



# Effect of Physiotherapy Treatment in Tertiary Care Hospital on Functional Disability in Frozen Shoulder Patients

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## Abstract

**Background:** Frozen shoulder was introduced as Adhesive capsulitis by Naviesar in 1947. It commonly occurs between 40 and 70 years and is more common in females than males. Bilateral movements occur in 10-40 % of cases. It is mostly seen in patients with Diabetes mellitus. Patients with frozen shoulders are managed by Physiotherapy, medications (NSAIDs), corticosteroid injection, Arthrography infiltration, and manipulation. If not managed conservatively, surgical options are also available. The symptoms of the Frozen Shoulder can be reversed after the treatment has been taken. So, it is important to check whether the physiotherapy treatment is beneficial from a long-term perspective or not. **Materials and Methods:** A total of 37 patients participated in this study, 20 were females and 17 were males. Previous demographic and assessment data of these patients were recorded. Patients who were undergoing treatment were called to the Physiotherapy OPD and their pain, range of motion, and SPADI scale were assessed- A statistical analysis of comparison of previous and present scores was done by using a computerized method. **Results:** Statistical analysis showed significant improvement in pain and SPADI score in pre and post-test periods (p values of Visual analogue scale were 0.0628 for at rest, 0.009 for on activity, and 0.0033 for SPADI. Range of motion was not showing significance (p-value is more significant than 0.05), it was maintained throughout during pre and post-test periods. **Conclusion:** In statistical analysis, Pain and SPADI assessment showed significance, and Range of motion did not show significance in the pre and post-test. Hence, we conclude that treatment taken in Tertiary care hospitals is effective in patients with Frozen shoulders in a long-term perspective.

**Keywords:** Frozen Shoulder, Functional Disability, Retrospective Study, Tertiary Care Hospital

## 1. Introduction

The shoulder joint is a structurally and functionally complex joint and it is one of the freely movable joints in the body. Free movements occur at synovial joints since the shoulder joint is a synovial joint of all socket varieties, it becomes the most freely mobile joint. The joint is formed by the articulation of the glenoid cavity of the scapula and humerus. Hence, it is also known as the Glenohumeral articulation<sup>1</sup>. Structurally, it is a weak joint because the glenoid cavity is too small and shallow to hold the head of

the humerus in place. There are four ligaments, and three bursae are there in structural components to stabilize the shoulder joint.

Frozen shoulder refers to an inflammatory condition of the shoulder represented by pain and reduced range of motion. The frozen shoulder was first introduced by Codman in 1934<sup>2</sup>. Before that in 1872, the same condition had already been labeled Periarthritis by Duplay<sup>3</sup>. Later, the frozen shoulder was introduced as Adhesive capsulitis by Naviesar in 1945<sup>4</sup>. It is one of the commonest conditions that occurs between the age of 40-70 years and is more

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common in females than males. Bilateral movements occur in 10-40 % of cases<sup>5</sup>. Most are seen in patients with diabetes mellitus and can be seen in patients with other comorbidities. Frozen shoulder is present in 25.7% of diabetic patients but 5% in the general population of India. The reason why it is common in Diabetes mellitus patients is Glucose molecules may attach to the collagen of the lining of the shoulder capsule. So, it decreases joint space and stiffens the joint capsule<sup>6</sup>. The pathology of this disease is inflammation of the synovium (lining of the capsule) causes pain and fibrosis in the process of tissue repair bringing about a reduced range of motion. It is characterized by stiffness and pain in the shoulder joint<sup>7</sup>.

Patients with frozen shoulder experience pain when the arm is held by the side and rotated internally. Mild atrophy of the deltoid and supraspinatus may also be present. On palpation, there is diffuse tenderness over the glenohumeral joint and this extends to the trapezius and interscapular area<sup>6</sup>. Patients have painful shoulder Flexion, Abduction, External rotation, and limited range of motion in all planes<sup>8</sup>. There is an almost complete loss of external rotation. Frozen shoulder is a progressive inflammatory condition, that progresses gradually and occurs in different stages. There are three phases of the clinical presentation of Frozen Shoulder which are as follows: Freezing phase, Frozen phase, and Thawing phase<sup>9</sup>.

In the first phase i.e., the freezing phase there is only pain and stiffness around the shoulder with no history of trauma. It usually lasts from 2-9 months. A nagging constant pain worsens at night and subsides in the morning. Pain can be relieved by non-steroidal anti-inflammatory drugs in this phase. It is also known as the painful freezing phase. Second is the Frozen phase also called as Adhesive phase. This phase usually lasts from 4-12 months. The pain gradually subsides but the stiffness of the joint capsule remains the same and a marked decreased range of motion is seen. Pain is only at the extremes of the movements. Patients may have difficulty while doing activities of daily living like combing hair, wearing clothes, and other day-to-day activities. The third one is the Thawing phase. This phase is also known as the resolution phase. It typically lasts between 9-12 months. Pain resolves in this phase but a patient may have restricted movements in all planes<sup>10</sup>. The causes or risk factors of this condition are classified into the primary and secondary- Primary cause is idiopathic which is no clear cause. Secondary causes involve immobilization, diabetic

mellitus, hypo and hyperthyroidism, stroke, heart attack, autoimmune conditions, trauma (including surgeries), history of cervical disc diseases, and adult age<sup>11</sup>.

