



# **A Comparative Study of Patients with Periarthritis Shoulder on Treatment with Analgesics Only and Analgesics Plus Exercises**

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

**Background:** Frozen Shoulder is known to be a painful condition affecting the shoulder joint that results in significant loss of range of motion. A number of published comprehensive studies have suggested the different modalities of treatment. In this study, we focussed on the effect of exercise on enhancing the restricted motion and reducing the severity of pain.

**Objective:** The objective is to study the influence of exercise on range of motion and pain severity in Frozen shoulder patients.

**Materials and Methods:** Thirty patients diagnosed with Periarthritis Shoulder were selected from orthopaedic outpatient in Saveetha Medical College, Chennai. These patients were randomly divided in two groups, receiving analgesics as well as exercises and another receiving only analgesic. They were assessed using the Visual Analogue Scale for the severity of their pain and range of motion with a Goniometer and results noted.

**Results:** The group receiving exercise in addition to analgesics showed greater reduction in pain severity and range of motion.

**Conclusion:** Physical exercise of the Shoulder joint helps in restoring the mobility and relieves stiffening of the muscles and hence should be added as the mainstay of treatment with pain relief.

*Keywords: Frozen shoulder; periarthritis shoulder; adhesive capsulitis; analgesics; exercise.*

## 1. INTRODUCTION

In the year 1934, Codman defined Adhesive Capsulitis as a painful condition associated with reduced range of motion at the scapohumeral joint [1]. There appears specific painful limitations of both active and passive movements and joint stiffness while the shoulder radiography results are normal [2].

The disease shows gleno-humeral fibrosis on arthroscopic examination and since no adhesions are appreciated on the imaging studies, its name, Adhesive capsulitis, is a misnomer [1].

The global prevalence of the disease is known to be 2-5% of general population [3].

Previous studies have shown that the prevalence of Frozen shoulder is more so in Diabetics, as opposed to the general population. This occurs as a result of glycosylation of the collagen fibres of the joint, producing stiffness [4]. Another study showed the association of this condition with Hyperlipidaemia [5]. Hyperthyroidism, Asian Ethnicity, Lower body mass index, female gender and family history are some other risk factors [6,7,8].

Despite the joint disability being a physical one, it affects the quality of life both physically and mentally. The limitation of wide range of daily activities like combing the hair, reaching for objects become difficult and bring a significant amount of physical, social as well as emotional distress to the patient [9].

## 2. MATERIALS AND METHODS

Our study was duly approved by the Institutional Review Board of our institution.

### 2.1 Study Design and Duration

It was a hospital-based prospective comparative study conducted between the months of January and July 2021 in the Department of Orthopaedics, Saveetha Medical College, Chennai.

### 2.2 Inclusion Criteria

Patients between the age of 40 to 70 years who are a clinically diagnosed case of Frozen shoulder of one or both sides with normal

shoulder joint X-rays and are willing for treatment and follow up.

### 2.3 Diagnostic Criteria

Frozen Shoulder is a clinical diagnosis. The patients complained of shoulder pain, had reduced range of motion and stiffness on examination. Xray was done to rule out other pathologies.

### 2.4 Exclusion Criteria

- Patients who were unwilling to participate.
- Patients suffering from any other musculoskeletal disorders or past history of injuries or fractures of the scapulo-humeral joint.

The patients were divided into two groups; Group A and Group B. This was done by randomisation using a table of random numbers to ensure comparability of two groups. Group A patients received centrally acting opioid, Tramadol 37.5mg and non-steroidal anti-inflammatory drug, Paracetamol 325 mg in combination, twice daily for a period of 14 days for pain relief. In addition these patients also underwent Physiotherapy, Shoulder exercises, Shock wave Therapy. Passive mobilisation and Capsular stretching exercises were recommended to prevent further loss of passive movements and for return of the lost movements. Group B patients were only given the above mentioned analgesics but they did not undergo exercise. Both group patients were advised to use heat packs and prescribed nonsteroidal anti-inflammatory drugs to reduce pain.

Both these groups were periodically followed up to a period of 12 weeks and their pain score was recorded using the Visual Analogue Scale, which is an easy and reliable method of measurement as it is self-assessed by the patient. The joint mobility in both these groups of patients were recorded using a simple and inexpensive instrument called Goniometer. It is a simple protractor which measures joint angles defining not only the ROM, but also helps in tracking progress during recovery. The assessments were done once before the start of treatment, and then periodically up to 12 weeks.

