



# LONG-TERM OUTCOMES OF EXERCISE THERAPY FOR ADHESIVE CAPSULITIS

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## ABSTRACT

**BACKGROUND:** This study evaluated the long term outcomes of exercise therapy for adhesive capsulitis. In this study, we understood how to overcome pain and improves ROM of shoulder. In this, we studied on two group Group A and Group B. In Group A we were using therapeutic protocol of treatment and in Group B we were using the conventional physiotherapy treatment.

**METHOD:** The research was a clinical experimental trial using convenient sampling having 30 participants from the college OPD of Sanskriti university. The inclusion criteria were Unilateral primary Adhesive Capsulitis., Age group 40-70 years old and Patients who had not taken physiotherapy treatment previously for same condition, while the exclusion criteria were Patients who had Adhesive Capsulitis secondary to Shoulder dislocation, fractures, reflex sympathetic dystrophy and rotator cuff tears, Previous reduction under general anaesthesia, Neurologic deficits affecting Shoulder function in normal daily activities or Injection with corticosteroids in the affected Shoulder in the preceding 4 weeks. The tools and instrumentations used were Shoulder Pain and Disability Questionnaire, consent form, Goniometer, SWD, Thera Band, Dumbbells, Wand, Moist pack, etc.

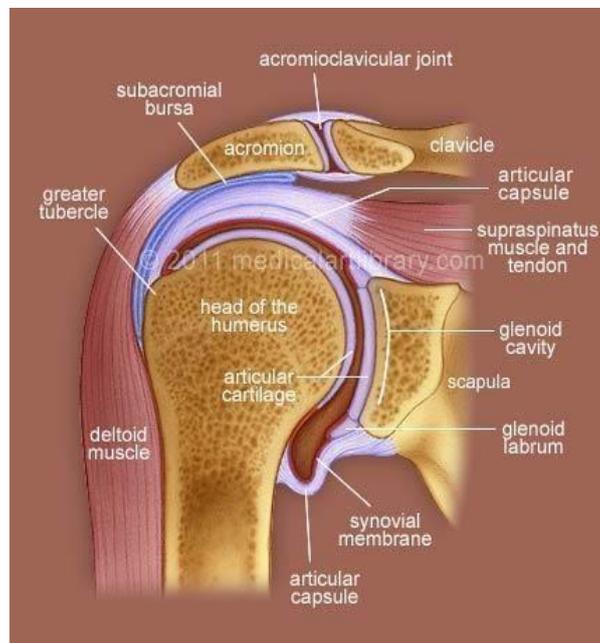
**RESULT:** All shoulder ROM showed significant improvement in both groups when compared with paired t-test for within group analysis. Group A had a significant decrease of SPADI score as compared to Group B by the end of treatment. Group A reduced by 19.73 and for Group B reduction was 12.53.

**CONCLUSION:** From the results obtained from this study it could be concluded that given therapeutic protocol is effective for management of Adhesive Capsulitis. It has been demonstrated that the given therapeutic protocol is more successful in managing adhesive capsulitis than conventional treatments. The patient's functional ability and joint mobility both improved as a result of this therapeutic protocol. Subjects did, however, considerably improve with both treatment approaches; the differences with the conventional treatment strategy were negligible.

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## INTRODUCTION

The shoulder joint, which is the highest and most movable joint in the upper limb, is a crucial joint of the axial skeleton. The shoulder joint has multiple axes of motion. Because of the muscles and joints of the shoulder, the shoulder joint is both flexible and stable, allowing for excellent range of motion while maintaining stability. In order to perform the full range of motions of the arms and hands, the shoulder must be both stable and mobile enough to support activities like lifting, pushing, and pulling. This joint's limited range of motion will result in serious morbidity. Many shoulder issues arise from the trade-off between stability and movement. Adhesive capsulitis is the most prevalent kind.