Diagnosis of a frozen shoulder is based primarily on history and physical examination. An injection of 3 to 5 ml of 1% lidocaine into the subacromial bursa of the affected shoulder is often useful for diagnosis. When a restriction of motion is due to disorders other than a frozen shoulder, the range of motion could improve after the injection of local anaesthetic. Plain X-ray examination is generally unhelpful it only shows erosion of bones. When there is previous trauma, or when examination shows acute inflammation, an x-ray should be taken in standard views like anterior-posterior in internal rotation, external rotation, and 90 abduction, axillary and bicipital groove views. Arthrogram is also used as a useful diagnostic investigation of the frozen shoulder. If the diagnosis is doubtful then we can go for an arthrogram, it might be useful. On an arthrogram, the volume of the shoulder joint is generally significantly reduced and filling is frequently lacking in the axillary fold and subscapular bursa.

Many treatments have been advocated for frozen shoulders. The main goal of treatment is to restore and maintain function. Prevention of secondary adhesive capsulitis in patients at risk is more important than treating the established condition. Early mobilization and gentle range of motion exercises should be part of managing all patients with shoulder dysfunction<sup>12</sup>. Patient education is an important component of managing a frozen shoulder. Patients should be educated about the natural history of the condition. They must understand that they will probably improve and eventually recover, but the rate of improvement will be slow. Patients with frozen shoulders are managed by Physiotherapy, medications (NSAIDs), and corticosteroid injections<sup>13</sup>. If not managed conservatively, surgical options are also available. Physiotherapy treatment includes Electrical modalities to decrease pain and swelling and exercise protocol to improve range of motion and to increase. In the initial phase of a frozen shoulder, pain is the main concern of the patient. So, for pain reduction, we use medications i.e., Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), corticosteroid injections, heating modalities like hot moist packs, cryotherapy, and pain-relieving modalities like ultrasound, TENS, IFT, etc. Ultrasound is a deep-heating modality. It might be useful for stretching joint contractures together with slow, and sustained

stretch. The common treatment for frozen shoulder starts with the application of a hot moist pack to alleviate pain and then concentrates on enhancing the range of motion. Then by progressed to active assisted exercises, active exercises, isometric exercises, and resisted exercises. Resisted exercises then progress by increasing resistance first by using resistance bands and then with weights as follows<sup>14</sup>.

Complications of a frozen shoulder are persistent stiffness and pain despite therapy. Loss of functional use of the upper extremity occurs. If forceful manipulation is given; the joints can dislocate or there can be neurovascular injury. Sometimes patients can fully recover and regain a pain-free range of motion that lasts for a long period. But, in some cases after some duration of post-treatment patient's condition will come back to the previous stage. Its recovery and reoccurrence vary from patient to patient. It usually depends on the lifestyle, diet, occupation, and other factors like habits, genetic factors, comorbidities, etc.

## 2. Methodology

Ethical number- 637/2022-2023

Place of study- Karad, Satara.

This was a retrospective study of 37 patients, 27 females and 10 males, which was done by convenience sampling, amongst the patients who were taken physiotherapy treatment in Physiotherapy OPD in a Tertiary care hospital in Karad. Techniques employed in this study were assessment of the Range of Motion of the shoulder, which was done by a goniometer, Pain done by the visual analogue scale, and SPADI was also used. The inclusion criteria for this where patients should complete at least 1 year of the post-treatment period. Individuals who were currently undergoing the treatment or recently completed treatment or treatment taken from different hospitals were not taken for this study. All informative data of the patients were recorded and these patients were called again to the hospital for the assessment. Comparison of the ranges of pre and post-tests done. This data was further taken for statistical analysis. Physiotherapy treatment given to the patients includes the application of a hot moist pack in the initial period along with ultrasound followed by cryotherapy. Then, to increase the range of motion active assisted exercises are also given to patients. Also, simple wand exercises and pendulum exercises are given to them.

Then strengthening of scapular muscles and shoulder muscles started with weight cuffs, dumbbells, and resisted bands.

## 3. Results

In this study, 37 patients participated with a mean age of 56.62 ranging from 40-60 years. The statistical analysis was done by using Instat Graphics 3.0 software.

