ROLE OF CONTOURGRAMS IN SPOTTING TECHNICAL MISTAKES IN BUTTERFLY SWIMMING

Ovidiu GALERU[1]
Victor BĂDESCU[2]
[1] Universitatea"Vasile Alecsandri" din Bacău
[2]Universitatea din Piteşti

Key words: swimming, training, technique, contourgrams.

Abstract:

The aim of this research is the study of methodology of the front crawl swimming technique evaluation; the discovery of defining elements appeared in the swimming technique evaluation methodology, for increased quality standards and effectiveness of the performance activity, by using the underwater video recordings method and processing the footage.

As a result of processing the video captures, the contourgrams can have a considerable importance in spotting the technical mistakes of arm stroking in front crawl swimming, thus having a basis for a new research methodology and perfecting the swimming technique by implementing the teaching units in the training plans.

Introduction

The video recording used in sportive training has the following advantages: the possibility of frame-by-frame analysis, slow-motion or fast-forward analysis and enlarged image for making contourgrams of the movement. For an underwater recording we need a mobile unit (camera and recorder/camcorder), the operator that handles the underwater camera, batteries for the camera and a monitor. The modern technique comes in the aid of video-training through the digital format, a method that shortens the time of the technical actions. Minimal equipment includes, with the camera, a laptop and specialized movement analysis software. Presentation (rendering). In all three situations there are demands regarding the content and proper didactic presentation of the recordings.

Spotting the technical mistakes. In spotting the technical mistakes in competitive swimming styles, a decisive role has the methodology of video recording, the recording angles, and the focusing distance. After a detailed analysis of the recordings, contourgrams for the arm movements during swimming were elaborated, representing the trajectory of the respective movement.

The MaxTRAQ software represents a less expensive and easy to use solution.

This program is emphasized much more with the MaxMATE software that analyses the processed data and can give accurate contourgrams.

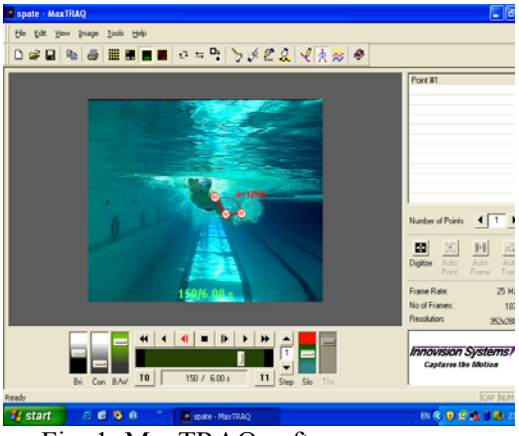


Fig. 1. MaxTRAQ software

Together with the video recordings, specific indexes were measured, in order to evaluate the effectiveness of this particular swimming style. The study was conducted on a group of 5 junior athletes II, of Bacău, of LPS Braila, during 12.01.2009-12.03.2009 at the Braila swimming pool. The video recording was made frontally and laterally. The contourgrams are presented as follows, together with the each subject's technical mistakes.

Subject 1. Technical mistakes:

- Arm movement: arms enter the water too much laterally, shortening the traction length. He does not perform the water grabbing movement, entering directly in traction. During the traction phase, at the maximum point of the knee flexion, the left arm is bent at an angle of 114º whereas the right arm, at an angle of 93º, which leads to the body being unbalanced and a faulty lateral alignment. He does not finish the water pushing movement, the arms exiting the water away from the core.

- Coordination: he does not synchronize the second leg beat with the end of the arms' pushing, which is due to a premature finishing of the arm strokes.

- Leg movement: knees are too spread apart during maximum extension and during the stroke.

