

## Original Article

# COMPARING EFFECT OF SHOULDER CUFF SUPPORT VERSUS SHOULDER STRAPPING IN PREVENTING POST STROKE SHOULDER PAIN

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## ABSTRACT

**Aims and Objectives:** The aim of research is to compare the effectiveness of shoulder cuff support versus shoulder strapping. **Methodology:** A sample of 20 stroke subjects was recruited for the study. The subject were randomly divided in to 2 groups Group A ( shoulder cuff group) and Group B (shoulder strapping group). Pre test assessment was done by Visual analogue scale & pain free range of motion to 90° degree. A received shoulder cuff and group B received shoulder strapping in their rehabilitation protocol. Both group were treated for 7 days . on seventh day reading were taken for both groups. **Results:** Development of pain and restriction of shoulder range is significantly less in group A- shoulder cuff group as compare to group B-shoulder strapping group on 7<sup>th</sup> treatment day. **Discussion:** Use of shoulder cuff support with stroke patients particularly in the early flaccid stage useful in preventing shoulder pain. Support of the flaccid shoulder early in management can reduce the incidence of subluxation.Strapping would not ensure support to the soft tissue all the time, and it may encourage some abnormal synergy pattern. **Conclusions:** Shoulder cuff support significantly decrease the onset and intensity of pain in affected upper extremity and prevent restriction of range of motion .as compared to shoulder strapping.

**KEY WORDS:** PSSP (Post stroke shoulder pain); Shoulder cuff; Shoulder strapping; Hemiplegia.

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## INTRODUCTION

World Health Organization (WHO), 2012, says that the incidence of stroke in India is around 130 per 100,000 people every year. It further says that about 20 percent of heart patients are susceptible to it. Further, the prevalence of strokes in India is as 16,67,372 every year and 4,568 stroke attacks each day the incidence of stroke is about 1.25 times greater for males than females.<sup>1</sup>

Stroke is the rapid development of clinical signs and symptoms of focal neurological disturbance lasting more than 24 hours or leading to death with no apparent cause other than vascular origin (WHO 2005)<sup>2</sup>. This can be a result of ische-

-mia caused by thrombosis or embolism or a result of a hemorrhage.<sup>3</sup> It is one of the leading causes of mortality and morbidity worldwide.<sup>1</sup> WHO estimated that in 1990, out of a total of 9.4 million deaths in India, 619,000 were due to stroke. This gives a stroke mortality rate of 73 per 100,000 (estimated total population 849 million).<sup>4</sup> The prevalence of stroke in India varies in different regions of the country and ranges from 40 to 270 per 100 000 population approximately 12% of all stroke occurs in the population <40 years of age.<sup>5</sup>

A significant proportion of stroke survivors experience neurologic sequale and complication due to the stroke. These include aphasia,

dysphagia, motor weakness spasticity or complete loss of movement opposite to the lesion,. Shoulder Pain is another common complication after stroke. The most frequent pain condition is that of hemiplegic shoulder pain, as reflected by the rather extensive amount of research devoted to this condition in the medical literature. The incidence of hemiplegic shoulder pain varies from 38% to 84 %.<sup>6</sup>

Post stroke shoulder pain (PSSP) can be defined as pain in the shoulder joint or the surrounding area that can occur spontaneously or can be movement- dependent , and it can become chronic more than 3 month , PSSP impedes rehabilitation and may also interfere with balance, walking, transfers performance of self care activity and quality of life, in the development of PSSP, alteration of shoulder proprioception (i.e , afferent information arising from peripheral areas of the body that contribute to joint stability , postural control, and motor control as well as alteration in the shoulder kinematics could play an important role.<sup>3</sup>

Shoulder pain caused by SHS can be a major problem in the rehabilitation of stroke patients.<sup>8</sup> Shoulder hand syndrome is a disturbance of the neurovascular mechanism caused by various etiological factor, characterized clinically by pain and limitation of movement in the shoulder and a swollen, discoloured hand, which may go to thickening and atrophy. The onset of pain may gradual or may occur with explosive suddenness. Patients are susceptible to these factors after stroke, which may be among the reasons why the incidence of SHS is high (12.5%– 27%). However it is difficult to prevent SHS because a single precipitating factor is not usually identified.<sup>9</sup>

According to Caillet, Chin, et al, suggested that use of shoulder cuff in stroke patients particularly in the early flaccid stage of rehabilitation is very useful in prevention of shoulder pain.<sup>10</sup> Mulley suggested that adequate support and protection of the flaccid arm are essential when the patient is lifted and move from bed. All person moving the dependent patient must be instructed concerning the hazards of pulling of the affected arm.<sup>10</sup>

On the other hand Amy Griffin 1986 suggested that Strapping presents as a potentially effective method for both prevention and treatment of hemiplegic shoulder pain.<sup>11</sup> till that few researches has been published which studied on early prevention of shoulder pain so this study aim is to compare the effectiveness of shoulder cuff support versus shoulder strapping in preventing post stroke shoulder pain.

