



## Adhesive Capsulitis of shoulder: How effective is conservative treatment

Authors

**Dr Rajesh Singh\*, Dr Pradeep K Verma, Dr Abhi Vora**

Department of Orthopaedics, Shyam Shaw Medical College, Rewa

\*Corresponding Author

**Dr Rajesh Singh**

Dept of orthopaedics, Shyam Shaw Medical College, Rewa, India

### Abstract

**Purpose:** To study the functional outcome of conservative management in adhesive capsulitis of shoulder.

**Study Design:** Prospective case control study.

**Material and Methods:** 154 patients were divided into 2 groups. One group received only NSAIDs as medication while other group received medication and physical therapy. Patients received treatment for 3 months. Patients were evaluated after 3 months for range of movements, VAS score for pain and functional outcome with CONSTANT score.

**Results:** Patients receiving medication and physical therapy show better improvement in range of movements, VAS score and CONSTANT score. Improvement in VAS score and CONSTANT score is statistically significant.

**Conclusion:** Patients with adhesive capsulitis should be treated with physical therapy before considering for intra-articular injections or operative interventions.

**Keywords:** Adhesive capsulitis, frozen shoulder, physical therapy.

### Introduction

Adhesive shoulder capsulitis, as described by Codman as ‘difficult to define, difficult to treat and difficult to explain from the point of view of pathology’.<sup>1</sup> Although Duplay is widely recognized as the first physician to describe this pathology, which he called ‘scapulohumeral periarthritides’ and Codman coined the term “frozen shoulder”, it was Neviasser in 1945, who first coined the term “adhesive capsulitis” based on his findings and noted that it is characterized by inflammation of the synovial lining and capsule, leading to dense adhesion formation globally within the joint.<sup>2,3</sup>

Adhesive capsulitis is often regarded as a self-limiting disease that resolves between 1 and 3 years<sup>4</sup>. The incidence of adhesive capsulitis in the general population is approximately 3% to 5% but in diabetes it can be as high as 20%.<sup>4</sup> Adhesive capsulitis can be primary or secondary. Primary (or idiopathic) adhesive capsulitis occur spontaneously without any specific trauma or inciting event. Secondary adhesive capsulitis is often observed after periarticular fracture dislocation of the glenohumeral joint or other severe articular trauma.<sup>5</sup> Although more common in non dominant shoulder, bilateral involvement can be upto 40 %-50%.<sup>4</sup> This study is conducted

to evaluate the functional outcome of conservative treatment in adhesive capsulitis of shoulder.

### Material and Methods

This was a case control study with patients divided into 2 groups. Patients who gave consent for physical therapy was included in case group while patient who refuse for physical therapy and wants medication was included in control group. All patients gave written informed consent before participating in the study. Patients were assessed and inclusion and exclusion criteria verified. Inclusion criteria were representative of the typical features of frozen shoulder: patient with between age 40 to 70 years with 1) complain of local shoulder pain for at least 3 months, frequently present either over the anteromedial aspect of the shoulder extending distally into the biceps region or over the lateral aspect of the shoulder extending into the lateral deltoid region. 2) Spontaneous onset of a painful stiff shoulder marked loss of active and passive global shoulder motion, with at least 50% loss of external rotation 3) Normal findings on anteroposterior and axillary radiographs of the glenohumeral joint.

Exclusion criteria were: 1) History of significant trauma to the shoulder 2) Prior surgery, dislocation, or fractures on the affected shoulder 3) Pathologic findings or glenohumeral osteoarthritis on radiographic evaluation 4) Clinical evidence of significant cervical spine disease 4) any treatment or manipulation to the affected shoulder within the last 3 months. 5) any Inflammatory joint disease or metabolic disease affecting the shoulder. 6) Refusal for consent for participating into study.

