OPTIMIZING TRAINING FOR THE MORPHOLOGICAL DEVELOPMENT AND FUNCTIONAL CAPACITY ON WATER AND ON LAND OF A JUNIOR SWIMMER SPECIALIZING IN SHORT-DISTANCE CRAWL SPEED TRIAL

Article DOI: https://doi.org/10.35219/efms.2018.2.06

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Abstract

The morpho-functional short distance swimming training can be approached with a program suitable for the junior and cadets' age with modern equipment testing applications that can create an innovative perspective in individualizing the training of swimmers in crawl, speed, short trials.

Key words: morphological development, functional capacity, swimmer specializing in speed crawl.

1. Introduction

The general purpose of the basic research is to objectify the morpho-functional training in junior cadets by recording the parameters of the specific and non-specific training tests in the short distance speed crawl swimming trial.

The operational purpose of the basic research is oriented on the recording of the morphological development and functional capacities data obtained in the testing at INMS Bucharest as well as some parameters registered in trials specific to on water and on land swimming training in short-distance crawl speed trials for the junior cadet category [2].

Specific operational goals:

- Records of spatiotemporal and ergometric strength-power parameters, as well as graphical evaluation on each individual subject
- introducing a specific and non-specific training motor program on land in the period between initial testing and final testing
- making the main means of the motor program revealed by the final results and the performances of the subjects in competitions more efficient.

2. Means and methods

We assume that by recording and analysing the morpho-functional parameters on the WEBA SPORT simulator one can perform executions specific to the crawl procedure in the planned strength and power training correlated with the speed, rate and correction of the amplitude of the pulling movement in the crawl procedure [1].

It is assumed that on the basis of a morpho-functional motor training program by specific and non-specific means on water and on land one can obtain a correlation of the crawl technique with the speed and the rate of the movement on contest distance in the specific swimming speed trials [7].

We emphasize the necessity to develop and propose this model to the FRNPM with the prospects for improvement at senior level [4].

Functional capacity testing method:

Specific measurement techniques are:

- Respiratory frequency per minute, the two phases of ventilation, inspiratory and expiratory which alternate rhythmically.
- Cardiac frequency per minute: Ruffier test, anaerobic effort capacity, score (weak "S", medium "M", good "B", very good "FB"). Backbone mobility, measured in centimetres [3].
- Neuro-muscular condition on land, muscle fibre strength, upper and lower limbs (arms pull-ups, sitting crunches, standing torso flexion in 30 seconds, no take-off long jump, 50 m flat speed running, with standing start [6].
- Neuro-muscular condition of anaerobic speed in water (4 x 25 m crawl) with 1.30 minutes break.
- Neuro-muscular condition of the effort at the anaerobic threshold (4x 50m crawl) with 2 minutes break.

The neuro-muscular condition of the competitive effort on contest distance of 100 meters crawl timed, repeated twice, with a 3-minute break, the numerical value of the pulling rate according to the rate recorded on the

WEBA Sport simulator, a trial proposed by the author as an indicative personal contribution to the training of professional swimmers in the crawl procedure over short distances [5].

3. Results

The experimental research in this study on a junior swimmer specializing in the crawl speed trial is accomplished by the individualized longitudinal method.

The evaluation in the basic research in our experiment is considered: in terms of participation in competitions [8], in terms of the training process [9], in terms of the individual results of the swimmer.

The research is carried out at the Campina training basin, within the Baracuda swimming sports club.

Testing in basic research includes records of morpho-functional results in specific and non-specific trials in three stages:

Initially, March 2018, following tests from INMSB and specific and non-specific short-distance crawl swimming trials proposed in the research.

Intermediate, May-June 2018, in compliance with a proposed motor program in specific and non-specific physical and biological training in the studied swimming trial

Final, August-October 2018, with the recording of the results obtained in the research with the graphic interpretation and the statistical-mathematical analysis.

