

5th International Conference EDU-WORLD 2012 - Education Facing Contemporary World
Issues

Early physical therapy intervention in infant hip dysplasia

Rata Marinela^{a*}

a "Vasile Alecsandri" University of Bacău, 157 Marasesti Av., Bacău, 600115, Romania

Abstract

The hip dysplasia represents a dysplastic syndrome, characterized by anomalies of articular and periarticular structures, and, as concerns the biomechanic part, reveals the hip instability, capsular laxity, and abnormal acetabulum. An important percent of our country's new-born children suffer from hip dysplasia, and most of their parents don't know that the role of the physical therapist in this disorder's recovery is as important as the role of the physician. **The research hypothesis:** By precocious physical therapy intervention, individually applied and structured in accordance with the identified deficit, the nursing's hip functionality increases and the risks of ulterior complications are eliminated. The action viewed a group of seven newborn babies, immediately after the diagnosis settlement, beginning with the physical therapy intervention. First, the newborn was evaluated, then the physical therapy intervention was structured in accordance with the initial results, which revealed the functional diagnosis. The number of sessions were 3 per week; they were realized by the physical therapist; and in the other days the patient exercised at home. As shown in the tests which were used in the initial evaluation, we can affirm that the newborns, at the end of the therapy, presented a qualitative spontaneous motility, in accordance with the stadium of development specific to the chronological age. Motility was symmetrical on both hips and pelvis in ventral and dorsal decubitus, the weight centre in ventral decubitus position being lowered, to xiphoid appendix, a fact that proves a greater stability of hips, but also an adequate support on forearms. Analysing the child's evolution, it can be seen that the effects of physical therapy weren't just locale, but they formed a complex of beneficial factors, which contributed to a general muscular equilibration, a fact that was reflected by a general development specific to the chronological age, qualitatively. The parent is the key-element as concerns the identification of the functional limits, since the first days, but also in the ulterior intervention, becoming a member of the work-team, besides the doctor and the physical therapist.

© 2013 The Authors. Published by Elsevier Ltd. Open access under [CC BY-NC-ND license](https://creativecommons.org/licenses/by-nc-nd/4.0/).
Selection and/or peer-review under responsibility of the University of Pitesti, Romania

Keywords: physical therapy, hip dysplasia, infant

* Rata Marinela Tel.: +4-074-241-1977

E-mail address: marinela_rata@hotmail.com

1. Introduction

Hip dysplasia is a syndrome characterized by anomalies of the articular and periarticular structures. From a biomechanical point of view, it is defined by instability of the hip, capsular laxity, and abnormal acetabulum.

Most newborns in Romania suffer from hip dysplasia, and most parents do not know that the physical therapist can play a role as important as that of the physician in treating this disorder.

In Romania, it is important to have an early interdisciplinary therapeutic approach (neonatologist, orthopedic physician, physical therapist) for correcting the position of the hip, the articular angles, and preventing future articular and periarticular sequelae.

This disorder has a prevalence of 90% for females, and of 10% for males. It is encountered in approximately 3% of the newborns in Romania, in most cases affecting the left hip, and in 40% of the cases it is bilateral, an asymmetry between the two lower limbs being observed.

The development of the children being treated from hip dysplasia can be very good, if the disorder is kept under control through orthopedic treatment. The earlier the dysplasia is treated, the better the prognosis (www.wikipedia.ro).

If the orthopedic techniques are unsuccessful, a surgical intervention being necessary, the prognosis is less favorable, although in the short term it seems so. But, as the professional literature points out, the therapeutic intervention must have an interdisciplinary character.

2. Research Hypothesis

Through an early physical therapy intervention that is individualized and structured according to the disorder, one can improve the functionality of the hip in infants, and eliminate the risk of future sequelae.

3. Material/ Methods

The experiment was conducted in the sensory chamber of the Physical Therapy and Occupational Therapy Department, Faculty of Movement, Sports, and Health Sciences, "Vasile Alecsandri" University of Bacău, where all the necessary equipment to perform the physical therapy intervention program could be found.

The research comprised multiple stages, being conducted between February 14 and April 10, 2012.

Research methods

In order to establish clear objectives and aims for this paper, a rigorous study of the literature was conducted, to examine the studies and research results published up to this date regarding this subject.

Subjects were observed to determine certain particular aspects of hip dysplasia, and their development. All the information was recorded in order to be analyzed in detail, statistically, and then represented graphically.

Methods of assessment and measurement

The somatoscopic assessment has highlighted the limitations of the hip movements during spontaneous motor activities (abduction, external rotation, extension), and the asymmetry of the lower limbs.

