



# Pharmacological Treatment of "Frozen Shoulder": A review

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## ABSTRACT

Frozen shoulder is among the most prevalent and difficult pathological conditions posed to the orthopedic specialist. It is a disorder characterized by a considerable decrease in the vigorous and passive range of motion (ROM) of the glenohumeral joint and pain. This is a systematic review that was carried out, including PubMed, Google Scholar, and EBSCO, and examined randomized controlled trials, observational, and experimental studies that study pharmacological treatment of the frozen shoulder. The study included 6 studies and concluded that treatment of Frozen Shoulder with steroid is safe and provides better recovery. Previous trials showed that patients treated pharmacologically with corticosteroids either orally or injections are significantly more likely to improve on pain and disability than those treated with physiotherapy only.

**Key Words:** Frozen shoulder, Adhesive capsulitis, Management of adhesive capsulitis, Corticosteroids

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## INTRODUCTION

Adhesive capsulitis (AC) referred to as frozen shoulder (FS) is an insidious disorder of the shoulder persevering 3 months and more causing fibrosis of the glenohumeral joint capsule to go together with by gradually advanced stiffness and significant constraint of a variety of motion [1]. FS is amongst the most prevalent and difficult pathological conditions posed to the orthopedic surgeon. It is a condition characterized by a substantial reduction in the active and passive range of motion (ROM) of the glenohumeral joint together with pain [2].

The overall prevalence of FS is 2-5%, which is more prevalent in women. Adhesive capsulitis accounts for up to 5%. Females are affected four times more often than men, although the dependent shoulder is further likely to be affected [3].

Patients with early AC usually have an unexpected beginning of one-sided frontal shoulder discomfort. Typical signs include a passive and aggressive range of motion limitation, first impacting external rotation and later shoulder abduction [4]. Physical disability caused by frozen shoulder consists of reduced reach, especially during overhead (e.g. hanging clothes) or side-by-side (e.g. fastening a seat belt) movements. Another frequent concurrent symptom with a frozen shoulder is neck pain, usually caused by overuse of cervical muscles to compensate for lack of shoulder mobility [5].

Frozen shoulder diagnosis is dependent on the patient medical record, physical examination, and imaging. No specific examination (laboratory or imaging) alone provides conclusive proof of the diagnosis of AC. Diagnostic AC imaging can be difficult, as the results based on commonly existing techniques (such as

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radiographs, ultrasound, plain MRI, and computed tomography) are typically unspectacular [6].

The bulk of medical options for AC are non-surgical and require pharmaceutical and physiotherapy. The purpose of "freezing" therapy should be to control discomfort, minimize inflammation and inform patients [7]. Mild to extreme pain patients who do not respond to non-operative care, intra-articular injection of corticosteroids must be considered [8, 9]. The injection must be done under ultrasonographic or fluoroscopic supervision to ensure proper positioning of the needle [10].

## MATERIALS AND METHODS

PubMed and EBSCO Information Services were chosen as the search databases for the publications used within the study, as they are high-quality sources. PubMed is one of the largest digital libraries on the internet developed by the National Center for Biotechnology Information which is a part of the United States National Library of Medicine. Topics concerning frozen shoulder have been used in the making of the article. Restriction to the last 10 years and English language due to unavailable resources for translation were used. The found articles were screened by titles, and reviewing the abstracts yielded 6 articles that were enrolled (**Figure 1**). Inclusion criteria: the articles were selected based on the relevance to the project, which

