

CONTRIBUTIONS TO THE ELABORATION OF THE PREPARATION MODEL IN THE HIGH JUMP EVENT, JUNIORS 18-19 YEARS OLD

KEYWORDS: training, research, contribution, elaboration, junior, model, modelling, planning, principle.

This study is structured on three parts, contains 11 chapters and a volume of annexes, the bibliography including 152 Romanian and foreign authors.

INTRODUCTION

Throughout the years, the athletics practiced at national level has been remarked in major international competitions due to some exceptional results that have made history in the Romanian sport. One of the athletic events that brought numerous medals at the Olympic Games or the World and European Championships was the *high jump* event. Some outstanding personalities in this event were: *Cornel Porumb, Iolanda Balaş Soter, Ioan Şerban, Csaba Dosza, Virginia Bonci-Ioan, Cornelia Popa, Sorin Matei, Galina Astafei, Oana Pantelimon, Ştefan Vasilache, Mihai Donisan, Petre Esthera, Doru Oprea, Ligia Damaris Grozav.*

In sports, the result is not accidental, but it represents the cumulated effect of all actions carried out on the sports field, of a set of internal and external factors, to which a particular motivational involvement of the athlete/athletes can be added.

We consider that the analysis of the preparation of ten junior high jumpers from our country will be really helpful to the coaches preparing athletes in this event; our assertion is based on a personal experience of more than thirty years in the performance athletics field, during which I prepared fifteen National Champions, among whom three girls.

We want to highlight a number of landmarks as large as possible, in order to shape a preparation model for high jumpers and to update quantitatively the existing ones, but at the same time to emphasize some novelties related to the training modelling.

PART I

CONCEPTUAL GENERALITIES SPECIFIC TO THE TOPIC APPROACHED IN THE SCIENTIFIC RESEARCH

In the first part of the study, we highlighted the main theoretical aspects with a major impact on the achievement of sports performances. The diversity of specialists' opinions regarding the definition of some notions and concepts

specific to the sports field reinforces their importance in the practical preparation. The desire to reach the highest step of the podium represented the central element in studying the most effective means, methods, principles, rules, norms, etc., which has led to an efficient and unitary sports preparation system. In this sense, training has become an object of study and research indispensable to achieve top performance in sports activity. The performance evolution in all sports branches has imposed the creation of new notions meant to structure, from the point of view of sports terminology, the correlation between practical activity and theory and their outcome - sports performance. High jump is present in specialty literature through the approach of all the technical elements specific to this event, but also of the conditional and coordination qualities/capacities involved in the preparation of athletes. The technique of this athletic event, with a special impact on the spectators, is permanently changing due to the new preparation methods and means issued from interdisciplinary research. Stating the preparation principles, the importance of developing the take-off, the objectives of general and multilateral physical preparation, the performance capacity, the actualities and the design in technical preparation, all these are but some of the topics approached in the first part of the study, as seen by the specialists in physical education and sports field. The national model for high jumper athletes brings a particular contribution to orienting the coaches when setting the general landmarks for the effort planning. The preparation modelling represents the main modality to achieve a new preparation model.

PART II

PRELIMINARY RESEARCH ON THE PREPARATION OF HIGH JUMPERS, 18-19 YEARS OLD, IN ORDER TO FULFIL THE PLANNED PERFORMANCE OBJECTIVES

Training modelling represented the main concern in the preparation of the ten junior high jumpers, 18-19 years old, in the period 1988-2008. The choice of the most appropriate methods and means and their quantification in view of fulfilling the performance objectives in official competitions was made depending on the athletes' momentary possibilities. The progressive adaptation to effort, a ratio optimally and individually differentiated between the specific effort and recovery, the individualisation of training means, the judicious planning of training tasks, an optimum ratio between specific preparation and multilateral preparation, the differentiated motivation of athletes, all these are only some of the landmarks pursued in achieving the performance capacity. The methodical and organisational approaches were materialized by:

- ❖ paying special attention to the harmonious physical development;

- ❖ using permanently a variety of means, in order to break the monotony;
- ❖ stimulating the desire to surpass one's own previous performances;
- ❖ introducing some means specific to other sports branches;
- ❖ conformity to a technique in the basic event, taking into account the conditional and coordination capacities of each athlete;
- ❖ encouraging the participation in competitions, without putting pressure on the result obtained;
- ❖ creating an agreeable atmosphere and a sustained working climate within the group of athletes;
- ❖ participating permanently in a system of unofficial competitions among the pupils in the group.

