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Features of technical and tactical actions of highly skilled athletes when swimming a distance of 100 meters by front crawl

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Purpose: *to determine the features of technical and tactical actions of highly skilled athletes when swimming a distance of 100 meters by front crawl.*

Material & Methods: *analysis and generalization of literary sources, video filming, timekeeping, methods of mathematical statistics. The contingent of subjects consisted of athletes who specialized in a distance of 100 meters in the way of swimming the front crawl and had the level of sports qualification master of sports of Ukraine, master of sports of international grade.*

Results: *dynamics of indicators of technical and tactical skill among highly skilled athletes during their overcoming the 100 meter distance by front crawl has been investigated; characterized by the variability of technical and tactical actions of highly skilled athletes in different parts of the competition distance of 100 meters; determined the degree of influence of speed, pace and "step" of the cycle of rowing movements on the result of swimming a distance of 100 meters using the front crawl.*

Conclusions: *overcoming the distance of 100 meters by the front crawl has its own specifics, which is reflected in changes in the indicators of technical and tactical master hood; model characteristics of the most influential parameters of technical and tactical actions of highly skilled swimmers can serve as a guideline for improving the training process of athletes depending on their distance specialization.*

Keywords: *front crawl, 100 meters, highly skilled athletes, technical and tactical actions, dynamics, interconnection, model characteristics.*

Introduction

The level of development of modern sports swimming requires specialists to search for ways to improve the training of athletes based on the study of a wide range of different fields, among which a significant role is devoted to the analysis of competitive activities (A. V. Boroday, 1990; A. A. Krasnikov, 1992; L. P. Matveev, 1996; V. N. Platonov, 2004; Kh. A. Sanosyan, 2009).

A systematic and ongoing analysis of the competitive activity of swimmers is an important means of managing the training process, since it is closely connected with various aspects of training – technical, physical, tactical and psychological. Knowledge of its structure, compliance with the functional capabilities and technical and tactical features of an athlete create the necessary prerequisites for achieving the planned result at competitions (V. M. Comotsky, 1986; L. P. Makarenko, 1996; V. A. Parfenov, A. V. Parfenov, L. V. Parfenova, V. A. Shcherbina, 1992; A. A. Pilipko, 2014, A. A. Pilipko, 2017; V. M. Platonov, 2012).

Despite a sufficient amount of accumulated information on the study of competitive activity, over time, the nuances of passing distances of different lengths by athletes of different ages, gender, skill level, determining the individual characteristics of their technical and tactical actions in various swimming methods require more detailed study.

Purpose of the study: to determine the features of technical and tactical actions of highly skilled athletes when swimming a distance of 100 meters by front crawl.

Objectives of the study:

1. Investigate the dynamics of technical and tactical skills of highly qualified athletes in overcoming the 100 meter distance by the front crawl method;
2. To characterize the variability of technical and tactical actions of highly qualified athletes in different parts of the competition distance of 100 meters by the front crawl method;
3. To determine the relationship of indicators of technical and tactical skill of high-class athletes and sports results at a distance of 100 meters using the front crawl method.

Material and Methods of the research

The following methods were used to solve the tasks: analysis and generalization of literary sources, video shooting, timing, methods of mathematical statistics.

The study was conducted at the Ukrainian Championships and Cups in swimming. The contingent of test subjects consisted of athletes who specialized in the distance of 100 meters in the manner of the king on the chest and had a level of sports qualification MSU, MSIG. The total number of surveyed was 16 swimmers.

Results of the research

Competitive outcome in swimming depends on many factors, among which one of the leading places is the ability of the athlete to effectively implement technical and tactical actions in a competitive environment.

The peculiarities of the technical and tactical actions of swim-

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mers of high qualification during the overcoming of the distance of 100 meters in the manner of the king on the chest were determined by the indicators of speed, tempo and "step" of the cycle of comb movements, which were evaluated at the starting segment, the distances, the turning and the finishing segments (Figure 1–3).

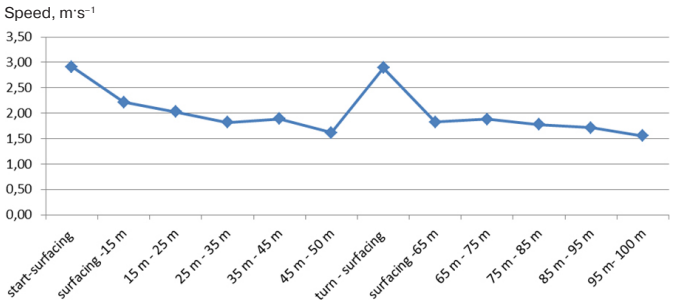

Figure 1. Dynamics of speed indicators during athletes overcoming a distance of 100 meters using a front crawl

As can be seen from Figure 1, the competition distance of 100 meters by the front crawl is overcome by swimmers with a general tendency to decrease in speed in the first half and the relative stabilization of this indicator in the second half of the competition distance.

