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MOTOR LEARNING CHILDREN WITH *DOWN* SYNDROME

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Abstract: *In conducting the study we started from the hypothesis that the development of a special and effective teaching strategy using well-systematic methods and means together with clearly formulated objectives, we will be able to teach the child / young man with Down syndrome to know him and the environment, forming motor skills that will help him adapt more easily and efficiently to the environmental conditions in which he lives. For evaluation we used the tests: Romberg, unipodal, Wells and Dillon, talo-crural mobility test, Ruffier, psycho-motor coordination, sticks test, coordination test (Denisiuk).*

Key words: *motor education, Down syndrome, psychomotor ability.*

1. Introduction

Since 2014, together with the students from the Kinetotherapy and Special Motility programs, we have been part of a joint training project with Special Olimpics Romania, aimed at children with Down Syndrome. In the years of the project with the volunteer students trapped in the project, we had the opportunity to work with these children in the many hours of sports training and competitions. During the time I spent with them, I found, from the dedication and passion with which they come to the activities, that they are special people from all points of view. With their warm and joyful souls, their smile and their gaze are full of emotion, the happiness with which they do things in their own way, how they play, creates a perimeter of their own, in which they truly enjoy themselves.

Down syndrome is the most common form of disability, a condition present in one third of people with severe mental disabilities even though not all of them have severe mental impairment.

Mental retardation is perhaps the most important clinical feature of the disease, its degree is invariable, oligophrenia can reach the degree of idiocy. The affected children are slow, apathetic, passive people can stay for hours in the same position, shaking the toy or favorite object endlessly. The subject is docile, affectionate and placid, cheerful, hyper-motivated, but in most cases he is sociable but self-centered and jealous.

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2. The problems

Learning difficulties in these subjects occur as a result of mental retardation, and this means that they develop and learn harder than normal children. Most will be able to go and talk, but much later, it develops very hard, and the voice is usually hoarse and monotonous. Also, some will be able to write and read, will be able to attend a normal school if the disability is not large and will lead a semi-dependent family life. They have a great sensitivity for dance and music and therefore these inclinations play a very important role in the integrative process due to their affinity for melotherapy, ludotherapy and art therapy. (2)

The factors that facilitate learning are determined by:

- strong visual awareness and visual learning skills;
- ability to learn and use sign, gesture and visual support;
- behavior and attitudes of normal children of the same age and adults;
- examples of practical learning plans and manual activities.

Factors that stop learning are:

- delayed locomotor skills - fine and raw;
- hearing and visual impairment;
- speech and language impairment;
- short-term hearing impairment;
- short-term concentration;
- difficulties of retention and consolidation;
- difficulties regarding generalization, thinking and rationalization;
- difficulties in logical succession.

Psychomotor disorders (5)

These children have a profile that highlights a particular level of motor development, as they have a delay in reaching the motor patterns. Thus, a different sequence of learning of the basic motor skills appears. It has been found that motor disorders appear to be relatively greater than mental disorders and a correlation between motor development and mental capacity of the child is assumed.

In these children there are two important problems in motor behavior:

1. *Adopting and maintaining posture against gravitational force*

Postural control means the coordination of the entire system of the specific bodily processes that are responsible for postural adoption during motor behavior. It is clear that every child with Down syndrome suffers from hypotonia at different levels. (4)

The reduced postural tone results in insufficient contractions, inadequate balance reactions, defective proprioceptive reactions in posture and movement and in hypermobility of the joints. Due to these disorders problems arise in the adoption and maintenance of postural position and movement.

2. *Lack of varied development of postural movements and inadequate development of qualitative motor elements*

The qualitative elements of motor purchases, such as: trunk rotation, balance and variety of movement, are insufficiently developed. The problems that arise in postural stabilization and movement lead to compensatory strategies of movement, static and symmetrical motor acquisitions and thus to a defective development of the qualitative motor elements. These problems that arise during a motor development stage are not isolated, but have consequences in the following

phases and develop in the phase prior to motor development. (4)

Recovery and therapy programs should aim to maximize the intellectual and aptitude potential that the child possesses, assuming that any progress made in the recovery and development of personal and social autonomy capabilities will allow a higher level of development. adaptation and integration into the family and community environment as a condition of normalizing the lives of these children. (6)

Down syndrome is a genetic condition that influences the whole life of the person and his family manifesting at a behavioral level through permanent dependence.

