

Combined Effect of Exercise and Orthotic Intervention in Case of Right Hemiparesis with Glenohumeral Subluxation - A Case Report

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ABSTRACT

Background: Stroke (Cerebrovascular accident [CVA]) is the sudden loss of neurological function caused by an interruption of the blood flow to the brain. The evidence of occurrence of shoulder subluxation in stroke survivors varies from 17–66%. GHS usually develops immediately after stroke

Case Description and Methods: A 40-year-old male having right hemiparesis due to CVA reported at SVNIRTAR after the proper assessment, the patient was treated with Physiotherapy treatment along with Bo bath Axilla Roll. The pre and post data were captured.

Findings and Outcomes: The Fugl-Meyer score of patients was improved from 0 to 20. There was also a significant improvement in Brunnstrom stage. Patient was also able to perform half of shoulder range of motion exercise in synergy pattern. There is significant improvement in reduction of shoulder subluxation and prevention of further increase in intra-articular mobility

Conclusion: Physiotherapy treatment along with orthotic intervention is paramount in case of shoulder subluxation.

Keywords: Hemiparesis, Shoulder Subluxation, Exercises, Bobath Axilla Roll.

INTRODUCTION

The occurrence of Gleno humeral subluxation (GHS) is frequent complication with hemiplegia following stroke. The evidence of occurrence of shoulder subluxation in stroke survivors varies from 17–66%. GHS usually develops immediately after stroke. Static stability of the glenohumeral joint depends on joint capsule, shape of articular surfaces and glenoid labrum, while as Dynamic stability of shoulder complex is derived from three major muscle groups. Flaccid paralysis prevents normal muscle response and stabilizing mechanisms to loading.^[1] It leads

to gleno-humeral pain which is because of overstretching of periarticular tissue and it causes pain. Since the capsule and ligaments contain high concentrations of pain receptors and overstretching may be the origin of painful ischemia in the tendons of the supraspinatus muscle and of the long head of the biceps muscle.^[2] Several authors suggest that other factors contributing to subluxation include improper positioning, lack of support in the upright position, and pulling on the hemiplegic arm when the patient is transferred.^[3,4] Besides its role in the development of shoulder pain (SP), GHS has demonstrated to be an independent

factor influencing arm motor recovery. In conclusion, GHS can be considered one of several potential sources of SP, it can be present alone or together with other problems and it should always be treated early after stroke onset.^[5,6]

No doubt Physiotherapy exercises along with Orthotic intervention is paramount in case of shoulder subluxation. The effectiveness of the orthosis along with exercises in reducing the complications of shoulder subluxation has not been clinically tested. Similarly, the Bobath Axilla roll through clinically not tested on number of patients, its effectiveness can't be generalized, therefore, due to the lack of evidence of the effectiveness of a particular orthosis in the treatment of shoulder subluxation, we have taken an attempt to test the effectiveness of exercises along with Bobath Axilla roll in reducing shoulder subluxation and shoulder pain, after inferior shoulder subluxation due to hemiplegia.

METHODOLOGY

A 40 yrs, old male subject with strokes was referred to swami Vivekanand National Institute of Rehabilitation Training and Research (SVNIRTAR) after 20 days of CVA and he was enrolled in this study after informed consent obtained from the wife of the client. The neuroanatomic location of the stroke was recorded from reports of computed tomography (CT) or magnetic resonance imaging (MRI) from the acute care hospital shows upper portion of posterior internal capsule affected, and the clinical stroke syndrome was recorded from the physical examination performed at admission which shows Right hemiparesis.