## 3. RESULTS

A total of 30 subjects were included in the study. In Group A, 15 subjects were included, mean

age was  $49.8 \pm 5.5$  years and there were 7 males and 8 females, who underwent Shoulder mobilisation exercises in addition to pain relief medications. On the other hand, Group B subjects received only analgesics. In Group B, there were 15 subjects with mean age of  $50.13 \pm 5.12$  years, of which there were 6 males and 9 females.

The statistics were calculated using the SPSS 21 Software. Paired t-test was used to analyse the pre and post treatment results within the groups, and ( $p$  value  $< 0.05$ ) was considered as significant.

Table 1 shows that there is significant reduction in VAS score ( $p < 0.005$ ) in pre and post-treatment stages. The range of motion during Abduction, External and Internal rotations have also shown improvement after treatment ( $p < 0.05$ ).

The values in Table 2 show reduced pain and improved range of motion in subjects of Group B, as compared to their initial symptoms, and this improvement was significant ( $p < 0.05$ ).

The VAS and Range of Motion was compared among the 15 subjects of Group A with that of Group B and this was analysed using the independent t-test as shown in Table 3.

Based on the above data, both group subjects showed improvement in terms of pain and restoration of movements but group A showed higher mean values as compared to Group B. In terms of effectiveness of treatment, Group A is significantly better than Group B ( $p < 0.05$ ).

#### 4. DISCUSSION

Frozen shoulder defined as a condition of restricted active and passive shoulder movements occurring in absence of a known intrinsic shoulder disorder, is a common presentation in the Orthopaedic outpatient [10,11]. Despite being a self limiting disease, resolving between 6 months to 2 years in most patients, it causes disabilities and affects quality of life of the affected personnel in the acute stage.

Taking into account the gravity of the problem, our study was conducted in an attempt to compare efficacy of treatment methods. The study subjects here received NSAIDs and Tramadol for pain relief. Among both the groups the post treatment values showed a significant reduction in pain score. This reduction was higher and longer lasting in Group A patients. Studies have shown intra-articular corticosteroid injections to reduce pain quicker but the effects lasted for shorter duration [12].

**Table 1. Comparison between pre and post-treatment values within Group A**

Group A	Mean $\pm$ SD		t-test	Significance
	0 weeks	12 weeks		
VAS	$6 \pm 0.92$	$2.93 \pm 0.96$	-10.80	0.000
Abduction	$65 \pm 12.10$	$103 \pm 13.60$	15.043	0.000
External Rotation	$19 \pm 9.26$	$49.3 \pm 11.93$	21.364	0.000
Internal Rotation	$34 \pm 7.36$	$59.3 \pm 9.97$	15.332	0.000

**Table 2. Comparison between pre and post-treatment values within Group B**

Group B	Mean $\pm$ SD		t-test	p value
	0 weeks	12 weeks		
VAS	$5.93 \pm 1.22$	$4.4 \pm 1.45$	-6.487	0.001
Abduction	$71.6 \pm 12.9$	$88.66 \pm 13.4$	7.462	0.001
External Rotation	$14.66 \pm 6.39$	$37.66 \pm 9.6$	10.095	0.001
Internal Rotation	$34.33 \pm 7.76$	$45.66 \pm 10.15$	5.906	0.001

**Table 3. Comparison between Group A and B**

Parameters	Mean $\pm$ SD		t-test	p value
	Group A	Group B		
VAS	$2.93 \pm 0.96$	$4.4 \pm 1.45$	-3.259	0.003
Abduction	$103 \pm 13.60$	$88.66 \pm 13.4$	2.905	0.007
External Rotation	$49.3 \pm 11.93$	$37.66 \pm 9.6$	2.949	0.006
Internal Rotation	$59.3 \pm 9.97$	$45.66 \pm 10.15$	3.719	0.001

The disease causes the range of shoulder motions to be severely affected, particularly in abduction, external and internal rotations. It was observed that shoulder mobilisation exercises markedly improved in the group undergoing regular exercises. Similar studies proved that early intervention with mobility exercises may reduce the morbidity with adhesive capsulitis [13]. But physiotherapy alone is not sufficient as effective treatment [2]. A wide number of other modalities like Ultrasound, bipolar interferential current, acupuncture, transcutaneous electromagnetic stimulation, electromagnetic field therapy have been tried and found to be effective. However, there is lack of scientific data supporting it and hence the values remain uncertain. Surgical methods like manipulation under anesthesia, Arthroscopic release are proved effective in refractory cases [14].