Between the initial test and the final test a motor program proposed in agreement with the coach was applied:

Table 1 Motor training plan

Day	Training tipe	Means	Remarks
Monday	Specific WEBA Sport	3x 200m crawl with 1 minute break	2 minutes break between series
		3x 200m dolphin with 1 minute break	
	Specific in water	4x 25m crawl with 1.30 min break	2 minutes break between series
		4x 50m crawl with 2 minutes break	
		4x 100m crawl with 3 minutes break	
Tuesday	Non-specific on land	4 pull-ups	circuit 5 times with 30 seconds break
		30 sec crunches	
		6 standing long jumps	
		Standing speed running knee to chest. (AGS)	
Wednesday	Specific WEBA Sport	3x 200m crawl with 1 min break	2 minutes break between series
		3x 200m dolphin with 1 minute break	
	Specific in water	4x 25m crawl with 1,30 min break	2 minutes break between series
		4x 50m crawl with 2 minutes break	
		4x 100m crawl with 3 minutes break	
Thursday	Non-specific on land	4 pull-ups	circuit 5 times with 30 seconds break
		30 sec crunches	
		6 standing long jumps	
		Standing speed running knee to chest. (AGS)	
Friday	Combined specific and non-specific	At the edge of the basin: standing high jump with extension 5 times, followed by start in water and 100m technical crawl swimming, intensity 70%	To be repeated 3 times with 1 minute break
		At the edge of the basin: on neoprene mattress, 30 seconds crunches, followed by water jump and 100m back technical swimming, intensity 70%	To be repeated 3 times with 1 minute break
		At the edge of the basin: 5 press-ups	To be repeated 3

		followed by water jump and technical dolphin swimming, intensity 70%	times with 1 minute break

Table 2 Nonspecific and specific on land physical training testing of the Subject (experimental)

	Non-specific on land physical training test				WEBA SPORT 100m specific on land physical training			
	Pull-ups	Crunch 30 sec	Running 50 m	Standing jump	Power (W)	Strength (N)	Average speed km/h	Rate
TI	8	24	7.3	2	9	19	1.1	100
TF	14	28	6.8	2.4	15	26	1.7	92

Interpretation of non-specific on land physical training test results:

Pull-ups: TI 8, TF 14, increase by 6. Percentage calculation: 75%

Crunch: TI 24, TF 28, increase by 4. Percentage calculation: 16.67%

Running 50m flat: TI 7.3, TF 6.8, improvement by 0.50 Percentage calculation: 6.85%

Standing long jump: TI 2, TF 2.40, improvement by 0.40. Percentage calculation: 20%

Calculation of non-specific on land physical training improvement,

Subject: (75%+16.67%+6.85%+20%): 4= 29.63%

Interpretation of specific on land physical training test results, WEBA Sport simulator:

Power (W) TI 9, TF15, improvement by Percentage calculation: 66.67%

Strength (N) TI 19, TF 26, improvement by Percentage calculation: 36.84%

Average speed TI 1.1 TF 1.7, improvement by 0.60. Percentage calculation: 54.55%

Rate TI 100 TF 92, improvement by 8. Percentage calculation: 8%

Calculation of specific on land physical training improvement,

Subject: (66.67%+36.84%+54.55%+8%):4=41.52%

Interpretation of morphological development results:

Height TI 173 TF 182 increase by 9. Percentage calculation: 5.20%

Weight TI 60; TF 61, increase by 1. Percentage calculation: 1.67%

Span TI 180, TF 182, increase by 2. Percentage calculation: 1.11%

Bust TI 87; TF 90, increase by 3. Percentage calculation: 3.45%

Calculation of morphological development improvement:

(5.20%+1.67%+1.11%+3.45%):4=2.86%

Interpretation of functional capacity development results

Respiratory frequency at rest TI 16 TF 15, improvement by 1. Percentage calculation: 6.25%

Cardiac frequency at rest TI 59 TF 58. Percentage calculation: 1.69%

Ruffier Testing TI 6, TF 0.6, improvement by 5.40. Percentage calculation: 90%

Mobility: TI 4; TF 10, increase by 6. Percentage calculation: 150%.