**Table 1.** Comparison of the visual analogue scale of previous and present assessment -AT REST and On ACTIVITY score

	At Rest		On Activity	
	Previous	Present	Previous	Present
<b>Mean</b>	0.6270	0.4459	0.9486	0.5351
<b>Median standard deviation</b>	0.6113	0.6172	0.7070	0.7349
<b>P- value</b>	0.0628		0.0009	

In the statistical analysis of the visual Analogue scale, pain at rest did not show a significant difference in previous and present scores but the on-activity score showed extreme significance in the post-test than in pre.

**Table 2.** Comparison of SPADI score of previous and present score of the shoulder joint

	Previous	Present
<b>Mean</b>	5.919	4.027
<b>Median standard deviation</b>	4.044	4.604
<b>P- value</b>	0.0033	

In the SPADI score, the statistical analysis of the assessment scores showed significant improvement between the previous and present assessments.

Statistical analysis of the Range of motion did not show a significant difference between the previous and present assessment test scores. So, we could say that the range of motion was not improved in the post-treatment period, it was maintained throughout the post-period.

**Table 3.** Comparing range of motion of previous and present assessment scores of all movements of the shoulder joint

	Flexion		Extension		Abduction		Adduction		Int. Rotation		Ext. Rotation	
	Previous	Present	Previous	Present	Previous	Present	Previous	Present	Previous	Present	Previous	Present
<b>Mean</b>	146.73	144.59	39.568	42.973	127.03	126.76	31.622	34.730	80.946	83.784	23.108	26.351
<b>Median standard deviation</b>	26.054	35.480	11.584	12.718	39.501	43.305	9.133	9.350	13.168	11.809	13.089	14.750
<b>P-value</b>	0.7435		0.0688		0.8876		0.1328		0.1840		0.2782	

## 4. Discussion

Frozen shoulder commonly occurs between 40-70 years of age group<sup>5</sup>. In this study also the patients were from this age group. The mean age of the patients who have undergone physiotherapy treatment and participated in the study was 56.162. This resembles the study of Edwards O *et al.*, that the Frozen shoulder is most common between 40-70 years<sup>5</sup>. Frozen shoulder is common in middle-aged people because of diseases like diabetes, thyroid, any injury, prolonged immobilization, or prolonged use because of the profession. Frozen Shoulder is commoner in females than males. Females, after 40 years started facing hormonal imbalance and menopausal issues. Because, due to these problems they may face diabetes, thyroid, and obesity-like problems. So, the frozen shoulder is most common in Females. In this study, amongst 37 patients, 20 Female patients and 17 Male patients were there, affected with frozen shoulders, and treatment was taken for the same. So, the present study correlates with the study of Li W *et al.*, that females are more affected by Frozen shoulders than males<sup>11</sup>.

Physiotherapy treatment in frozen shoulder patients showed long-term effects, and their pain and SPADI scores were improved. Hence, it is proved by Chan HB *et al.*, that patients with frozen shoulders who had taken Physiotherapy treatment are the most beneficial treatment for frozen shoulders<sup>13</sup>. Physiotherapy treatment benefits the frozen Shoulder patient because it focuses on overall aspects like decreasing pain, increasing movement range, and improving Functional independence, not just on pain management. In frozen shoulder patients, physiotherapy treatment plays an important role in pain management as proved by Tveitå *et al.*<sup>15</sup>. For pain management in patients with frozen shoulders, the use of hot moist pack therapy along with stretching and exercises shows excellent results in pain reduction<sup>16</sup>. The range of motion of the

patient was not showing significant improvement, it was maintained throughout the post-treatment period. It resembles the study of Chan HB *et al.*, and proved that the range of motion can never be restored<sup>10</sup>. Patients who were coming after completing the treatment will be performing exercises daily, so their range of motion is maintained throughout<sup>13</sup>. SPADI indicated the pain and disability of the patient as she/he was doing well in daily living or not and able to perform daily tasks and functions easily. In this study, SPADI is used in frozen shoulder patients to assess the pain and disability before and after treatment taken for the frozen shoulder. SPADI indicates the functional disability of the frozen shoulder patients to see if it is affected by the disease or not, as was proved by Tveitå EK *et al.*<sup>15</sup>. The Scale of rating Pain and Disability Index i.e., SPADI helps to assess the functional disability of the patient in patients with frozen shoulders.

In this retrospective study, patients who participated showed significant long-term effects in the Physiotherapy treatment given during the time of the treatment. Their improvement also shows consistency and improvement in the post-treatment period than in the pre-assessment score.

## 5. Conclusion

In statistical analysis of the previous and present score assessments, the pain and SPADI assessment showed significance, and the range of motion did not show significance in the pre and post-test. Hence, we conclude that there was no effect on the range of motion in the post-treatment period.

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