

Effectiveness of Passive ROM and Electrical Muscle Stimulation in Patients with Brachial Plexus Injury

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Abstract: *Brachial plexus, a major source of motor and sensory supply to the whole upper extremity, is commonly injured by motor vehicle trauma in adults and during birth in newborns. It can also be caused by penetrating injuries, falls and humeral fractures. Brachial plexus lesions frequently lead to significant physical disability that would result in difficulty in activities of daily living. Therefore, it is essential that this very valuable segment of our population is functionally restored. Thus, we aim to evaluate the effectiveness of passive range of motion exercises and electrical muscle stimulation in patients with brachial plexus injury. Method: A 57-year-old male patient with brachial plexus injury, who was admitted to the Department of Medicine, was enrolled in the study. The patient was assessed for pain level using Visual Analog Scale (VAS) and disability was assessed by using Disability of Arm, shoulder and hand (DASH) score. Hospital Anxiety and Depression scale (HAD) was also used to assess anxiety and depression of the patient. Results: The finding of the present study indicated a significant effect of passive exercises and electrical muscle stimulation on pain and disability in patient with brachial plexus injury.*

Keywords: Brachial plexus injury, Visual Analog Scale, Disabilities of arm, shoulder and hand.

1. Introduction

The number of brachial plexus injuries that occur each year is difficult to ascertain; however, with the advent of more powerful motor sports, the number of plexus injuries continues to rise in many centers throughout the world. Brachial plexus injuries can be classified as either traumatic or obstetric. Based on his nearly two decades of work with more than 1000 patients with brachial plexus lesions, (Naraka's) (3) stated that 70% of traumatic brachial plexus injuries occur secondary to motor vehicle accidents. Obstetric brachial plexus palsy (OBPP) occurs primarily in young children. The incidence (number of new cases) of OBPP ranges from 0.2-4% of live births globally.

The World Health Organization (WHO) estimates the worldwide incidence is approximately 1-2%. The most common symptom is lack of muscle control in the arm and lack of sensation in the arm or hand. Deterioration of quality of movement has a major impact on socioeconomic status of individual and this lead to psychological distress. Unfortunately, traumatic incidences of Brachial Plexus injuries are on the rise, but the patients coming for follow up are less. The purpose of present study was to evaluate the effectiveness of passive range of motion exercises and electrical muscle stimulation to restore the functional ability in patients with brachial plexus injury.

2. Methodology

A 57-year-old male patient, admitted to the Department of Medicine, with the diagnosis of Brachial plexus injury was taken for the study. The patient represented with the symptoms of Erb's Palsy having right arm weakness

corresponding sensory deficit and pain with lack of muscle control in the arm and hand of affected side. The patient was assessed for pain and disability with VAS (visual analogue scale) and DASH (Disability Arm shoulder Hand) score respectively. The patient was also assessed for Hospital Anxiety and Depression with HADscale (Hospital Anxiety and Depression Scale). After the assessment, the patient was given Passive ROM Exercises for Arm, Shoulder and Hand which includes external rotation and abduction of shoulder, flexion and supination of elbow and extension of wrist for 10 days twice a day with at least 10 repetitions in one set. Patient was given Electrical Stimulation on Galvanic mode for 10 minutes on the Deltoid muscle, Wrist Extensor muscles, Extensor Digitorum, Extensor Carpi Ulnaris, Extensor carpi radialis, Extensor digiti minimi, Bicep brachii and the Brachialis muscle. The duration of current used ranges from 0.01 milliseconds (ms) to 3 seconds. Patient was reassessed on 11th day after of physiotherapy treatment.

3. Results

Table 1: Effectiveness of exercises and stimulation

Scale	Before Treatment	After Treatment
VAS Scale	4	1
DASH Score	59	45
HAD Score	5	0

Table 1.1 describes the comparison of DASH Score, VAS Score and HAD Score before and after treatment among the patients of Brachial plexus injury receiving physiotherapy. The finding of the present study reveals that there is significant association of passive movement exercises, electrical muscle stimulation and pain and disability score. It has been found that with the regular conservative

management there is significant decrease in pain as well as disability and further it improves the Anxiety and Depression among the patients.

4. Discussion

This study found that there is improvement in the pain and disability in patients with brachial plexus injury. There is a common belief that the effectiveness of training programme can be enhanced by the addition of Electrical Stimulation. Electrical muscle stimulation is the elicitation of the muscle contraction using electrical impulses. Current which vary in magnitude can stimulate a motor nerve and so produce contraction of the muscle which it supplies. Rehabilitation goals were to bring the hand to the face (To activate bicep function). Joanne Glinsky (10) also conducted a study in the year 2007 on the efficacy of electrical stimulation to increase muscle strength in people with neurological conditions. Our study also found that the timely referral and Physiotherapy treatment improves the Pain and Disability among the patients with Brachial Plexus Injury.

5. Conclusion

This study found that there is significant improvement in pain and disability when the patient refers timely. It has also been found that Physiotherapy treatment helps in decreasing Depression and Anxiety from the Hospital environment very precisely.

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