S.1. (butterfly)	
50m with a start from the water (time)	**31,85**
Number of stroke cycles / 50m	**26**
Average speed (V m/s)	**1,56**
Distance over a stroke cycle (DPC m)	**1,92**
Propulsion index (Ip = V x DPC)	**2,995**

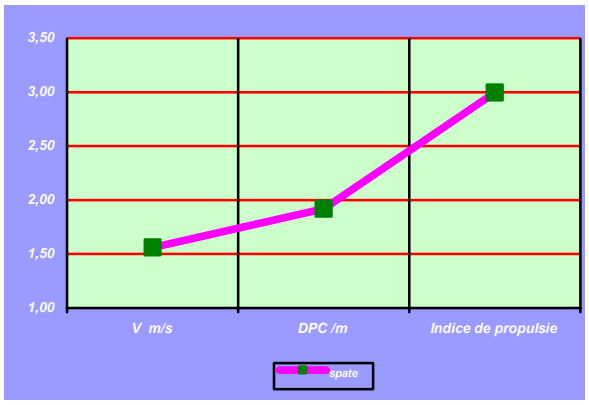
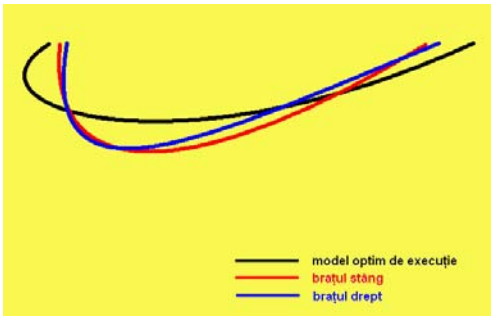
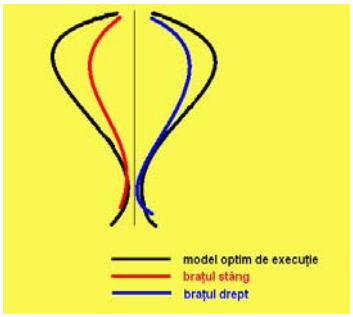


Chart 1. Swimming technique indicators (S1.)



S.1. lateral view



S.l. frontal view

Subject 2.Technical mistakes:

- Arm movement: the arms enter the water in a correct manner, but with too much force, which leads to an incomplete lateral grabbing of the water. He works symmetrically with his arms, but he generates a much greater force on his left arm, which leads to a snake-like swimming trajectory. He does not finish pushing the water.

- Leg movement: is inconsistent in stroking the water, which leads to an unbalance. Leg movement is not performed with tight hips.

S.2. (butterfly)	
50m with a start from the water (time)	**32,09**
Number of stroke cycles / 50m	**27**
Average speed (V m/s)	**1,55**
Distance over a stroke cycle (DPC m)	**1,85**
Propulsion index (Ip = V x DPC)	**2,867**

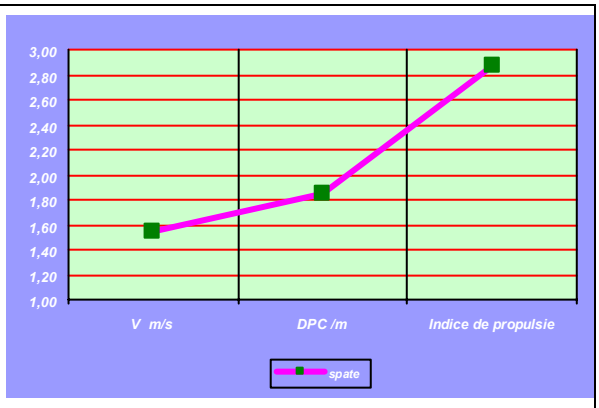


Chart 2. Swimming technique indicators (S2.)

S.2. lateral view *S.2. frontal view*

Subject 3 Technical mistakes:

- Arm movement: the arms enter the water in an incorrect position, but the water grabbing is too much laterally, not allowing an optimal closeness of the palms in the traction phase, which leads to a shorter trajectory of the aquatic work, not generating an optimal force and buoyancy for the butterfly stroke. For the same reason, the angle formed during the maximal point of the flexion is more than 110º

- Breathing: chaotic coordination of breathing (irregular).

