

MINISTRY OF NATIONAL EDUCATION AND SCIENTIFIC RESEARCH
THE NATIONAL UNIVERSITY OF BUCHAREST
FOR PHYSICAL EDUCATION AND SPORTS

SUMMARY

DOCTORAL THESIS

**STUDY ON THE ROLE OF COORDINATION SKILLS IN
ACHIEVING GOOD BADMINTON PERFORMANCES BY 14-16
YEARS OLD JUNIORS**

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Introduction

Badminton is one of the world's most popular sports, due to the ease with which it may be played by people of all ages, regardless of gender or training, either for recreation or for achieving sports performances, depending on the players' level.

The role of the coach is to use this immediate motivation to get the beginner to progress. Besides, this ease in using the shuttlecock and the racquet may also lead to rapid disinterest from the player if the coach cannot manage to challenge him/her adequately to improve his/her shuttlecock hitting technique.

This work aims at providing a unique outline of a training programme which contains all development elements of the sportsmen's coordination skills. The presentation of various learning situations for the acquisition of this sports game is not a new attempt but the idea of bringing together the driving feature, the coordination skill and the performance skill in badminton is an element of originality which will be able to generate valid conclusions leading to high sports performances in competitions.

In an attempt to develop a valid scientific endeavour to identify the positive and negative aspects of the coordination skills and of the technical procedures and tactical actions used by the athletes, it is important to establish both relations between these skills and also the best testing methods in order to be able to measure their level.

Being a duel sport, the badminton also implies the assessment of the athlete's performances; our research activity has a section aimed at identifying the level reached by players after going through an educational learning process both in terms of competition and in terms of the efficiency of the training programme.

Our approach is all the more important since the results of the athletes included in the research on a global scale confirm the success of the training programmes.

Why I chose this topic

I spent over 35 years on both sides of the badminton net, both as a player and as a coach and this has led me to a permanent quest for scientific answers about the evolution of the badminton game throughout the years, but also about possible strategies to develop this field.

My personal interest into this research topic comes from the close knowledge of the badminton phenomenon and from having discovered certain issues which lead to a low level of organization and development of Romanian children and junior centres. We believe that this training period is crucial for the future evolution of badminton players from the perspective of representing our country internationally.

There is a whole series of internal and external factors that lead to difficulties which, in their turn, lower the players' chances to achieve high performances. Among the internal factors, we could mention the players' low motivation, a low degree of education, improper eating habits, an inadequate rest and training schedule or the existence of a microclimate which is incompatible with sports performances. On the other hand, the lack of proper training conditions and of rehabilitation means after the effort, the authorities' lack of interest for sports or the coaches' lack of preparation are the external causes of failure.

Our approach of this topic is also justified by the low number of studies carried out with regard to the national badminton phenomenon concomitantly with just a few books which make up the specialised literature. Besides, the biographic resources which exist in Romanian are also in line with the board of coaches who carry out the selection and train the current generations based on outdated principles, by using means and methods which are in full disagreement with the speed at which contemporary sports progress.

Hence one of our research directions covers the complex training of juniors which leads to important sports achievements both nationally and internationally. Moreover, our intervention is also aimed at favouring the rapid passage of athletes to upper value categories.

This work is structured into three parts, as follows:

- Part I – The theoretical and methodological justification of the research topic
- Part 2 – Preliminary research
- Part 3 – Final research

PART 1 includes six chapters and approaches theoretical aspects about the characteristics of the effort capacity in sports activities, the particularities of coordination capacities, the contents of badminton training and the morpho-functional and psychological features of juniors aged 14-16.

Conclusions

This first part of the thesis whose main orientation was the theoretical and methodological justification of our study triggered the following conclusions:

- In badminton, a sport discipline whose success is determined by accurate changes of direction made at maximum speed, the energy substrate is represented by the creatine phosphate (CP) and the glycogen; the ergogenesis is made up of 60% anaerobic alactacid effort, 20% anaerobic lactic effort and 20% aerobic effort;
- The coordination capacities are assimilated to routine features due to the strong automation of execution and to the low energy consumption required;
- Spatial orientation, perception speed and selective attention favour rapid, successful representations whose role is to anticipate the evolution of the exchanges of shuttlecocks during the game;
- Maintaining the balance of the body, the direction and acceleration of its movement are characteristics of the influence of the vestibular analyser in the execution of the movement acts and actions, which is also responsible for the frequent unbalancing-rebalancing during the badminton game;
- Starting from the game structure, the studies show that the dynamism of sportsmen and their competitiveness are the most important identified personality factors in badminton;
- The novelty elements outlined in the 1st part of the thesis are represented by the association of a multitude of data converging towards the identification of the role of coordination skills in obtaining performances for badminton junior players.

PART 2 comprises three chapters and represents a preliminary research into the level of coordination skills put in relation with the technical procedures and the

tactic actions of badminton in the case of junior player groups, aged 14-16.

Prerequisites of preliminary research

Given the little information available on our topic, approaching the badminton game from the perspective of the role of coordination skills in reaching top performance is a prerequisite which ensures the unity of knowledge in this field and the surpassing of the borders of the training process.