Patients receiving only medication received Aceclofenac 100 mg twice a day for 10 days then paracetamol 500 mg twice a day for 7 days and then only when pain increased. Patients with medication and physical therapy followed same regime for medication and patient was started on physical therapy supervised under physiotherapist twice a week for 6 weeks. Later exercise at home

was taught and once in two week follow up was done by physiotherapist.

Range of motion was measured in a standardized manner with a universal goniometer from bone landmarks. Since most patients were unable to reach 90° of abduction; therefore, external rotation was measured at the maximum pain-free angle of abduction. This point of abduction was recorded at baseline and used for subsequent measures to ensure comparability of results. Functional outcome was assessed with Constant-Murley score.<sup>6</sup> Pain assessment was done using Vas Analogue Scale (VAS).<sup>7</sup> Routine anteroposterior and lateral radiographs were performed to exclude bone causes of stiffness, such as osteoarthritis. Primary and secondary outcome measures were taken. Health comorbidities, including diabetes mellitus, thyroid disorders, and cardiovascular disease, were determined, and a history of any previous shoulder disorders was ascertained.

**Statistical analysis** was done using SPSS software for Windows (version 10.0) by the Chi-Square test.

### Results

Total 154 patients with adhesive capsulitis treated between January 2018 and December 2018 were included on the study. From these charts, 60 patients who gave consent were selected to be included in the group with physical therapy. Rest 94 patients were included in control group.

	Control group	Physical therapy group
M/F	52/42	38/22
Age (mean in years)	54.5	46.6
Side involved (dominant/non dominant)	38/56	28/32
Co-morbidity		
Diabetes mellitus	9	8
Smoker	18	8

90 (58.4%) were women, and 64 (41.5%) were men. The average age of all patients was 50.55 years (range, 20-96 years). The average age of men was 58 years (range, 34-96 years), and the average age of women was 54 years (range, 20-82 years). The dominant shoulder was involved in

66(42.8%) of the 154 patients. 17 patients (11.1%) had diabetes mellitus, 26 (16.9%) were active smokers.

Range of movement	Control group		Physical therapy group	
	Baseline	3 month	Baseline	3 month
Forward elevation	96(85-120)	120(110-125)	95(85-125)	155(145-160)
External rotation	15(10-20)	20(15-25)	15(10-20)	50(46-60)
Abduction	60(50-65)	90(60-100)	60(50-65)	120(110-160)
Internal rotation	L4/L3	L3/L2	L4/L3	T10/L2
VAS score	3.6(3-5)	4(3-5)	3.2(2-5)	7.5(6-9)
Constant score	37.5(32-41)	43.2 (35-45)	38.1(35-40)	80.9(65-90)

There were no statistically significant differences between the groups in any of the measured baseline characteristics. The mean Constant score at baseline was 37.5 in control group and 38.1 in case group. The mean forward elevation was 96(85-120), the mean external rotation was 15 (10-20) mean abduction was 60 (50-65) and mean internal rotation was L4 to L3 in control group while forward elevation was 95 (85-125), the mean external rotation was 15 (10-20), mean abduction was 60 (50-65) and mean internal rotation was L4 to L3 in control group. After 3 month while control group shows no statistically improvement, case group show significant improvement in range of movements. Mean forward elevation improved from 95 to 155, external rotation improved from 15 to 50, mean abduction improved from 60 to 120 and mean internal rotation improved from L4/L3 to T10/L2. VAS score improved from 3.2 to 7.5 which is statistically significant ( $p < .005$ ). Similar trends was found with CONSTANT score which improved from 38.1 to 80.9 ( $p < .005$ ).

