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PHYSICAL TRAINING IN PERFORMANCE BOBSLEIGH

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Abstract

Aim. Synergism is very important in the body's adaptation to effort respiratory cardio followed by neuro-muscular synergism and systems integrative neuro-endocrine-humoral and biochemical projection of effort.

Methods. There are 4 research subjects, 2 boys and 2 girls, members of the Youth Olympic Team. Optojump is a system for analyzing the strength and resistance of the lower limbs

Results. The predominant effort in the bobsled is of anaerobic lactacid type (start under 6 seconds, maximum intensity). The energy required for the mechanical work performed is ensured by the enzymatic breakdown of ATP without producing lactic acid.

Conclusions. In bobbers, the motor qualities are found in a close bond of interdependence, in the following order: skill, speed, strength and endurance. Their combination characterizes the specific effort and determines the essential and decisive elements in the orientation of the preparation and the choice of means.

Keywords: bobsleigh, physical training, performance.

Introduction

The emergence of bobsled as a sport in Romania dates back to 1909, according to the Encyclopedia of Physical Education and Sport in Romania - Volume I, Bucharest 2002. The entire activity was reduced to a few days a year, around the winter holidays, but starting with 1910 there were competitions organized under the title of "competitions for winter sports", pretentiously named as such, but the participation was very modest.

Until 1916, bobsleigh competitions were regularly held in Sinaia, along with sled and skeleton competitions, without precise regulations. The first nominated winner of a bobsleigh competition, in 1910, was N. Filiti, and for multiple crews was "Cercul Sportiv Român". In 1911, women in bobsleigh were very active. The contests were organized in three events: bobsled - two women, bobsled - two men and 2-5-6 people. The winners were: Natalia Darvari (women), Jean Costinescu (men) and "Săniutza Society" for multiple crews. In 1912, the competition program was the same. In women, Mihaela Ghyka won, and in multiple crew, the (male) crew won, being led by the same Mihaela Ghyka.

In order to develop motor capacities, most theorists and practitioners were determined to update the content and orientation of the training process.

Behind a sporting success is a solid theory, scientifically argued which is the starting point in developing the approach to the entire sports training. The development of this strategy is done starting from the knowledge of the model from the practiced sports branch, and the analogy of the model with the practical activity helps the coach and the physical trainer to create an overview of the content elements, of the entire process or system. Sports results do not happen by chance (Wilson, 2010). They are obtained due to a cumulative effect of a set of determining factors (internal or external) and in close connection with the increased motivational involvement on the part of the bobber athletes, motivation that causes them to be aware (throughout the training period) of the importance of all the factors within the training, which aim to achieve all the planned performance objectives (Washington post. 1997).

From a physiological point of view, sports performance is influenced by a number of factors: the energy produced in the body through the aerobic-anaerobic process, the state of health and the neuro-muscular functional state, physiological factors (sports form, training status), genetic factors, and so on (Balint, Ganzenhuber, Balint & Spulbel, 2013).

Using the classification of efforts according to the most demanded apparatus or system of the body, the scientists found that the bobsleigh test is part of the efforts of the neuromuscular type. (Scott, 2008)

The predominant effort in bobsleigh is of an anaerobic-lactacidic nature (the start under 6s, maximum intensity, during the descent, sequences of anaerobic effort, maximal and submaximal intensity). Well-prepared bobbers, from the start to the climb into the bobsled, run with their chest locked on inspiration (apnea). (Millet, 2006). The reserves of ATP are sufficient to fully cover the energy expenses, the effort made entirely on account of ATP energogenesis, being of maximum intensity.

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Without continuous activity, carried out from an early age over several years, one cannot reach the level of training required by the demands of competitions and sports performances. At the same time, carrying out a continuous activity during an annual sports training cycle, some elements must be taken into account such as: the logical rational selection of general training means with the help of specific means within the stages and weekly training cycles.

Modeling the dynamics of effort in training after the competition is achieved by: achieving a full match between the competition requirements and the training content (Bompa, 2001); setting the volume parameters according to the characteristics of the effort in the competition, the degree of sports preparation, age and sex.

Increasing efforts in training – in the preparation of bobbers, the training stimuli change periodically, the main ways of changing the effort are as follows: based on the volume of effort, by increasing the number of hours of training, the number of trainings and the number of kilometers covered in the bobsled descent on different slopes (Pelin, 2007). Volume increase is possible for all quantitative indicators of training.

In bobbers, the motor qualities are found in a close bond of interdependence, in the following order: skill, speed, strength and endurance (Bruggemann, Morlock & Zatsiorsky, 1997). Their combination characterizes the specific effort and determines the essential and decisive elements in the orientation of the preparation and the choice of training means (Pelin, 2007).

Starting from the idea that in bobsleigh the specific effort represents a combination of force and speed in equal proportion, the existence of the substitution zone makes the same performance the result of different combinations (Țifrea, 2012).

Skill is the most complex and also the most complicated motor quality in bobsleigh. To date, a proper definition of this notion has not yet been found, as there is no precise unit of measure for establishing the level of skill development (Pelin, 2008).

