



ISSN Print: 2394-7500  
ISSN Online: 2394-5869  
Impact Factor: 5.2  
IJAR 2018; 4(12): 320-323  
www.allresearchjournal.com  
Received: 11-10-2018  
Accepted: 13-11-2018

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## Study on the effectiveness of taping in the management of scapular alignment among patients with adhesive capsulitis: An experimental study

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### Abstract

**Background:** Adhesive capsulitis of shoulder is one of the common cause of stiffness and pain of the shoulder joint. Globally it is estimated that around 2%-5% of the population were affected by adhesive capsulitis. Even though it is a self-limiting condition, it's difficult for the patient to wait for such a long period to heal as it interferes with the activities of daily life. There is evidence of scapular kinematic alterations associated with shoulder impingement, rotator cuff tendinopathy, rotator cuff tears, glen humeral instability, adhesive capsulitis, and stiff shoulders. The study aims to analyze whether taping can be used as an adjunct to stretching and strengthening exercise program in correction of scapular alignment in patients with adhesive capsulitis.

**Methods:** Twenty clinically diagnosed adhesive capsulitis subjects were randomly divided in to two groups A and B. Group A received stretching and strengthening exercise program along with taping group and group B received stretching and strengthening exercise program alone. Intervention lasted for 2 weeks, one hour per day. Dynamic scapular alignment was assessed by lateral scapular slide test before and after 2 weeks of intervention.

**Conclusion:** Stretching and strengthening exercise program along with taping and stretching and strengthening exercise program alone were effective in repositioning normal scapular alignment. When comparing both stretching and strengthening exercise program along with taping is more effective in repositioning normal scapular alignment among patients with adhesive capsulitis

**Keywords:** Adhesive capsulitis, dynamic scapular alignment, taping

### Introduction

Adhesive capsulitis of shoulder is one of the common cause of stiffness and pain of the shoulder joint. Globally it is estimated that around 2%-5% of the population were affected by adhesive capsulitis <sup>[1]</sup>. It is a self-limiting condition which last for 2-3 years <sup>[2]</sup>. However some studies reported that 20%-50% of the adhesive capsulitis patients continue to have pain and restricted movement beyond 3 years <sup>[3]</sup>. Even though it is a self-limiting condition, it's difficult to wait for such a long period as it interferes with the activities of daily life. Scapular kinematic alterations is associated with stiff shoulders shoulder, adhesive capsulitis, glenohumeral instability, rotator cuff tears, rotator cuff tendinopathy and impingement. Scapular kinematic alterations also cause altered muscle activation in these patient populations, especially increased upper trapezius and reduced serratus anterior activation <sup>[4]</sup>. Stretching and strengthening exercise programs are widely used as a first line Physiotherapy modalities in shoulder adhesive capsulitis patients <sup>[5]</sup>. Taping assist in maintaining the proximal shoulder-girdle stability which is necessary to perform elevation of the arm. With the tape holding the scapula in a more proper alignment, the patient can use the shoulder near normal <sup>[6]</sup>. The purpose of the study is to find whether taping can be used as adjoin therapy in the treatment of shoulder adhesive capsulitis along with stretching and strengthening exercise program.

### Materials and Methods

Review Board of Lourde hospital and Lourde Institute of Allied Health Sciences, Kannur has approved this two group pre and post-test experimental study and a written consent was obtained from the participants after giving clear instructions regarding the treatment

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procedure and its implications. The study was conducted in Lourde hospital, Taliparamba, Kerala. Twenty clinically diagnosed shoulder adhesive capsulitis patients were selected for the study and randomly assigned into anyone of the experimental group. Group A ten patients treated with stretching and strengthening exercise program along with taping and group B ten patients treated with stretching and strengthening exercise program alone.

Clinically diagnosed idiopathic shoulder adhesive capsulitis male patients of age between 45 to 50 were included for the study. All extraneous variables were clearly identified and ruled out from the study.