Athletes demonstrate the highest value of the speed parameter in the "start-surfacing" area (V=2,91 m s^{-1}), which is explained by the inertial acceleration obtained by performing a starting jump and the specificity of swimming movements that are carried out under water.

A further sharp decrease in speed indicators, which occurs to the "35 m" mark, is due to the formation of a coordination structure of movements when overcoming distance segments.

At the "35-45 m" section, there is a slight increase in speed indicators followed by their gradual decrease until the turning shield touches, which is connected with the attempt of the athletes to perform the most rational turn.

A significant surge in speed is observed in the "turn-surfacing" area, which is caused by the fact that swimmers repulse the side of the pool and slide them under water.

The section "65-95 m" is overcome by athletes in an attempt to keep a uniform speed of movement along the distance (its fluctuations occur within 1,56–1,88 m·s^{-1}).

Finishing meters are characterized by the appearance of progressive fatigue, adversely affecting the speed parameters of swimmers.

A significant fluctuation in the pace of rowing movements occurs at the first 50 meters of the competition distance (Figure 2).

The highest rate of pace was recorded in the area of "surfacing – 15 m" (70,52 cycles/min), which is explained by the attempt of athletes to maintain high rates of speed after the start by increasing the frequency of rowing movements.

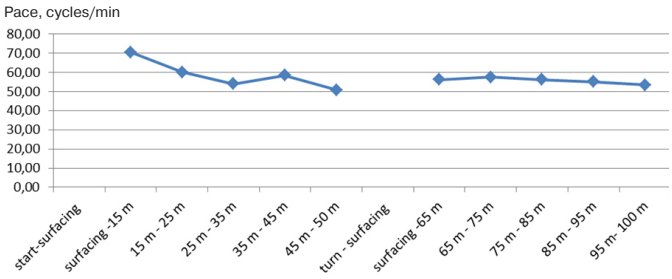

Figure 2. Dynamics of pace indicators of rowing movements during athletes overcoming a distance of 100 meters using a front crawl

Over the next 20 meters, a decrease in pace to the level of 54,03 cycles per minute is observed, followed by a slight increase in this indicator over the next 10 meters.

When swimming up to the turntable, the movements of the athletes slow down, which is explained by the specifics of the turn.

The second half of the distance is overcome by swimmers with a relatively equal frequency of movements.

Such an indicator of technical and tactical skill as the "step" of the stroke movement cycle is the most unstable among sprinter swimmers (Figure 3).

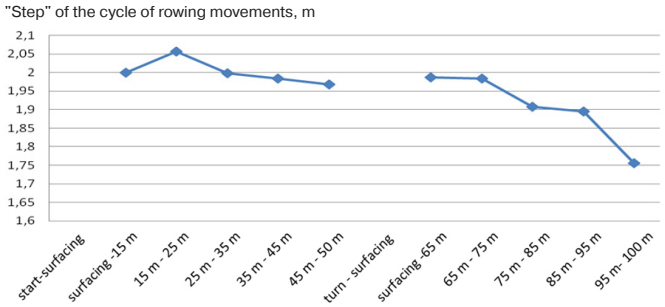

Figure 3. Dynamics of indicators of the "step" of the cycle of rowing movements during the athletes overcoming a distance of 100 meters using a front crawl

If in the first half of the competition distance its changes are relatively insignificant, then the second half of the distance is characterized by a noticeable reduction in the length of the stroke.

The highest rate of "step" of the cycle of stroke movements is fixed at the site "15-25 m" (2,06 m), when athletes perform powerful motor actions at an optimal pace due to the effective repulsion phase.

The rapid shortening of the stroke length, especially in the "75-85 m" and "95-100 m" areas, is explained by the appearance of progressive fatigue, which is reflected in the swimming technique, namely, it provokes such an error as a shortening of the stroke.

Thus, the swimming distance of 100 meters in the way of front crawl has its own specifics, which affects the changes in the indicators of technical and tactical skill.

The analysis of the obtained digital material suggests that, despite the similar picture of the passage of a distance of 100

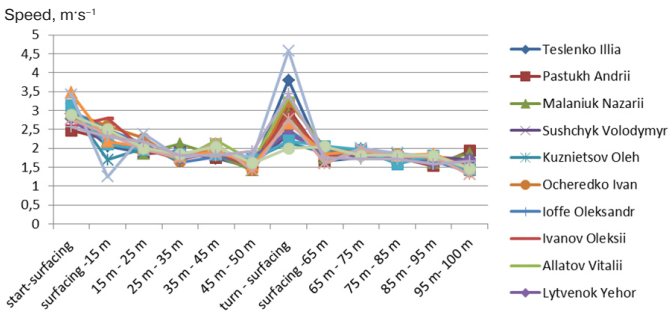

Figure 4. Dynamics of individual indicators of speed in the process of athletes overcoming the distance of 100 meters using a front crawl

meters, in some of its sections the parameters of technical and tactical skills of athletes differ significantly (Figure 4–6).

