

## Comparison of the Structure of Physical Training in Rowing and Canoeing

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**Introduction.** Athletic records, competition and consistency of sport results in different competitions, as well as the volume and intensity of training loads have increased recently [5, 7]. One of the ways to achieve maximum sport result is to optimize of the structure of physical training.

The structure of physical training contains different types of preparation: overall physical, special physical, technique, mental, tactical, theoretical, as well as extra-training and extra-competition factors, one of which is sport equipment [1, 5, 7]. Depending on the peculiarities of the kind of sport, the ratio of all the factors listed above can vary considerably. To increase the efficiency of the training process it is necessary to define the most important types of preparation.

Rowing and canoeing belong to the kinds of sport which demand from the athlete all-round training and highly developed almost all kinds of movement skills [2], which requires well-balanced correspondence of all kinds of preparation. As far as in rowing and canoeing different types of training have different influence on the sport result, it is necessary to find out the degree of their impact and consequently correct the training process.

The training of the athlete is comprehensive and includes the following parts: technique, physical, mental, tactical and intellectual ones, which are interrelated and complete one another. Only appropriate development of all the mentioned kinds of training allows to introduce the athlete in good physical conditions, integral indicator of which is sport result [2, 5, 7]. At the same time, in the theory and methodology of sport training there is a number of such significant characteristics of preparing and types of preparation, which have the biggest impact on the result in a certain kind of sport. As usual this defines the purposeful selection of means and methods of their formation and development [2, 3].

Contemporary practice shows that the methodology of defining the degree of influence of different kinds of training on the result in rowing and canoeing has not been elaborated properly yet and needs further examination, based on experimental research.

As long as it is not possible to give proper quantitative assessment of the influence of different types of training on the sport result, one of the ways to solve this problem is to implement the qualimetry procedures [4, 6].

To use this data the mathematical tools, closely connected with mathematical and statistical methods, have been developed [1, 6, 8].

On the base of what is mentioned above, we set the aim and tasks of the research.

**The aim of the investigation** is to compare the influence of different types of training on the sport result in rowing and canoeing.

**The research techniques:** the analysis of specialist literature; expert evaluation method; methods of mathematical statistics.

**Results.** To fulfill the tasks set we used the method of expert evaluation. This technique allows to range the objects under investigation according to the degree of their influence on the sport result. The objects of investigation are the types of sport training: special physical preparation, overall physical preparation, technique preparation, mental preparation, tactics preparation, theoretical preparation, and sport equipment.

Criteria of evaluating the objects under investigation are the following: the degree of the influence of this kind of training on the sport result; the number of hours, used for this kind of training; the level of athletes' preparation in this type of training; objectivity of the control over this type of training; the rate of increase of the athlete's preparation.

Carrying out the evaluation contained the following stages: setting the tasks; selecting the experts; choosing the technique (making up the plan of evaluation); questioning the experts; data processing and its analysis; evaluating the level of experts' opinion consistency.

The effectiveness of the evaluation, the importance of the results gained depends directly on the organization of work at all stages of its carrying out.

The most important stage is selecting the experts. 16 experts participated in the research: 8 specialists in canoeing (of them 4 athletes and 4 coaches), and 8 specialists in rowing, correspondingly. The criteria of selecting the experts were the following: for athletes – sport qualification (Master of Sports of Ukraine), sport experience (5 years at least); for coaches – coaching category (first and high), working experience (7 years at least), the number of Masters of Sports trained (5 at least).

We used the method of paired comparison, which is based on paired comparison of all (one with another) factors. The most significant one in each pair was marked with «1», the second one – with «0» point. The data was noted down in the matrix of paired comparison, where both on the level and vertically all the objects compared are placed. Each cell of the table is related to two objects compared and the marks «1» or «0» was put there. The place, taken by the object, was defined by the number of points received: the bigger the number was, the higher the place taken was.

Each expert was given the questionnaire and the instructions of filling it up, as well as the criteria of evaluation of training types.

The following stage of the evaluation was data processing and its analysis. The aim of this stage is reducing the experts' opinions to the same denomination.

We separately examined the importance of the types of training in canoeing and rowing. Tables 1 and 2 contain the integrated experts' opinions in canoeing and rowing, correspondingly. Tables 2 and 3 contain the results of paired comparison which increased the reliability of the evaluation.

Table 1

**Summary table of the experts' opinions about the importance of different types of training in canoeing**

№	Object of evaluation Type of training	Ranking result. Expert №. (m – number of experts).								Total points $\sum X_i$	$\sum X_i - X_c$	$(\sum X_i - X_c)^2$	Place
		1	2	3	4	5	6	7	8				
1	Overall physical preparation	3	3	3	3	4	2	3	1	22	-10	100	3
2	Special physical preparation	2	1	1	2	1	1	2	2	12	-20	400	1
3	Technique preparation	1	2	2	1	2	3	1	3	15	-17	289	2
4	Tactics preparation	6	7	5	6	6	6	6	6	48	16	256	6
5	Mental preparation	5	5	6	4	5	5	5	4	39	7	49	5
6	Theoretical preparation	7	6	7	7	7	7	7	7	55	23	529	7
7	Sport equipment	4	4	4	5	3	4	4	5	33	1	1	4

As we can see in Table 1, the types of training in canoeing are distributed in the following way: 1 place – special physical preparation, 2 place – technique preparation, 3 place – overall physical preparation, 4 place – sport equipment, 5 place – mental preparation, 6 place – tactics preparation, 7 place – theoretical preparation.