- The undulation movement is faulty.

S.3. (butterfly)	
50m with a start from the water (time)	**34,12**
Number of stroke cycles / 50m	**27**
Average speed (V m/s)	**1,46**
Distance over a stroke cycle (DPC m)	**1,85**
Propulsion index (Ip = V x DPC)	**2,701**

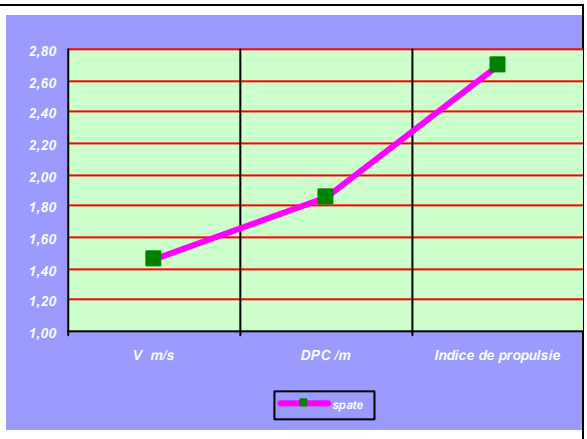
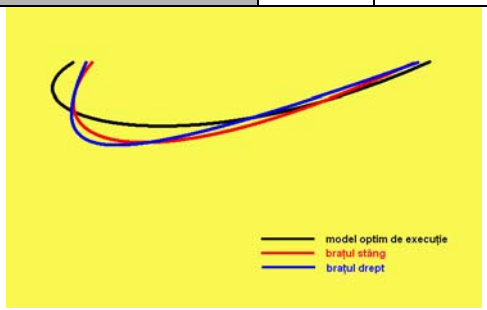
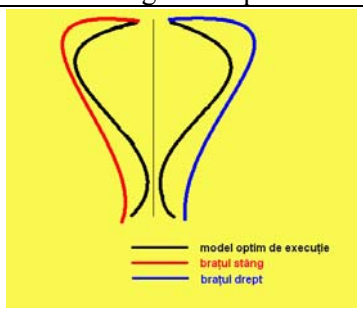


Chart 3. Swimming technique indicators (S3.)



S.3. lateral view



S.3. frontal view

Subject 4 Technical mistakes:

- Arm movement: when the left arm enters the water, the water grabbing is performed from a lower position than the one of the right arm. In the trajectory of the arm, the palms have moments when they are out of the water, which misbalances the water support. The shoulders are not above the water, which leads to breaking moments during sliding.

- Leg movement: during movement, the knees are bent too much, which leads them to be much above the water.

S.4. (butterfly)	
50m with a start from the water (time)	**35,02**
Number of stroke cycles / 50m	**36**
Average speed (V m/s)	**1,42**
Distance over a stroke cycle (DPC m)	**1,38**
Propulsion index (Ip = V x DPC)	**1,959**

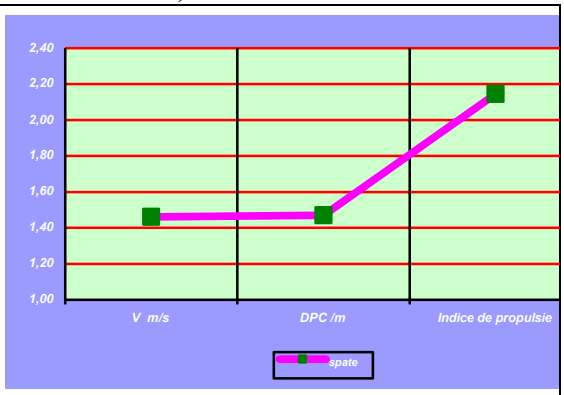
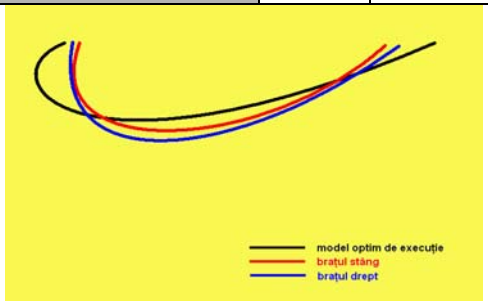
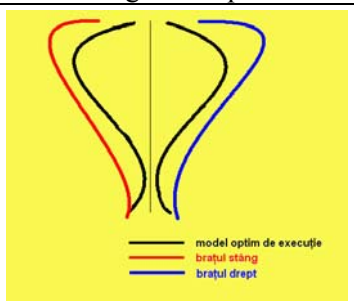


