

ASSESSMENT IN CHILDREN WITH SPASTIC TETRAPARESIS

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Abstract: Background. Children with spastic tetraparesis who benefit from early and continuous kinetic intervention have a chance to an almost normal neuromotor development and to a better integration into society, in this way the quality of life of these children being increased.

Design and methods. The 17 years old patient's present and over time conditions, and her quality of life were assessed using the questionnaire method, ataxia test, Thomas test, Dynamic Gait Index and the assessment of the ADLs.

Results. Regarding the ataxia, it seems that it was installed throughout the patient's development and there was no improvement. According to the Thomas test results, the hip flexum decreased throughout the years from an angle of 13° in 2001 to 5° in 2006, before stopping the physical therapy. From then up until now the hip flexum reinstalled, getting worse by 3°. Regarding the gait, the patient has a slight impariment and both a moderate and severe impairment, depending on the obstacles and walking directions.

Conclusions. The continuity of physical therapy resulted in the improvement of the patient's state and the independence in carrying out various activities, such as household and selfcare, even if she needs an almost constant supervision.

Key words: cerebral palsy, spastic tetraparesis, quality of life, ADL, ataxia, gait, physical therapy

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INTRODUCTION

Cerebral palsy is a lifelong condition that affects the individual, family and immediate community. Therefore, the goal of allowing the individual with cerebral palsy to live life with the least impact of the disability requires complex attention to the individual and the family.

The aim of physical therapy is to help the child with cerebral palsy to develop into an adult in whom the effects of the disability are managed so that they have the least impact possible on adult function (Freeman, 2007).

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Since cerebral palsy hinders a child's development and usually causes problems that persist into adulthood, it is classified as a developmental disability. Even though the brain injury that causes cerebral palsy is present at birth, it is often difficult for doctors to recognize it. For this reason, there may be a delay in diagnosis (Sieglinde, 2006).

Cerebral palsy is a disorder of movement and posture. It is caused by a brain injury that occurred before birth, during birth, or during the first few years after birth. The brain injury hinders the brain's ability to control the muscles of the body properly. The brain tells our muscles how to move and controls the tension of the muscles. Without the proper messages coming from the brain, infants with cerebral palsy have difficulty in learning basic motor skills such as crawling, sitting up, or walking (Sieglinde, 2006).

Spastic tetraparesis is affecting all four limbs, with the possibility to affect more one one half body or the upper limbs (Popescu, 2001). The spastic form of infant cerebral palsy is the most common form, being present in 70-80% of all cases (Vereanu D. et al, 1963). If the level of spasticity is high, the child has certain typical patterns due to the severity of the co-contraction of the involved sides, especially around the proximal joints: hips and shoulders (Căciulan, Stanca, 2011).

Once the spasticity is installed, the child with spastic tetraparesis cannot keep his head up and straight, he cannot keep balance in different positions and he cannot use his hands and arms.

In supine, it can be observed a strong retraction of the neck and shoulders. The head rotation to one side causes a characteristic attitude of the asymmetric tonic neck reflex (the swordsman's position) and an asymmetry of the trunk and limbs. Any attempt to rotate the trunk in the same direction as head and to roll is hindered by the shoulder retraction and the inability of the spine intersegmentary rotation, through the absence of the recovery reactions.

In prone position, the child can't lift the head or he can't use his arms and hands to support himself; thus he doesn't have the „doll's position”. In sitting, the shoulders, arms and spine are flexed. The hips and knees may also be flexed. If the trunk and upper limbs are extended, there is possible to lift the head from prone position and to maintain the „doll's position supported by the forearms”. On the attempt to do the quadruped position, the trunk and lower limbs are flexed (Căciulan, Stanca, 2011).

The inability to bend the head from supine and to lead the upper limbs to body midline, prevents the child to initiate the sitting position, emphasized by the inability or difficulty to bend the hips, due to the increase of the extensor's spasticity caused by touching and pressing the buttocks (Bobath, 1980).