## Discussion

Adhesive capsulitis has been known by many names, including peri-arthritis of the shoulder by Duplay, peri-arthritis scapulae by Charnely, and frozen shoulder by Codman.<sup>2,3,8</sup> In 1945, Neviaser described the gross and histologic pathology in a

series of cases and proposed the term “adhesive capsulitis” as a more precise descriptor of the findings.<sup>3</sup>

Neviaser in 2011 explained four stages of disease on basis of arthroscopic appearance of joint capsule.<sup>9</sup> Stage 1, the preadhesive stage, consists of a fibrinous inflammatory synovitis reaction without adhesion formation. At this stage, patients typically have full motion but report pain, particularly at night. Stage 2 is marked by acute adhesive synovitis with proliferation of the synovium and early formation of adhesions, most notably in the dependent inferior capsular fold. Pain is a prominent feature, and motion loss is present but typically mild. Stage 3, the maturation stage, involves less synovitis and more fibrosis. The axillary fold is obliterated. Pain may be less severe than in stages 1 and 2, but motion is significantly restricted. In stage 4, the chronic stage, adhesions are fully mature, and motion is severely reduced. Because of the marked fibrosis, intra-articular structures may be difficult to identify at arthroscopy. Patients may have painless, limited range of motion in stage 4, but pain occurs when the arm is suddenly moved beyond the limits of the scarred capsule.

Clinically it is divided into 3 stages. Stage 1, the freezing or painful stage- pain present and progress with restricted active and passive ROM. It last for 3 to 9 months. Stage 2, frozen or transitional stage- pain may decrease but there is progressive restriction of ROM. It last for 4 to 12 month. Stage 3, the thawing stage- pain decrease and gradual regaining of shoulder ROM occur. Last for 12 to 42 month.<sup>4</sup>

Pathoanatomically there is contracture of the glenohumeral capsule- the hallmark finding of adhesive capsulitis. There occur loss of the synovial layer of the capsule, adhesions of the axillary to itself and to the anatomical neck of the humerus, and overall decreased capsular volume.<sup>9</sup> There is a thickened and fibrotic rotator interval and a contracted CHL is considered the essential finding in adhesive capsulitis. The CHL ligament is placed under tension with maximal external

rotation; therefore, it is the main target of operative treatment of adhesive capsulitis.<sup>12,13</sup>

Various mode of treatment is explained for its management including non operative treatment with NSAIDs, physical therapy, corticosteroid intra-articular injection, sodium hyaluronate intra-articular injection, Hydrodilution or distension arthrography. Operative management is reserved for patients with no relief or worsening of symptoms with conservative management. These include manipulation under anesthesia and arthroscopic or open capsulotomy.<sup>14</sup>

Vermeulen et al<sup>15</sup> in 2000 presented a case report of 7 patients with adhesive capsulitis treated with use of end range mobilization technique and showed improvement in range of motion, pain and increase in mean capacity of glenohumeral joint capsule( from 10cc to 15cc after 3 month).

Griggs et al<sup>16</sup> evaluated the outcome of 75 patients with idiopathic adhesive capsulitis treated with a stretching-exercise program with mean follow up 22 months. They reported that there was significant improvement in pain ( $p < 0.001$ ) and significant improvement in all angles of motion ( $p < 0.00001$ ). 90% (sixty-four) of the patients considered the outcome of the nonoperative treatment protocol to be satisfactory. There was a significant association between the initial score for pain with activity and the DASH score ( $p = 0.0235$ ) and a highly significant association between the final score for pain with activity and the DASH score ( $p < 0.0001$ )

Diercks et al<sup>17</sup> in 2004 studied 74 patients with adhesive capsulitis. They did supervised neglect with supportive therapy and exercise within pain limits in one group and intensive physical rehabilitation treatment, including passive stretching and manual mobilization (stretching group). Patients were followed for 24 month and concluded that supervised neglect is superior to intense physical rehabilitation with regards to functional end results and speed of recovery.

In our study we compare functional outcome in adhesive capsulitis with and without physiotherapy. One group receive only medication

while other received physical therapy along with medication. Group with physical therapy showed better improvement in range of motion in all direction with improvement in VAS score ( $p < .005$ ) and CONSTANT score ( $p < .005$ ).

### Conclusion

It can be easily concluded that patients with adhesive capsulitis should be treated with physical therapy before considering for intra-articular injections or operative interventions.

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