

ERB'S PALSY PHYSICAL THERAPY

Mustafa Kamal Abdulazeez

Ministry of health/Al-Anbar Health department/ Heet General Hospital

Abstract:

Introduction:

Erb palsy considers the most frequent neurological birth-related injuries. It is caused by tension on the neck region throughout rough shipment that affects the top section of the major neurons that feed it, notably the ones located at C5-C6 of the brachial plexus.

Influenced. Kids encounter significant physical limits, either long-term or short-term, as a result of a range of complications impacting the shoulder, the elbow, or wrist. It is crucial that healthy knee growth to keep full active movement as the nervous system recovers. Rehabilitation treatment can significantly improve the limitations and difficulties of Erb's Palsy sufferers. Appropriate evaluations as well as care prevent injuries as well as psychological concerns, increasing the kid's chances of returning to full involvement in everyday life.

Objective:

To ascertain the benefits of PT on power, spectrum, and performance among kids who have Erb's palsy.

Methods:

A randomized research study included 30 kids aged 1 to 10 years.

Integration standards: (Erb's obstetric palsy, no prior surgery, age around 1 and 10 years, vigorous flexion of the elbow (above 100 degrees) despite opposition, and appropriate data confirming shoulder impairments)

The Mallet score was recorded to evaluate shoulder mobility. Physiotherapy therapies involved neurological techniques to increase sense of balance, prosthesis, and electromagnetic treatment. Conditioning involved using weights, bands with resistance, and physical restriction. The person's active flexibility of movement was assessed utilizing the measurement of n, and a modified hammer scale was used to establish a reference value. The therapy was administered daily for six months. After the procedure assessments were conducted two, four, and six months after the treatment was administered. SPSS 25.0 was utilized to analyze the data.

Results:

The research found substantial enhancement of post-interventional findings for categories like absorption, rotated outside, hand-to-spine motion, hand-to-mouth motion, hand-to-neck motion, and tilting ($p < 0.05$).

Additionally, the Oxford Scale of Strength of Muscles reveals a substantial increase after treatment ($p < 0.05$).

Conclusion:

The research discovered that a combined physiotherapy strategy increased the upper-limb capacity, flexibility, motion, and ability to function in individuals with Erb's Palsy.

Introduction

Introduction

Erb palsy, also known as Erb-Duchenne paralysis, refers to weakness caused by a trauma to the higher band of the major neurons that feed it, notably the upper part of the trunk C5-C6 of the brachial plexus. Erb palsy is one of the most common cerebral injuries from birth, induced by stress in the cervical region after giving birth. [1]

The obstetrical method is the primary cause of this damage. The biggest warning signs include shoulder instability and the fetus's enormous size. Most instances heal with time, although a few newborns may require surgery. Persistent impairment is uncommon.[2]

Erb palsy is thought to have originated as a birth trauma. Erb's palsy is defined by arm sensory loss, in addition to stiffness as well as degeneration of the the delirium, arm, and the shoulder muscles.

The immobilized biceps muscle prevents the forearm from moving from side to side and causes the elbow to lose flexibility. Additionally, the afflicted side lacks a Moro response. This thoracic neuron palsy differs from Klumpke palsy (C7, C8, and T1) due to the presence of a grab response. The infant may have reduced feeling on the outside of the forearm and/or spinal palsy (C3, C4, as well as C5a), resulting in hemidiaphragm neuropathy.[3]

Epidemiology

It is a frequent birth harm, with probabilities ranging from 0.9 to 2.6 per 1000 live births. It produces substantial arm vulnerability, affecting 0.4 to 5 out of 10,000 infants.[2]

Etiology

Erb palsy is caused by a damage to the neck spinal cord nerves C5 and C6, which form members of the brachial plexus, as well as consist of the ventral rami of neck trunk cells C5-C8 and pectoral cell T1. The spinal nerves originate in the vertebrae, travel via the cervicoaxillary system in the neck and ribs, and exit in the axilla. Elevation of the neck throughout birth is a particularly prevalent cause of plexus brachial injury. The risk factors with the greatest impact are the development of macros as well as shoulder dystocia.

