

Prognostic parameters of hydrodynamic technical and tactical training of paralympic swimmers in the sport of the blind

UDC 796.015+797.21



PhD, Associate Professor **L.V. Vinokurov**¹

Dr. Hab., Professor **D.F. Mosunov**^{1,2}

Honored Coach of Russia, Associate Professor **I.L. Tveryakov**³

¹Saint-Petersburg Scientific-Research Institute for Physical Culture, St. Petersburg

²Lesgafit National State University of Physical Education, Sports and Health, St. Petersburg

³The Federal Training Sports Center of the Representative Teams of Russia, Moscow

Corresponding author: leon_1205@mail.ru

Abstract

Objective of the study was to analytical and empirical identification of predictors of special technical and tactical training of highly qualified athletes in Paralympic swimming for the blind.

Methods and structure of the study. The study included a qualitative analysis of materials previously obtained by surface and underwater photo and video recording of the phases of the swimming cycle when Paralympians swim in various styles, sometimes with the use of LED indicators; an expert survey and a thematic analysis of the experience of the leading coaches of highly qualified (Master of Sports of Russia, International Master of Sports of Russia, Honored Master of Sports of Russia) swimmers of the blind sport was carried out.

Results and conclusions. It is shown that Paralympic swimmers are characterized by two groups of predictors – specific and typical, reflecting what needs to be eliminated or compensated for by the coach and athlete in swimming technique. It is argued that deviation predictors are not technical errors in swimmers with visual impairments, but characterize an initially different organization of locomotion. The substantive differences of the predictors and the possibility of their correction in the selection of adequate methods have been established and described.

Keywords: sports of the blind, Paralympic swimmer, technical and tactical, deviations, predictors, reserves, technique violations, correction.

Introduction. Deviations of motor actions (water locomotion) in the technique of Paralympic swimmers from the standards for healthy athletes, determined by the complete absence or limitations of visual control, functional, physical, psychological consequences of HIA, determine and reflect the essence of technical and tactical training reserves (TTTR) [2,3]. Such a deviation or “wrong” technical action was until recently considered as a mistake of swimmers in the sport of the blind, although they form their own body scheme, a unique image of the outside world, special spatial orientation skills, etc., which differ from those of healthy athletes.

It is these “mistakes”, deviations in movements that determine or set the actual technical and tactical training reserves. We define them as prerequisites-deviations or predictors of the main TTTR of Paralympic swimmers, reflecting the subject of corrective influences, that is, what needs to be eliminated by correc-

tion (or compensation) for the coach and athlete while simultaneously developing specific techniques and skills in Paralympic swimming technique.

Objective of the study was to analytical and empirical identification of predictors of special technical and tactical training of highly qualified athletes in Paralympic swimming for the blind.

Methods and structure of the study. The study carried out a qualitative analysis of materials obtained earlier by the method of surface and underwater photography and video recording of the phases of the swimming cycle when Paralympians swim in various styles, sometimes with the use of LED indicators [1]; an expert survey and a thematic analysis of the work experience [3] of the leading coaches of highly qualified swimmers of the blind sport was carried out. In general, 352 videos of swims received during training and competitive events in 2019-2021 were analyzed as part of the planned scientific and methodological



support for athletes of the Paralympic team of the Russian Federation in swimming for the blind. The survey of nine coaches of Paralympic swimmers in

the sport of the blind was carried out in the form of an oral semi-structured interview aimed at identifying predictors of the main reserves in swimming technique.

Table 1. *Interrelations of Informative Indicators of Swimming Technique with Specific Predictors of Technical and Tactical Training Reserves of Paralympic Swimmers in the Blind Sports*

Informative indicators of swimming technique	Specific predictors of swimming technique performance in swimmers with visual impairment
Torso angle of attack, degrees	Muscle tension due to fear of collision
Angular range of footwork, degrees	Distorted image of realized movement
Maximum leg bending angle, degrees	
Angle of flexion in the elbow joint in the middle of the stroke, degrees	
Angle of flexion in the elbow joint at the end of the stroke, degrees	
Dynamics of the angle in the elbow joint, degrees	
Cycle time, s	Fear of collision before turning
Time of the working phase of the stroke, s	
Rhythm, %	
Temp, cycle/min	

Table 2. *Typical predictors, their manifestations in the swimming technique of Paralympic swimmers in the sport of the blind and the possibility of correction*

