

ASPECTS REGARDING THE KINETIC MEASUREMENT RECOVERY OF THE BRAHLE PLEX

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Abstract: *This paper presents the study of a complex pathology of the upper limb encountered on an adult patient, namely brachial plexus paresis occurred at birth. The traumatic factor acting in these cases can often be brutal or faulty obstetric maneuvers, which can reversibly or irreversibly damage the movements of the newborn's upper and lower limbs. The importance of the studied topic is that this trauma determines physical, economic, social, psychic limitations even to the dependence on another person or to the means of assistance, and may be invalid. At the beginning of the study, the research framework was established, the hypothesis was made and the anamnesis was done, the research methods and techniques were selected, the study and the research techniques were applied, the data was recorded, the study strategy was established and the conclusions were established.*

Key words: *patient, kinesiotherapy, trauma.*

1. Introduction

The incidence of this pathology is 1 to 800 of new borns, affecting both boys and girls to the same extent. Prevalence was reported as 1-2% worldwide, according to the data provided by the World Health Organization, the number rising in undeveloped countries.

Brachial plex paralysis occurs most frequently after difficult births, or sometimes after apparently normal births. Paralysis is the consequence of injury to the primary element of the peripheral nervous system of the upper limb, namely the brachial plexus of the fetus at birth, by a traumatic factor. From the complexity of

this pathology, which will be presented below, I chose to study the progression of this disorder over time on an adult patient, studying the methods and techniques for recovering mobility and sensitivity.

Trauma to the head, chest, fractures or dislocations affecting the shoulder or spine often has a plexral home.

Supraclavicular damage is more common, with a higher degree of severity, and is associated with a bleak prognosis as compared to infraclavicular impairments.

There are many causes of this affection in specialty literature, but obstetric plexus brachial paralysis on new borns together with those of traumatic origin are among the most studied.

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Recovery, in the case of brachial plexus paralysis, in children or adults, differs from many points of view. On the growing and developing child, the nervous system is in a process of development, while in the adult, the nervous system is mature, with varying behaviors, and with aging, the nervous system is experiencing a physiological decline.

Patient harm can be unilateral, or bilateral, an extremely difficult situation for a person. It faces major mobility problems of the affected superior member, experiencing difficulties in daily activities. With the aging process, the human body enters in a regression process, which means that changes in the nervous inflow transmission occurs in the nervous system.

The development of technology and technology also influences medical research, opening new pathways for the recovery of brachial plex paralysis and paving the way for new discoveries, technical or procedural innovations.

2. Materials and Methods

2.1. Research Hypothesis

It can be demonstrated that by applying kinetic methods, in particular resistance mobilizations and an analytical exercise program performed by the patient, an increase in segmental mobility, strength, and coordination can be achieved, conferring the ability to perform as complex as possible.

The present lecture proposes the improvement of the kinetic programs in recovery in the plex brachial paresis.

The research is conducted on the course of 6 months, 03.12.2016-02.06.2017. Of the many patients I chose to present the

case of an adult with brachial plex paralysis from birth.

The study will consist of 72 hours of work and will be done on Tuesdays, Thursdays and Saturdays by the subject with the help of the physical therapist. The session contains analytical insight, local massage and exercises by the subject. All this will be within 1 hour.

The location of the study is in a physiotherapy cabinet in Suceava, which has the space and materials needed to perform the exercises, but also at the patient's home.

The materials used are: mattresses, coasters, dumbbells, sticks, balls, elastic bands, ball.

Anamnesis

1. Name: SS, Age, 21 years, 6 months, Gender: Male, Living and working: Singer, Traveling very much, Height: 1.77 cm, Weight 90 kg, began to gain weight from the age of 18 until then having a normal weight, Lifestyle: active
2. Nutrition: preferences for meat, animal fats, fried food, sweets, vegetables etc.
3. Activities: traveling, sports, singing, trauma: from birth
4. Treatment followed: He was not operated, followed a kinetic program at the age of 1 year and 6 months for 2 months at the hospital. Then, until he was eight, he worked at home, but rarely.
5. Member suffering: Right upper member, Other deficiencies presented: a slight scoliosis, Personal history: None
6. She was sent from the age of 2 to recovery, but her parents did not have time and a very good financial situation, they did not leave, preferring to work home with him at what they saw at the hospital.

