Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v31i7.7249

EFFECTS OF ACTIVITY BASED SCAPULAR MOBILIZATION ON UPPER LIMB FUNCTION IN CHILDREN WITH ERB'S PALSY

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Abstract

An ailment known as erb's palsy affects neuromuscular system causes weakness or paralysis of the affected arm, limited range of motion and possible deformities. The specific muscles affected are those controlled by the C5 and C6 nerve roots. Scapular mobilization refers to therapeutic techniques or exercises aimed at improving the mobility, stability, and function of the scapula (shoulder blade). The objective of the study was to determine the effects of activity based scapular mobilization techniques on upper limb function in children with erb's palsy. It was randomized clinical trial and carried out in social security hospital Gujranwala and M.Islam Teaching Hospital Kamoke District Gujranwala. Sample size of 34 patients were taken. Non probability convenient sampling technique was used. Before being randomly chosen to either the scapular mobilization technique group or the activity based scapular mobilization, participants who met the eligibility requirements gave their consent. Mallet score and Box and Block test were employed to assess the upper extremity function, respectively. Standard Goniometer was used to assess shoulder range of motion. SPSS 25 was used to analyze the data. The mean age of children in EG was 7.37±1.369 and in CG was 7.27±1. 237.independent sample of t-test of BBT and extension with p-value was <0.05, accepting the alternate hypothesis i.e. activity based scapular mobilization is effective. However, p-value mallet score and adduction were >0.05 showed that both the treatments were equally effective to improve these ranges. Mann Whitney U test p-value on flexion, abduction, IR, ER was <0.05 accepting the

alternate hypothesis showed that activity based scapular mobilization is more effective. The study found that both the activity based scapular mobilization exercises and manual scapular mobilization are effective to increases ROM of shoulder joint, strength, reducing disability and gain functional movements of upper limb in children with erb's palsy. However, activity based scapular mobilization exercises combined with manual mobilization are more effective than general mobilization technique.

Key words: Erb's palsy, Mallet Score, Box and block test and scapular mobilizations

Introduction

Erb's palsy, also known as nerve root compression of the fifth cervical (C5) and first thoracic (T1) nerves, is characterized by injury to the C5, C6, and occasionally C7 nerves (1). Obstetric brachial plexus injury (OBPI) is the medical term for brachial plexus injuries that occur after childbirth and can result in paralysis of the upper extremities. Based on the location of the lesion, there are three forms of OBPI: lesions on the upper and lower plexus C5-C6, lesions on the upper and lower plexus C5-T1, which is a mixture of the two, and lesions on both C5-T1(2). The most common kind of OBPP, accounting for 50–60% of cases (3), is classic Erb palsy, a paralysis of the shoulder's external rotation and abduction caused by involvement of the C5–C6 nerve roots in the upper brachial plexus. This issue usually manifests in the early stages of development as an internal rotation deformity of the afflicted shoulder (4).The lateral cord produces the musculocutaneous nerve, the posterior cord produces the ulnar nerve, and the radial and axillary nerves come from the lateral cord. The lateral and medial cords come together to produce the median nerve(5).Birth injury to the brachial plexus is a challenge associated with childbirth, and its prevalence varies by country. There are major health hazards for children who have birth injuries to the brachial plexus. In addition, families along with the community at large experience socioeconomic consequences. There are two types of brachial plexus birth palsies that fall into this category: lower plexus injury (also called Klumpke's palsy) and upper plexus damage (also called Erb's palsy). Injury types that are less severe typically heal effectively with therapy and eventually fade away on their own. However, major and complex diseases will need a complete treatment plan in order to be managed (6). The most prevalent kind of brachial palsy, Erb's palsy, affecting muscles innervated by the C5 and C6 roots of the brachial plexus. Elbow pronation, sagging shoulders, an immobile affected arm placed in adduction, internal shoulder rotation, and a unilateral Moro reflex response are its defining characteristics. Dorsal extension of the wrist is usually seen, with the palm pointing upward. Klumpke' s palsy, on the other hand, affects only the hand muscles stimulated by the C8 and T1 roots. Strong upward arm lifting that widens the axillary angle causes Klumpke palsy, which strains the lower roots (C8, T1, maybe C7). Parturition and serious injuries that cause an abducted arm to twist could cause this. Hand weakness caused by brachial plexus lower(7, 8). Obstetric palsy (OP) can be treated with both surgical and non-surgical techniques(9). Physical therapy appears to be crucial to conservative treatment, functioning in concert with other professions. It contains several tools and techniques that have been demonstrated to be useful in the treatment of obstetric paralysis, such as splints, massages, electrotherapy, kinesiotherapy, and special neuromuscular rehabilitation techniques like the Vojta method and Neuro-Developmental therapy (NDT-Bobath). Recent years have seen a rise in the popularity of Constraint-Induced Movement Therapy (CIMT), which seems to be especially effective at restoring motor function and competency. The goal of this physiotherapy or occupational therapy approach is to limit the use of the injured limb to tasks that must be completed on a daily basis. A special splint is placed on the uninjured limb, preventing any movement (9). Physiotherapists have been using manual treatment in the last few years to help patients with primary AC improve their shoulder function and range of motion, either with or without therapeutic activity. The process of manually performing a continuous mobilization to the scapulothoracic joint in four directions is known as scapular mobilizations. It is a type of manual therapy that is commonly used to treat shoulder musculoskeletal disorders. It works by moving joints or blockages in a way that stretches the muscles and increases the scapulothoracic distance. It is currently unclear from a therapeutic perspective how using a passive scapular joint mobilizations

