

## Role of Intraarticular Steroid Injection with Physiotherapy and Physiotherapy alone in Idiopathic Adhesive Capsulitis of Shoulder (Frozen Shoulder)

Braja Sundar Sahoo<sup>1</sup>, Kumuda Bandhu Sahoo<sup>2</sup>, Laba Kumar Naik<sup>3</sup>, Tarini Prasad Sahoo<sup>4</sup>

<sup>1</sup>Associate Professor, Department of Orthopaedics, Veer Surendra Sai Institute of Medical Sciences and Research, Burla, Odisha. India.

<sup>2</sup>Assistant Professor, Department of Orthopaedics, Veer Surendra Sai Institute of Medical Sciences and Research, Burla, Odisha. India.

<sup>3</sup>Assistant Professor, Department of Orthopaedics, Fakir Mohan Medical College and Hospital, Balasore, Odisha. India.

<sup>4</sup>Orthopaedic Specialist, DHH, Angul, Odisha. India.

---

Received: 25-03-2023 / Revised: 25-04-2023 / Accepted: 15-05-2023

Corresponding author: Dr. Kumuda Bandhu Sahoo

Conflict of interest: Nil

---

### Abstract

**Background:** Frozen Shoulder otherwise termed Adhesive Capsulitis is a common, disabling but self-limiting condition. It presents with progressive pain & limitation of movement and ends in resolution. Management is manifold, non-operative management includes analgesia, physiotherapy, and oral or intraarticular corticosteroid. Operative management includes intraarticular distension, manipulation under anesthesia and arthroscopic capsular release.

**Methods:** This study, spanning over two years included 47 patients, 22 patients were treated with physiotherapy alone and 25 patients were treated with intraarticular steroid injection followed by physiotherapy. Both the groups took NSAIDs for analgesia.

**Results:** The result was compared between the two groups with regard to age, sex, side of affection, duration of symptoms, pain, tenderness, muscle atrophy, range of movement. Overall result was good in 10, fair in 6 and poor in 6 cases of the physiotherapy alone group and good in 20, fair in 5 cases in the physiotherapy following intraarticular steroid injection group. No poor result was seen in this group.

**Conclusion:** Though the study population and the duration of study was small, intraarticular steroid injection followed by physiotherapy gives good result in cases of Adhesive Capsulitis or Frozen Shoulder.

**Keywords:** Frozen Shoulder, Adhesive Capsulitis, Intraarticular Steroid, Physiotherapy.

---

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

---

### Introduction

Frozen shoulder also termed as Adhesive Capsulitis, is a common disorder characterised by progressive pain & stiffness of the glenohumeral joint. Over the time there is slow recovery usually

ending in resolution. Frequently this is a very disabling condition and frustrating to the patients and to the health care professionals [1,2].

In 1934 the term frozen shoulder was first used by Dr. Codman [3]. He described the classic diagnostic criteria of idiopathic etiology, global restriction in the range of movement of the shoulder, painful at the outset and normal plain x-ray findings and described that it was difficult to define and even more difficult to explain the underlying pathology. Neviaser in 1945 coined the term adhesive capsulitis describing the texture of the inflamed capsule similar to that of sticking plaster [4]. In reality there was no adhesion of the capsule rather progressive contracture of the capsule. Frozen shoulder is classified as either primary or idiopathic and secondary. In the first group the onset is gradual, and progression is slow not associated with any obvious trigger mechanism. Secondary cases are in general due to Trauma or prolonged immobilization following stroke and cardiac surgery.

This is an isolated condition in the life of a patient who is healthy and continues to be healthy. The amazing feature is that though there is near complete loss of all movement of the shoulder it spontaneously resolves and patient regains a workable range of movement. Although being a very common shoulder problem affecting middle aged and elderly male & female, very little attention has been paid to it in our country.

### Material & Method

The Study was conducted in the Department of Orthopedics, VIMSAR, Burla, from November 2019 to October 2021. The cases were selected from those who presented with pain & stiffness of the shoulder. The procedure was explained to all the patients and written informed consent was obtained from them. The study was approved by the Institutional Research & Ethics Committee Vide No. 19255 / 30.11.2019.

After thorough clinical examination, X-ray of the shoulder AP view, axially view and

X-ray of the cervical spine AP& Lat view was done to rule out cervical spondylosis and glenohumeral osteoarthritis. Relevant blood investigation including ESR, CRP, FRS, PPBS were routinely done. USG of the shoulder was advised to look for rotator cuff lesion, bicipital tenosynovitis.

