the motor skills needed by the players specialized on the wing position. These improvements were statistically significant for the following tests:
 - **10yard acceleration test** (Dif. $X = 0.04$ sec; $p = 0.012 < 0.05$). **Preliminary research hypothesis was confirmed**, thus demonstrating the effectiveness of the means used in training which aimed to improve the speed acceleration of the wing players;
 - **Illinois test** (Dif. $X = 0,05$ sec, $p = 0.003 < 0.05$). **Preliminary research hypothesis was confirmed**, thus demonstrating the effectiveness of the means used in training which aimed to improve the agility of the wing players;
 - **30 – 15 IFT** (Dif. $X = 0,79$ km/h, $p = 0.000 < 0.05$). **Preliminary research hypothesis was confirmed**, thus demonstrating that the level of maximal aerobic capacity of the players specialized on the wing position showed positive evolution after applying the physical preparation program;
6. The improvements regarding coordination are statistically insignificant. At **Shark Skill test** homogeneity inside of the experimental group is poor for both testing ($p = 0.104 > 0.05$ for left foot and $p = 0.777 > 0.05$ for right foot). **The preliminary research is not confirmed.**

Proposals for the basic experimental research:

- Introducing exercises with additional weights for the development of the maximal strength and explosive strength, taking into consideration that through the programs used in the preliminary research, which had included strength exercises based on the own body weight while using different materials, the basic support in this regard was created;
- Maintaining the evaluation tests used in the preliminary research with the addition of the 1RM (one maximal repetition) test for the major muscle groups needed by the handball players specialized on the wing position;
- Changing the training hours, so that more time for post effort recovery can be provided, especially before trainings where one of the themes is the improvement of the coordination. We believe that insufficient post effort recovery time, the short period were the research was conducted and the heritability coefficient led to an insignificant increase of the mean for the coordination test Shark Skill;
- Maintaining the post effort recovery means used in the preliminary research, with the addition of a circuit of means using foam rolls;
- Diversification of the methods and means used in the preliminary research regarding the physical preparation. This will increase the attractiveness,

which determines and infuses among the players a more conscious and active participation.

Part III: Study regarding the preparation of the players specialized on the wing position includes a number of 5 chapters. **Chapter 9:** *Operational approach of basic experimental research*; **Chapter 10:** *Experimental arguments upon the efficiency of applying physical and technical-tactical programs for the players specialized on wing position*; **Chapter 11:** *General conclusions and proposals*; **Chapter 12:** *Annual planning model for women handball teams at senior level*; **Chapter 13:** *Elements of originality, exploitation of research results and research limitations*.

The purpose of the basic experimental research consists in improving the playing performance of the players specialized on the wing position by elaborating and implementing unique models of physical and technical-tactical preparation according to the tasks of this position, looking for the development of the motor capacity, improvement of the technical-tactical baggage, and perfecting the collaboration of the court couples.

The hypotheses of the basic research are:

- H1: Selection and adaptation of some means and methods regarding physical preparation in accordance with the specific of the wing position positively influence the motor performances of these players;
- H2: Systematic use of some means regarding to the development of the technical-tactical parameters of the players, in accordance with the specific of the wing position, causes the improvement of the efficiency and in the same time an increase of the active involvement of these players in the game.

The subjects involved in the basic experimental research are women handball players specialized on the wing position working for three teams of the Romanian National Handball League, senior level: CSM Bucharest, Corona Brasov and SCM Craiova. 12 women wing players are included in the experimental group. The control group consists of 13 women wing players, which are under a professional contract with the teams: CSM Ploiesti, FC Unirea Slobozia and U Alexandrion Cluj.

Conclusions of the basic experimental research:

- 1) The prepared and applied approach through our experimental researches started from the idea of increasing the active involvement in the game of players specialized on the wing position. We believe that the importance of this issue is very high, taking into consideration the current trends in women's handball elite.
- 2) The process of the active involvement of the wing players in the game is long lasting and requires continuity but also spread among all teams from the Romanian National Handball League, in order to be one of the "big"

national teams which manage to maintain themselves in the world hierarchy.

- 3) We appreciate that the methods and means used are from the most modern and attractive. The diversification was possible using materials such as fit balls, elastic ropes and bands, TRX's, additional weights, unstable surfaces for balance, belts and watches to monitor the heart rate.
- 4) The planning was realized according to the individual particularities of each player and to the characteristics of each preparation period.
- 5) Restructuring the transition phase allowed us to early introduction of the specific preparation with the ball, inside of the preparatory phase of the next macrocycle.
- 6) The research results show the efficiency of the programs of physical preparation applied through the basic research. **The hypothesis I1 was confirmed for 10yard acceleration test, Illinois test, 30 – 15 IFT test, 1 RM – bench press and 1RM – squat.**
- 7) The greatest progress obtained after applying the physical preparation programs was noted regarding maximal strength. The differences between initial and final testing, but also the differences between the experimental and control group, were very big.
- 8) The smallest progress obtained after applying the physical preparation programs was noted regarding the coordination. **The hypothesis I1 was confirmed for Shark Skill – L. Also for Shark Skill – R, the hypothesis I1 was confirmed after applying the physical training programs during the second macrocycle. The results obtained at Shark Skill – R for the first macrocycle doesn't confirm the hypothesis I1, so the null hypothesis is accepted.**
- 9) Improving the awareness of the individual competences, in order to increase motivation and responsibility of the players involved in the research, was realized by introduction of personal records completed after each physical test and after each game played, containing quantitative and qualitative indicators of physical performance and playing performance.
- 10) Through the use of the means dedicated to technical-tactical preparation, we wanted to increase the active involvement of the wing players in the game, to improve technique, to perfect the collaboration between court couples, to raise the responsibility in resolving surprising game situations, to improve fast breaks by developing the anticipation and quick reaction capacities.
- 11) The wing players included in the research had scored most of their goals after a fast break. The second position from where they preferred to shoot was the specific angle of the wing. After applying the technical-tactical preparation through this research, they have significantly improved the number of the goals scored after a break through or a change of direction.