Children with Down syndrome present a certain degree of difficulty in learning, from weak to severe, although the syndrome is genetic, environmental factors play an important role in development, as with any student, being as different as regards their development and progress as ordinary students.

The assessments made, over time to several categories of children with disabilities, revealed many similarities, sometimes even to identification, but also differences that highlight precisely the particulars that must be taken into account for each category separately. Mental impairment is an aggravating factor of psychomotor disorders, as, moreover, the communication disabilities s.a.m.d. (1)

There is a schematic of psychomotor disorders, namely:

1) Motor disorders: Delays in motor development; Major motor deficiencies; Motor weakness; Balance disorders; Coordination disorders; Sensitivity disorders. Disorders of bodily pattern. Lateral disorders. Disorders of orientation, organization and spatial structuring. Disorders of orientation, organization and temporal structuring. Psychomotor instability.

2) Motor disorders: Apraxia (inability to perform movements, gestures adapted to a purpose); Dyspraxia (inability to express and coordinate movements adapted to a goal); Motor dysgraphia (spelling disorders, caused by a motor disability, late motor maturation, incorrect lateralization).

3) Psychomotor disorders of an emotional nature. (5)

In disorders of the body diagram, the symptomatology can be described by the impossibility of knowing the parts of the own body or of the partner, the spatial relations between the own body and the surrounding objects, as well as the objects between them, cannot be established correctly. It is noticed the incorrect use of the limbs in the execution of the gestures, due to the lack of concentration, imitation or knowledge of all the spatial possibilities of his own body. Moving is done after a long period of thinking and with characteristic slowness, it does not coordinate the intention to execute the movements and the actual execution, it fails to complete the actions, being subtracted from other stimuli. (3)

Lateral disorders show a certain preference for right or left, or the choice of hand is made at random. There are difficulties in recognizing the left-right part of the body and there are difficulties in visual discrimination.

Disorders of orientation, organization and spatial structuring have causes in the incorrect integration of the body diagram, the insufficient training of the child in the manipulation activity. The subject cannot

recognize spatial terms (before, after, etc.), cannot integrate into the rules games, cannot establish a progression**(5)**

Psychomotor instability is a syndrome characterized by an imbalance of personality, due to a deficiency of inhibition. This disorder is manifested by constant agitation, lability of attention, lack of concentration and volitional effort. The subject is characterized by agitation, turbulence, permanent and excessive need for movement, change of space, parasitic movements, difficulties of reproduction and coordination of movements. (5)

Psychomotor disorders of an affective nature are determined by the deficient family environment, by appropriate methods, and are most often explained by excess and inhibition deficits, as a result of an emotional load, the emotional imbalance being difficult to delimit by the motor disorder.

2.1. Hypothesis, Purpose and Goals of the Research

In conducting the study we started from the hypothesis that the development of a special and effective teaching strategy using well-systematic methods and means together with clearly formulated objectives, we will be able to teach the child / young person to know him and the environment, forming motor skills that will help him to adapt more easily and more efficient in the environmental conditions in which he lives.

The topic of the project is topical in that it answers the many questions asked by parents, the people responsible for their education, in order to create skills that will help them become adults. The topic addressed in the research aims to find the most effective kinetotherapeutic means of training the motor skills and basic skills that allow them to adapt to life.

3. Material and Methods

The research activity was organized in the fitness room of our faculty and at the School Center for Inclusive Education in Brașov, in collaboration with the professional kinetotherapist Dumitrașcu Adriana, between October 2015 - May 2017, with 3 subjects, respectively a girl and 2 boys. All have framed with mild mental impairment. The main research methods were those that gave us the opportunity to gather specialized information to theoretically strengthen the work but also of motor learning. For evaluation we used the tests: Romberg (item 1) - for balance assessment, unipodal test (item 2), Wells and Dillon test - for measuring spine and foot mobility (item 3), talo-crural mobility test (item 4) , Ruffier test (item 5), psycho-motor coordination test (item 6), sticks test (item 7), coordination test (Denisiuk) (item 8)

The motor training programs included simple means in the form of physical exercise, perceptual-motor exercises of orientation and spatial-temporal organization, applied paths from unified gymnastics, means from ABA therapy, ball games.