### Inclusion Criteria:

#### Age more than 40yrs

- Pain & stiffness of shoulder for more than 1 month.
- Insignificant trauma to shoulder not associated with fracture.

### Exclusion Criteria:

- Major trauma to shoulder with fracture
- Associated DM, RA,
- Cervical spondylosis
- Presence of active infection around shoulder

### Glenohumeral Osteoarthritis

After selecting the cases basing of these criteria, they were randomly allocated into either of two groups. One group receiving physiotherapy alone of the shoulder and other group getting Intra-articular hydrocortisone injection followed by physiotherapy. Both the groups received non-steroidal anti-inflammatory analgesics for pain control. Triamcinolone Acetonide 40mg in 1ml was the steroid that was used along with 1ml of 2% Lignocaine. Physiotherapy in the form of active & assisted shoulder mobilization exercise, modified sleeper's stretch, cross body stretch, pendulum exercise, shoulder wheel & pulley exercise were advised. Other physical therapy in the form of hot fomentation, ICE pack, ultrasound, SWD, TENS, and IFT was applied.

All cases were follow up minimum up to 6 month. Pre-treatment and post treatment pain score, muscle atrophy, tenderness, range of movement was compared at 6 month. The final result was graded as good, fair, poor.

Good- No pain, no tenderness, no muscle wasting, near normal shoulder movement.

Fair- Mild pain, minimal or no tenderness, no muscle wasting, minimal restriction of movement not affecting ADL.

Poor – pain, tender, muscle wasting, gross restriction of movement affecting ADL.

### Result

The study was conducted in the Department of Orthopedics, VIMSAR, Burla from November 2019 to October 2012 as an outpatient basis. Total 48 cases

were selected. They were randomly allocated into either of two groups, one group receiving physiotherapy alone and the other group receiving intraarticular steroid injection followed by physiotherapy. The two groups were compared regarding their demographic data, clinical presentation, outcome and complications.

The physiotherapy alone group was termed 'P' group and the group receiving intraarticular steroid injection and physiotherapy was termed 'S+P' group.

**Table 1: Age distribution of patients in the two groups**

Age in range	Total no. of cases	'P' group	'S+P' group
40-50 yrs.	27	11	16
51-60 yrs.	17	9	8
61-70 yrs.	2	1	1
71 yrs. & above	1	1	0

**Table 2: Sex distribution of cases**

Sex	Total no. of cases	'P' group	'S+P' group
Male	25	10	15
Female	22	12	10

**Table 3: Distribution of side of affection**

Side of affection	Total no. of cases	'P' group	'S+P' group
Rt	23	9	14
Lt	24	13	11

**Table 4: Distribution of duration of symptoms at the beginning of treatment**

Duration of symptoms	Total no. of cases	'P' group	'S+P' group
1-2 months	28	15	13
2-4 months	10	4	6
4-6 months	5	1	4
>6 months	4	2	2

The clinical parameters of pain score, tenderness, muscle atrophy and range of motion of the shoulder is presented in a comparable tabular form for both physiotherapy alone group and intra-articular steroid followed by physiotherapy group during pre and post treatment follow up period.

**Table 5: Distribution of pain among the cases both at the time of initiation of treatment and at 6 months of follow-up**

Pain	Pre-treatment		Post-treatment follow-up	
	'P' group	'S+P' group	'P' group	'S+P' group
'0' No pain	0	0	11	18
1-3 mild	3	2	11	7
4-6 moderate	9	13	0	0
7-10 Severe	10	10	0	0

**Table 6: Distribution of tenderness was, '0'- nil, '+' – present, B- Bicipital**

Tenderness	Pre-treatment		Post-treatment follow-up	
	'P' group	'S+P' group	P' group	'S+P' group
'0' No tenderness	0	0	12	21
+	16	21	9	4
B+	6	4	1	0

**Table 7: Distribution of muscle atrophy in the two groups were, '0'- no, 'D+'-(deltoid) 'S+'-Supraspinatus, 'I+'-Infraspinatus.**

Muscle atrophy	Pre-treatment		Post-treatment follow-up	
	'P' group	'S+P' group	P' group	'S+P' group
0	7	7	12	18
D+	7	9	8	7
D+, S+	6	6	2	0
D+, S+, I+	2	3	0	0