7. Patient evaluation was done by:

Overall assessment of the patient's functional capacity according to the Health Assessment Questionnaire Disability Index (HAQ)

Criteria	Rating depending on the execution possibilities: (3 = no difficulty; 2 = difficult; 1 = very hard; 0 = impossible)				
	Initial	Intermediate			Final
Final score (arithmetical)	1,6	1,6	1,7	1,9	2,4

Assessment of general functional status through ADL

Parameters	assessment based on execution options (normal - 4, slightly difficult - 3, medium -2, very difficult to achieve -1, impossible -0)				
	Initially	Intermediate			Final
Mobility in bed	3	3	3,6	3,8	4
Alimentation	3,2	3,2	3,2	3,4	3,8
Hygiene	2,5	2,5	2,7	3,1	3,4
Dressing	2,6	2,6	2,7	3,2	3,2
Utilities	3,9	4	4	4	4
Comunication	3	4	4	4	4
Final score (arithmetical)	3,08	3,26	3,47	3,65	3,73

3. The Dreiser functional index

Criteria	Yes, without weight	Yes but some weight	Yes, with big weight	No
Grade	0	1	2	3
Arithmetic mean:	12 Very significant(11-13 points)			

The Hettinger system:

Testing joint mobility and balance

Test 1 - Orthostatic, with the legs close and the knees in extension, torsion of the trunk, the subject trying to touch the floor with his hands. Match the score on a scale from 1 to 10. S.S earned 1 point

On initial testing, S.S. has earned 1 point for mobility testing. The patient could lean a little, the distance between his hands and the floor being about 20cm. This test

helped me to correctly determine future exercises.

Test 2 - Sitting on the floor: looking for the halluces to be brought to the nose (bending the trunk, the head, and pull the feet with his hand); the score on a scale from 1 to 10. S.S earned 2 points.

The patient has some articular mobility, which can bring the halves up to 15 cm from the nose. This test helped me to establish the exercises of articular ankle mobilization.

Recovery programme			
<i>The principles and objectives of the treatment are: Fighting pain, fighting redress and retraction, reeducation of sensitive function; regaining and maintaining effort, toning muscles, restoring prehension, correcting soft tissue retractions, creating hygienic and ergonomic behavior will protect your hands by preventing progression of degenerative processes and the appearance of acute attacks</i>			
<i>Step I Period of deployment: 3 months</i>	Objective	Content	Dosage
	Evaluation; Establishing the rest of the function, preserving the function	Shoulder Abduction - From orthostatic, in front of the mirror. The abduction of arms with weights up to 90 in the front plan is performed, then the reverse movement is made by rotating the palms downwards.	2 x 10 P 30 sec.
		From the orthostasis, in front of the mirror, the weight arm is placed in front of the opposite inferior limb, with the palms to the thigh. Slowly rising the diagonal weight up to the arm's flexion on the same side and the rotation of the hand.	2 x 10 P 30 sec.
		Shoulder flexion - A patient in a seated position is lifted with extended arm forward, in sagittal plan to 90. Patient in dorsal decubitus, an arm hanging freely and sustaining weight. Raises the weights by crossing the back.	2 x 10 P 30 sec.
		Shoulder extension Patient in dorsal decubitus, an arm hanging freely and sustaining a weight. The weight lifting is performed with the back crossing.	2 x 10 P 30 sec.
		<i>Codman pendulums</i> <i>ROTATION</i> exercises, in which the arm is rotated clockwise and counterclockwise, the shoulder being relaxed; Pulley Exercises FORWARDS-BACKWARDS, with the relaxed shoulder, the arm is moved forward and backwards Pivotal exercises On the side, the arm is moved left and right	(a series of 15 rotations), series of 20); (20 series).
		<i>Stretching - Exercises are performed for: Shoulder stretching, passive internal rotation, passive external rotation, stretching of the muscles in the lying position</i>	3x6

Recovery program						
Step II Duration: 5 months	Objective	Content			Dosage	
	Step II Duration: 5 months	Increasing mobility, strength, stability, skill	Promoting mobility	Movement initiation	Rhythmic initiation (IR)	
Active movement of relaxing opposition (MARO)						
Repeated counters (CR)						
Increasing amplitude				Rhythmic initiation (IR)		
				Relaxation-Opposition (RO)		
			Relaxation-contraction (RC)			
			Rhythmic Stabilization (SR)			
Promoting stability			Strengthen the postural muscular discharged		Slow Resisting Reversal (ILO)	
					Alternating isometry (Iz A)	
			Strengthening postural muscles and cohabitation from discharge		Slow Resisting Reversal (ILO)	
		Isometric contraction in the shortened area (CIS)				
		Alternate isometry (Iz A)				
		Rhythmic Stabilization (SR)				
		Loading contraction		Slow down with slow down (ILO-)		
				Alternate isometry (Iz A)		
				Rhythmic Stabilization (SR)		
		promoting controlled	Mobility		Slow Reversal (IL)	
Slow Resisting Reversal (ILO)						
Repeated contractions (CR)						
Sequence for strengthening (SI)						
Agonistic inversion (IA)						
promoting ability	Ability		Slow Reversal (IL)			
			Slow reversal with opposition (ILO)			
			Repeated contractions (CR)			
			Sequence for strengthening (SI)			
			Agonistic inversion (IA)			
			Strength Progress (PR)			