As can be seen from Figure 4, the most noticeable difference in speed indicators is observed in the sections "surfacing-15 m" and "turn-surfacing" (coefficient of variation is 17,56 and 24,81, respectively).

Significant individual differences in the parameters of the pace of rowing movements are demonstrated by athletes mainly in the first half of the competitive distance (Figure 5).

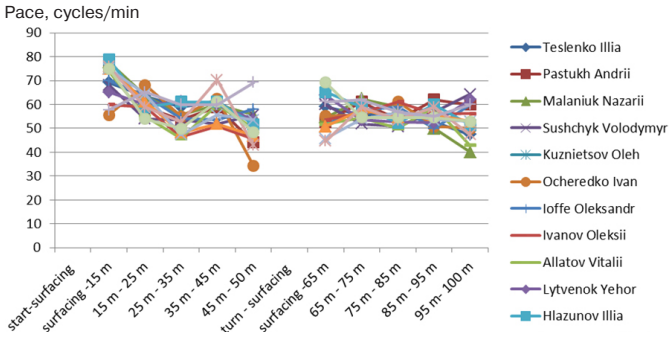

Figure 5. Dynamics of individual indicators of the pace of stroke movements in the process of athletes overcoming the distance of 100 meters using a front crawl

This is especially noticeable during the swim to the rotary shield.

In the second half of the competition distance, the frequency of rowing movements among highly qualified swimmers is noticeably different after the turn and at the finishing meters.

Such an indicator of technical and tactical skill as the "step" of the cycle of rowing movements is characterized by relative stability over the course of overcoming all 100 meters of competitive distance (Figure 6). The only exceptions are individual athletes who have a significant fluctuation in the value of the stroke length parameter (A. Ivanov, I. Ocheredko, N. Malanyuk).

Considering the dynamics of changes in tempo and "step" of the stroke cycle, it can be concluded that the vast majority of athletes are trying to compensate for the shortening of the stroke by increasing the pace of movements. This is especially noticeable at the finishing meters of the distance, when, against the background of progressive fatigue, there is

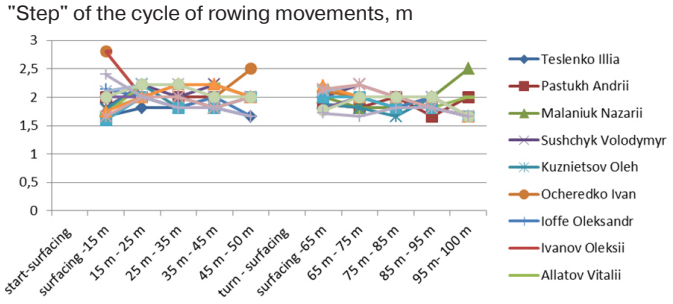

Figure 6. Dynamics of individual indicators of the "step" of the cycle of stroke movements in the process of athletes overcoming a distance of 100 meters using a front crawl

a significant deterioration in the performance of the repulsion phase.

Investigating the degree of influence of technical and tactical indicators on the result of overcoming the competitive distance of 100 meters with a highly qualified fin of the chest crawl method, we determined the parameters that are most important for demonstrating high results at the chosen distance (Figure 7–9).

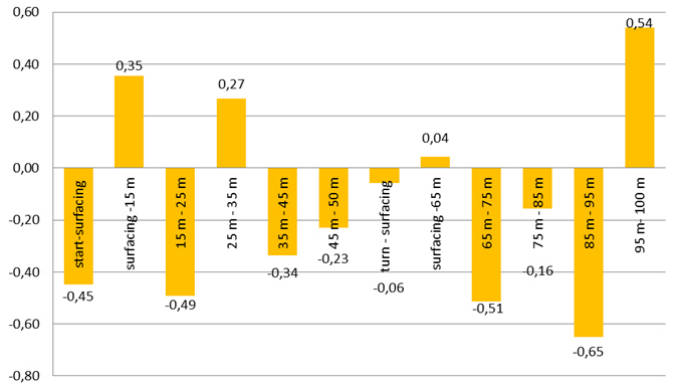

Figure 7. The degree of correlation between the indicators of the speed of swimming of various parts of the competition distance of 100 meters by the front crawl and the final sports result

As can be seen from Figure 7, the speed indicators on the sites are most significantly affected by the parameters: "65 m – 75 m" (R=–0,51), "85 m – 95 m" (R=–0,65) and "95 m – 100 m"(R=0,54).

The average degree of the correlation relationship is traced between the final result and the speed of overcoming by the athletes of the sites "start-surfacing" (R=–0,45) and "15-25 m" (R=–0,49).