**Table 8: Average range of movement of the shoulder in the pretreatment and posttreatment period in both the groups are presented in degrees.**

Average range of movement in degree.	Pre-treatment		Post-treatment follow-up	
	'P' group	'S+P' group	P' group	'S+P' group
Flexion	45.45	47	4.55	82.8
Abduction	22.45	21.8	71.14	80
Abduction	80.88	76.58	151.14	162
External Rotation	12.5	14.4	31.60	41.4
Internal Rotation	13.09	13.8	33.41	44.6

**Table 9: Final result were as follows in the two groups.**

Result	'P' group	'S+P' group
Good	10	20
Fair	6	5
Poor	6	0

## Discussion

Frozen shoulder is a common condition affecting the glenohumeral joint characterized by pain and limitation of movement. Associated with a protracted clinical course, it usually ends in resolution.

Management is manifold ranging from conservative to surgical measures. Conservative treatment options include oral non-steroidal anti-inflammatory medication for pain relief and physiotherapy which forms the main stay of treatment. Other methods include use of steroid in the form of oral preparation or intra-articular injection followed by physiotherapy. Most studies demonstrate a

short-term clinical benefit. Carret et al compared the result of intra-articular steroid injection, physiotherapy and a combination of the two in a prospective comparative study [5]. He reported that at six weeks the steroid group has improvement more than the other group, but at 12 months, there was no difference. Ryan et al performed a randomized controlled trial in 80 shoulders and showed early improvement in the steroid group [6].

This study was taken up to compare the result of intra-articular steroid injection with physiotherapy and only physiotherapy in idiopathic adhesive capsulation of shoulder.

Regarding the age of incidence, maximum number of cases (57.44%) were found between 40 to 50 years. The mean age in the intra-articular steroid injection with physiotherapy group was 49yrs and in the physiotherapy alone group it was 51.36 yrs. This finding was comparable with other studies that of Kamath et al [7] and Ryan et al [6] with a P value of >0.05.

This condition was more common in males 53.2% which is comparable to the studies of Kamath et al [7] and Ryan et al [6] with a P value of >0.05.

In this study right shoulder was affected in 23 cases and left in 24 cases. No case has bilateral affection. In the study group left shoulder was affected in 13 cases (59%) and right shoulder in 9 cases (41%). In the intra articular group it was 11(44%) and 14(56%) respectively with a P value of 0.302. This finding is comparable to that of Maryam et al [8], and Callis et al [9].

The mean duration of the disease in the physiotherapy also group was 2.5 month with a range of 1-8 months and in the intra articular injection group it was 3 months with a range of 1.2-7 month. Jain et al [10] reported mean duration of illness 5.63 month for physiotherapy group and 5.21 month for intra articular injection group. Similar result was documented by Ryan et al [6] the mean duration being 3.6month for physiotherapy alone group and 3.5month for intraarticular injection group.

Pain is a constant feature in almost all cases. Pre-treatment mean VAS score in physiotherapy alone group was 6 and intraarticular injection group it was 5.96. Following treatment at the end of 6month the score was 1.23 and 0.4 respectively. The intraarticular group had better pain reduction compared to the physiotherapy alone group. Similar result was reported by Kamath et al [7], and Ryan et al [6]. Callis et al [9] found that improvement in pain score was better in the physiotherapy group.

Muscle atrophy was seen in 33 patients. In the pretreatment period 15 patients (68%) in the physiotherapy alone group and 18 patients (72%) in the other group had muscle atrophy. After treatment at six months, 12 patients (54%) in the physiotherapy group and 18 patients (72%) in the steroid plan physiotherapy group had improvement in muscle atrophy.

Tenderness around shoulder was seen in 22(100%) patients in the physiotherapy group and 25(100%) in patients in the physiotherapy group. After treatment it improved, 12 patients (54%) in the physiotherapy group and 21 patients (84%) in the intraarticular steroid group had no tenderness. Kamath et al [7] and Jain et al in their studies in adhesive capsulitis reported similar results.