The radiographic examination, conducted by a specialist physician, was used to identify the degree of hip dysplasia, calculating the articular angles.

The data recording and analyzing method

Recording the observations was useful for the analysis and interpretation of the data, starting with the partial results, recorded in charts, to the comparison with the final tests, from which the elements for the statistical analysis and graphical interpretation were extracted.

4. Physical Therapy Intervention

The subjects were seven male infants, about 20 days old.

Thus, after establishing the diagnosis, the physical therapy program began. The program was conducted for approximately one month.

First, an assessment of the infants was conducted, and then the physical therapy intervention was structured according to the initial results, from which a *functional diagnosis* was established:

- Reduced mobility for the movements: extension, external rotation, abduction.
- Frontal pelvic asymmetry, higher lifting in the affected part;
- Higher contractures in the lumbar paravertebral muscles in the part of the hip with dysplasia;
- Difficulties in maintaining the prone position more than 10 seconds.

The Physical Therapy goals:

- rebuilding the mobility of the hips with dysplasia;
- strengthening the hypotonic muscles of the affected members;
- rebalancing the pelvis muscles to correct the asymmetry;
- increasing the passive and active stability of hip joints;
- facilitating the quality acquisition of motor elements in the next stage of development;
- preventing future articular and periarticular sequelae.

The Physical Therapy program

The physical therapy programs used a variety of physical therapy methods and Swedish massage procedures for the rehabilitation of hip dysplasia.

The Swedish massage was used as a therapeutic method both for strengthening the hip muscles (lateral rotator group; gluteus maximus; gluteus minimus; and gluteus medius), and for decontracting the paravertebral muscles. The applied procedures were: sliding, friction, kneading, tapotement, the infant being in prone position, their choice being made according to the aims of the massage.

The physical therapy intervention program comprised: posturing, passive and active mobilizations, and Vojta procedures.

The *posturing* was done from the prone and supine positions, the legs performing an external rotation and abduction, with flexed knees. The duration of these exercises were 10 seconds each, with 3 repetitions.

The passive mobilizations consisted in slow, analytical movements, of external rotation, abduction, and extension, at first, and then combined, applying light tensions at the end. Circular tractions were also applied for the hips with dysplasia. Slidings were applied at the lumbosacral junction, for 5-7 seconds, to decontract the paravertebral muscles and the quadratus lumborum muscle. There were a number of 5-7 exercises in the first 2 weeks; then they increased to 10 repetitions, and even 2 series towards the end. The working positions were the same as for the posturing.

The active mobilizations consisted in facilitating the recovery reactions of a gym ball from prone and supine positions. The aim of these movements was to strengthen the hip muscles, and the entire body, thus aiding the next stage of development.

The number of sessions per week were 3, conducted by the physical therapist, the remaining or other days the subject performed the exercises at home. The sessions were about 20-30 minutes each, in average, according to the newborn's mood at that time.

The mothers were instructed to apply an ample program of simple exercises at home. These consisted of Vojta procedures, passive and active mobilizations, posturing, and massage. The sessions were about 10-15 minutes each, 3 times per day. The parents were instructed to follow the newborn's daily physical therapy program. Thus, the intervention took place one hour before or after feedings, the newborn's rest being also important.

5. Presentation and Interpretation of the Results:

The data presented in the tables and figures below are good, reflecting the effectiveness of the physical therapy intervention.

Table 1 Radiographic values of the right hip

Subjects	Assessed joints	Radiographic values	
		Initial testing	Final testing
1.	Right hip	62°	70°
2.	Right hip	55°	78°
3.	Right hip	50°	69°
4.	Right hip	55°	70°
5.	Right hip	66°	77°
6.	Right hip	63°	72°
7.	Right hip	52°	67°
Arithmetical mean		57.57°	71.86°
Standard deviation		6.08	4.14
Variability coefficient		10.56%	5.76%

Table 2 Radiographic values of the left hip

Subjects	Assessed joints	Radiographic values	
		Initial testing	Final testing
1.	Left hip	54°	76°
2.	Left hip	70°	78°
3.	Left hip	64°	70°
4.	Left hip	54°	74°
5.	Left hip	51°	68°
6.	Left hip	58°	74°
7.	Left hip	54°	69°
Arithmetical mean		57.86°	72.71°
Standard deviation		6.79	3.77
Variability coefficient		11.74%	5.19%