## MATERIAL AND METHODS

A sample of 20 stroke took part in this study . after taking informed consent the selecting subject were randomly divided in to 2 groups Group A shoulder cuff group and Group B shoulder strapping group.. Pre test assessment was done by Visual analogue scale , and pain free range of motion to 90° degree. After assessment group A received shoulder cuff whereas group B received shoulder strapping in their rehabilitation protocol. Both group were treated for 7 days . on seventh day reading were taken for both groups. **Inclusion:** The following inclusion criteria was considered for the study Age group is between, ( 40-70 yrs) Both male and female Acute hemiplegics , 7 to14 days after stroke GCS should be more than 10/15, Able to comprehend Vas should be 0 [0-10] ,Pain free PROM should be 90° .**Exclusion criteria:** The person who have Previous shoulder injury; Previous shoulder pain Previous restriction of shoulder movement; Periarthritis shoulder Any other neurological deficit (e.g- auditory and speech defect) Previous musculoskeletal problem of upper extremity , e.g fracture , arthritis etc **Instrumentation:** Shoulder cuff, Dynaplast tape, Goniometer, Scissor, inchtape.



**Fig-1:** Shoulder cuff.



**Fig-2:** Dynaplast Tape

**Protocol**

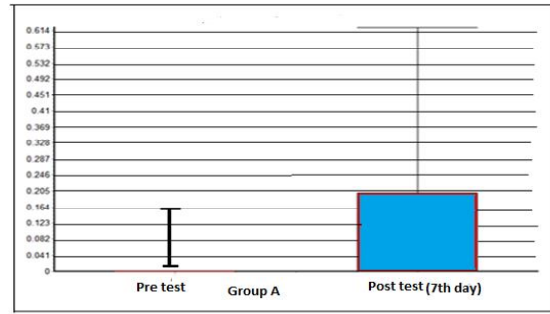
**Procedure: GroupA (Shouldercuff Group):** Subject following treatment for next seven days. shoulder cuff is given by the following procedure- The patient was positioned in sitting on a bed or a chair with both arms unsupported at the sides. The cuff will be applied on the affected side. The design had an arm cuff and vertical strap system to support the weight of the affected shoulder through the sound axilla. It will be applied for 6 days,.

**Group B (Shoulder strapping group):** Received strapping technique-consisted of three lengths of non stretch tape (dynaplast tape) is applied everyday for 24 hrs for six consecutive days.on third day strapping was removed and reapplied.The First main tape was applied from the medial third of the clavicle, around the surgical neck of humerus and along the spine of scapula to its medial thirdThe second arm was supported under the elbow. The two main 'supporting' tapes were applied first. Both were applied using a lifting action, starting 5 cm above the elbow, and moving up the arm front and back, crossing at the top of the shoulder. The posterior arm tape was then anchored down past the clavicle whereas the tape from the anterior aspect of the arm came across the shoulder and down past the spine of the scapula.

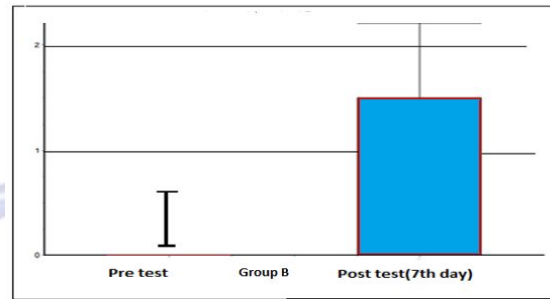
**RESULTS**

**Data Analysis-** In order to compare variables between the two periods (Before treatment vs. After 7<sup>th</sup> treatment).unpaired t- test were used to analyze and compare the intervention score between the groups for parametrics and non parametric data respectively and paired t- test were used to analyze and compare the scores

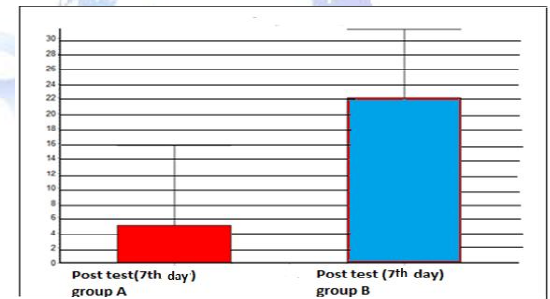
within the groups.with the p value of <0.05.



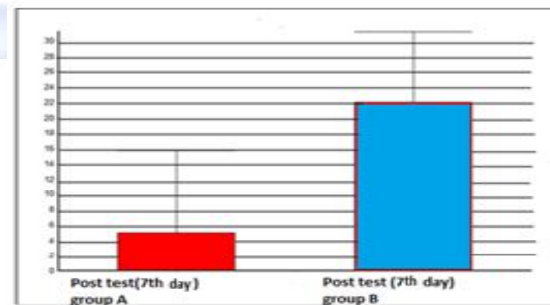
**Graph-1:** pre and post VAS in group A.