HYPOTHESIS

Children with spastic tetraparesis who benefit from early and continuous kinetic intervention have a chance to an almost normal neuromotor development and to a better integration into society, in this way the quality of life of these children being increased.

OBJECTIVES

The aim of this research is to follow the neurological development of the child, from the diagnosis moment until now; to assess the current status of motor function; to assess the present subject's quality of life; to assess the degree of social integration; to assess the ADLs.

DESIGN AND METHODS

Subjects: The research, held in March-June 2012, at School with I-VIII classes „Nicolae Popoviciu” Beiuș, was performed on a 17 years old teenager, diagnosed at birth with infant disabling encephalopathy, extrapyramidal syndrome. As associated diseases, she suffers from spastic tetraparesis predominantly on right side and psychomotor retardation. Patient data was collected from the questionnaire which was completed by the mother. The affection was detected at birth, being caused by perinatal factors. During birth, the child was asphyxiated by the umbilical cord. The APGAR score was 1/3, the newborn being inert, cyanotic, without reflexes and there was no crying. At birth she weighed 2.5 pounds.

Regarding the neurological development, according to the mother, the child acquired the main „movements” thus: the head control after 1 year; assisted gait after 2-3 years; individual gait

after 5 years. Until now, surgery was not necessary, instead, she received medical treatment and physical therapy. She is continuously taking the medical treatment since birth and this is the Encephabol syrup and B vitamins.

She started physical therapy after 2 years, at Băile 1 Mai Recovery Hospital, 21 days, once-twice a year, until the age of 8. After that, she didn't do physical therapy until third grade, when she started physical therapy at Beiuș. Since 2007 she has not done physical therapy, because the financial conditions don't allow it. Instead, her mother does exercise with her 3-4 times per week. These exercise are: walking; going up-down on stairs; dancing; riding the 3 wheel bicycle; various coordination and skill activities (eg. drawing, household chores etc.) The progress mother noticed after the kinetic intervention are: a better trunk and lower limbs control.

Currently, D. has a height of 1.64 m and a weight of 60 pounds. Mother said that since 2007 (after stopping the physical therapy) and so far, she has noticed a neuromotor regression, compared to her condition until then.

ASSESSMENT METHODS

To gather all the patient data, we used various assessment methods and tests, presented below: a) The test for ataxia (figure1):

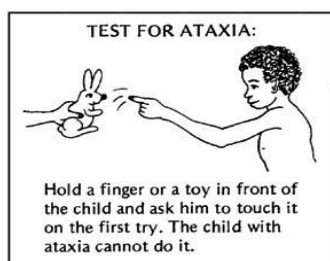


Figure 1. The test for ataxia

(Source: <http://www.dinf.ne.jp/doc/english/global/david/dwe002/dwe00211g19.gif>)

- b) Thomas Test (figure 2): It is used to identify unilateral fixed flexion deformity of the hip. The test consists of 3 steps¹:
- Step 1: the patient lies supine on the examination table. The clinician passes the palm of his hand beneath the patients spine to identify lumbar lordosis.
 - Step 2: The „normal” hip is flexed till the thigh just touches the abdomen to obliterate the lumbar lordosis.
 - Step 3: measure the angle between the affected thigh and the table to reveal the fixed flexion deformity of the hip.



Figure 2. Thomas test

(Source: http://tiger.towson.edu/~mlipka1/thomas_test.htm)

¹ http://en.wikipedia.org/wiki/Thomas_test

- c) Dynamic Gait Index - DGI: DGI was developed as a clinical tool to assess gait, balance and fall risk. It evaluates not only usual steady-state walking, but also walking during more challenging tasks. This consists of 8 functional walking tests, performed by the subject and marked out of three according to the lowest category which applies. Total score is 24².
- d) Questionnaire on subject's personal, clinical and treatment data:
This questionnaire is a personal contribution, made with the aim to gather data about the patient, her disease and details about the physical therapy she has done.
- e) ADL – Activities of Daily Living: This assesses the functional independence level in the daily self-care activities.