Both the group subjects received stretching exercises to levator scapulae, rotator cuff muscles, supraspinatus and subscapular is and strengthening exercises to shoulder abductor, shoulder extensors and rotator cuff, the exercises were given for 2 weeks, one hour per day. Subjects in group A additionally received taping with kinesio-tape material,

with fully retracted and depressed scapula two horizontal and two vertical strips were used to facilitate thoracic extension.

Dynamic scapular alignment was assessed by lateral scapular slide test in three levels. Glenohumeral joint in 0° (arm relaxed on the sides), 45° (hands supported on hip and web space on iliac crest) and at 90° (with glenohumeral internal rotation). The measurements were repeated for both the experimental group subjects after two weeks of intervention and scores were recorded in centimeters for analysis.

**Data Analysis and Results**

The study aims to compare and find the effects of stretching and strengthening exercise program along with taping and stretching and strengthening exercise program alone on dynamic scapular alignment among adhesive capsulitis patients.

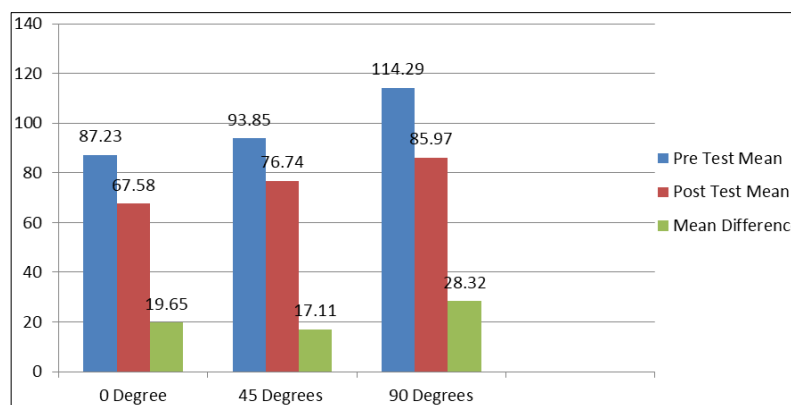
**Table 1:** Mean value, Mean Difference, Standard Deviation and Paired ‘t’ value of scores of dynamic scapular alignment in Group A

Range	Measurement	Mean	Mean Difference	Standard Deviation	Paired ‘t’ value
0°	Pre-test	87.23	19.65	0.87	7.16*
	Post-test	67.58			
45°	Pre-test	93.85	17.11	0.92	5.88*
	Post-test	76.74			
90°	Pre-test	114.29	28.32	1.73	5.17*
	Post-test	85.97			

0.005 level of significance

In Group A for dynamic scapular alignment at 0°, 45° and 90° the calculated paired ‘t’ values are 7.16, 5.88 and 5.17 respectively and the ‘t’ table value is 3.250 at 0.005 level. Since all the calculated ‘t’ values are more than the ‘t’ table value, there is significant difference between pre and post

test scores of dynamic scapular alignment at all the three levels following stretching and strengthening exercise program along with taping among adhesive capsulitis patients.



**Fig 1:** Graphical representation of pretest, posttest and mean difference values of dynamic scapular alignment in Group A.

**Table 2:** Mean value, Mean Difference, Standard Deviation and Paired ‘t’ value of scores of dynamic scapular alignment in Group B

Range	Measurement	Mean	Mean Difference	Standard Deviation	Paired ‘t’ value
0°	Pre-test	86.01	6.96	0.38	5.82*
	Post-test	79.05			
45°	Pre-test	91.65	10.93	1.09	3.8*
	Post-test	80.72			
90°	Pre-test	110.21	8.59	1.28	3.6*
	Post-test	101.62			

In Group B for dynamic scapular alignment at 0°, 45° and 90° the calculated paired ‘t’ values are 5.82, 3.8 and 3.6 respectively and the ‘t’ table value is 3.250 at 0.005 level. Since all the calculated ‘t’ value are more than the ‘t’ table

values, there is significant difference between pre and post test scores of dynamic scapular alignment at all the three levels following stretching and strengthening exercise program alone among adhesive capsulitis patients.