Calculation of functional capacity improvement,

Subject: (6.25%+1.69%+90%+150%):4=61.99%

Interpretation of water physical training development results:

Anaerobic speed test: 4x25m crawl with a 1.30 min break. TI 13,70 TF 11.60, improvement by 2.10. Percentage calculation: 15.33%

Anaerobic threshold test 4x 50m crawl with a 2 minutes break. TI 30.5 TF 26.4, improvement by 4.10. Percentage calculation: 13.44%

Competitive speed test 2x 100m crawl with a 3 minutes break, TI 62 seconds, TF 57.50 seconds, improvement by 4.50 sec. Percentage calculation: 7.26%

Calculation of improvement in specific physical training in water for Subject 1:

(15.33%+13.44%+7.26%):3=12.02%

The statistical indicators for the non-specific physical development trials on the research sample recorded:

- Pull-ups: The value of the tf-Stiudent test in this trial was 5.86, for p>0.05, higher than the t-table, which rejects the null hypothesis.
- Crunch (30 sec): The value of the tf-Stiudent test in this trial was 12.75, for p>0.05, higher than t-table, which rejects the null hypothesis.
- 50m running (sec) The value of the tf-Stiudent test in this trial was 3.93, for p>0.05, higher than the t-table, which rejects the null hypothesis.

- Standing long jump (cm) The value of the tf-Stiudent test in this trial was 31.7, for p>0.05, higher than t-table, which rejects the null hypothesis.
- Respiratory frequency (breaths / minute)
- The value of the tf-Stiudent test in this trial was 2.9, for p>0.05, higher than t-table, which rejects the null hypothesis.
- Ruffier test:The value of the tf-Stiudent test in this trial was 11.26, for p>0.05, higher than t-table, which rejects the null hypothesis.
- Cardiac frequency (beats/ minute): The value of the tf-Stiudent test in this trial was 6.95, for p>0.05, higher than t-table, which rejects the null hypothesis.
- Coxofemoral mobility (cm): The value of the tf-Stiudent test in this trial was 9.5 for p>0.05, higher than the t-table, which rejects the null hypothesis.
- Power (W): The value of the tf-Stiudent test in this trial was 17.25, for p>0.05, higher than t-table, which rejects the null hypothesis.
- Relative strength (N): The value of the tf-Stiudent test in this trial was 21, for p>0.05, higher than t-table, which rejects the null hypothesis.
- Average speed (km/h): The value of the tf-Stiudent test in this trial was 2.9, for p>0.05, higher than t-table, which rejects the null hypothesis.
- Rate (strokes 100m): The value of the tf-Stiudent test in this trial was 28.5, for p>0.05, higher than the t-table, which rejects the null hypothesis.
- Index 4x 25m crawl with 1.30 minutes departure break: The value of the tf-Stiudent test in this trial was 4.66, for p>0.05, higher than t-table, which rejects the null hypothesis.
- Index 4x 50m crawl with 2 minutes departure break: The value of the tf-Stiudent test in this trial was 5.92, for p>0.05, higher than t-table, which rejects the null hypothesis.
- Index 2x 100m crawl with 3 minutes departure break: The value of the tf-Stiudent test in this trial was 18.4, for p>0.05, higher than t-table, which rejects the null hypothesis.

4. Conclusion

The results obtained in the test trials by the application of the motor program with specific and non-specific means initially and finally recommended, following the medical check-up at INMSB revealed the rate of individual progress confirmed by the parameters obtained and the performances in the competitions.

It was found from the study of the INMSB medical records that the swimmer has, on an individual basis, a substantial morpho-functional progress taken as percentage in terms of deficiencies that required a customized motor program.

The statistical-mathematical processing at the 0.05 test Student confirmed the assumptions of the research.

As a personal contribution we recommend the application of an individualized motor training program with non-specific and specific means both on land and in water to obtain maximum efficiency of effort in speed trial for cadet and junior swimmers.

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