Macrosomic newborns sometimes require an intervention to be extracted from the birth canal that is performed following emergence. This activity strains the brachial plexus, injuring it throughout the process. However, brachial plexus damage can occur irrespective of shoulder dystocia and median weighing newborns.[3]

Nevertheless, breech birth, an ultrashort subsequent phase of employment, multipara mom, overweight or obese parental obesity, or suction and forceps labor can potentially result in brachial plexus damage in addition to a cesarean birth. [4][5][6][7]

Management

The degree of Erb's palsy determines how it is addressed, with some instances necessitating surgical treatment whereas other cases may be controlled only with physical therapy. The recommended

therapy is immediate stabilization accompanied by active and passive flexibility in movement training. Various therapy options for Erb Palsy are:

1. Hydrotherapy

It is one of the physical rehabilitation options due of the anti-gravity setting. By lowering pressure on the neuromuscular structure, the neonate is capable of moving significantly fewer problems. It additionally strengthens muscles and alleviates cramps. Paralyzed muscles rest in the exact reverse stance of the waiter's tip stance, which involves flexion of the shoulder, arm rotation to the exterior, and arm supination. This treatment promotes typical motions in the afflicted arm.[2]

2. Physiotherapy

The most common form of medical care for Erb's palsy is hydrotherapy. Even for newborns with mild brachial plexus injuries, this type of treatment is indicated to accelerate recovery and increase the likelihood that the kid will regain full function of the forearm.

Psychotherapy is performed either individually or in conjunction with hydrotherapy. Physiotherapy is recommended for moderate illnesses with the goal to strengthen the region and allow it to recuperate naturally. Physical treatment could be combined with surgery in extreme situations.

The physical activities for a newborn with Erb's palsy are modest and moderate. Activities usually advised involve light massage, training for strength, various movement motions, activation activities, and moderate stretching.[2]

Specialists illustrate how parents may urge their newborn to use the afflicted arm spontaneously, permitting an additional proactive type of treatment.

Courses need to be held with a qualified paediatric physical therapy provider. Parents receive instruction on ways to apply these workouts at home for the greatest final outcomes.

Additional part of rehabilitation is the use of casts, orthodontics, and tape to encourage joints realignment and teach children's hand, wrist, shoulder, and palm to be positioned as well as function in ergonomically right positions that encourage recovery. These appliances can additionally avoid malformations caused from inappropriate placement [10][11]

3. Occupational Therapy

Physiotherapy is typically necessary following operation or for people who have suffered persistent disabilities to assist them with daily tasks including eating, fastening shoes, performing, sketching, and so on.[2]

The practice of occupational therapy emphasizes small motor abilities and nutrition, that may substantially aid in rehabilitation. Babies have the best benefits of both bodily and cognitive treatment for Erb's palsy when begun as soon as feasible..

4. Surgery

The use of surgery is normally reserved for the final recourse and is postponed until rehabilitation fails to provide recovery from function. Nerve grafting and neural stretching are surgical procedures. Nerve grafts have the highest probability of success.[8][9]

Transplantation is indicated in situations when there is no visible mending by the age of six months, or when the recovery period is too sluggish or insufficient. With the objective to regain mobility as well as sensation.

Surgery seeks to repair the lesion to the spinal neurons in addition to relieve stress on these nerve cells, giving them an increased likelihood of recovering.

Erb's palsy can be treated using two different forms of nerve surgery:

- **Neural transplant.** Specialists heal a nerve rupture by grafting a nerve via a different region of the human body.
- **Neural transmission.** Throughout a nerve move, an orthopedic surgeon utilizes a functioning donor nerve to redirect and heal a full rupture in a nerve.