Objectives of preliminary research

- Identification of the level of the coordination skills of 14-16 year old badminton players with the help of five tests;
- Determination of the level of the technical – tactical elements of 14-16 year old badminton players through the assessment of the technical procedures and tactical actions with the help of two badminton-specific observation scales.

Purpose of preliminary research

The purpose of this preliminary study is to identify the initial level of the coordination skills and technical-tactical components of 16 badminton players by applying a set of five coordination assessment tests and two scales to assess the badminton specific technical and tactical features.

Tasks of the preliminary research

- to do scientific research on the research topic;
- to establish the sample subject to the assessment;
- to carry out the initial assessments by applying the established tests;

Hypothesis of the preliminary research

Hypothesis 1. *Knowledge of the level of development of the coordination skills favours the establishment of a properly directed specific training programme.*

Hypothesis 2. *The identification of the level of development of coordination skills provides information about the improvement of the performances of 14-16 year old junior badminton players.*

Period, stages and sample of the research

Our preliminary study covered the period November – December 2013 and included both tests for the assessment of the coordination skills and the registration of certain aspects about the technical procedures and the tactical actions used by the athlete. Besides these athlete's motor functions assessment test, we also used a scale to assess general badminton knowledge.

In order to identify the level of coordination skill and implicitly to check the

preliminary hypothesis no. 1, we used a set of five tests:

- shuttle-run sprint between medicine balls numbered to determine the sportsmen orientation skills,
- throwing the medicine ball back to determine the kinaesthetic differentiation capacity,
- the motor reaction test to determine the motor reaction capacity,
- balanced walking on the gymnastics bench to determine the balance skill,
- running to an imposed rhythm to determine the rhythmicity capacity.

The analysed technical procedures are service and return of service, the smash and backhand grip, the lob and the drop shot. The tactical aspects of the badminton game covered by this study are the following: the length of the shots, the placement of the shots, the position in the field and the general tactics.

The subjects of the test are 16 athletes (6 girls, 10 boys) aged between 14 and 16, members of the junior groups of the School Sports Club No. 6 from Bucharest. Training and assessments were done in the sports hall of the abovementioned club.

Conclusions

- Considering the results obtained during the preliminary assessments, the information about the level of technical and tactical training and also the degree of development of the coordination skills gives us the possibility to properly direct the training programme to be applied in the 3rd part – **the first hypothesis of the research is confirmed.**
- As a consequence, the results of the performed tests highlighted a substantial association between the level of the technical-tactic structures and the coordination skills of 14-16 year old badminton players for one single indicator of the ten analysed – **the 2nd hypothesis of the research is not confirmed.**
- It results that in professional sports one cannot rely exclusively on one's coordination skills, but it is also necessary to develop the other skills: strength, endurance or speed. We support this allegation which is especially valid for professional training because many coaches do not agree to the idea that regardless of the type of sports (cyclical, acyclical), during their preparation, athletes must prepare all metabolic areas subject to the effort: aerobic threshold, anaerobic threshold, VO_{2max} , tolerance to lactate or strength.
- For the experimental part we believe it is useful to increase the number of subjects and also to include into the analysis other parameters such as the anthropometrical features of the athletes or their school grades.

PART 3 is made up of five chapters and includes a final study into the role of coordination skills for being a successful athlete in the case of 14-16 junior badminton players.

Prerequisites of the research

The optimization of the 14-16 year old athletes training programme by using means which are specific to the development of coordination skills is an important requirement for increasing the athlete's sport performances.

Objectives of the research

- To develop the coordination skills of badminton players through a customized improvement programme.
- To establish the influence of the use of a coordination capacity development programme on the technical-tactical components in badminton.

Purpose of the research

The purpose of our research is to identify the means of customized intervention which will lead to an increase of the level of technical-tactical components in badminton and to reaching the objectives of the research.

Tasks of the research

- To implement the training programme;
- To carry out the initial and final assessments by applying the established tests;
- To establish the statistical parameters which are to be used for the analysis of results;
- To collect, process, analyse and interpret the results of the research;
- To draw-up the final conclusions of the research.

Hypothesis of the research

Hypothesis 1. *Using a special training programme focused on the development of coordination skills may cause significant differences with regard to the results registered by athletes during the assessment tests.*

Hypothesis 2. *The systematic use of an optimized training programme objectivized with the means to develop coordination skills may determine an improvement of the juniors' performances.*

Period, stages and conditions of the research

Our study covered a period of 12 months, from January to December 2014. During all this time, we carried out initial and final tests covering both the coordination skills and the anthropometric features and the technical procedures and tactical actions used by the athletes.

In order to identify the coordination skills level we used a number of five tests aimed at determining the orientation skills of athletes, the kinaesthetic differentiation ability, the motor reaction, the balancing capacity and the rhythmicity.

In order to identify the level of the technical-tactical components of athletes, they were assessed during the bilateral games organised during the training sessions. The analysed technical procedures are the serve and the return of serve, the smash and the backhand, the lob and the drop shot. The tactical aspects of the badminton game monitored by this study are the following the length of the shots, the placement of the shots, the position in the field and the general tactic used. The technical procedures and tactical actions used by athletes could also be monitored through video recordings.