Chart 4. Swimming technique indicators (S4.)



S.4. lateral view



S.4. frontal view

Following the contourgrams and specific swimming evaluation indexes analysis, we will be able to intervene in the training process using specific methods and means for correcting the technical mistakes. The means I have

suggested in order to solve the aim of this study were: implementing in the annual training plan certain teaching units that contain specific sets of exercises, which will correct the technical mistakes in front crawl swimming.

Regarding the teaching units, they are similar with classical training programs, only that every allocated group of lessons can be realized with other exercises and contents.

Teaching unit (butterfly)				
Theme	**Objectives / Competences**	**Contents**	**Dosage**	**Evaluation methods**
T43	Butterfly: correcting the arms' movement	► Specific butterfly stroke arms movement, legs supported on floater	8x50m p.30sec.	DPC Video feedback
T44	Butterfly: correcting the arms' movement	► Floating face down, leg movement in freestyle stroke, arm movement in butterfly stroke	6x50m p. 30sec.	DPC Video feedback Contourgrams
T45	Butterfly: correcting the arms' movement	► Butterfly slide; one arm is extended forward in the water; the other performs the stroke in coordination with the undulation movement. (after 25m the athlete changes arm)	4x100m p.30sec.	Video feedback Contourgrams
T46	Butterfly: correcting the arms' movement	► Performing arm movement with small hand fins	10x50m	DPC Video feedback Contourgrams
T47	Butterfly: correcting the coordination	► Butterfly slide (2/1) – performing a movement with one arm, then the other, followed by the movement of both arms and breathing.	8x50m p.25sec.	Video feedback Contourgrams
T48	Butterfly: correcting the coordination	► Butterfly slide (2/2) – performing a movement with one arm, then the other, followed by two cycles with both arms. Breathing is done during the movement with one arm.	8x50m p.25sec.	Video feedback Contourgrams
T49	Butterfly: correcting the coordination	► Butterfly stroke with 3 leg beats for one arm cycle	8x50m p.30sec.	DPC Video feedback Contourgrams
T50	Butterfly: correcting the coordination	► Butterfly slide with 4 leg beats for one arm cycle	6x50m p.25sec.	Video feedback Contourgrams
T51	Butterfly: correcting the legs' movement	► butterfly leg beats performed vertically	8x40sec p.25sec.	Video feedback
T52	Butterfly: correcting the legs' movement	► Butterfly leg stroke performed floating on the back	8x50m p.25sec.	Video feedback
T53	Butterfly: correcting the legs' movement	► Leg movement performed coastal position, one arm above the other along the body	8x50m. p.30sec.	Video feedback
T54	Butterfly: correcting the legs' movement	► Leg movement performed with fins	5x100m	Video feedback
T55	Butterfly: correcting the start and return launch	► Back undulations (10 beats in apnoea, 4 beats breathing)	4x50m p.1min	Video feedback

Conclusions

We think the traditional swimming technique teaching-learning-evaluation activities can be structured and re-thought; in this sense, a first attempt of modernizing the process is focused on the teaching-learning-evaluation activities, according to the praxiological circuit model, in which the instructional objectives are the ones that condition the other didactic design operations.