The movement of shoulder is restricted in all direction but more so in abduction & internal rotation. In our study improvement was much better in the intraarticular steroid injection followed by physiotherapy group. The mean pretreatment flexion, glenohumeral abduction, scapulothoracic abduction, external rotation and internal rotation in the physiotherapy group was 45°, 23°, 72°, 12°, 13° respectively. In the intraarticular injection group, the corresponding movement was 47°, 22°, 73°, 14°, 14° respectively. At the end of six months of treatment flexion, glenohumeral abduction, scapulothoracic abduction, external and internal rotation improved to 70°, 71°, 151°, 31°, 33° in the physiotherapy group and 83°, 80°, 162°, 41°, 45° in the intra articular injection group. The improvement in flexion, scapulothoracic abduction and internal rotation was statistically significant (P-value <0.05) whereas improvement in glenohumeral abduction, and external rotation were statistically non-significant (P-value >0.05). These findings are comparable to the studies of Kamath et al [7], Jain et al [10]. Arslan et al [11,12] reported that statistically significant improvement of movement was

found in both the groups, when the two groups were compared the result was not statistically significant.

### Summery & Conclusion

Frozen shoulder is a relatively common condition. It is a disabling and painful condition affecting otherwise a healthy individual. In spite of a protracted course, all patients recover but full range of shoulder movement may not return. The management include NSAID for analgesia with or without physiotherapy to maintain & regain range of movement of the shoulder. Arthroscopic distension, manipulation under anesthesia or surgical release of the capsule followed by physiotherapy are other options. Surgical procedure has its own complications, involves expertise and cost. Treatment with physiotherapy alone or in combination with intra articular steroid injection is a simple, cost-effective method of management. Comparing the two methods, it is observed that, the combination of intra articular Triamcinolone injection followed by physiotherapy gives good result in terms of pain control, improvement in range of movement and decreasing muscle atrophy.

### Limitation of the Study

No comparison with placebo

Small size of the study population

Short term follow up

### References

1. Reeves B. The natural history of the frozen shoulder Syndrome. Scand J Rheum. 1975;( 4): 193-6.
2. Binder A, Bulgen D, Hazleman B, Tudor J, Wraight P. Frozen shoulder: an arthrographic and radionuclear scan assessment. Ann Rheum Dis. 1984; 43 (3): 365-9.
3. Codman E. The shoulder. Boston: Todd. 1934.
4. Neviasser J. Adhesive capsulitis of the shoulder: a study of the pathological findings in peri-arthritis of the shoulder. Bone Joint Surg. 1945;27: 211-2.
5. Carret S, Moffet H, Tarrdiff J et al. Intraarticular corticosteroids, supervised physiotherapy, or a combination of the two in the treatment of adhesive capsulitis of the shoulder. Arthritis Rheum 2003; 48: 829-38.
6. Ryans I, Montgomery A, Galway R. Randomized controlled trial of intra articular triamcinolone and or physiotherapy in shoulder capsulitis. Rheumatology. 2005; 44:529-35.
7. Prasant Kamath, Kosha Anish Gala, Santosh Borkar, Kunal Gopal Jasnani, Uma Jitendra Chandurkar, Ameya Nandanwar. A comparative Study of the effect of supervised physiotherapy with or without local intra-articular corticosteroid injection in early stage of adhesive capsulitis of the shoulder. International Journal of Contemporary Medical Research. 2020; 7(3): C10-C14.
8. Maryam M, Zahra K, Adeleh B, Morteza Y. Comparison of the effect of corticosteroid injection with physiotherapy in treatment of painful arch of shoulder. Shahrekord Uni Med Sci J. 2007; 3(9):52-56.
9. Calis M, Demir H, Ulker S, et al. Is intraarticular sodium hyaluronate injection an alternative treatment in patients with adhesive capsulitis? Rheumatol Int. 2006; 26:536-540.
10. Jain RK, Nagar J, Jayaswal A. Evaluation of results of physical therapy vs intra articular steroid injection in peri-arthritis of shoulder: a comparative prospective study. Int J Res Orthop. 2019; 5:382-7.
11. Arslan S, Celiker R. Comparison of the efficacy of local corticosteroid injections and physiotherapy for treatment of adhesive capsulitis. Rheumatol Int. 2001; 21:20-23.
12. Bunchbinder R, Green S, Youd JM. Corticosteroid injection for shoulder pain. (Cochrane Review). (Cochrane

Library). Issue 2. Chichester: John Wiley & Sons, Ltd, 2004.

13. Bunchbinder R, Green S, Youd JM. Corticosteroid injection for shoulder

pain. (Cochrane Review). (Cochrane Library). Issue 2. Chichester: John Wiley & Sons, Ltd, 2004.