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BUCHAREST

Bucharest, Romania, 2017

Abstract of the doctoral thesis:

**THE VALUE AND RELEVANCE OF PHYSICAL TRAINING IN  
TARGET SHOOTING –HIGH PERFORMANCE SPORT- SAMPLE 10M  
AIR RIFLE 60 SHOTS MEN  
CASE STUDY**

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Part I: GENERAL THEORETICAL ASPECTS REGARDING TARGET SHOOTING AND SPECIFIC FUTURES ON SAMPLE 10M AIR RIFLE 60 SHOTS MEN, **which includes four chapters: Chapter 1:Target Shooting, general and specific aspects;Chapter 2:Relevant factors of performance capacity in target shooting; Chapter 3:Training and competition in performance shooting sport; Chapter 4:Conclusions.**

*Reasons for choosing this topic*

The main reasons for choosing this topic, original and complex were:

- Lack of approach on physical training component for target shooting sport, both in general (reference of the subject in the literature) and in the training plans, in the context of its relevance recognition in the range of concerns for specific theoretical methodology
- The work carried out as second coach of the Olympic team "10m Air Rifle "in 2008-2012 Olympic cycle, where I had as main responsibility, the physical training of athlete Moldoveanu Alin George, Olympic champion - London 2012 at the above mentioned sample.
- Interested in contributing to new guidelines for the methods used in the training of athletes skilled in the sample 10 m air rifle, respectively, general and specific physical preparation of this sample.
- The desire to determine and highlight the influences of physical training and its effects on athletes specialized in this sample.

**Part II: PRELIMINARY RESEARCH REGARDING PHYSICAL TRAINING OF HIGH PERFORMANCE ATHLETES PRACTICING TARGET SHOOTING - AIR RIFLE 10 M, 60 SHOTS, MEN, EUROPEAN LEVEL, which includes four chapters: Chapter 5:**Methodological framework of preliminary research;**Chapter 6:** Organize and conduct preliminary research;**Chapter 7:** Processing, interpreting and presenting preliminary research results;**Chapter 8:**Preliminary research conclusions.

### **Premises of preliminary research;**

Target shooting is sports branch with significant results achieved both nationally and internationally;its performance is beeing determined by several conceptual, educational, organizational, psychosocial and financial economical factors.

The plurality of samples of target shooting and their diversity, is requiring a sustained effort for analysing the theoretical aspects and practical methods, specific for each sample, in order to optimize the preparation process and thus to obtain performance in the highest levelcompetitions.

Specialty literature study in conjunction with the analysis of preparation methodology, shows that physical training is a constant concern for athletes practicing sample Air Rifle 10m, at European level, being considered with different weights in their training plans, depending on the preparation period and the associated objectives.

### **Preliminary research objectives**

Our scientific approach aims to highlight the importance of knowing the particularities of the physical component during two periods of a complete training cycle, namely the preparatory period and the competitive period, specific to the 10 m air rifle, 60 shots, men, at European level, as well as the practical ways to apply it in comparison with the other components of the training.

### **Purpose of preliminary research**

The purpose of this research is to highlight that physical training is an important component of training for athletes in Europe,practicing 10 m air rifle, 60 shots, men.

## **Hypothesis**

Physical training at the level of European countries with outstanding results in shooting sport generally and in the 10 m air rifle sample specifically, differs in comparison with the approach of this component at national level.

### **Preliminary research tasks:**

- Documentation and systematization of knowledge regarding the notion of physical training, as well as the motor skills necessary for practicing the sample air rifle 10m;
- Determining the duration and type of research;
- Establishing the place of application of the questionnaire;
- Establishing the topics to be surveyed and recorded;
- Statement of theoretical and experimental conclusions drawn from analysis and interpretation of research results;
- Presentation of a set of methodological proposals accommodating the feedback achieved by the finalization of the scientific approach undertaken.

**Research methods used:** Method of bibliographic study; Observation method; Call method; Questionnaire method.

## **CONCLUSIONS OF PRELIMINARY RESEARCH**

A sporting branch with notable results at national and international level, the shooting sport is highlighted by its complexity and diversity, its performances being determined by a series of factors of conceptual, educational, organizational, psycho-social and economic-financial nature.

The optimization of the training process in the modern shooting sport requires an objective analysis of the theoretical and practical-methodological aspects involved in the achievement of the performances, especially the influence that, some of the less studied aspects, effects at the level of the general training framework.

The results obtained at this research stage indicate physical training as an important vector for the athletes and specialists in the field of European shooting, which is confirmed by the constant presence of this component in their training plans, in different weights, depending on the training period and its objectives. Therefore, during the competition period, the number of days allocated to physical training in a week decreased by an average of 0.92 days per week or by 31.6%,

from 2.92 days a week during the preparatory period to 2 days per week during the competition period. According to the Wilcoxon nonparametric test (table no.121), the average decrease in the number of physical training days during a week during the competition period is statistically significant ( $z = -2.366$ ,  $p = 0.018 < 0.05$ ).

