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SOMATIC AND MORPHOFUNCTIONAL DEVELOPMENT OF MALE ATHLETE ROWERS COMPETING IN OPEN CATEGORY

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Abstract

Rowing is a cyclical Olympic sport which is characterized by an aerobic effort over a 2000 m race. To obtain high performance in rowing, meeting anthropometric parameters, showing stature, and meeting weight requirements is important. The selection of youth for this sport is subject to exceptional physical skills, according to data compiled by Romanian Rowing Federation for anthropometric models that facilitate the work of coaches. The anthropometric model is part of the biological model's performance and achievement in the growth and development of the individual that creates favourable conditions for achieving high-level results. The level of somatic development in rowers was determined in the study by measuring anthropometric data, and was reported in the calculation for the physical and nutritional status of the Basic Guide for Establishing Romanian Sports/Rowing, INMS 1987 (Men's Open Model). Research methods used were: observation, studies by specialists, tests and anthropometric measurements, and analysis of the results. Comparing the level of somatic, morphological, and functional development of competing rowers follows the specific physical preparation in accordance with the requirements and effectiveness of the model presented. The needs for modern training methods are consistent with the worldwide objectives and efforts in various stages of preparation and performance.

Keywords: Sports, training, athletic performance, efficacy, physical effort, competition.

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1. Introduction

Training and efficient athlete models play a special role in developing and improving sports performance. The model of training and competition is a conceptual indicator, which along with 67 other factors creates the premise of a high-performance generator. Appropriate scientific leadership is important or the model to become operational, and for the ability to change the strategy to counter the influence of unexpected disturbances. Models can cause changes in the structure and content of the educational process in general, and with particular workouts. Selection is an ongoing process that is applied to all sports and is a prerequisite to high level performance (Neder, 2015, p. 123).

Gagea (1982, pp.12) states that "the most dramatic change in approach to sports training model abandonment occurred when champions switched to the biological model." The biological model can have a creative component and gives rise to compensations and innovations.

Anthropometric parameters and values are essential in rowing through outstanding stature and gauging requirements. Thus, the selection process of young people with exceptional physical skills should be made at the start of their sporting activity. Based on this data we have created some anthropometric models that help coaches through the selection process.

Morphological and functional integration of the musculoskeletal system, good muscle joint mobility and elasticity, tensile and pressure, good muscle strength, and optimal neuromuscular coordination help to increase sports training (Potop, Grigore, & Moraru, 2014). In sports, physical effort involving the muscular system, energy transmission, and information processing, is predominant, responding to specific requests that the body produces, through development at different levels of physical abilities and functions of the athlete (Neder, 2010, p.28).

Today we know the results of great performance training through processes visible over several years. It is therefore important to pay attention to the development of various core capacities (Bompa, 2002, pp.82) and to prepare for long-term performance. The potential for the specific force in canoeing will be transposed into the motion of rowing boats.

2. Problem Statement

In rowing, anthropometric parameters are essential in determining outstanding stature and weight requirements. In these circumstances, the selection of young people with exceptional physical fitness must be done at the start the sports activity. Thus, based on this data, the federation has developed some anthropometric models that aid coaches in the selection process. The anthropometric variable is part of the biological model to measure performance, achievement, growth, and development of the individual that creates favourable conditions for achieving high-level results.

As with all sports, rowing has a wide range of requirements in relation to sports performance. From Dospinescu (2006, p. 19), we see that an essential requirement for practicing rowing is "the combination of those energy sources which should provide strength, power, and endurance."

This transposition of potential force in rowing movements will determine the level of performance. In other words, not every rower with high load-resistant qualities will provide higher performance, but only those who manage to effectively overlap these indicators will succeed in rowing. The factors that must be sought after include a good force/resistance ratio as well as strength, coordination, and technique.

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Among the most important requirements for determining rowing performance are: health and functional capacity, certified sports medicine, results of the investigations that are appropriate for the practice of rowing performance, somatic skills, and nutritional status, in accordance with the Romanian Rowing Federation and the results recorded in the control samples.

3. Research Questions

During this research the following questions were asked:

- Are the Somatic Measurement Results comparable with the Open Model Results?
- Do the Morphological and Functional Results are consistent with the objectives and characteristics of parameters in the respective stage of preparation?

Applying this model for using the morphological and functional indicators of somatic development to select athletes can lead to their achieving performance in sports?

4. Purpose of the Study

The research purpose is to show the effectiveness of sports training models in relation to the development of somatic and morphofunctional in selected athletes to achieve high performance.

Through this comprehensive study, we highlighted the correlation between somatic and morphological and functional indicators of selected athletes using the model imposed by the Romanian Rowing Federation to accurately predict the evolution of sports performance and to confirm the effectiveness of the model presented.

5. Research Methods

Actual research in this study took place in the Junior Olympic Centre (CSN Calarasi), where some aspects of preparing athletes for rowing were implemented. Several tests applied to a group of juniors and carried out under the National Institute of Sports Medicine were used in our research in pursuit of somatic, physiological, and functional indicators: anthropometric tests (height, weight, bust, and wingspan), functional exploration (heart rate (FC), blood pressure (BP). Measurements and tests were conducted from October to December 2015 and represent the next stage of selection for the next training year (Urichianu, 2014).

Research methods used are: pedagogical observation; document analysis; method scheduling; test method (anthropometric, morphologic function, functional); modeling method; statistical and mathematical methods of processing graphical representation, and interpretation of data.

