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ASPECTS OF LEARNING OF THE SWIMMING TECHNIQUES IN THE DOWN SYNDROME CHILDREN

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Abstract

Swimming is a sport discipline performed in water with the help of arms and legs, whose movements are coordinated with breathing all the time. The four techniques practiced are the following: freestyle, backstroke, breaststroke and butterfly. The skills specific to these techniques can be learnt by the Down syndrome children, but they require more time to complete each step, a specific methodology, more attention and a lot of patience from the coach. The purpose of this paper is to underline how three children with Down syndrome have learnt and consolidated the freestyle kick technique. For that, we used several evaluation items of the freestyle-specific skills and a swimming test – the freestyle kick movement with the arms on a board, the athletes wearing fins on their feet. The evaluation of children occurred every six weeks, during one year. The obtained results have shown that progress in swimming learning is achieved in small steps. The personal characteristics and associated diseases can influence the learning process. Finally, we can say that our athletes have passed the first step. However, they are still at the beginning of learning the specific skills. The three children with Down syndrome must go on improving their swimming technique.

Keywords: Swimming, technique, children, Down syndrome.

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1. Introduction

Swimming is a sport discipline performed in water by using the arms and legs. Their movement is permanently coordinated with breathing. The four swimming techniques are the following: freestyle, backstroke, breaststroke and butterfly. The motor skills specific to these techniques can also be learnt by children with Down syndrome, but they require more time to complete each step, a specific methodology, more attention and a lot of patience from the coach. We think that each style should be learnt separately, because there is no transfer of knowledge in individuals suffering from Down syndrome. Imitation of the coach's movements is the key to learning. Even during the movement consolidation phase, the coach must perform the movements on the ground, while the learner performs the same movements in water by swimming.

2. Problem Statement

The time required by an individual suffering from Down syndrome to learn and consolidate a technical procedure depends on a large number of factors, among which we mention the following:

- The development level of the learner's motor skills (Neagu, & Papp, 2012, p. 494);
- The learner's attention capacity and his/her interest in what he/she learns;
- The complexity of the movement to be learned.

To the above-mentioned factors, there are added the aquatic environment characteristics (Fragala-Pinkham, O'Neil, & Haley, 2010, p. 162; Querido et al., 2010, p. 58) that give distinct aspects (body weight reduction, horizontal swimming position, resistance opposed to moving forward through the water, water density, etc.) to motor learning, which cannot be encountered on the ground. However, regardless of the purpose of practicing swimming, namely the recreational, therapeutic or competitive one (Shapiro & Malone, 2016, p. 385), the specific technique for the swimming styles must be correctly learnt by the disabled athletes.

Learning the swimming techniques involves five algorithms, namely the body position in water, leg motions, arm motions, arms – breath coordination and legs – arms – breath coordination, which must be also observed by the disabled individuals during the process of acquiring knowledge on this discipline.

3. Research Questions

Progress in teaching children with Down syndrome the crawl swimming style is obtained in small steps and is affected by a multitude of variables occurring during the learning process.

4. Purpose of the Study

The study aims to capitalise on the experience acquired in teaching children with Down syndrome the crawl stroke. It is part of the research project designed and published under aegis of the National University of Physical Education and Sports of Bucharest, as a partner of the programme co-funded by the European Social Fund within the Operational Sectoral Programme for Human Resources Development 2007-2013 through the project Pluri- and interdisciplinarity in doctoral and post-doctoral

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programmes, Project Code: POSDRU/159/1.5/S/141086, its main beneficiary being the Research Institute for Quality of Life, Romanian Academy.

5. Research Methods

The assessment of the swimming technique learning and execution levels was carried out using the progress items that aimed at the main skills specific for the crawl stroke. Those items were taken from Special Olympics International (2004, p. 99) and modified and customized by us (Bălan, 2015, p. 47). During the research, several assessment items were applied to the crawl swimming technique. In this study, we present only three items considered by us as the most relevant: crawl leg strokes in movement with the arms leaning on the float and a life belt around the waist, leg strokes in movement with the arms leaning on the float and crawl swimming on a 15-meter distance. Assessment scores used: 1 = the child does not perform the relevant item; 2 = the child rarely performs the relevant item; 3 = the child often performs the relevant item.

The initial assessment was applied during the first class to evaluate the learners' initial level. Subsequently, the assessments were carried out every six weeks. We mention that subject S1 was assessed only seven times, because he participated in fewer classes than the other subjects.

To objectify our research, we carried out special swimming trials as well. They consisted of crossing the 31m distance of the swimming pool against time by crawl leg strokes, with a float and flippers. Throughout the trial, the child was permanently not only under physical and motor stress, but also under psychomotor (ability of spatial and temporal orientation to the final point of the trial – the pool wall) stress. At the same time, we wanted to record the progress experienced by the child in the correct learning of the crawl leg motion technique, but also other aspects, such as the adaptation to effort, the fear of water, the strengthening of self-confidence, the familiarization with the mates, etc.

