

Міністерство освіти і науки України
Комітет з фізичного виховання і спорту МОН України
Сумська обласна державна адміністрація
Управління молоді та спорту Сумської обласної державної адміністрації
Національний університет фізичного виховання і спорту України
Тартуський університет (Естонія)
Сумський державний університет



**ІННОВАЦІЙНІ ТЕХНОЛОГІЇ
В СИСТЕМІ ПІДВИЩЕННЯ КВАЛІФІКАЦІЇ ФАХІВЦІВ
ФІЗИЧНОГО ВИХОВАННЯ І СПОРТУ**

ТЕЗИ ДОПОВІДЕЙ
VI МІЖНАРОДНОЇ НАУКОВО-МЕТОДИЧНОЇ КОНФЕРЕНЦІЇ
(Україна, Суми, 18–19 квітня 2019 року)

Суми
Сумський державний університет
2019

KINEMATIC CHARACTERISTICS OF HAND STROKE IN CRAWL ON CHESTS

Bondarenko K. K., Ph.D., Busel T. A., a senior teacher,
Volkova S.S., stud.

Francisk Skorina Gomel State University
kostyabond67@gmail.com

Introduction. The basis of competitive activity in swimming is an optimal combination of physical strength and technical training [2]. Improvement in performance in swimming is determined by the level of technical and physical fitness of athletes, taking into account the principles of biomechanics. One of the questions of the biomechanics of swimming is the identification of the principled features of hand stroke. However, under the influence of fatigue, changes occur in the technique of swimming [1].

Purpose. The purpose of the work was to improve the structure of swimming techniques of young athletes.

Presentation of the study material. Analysis of the kinematic characteristics of the movement was carried out by means of video analysis and software «KinoVea». The experiment involved 53 young athletes aged 11–12 years. The spatial, temporal and spatial-temporal characteristics of the swimming technique were investigated. Athletes floated ten twenty-meter segments at the maximum pace. With the help of video recorded movement.

Swimming was performed by the method of «crawl on the chest». 68,2% of young athletes increased their swimming speed by increasing the stroke length of the stroke. 19,9% of athletes increased swimming speed due to pace. At the same time, due to the pace and «stroke» of the stroke, 11,9% of young athletes increased their swimming speed.

Analysis of the kinematic parameters of swimming over time revealed changes in the structure of the stroke. As fatigue revealed an increase in the number of strokes at a distance. There is an increase in the duration of the swim of the distance and reduce the average speed. Under the influence of accumulation of fatigue, the structure of movement changes. In the phase of tightening the trunk

to the fulcrum point, a decrease in the bending angle to $117,4 \pm 4.8$ degrees in the sagittal plane and 129.3 ± 4.8 degrees in the frontal plane is observed. Some swimmers to increase the effort of the stroke perform this movement is not smoothly enough. In the repulsion phase, with fatigue, the energetic adduction and extension of the shoulder and the powerful repulsion by the forearm and hand from water disappear. The wrist immediately behind the elbow begins to move upward and the end of the stroke does not occur. Against the background of fatigue in this phase, the hand is most often removed from the water earlier, without reaching the level of the thigh. In some cases, with severe fatigue, the absence of this phase was noted. Thus, the powerful, sliding movement of the forearm and brush up and back disappears.

Findings. Fatigue of a swimmer's skeletal muscles during multiple swimming affects the kinematic indicators. This determines the nature of the movement of the arm links relative to each other and the surface of the water. The phases of movement are marked by significant changes in kinematics.

In the phase of capturing water, the wrist does not turn around with the palm outwards and loses its support against the oncoming flow. Rotational movement of the forearm does not occur, and the elbow goes down. In the phase of pulling up the trunk to the fulcrum, there are decrease efforts the stroke hands. In the repulsion phase, the energetic adduction and extension of the shoulder, as well as the powerful repulsion by the forearm and the wrist from water, disappear. In some cases, this phase may be absent due to the early removal of the hand from the water and the inability to perform a forceful movement.

Literature

1. Бондаренко К. К., Лисаевич Е. П., Шилько С. В., Бондаренко А. Е. Изменение кинематики гребка при утомлении скелетных мышц. Российский журнал биомеханики. 2009. Т. 13. № 2. С. 24–33.
2. Бондаренко К. К., Палашенко М. Ю., Назаренко И. А., Захарченко О. А. Структура тренировочной деятельности пловцов на основе функционального состояния скелетных