Also, a relevant indicator of the juniors' performances is represented by the place obtained in the general ranking of the national badminton contest, which is found on the website of the Romanian Badminton Federation.

The location for the assessment and the training programmes is the sports hall of the School Sports Club No. 6 from Bucharest.

Stages of the research:

- Stage 1 – initial testing of the coordination skills, technical procedures, tactical actions and anthropometric particularities (January – February 2014);
- Stage 2 – enforcement of the training programme customized with coordination skills development means (February – November 2014);
- Stage 3 – final testing of the coordination skills, technical procedures, tactical actions and anthropometric particularities (December 2014).

The studied sample

The subjects of our tests are athletes of the School Sports Club No. 6 from Bucharest, which is affiliated to the Romanian Badminton Federation. The sportsmen were investigated/assessed via two tests: initial and final (according to the research stages).

The number of juniors who participated at our study is 26, of which 14 girls and 12 boys, aged 14 to 16.

General characteristics of the training programme

- The trainings took place in the sports hall of the School Sports Club No. 6 from Bucharest;
- The frequency of these trainings is of 4 sessions per week (Monday, Wednesday, Thursday, Saturday);
- The training programme took place between January and December 2014;
- One training session lasts 90 minutes;

- Each training session is preceded by 10 minutes allocated to preparing the body for the effort and ends with 10 minutes allocated to cooling down after the effort;
- During most training sessions, sportsmen take part in 20 minutes bilateral games with a topic or free;
- The training sessions also include exercises for the development of one's coordination skills.

Conclusions

Conclusions drawn from the 3rd part of the research

- By creating efficient training programmes for junior badminton players, individual continuous evolution opportunities are created with regard to the elements of the sports training
- Upon the validation of the statistical hypothesis with the t bilateral test, averages of the statistically significant percentages were discovered in seven out of the eight procedures evaluated at $p < 0.05$ and 25 degrees of freedom, which suggests that the evolution of the used motor skills cannot be a matter of chance, but it is rather the consequence of training programmes.
- As far as the assessment of the tactical aspects is concerned, we noted an increase of the number of actions taken between the initial and the final testing in terms of the tactics (15.00 actions initially and 16.69 actions in the end) and of the length of the shots (22.12 actions initially and 24.73 actions in the end).
- After having analysed the assessments made, **hypothesis 1 is confirmed**, therefore *the use of a special training programme focused on the development of coordination skills triggers significant differences in terms of the results registered by sportsmen during the assessment tests.*
- With regard to **hypothesis 2, this is partially confirmed**, *the systematic use of an optimized training programme, objectivized with means for the development of coordination skills triggers the improvement of certain but not all parameters which are specific to the technical-tactical components of junior players.* The orientation skill influences 75% of the technical component parameters and 75% of those of the tactical component and the kinaesthetic differentiation ability influences 12.5% of the technical component parameters. The motor reaction capacity influences 12.5% of the technical component parameters and 50% of those of the tactical aspects and the rhythmicity capacity influences 37.5% of the technical component parameters.

General conclusions

- The use of a training programme optimized with methods of development of

various forms of manifestation of the coordination skills influences the performances of 14-16 year old badminton players, which highlights their role in training.

- Among the forms of manifestation of coordination skills, our study emphasizes the need to use mainly exercises which are specific to the development of the athlete's orientation ability and rhythmicity capacity within the technical specific training sessions.
- For the tactical component of the badminton training, the study has revealed the importance of using methods to develop the orientation capacity and the motor reaction capacity.
- The 2014 results at the national contests place the participants in our study among the first four in the general ranking of the Romanian Badminton Federation at the under 17 age group, both at men's singles and at men's doubles. At the women category, the best rankings are 4th and 5th at the under 17 age group.
- In 2015, in the men's singles contest, the players of the School Sports Club No. 6 ranked 1st and 2nd in the under 19 age group and 1st in the under 17 age group at all three trials. As for the girls under 17, the best results were the 5th rank in all three trials.
- Training programmes should be updated on a constant basis in order to provide practical solutions for future badminton experts and also to attract a significant numbers of players.
- By monitoring and analysing the school situation of athletes, this paper manages to identify relations between the education level and sports performances, thus making it possible to shape their personality.

Elements of novelty and originality of the study

- The approach of the topic of the role of coordination skills in achieving sports performances by junior badminton players and the way in which the experimental approach was organized and developed.
- The development of the training programme on the one hand and the joining of the variables of coordination skills and technical-tactical components in the badminton game, on the other hand.
- The development of the result recording procedures and the identification of the correlations between the coordination skills and the technical-tactical components of the badminton game, because the specialised literature indicates a low number of such approaches at international level.
- The identification of the correlations between the coordination skills and the anthropometric parameters in the badminton game in the case of Romanian players aged between 14 and 16.
- The first time use in Romania of Bobrich's observation scale on the rating of the technical procedures and establishing the level of appropriation of the technical actions from badminton and of Hirtz's tests for the assessment of

- coordination skills.
- Establishment of a relation between the coordination skills and the school situation of badminton players.