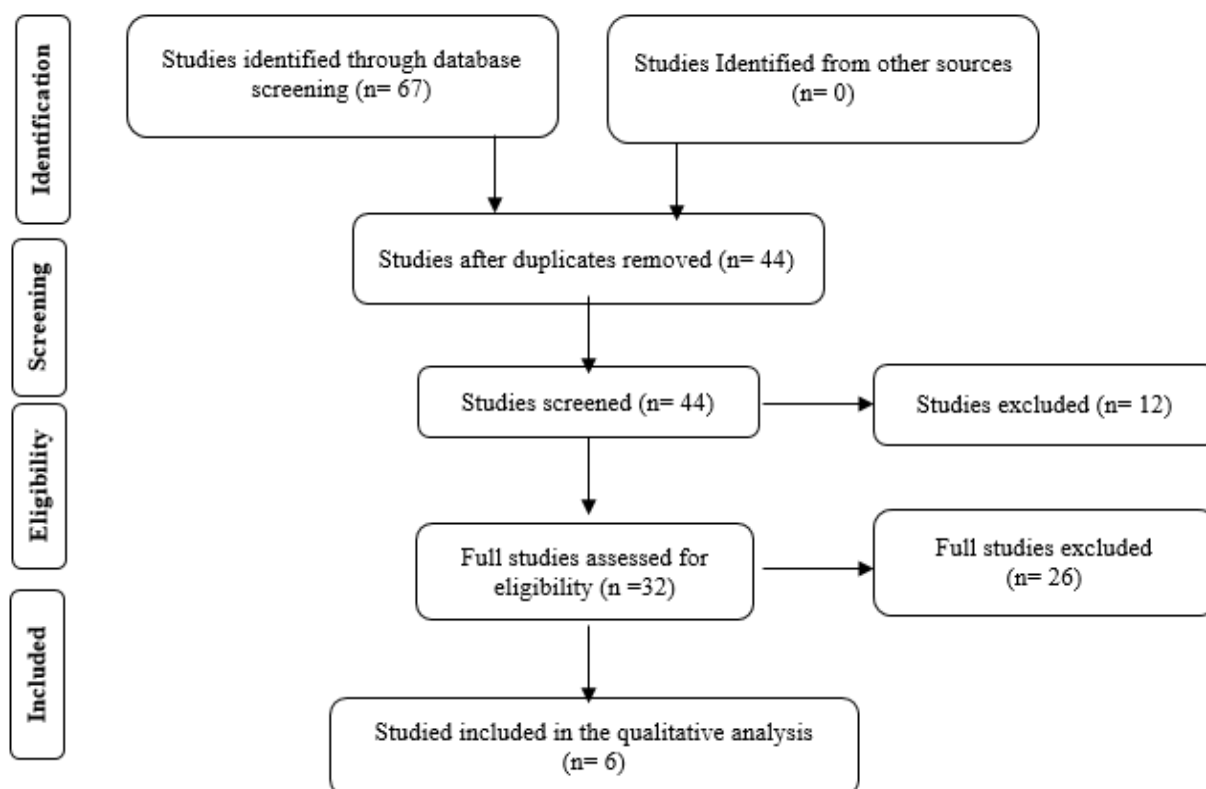
should include one of the following topics; 'frozen shoulder, adhesive capsulitis, management of adhesive capsulitis, corticosteroids, and frozen shoulder'. Exclusion criteria: all other articles which did not have one of these topics as their primary end or repeated studies, and review studies have been excluded.

### Statistical analysis

The data was extracted based on a specific form that contained (Title of the publication, author's name, objective, summary, results, and outcomes). These data were reviewed by the group members to determine the initial findings and the modalities of performing the surgical procedure. Double revision of each member's outcomes was applied to ensure the validity and minimize the mistakes.

## RESULTS AND DISCUSSION

The search of the mentioned databases returned a total of 67 studies that were included for title screening. 44 of them were included for abstract screening, which led to the exclusion of 12 articles. The remaining 32 publications full-texts were reviewed. The full-text revision led to the exclusion of 26 studies, and 6 were enrolled for final data extraction (**Table 1**).



**Figure 1.** Flow chart illustrating the process of data extraction

**Table 1.** Author, year of publication, study type, and study outcome

Author Country Year	Study type	Sample size	Outcome
N. Gam <i>et al.</i> [11] Denmark 1998	A Randomized Controlled Trial	120 patients	Distension with steroids can seem to help in the management of "Frozen Shoulder". Other studies seem to support the conclusion.
BA de Jong <i>et al.</i> [12] Netherlands 1998	Randomized, double-blind clinical trial.	57 patients	In the management of frozen shoulder, better symptom relief is got by a dose of 40mg triamcinolone acetonide intra-articularly than with a dosage of 10 mg. The consequence of aching and sleep trouble was extra noticeable than on ROM. Intra-articular inoculations with triamcinolone acetonide seem to be an actual process to acquire symptom release for cases with tender capsulitis of the shoulder
Leo GH Jacobs <i>et al.</i> [13] Nottingham 1991	Prospective randomized trial	47 patients	Intra-articular steroid inoculations must a valuable part in the outpatient controlling of initial capsulitis.
D A W M van der Windt, <i>et al.</i> [14] Netherlands 1998	Randomized trial	109 patients	The valuable properties of corticosteroid inoculations directed by GP for management of painful stiff shoulder are greater to persons of physiotherapy. The changes between the interference groups were mostly the outcome of the relatively earlier respite of symptoms that arose in cases cured by injections. Contrary reactions were usually mild but clinicians must be alert to the possible complications of injections of triamcinolone, especially in females.
Jacobs, Leo G <i>et al.</i> [15] UK 2009	A prospective randomized trial	53 patients	Management using steroid shots with expansion as an out-patient is thus suggested for the management of Idiopathic "Primary" Frozen Shoulder. This takes similar medical consequence as a manipulation under anesthetic with less attendant risks.
Buchbinder R <i>et al.</i> [16] Australia 2004	Double blind, randomized, placebo- controlled trial.	50 particip ants	A three-week sequence of 30 mg prednisolone every day is of substantial short-term advantage in adhesive capsulitis nonetheless effects are not preserved afar one and half month.