5.1. Subjects

The study subjects are three children with Down syndrome, born in 2001. The fact that they had not practiced any sport discipline before starting the research and they could not swim represented the criteria based on which they were included in the research. Out of the three children, two are boys (S1 and S3) and the third subject is a girl (S2). They participated in swimming classes once a week, for 14 months. Classes were carried out in the 31m-long swimming pool of the Miramar Residential Complex.

Children's participation in the swimming classes was conditioned by a large number of variables including, among others, the following: the season diseases, the parents' availability to bring them to the swimming classes, the school schedule, the number of individual classes, unforeseen events, etc.

6. Findings

After applying the intervention programmes under which the subjects followed swimming classes, we can assert the following:

- Amount of pool lengths swum by each child to learn the crawl technique (Figure 01):

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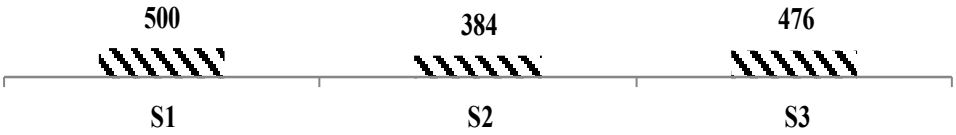

Figure 01. Amount of pool lengths swum by using the crawl stroke

Subject S1 swam the highest amount of pool lengths by using the crawl stroke. We mention that he has a left leg deficiency, namely the "backwards bending knee", as well as the knee valgus deformity. For these reasons, he did not maintain a correct position of the left knee and he had to practice much more exercises especially for the crawl leg strokes, while wearing flippers, in the attempt to correctly learn the leg movement.

- Amount of pool lengths swum by each child with Down syndrome to exercise with the means used to learn the crawl style (Figure 02):

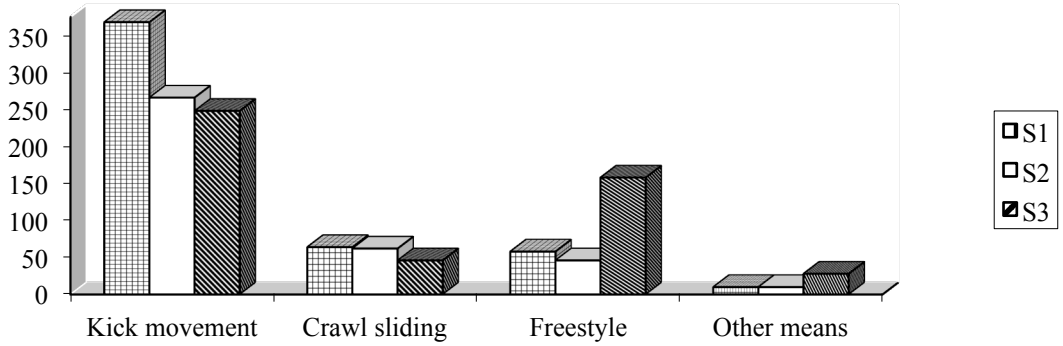

Figure 02. Amount of pool lengths swum by each child to exercise with the means used to learn the crawl style

The above graph shows that S1 swam by 100 pool lengths more than the other subjects using the crawl-specific leg movement.

The assessments carried out to see the progress acquired in learning the swimming technique are shown in Table 01, Table 02 and Table 03:

Table 01. Progress acquired related to the item concerning the crawl leg stroke in crossing with the arms leaning on the float and a life belt around the waist

	Acquired Progress Assessment							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
S1	2	3	3	3	3	3	3	-
S2	1	1	1	2	3	3	3	3
S3	2	3	3	3	3	3	3	3

Table 02. Progress acquired related to the item concerning the crawl leg stroke in crossing with the arms leaning on the float

	Acquired Progress Assessment							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
S1	1	1	1	1	2	3	3	-
S2	1	1	1	1	2	3	3	3
S3	1	1	2	3	3	3	3	3

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Table 03. Progress acquired related to the item concerning the full technique practiced on the 15m distance

	Acquired Progress Assessment							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
S1	-	-	-	1	1	1	1	-
S2	-	-	-	-	1	1	1	1
S3	-	-	-	1	1	3	3	3

Within the teaching process, the full crawl technique is approached much later than the leg strokes. For this reason, the assessment of the subjects related to this item was carried out starting with the fourth class, during which only S1 and S3 were assessed. S3 succeeded to swim 15m by using the full crawl technique without any stop. The other subjects learned the full crawl technique, but could not swim 15m without any stop.