In circumstances when Erb's palsy is sufficiently severe to require an operation, full recuperation is unlikely. The majority of children receiving such sort of operation will recover, although they could never regain complete use or feeling of their damaged arm.

The last form of operation is relatively simple and suitable for children of all ages. It reduces strain on injured nerves and improves recovery. The success of this method varies.[11]

5. Medical Therapy

6. Botulinum neurotoxin shots are occasionally employed to treat contractures.

Botox medication is botulinum toxin A. **Clostridium** botulinum produce a highly toxic substance from which Botox is made from. Botox instantly incapacitates muscle fibers in the area of administration. Botox's preventative action minimizes the chance of the toxin migrating to other regions of the body.

Botox improves shoulder flexibility and employs to paralyze functional muscles in the arm.

Despite studies into the efficacy of this kind of therapy is restricted a single investigation found that kids who had injected with Botox had increased mobility and movement in their elbow and shoulder bones. Many of the youngsters in the research had their scheduled operations delayed because of the efficacy of Botox therapy. [10][11]

Neuromuscular Electrical Stimulation

Besides to the more standard therapies for Erb's palsy, such as surgeries and physiotherapy, alternative techniques may be beneficial. Another among them is muscular stimulation with electricity, which involves applying a current of electricity to the muscles of the afflicted arm.

It has been found to strengthen muscle and enhance circulation in newborns, although there is currently limited studies on the practice. This form of therapy may also be effective in decreasing the gradual breakdown of muscles which a kid with Erb's palsy cannot utilize normally. [10][11]

Evaluation of shoulder function

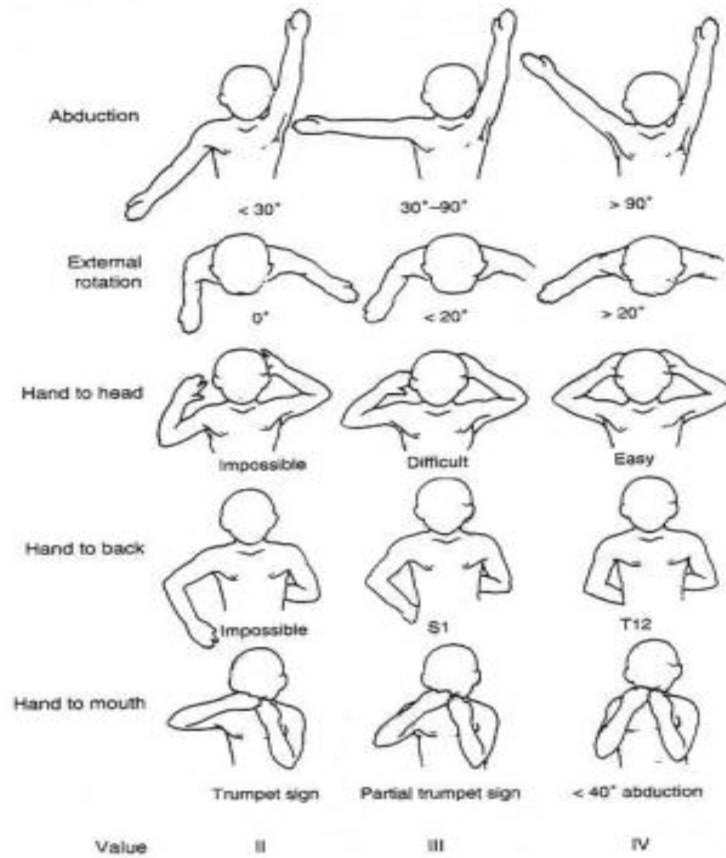
A number of other techniques for evaluating shoulder abduction/external movement, including the Toronto muscle classification system [12], the King Saud University evaluation method [13], and the Mallet scoring method (Table 1). Mallet grading is still among the most frequently employed method in numerous obstetric chiropractic clinics [15][16].