Duplay was the first to identify "peri arthritis of the shoulder," a painful and stiffening ailment of the shoulder, in 1872. He recommended treating it with manipulation while under anaesthesia. <sup>[2]</sup> Neviasser coined the term "adhesive capsulitis" in 1945 in response to his observations of synovial alterations in the glenohumeral joint. Neviasser was the first to diagnose the pathology in individuals with adhesive capsulitis by histological and surgical testing. According to a study by Neviasser, adhesive capsulitis is actually a "thickening and contraction of the capsule that leads to reduction in ROM and stiffness of the joint" and is not the same as adhesive capsulitis<sup>[3]</sup>. Adhesive capsulitis is sometimes referred to as "frozen shoulder" because to its severe pain and stiffness. In 1934, Codman coined the term "adhesive capsulitis" to describe a condition that lacked abnormal radiological findings but was characterized by a slow onset, pain at the side of the shoulder, pain while resting on the side, reduction in all ROM, and specifically restricted elevation and external rotation.<sup>[4]</sup>

The etiology of adhesive capsulitis remains mostly unknown. The majority of basic science investigations that attempt to identify the cause of adhesive capsulitis have not yet come to a satisfactory conclusion. Adhesive Capsulitis is a crippling, excruciating illness that frequently has a lengthy course. Many authors have described the natural history of adhesive capsulitis; nonetheless, the topic is still debatable. Numerous studies indicate that adhesive capsulitis causes pain, which eventually resolves to full range of motion and no pain following the final stage of the illness.

Despite the fact that simple at-home stretching exercises and information on adhesive capsulitis have been demonstrated to enhance patients' self-assessed shoulder function and overall health, It is noteworthy that there is a dearth of evidence from randomized controlled studies comparing various rehabilitation approaches. According to a recent systemic evaluation conducted by Green et al., physiotherapy is not a suitable treatment for adhesive capsulitis on its own. In order to effectively treat adhesive capsulitis, physiotherapy must be supplemented with other therapies including injections and intra-articular effects. The purpose of the current study is to determine the effectiveness of a particular physiotherapy intervention that was developed following a thorough evaluation of the literature.

### STATEMENT OF PROBLEM

There is no one globally recognized standard medicinal, surgical, or physiotherapy regimen that is generally acknowledged as the most effective treatment for restoring motion in patients with adhesive capsulitis in the shoulder. Physical therapy treatment techniques such as heat or ice applications, ultrasound, IFT, TENS, active and passive range of motion (ROM) exercises, PNF techniques, and mobilization techniques have not been shown to be the most effective based on recent evidence. Therefore, it's vital to discover a physiotherapy treatment for adhesive capsulitis.

### AIM OF THE STUDY

To evaluate which of the treatment is more effective in the management of adhesive capsulitis.

## PURPOSE OF THE STUDY

To find the efficacy of find effective physiotherapy treatment for Adhesive Capsulitis.

## SIGNIFICANCE OF THE STUDY

To find effectiveness of Therapeutic Protocol for Physiotherapy Management of Adhesive Capsulitis.

## HYPOTHESIS

### EXPERIMENTAL HYPOTHESIS

There will be significant difference between ROM and SPADI scores by two different treatment protocol for management of Adhesive Capsulitis.

### NULL HYPOTHESIS

There will be no significant difference between ROM and SPADI scores by two different treatment protocol for management of Adhesive Capsulitis.

## OBJECTIVES

- To find efficacy of specific physiotherapy treatment protocol for the management of patients with adhesive capsulitis.
- To find functional and physical improvement in patients with Adhesive Capsulitis.
- To find effectiveness of treatment in each phase of Adhesive Capsulitis.

## METHODOLOGY

### STUDY DESIGN

The design of the study was Experimental Clinical Trial.

### SOURCE OF DATA

The study was conducted by assigning the patients from College OPD, Sanskriti University.

### SAMPLING

Convenient sampling was used in the study.

### SAMPLE SIZE

30 subjects having adhesive capsulitis were selected for the study.

## SELECTION CRITERIA

The above-mentioned number of patients were screened and recruited according to the following criteria.