In contrast to the European-level results, at national level, physical training still has many gaps both at the application level (lack of specialized persons in this sense - physical trainers) and recognition of its role in the general training, as well as at the level of its representation in the training plans, by weight and importance.

Regarding the priorly mentioned aspects, concerning the "lead of physical training lessons by a specialist (physical trainer) ", the answers given by the practicing athletes of the 10m air rifle sample, objected by the results of the Chi square test, show that differences between countries are significantly varied from statistical standpoint, in terms of responses given by athletes,  $p < 0.001$ , for  $\chi^2 = 80.612$  and 6 degrees of freedom.

Based on the answers of the questioned athletes, our scientific approach will be directed towards the rationalization and standardization of the means of training, which will ultimately lead to the development of a model of training and competition, which is absolutely necessary in achieving notable results at the high level competitions.

**Part III: MODEL OF PHYSICAL TRAINING OF THE OLIMPIC CHAMPIONSHIP AT SHOOTING SPORT - 10M AIR RIFLE, 60 SHOTS, MEN**, which includes 7 chapters: **Chapter 9**: Particular aspects related to the performances and morpho-functional parameters of the athlete subject to the research; **Chapter 10** : The methodological and operational framework of the final research; **Chapter 11**: Model of preparation and participation in the major competitions of the athlete Alin Moldoveanu in 2012 - case study; **Chapter 12**: Results - processing and interpretation; **Chapter 13**: The conclusions of the final research; **Chapter 14**: General conclusions of the thesis; **Chapter 15**: Elements of originality and dissemination of results.

## **METHODOLOGICAL AND OPERATIONAL FRAMEWORK OF FINAL RESEARCH**

### **The premises of the final experimental research**

- The study of the speciality literature highlights an intrinsic connection between the heart rate of the shooter and his equipment (rifle), with direct implications in athlete's performance. As part of the training, these performances are evaluated, among other things, with the "SCATT" electronic training system for the shooters. Therefore, using this system in our research is a necessary and objective approach under the conditions imposed by the high performance.
- In addition to the morphological, functional and motric components, which have direct effects on the increase performance capability, the proposed model addresses for the first time a series of particular aspects involved in the prophylaxis of postural deficiencies specific to this sample of shooting sport.

### **Objectives of the final experimental research**

The objectives of this paper can be synthesized as follows:

- Analysis and interpretation of the information acquired during the second stage of the research regarding the place and role of the physical component in the general training of the athletes practicing 10 m air rifle, 60 shots, men;
- Streamlining and standardization of the general physical training resources according to the particularities of the analyzed sample;
- Using, for the first time, at this research stage, modern methods of preparation and evaluation (the monitoring device of the effort parameter - SUUNTO and the SCATT electronic training system for shooters);
- Developing a physical training model adapted to the 10 m air rifle sample, 60 shots, men, based on modern methods, which essentially contributes to increasing of the performance capacity;

### **Scope**

The purpose of our scientific approach is to point out the physical component as an important vector in the general training strategy for athletes practicing this sample. Moreover, the research aims the opportunity to implement a physical training model that takes into account the particularities of this sample and the current trends imposed by the achievement of the high performances.

### **Tasks**

- observația pedagogică;
- analysis of planning documents;
- application of the model of preparation and analysis of its effectiveness, in relation to the results obtained in the targeted competitions;
- data analysis, processing and interpretation;

- to formulate the conclusions and proposals drawn from the interpretation of the results obtained at this stage of research.

### Hypotheses

- *Implementing a physical training model to accommodate the current requirements of high performance shooting sport will lead to an increase in general and specific effort capacity, highlighted in better indexes of performance capacity, materialized in achieving the best results.*
- *A good physical condition results in a functional accommodation of the body in general and of the cardiovascular system in particular, the heart being able to reduce the rate and intensity of the beats during the preparation of the shooting.*

### Phases of the final research

Our scientific research took place between September 2011 and May 2013 and includes the following stages (table no.140):

#### *Phases of the final research*

Table no. 140.

Phase no.	Period	Phase content
Phase I	01.09.2011-01.08.2012	Develop and implement the physical training program in the context of general training and assess its effectiveness through the use of electronic monitoring and measurement devices.
Phase II	02.08-31.12.2012	Analysis of planning documents for the athlete subject to this research, of training plans, shooter's model, synthetic indicators, volume divided by the main training methods, qualitative indicators and competition profile.
Phase III	01.01-15.02.2013	Analyse the main indicators of training for Moldoveanu Alin George with the parameters of the European athletes that were the subject of the applied questionnaire.
Phase IV	16.02-31.05.2013	Evaluation, objective analysis and interpretation of particular aspects of the physical component of the training for the athlete subject to the research. Drawing conclusions of the experimental research and the general conclusions of the thesis.