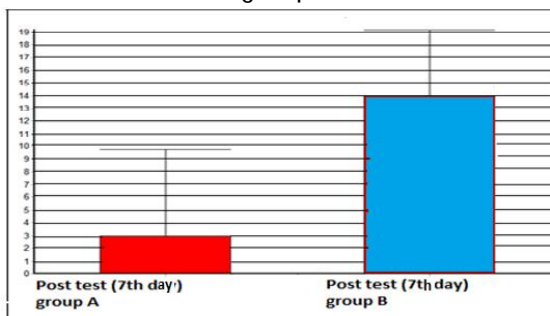
**Graph-2:** pre and post VAS in group B.



**Graph-3:** post VAS score of group A and B.



**Graph-4:** post restriction of abd in group A and group B.



**Graph-5:** post restriction of external rotation range in group a and B.

## DISCUSSION

The result obtained revealed that shoulder cuff significantly decrease the development of shoulder pain and causes less restriction in shoulder abduction and external rotation range of motion. where Pain level was significantly increased in group B and there is more restriction in shoulder abduction and external rotation range. So this study supports the experimental hypothesis that shoulder cuff decrease the incidence of development of shoulder pain in acute hemiplegics.

The possible explanation of difference in development of shoulder pain in both group can be explained by use of effective shoulder cuff support in group A. The high response rate (92.6%) indicates the issue of shoulder supports is of major concern to health professionals involved in the management of stroke persons.<sup>10</sup>

Judy griffin et al suggested that flaccid or hypotonic hanging shoulder will sublunate and develop shoulder pain because gravitational pull unopposed by flaccid shoulder musculature produces painful and possibly irreversible overstretching of superior joint capsule and supraspinatus muscle, pain in the shoulder and, reinforce poor synergic patterns in the arm, and interfere with gait patterns and postural support.<sup>11</sup>

According to Tobis, The relationship of supraspinatus muscle activity to the onset of GHJ subluxation, if the superior capsule had been allowed to become overstretched when the flaccid supraspinatus muscle could not respond to loading, and the GHJ subluxation persisted.<sup>11</sup> Flaccidity may be the characteristic static during subluxation Shoulder subluxation therefore appears to be strongly associates with shoulder pain.

Caillet and Chino et al suggest that; use of shoulder cuff support with stroke patients particularly in the early flaccid stage is useful in preventing shoulder pain and most frequently used to reduce gait and balance problems and to protect the flaccid arm<sup>10</sup>.

Moskowitz and associates suggested that support of the flaccid shoulder early in management can reduce the incidence of subluxation.<sup>10</sup>

Some evidence exists that spasticity may actually reduce subluxation; hyperactive stretch reflexes can be stimulated by the weight of the unsupported arm during ambulation causing reduction of subluxation process.<sup>11</sup>

If proximal upper extremity musculature is flaccid or hypotonic after stroke the scapulohumeral rhythm can be significantly disturbed. Inferior and anterior glenohumeral subluxation is common result of proximal upper extremity hypotonia.<sup>27</sup>

The position the head of the humerus in the glenoid fossa by shoulder cuff support prevent pain and maintain range of motion at the shoulder joint and it pushes the humerus upwards mechanically and also reduce subluxation. To prevent long lasting stretch of the superior part of the capsule and supraspinatus, the patient will need this support when he is upright until such time as he can use the supraspinatus and deltoid to hold the humeral head in glenoid fossa.

In group B shoulder pain developed at 7 day which further progressed , also there is significant restriction of shoulder abduction and external rotation range. Pain in shoulder is the signs of hemiplegic shoulder pain which can progressed into shoulder hand syndrome. H.C. Hanger et al suggested that strapping would not ensure support to the soft tissue all the time, and it may encourage abnormal synergy pattern..<sup>24</sup>. and It has not long term effect on proximal muscle activity.

To prevent and alleviate shoulder pain, Christopher I.M price and Gulanuch Chanchairujira described that therapist should directly effort towards cuff support and poor positioning and handling of the affected upper extremity to avoid shoulder pain and subluxation. Therefore shoulder cuff support can prevent shoulder pain in acute hemiplegics.<sup>25, 10</sup>

## CONCLUSION

Development of pain and restriction of shoulder range is less in group A in comparison to group B. So shoulder cuff support significantly decrease the onset and intensity of pain in affected upper extremity.

## Clinical implication

Shoulder cuff supports were proved to be beneficial in preventing post stroke shoulder pain. So this technique should be widely utilized in hemiplegic rehabilitation.

## Future research

This study can be done on a large sample size with long duration and different type of shoulder support can be used to prevent shoulder pain.

## Limitation of study

Small sample size and short duration are the limitation of study.

## Conflict of interest

There is no conflict of interest related to this clinical research among all authors.

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