### INCLUSION CRITERIA:

- U/L primary Adhesive Capsulitis.
- Age group 40-70 years.
- Patients who has not taken physiotherapy treatment previously for same condition.

### EXCLUSION CRITERIA:

- Patients who had Adhesive Capsulitis secondary to Shoulder dislocation, fractures, RSD and rotator cuff tears.
- Previous reduction under general anaesthesia.
- Neurologic deficits affecting Shoulder function in normal daily activities.
- Injection with corticosteroids in the affected Shoulder in the last 4 weeks.

## VARIABLES

Dependent Variable:

- Pain
- Shoulder range of motion
- Shoulder Pain Disability Index

Independent variable:

- Conventional PT Treatment
- Protocol designed for Adhesive Capsulitis

## INSTRUMENTATION AND TOOLS

- Shoulder Pain and Disability Questionnaire- Roach KE(1991)
- Informed consent form
- Assessment Sheet
- Goniometer
- SWD
- Thera band
- Dumbbells
- Wand
- Moist pack

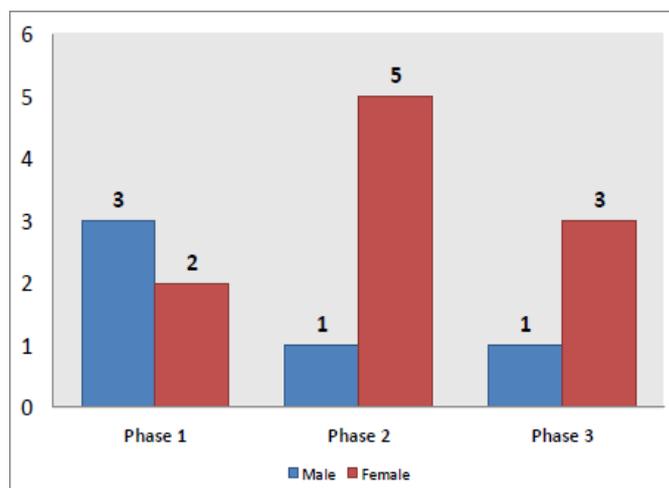


## PROCEDURE

An ethical clearance from Sanskriti University was acquired. The individuals were referred for treatment to Sanskriti University's physiotherapy department after receiving a diagnosis from an orthopaedic surgeon. Subjects that satisfied the inclusion criteria were chosen for the study after each participant was evaluated using the assessment sheet. Informed written consent was obtained from subjects who were willing to participate in the study after it was determined that they were suitable. The patient received a brief explanation of the trial. They were split up into Group A and Group B. ROM was measured while lying supine using a universal goniometer.

## INTERVENTIONS

The participants were invited to plan therapy sessions four to five times per week for four weeks. The study's brief period aimed to evaluate alterations caused by mobilizations while minimizing those caused by adhesive capsulitis' natural progression. Group A received a specific therapeutic protocol. Group B received conventional physiotherapy treatment. Joint mobilization was given first, followed by SWD. To prevent joint compression and soft tissue damage, lateral traction of the glenohumeral joint was used before and during mobilization procedures (Group 2, Phases 2&3).



	Phase 1	Phase 2	Phase 3
Duration	1-12 weeks	12-24 weeks	> 24 weeks
Modality	Moist heat	SWD	SWD
Stretching	Low intensity , short duration (1-5s), Painfree	Low intensity, long duration (5-15s)	End range/ overpressure, increased-duration
Strengthening	Isometric (Manual)	Isotonic (Thera band, Thera tube, Manual)	Isotonic (Dumbells, Manual)
Mobilization	Low grade (Maitland I&II)	Low to high grade	High grade (Sustain Hold)
Other	Positional stretching	MWM PNF Capsule stretch	Distraction, Capsule stretch

Therapeutic Protocol for Adhesive Capsulitis (Group A)

No.	Conventional Physiotherapy Treatment
1	SWD
2	Strengthening (Manual)
3	Anterior and Posterior joint Mobilization (middle range)
4	Passive, AAROM, AROM exercises
5	Stretching (Prolong)
6	Capsule stretch
7	Free active exercises (Wound, Pulley, Pendular)
8	Home exercises

Conventional Physiotherapy Treatment (Group B)

### OUTCOME MEASURES

- Shoulder ROM.
- Shoulder Pain Disability Index.
- Pain.