### **Research methods, samples and equipment used in final experimental research;**

- *Observation method;*
- *Conversation method;*

- *Study case;*
- *Modeling method;*
- *Ruffier test*
  - *The effort parameter monitoring device - SUUNTO*
  - *"SCATT Electronic Training Monitoring System"*

### **PART III CONCLUSIONS**

The evaluation of the achievement of the proposed objectives in the third part of the paper was based on the use of some tests adapted to the current requirements of the training for high performance shooters.

Particular aspects of the overall effort capacity were highlighted by improving the parameters of Ruffier test, respectively 10.8 (Ruffier I.R.) in the initial testing performed in February 2010 compared to the 4.4 (I.R.) value recorded at the final test in May 2012. Considering abovementioned aspects, we can conclude that improving this index is the result of applying the training methodology used.

Another important element to highlight the training level of the high performance shooter, selected for our research, with direct implications in exercising the performance capacity, was the evolution of heart rate during the specific effort. Therefore, both the results of the Ruffier test, as well as the data obtained by using the training monitor - SUUNTO, represented the basis of analysing this evolution.

The last mentioned device revealed an accommodation of heart rate (H.R.) at the specific effort as follows (Table 184):

- *Initial testing*: maximum H.R. 103 beats/min; minimum H.R. 62 beats/min; average H.R. 80 beats/min.
- *Final testing*: maximum H.R. 88 beats/min; minimum H.R. 56 beats/min; average H.R. 68 beats/min.

The data obtained from the application of specific assays and tests proves the usefulness and objectivity of our scientific research by confirming the hypothesis that "a good physical condition results in a functional adaptation of the body in general and of the cardiovascular system in particular, able to reduce the frequency and intensity of the pulse during the shotrelease".

In our research, the SCATT electronic system was an important vector in assessing the technical performance of the athlete, subject of this thesis. Moreover, this system provides complementary information about the physical component of training: balance, changes in cardiac frequency with direct implications in the

achieved performance. Thus, at the level of this parameter the following values were obtained, which confirm the proposed objectives (table no.185):

*Average result / fire:* initial testing 10,258 points; final testing 10,344 points, with an average increase of 0.086 points;

*Dispersion Diameter:* initial testing 9.0 mm and final testing 6.6 mm, group diameter being enhanced by -2.4 mm;

*Trajectory length:* initial testing 13.7 mm and final testing 12.8 mm, with a 0.9 mm drop;

*Horizontal trajectory length:* 10.6 mm initial testing and 10.0 mm final testing, 0.6 mm shorter;

*Vertical Trajectory Length:* Initial testing 6.7 mm and final testing 6.0 mm, improved by 0.7 mm.

The particular aspects of our research, analysed above, conclude a necessary and valid feed-back, both at the experimental level and in the theoretical-methodological plan of the training, in support of the confirmation of the hypothesis, according to which "the implementation of a physical training model adapted to the current requirements of high performance shooting sport, leads to an increase in general and specific effort capacity, planned in superior characteristics of performance capacity".

From the analysis of Alin George Moldoveanu training model, a general conclusion is drawn that physical training is a constant preoccupation with the general training methodology, approaching as weight and distribution, in different stages, the European average analysed in Part II of the research. It is worth mentioning that the specific approach to physical training on the grounds of its importance in the equation of increasing the performance capability, resulted in the achievement of some outstanding performances, culminating in obtaining the title of Olympic champion in 2012.

## **GENERAL CONCLUSIONS OF THESIS**

In the whole of individual sports disciplines, shooting sport offers practitioners a number of educational and formative valences, which place it at the center of the theoretical and methodological preoccupations. However, at national level, aspects of theoretical and practical nature, particular to this sport, are insufficiently addressed, being the starting point for the realization of our scientific research.



The above-mentioned aspects, complemented by a series of outstanding results obtained by Romanian athletes in the field competitions, have determined us to address a useful and necessary topic for the specialists in the field, especially for those involved in the achievement of the high performance, the present research representing a solid reference both in the theoretical background and in the specific methodology.

From the point of view of theoretical notions, our research succeeds in addressing a major theme of training in general and shootingsport in particular, related to physical component. From the study of the specialized literature, we can state, knowingly, that this component is insufficiently subject to scientific analysis, although it has particular implications for the achievement of the shooter's performance objectives.

Relative to the European average, it can be concluded that at the national level, physical training has the same methodological support, both in terms of recognizing its importance and in terms of the actual share of components in the overall training. Moreover, there is an insufficient representation of qualified personnel towards the concrete application of this component in specific training.

Regarding the structure and content elements of the training, the current thesis outlines in a necessary and objective way the importance of the physical component in the training of high performance athletes, as well as the original approach of conducting and evaluating the parameters of the effort, using, for the first time, some electronic resources.