Following the recovery program (after steps I and II) we will also use the Kabat Diagonal

Step III Duration: 3 months	Improving and raising the capacitive grade at ADL level	Exercise the activities in ADL
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3. Results and Discussions

As a result of the measurements, there was an increase in the joint amplitude,

increase of the muscular force and decrease of the painful sensation as shown in the following tables.

Motion Amplitudes

Table 1

Straight shoulder	Initial	Final
Flexion	45°	65°
Extension	12°	30°
Abduction	87°	103°
Internal rotation	84°	87°
External rotation	14°	31°

At baseline, the flexion angle of the S.S. patient was 45°, the extension was 12°, the abduction of 87°, the internal rotation of 84° and the external rotation of 14°. In

final testing, the patient's flexion angle S.S. increased to 65°, 30° extensions, 103° abduction, 87° internal rotation, and 31° external rotation.

Bone joints goniometry

Table 2

Straight elbow	Inițial	Final
Flexion	138°	145°
Supination	67°	78°
Pronation	72°	83°

On initial testing, S.S. had a flexion of the elbow of 138°, the supination was 67° and the 72° prone. In the final test, an

increase in flexion up to 145°, supine to 78°, and a 83° protraction can be observed.

Table 3

Balance on affected musculature - Shoulder joint versus movement

The movement and muscles involved	Force	
	Inițial	Final
Deltoid Flexion (previous fibers)	2+	4+
Abduction - Deltoid + Supraspinatus	2+	4
External Rotation - Supraspinatus + Infraspinatus + small round	2+	4+

In the initial testing, the S.S. patient had a force of the deltoid, superspinus, infraspinus, and a small round of 2+, and

finally, a 2-unit muscle growth was observed.

Table 4

*Balance on impaired muscles - joint of the elbow
in relation to the movement*

The movement and muscles involved	Force	
	Initial	Final
Flexion – brahial biceps+previous brahial	3+	4+
Supination – biceps+ short supinator	3+	4+

On initial testing, the S.S. patient had a force of brachial biceps and a short 3+ supporter, and in final testing, we can see an increase of 1 unit of said muscularity.

Table 5

*Balance on the affected muscles - the fist joint
in relation to the movement*

The movement and muscles involved	Force	
	Initial	Final
Radial extension – external radials I and II	2+	3+

In the initial testing, the S.S patient had a force of 2+ of the external radials I and II, and in the final testing we can see the increase by 1 unit of the external radials I and II

In the initial test, the SS patient received 1.5 points at the limit of "difficulty" and "very hard" in June, final testing, the SS patient received a 2.3-hour sneeze, looking for "without difficulty" .

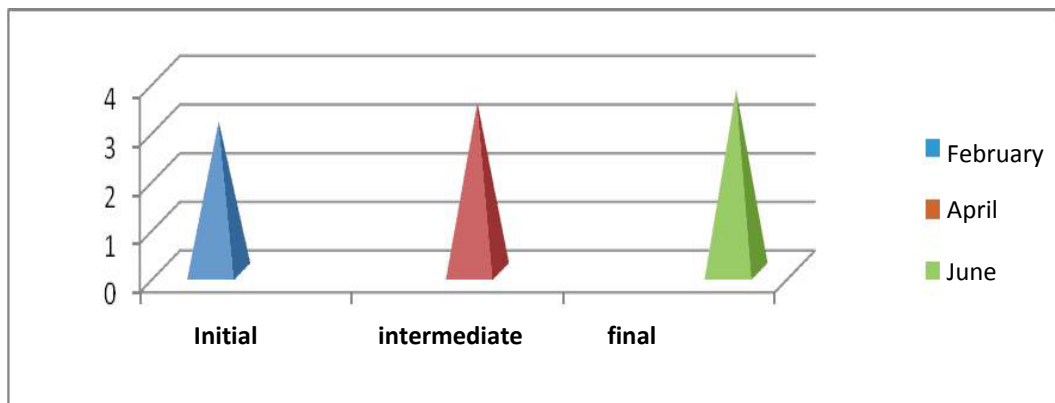


Chart 1. Appreciation of general functional status through ADL

In the initial trial, the S.S. patient achieved 2.8 points, which means that the Adls performed with difficulty, in the final test, in June, we can see an increase of 0.7

points, pointing to normality. After collecting the final data, the following issues emerged:
-The graphical representation of the

Hettinger system that focused on the Mobility and Balance Testing.