Epidemiological studies have shown that women are at higher risk of developing this condition as compared to men [15]. Our study group, however, did not show a pattern with respect to the sex composition of the population. Results may vary as a result of heterogeneity in sociodemographic characteristics.

## 5. CONCLUSION

Despite the nature of the disease being self-limiting, the course of resolution is variable and hence, should be intervened. Analgesics help in providing pain relief but if unaccompanied by mobilising exercises, will short lasting and ineffective in restoring the restricted movements. Exercise is necessary for reducing stiffness and improving the range of motion.

## CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

## ETHICAL APPROVAL

We conducted our research after obtaining proper IEC approval.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

1. Hsu JE, Anakwenze OA, Warrender WJ, Abboud JA. Current review of adhesive capsulitis. *Journal of Shoulder and Elbow Surgery*. 2011;20(3):502-14.
2. Robinson CM, Seah KM, Chee YH, Hindle P, Murray IR. Frozen shoulder. *The Journal of Bone and Joint Surgery*. British Volume. 2012;94(1):1-9.
3. Ramirez J. Adhesive capsulitis: Diagnosis and management. *American Family Physician*. 2019;99(5):297-300.
4. Inayat F, Ali NS, Shahid H, Younus F. Prevalence and determinants of frozen shoulder in patients with diabetes: a single center experience from Pakistan. *Cureus*. 2017;9(8).
5. Wang JY, Liaw CK, Huang CC, Liou TH, Lin HW, Huang SW. Hyperlipidemia Is a Risk Factor of Adhesive Capsulitis: Real-World Evidence Using the Taiwanese National Health Insurance Research Database. *Orthopaedic Journal of Sports Medicine*. 2021;9(4):2325967120986808.
6. Huang SW, Lin JW, Wang WT, Wu CW, Liou TH, Lin HW. Hyperthyroidism is a risk factor for developing adhesive capsulitis of the shoulder: a nationwide longitudinal population-based study. *Scientific Reports*. 2014;4(1):1-4.
7. Malavolta EA, Gracitelli ME, Pinto GD, Silveira AZ, Assunção JH, Ferreira AA. Asian ethnicity: a risk factor for adhesive capsulitis?. *Revista Brasileira de Ortopedia*. 2018;53:602-6.
8. Wang K, Ho V, Hunter-Smith DJ, Beh PS, Smith KM, Weber AB. Risk factors in idiopathic adhesive capsulitis: a case control study. *Journal of Shoulder and Elbow Surgery*. 2013;22(7):e24-9.
9. Gupta S, Raja K, Manikandan N. Impact of adhesive capsulitis on quality of life in elderly subjects with diabetes: A cross sectional study. *International Journal of Diabetes in Developing Countries*. 2008; 28(4):125.
10. Zuckerman JD, Rokito A. Frozen shoulder: a consensus definition. *Journal of Shoulder and Elbow Surgery*. 2011;20(2): 322-5.

11. Chan HB, Pua PY, How CH. Physical therapy in the management of frozen shoulder. Singapore Medical Journal. 2017;58(12):685.
12. Manske RC, Prohaska D. Diagnosis and management of adhesive capsulitis. Current Reviews in Musculoskeletal Medicine. 2008;1(3):180-9.
13. Morén-Hybbinette IN, Moritz U, Scherstén B. The clinical picture of the painful diabetic shoulder—natural history, social consequences and analysis of concomitant hand syndrome. Acta Medica Scandinavica. 1987;221(1):73-82.
14. Warner JJ, Allen A, Marks PH, Wong P. Arthroscopic release for chronic, refractory adhesive capsulitis of the shoulder. JBJS. 1996;78(12):1808-6.
15. Mezian K, Coffey R, Chang KV. Frozen shoulder. StatPearls [Internet]; Sep 3, 2020.

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