technique could improve shoulder function or range of motion, despite the biomechanical foundations. (10, 11).

Materials and Methods

It was a Randomized controlled trial RCT (trial registry number NCT06198218).The sample size was 34 after adding 10% attrition rate (12)**.** It was Non probability Convenience sampling technique. The study was conducted in Social Security hospital Gujranwala Physiotherapy Department and M. Islam teaching Hospital Physiotherapy Department, Kamoke, District Gujranwala. After BASR's approval of the synopsis, the study was finished in six months. Inclusion Criteria included patients having age ranging from 5 to 9 years (13), Diagnosed as obs. Erb's palsy (14, 15), Limited range of motion (16) F (0-60º),E (10-20º), Abd. (20-50º), Add. (10-25º), IR (10-50º), ER (0-35º), Both male and female involved (17).Exclusion Criteria include Children with Erb's palsy associated with other comorbidities (15), Other paralytic conditions(hemiplegia) (18), Previous history of surgery and trauma (arthroscopy, fixations) (16), Any skin condition (Allergies, infection) and Local corticosteroids injections into the effected shoulder over last 3 months, No present Fracture/ contractures, Neurological disorders with muscle weakness in shoulder joint. Data Collection Tools Goniometry, Mallet score and Box and Block test

Results

The results of descriptive statistics of age showed minimum age is 5 and maximum age is 9 in experimental and control group. The mean age of participants in experimental group is 7.37±1.369 whereas mean age of participants in control group was 7.27±1.237. The frequency distribution of gender showed Out of 15 patients in experimental group, 7 are male and 8 were females while in control group 9 were males and 6 were females. The Normality tables showed that the significance value for BBT was .365 and extension was 0.80 which is greater than 0.05. hence the data was normally distributed so parametric tests were used for intergroup and within group analysis i.e. independent t-test and paired sample t-test respectively. While the data for flexion was 0.00, for adduction was .012, abduction was .000, IR was .000, ER was .003 and mallet score was .000 scale was Not normally distributed because significance value was less than 0.05 so non-parametric tests were used i.e. Mann Whitney U-test and Wilcoxon signed rank test.

Table 1: Wilcoxon Test within Group Comparison of Group A and Group B

Total	**Group A (Experimental)**				**P-Value**	**Group B (Control)**				**P-Value**
	Pre –Treatment		Post-Treatment			Pre-Treatment		Post-Treatment		
	Median	Mean Rank	Median	Mean Rank		Median	Mean Rank	Median	Mean Rank	
Flexion	32.00	8.00	118.00	.00	.001	29.00	8.00	82.00	.00	.001
Abduction	29.20	8.00	97.67	.00	.001	24.00	8.00	75.00	.00	.001
Adduction	20.86	8.00	64.00	.00	.001	19.33	8.00	47.67	.00	.001
Internal Rotation	14.44	8.00	59.00	.00	.001	15.40	8.88	42.50	2.25	.002
External Rotation	19.00	8.00	60.20	.00	.001	10.00	7.50	49.00	.00	.001
Mallet score	2.00	8.00	3.600	.00	.000	1.769	8.00	2.846	.00	.000

Table 2: Mann Whitney test for Between group comparison of Group A and Group B

Total	**Pre –Treatment**		**P-Value**	**Post-Treatment**		**P-Value**
	Group A	Group B		Group A	Group B	

	Median	Mean Rank	Median	Mean Rank		Median	Mean Rank	Median	Mean Rank	
Flexion	33.00	00	30.00	8.00	.512	118.00	.00	82.00	8.00	.001
Abduction	30.00	.00	24.00	8.00	.106	98.00	.00	75.00	8.00	.000
Adduction	20.86	00	20.00	8.00	.305	64.00	.00	50.00	8.00	.006
Internal Rotation	15.00	.00	15.00	8.00	.902	59.00	.00	40.00	8.00	.001
External Rotation	19.00	0.00	10.00	8.00	.436	55.00	.00	49.00	8.00	.002
Mallet-score	2.00	.00	2.00	8.00	.512	4.00	.00	3.00	8.00	.007

Table 3: Across the group comparison of Extension and BBT (independent sample test).