The results are shown in table 1.

Table 1

Table with results for experiment items - initial and final testing

	Initial testing						Final testing					
	M.D		B.D		T.I		M.D		B.D		T.I	
Item 1	16 sec		13 sec		10 sece		18 sec		16 sec		11 sec	
Item 2	4 sec		0		1 sec		6 sec		2 sec		4 sec	
Item 3	-	+	-	+	-	+	-	+	-	+	-	+
		3cm	2cm		2cm			5 cm		4cm		2cm
Item 4	Good		Poor		Poor		Good		Good		Poor	
Item 5	6,3		4,1		5,2		6,7		5,4		5,2	
Item 6	23 sticks		15 sticks		21 sticks		25 sticks		18 sticks		16 sticks	
Item 7	Over 50 cm		Over 50 cm		Over 50 cm		40 cm		Over 50 cm		50 cm	
Item 8	55 sec		60 sec		58 sec		53 sec		57 sec		55 sec	

4. Discutions and Conclusions

Through the program conducted for one year, with children with Down Syndrome their psychomotor capacity has improved. Even if the performances are not spectacular, the small values obtained for all the psychomotor components, especially the ones we tested through the above mentioned tests, showed us that by patience, the selection of the appropriate means and especially the verbal stimulation, encouragement and mobilization can motivate the subject with medium and low mental difficulties and capacities. Analyzing and comparing the items for the two tests and for the 8 samples, we obtained the following values:

In the Romberg test, all subjects increased their performances with one until 3 sec., Which allowed the introduction in their preparation of more complex means, which needed more attention. We can say that in item 2 - unipodal balance test, in the initial test one of the subjects could not maintain balance, but in the final test all were able to improve their results very little - by 2-3 sec. For the two mobility tests (item 3-4) all subjects they made progress, with the results being between 2-4 cm and the "Good" rating, less one of them - which for health reasons on the day of testing only the "Poor" rating was successful. At the Ruffier effort test, all subjects were around values 5.4 and 6.1, normal effort values rated with "Very good" and "Good". In the sticks test - moving the sticks from their box to an empty box, the final values showed progress with 2-4 sticks more than in the initial test. For health reasons the same subject who had difficulties and with a sample above, failed to produce a better result (T.I - 6 sticks).

In the psycho-motor coordination test, subjects behaved the same, none of them appreciated the distance traveled at the time of initial testing. So did the final test, when only one of them managed to approach 50 cm from the end of the drawn line.

The Denisiuk test was a pleasant way to appreciate their behavior as they are accustomed to the obstacle courses in the Special Olympics competition in which they participated in all the multi-annual editions held in the city and the country.

The time difference between the initial test and the final test was 2-4 seconds smaller. In this test the children were motivated, encouraged and ambitious by the encouragement of their colleagues.

The figures below show graphically the performance evolution between the two tests.