- 12) Specialization on the wing position was realized through short sessions (10-15 minutes) included in each handball training, which led to an increase of the total time allocated to this objective during the hole season (compared to the model usually met in the Romanian women handball, where specialization is planned once a week, into an individual training session).
- 13) Inclusion inside of each microcycle of training sessions dedicated to perfecting the collaboration between court couples was realized using means dedicated to second and 4th phases of offence and defense.
- 14) The technical-tactical preparation models used, brought big improvements regarding the active involvement of the wing player in the game, but didn't not resolve all the problems that might appear on the wing position, and mostly on the collaboration with other positions:
- **Hypothesis I2** of the basic experimental research **was confirmed** when speaking about the **efficiency of all shoots, the efficiency of wing shoots, and the efficiency of the break through shoots**. Although positive developments were found in terms of **fast break shoots and 6m shoots**, these weren't statistically significant and thus the **I2 hypothesis was not confirmed**;
 - The fastbreak efficiency had very good values from the initial testing, that is why it was very hard to improve these numbers statistically significant;
 - If for the **goals scored after a break through**, the **hypothesis I2 was confirmed**, for the **total number of goals** the **hypothesis I2 wasn't confirmed**. The explanation stays in the fact that, for a break through action, a female wing player depends only on her own technical and tactical skills. For the rest of the actions, a wing player needs the help of a colleague, the collaboration between players having a huge importance. These relations can be realized only after a long time of practice and play together and the continuity of the technical-tactical programs implemented through the research will underlie the improvement of the active involvement of the wing players in the handball game.
- 15) The introduction of post effort recovery as a constitutive part of the training process has fulfilled the pursued objective. During the experimental researches, none of the wing players has missed a training session or a handball game because of a severe injury.

Elements of originality:

The original elements we propose through the basic experimental research are mostly found in the means and methodology used, but also in the changes made regarding planning of contained microcycles and mezocycles.

Regarding the evaluation tests used in the research:

- ✓ Using the 30-15 IFT test for the evaluation of the maximal aerobic capacity. The novelty consists in replacing Cooper test, which was used for a long time in the Romanian handball. The explanation for changing

the test stays in the specificity of the effort for the game of handball, on which 30 – 15 IFT folds properly;

- ✓ The use of the 1RM calculation test for the major muscle groups needs for the handball players specialized on the wing position. This test allowed us to create individual programs for the development of the maximal strength, power, explosive strength and muscular hypertrophy, for each wing player included in the basic research;

Regarding physical preparation:

- ✓ The way of organize and structure the training process, using circuits, which determined a general processing in terms of motility;
- ✓ Early introduction in the preparatory phase of the specific physical preparation, using technical elements of the handball game. This was possible due to reorganization we have made in the transition phase;
- ✓ Planning of individual trainings for the transition period in order to maintain the effort capacity at 60-70% of maximum possibilities of each player;
- ✓ Maintaining a session of general physical preparation through the competition period. This session was scheduled within each microcycle respecting the curve of effort, which provide over-compensation stage;
- ✓ Planning of at least one session per week for the development of all forms of manifestation of strength, using additional weights, according to the specifics of each period.

Regarding the technical-tactical preparation:

- ✓ Introduction within each training to a short duration session of 10-15 minutes with focus on the specialization of the wing position. We believe that this approach, in stead of the typical weekly training with the same goal, will significantly increase the time allocated to this important section of the preparation;
- ✓ Introduction of the training sessions with focus on the specialization of another position (in our case the line player position), needed to increase the active involvement of the wing player during the game;
- ✓ Analytical practice of the offence systems, focusing on those parts of the combination in which the wing player is involved.

Regarding the post effort recovery:

- ✓ Introduction of the post effort recovery as a constitutive part of the preparation program, as the training sessions. Each training session ended with 15 minutes dedicated to this theme.

Proposals:

1. The models of physical and technical-tactical preparation have to be used constantly and continuously. The long duration of application of such programs will increase the value of the players specialized on the wing position;

2. The models of physical and technical-tactical preparation should be extended to all the players of a handball team, with the necessary changes required by the characteristics and tasks of each position, and also in relation to the individual particularities of each player;
3. The relatively moderate active involvement of the wing players in teams strategy needs to be improved by insisting during preparation on perfecting the court couples relations, on improving the play without ball, in which the wing players can have an important role;
4. The inclusion in each training session of a short (10 – 15 min) part of wing position specialization, in stead of the typical weekly session with the same objective;
5. The constant inclusion in the training planning to session dedicated to the second position specialization (in our case the line player position), in order to increase the active involvement of the wing players in teams strategy;
6. Maintaining the general physical preparation sessions also for the competition phase, planned so to follow the effort's curve inside of the microcycle (overcompensation);
7. Planning minimum one session dedicated to strength development, following the current trends in women's handball, which relies mainly on superior parameters of speed and strength;
8. Maintaining physical activities also for the transition phases through the use of individual training sessions in order to maintain the effort capacity at a level that will allow the early specific preparation with ball inside of the preparatory phase of the next macrocycle.