The level of somatic development of the rowers was measured using anthropometric data and the calculations were reported for the physical and nutritional status of the Basic Guide for Establishing Romanian Sports/Rowing, INMS 1987 (Model Men's Open, over 21 years, Table 01).

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Table 01. Anthropometric Rowing Model. Open-standards category at 100% [172 Basic Guide for Romanian sports facilities, INMS 1987].

Gender	Height (cm)	Tall with arms stretched above(cm)	Scale arms(cm)	Weight (height-100)
Female	180	232	184	+3 la –6 kg
Mans	197	256	209	100 kg

Rules for morphological skills. Open category - Rules at 100%. Morphological skills in group norm for male arithmetic mean of the first 3 percentage parameters.

6. Findings

In order to make a training module more efficient in identifying and discovering functional athletes, which includes the means and methods of modern rowers, the functional reserves of athletes must be identified and it is also important to know how to predict any possible changes.

From table 01 it is noted that there is an average height of 190.13 cm, which means 96.5% of the popular Open 197cm; the height with arms raised - shows an average of 245.63 cm, which means 95.7% compared to the 256cm model Open; wingspan - shows an average of 196.21 cm, which is 93.8% compared to the model Open 209 cm; weight - has an average of 82.08 kg, which is 82% compared to its open 100kg.

Table 02. Somatic development results

Exemplary	**197.0**	**256.0**	**209.0**	**100**
	Height (cm)	Measurement with arms stretched above, (cm)	Wing span, (cm)	Weight, (kg)
No.	RM	RM	RM	RM
1	186.0	245.0	197.0	78.3
2	191.0	246.0	195.0	82.0
3	186.0	240.0	192.0	80.5
4	190.5	243.0	194.0	74
5	200.0	256.5	206.0	89.5
6	188.0	244.0	197.0	89.5
7	193.0	250.0	201.0	89.5
8	189.5	245.0	193.0	76.2
9	191.0	247.0	194.5	83.5
10	188.0	246.0	198.0	81.5
11	188.5	244.0	192.0	82.0
12	190.0	241.0	195.0	78.4
X	190.13	245.63	196.21	82.08
AE	1.08	1.25	1.17	1.50
S	3.74	4.32	4.04	5.20
CV%	1.96	1.76	2.06	6.34

Note: X- arithmetic mean, AE- average error, S- significance, CV coefficient of variation, RM-resulting measurements.

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Determining the level of functional capacity and development of junior rowers was achieved through the application of functional exploration tests, measuring both the physical condition and functional status during a given period.

Table 03. Analysis of somatic development results of junior rowers

No. crt	Anthropometric measurements	Exemplary		Tests
		Value	%	X±Em
1.	Height (cm)	197,0	96,5	190.13±1.08
2.	Tall with arms stretched above, (cm)	256,0	95,7	245.63±1.25
3.	Wingspan (cm)	209,0	93,8	196.21±1.17
4.	Weight (kg)	100,0	82,0	82.08±1.50

Height (cm) shows an average of 190,13cm which means 96.5% of the popular Open 197cm; height with arms above (cm) has an average value of 245,63cm which means 95.7% compared to the 256cm model Open; wingspan (cm) has an average 196,21cm which means 93.8% compared with the model Open 209 cm; weight (kg) averaged 82,08kg which means 82% compared to its Open 100kg. Open model, as compared with the level of somatic development of junior rowers are very close to it in this research, given the fact that athletes are in junior Open category and have at least 3 years of training.

Table 04 presents the results of morphological and functional development in junior rowers on FC TA min and max, orthostatic and supine, and functional exploration results. Standing, heart rate (HR, b / min) has an average of 61,67b / min; Maximum blood pressure (BP max.-MMH) has an average of 118,25mmH; minimum blood pressure (BP min.-MMH) has an average of 64,5mmH. Supine heart rate (HR, b / min) has an average of 66,5b / min and maximum blood pressure (BP max.-MMH) has an average of 118,08mmH, minimal blood pressure (BP min.-MMH) has a 66,00mmH average.

Table 04. Results of morphological and functional development of junior rowers

No.	Control samples		Tests X±Em
1	Supine	HR, b/min	61.67±1.04
2		BPmax, mmH	118.25±1.73
3		BPmin, mmH	64.5±0.93
4	Standing	HR, b/min	66.5±1.05
5		BPmax, mmH	118.08±1.43
6		BPmin, mmH	66.00±0.74

Note: HR-heart rate, BP - blood pressure, b - beats, min.- minute.

Analysis of somatic development, morphological and functional somatic measurements in junior rowers highlights the relationship of the Open model, indicating that development and function levels are consistent with the objectives and characteristics of parameters in various stages of preparation.

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7. Conclusion

Applying this model confirmed the hypothesis that the study presented, which was that using the morphological and functional indicators of somatic development to select athletes creates favourable conditions for achieving performance in sports.

Determining the level morphological and functional somatic development and anthropometric data showed the ratio of the rowers Open model and the functional exploration by tracking both the physical condition and functional status during that period.

Analysis of somatic development, morphological, and functional somatic measurements in junior rowers highlights the relationship between the open model and the competition results and proves to be consistent with the objectives and characteristics of effort parameters in various stages of preparation. Open versus model values on the somatic development of junior rowers are in research very close to it, given the fact that athletes are in the junior Open category and have at least 3 years of training.

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