Comparative Study on the Anthropometric Model of the Bobsledder

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Abstract

Since the 19th century we can talk about "winter sports" in the usual sense of the word. Spending winter holidays in the mountains became intertwined with sports fashion, ascents and skiing becoming an integral part of them, just like evenings or balls.

"Bobsleigh" is a winter sport in which the crew of two or four people compete with a piece of equipment called "sleigh", on ice tracks. This sport was invented in the late 19th century (1870)when a steering mechanism was attached to a sled.

Nowadays, in modern training, the idea that only the technical-tactical component (piloting) is important for the pilot and only physical training for the pusher can no longer be accepted. Without multilateral training, no one is able to achieve high performance today.

From a motor and technical point of view, bobsled belongs to the group of skill sports in high speed conditions. However, it is a sport that puts intense strain on the nervous system, with the psychological factor playing an essential role for the entire crew. From here one can draw the idea that bobsledders must be fast, explosive, dexterous and, last but not least, resistant.

Without continuous activity, carried out from an early age over several years, it is not possible to reach the level of training required by the demands of competitions and sports performances.

The athletic condition of the athletes is the basic requirement, the pilots being selected from sports such as athletics, biathlon or other sports in which the athletic condition is decisive. You can also select and form pilots from among the elite pushers.

At the moment of triggering the start and pushing the bob, the athlete's effort is transmitted along an curve that includes almost all muscle groups, which leads us to think of a dynamic of the qualitative growth of the muscles involved in the effort: biceps, triceps, deltoid, the dorsal muscles of the chest, abdominal muscles, gluteus

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maximus, muscles of both legs. The forearm flexors have a secondary role, but the extensors and the scapulo-humeral muscle groups have a decisive role in two key moments of the start: pulling the bobsled and accelerating before getting in the bobsled.

***Keywords**: anthropometry, comparative study, bobsledder, model.*

1. Introduction

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.

Using the classification of efforts according to the most demanded apparatus or system of the body, the scientists found that the bobsled competition is part of the efforts of the neuromuscular type. (Scott, S.H., 2008, pp. 1217-1224)

What does performance in bobsled depend on?

- the production of energy (the result of improving the capacity for aerobic exercise)
- neuromuscular function
- psychological factors (motivation, psyche, will)
- adaptation of the body to effort and recovery capacity

The predominant effort in the bobsled event 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 bob, run with their chest blocked on inspiration (apnea). (Millet, G. 2006, page 103)

The promptness with which the nervous and neuro-muscular system will respond when the start is triggered, the frequency of the running steps and the force of the push made by the muscular system, are the determining physiological factors in achieving great performance.

The problem of the processes of restoring the functional capacity of the organs and restoring the energy substances of the cells are in the attention of

the specialists in the field of sports medicine and last but not least condition the achievement of high-level sports results.

The increase in effort capacity, depending on the effort, is directly proportional to the increase in the effort that produced it. The more a training session demands the body, the more its capacity for effort increases after the fatigue disappears.

Nowadays, two on-ice trainings supplemented with a third of specific physical training has become a normal practice. During the period when there is no snow, three training sessions are held daily. Optimal results are obtained when the organs and systems that have been stressed have time to recover and enter the overcompensation phase.

The workouts are accompanied by post-action phases that last several hours, depending on the individual. A great emphasis is placed on restoring the body between heats, competition days and after the competition.

2. Assumption

An optimal physical training program can contribute to an optimal development of anthropometric indices in women's bobsled trials.

3. Logistics

The study was carried out on the athletes of the National Youth Bobsled Team, medalists at the Youth Olympic Games in St. Moritz in 2020. The venue was at the National Institute of Sports Medicine in Bucharest, in March 2021 at the beginning of the training period and in October 2021 at the beginning of the competition stage.

3.1. Tests performed:

- anthropometric measurements: waist (with the wall-mounted thaliometer) and weight (with the electronic scale)
- testing the strength of the palmar flexors for both the left and the right hand. The test was carried out using the digital dynamometer.

– testing the strength of the scapular belt. The test was performed with the dynamometer
– lumbar strength testing. The test was performed with the dynamometer.

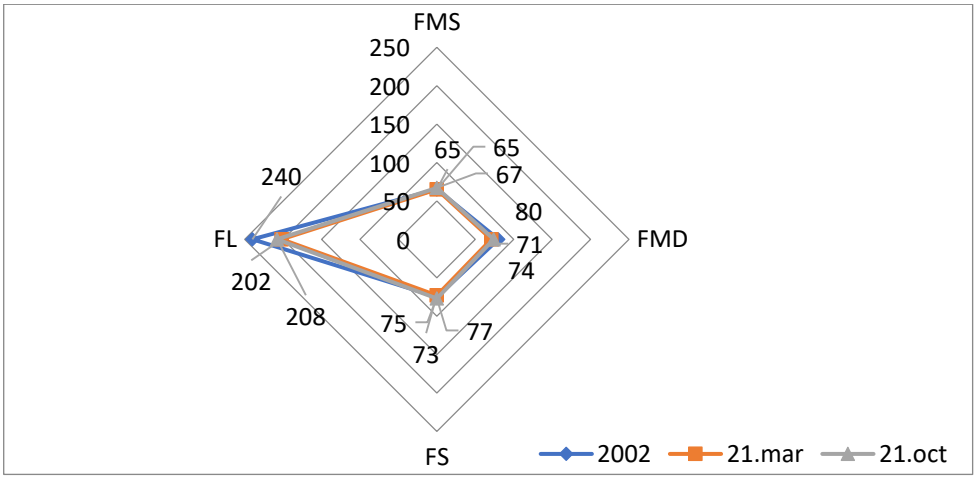
4. Results

Table 1. Anthropometric data (height, weight and body mass index)