Knowing the theoretical content of both the *momentary performance capacity* and the *optimum performance capacity*, we prefigured the practical direction of acting within the preparation microcycles.

Efficiency in the effort planning was a constant throughout the 20 years of preparation of the ten high jumpers. This objective was fulfilled by introducing a mathematical formula to calculate the number of tasks per stage, namely:

$$S.T.E. = A. \times C.$$

where: S.T.E. = total number of tasks in the stage;

A = number of training sessions in that stage;

C = a coefficient that prefigures a number situated between a minimum and a maximum of tasks proposed to be achieved.

Knowing the total number of tasks in a mesocycle, it is possible to calculate in percentages the weight of the training components (technical preparation, development of speed, strength and take-off, harmonious physical development).

This method allows to:

- ✚ make a judicious distribution of the tasks for each stage, according to the period in course (preparatory, precompetitive or competitive one);
- ✚ realize an optimum ratio between the training factors (specific preparation and multilateral preparation), depending on the objectives proposed, the sports event/branch practiced, preparation stage, performance, age, gender;

The percentage allocated to each training task through the method presented reflects their weight within the stage plans and, secondly, the dynamics over a preparation year.

A particular attention was paid, within the preparation of high jumpers, to the utilization of a number of means as varied as possible, with the aim of:

- creating a motor repertoire;
- breaking the monotony specific to athletics;
- stimulating motivation in fulfilling the different training tasks;
- stimulating creativity, in order to achieve a correct technique.

For using many variants in the preparation of athletes, starting from a basic exercise, the following rules must be taken into consideration:

- knowing the correct technique of performing the basic exercise;
- stabilizing the conditional and coordination qualities/capacities at a high level, in order to successfully sustain the variants planned;
- introducing some supporting materials (benches, balls, markers, sticks, etc.) in the preparation increases the exercise difficulty.

The volume in number of repetitions and the intensity in percentages, specified for the preparation means, sketch the overall picture of the effort quantification in junior high jumpers, performance category. The development of take-off at the level of upper limbs was present through specific exercises, in accordance with the definition proposed. Assessing the take-off of the upper limbs can be done through:

1. five bending and stretching moves while getting off the floor (push-ups) on the spot, against the clock;
 - the time recorded will mark the duration of push-ups (it is considered that the longer the time, the greatest the amplitude of the push-up);
2. three bending and stretching moves while getting off the floor (push-ups) to advance;
 - the distance from the starting line to the last landing is measured with a tape.

The good results achieved by the high jumpers were also due to the exercises for strength development through the isometric method. The description of exercises, their quantification and the rules for using them during preparation are elements of novelty for the athletic jump events.

PART III

RESEARCH REGARDING THE ELABORATION OF THE PREPARATION MODEL FOR JUNIOR HIGH JUMPERS (18-19 YEARS OLD)

Premises of the research

This scientific research aims to emphasize the general landmarks that define a preparation model in the high jump event, based on the theoretical knowledge provided by specialty works, but mostly on the personal experience accumulated throughout the years in performance sports.

Objectives of the research

- the new aspects resulted from the analysis of preparation plans (macrocycles, mesocycles, microcycles) will represent the general landmarks of a new preparation model for high jumpers, males aged 18-19 years; we shall permanently compare the results obtained in the scientific research with the indicators of the existing model;

- highlighting the theoretical and practical importance of knowing the basic indicators used in the preparation of junior high jumpers aged 18-19 years.

A particular place within this scientific approach comes to the analysis of the indicators resulted from the **initial, intermediate and final testing**.