One aspect of the Mallet test is the fact that every rating corresponds to specific levels of deficiency with regard to shoulder abduction and rotation toward the outside. The researchers found that the Mallet grade was unable to be implemented to some kids who have perinatal ERB's palsy, mostly due to a mismatch between the Mallet degree of abducted shoulder as well as the classification of shoulder rotated externally.

Mallet Classification

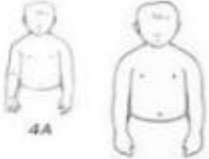
The revised Mallet Category is extensively used to categorize shoulder function in newborns and kids with maternal spinal palsy. This categorization requires sufferers to voluntarily execute five various shoulder motions: absorption, external rotation, putting one's hand behind the neck, positioning the palm as far as it can be on the vertebral column, and putting the hand to the mouth. Every move of the shoulder is then scored on a scale of I (no movement) to V (normal motion equivalent to the one of the opposite, undamaged arm). Each pair depicts levels II, III, and IV. It is

feasible just for youngsters 3-4 years old and older that may dependably make spontaneous motions on cue. [17].



Improved Mallet Dimension: Assessment of Performance as well as Arm Aesthetics.

The supine as well as sleeping posture might be examined additionally to the traditional Improved Mallet Method shoulder activities. In the resting posture, the medial turn at the level of the shoulder is graded on a scale of 1 to 5. Steady forearm supine as well as lateral motion are observed in the relaxed posture. The overall Mallet result is generated using the results of absorption, hand to neck, hand to vertebrae, hand to mouth, and horizontal movement, with a maximum total of 25 [18].

	2	3	4	5
Arm at Rest		 2A		 4A
External Rotation	 < -20°	 -20° to 20°	 20° to 70°	 > 70°
Abduction	 < 30°	 31° to 90°	 91° to 170°	 > 170°
Hand to Neck	 Not Possible	 Difficult	 Easy	 Symmetrical
Hand to Spine	 Not Possible	 Difficult	 Easy	 Symmetrical
Hand to Mouth	 81° to 120°	 41° to 80°	 15° to 40°	 < 15°
Supination	 -60° to -31°	 -30° to 30°	 31° to 80°	 > 80°

Muscle Strength Grading Scale

The Oxford Scale is a simple way to test and grade muscular strength. An accurate evaluation requires a thorough understanding of muscle architecture. The Oxford Scale is a 0-5 scale that is recorded as 0/5 or 2/5, occasionally with a + or - sign indicating a greater or lesser strength but not enough to lower or raise the score. The physical therapist ought to put the patient in the optimal attitude allowing for precise evaluation, adequate eyesight, and touch of the relevant tissues..

Oxford Scale

- 0/5 No tension
- 1/5 Obvious muscular tension yet no motion.
- 2/5 Motion and weight removed •
- 3/5 Motion versus weight just
- 4/5 Motion over weight with moderate connection
- 5/5 Motion over gravity with complete connection

Muscle Groups Tested:

- Wrist Extension
- Wrist Extension
- Shoulder Abduction
- Ankle Dorsiflexion
- Knee Extension
- Hip Flexion

Methods:

The planned investigation was conducted during (...) and (...). The research included thirty kids aged 1 to 10 years.

Inclusion criteria :

- ✓ Erb's prenatal paralysis
- ✓ No prior operation
- ✓ Age around 1-10 years
- ✓ Effective wrist abduction (above 100 degrees) versus an inability to respond
- ✓ Sufficient documentation of shoulder impairments

The Mallet rating (Table 1) was used to evaluate shoulder mobility.

Table 1. presents the Mallet scoring approach to shoulder strength.