### STATISTICAL ANALYSIS

- In this study, statistical analysis was done using SPSS (Statistical Package for the Social Sciences) Version 10.
- Data was presented as mean + standard deviation (SD) and percentage (P).
- Comparison of pre and post measurement of ROM and SPADI in each group was done by paired t-test.
- Comparison of Group A and Group B with respect to ROM and SPADI was done by using unpaired t-test.
- P value <0.05 was considered as statistically significant.

### RESULTS

Demographic Characteristics of the subjects:

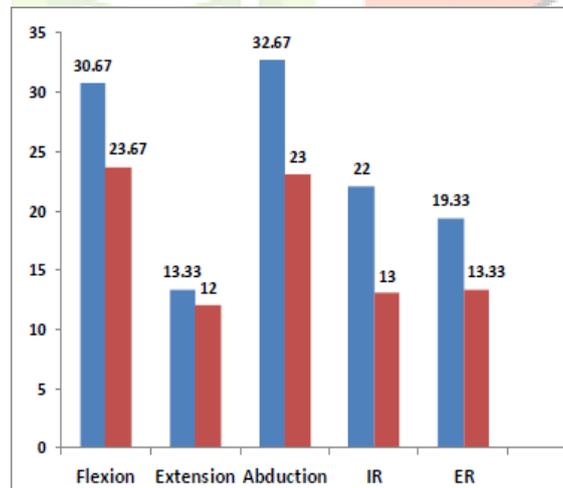
Out of the 44 patients who were initially screened, 15 participants were eliminated for the following reasons: 3 of them presented after undergoing anaesthesia for a manipulation; 4 of them did not meet the inclusion criteria; 1 of them declined to participate; and 6 of them had secondary adhesive capsulitis. There were thirty participants in the research. During the course of four weeks, every participant finished the study. Tables 3 and 4 show the demographic information for 30 participants who finished all of the therapy sessions.

Age groups	Male	%	Female	%	Total	%
40-49	1	16.67%	5	83.33%	6	40%
50-59	3	42.86%	4	57.14%	7	46.67%
60+	1	50%	1	50%	2	13.33%
total	5	33.33%	10	66.67%	15	100
Mean Age	54.4		50.6		51.86	
SD Age	6.46		4.32		6.96	

Age groups	Male	%	Female	%	Total	%
40-49	1	14.29%	6	85.71%	7	46.67%
50-59	2	40%	3	60%	5	33.33%
60+	2	66.67%	1	33.33%	3	20%
Total	5	33.33%	10	66.67%	15	100
Mean Age	55.8		49.6		51.66	
SD Age	6.12		5.56		5.28	

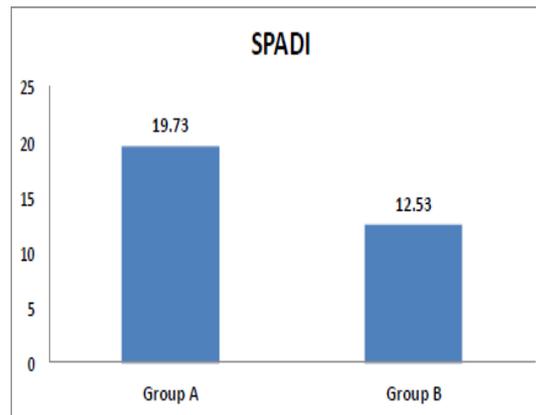
### SHOULDER ROM:

Both groups experienced significant improvement in shoulder range of motion when compared using a paired t-test for within-group analysis. Subjects in Group A showed the greatest improvement in ROM (65(Flex), 25(Ext), 55(Abd), 30(IR), 35(ER), while Group B showed 40(Flex), 30(Ext), 40(Abd), 20(IR), and 25(ER). There were no significant variations in shoulder flexion, extension, and external rotation ROM across groups. Statistical analysis revealed significant results for shoulder abduction, IR ROM, and SPADI scores.