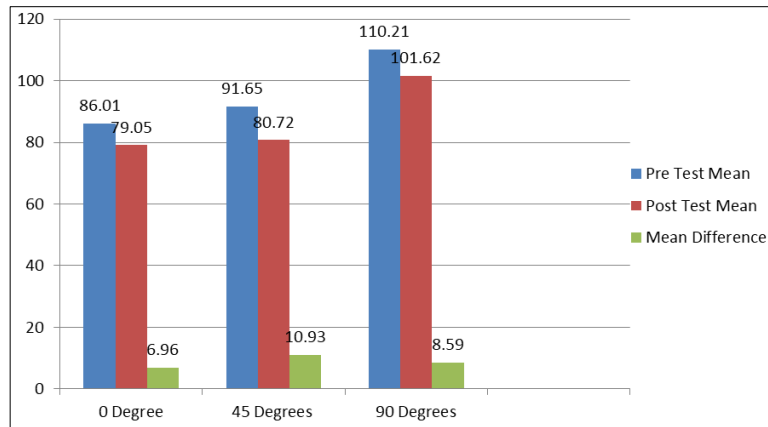


Fig 2: Graphical representation of pretest, posttest and mean difference values of dynamic scapular alignment in Group B.

Table 3: Mean, Mean difference, Standard deviation, and Unpaired ‘t’ value of dynamic scapular alignment of Group A and Group B

Range	Groups	Mean	Mean Difference	Standard deviation	Unpaired ‘t’ test
0°	Group-A	19.65	12.69	1.99	3.12*
	Group-B	6.96			
45°	Group-A	17.11	6.18	1.65	3.27*
	Group-B	10.93			
90°	Group-A	28.32	19.73	1.131	3.059*
	Group-B	8.59			

In between group analysis the calculated unpaired ‘t’ values for 0°, 45° and 90° are 3.12, 3.27 and 3.059, the ‘t’ table value is 2.878 at 0.005 level. Since all the calculated ‘t’ values are more than the ‘t’ table value there is significant difference between the scores of group A and B in all the

three levels. When comparing the mean values of both the groups, group A subjects showed more difference in dynamic scapular alignment scores in all the three levels than group B subjects.

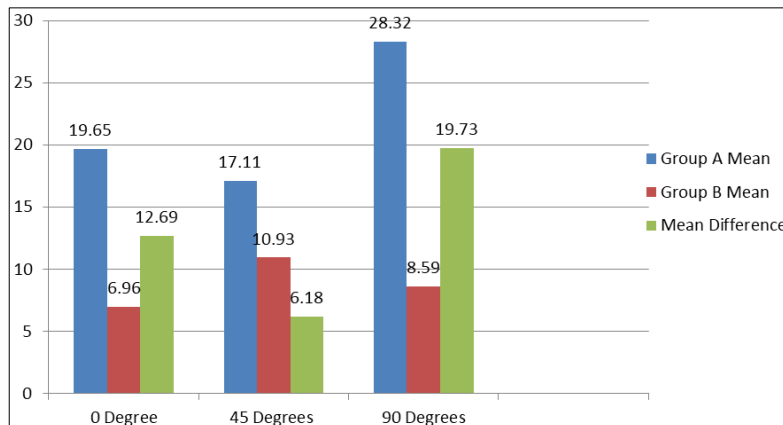


Fig 3: Graphical representation of mean difference values of dynamic scapular alignment in group A and group B

**Discussion**

The major finding of the study is taping along with stretching and strengthening exercise have a positive effect in realigning the scapular position in patients with adhesive capsulitis. Kinesio taping mechanically corrects the alignment of scapula also gives tactile stimulation [7] which enhances muscle contraction so that the scapular normal position was maintained thereby pain may be reduced.

**Conclusion**

Stretching and strengthening exercise program along with taping and stretching and strengthening exercise program alone were effective in repositioning normal scapular alignment. When comparing both stretching and strengthening exercise program along with taping is more effective in repositioning normal scapular alignment among patients with adhesive capsulitis. Hence taping can be used

as a adjoin therapy in the treatment of shoulder adhesive capsulitis patients.

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