The effect of the rate index of the stroke movements is less significant (Figure 8).

The most significant indicators of the "step" of the cycle of the stroke movements were recorded in the sections: "surfacing – 15 m" (R=–0,57) and "surfacing – 65 m" (R=–0,44) (Figure 9).

Having determined the parameters of technical and tactical skill of highly skilled swimmers witch most influence the final

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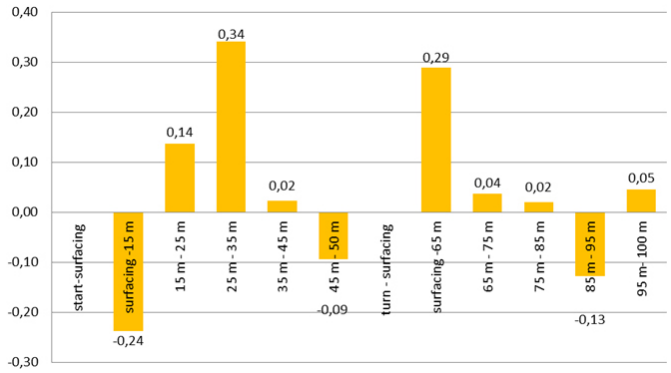

Figure 8. The degree of correlation between the pace indicators of stroke movements when swimming different sections of the competition distance of 100 meters by the front crawl and the final sports result

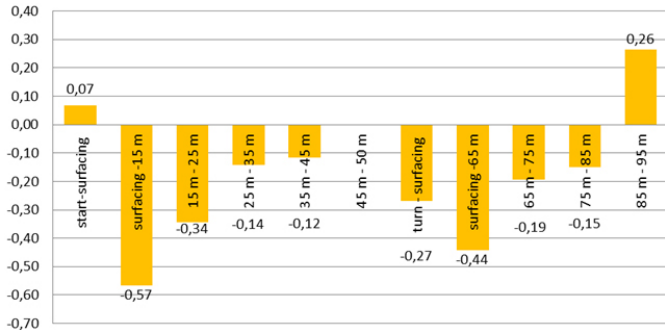

Figure 9. The degree of correlation between the indicators of the "step" of the cycle of stroke movements when swimming different sections of the competition distance of 100 meters using the front crawl and the final sports result

result of overcoming the distance of 100 meters using the crawl on the chest, we developed their model characteristics (Table 1).

The use of model characteristics makes it possible to determine the compliance of the individual parameters of a particular athlete with their subsequent selection of the most effective ways to improve the training process aimed at eliminating deficiencies in the preparedness of a swimmer.

Conclusions / Discussion

The results of the study confirm the opinion of many experts that the competitive result in swimming depends on a number of factors. One of the leading places in this list is occupied by the ability of an athlete to effectively implement technical and tactical actions in a competitive struggle. Having advanced the hypothesis that the techno-tactical actions of swimmers during the overcoming of various competitive distances have their own peculiarities, we have proved that the distance of 100 meters in the way of front crawls is overcome by athletes of high qualification with the general tendency to decrease the indicators of speed and rate of stroke movements on the first half of the distance and their relative stabilization in the second 50 meters. A noticeable shortening of the length of the stroke takes place at the second half of the competitive distance of 100 meters. It was confirmed that the dynamics of technical and tactical skills are related to the level of physical and functional fitness of athletes, as well as due to the individual style of competitive struggle. It was determined that the sporting result at a distance of 100 meters in the way front crawl is under the significant influence of speed indicators swimming segments: "65 m – 75 m" (R=–0,51), "85 m – 95 m" (R=–0,65) and "95 m – 100 m" (R=0,54), as well as the "step" parameter of the stroke movement cycle recorded at the "surfacing – 15 m" section (R=–0,57). It can be argued that the orientation on the model characteristics of the most influential indicators of technical and tactical skill of highly skilled swimmers allows us to improve the training process of athletes, depending on their distance specialization.

Table 1

Model indicators of technical and tactical skill of athletes who specialize in swimming front crawls at a distance of 100 meters

No. i/o	Indicators	Model values
1.	Speed at sections "start - surfacing", m·s^{-1}	2,91
2.	Speed at sections "15 m – 25 m", m·s^{-1}	2,03
3.	Speed at sections "65 m – 75 m", m·s^{-1}	1,88
4.	Speed at sections "85 m – 95 m", m·s^{-1}	1,71
5.	Speed at sections "95 m – 100 m", m·s^{-1}	1,56
6.	"Step" cycle stroke movements at sections "surfacing – 15 m", m	2,00
7.	"Step" cycle stroke movements at sections "surfacing – 65 m", m	1,99

The prospect of further research is to determine the characteristics of technical and tactical actions of highly qualified athletes when swimming distances of 200 and 400 meters using the front crawl.

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