Grade	Description
I	Flail shoulder
II	Dynamic abduction is < 30° with 0 degrees of outer spin. It is tough to move the hand to the back of the head. Hand-to-back is impracticable. Hand to mouth with the appropriate horn motion.
III	Dynamic abducted. 30-90° Lateral rotation of up to 20 degrees. Hand to the back of the head using force. Hand in hand with challenges. Hand-to-mouth communication is possible with a half horn signaling (over 40° of shoulder abduction).
IV	Energetic kidnapped. 30-90° Outward movement of up to 20 degrees. Hand to the back of the head with force. Hand in hand with challenges. Hand-to-mouth communication is possible with a half trumpet signal (over 40° of shoulder flexion).
V	Normal shoulder

The kids were treated with a comprehensive rehabilitation look at involving brain development methods for enhancing sense of balance, electrical excitement, orthoses, as well as rebellion training such as heavyweights, thera groups, and resistance training tasks.

The treatment was given frequently for six months. Following the intervention evaluations were conducted two, four, and six months following the occurrence.

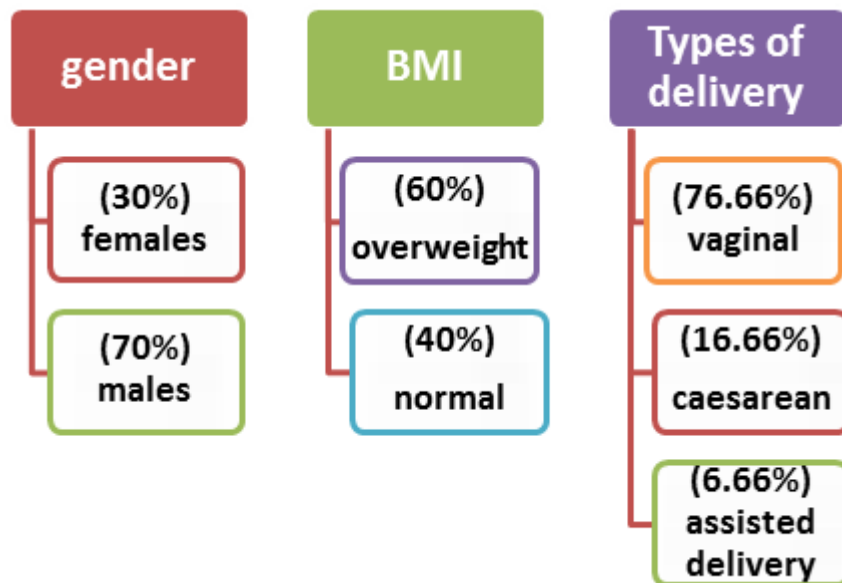
Results:

1. demographics Characteristics:

gender: 9 patients (30%) were females ,while 21 patients(70%) were males.

BMI: 18 (60%) children were overweight and 12(40%)had normal body mass index.

Types of delivery:23 (76.66%) were vaginal delivery ,5(16.66%) were caesarean delivery and 2(6.66%) were assisted delivery(either with forceps).



Pre and Post Interventional Variables:

The means of all estimated variables showed a significant improvement($p\text{-value} < 0.05$) between pre-intervention and post- intervention ,it was as the following :

1. Mallet Score of Range of motion of abduction raised from the mean (1.42 ± 0.50) to (4.26 ± 0.73) with $(p\text{-value} = 0.009)$
2. Mallet Score of Range of motion of external rotation had a significant raising between pre-intervention (1.52 ± 0.61) and post- intervention (4.36 ± 0.68) with $(p\text{-value} = 0.01)$
3. Mallet Score of Hand to spine movement had a significant raising between pre-intervention (1.52 ± 0.51) and post- intervention (4.15 ± 0.67) with $(p\text{-value} = 0.01)$
4. Mallet Score of Hand to mouth movement had a significant raising between pre-intervention (1.60 ± 0.50) and post- intervention (4.35 ± 0.48) with $(p\text{-value} = 0.005)$
5. Mallet Score of Supination had a significant raising between pre-intervention (1.30 ± 0.47) and post- intervention (4.20 ± 0.61) with $(p\text{-value} = 0.02)$
6. Mallet Score of Hand to neck movement had a significant raising between pre-intervention (1.31 ± 0.48) and post- intervention (4.00 ± 0.72) with $(p\text{-value} = 0.04)$