- On initial testing, S.S. has obtained 1 point for this test. The patient could lean a little, the distance between his hands and

the floor being about 20cm.

After 6 months of physical therapy, the results were:

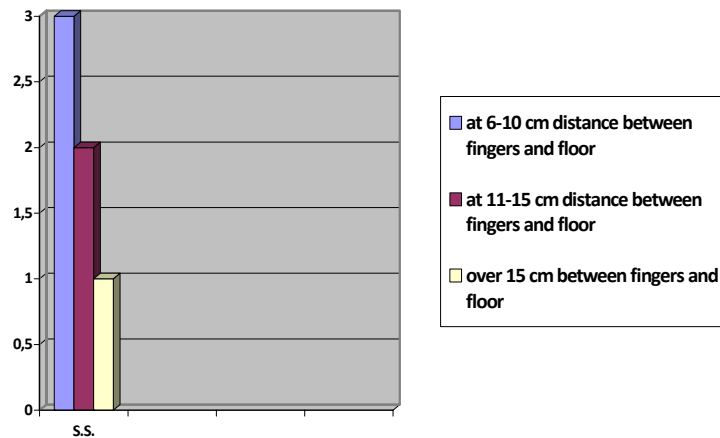


Chart 2. *By comparing the graphs, it can easily be observed that the patient made significant progressions and could bend up to 7 cm from the floor*

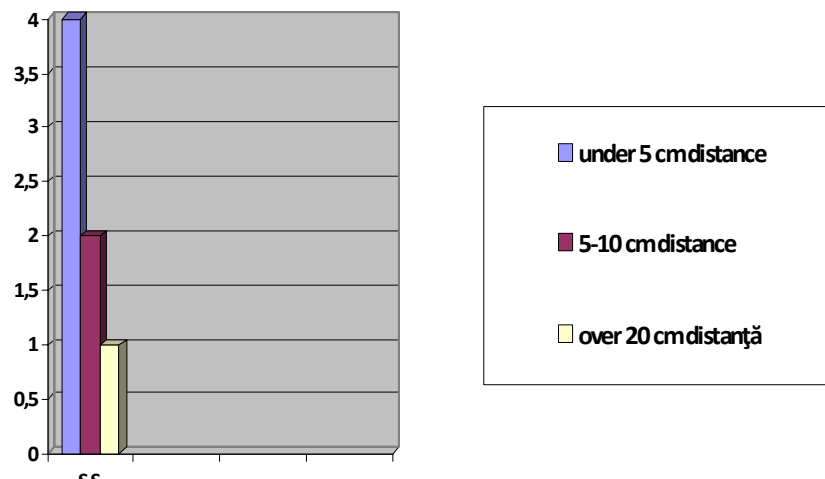


Chart 3. *Graphic representation of the Hettinger System. Testing of joint mobility*

Following the chart, it is noted that the patient initially has some articular mobility, which can bring the halves up to a distance of 15 cm from the nose. S.S earned 2 points.

After 6 months of treatment, it can be seen, by comparing the Charts, that S.S. it has increased its mobility with two points, respectively, it can bring halucele to the nose at a distance less than 5 cm.

4. Conclusions

- At the end of the study we found that the hypothesis was validated.
- Applying recovery kinetics, encouraging recovery and hurrying the process of recuperating and re-educating mobility.
- Excellent results can be obtained when working outside the kintotherapy cabinet.
- With discontinuation of treatment, recovery benefits are lost, so it is advisable to continue home treatment.
- It can be said that the kinetic means had a positive influence on:
 - improving postural control, coordination of movements and overall balance;
 - Increasing the amplitude of movement at the articular level;
 - the ability to adapt the reflex-inhibitor (relaxation) positions.
- At the end of the kinesiotherapy program, the patient was encouraged to continue the recovery program and preventively to avoid possible sequelae
- As a result of the initial measurements and the comparison with the final

ones, the hypothesis according to which the kinetic therapy can be recovered by the sequelae of the brachial plexus paresis.

- The presence of a physical therapist gives the patient brachial plex paresis, confidence, desire for perseverance, motivated to progress both by his own desire and by the instructions given by the physical therapist to be followed at home.

Suggestions:

During the 72 recovery session, the patient received hygienic-dietetic indications, kinesiotherapy indications, counseling for therapy opportunities and encouraging the continuation of the kinesiotherapy program at home, a program taught at the kinesiotherapy room.

The prognosis is favorable in the brachial plex paralysis of the Duchenn Erb type, the success depending largely on the frequency of the kinesiotherapy program.

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