Variables	**Activity based mobilization**	**Manual mobilization**	**Mean difference**	**P value**
	Mean ±SD	Mean ±SD		
Pre _treatment of extension	27.27±5.284	24.67±6.373	2.600	.249
Post_treatment of extension	54.53±5.475	40.33±7.603	14.200	.001
Pre-treatment of BBT	6.87±1.922	5.80±1.699	1.067	.569
Post-treatment of BBT	14.67±2.257	10.20±1.320	4.467	.002

Table 4: Within group comparison of Extension and BBT using (Paired Sample Test)

Group	**Scapular mobilization**	**Manual mobilization**	**P value**
	Mean± SD	Mean ±SD	
Activity based mobilization	27.27±5.28	54.53±5.47	0.00
Manual mobilization	24.67±67.37	40.33±7.603	0.00
Groups	**Pre-treatment of BBT**	**Post treatment of BBT**	**P-value**
Activity based mobilization	6.87±1.922	14.67±2.27	0.00
Manual mobilization	5.80±1.699	10.20±1.320	0.00

DISCUSSION

The study discovered that in children with Erb's palsy, both activity-based scapular mobilization exercises and manual scapular mobilization together increase shoulder joint range of motion (ROM), reduce impairment, and improve upper limb function. On the other hand, manual mobilization in conjunction with activity-based scapular mobilization exercises proves to be more efficacious than general mobilizations techniques.

In (2022), Emad R.Abdelaziz et al. examined thirty infants of both sexes, ages one to three, who had Erb's palsy. They were split into two groups of fifteen children each at random. Group A receives a comprehensive physical treatment course. In addition to receiving reciprocal electrical stimulation of the triceps and biceps muscles, Group B receives the same. Both groups got computerized electromyography both before and after therapy. Both groups show improved functional rehabilitation of the shoulder joint in kids with brachial plexus palsy, but Group B recovered more quickly (17). Results of previous study shows that greater effects of reciprocal electrical stimulation in group B as compared to group A, but in current study shows that group which receive conventional physical therapy with activity based scapular mobilization shows more improvement than group B.

In (2023), Ahmed et al. carried out a study on mirror treatment for individuals with erb's palsy who lack fine motor skills. 30 children, ages 5 to9, suffering from Erb's palsy took part in this study. Two groups of subjects were randomly assigned. Each group had a predetermined schedule, but the study

group underwent three weekly sessions of an hour-long mirror treatment. After treatment, there was a noticeable improvement in the study group receiving mirror therapy (13). The previous study showed that group was treated with mirror therapy and shows a remarkable improvement like our current study shows that activity based scapular mobilization show more improvement than another group.

In (2021), Torrey et al. examined the application of a dynamic elbow brace designed specifically for treating brachial plexus in infants. They came to the conclusion that the brace offered chances for targeted muscle activation, leading to gains in strength, functional mobility, and motor control. An excellent outcome was achieved by using a customized dynamic elbow brace in conjunction with a thorough treatment plan, which proved to be an effective therapeutic equipment(19).Authors concluded that customized dynamic elbow brace help gaining strength and motor control in brachial plexus injury similar to current study that show strength, functional mobility ad normal ranges improved by using activity based scapular mobilization.

In (2022), Marie-Ange et al. prospective cohort research conducted to evaluate functional outcomes by parents of neonates and infants with brachial plexus injury. Three groups were created out of the 69 examples. While the first group engaged in modest, repeated, and passive mobilizations exercises. To the other group (tactile sense activation). To the third group (interactive activities with bright balloons and colorful objects to improve gripping skills). In any case where professional physiotherapy would not be practical, they concluded that loving parents would provide an excellent substitute (20). Authors concluded that physical therapy exercises help child to enhance sensations and improving gripping skills by parents help similar to the current study that shoulder ranges, strength, reducing disability and gaining normal functions in activity based scapular mobilization is improved.

CONCLUSION: ???????

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