7. Oxford Scale of Muscle Strength improved from (1.40+0.50) at pre-intervention to (4.20+0.69) with (p-value=0.001)

Variables	Mean	SD	p-value
Mallet Score: Range of motion of abduction			
Pre-Intervention	1.42	0.50	0.009
Post-Intervention	4.26	0.73	
Mallet Score: Range of motion of external rotation			
Pre-Intervention	1.52	0.61	0.01
post-Intervention	4.36	0.68	
Mallet Score: Hand to spine movement			
Pre-Intervention	1.52	0.51	0.01
post-Intervention	4.15	0.67	
Mallet Score: Hand to mouth			
Pre-Intervention	1.60	0.50	0.005
post-Intervention	4.35	0.48	
Mallet Score: Supination			
Pre-Intervention	1.30	0.47	0.02
post-Intervention	4.20	0.61	
Mallet Score: Hand to neck movement			
Pre-Intervention	1.31	0.48	0.04
post-Intervention	4.00	0.72	
Oxford Scale Muscle Strength			
Pre-Intervention	1.40	0.50	0.001
post-Intervention	4.20	0.69	

Discussion

In our research, the majority of patients (70%) were male, with only 30% being female. In contrast, Anees' study discovered that females (7.3%) were larger in number than men (28.3%)[19]. The same was true for BMI; in this case, we discovered that overweight children were more prevalent than typical BMI kids (60% and 40%, correspondingly). While Anees' research found the reverse, with typical BMI kids being the most prevalent (84. 8%) and overweight children being the least (15.2%) [19]. Our study was Unlike other research that discovered that kids with Erb's palsy had a typical body mass index, this palsy has never had a consistent relationship with the kid's BMI. Nevertheless, the method of distribution remained unchanged. Our analysis found that 76.66% of deliveries were normal and 16.66% were cesarean. As in Anees' research, it was 69.6% and 30.4%, correspondingly [19]. As we discovered which delivery via the vagina became more prevalent in Erb's palsy, possibly because of medical errors and shoulder instability, a new investigation stated that birth treatments have significance variables causing Erb's palsy, such as improperly handling throughout birthing or high pressure or pulling on the upper part of the body throughout C-section shipment, leading to lesion to affect the nerves of C5 and C6. The present research evaluated the influence of physiotherapy on the upper-limb vary as well as mobility in kids who have Erb's palsy. Results showed substantial enhancement in varies that included absorption, rotation to the exterior, hand-to-spine motion, hand-to-mouth motion, hand-to-neck motion, and tilting (p<0.05). Nevertheless, a single of the most recent research investigations undertaken to find the comprehensive strategy to managing Erb's palsy with psychotherapy and mechanical activities produced significant results demonstrating that ranges of shoulder and arm were enhanced after delivering continuous physiotherapy treatments for 6 weeks. It was observed that around 0.4% of newborns sustained damage to the brachial plexus as a result of delivery, with Erb's palsy with neurapraxia accounting for approximately 48% of cases. Shoulder rotating outward is essential for

executing a variety of routine tasks. The patient's ability to rotate outside the afflicted arm ought to be recovered as quickly as feasible. Nevertheless, recovering the external rotation is a difficult effort between the healthcare professional and the patient, because barely any gains were noted on the modified Mallet magnitude, vigorous motion scale, and cervical elevating. Occupational treatment for persons with Erb's palsy improves their deficits and problems. In addressing Erb's palsy patients, physicians must always concentrate on restoring the patient's capacity to turn outwardly their arms and shoulders. Considering the findings of this investigation, it was advised suggested additional investigations be performed with the objective of countering the limited increases in exterior rotation by employing larger sample sizes and more concentrated interventions

Conclusion:

The research demonstrated that a combined physiotherapist strategy increased upper-extremity power, range of motion, as well as functioning in individuals with Erb's Palsy.]

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