



Beginner adaptive swimming model for psychophysical progress of children with down syndrome

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Applicant **G.N. Noroshkina**¹

PhD, Associate Professor **V.K. Klimova**¹

PhD, Associate Professor **Y.A. Strelkova**¹

A.G. Chebotarsky¹

¹Belgorod State National Research University, Belgorod

Corresponding author: klimova@bsu.edu.ru

Abstract

Objective of the study was to analyze benefits of an ontokinesiological knowledgebase building professional pObjective of the study was to develop and test benefits of a new beginner adaptive swimming model for children with Down syndrome.

Methods and structure of the study. We sampled for the new adaptive swimming model testing experiment the 9-12 year-olds with Down syndrome (n=20: 6 girls and 14 boys) and trained them for two years by 60min adaptive swimming sessions 3 times a week. We used the following research methods: theoretical and practical research data analyses and generalizations; family interviews; training process observations; and psychophysical progress tests. The new three-stage multilevel adaptive swimming training model included modern aquatic rehabilitation and aquatic aerobics elements and other special exercises. The adaptive swimming trainings were reasonably customized to the **individual health conditions and progress needs to encourage good progress of every child.**

Results and conclusion. The new beginner adaptive swimming model for children with Down syndrome was tested beneficial as verified by the actual progress of the sample, with every child making success in the trainings. The psychophysical progress was associated with progresses in the movement coordination and speed-strength skills. We have good reasons to conclude that the aquatic rehabilitation and special adaptive swimming practices are beneficial for psychophysical and cognitive performance correction goals with special socialization benefits to facilitate the children's adaptation to social environments outside the swimming groups.

Keywords: Down syndrome, children, adaptive swimming, psychophysical development, adaptive physical education.

Background. Modern theoretical and practical publications and analyses of the Down-syndrome-related health disorders give reasons to qualify people with Down syndrome with a special health group [1, 2]. Clinics diagnose congenital hypotonia, joint hypermobility, impaired balance and spatial controls, proprioceptive data flow processing disorders and impairments of the key motor skills that tend to evolve into wrong motor stereotypes [3, 6, 8, 9]. The motor dysfunctions provoke concomitant diseases including instability of the cervical vertebrae, cardiac defects,

impaired vision and hearing, and immune system disorders.

Adaptive physical education methods are commonly ranked among the most efficient tools for the underage psychophysical development correction services. Psychophysical progress is known to be directly correlated with the child's primary research activity since the adapted physical education models facilitate the brain formation and development process [5]. Every child with Down syndrome needs an individualized training service with special corrective



exercises. Modern aquatic rehabilitation and adaptive swimming methods offer a wide range of versatile tools to physically activate children and encourage their physical progress on a positive motivational emotional background.

Modern adaptive swimming sport records still mention no one Special Olympics, World and European champions among people with intellectual disabilities. In was only the 2017 World Swimming Championships (Mexico) that offered a few special events for competitors with Down syndrome; and Anastasia Petrova from Russia was successful in winning bronze in the 200m butterfly event.

As reported by Tatyana Olkhovskaya, Russian People with Intellectual Disabilities Sports Federation Director, the global people with intellectual disabilities sport communities are still in need of standard training methods for children with Down syndrome [7]. One of the promising solutions is to mobilize the existing experiences and methods to build up a training database with an efficient training toolkit for people with Down syndrome [10].

Objective of the study was to develop and test benefits of a new beginner adaptive swimming model for children with Down syndrome.

Methods and structure of the study. We sampled for the new adaptive swimming model testing experiment the 9-12 year-olds with Down syndrome (n=20: 6 girls and 14 boys) and trained them for two years by 60min adaptive swimming sessions 3 times a week. We used the following research methods: theoretical and practical research data analyses and generalizations; interviews; training process observations; and psychophysical progress tests. The progress was tested by (1) freestyle board swimming; (2) backstroke board swimming; (3) underwater breath control; (4) chest asterisk floating; (5) back asterisk floating; (6) jump to the pool; (7) breath-controlling board swimming; (8) longitudinal "screw" rotation; (9) 25m backstroke; (10) 25m freestyle; (11) exercises on commands; and (12) counted repetitions tests.