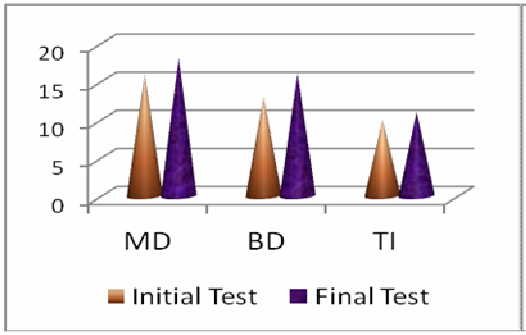

Fig. 1. *The evolution to the Romberg Test*

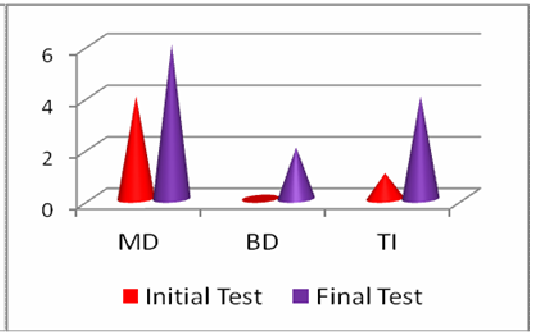

Fig. 2. *The evolution to the Unipodal Test*

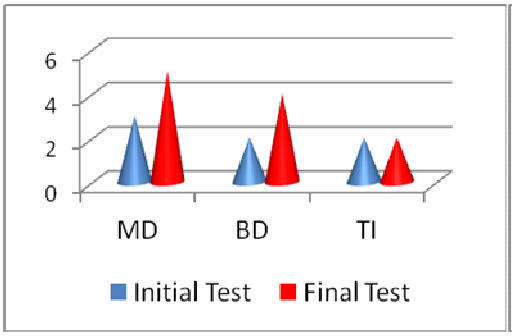

Fig. 3. *The evolution to the Wells & Dillon Test*

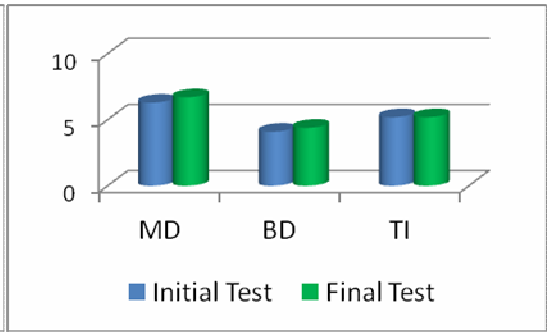

Fig. 4. *The evolution to the Ruffier Test*

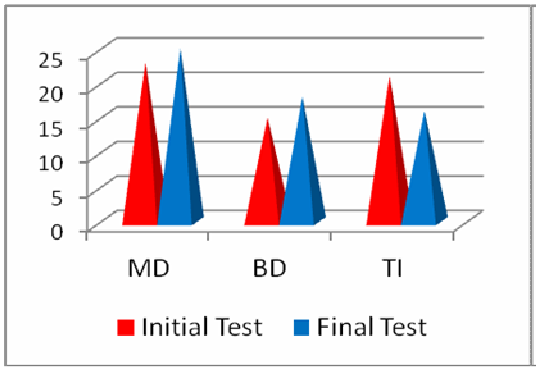

Fig. 5. *The evolution to the beaters / chopsticks Test*

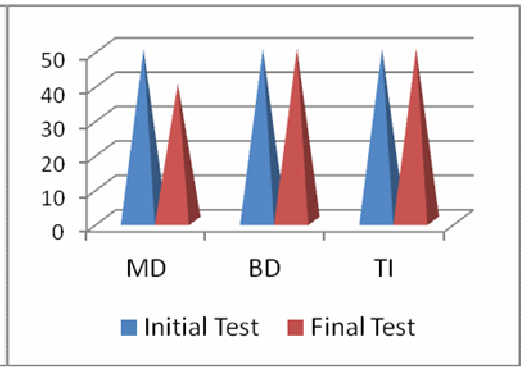

Fig. 6. *The evolution to the Coordination psycho-motor Test*

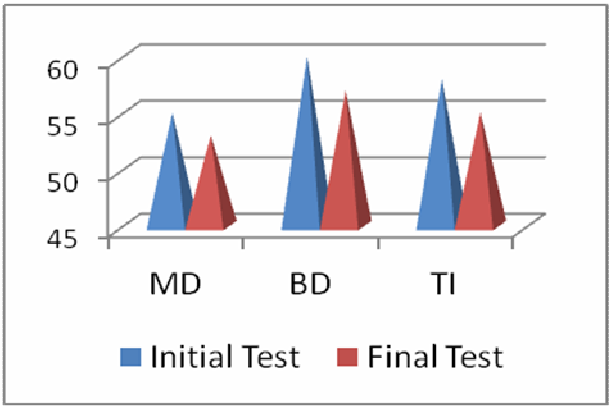

Fig. 7. *The evolution to the Denisiuk Coordonation Test*

In order to be more effective the psychomotor training program, it should be personalized and applied individually by each subject and in the end evaluated in terms of performance. In addition to the classical means - exercises and games - sensory therapy, occupational therapy, dance and movement therapy can be adopted.

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