Table 2

**Summary table of the experts' opinions about the importance of different types of training in rowing**

№	Object of evaluation Type of training	Ranking result. Expert №. (m – number of experts).								Total points $\sum X_i$	$\sum X_i - X_c$	$(\sum X_i - X_c)^2$	Place
		1	2	3	4	5	6	7	8				
1	Overall physical preparation	1	1	2	2	2	1	2	3	14	-17,7	313,29	2
2	Special physical preparation	2	2	3	1	1	2	1	1	13	-18,7	349,69	1
3	Technique preparation	3	4	1	3	4	3	3	2	23	-8,7	75,69	3
4	Tactics preparation	6	6	6	6	6	6	6	7	49	17,3	299,29	6
5	Mental preparation	4	3	4	4	4	4	5	4	32	0,3	0,09	4
6	Theoretical preparation	7	7	7	7	7	7	7	6	55	23,3	542,89	7
7	Sport equipment	5	4	5	5	3	5	4	5	36	4,3	18,49	5

In rowing (Table 2) the types of training are distributed in the following way: 1 place – special physical preparation, 2 place – overall physical preparation, 3 place – technique preparation, 4 place – mental preparation, 5 place – sport equipment, 6 place – tactics preparation, 7 place – theoretical preparation.

The next stage of evaluation is the analysis of experts' opinion consistency.

The degree of experts' opinion consistency is defined with the help of concord index, which is calculated according to the formula:

$$W = \frac{12 \cdot S}{m^2 \cdot (n^3 - n)},$$

where:  $S$  – sum of squares of rank sums deviation;

$m$  – number of experts;

$n$  – number of characteristics under examination (types of training).

If  $W_{\text{pac}} \geq W_{\text{гр}}$ , evaluation is considered accomplished and the sum of experts' points (places) is valid. The evaluation is regarded reliable (in case the number of experts is  $m = 8$ ) if the index of experts' opinion consistency is at least 0,7.

While evaluating the importance of different types of training in canoeing and rowing we received the following concord indexes:  $W_{\text{pac}} = 0,91$ ,  $W_{\text{гр}} = 0,89$  correspondingly.

The comparison of the results (Table 3) proves that in both kinds of sport the first place is taken by special physical preparation. It is connected to the fact that achieving a specific sport result demands considerable volume of special exercises, which are the most effective.

Table 3

### Comparison of the influence of different types of training on sport results in rowing and canoeing

	Rowing	Canoeing
1 place	special physical preparation	special physical preparation
2 place	overall physical preparation	technique preparation
3 place	technique preparation	overall physical preparation
4 place	mental preparation	sport equipment
5 place	sport equipment	mental preparation
6 place	tactics preparation	tactics preparation
7 place	theoretical preparation	theoretical preparation

The sixth and seventh places are taken by tactics preparation and theoretical preparation correspondingly. Nowadays in rowing and canoeing in «straight» distances the tactical variants of getting over the distance are practically replaced by the optimal model of getting them over. In rowing the second place is taken by overall physical preparation, the third one – by technique preparation, but in canoeing these factors are placed otherwise. It is connected with the fact that the technique in rowing is easier than in canoeing. At the same time rowing makes higher demands to developing physical quality of the athlete.

**Conclusions.** Defining the influence of different kinds of training on sport result in rowing and canoeing allows to correct the plan of training process. The results achieved are reliable because the concord indexes are much higher than boundary ones. Despite the likeness of two kinds of sport compared, the influence of different kinds of training on sport result is different, which is caused by the peculiarities of competitions and the degree of complexity of developing the techniques of physical actions.

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**Annotations**

*The paper presents an expert assessment of the impact of different types of training for athletic performance in rowing and canoeing. Based on these data, a comparative analysis of the training process in these sports. Identified the distinctive design features of the training process and the importance of different types of training in rowing and canoeing.*

**Key words:** академическая гребля, гребля на байдарках, тренировочный процесс, экспертная оценка

**Александр Жирнов, Леонид Богачук. Сравнение структуры спортивной тренировки в академической гребле и гребле на байдарках.** В статье представлены данные экспертной оценки влияния разных видов подготовки на спортивный результат в академической гребле и гребле на байдарках. На основании полученных результатов проведён сравнительный анализ тренировочного процесса в этих видах спорта. Установлены отличительные особенности построения тренировочного процесса и важности разных видов подготовки в академической гребле и гребле на байдарках.

**Ключевые слова:** академическая гребля, гребля на байдарках, тренировочный процесс, экспертная оценка.

**Олександр Жирнов, Леонід Богачук. Порівняння структури спортивного тренування в академічному веслуванні та веслування на байдарках.** У статті представлено дані експертної оцінки впливу різних видів підготовки на спортивний результат в академічному веслуванні та веслування на байдарках. На підставі отриманих результатів проведено порівняльний аналіз тренувального процесу в цих видах спорту. Виявлено певні особливості побудови тренувального процесу й важливості різних видів підготовки в академічному веслуванні та веслування на байдарках.

**Ключові слова:** академічне веслування, веслування на байдарках, тренувальний процес, експертна оцінка.