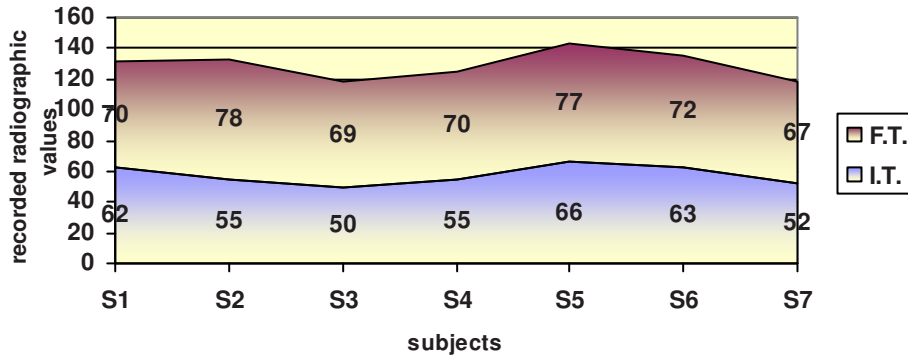


Figure 1 Graphical representation of the progress recorded in the right hip

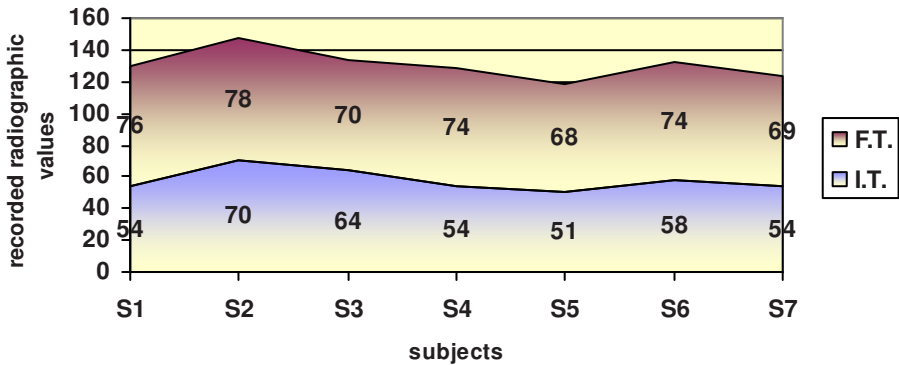


Figure 2 Graphical representation of the progress recorded in the left hip

Legend: I.T.-Initial testing, F.T.-Final testing, R.h.- right hip, L.h. - left hip

The data show that the articular angles of the femoral head have increased, being within normal values in the final assessments. The average mobility progress for the total left hips was of 14.85 degrees, and of 14.29 degrees

for the total right hips. This leads to the statement that there was no predominance of one side of the body over the other, left or right. The analysis of the statistical data shows a better homogeneity of the groups in the final tests.

Also, the lowest value recorded in the initial testing was of 50 degrees, and the highest, of 70 degrees, the latter falling within normal values. The best result was recorded in subject 2, with 23 degrees for the right hip, followed by subject 1, with 22 degrees for the left hip.

The somatoscopic examination revealed that at the end of the therapy program, the infants showed better spontaneous motor actions, in compliance with the natural stage of development for their chronological age. The mobility was symmetrical in both hips and pelvis, in prone and supine positions, the center of mass in prone position being lowered towards the xiphoid process, which shows a higher stability of the hips, as well as an adequate forearms support.

Conclusions

At the end of the research, it can be said that the initial hypothesis has been confirmed.

The structured and individualized, early implemented physical therapy program plays an incontestable role in improving infants' functional deficits.

After analyzing the progress recorded by the infants, it is obvious that the effects of the physical therapy, including Vojta procedures, were not just local, but they also represented a complex of beneficial factors that contributed to a general muscular balance, a fact highlighted by the better general development in compliance with the children's chronological age.

Due to the evaluation and exploration methods that were used objectively, the recorded results are concrete, emphasizing the effectiveness and importance of physical therapy for infants with hip dysplasia.

The parent represents the key element with regards to the identification of the functional limitations since the first days of birth, but also for the therapeutic intervention, consequently becoming a member of the team, together with the physician and the physical therapist.

The perseverance, consistency, abnegation, and involvement of the team has led to a shortening of the rehabilitation period, obtaining some remarkable results with regards to the articular angles, and also a harmonization of the newborns' general functionality.

References

- [1] Albu, C., et al (2008), *Universul de mișcare al copilului mic*, Iași, Ed. Polirom.
- [2] Bradford, N., (2000), *Your premature baby: 0-5 years*, Singapore, Editura First Frances Lincoln.
- [3] Ochiană, G., (2006), *Ludoterapia în recuperarea disabilităților psiho-neuro-motorii ale copiilor*, Iași, Ed. Performantica.
- [4] Pedefunda, Gh., (1992), *Semiologia neurologică*, Iași, Ed. Contact Internațional.
- [5] Popescu, V., (2006), *Neurologie Pediatrică*, București, Ed. Teora.