Hypotheses of the research

1. The diversity of methods, the variety of training means and not at least the increase in efficiency of the effort quantification impose a reconsideration of the preparation model for high jumpers.
2. Achieving a complete study on the preparation of the most valuable high jumpers in the performance category, juniors aged 18-19 years, will positively influence the future performers in this athletic event.
3. The operational value of a model and the updating of some preparation indicators could maximize the high jumpers' performances at junior level and not only.

Methods, techniques and tools used in the scientific research

Recordings, observation, model and modelling, experiment, statistical-mathematical method, graphical method

Location and duration of the experiment

The experiment was mostly conducted on the sports grounds of School no. 190. Competitions took place on stadia homologated in our country and abroad.

The experiment covered a period of *twenty years*, between 1988 and 2008. During this entire time interval, I was the teacher of the ten athletes included in the present scientific research.

Subjects

The ten athletes investigated in our experiment were National Champions of Romania and, out of them, five won the Junior Balkan Games. The values obtained on the general preparation indicators of the national model are compared with the subjects' results on: the preparation periodization, the preparation staging, the number of training sessions, days of preparation, hours of preparation and rest days, the weekly cycles and the number of competitions. The indicators introduced in the experiment are the work coefficient and the total number of tasks in a mesocycle.

Initial testing and final testing included 9 nonspecific events, among which 50m standing start sprint, standing long jump, 300m, 600m, loaded push-ups, and 4 specific events (standing high jump, stepped high jump, 3-step high jump approach and 5-step high jump approach).

The results in official competitions were also analysed.

Statistical-mathematical analysis of motor indicators was achieved for technical preparation and multilateral physical preparation (development of speed, strength, take-off, endurance, harmonious physical development, sports games).

For the experiment sample, we analysed the central tendencies (arithmetic mean, median, mode), the homogeneity (standard deviation, amplitude, coefficient of variation) and the effect size (difference between means, Cohen's index), and we verified the statistical hypotheses (null hypothesis H_0 , alternative hypothesis H_1 , confidence threshold α , degree of freedom- df, t-critical, t-calculated, statistical significance threshold - p value).

Practical-methodical conclusions

Hypothesis no. 1, **“the diversity of methods, the variety of training means and not at least the increase in efficiency of the effort quantification impose a reconsideration of the preparation model for high jumpers”**, has been confirmed and supported by the following data:

- the introduction of a mathematical formula contributes to increase the preparation efficiency and removes arbitrariness in the effort planning:
 - ✓ **Variant “A”** $S.T.E. = \frac{N.A.x C x E.}{N}$
 - ✓ **Variant “B”** $S.T.E. = A. x C.$
 - ✓ the value of “C” (coefficient of multiplication of the number of training sessions) influences the preparation periods: preparatory period – $C = 1.6-1.8$; precompetitive period – $C = 1.4-1.7$; competitive period – $C = 1.2-1.5$;
 - ✓ the training components are established in percentages, from the total number of tasks per mesocycle, depending on the objectives of the stage and on the athlete's bio-psycho-motor possibilities;
- by introducing a mathematical formula for the effort planning, 95% of the progress achieved in 12 trials out of 13 (nonspecific and specific ones, plus the dynamics of performances), representing 92.85%, is due to the means used and quantified over a preparation year;
- the effect size (Cohen's index, the difference between means) has reached the significance threshold and is from high to very high in 13 trials, within the interval 0.70-2.82, by underlining the importance of the means used and of their quantification in the preparation of the ten high jumpers;
- the ten subjects obtained an average performance of 2.08m with a much smaller volume of effort (**number of repetitions**), compared to the indicators of the national model, for instance: training sessions – **256 reps.**, against 460 reps.; hours of preparation – **512 reps.**, against 1062 reps.; days of training – **244 reps.**, against 284 reps., etc.