Buchbinder *et al.* conducted a meta-analysis of 5 studies covering a comparatively small proportion of patients comparing steroids compared to placebo (two studies), oral against intra-articular steroids (one study), oral steroids versus non-treatment (one study), and anesthesia versus intra-articular steroid injection both with and without oral steroids (one trial) and reported that steroids may prompt short-term release of discomfort while the influences are not continued further than 6 weeks. No clear contrary properties were stated [17].

Canbulat *et al.* [18] recorded that oral glucocorticoids (0.5 mg/kg/day of methylprednisolone) increased health results in 33 FS patients: mean American Shoulder and Elbow Surgeons score from 25.9 at first to 98.7. Buchbinder *et al.* [16] stated the outcome of oral prednisolone for the management of FS in a clinical, double-blinded, placebo-adjusted research and reported considerable favorable effect in the intervention group at 3 weeks. A clinical trial that included 40 patients undertaken by Lorbach *et al.* [19] reported that cases with idiopathic FS received an oral corticosteroid regimen (20 cases) or an intra-articular shot of cortisone (20 cases) [20].

Important differences in pain and functional results were reported for 4-week follow-up in treated patients with oral therapy. Even so, patients treated with intra-articular injection reported better outcomes in objective shoulder ratings, ROM, and patient satisfaction relative to the oral steroid community [21, 22].

Intra-articular corticosteroid injections can lead to short-term pain management and enhanced range of movement. These effects typically last only a period of 6 weeks and are most successful when given at an early stage of the disease [10]. In a double-blind randomized clinical trial, intra-articular and rotator interval steroid injections on 122 patients resulted in pain reduction in 6 weeks. The outcome was sustained for 12 weeks, but not for 26 weeks. There was little difference between the group receiving the intra-articular injection and the group receiving both intra-articular and revolving interval injections [23]. In a randomized clinical study, Carrette *et al.* [24] observed 93 individuals with frozen shoulder who had symptoms for even more than 1 year. 43 Patients were assigned into one of four groups: intra-articular corticosteroid infiltration by fluoroscopy accompanied by physiotherapy; intra-articular

corticosteroid infiltration by themselves; intra-articular saline infiltration accompanied by supervised physical therapy; or intra-articular saline infiltration alone. Physical therapy alone was found to be of limited efficacy in treating frozen shoulder Griesser *et al.* [25] performed a systematic review of the current stage I and II proof trials for intra-articular injection of FS. Eight research, composed of 409 shoulders, achieved their participation requirements. Although the mean adjusted Coleman technique score of the included studies was as low as 44, all treatments showed enhanced outcomes with a tendency toward better enhancement in 36-Item Short Form Survey (SF-36) scores consistent with steroid injection relative to anesthesia manipulation. Ryans *et al.* [26] reported results of a four-way randomized controlled trial, Corticosteroid injection groups increased dramatically in terms of shoulder-related injury, and physiotherapy groups improved ROM amounts. However, at 16 weeks, both groups had progressed to a comparable level with respect to all the result indicators. In 2016; Sharma, Satya Pal *et al.* [27] reported that 4 injections of corticosteroid both with and without distension, delivered with growing intervals over 8 weeks, is better than the normal medication for adhesive shoulder capsulitis. However, in the long term, little distinction was noticed between either of the groups, suggesting that natural recovery takes place regardless of or without care.

Four previous research associated the efficacy of corticosteroid treatments with physiotherapy for pain [28-31]. 3 research [28-30] of small sample groups (fewer than 25 patients per intervention group) have been unable to demonstrate major variations between therapies. This experiment either used a single injection or a particular form of corticosteroid. Just one study was performed in the primary care environment and this trial revealed substantial variations between therapies [31].

## CONCLUSION

Treatment of Frozen Shoulder with steroid is safe and provides better recovery. Previous trials showed that patients treated pharmacologically with corticosteroids either orally or injections are significantly more likely to improve on measures of pain and disability than patients treated with physiotherapy only. Further studies may be needed in the future to compare oral and injection corticosteroid treatment depending on the stage of the disease.

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