The individual progress test scores were recorded in the personal diaries as follows: tests 1-3: able/ unable; tests 4-8 were scored by 0 to 3 points, with a refusal scored by 0 point; instructor-assisted execution scored by 1 point; execution with technical errors scored by 2 points; and error-free execution scored by 3 points; tests 9-10 were scored by distance times; and tests 11-12 were scored by 0-2 points, with a refusal scored by 0; occasional execution by 1 point; and good counted execution scored by 2 points.

Results and discussion. Having interviewed the families, we found only 2 children out of 20 having basic swimming skills and 2 more having some aquatic practicing experiences, with all the others being newcomers to the pool. The families were found virtually unaware of the health benefits of aquatic rehabilitation methods, with most of them having no idea of the educational and developmental benefits of the modern adaptive swimming service and actual progress needs and resources of their children. Given in Table 1 hereunder are the progress test data of the sample.

As demonstrated by the above Table, the arithmetic mean test scores of the sample grew a few times in the post- versus pre-experimental tests – e.g. an eightfold progress was fixed in the screw rotation test. Given on Figure 1 hereunder is the visualized pre- versus post-experimental test data. It should be emphasized that every child in the sample was tested with a significant individual progress.

The progress tests and observations showed that children with Down syndrome are quite trainable, with 90% of the sample demonstrating success in the basic swimming skills mastering process. Our analyses of the age-specific progress test data found no correlation between ages and actual progresses, with the qualitative changes and progress rates apparently more dependent on the individual characteristics. This finding should not be interpreted as a contraindication for early adaptive swimming trainings as it is never too late to for the children with Down syndrome to join adaptive swimming groups.

Table 1. Pre- versus post-experimental test data of the sample

Test	Chest asterisk floating		Back asterisk floating		Jump to the pool		Breath-controlled board swimming		Longitudinal "screw" rotation	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
M, points	0,9	2,0	1	2.6	0,7	2.0	0,4	2,2	0,2	1,6

Note: tests were scored by 0 to 3 points, with a refusal scored by 0 points; instructor-assisted execution scored by 1 point; technically deficient execution scored by 2 points; and an error-free execution scored by 3 points; M – arithmetic mean

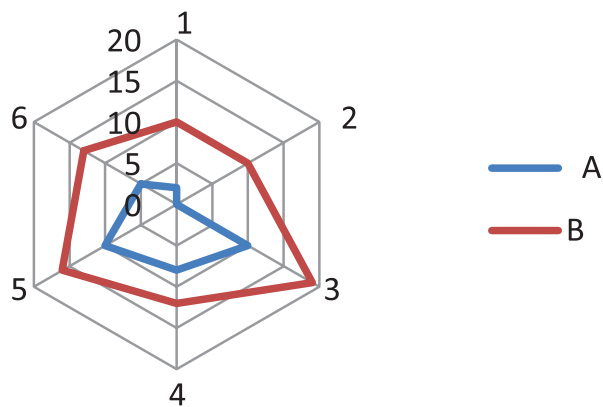


Figure 1. Pre- (blue) versus post-experimental (red) individual successes (headcount): 1 – 25 m backstroke; 2- 25 m freestyle; 3- exercise on command; 4- counted repetitions; 5- standing long jump; and 6- gymnastic ladder climbing tests

Conclusion. The new beginner adaptive swimming model for children with Down syndrome was tested beneficial as verified by the actual progress of the sample, with every child making success in the trainings. As things now stand, the sample easily swims 25m and continues trainings in an inclusive health-improving swimming group with the healthy peers. This fact demonstrates benefits of the new adaptive swimming model for socialization of children with Down syndrome and their psychophysical progress agendas.

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