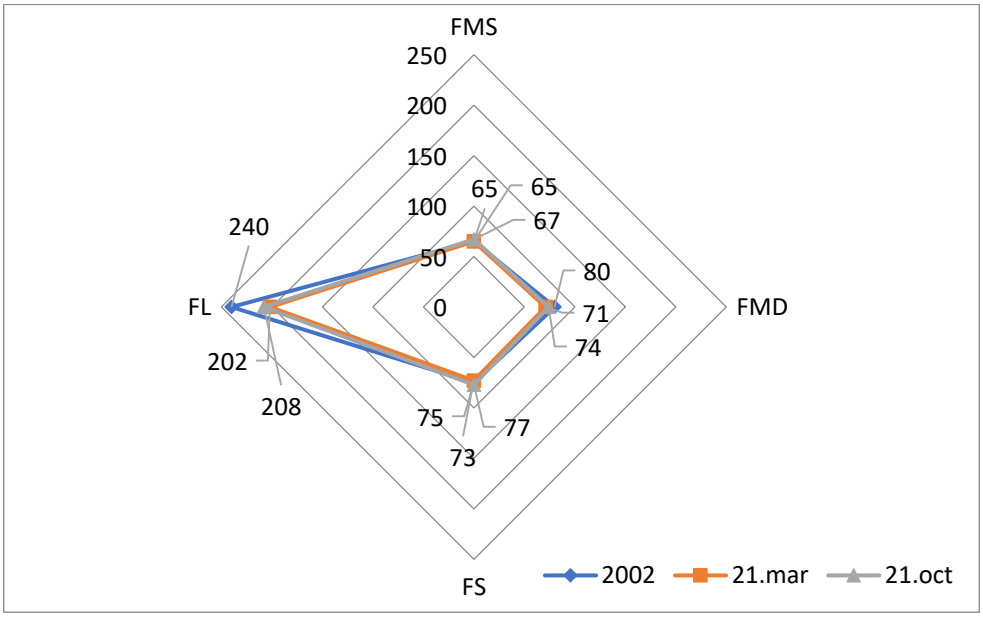
	MODEL FEMALE BOBSLEDDERS AT FIRST COMPETITION (2002)		ANTHROPOMETRIC DATA AT THE BEGINNING OF THE TRAINING PERIOD (MARCH 2021)		ANTHROPOMETRIC DATA AT THE BEGINNING OF THE COMPETITION PERIOD (OCTOBER 2021)	
	Pilot	Pusher	Pilot	Pusher	Pilot	Pusher
HEIGHT (CM)	167	168	167	168	167	168
WEIGHT (KG)	76	79	78	79	76	78,5
BMI(KG/M²)	27.25	27.99	27.97	27.99	27.25	27,64

Table 2. Anthropometric data related to the strength of the flexor muscles in both hands, scapular strength and lumbar strength

	MODEL FEMALE BOBSLEDDERS AT FIRST COMPETITION (2002)		ANTHROPOMETRIC DATA AT THE BEGINNING OF THE TRAINING PERIOD (MARCH 2021)		ANTHROPOMETRIC DATA AT THE BEGINNING OF THE COMPETITION PERIOD (OCTOBER 2021)	
	Pilot	Pusher	Pilot	Pusher	Pilot	Pusher
THE STRENGTH OF THE RIGHT HAND FLEXOR MUSCLES	60	65	61	65	63	67
THE STRENGTH OF THE LEFT HAND FLEXOR MUSCLES	70	71	72	71	74	74
SCAPULAR STRENGTH	70	73	72	73	75	77
LUMBAR STRENGTH	170	190	200	202	205	208



Graph 1. Anthropometric strength data for the pilot



Graph 2. Anthropometric strength data for the pusher

Legend:
– FMS- left hand flexor muscle strength
– FMD- right hand flexor muscle strength
– FS- scapular force
– FL- lumbar strength

In table no. 1 we can see that from the point of view of the body mass index, the pilots at the beginning of the competition period are at the level of

the model of the specialized literature, that is, at the level at which the female bobsledders were at the beginning of the competitions intended for women.

Also in table no. 1, we notice that among the pushers, at the beginning of the competition period, the body mass index is 0.35% lower than the model offered by the specialized literature.

In table no. 2 we can see that both in the measurements made at the beginning of the training period and those at the beginning of the competition period, the results are better, the force is higher, and last but not least, the force is higher at the beginning of the competition period compared to the period of training, which means that the applied physical training programs were correct and had the desired effect.

5. Conclusions

This work can be a path breaker in Romania, or at least among the first, as the specialized literature lacks research in this field. Bobsleigh athletes have strong shapes and structures, demonstrated by the measurements taken, and can fall into the endomorph or overweight category.

The analysis of the forces indicates that the bobsledders must be strong in order to push the bobsled at the start close to the maximum.

Strength is greater at the beginning of the competition period compared to the training period, which means that the applied physical training programs were correct and had the desired effect.

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