Hypothesis no. 2, **“achieving a complete study on the preparation of the most valuable high jumpers in the performance category, juniors aged 18-19 years, will positively influence the future performers in this athletic event”**, has been confirmed and supported by the following data:

- there were monitored ten high jumpers, National Champions of Romania in junior 1 category, 18-19 years old, in the period 1988-2008;

- among the ten athletes, five were Balkan Champions at junior level;
- seven out of the ten athletes were also National Champions at senior level;
- presently, there are two more high jumpers in the internal and international competitions, one of them being the National Champion D.M., with 2.32m;
- valuable performances, beyond the average value of the national model (2.08m), were achieved by: S.C. - 2.11m, T.N. - 2.15m, B.N. - 2.11m, H.G. - 2.09m, D.M. - 2.11m;
- the anthropometric data of the existing model (height, weight, nutrition index) are added the following: length of the foot sole, body mass index, proportionality index;
- the performances obtained during a competitive year by each high jumper (14 annual competitions on average) certify the athletes' value at the national and international levels;
- the sample analysed has a high homogeneity level, 89.77%, confirmed by the coefficient of variability, under 10%, according to the research data;
- the small values of standard deviation also confirm the sample's homogeneity in a proportion of 84.61%;
- arithmetic mean, median and mode reflect the central tendency of the sample and show that the data dispersion keeps a homogeneous structure.

Hypothesis no. 3, **“the operational value of a model and the updating of some preparation indicators could maximize the high jumpers' performances at junior level and not only”**, has been confirmed and supported by the following data:

- the model proposed is defined by *44 indicators*, against the *34 indicators of the 1989 model*;
- *25 indicators are common* with those of the national model;
- the alternative hypothesis (H_1) is accepted and the null hypothesis (H_0) is rejected, the significance threshold of $p < 0.05$, for 12 trials out of 13, representing 92.30%;
- the preparation is verified through initial and final tests, *9 nonspecific trials and 4 specific trials*, compared to 5 and 2, respectively, of the national model.

We propose the following indicators:

1. *anthropometric indicators*: sole, proportionality index, body mass index;
2. *nonspecific physical indicators*: 50m standing start sprint, standing long jump, trunk flexion from lying on the back, ups-and-downs with barbell;
3. *specific physical indicators*: standing high jump;
4. *general preparation indicators*: precompetitive period, work coefficient, number of tasks per mesocycle;
5. *motor indicators*: technical preparation, speed development, strength development, explosive strength development (take-off), harmonious physical development.

Personal contributions regarding the research efficiency in the development of the Physical Education and Sports field, at the practical and theoretical levels

- a. Elaboration of a new preparation model for junior high jumpers, 18-19 years old, classification category: performance.
- b. Introduction of a mathematical calculation formula in two variants, "A" and "B", for planning the total number of tasks within a mesocycle and the number of tasks on each training factor.
- c. Establishing in percentages the number of tasks allocated to each training factor during a mesocycle.
- d. Establishing a "C" coefficient of multiplication to calculate the total number of tasks in a mesocycle, depending on the period in course (preparatory, precompetitive or transitional one).
- e. Increase in importance of the number of total tasks and also of those allocated to each training factor in the effort planning during the mesocycle.
- f. Defining general and multilateral preparation within the physical preparation.
- g. Theoretical delimitation of the objectives of multilateral physical preparation.
- h. Classification of exercises for strength development through the isometric method, depending on the body's position against the floor or a gymnastics apparatus, with different objects (medicine balls, elastic, dumbbells, weight bar), and their quantification during preparation.
- i. Rules for using the exercises destined to strength development through the isometric method, for the performance athletes.
- j. Proposal to introduce 19 new indicators in the preparation model for high jumpers, performance category, so that it contains 44 indicators.
- k. Definition given to the notion of "take-off of the upper limbs".
- l. Setting some trials and standard tests for the take-off of the upper limbs.
- m. Assessment of the high jumpers through 9 nonspecific trials.
- n. Conceptual delimitations related to the performance capacity, by introducing the notions of: 1. Latent sports performance capacity; 2. Momentary sports performance capacity; 3. Optimal sports performance capacity.