At the special swimming trial, crossing the 31m pool against time by crawl leg strokes, with a float and flippers, the scores are the following (Table 04 and Figure 04):

Table 04. Progress acquired related to the item concerning the full technique practiced on the 15m distance

	The assessment class*						
	6	**12**	**18**	**24**	**30**	**36**	**42**
S1	52.63	55.19	51.4	45.63	43.17	41.12	-
S2	1.38.30**	1.20.08**	1.02.83	59.70	1.00.82	53.84	49.82
S3	58.28	51.28	43.55	40.20	43.55	35.42	38.74

* times are expressed in minutes and seconds
** the subject also used the life belt, being very afraid

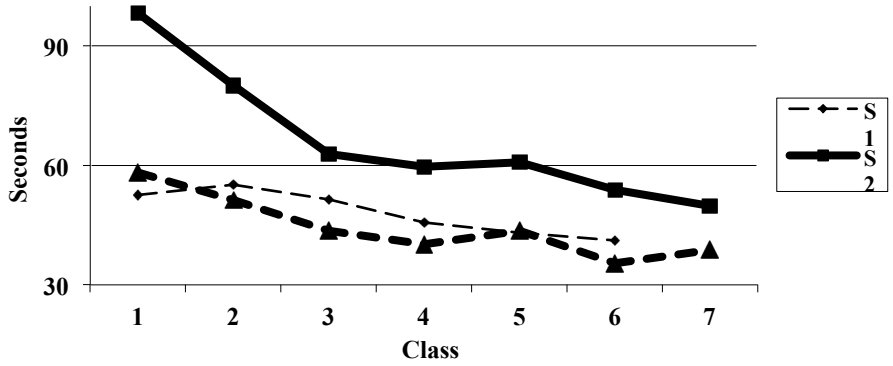

Figure 03. Performance trend in time (seconds)

All subjects experienced an obvious improvement of their times since the first timing until the last one. A poorer time than the previous one was due to some objective reasons (as the interruption of swimming classes because of some disease).

The results of the special swimming trial show an obvious improvement in the case of S2 and S3 during the first four tests. In the case of S1, the second testing shows a poorer result than in the first testing. We think that such a result was the effect of the learning break causing some loss of knowledge related to the motor skill (crawl leg stroke). In the case of S2, it can be observed stagnation in the time performance between the third and the fifth trials, which is a common fact for children with Down

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syndrome, to whom the small learning steps alternate with stagnation periods of time and even with setback periods of time. For S3, the results show increases and decreases in performance during the assessment period, which is perfectly normal.

7. Conclusion

Following the research carried out, the following conclusions can be drawn:

- Children with Down syndrome can practice a variety of sport disciplines. Their selection must take into account the child's preferences;
- Children with Down syndrome can assimilate skills considered until recently as very difficult for them. We consider that further practice at home, under the supervision of parents, is very important for the progress of children;
- During the teaching and learning activities carried out with children suffering from Down syndrome, the goals must be clearly defined and carefully monitored. Such goals must be permanently adapted according to the progress made by each child;
- Swimming is a sport discipline that can be learned by children with Down syndrome. The motor acts and actions specific to this discipline complement the means used during the physical education class within the complex intervention programme to be followed by those children;
- We recommend carrying out the swimming teaching initiation stage in an individualized manner, with each child separately and subsequently included in a group of few members, because the child with Down syndrome has an unpredictable behaviour and needs careful supervision. During the swimming technique consolidation stage, the child can be included in a group of healthy children in order to continue the consolidation of the skills learned;
- Swimming helps children with Down syndrome to overcome their fear of water and the pool depth, to gain self-confidence in their power, offering them the opportunity to freely move in an unusual environment for humans, where the differences between them and healthy children are less obvious;
- Professionals who will work with children suffering from Down syndrome must prove high patience and empathy levels. They must permanently encourage such children and reward them following the effort made. They must also intervene whenever children face learning difficulties and help them resolve the assigned tasks. During the teaching process, children should not be forced to do a certain action, because they will not do it. Professionals must stimulate them and induce them the wish to do the relevant action (to stimulate their own desire to participate in the relevant activity). At the same time, professionals must know that the learning progress is small and alternates with stagnation or even setback periods;
- Progress in learning swimming is acquired by children with Down syndrome in small steps. Individual features, but also the disease-associated syndrome, affect the entire educational process. Children included in the research passed to a stage next to the swimming initiation stage. They have succeeded to learn swimming, but their individual skill consolidation levels

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are different. The process of acquiring motor skills must continue so that the relevant children could consolidate and improve their swimming technique.

Acknowledgments

This research took into account the provisions of the WMA Declaration of Helsinki, 2013, on the ethical principles for medical research involving human subjects. Before starting the research, we also received the consent of parents on the tests and assessment trials for the three children suffering from Down syndrome, as well as on publishing the obtained results.

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