Passive Range of Motion

- Bilateral Upper Extremities - Within Normal range; Right shoulder pain at end ranges
- Bilateral Lower Extremities - Within Normal range; Except Right Ankle dorsiflexion
- 0° to 5°
- Tone -

- RUE increased tone (moderate to severe) in elbow flexors; shoulder adductors and internal rotators.
- RLE increased tone (moderate) in hip and knee extensors, plantar flexors.
- Motor Control
- RUE: partial motion in extensor synergy pattern (shoulder and elbow extension); no
- Voluntary motion of hand; limited in flexor synergy pattern.
- RLE: full motion in both extensor and flexor synergy patterns with extensor pattern dominating; LE flexion synergy achieved with associated reaction of RUE (increased flexion).
- Strength
- LUE and LLE: full isolated movement with Normal strength.
- RUE and RLE limited movements; unable to MMT.
- Functional Status
- Eating: supervision (FIM 5)
- Bathing: mod assist RUE and RLE (FIM 3)
- Dressing: mod assist RUE and RLE (FIM 3)

A detailed Motor recovery of the affected extremity was assessed using the sum of the upper extremity, wrist, and hand scores of the Fugl-Meyer Motor Function Evaluation.^[7] The Fugl Meyer Evaluation is a quantitative application of the Brunnstrom scale of motor recovery based on the description of motor recovery after stroke.^[8] An ordinal scale was used to rate various stereotypical movements: 0 for unable to perform, 1 for able to perform partially, and 2 for able to perform completely. It is a reliable method of measuring motor recovery after stroke. The highest possible attainable score was 66. An anthropometric assessment of affected right upper limb shows grade-1 subluxation. Psychological assessment of patient shows he was motivated and cooperative. He appears anxious about his future and exhibited a brief episode of crying during the initial therapy session. His main goal is to walk

again. Family is supportive and anxious to

have him home again.

Treatment -

The patient received rehabilitation from an interdisciplinary team. The patient was treated with individual physiotherapy twice a day (a total of three hours per day) for five days a week and one hour a day on Saturday and Sunday. GHS was treated with positioning of the limb while patients lay in the bed, with Bobath Axilla roll (Fig -1) in the sitting position and with shoulder strapping, which has been shown to be useful in the first period after stroke, in the upright position and during walking. Neuropsychological training was administered.



Fig1: Posterior view of patient using Bobath axilla roll

RESULT

There was significant improvement in patient motor functions with no pain on affected side during passive movement. The Fugl-Meyer score of patients was improved from 0 to 20. According to Brunnstrom stage it is classified as stage-3 which was at stage 1 at the initial stage. Patient is able to perform half of shoulder range of motion exercise in synergy pattern. There is significant improvement in reduction of shoulder subluxation and prevention of further increase in intra-articular mobility.

DISCUSSION

It is an important issue that there is relationship between shoulder subluxation and pain. GHS usually develops immediately after stroke, although emphasis has been placed on the reduction of GHS. In agreement with other authors GHS appears to be a co-factor associated with the development of shoulder pain. The exercises with orthotic intervention hold the glenohumeral joint in place, prevent sloping of the glenoid fossa, and hold correct alignment of the glenohumeral joint in the subluxed shoulder. The muscles around gleno humeral joint plays a supporting role as it surrounds the glenohumeral joint from all side after activation. When activated, the combination of these muscles is thought to work in conjunction to prevent downward and anterior instability of the glenohumeral joint and therefore reduce subluxation. [8,9]

Evidence suggest that shoulder support may be used to prevent or reduce shoulder subluxation External support can be discontinued when muscle tone around the glenohumeral joint is sufficient to prevent subluxation. An exercise programme should always accompany the use of a sling. Williams et al. showed that Bobath sling to be effective and similar in correcting GHS. [10] The mechanism behind reduction of shoulder and correction of shoulder subluxation is to decrease the traction forces and activation of receptor present in joint capsule- ligamentous structure. Bobath roll also distribute the affected limbs weight to another part of body.

Further studies need to address the benefits and complication of long-term use of shoulder support in order to determine the use and necessary purpose in stroke rehabilitation.

CONCLUSION

There is a good result of combined effect of exercise and orthotic intervention for long term prevention and correction of shoulder subluxation. Without proper training in the

use of a support, stroke survivors may face potential complications such as pain or contracture. More research is needed to critically evaluate the presumed benefits of supports in stroke rehabilitation so that the role of supports in correcting shoulder subluxation may be better clarified.

Declaration by Authors

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