When the athlete is in full training process whose parameters (volume, intensity, complexity) best correspond to his ability to adapt and the indices of effort capacity are at a higher level, it is called: "high degree of training" .

Materials and methods

1. Participants

There are 4 research subjects, 2 boys and 2 girls, members of the Youth Olympic Team.

2. Research methods and materials

In this paper, the following research methods were used: the bibliographic study method, the test method, the graphic method, statistical-mathematical methods and techniques. The grades represent the results obtained during testing with the Optojump measuring and evaluation device.

Optojump is a system for analyzing the strength and resistance of the lower limbs.

Laboratory tests:

- 5 jumps on the left leg with hands on the hip - 5 successive jumps are performed on one leg, hands are kept on the hip.

-5 jumps on the right leg with hands on the hip - 5 successive jumps are performed on one leg, hands are kept on the hip.

Results

Table 1. Initial explosive force testing

Events		Contact time	Flight time	Jump height	Strenght	Reactive force index
Event 1	1	0,376	0,326	13,0	14,63	0,35
	2	0,396	0,348	14,8	15,72	0,37
	3	0,340	0,312	11,9	14,38	0,35
	4	0,362	0,312	11,9	13,97	0,33
Event 2	1	0,456	0,350	15,0	14,87	0,33
	2	0,440	0,336	13,8	14,25	0,31
	3	0,304	0,296	10,7	14,05	0,35
	4	0,382	0,294	10,6	12,51	0,28

Note: test 1 - 5 vertical jumps with hands on hips - left leg; test 2 - 5 vertical jumps with hands on hips - right leg

Table 2. Final explosive strength testing

Events		Contact time	Flight time	Jump height	Strenght	Reactive force index
Event 1	1	0,356	0,388	18,5	19,49	0,52
	2	0,610	0,314	12,1	11,44	0,20
	3	0,284	0,246	7,4	11,04	0,26
	4	0,364	0,052	0,3	1,43	0,01
Event 2	1	0,420	0,404	20,0	19,06	0,48
	2	0,546	0,286	10,0	10,48	0,18
	3	0,312	0,262	8,4	11,59	0,27
	4	0,372	0,076	0,7	2,20	0,02

Note: test 1 - 5 vertical jumps with hands on hips - left leg; test 2 - 5 vertical jumps with hands on hips - right leg

Table 3. Results of initial versus final testing – Experimental group – evaluation of explosive force

Coefficients (pair)	t	df	p	d	The confidence interval	
					Lower limit	Upper limit
Contact time (s)	-0,298	27	0,76		-.033	.024
Flight time (s)	-3,860	27	0,00	0,72	-.060	-.018
Jump height (cm)	-3,148	27	0,00	0,59	-4.442	-.936
Strenght (W/kg)	-1,681	27	0,10	-	-3.032	.301
Reactive force index (m/s)	-3,278	27	0,00	0,61	-.098	-.022

Note: df = degrees of freedom (N-1); d = effect size indicator (Cohen's d).

Discussions

The statistical analysis of the data (table 3.15.) comparing the results obtained in the case of the initial testing with those of the final testing, for the evaluation of the explosive force (through the 7 evaluation samples), highlighted:

- In the case of contact time and power coefficients, there are no statistically significant differences ($p > 0.05$) between the results from the initial testing and those from the final testing;
- Looking at the flight time coefficient, there are significant differences, under statistical ratio ($p = 0.00$) between the results obtained at the initial testing and those obtained at the final testing;

The size of the effect is $d = 0.72$, which means that the effect of the intervention is very strong, in terms of the flight time coefficient (explosive force).

- Regarding the jump height coefficient, significant differences ($p = 0.00$) are found between the results obtained at the initial evaluation and those recorded at the final evaluation;

The effect size indicator is $d = 0.59$, which indicates that the effect of the experimental intervention is a strong one, in terms of the jump height coefficient (explosive force), for the results of the experimental group.

- And regarding the reactive force index, significant differences are found between the results at the beginning of the research and those at the end of the study, at the level of the experimental group.

The effect size is $d = 0.61$, which highlights a strong effect of the physical training program applied to the participants in the experimental group, on the final results of the research, in terms of the coefficient of the reactive force index (explosive force).

Conclusions

Behind a sporting success is a solid theory, scientifically argued and which is the starting point in developing the approach to the entire sports training.

As part of the body's adaptation to effort, the cardio-respiratory synergism followed by the neuro-muscular synergism and the integrative neuro-endocrine-humoral systems and the biochemical projection of the effort is very important.

In bobbers, the motor qualities are found in a close bond of interdependence, in the following order: skill, speed, strength and endurance. Their combination characterizes the specific effort and determines the essential and decisive elements in the orientation of the preparation and the choice of means.

Starting from the idea that in bobsleigh the specific effort represents a combination of force and speed in equal proportion; the existence of the substitution zone leads to the situation in which the same performance is the result of different combinations.

The predominant effort in the bobsleigh is of an anaerobic-lactacidic nature (the start under 6s, maximum intensity, during the descent, sequences of anaerobic effort, maximal and submaximal intensity). Well-prepared bobsledders, from the start to the climb into the bobsled, run with their chest blocked on inspiration (apnea).

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