Basic Typical Predictors	Typical predictors as manifestations of swimming technique requiring correction	Possibility of correction. Correction method
1. Muscle spasm (from exercise)	Premature end of the stroke, inefficient grip when the hand enters the water, distorted stroke trajectory	Possible. Massage
2. The trajectory of the movement of the body in «zigzags» along the path	Increasing the distance actually traveled on a course	Possible (conditionally). Swimmer's wiring method; exercises for the sense of water, orientation in space
3. Insufficient strength training	Premature end of the stroke, negative angle of flexion of the elbow, hand, stroke trajectory down	Possible. Strength training
4. Deviation from the effective stroke trajectory	Premature end of the stroke, negative angle of flexion of the elbow, hand, stroke trajectory down	Possible. Swimmer's wiring method; exercises for the sense of water, orientation in space
5. Insufficient level of development of coordination abilities	Premature end of the stroke, the trajectory of the entry of hands into the water is distorted	Possible. Increasing the amount of work on land, adding simulation exercises
6. Low mobility of the joints, torso	Insufficient extension of the arms during the entry of the hands into the water, a decrease in the length of the stroke	Possible. More work on flexibility
7. Fear of colliding with the side of the pool		Possible (conditionally). Practicing turns with a spotter; exercises for the sense of water, orientation in space
8. High angle of attack	Non-streamlined position in the water ("verticalization" of the athlete's body)	Possible. Depending on the reasons: massage (with severe muscle spasm); changing swimming technique
9. Insufficient speed and speed-strength endurance	Inability to maintain the required speed at a distance, inability to achieve the required competitive speed	Possible. Adding training load to improve endurance
10. Asymmetry of movements	Asymmetry of rowing movements	Possible. Swimmer's wiring method; creating an accurate image of the rowing movement; exercises for the sense of water, orientation in space



Results of the study and their discussion. The study identified two groups of predictors-deviations, the most typical for Paralympic swimmers in the sport of the blind - specific and typical.

Specific predictors are prerequisites-deviations that reflect the influence of nosological features and the consequences of visual disease on the informative indicators of the swimming technique of Paralympians in the sport of the blind. Three predictors were identified as specific ones: muscle tension due to the fear of a collision, a distorted image of the movement being realized, and the fear of a collision before performing turns, presented in Table 1 as factors of influence on eight main informative indicators of sports swimming technique. For two informative indicators - the cycle time and the time of the working phase of the stroke - no specific predictors were found in the swimming sport of the blind.

Typical predictors are basic and deviations in the swimming technique, in a certain combination reflecting a set of characteristic features (nosological, morphofunctional, etc.), constant or regularly repeated in Paralympic swimmers of one specific sports and functional class.

In Table 2 shows the most frequently manifested, regardless of the sports-functional class, typical predictors of TTTR in blind swimmers. It is also shown that most of the typical predictors of the reserves of Paralympic swimmers with visual impairments can be corrected completely or conditionally, but for this it is necessary to select means and methods adequate to the actual predictors for the implementation of the reserves formed as a result of these predictors.

In general, for Paralympic swimmers in the sport of the blind, typical predictors were identified for eight

sports functional classes (out of nine classes), namely: S11, S12, S13, SB11, SB12, SB13, SM12, SM13.

Conclusions. The significance of the selected groups of model predictors is that it will allow the coach of a Paralympic swimmer to determine what reserves an athlete has to increase the effectiveness of his technical and tactical training in general, to understand which of these reserves should, first of all, try to implement in work with an athlete, in which of the four main styles of swimming this athlete is most likely to be the most successful in wrestling.

References

1. Belousov S.I., Vinokurov L.V. *Primenenie svetodiodnykh indikatorov dlya videoregistracii i korekcii elementov sportivnoj tekhniki plavaniya v sporte slepyh* [Application of LED indicators for video recording and correction of elements of sports swimming technique in the sport of the blind]. *Adaptivnaya fizicheskaya kultura*. 2020. No. 2 (82). pp. 35-36
2. Tveryakov I.L. *Obobshchenie opyta mnogoletnej podgotovki sportsmenov po vidu sporta sport slepyh – disciplina plavanie* [Generalization of the experience of long-term training of athletes in the sport of blind sports - the discipline of swimming]. *Uchenye zapiski universiteta im. P.F. Lesgafta*. 2015. No. 8 (126). pp. 179-184
3. Mosunov D.F. [ed.] *Tekhniko-takticheskaya podgotovka plovca v paralimpijskom plavanii* [Technical and tactical training of a swimmer in Paralympic swimming]. St. Petersburg: NGU im. P.F. Lesgafta publ., 2018. 316 p.