### SPADI SCORE:

Group A had a significant decrease of SPADI score as compared to Group B by the end of treatment. Group A reduced by 19.73 and for Group B reduction was 12.53.



### DISCUSSION

This results is consistent with those of Roubal et al. and Placzek et al. A posterior gliding manipulation led to significant increases in both external and internal rotation ranges of motion. Anterior glide mobilization procedures did not significantly improve shoulder external rotation ROM.<sup>72</sup>

Nicholson conducted a controlled trial with 20 patients divided into two groups for 4 weeks. In the experimental group, passive mobilization strategies were used. Unlike our study, Nicholson began his mobilization procedures gently in the neutral position and gradually progressed to the end of the range of motion (ROM). The author did not provide a detailed description of their mobilization strategies. After 4 weeks, only the experimental group experienced an increase in passive glenohumeral flexion, with no difference in pain scores across groups.<sup>73</sup>

Although there was limited improvement in Flexion and External Rotation ROM, the experimental group had a higher functional outcome score (SPADI). This observation aligns with the findings of Shaffer B et al. Long-term follow-up showed significant improvement in shoulder function in individuals with Adhesive capsulitis after end range mobilization.

Future research should investigate glide direction and various joint mobility strategies, such as shoulder abduction and flexion angles. To achieve this goal, a multicentre study with a higher sample size is necessary.

The basic goal of this study was to categorize patients with primary adhesive capsulitis into a uniform group. However, because different parts of the capsule have been found to have developed contractures, some researchers propose that this syndrome may have subgroups<sup>[77, 78]</sup>. If the supplementary motion tests are able to identify these 61 subgroups, then alternative mobilization strategies might be necessary.

Adhesive capsulitis patients should receive more attention in their rehabilitation regimens about aberrant scapulohumeral rhythm during arm elevation. It is challenging to quantify the degree of glenohumeral mobility as part of the entire range of abduction and flexion in the sagittal plane when measuring shoulder motion with a traditional goniometer. Accurate estimation of scapulothoracic compensation was not possible.

### LIMITATIONS OF THE STUDY

- The sample size small There were no long term follow up.
- Only Unilateral adhesive capsulitis was evaluated.
- Treatment can be given using evidence-based treatment for adhesive capsulitis.
- Age, BMI match samples were not taken in the study.
- Individual gender differences were not compared in the study.

### FUTURE STUDIES

- Future studies should look into whether the therapeutic protocol used in the current trial is as effective as those used in the early stages of adhesive capsulitis.
- Further studies should have a sufficient number of patients to allow for the statistical comparison of the dominant and non-dominant shoulders in each group.

- This study's 4-week treatment period prevented researchers from examining the long-term effects of physiotherapy; therefore, a longer follow-up study should be conducted.

### CONCLUSION

These present individuals were evaluated and sorted into two groups (A and B). Group A received a specialized therapeutic protocol, whereas Group B received conventional physiotherapy. We investigated before and after outcomes assessments, including range of motion, shoulder discomfort, and disability index. We utilized paired and unpaired t-tests to examine before and post treatment effects in both groups.

The outcome indicated that both groups had significantly improved in terms of ROM; nevertheless, upon comparison of the two groups, the experimental group (group A) had significantly improved in terms of IR ROM, SPADI, and abduction. Based on the study's findings, it can be said that the prescribed treatment plan is successful in treating adhesive capsule disease.

It has been demonstrated that the given therapeutic protocol is more successful in managing adhesive capsulitis than conventional treatments. The patient's functional ability and joint mobility both improved as a result of this therapeutic protocol. Subjects did, however, considerably improve with both treatment approaches; the differences with the conventional treatment strategy were negligible.

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