RESULTS AND DISCUSSION

Following the previous and current assessments, and comparing the results, there have emerged the following conclusions:

- a) Ataxia test: positive.

Table 1. The results of the test for ataxia, from childhood to present

YEAR	TEST RESULT
2000	Positive
2004	Positive
2011	Positive

It can be noticed that ataxia was installed throughout the subject's development. There has been no improvement so far (table1).

- b) Thomas test: positive.

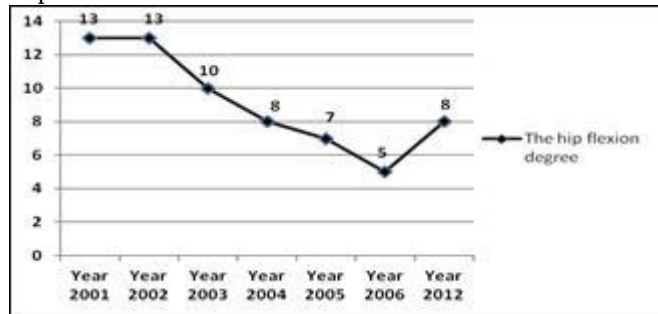


Figure 3. Thomas test - results

In this chart (figure 3) it can be noticed that the hip flexion decreased during the years when the subject did physical therapy, from an angle of 13° in 2001, to 5° in 2006, before interrupting the physical therapy. Since then until now, the hip flexion was reinstalled, increasing with 3°.

- c) ADL – Activities of Daily Living:

Table 2. The functional independence level in the daily self-care activities and handling her own body

ADL	Lvl. 1	Lvl. 2	Lvl. 3	Lvl. 4	Lvl. 5	Lvl. 6
Feeding						
1. Solid food					✓	
2. Liquid food (soup)	✓					
3. Liquids (water, juice etc.)		✓				

² http://www.physio-pedia.com/Dynamic_Gait_Index

Selfcare						
1. Overall care						
2. Washing teeth						
3. Dressing/ undressing upper body						
4. Dressing/ undressing lower body						
5. Taking shoes						
Daily activities						
1. Dish washing						
2. Vacuum cleaning/ sweeping						
3. Folding clothes						

Regarding the daily activities, the dependence levels differ, depending on the activity itself. For example, when about feeding, she is almost independent with the solid food, unlike the liquid food, where she is total dependent. Because of the ataxia specific movements, the subject cannot handle fine, coordination and balance movements, as leading the soup spoon to mouth, or handling a glass with water without straw.

Regarding the selfcare, she is permanently dependent on mother, especially when it's about dressing the lower body and taking shoes. When it's about handling the upper body (dressing, washing teeth, overall care) sometimes she manages to do it herself, mother interferes only occasionally.

When it's about daily activities, she is folding clothes alone, without help, slowly, as much as allowed. She also washes dishes, but only the plastic ones, because sometimes she throws them and there are risks to get hurt. She really enjoys doing the household, she likes to feel useful and to help her mother.

The gait assessment was done only in present. The final score is 8/24. The subject shows: mild impairment, in terms of stepping around obstacles and walking up/dows stairs; moderate impairment, in terms of gait level surface, change in gait speed, gait with horizontal head turns, gait and pivot turn; severe impairment, in terms of gait with vertical head turns and steps over obstacle.

CONCLUSIONS

Following this study, we came to the following conclusions:

Throughout the years when the subject did physical therapy, it has been noticed an improvement of her condition, which appears both from the assessments and her mother's observation, who is permanently with her daughter. It was also noticed that, since stopping physical therapy in 2007 until present, there is a slight regression regarding the neuromotor development and the execution of various daily and other activities.

Regarding the subject's general outlook on life, this is the same as the mother's, because her mother understands what her daughter is going through and how she sees things. They are both relatively pleased, more specifically resigned, though they wish the social function to be improved. The continuity of physical therapy resulted in the improvement of the patient's state and the independence in carrying out various activities, such as household and selfcare, even if she needs an almost constant supervision.

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