

# Manipulation Under Anesthesia for Frozen Shoulder With and Without Steroid Injection

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**ABSTRACT.** Kivimäki J, Pohjolainen T. Manipulation under anesthesia for frozen shoulder with and without steroid injection. *Arch Phys Med Rehabil* 2001;82:1188-90.

**Objective:** To study the effect of manipulating a shoulder with adhesive capsulitis (frozen shoulder) under anesthesia with and without corticosteroid injection.

**Design:** Randomized trial.

**Setting:** Hospital.

**Participants:** Twenty-four patients referred for manipulation of a frozen shoulder.

**Intervention:** The patients were randomized into 2 groups. One group received an injection of corticosteroid and manipulation; the other was only administered manipulation during anesthesia.

**Main Outcome Measures:** The degree of shoulder mobility and pain before and after the manipulation.

**Results:** Manipulation under anesthesia increased the mobility of the affected shoulder. Injection with lidocaine and betamethason did not enhance the effect of the manipulation.

**Conclusion:** Manipulation under anesthesia without intra-articular corticosteroids is recommended as the therapy for frozen shoulder.

**Key Words:** Adhesive capsulitis; Anesthesia; Corticosteroids; Rehabilitation; Shoulder.

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**A**DHESIVE CAPSULITIS of the shoulder (frozen shoulder) is characterized by gradually increasing stiffness and pain. Diabetes<sup>1</sup> and hemiplegia<sup>2</sup> increase the risk of this condition, but in most cases no predisposing disorders are noted. Approximately 2% of the population in southern Sweden suffers from frozen shoulder sometime in life.<sup>3</sup>

Restriction of passive shoulder mobility is the leading clinical finding associated with adhesive capsulitis. Rotation movements are restricted the most, and abduction is more restricted than flexion. Shoulder radiography and ultrasound examinations show normal findings, but arthrography reveals mutilation of synovial folds and restriction of the intrasynovial space, neither of which is noted in other shoulder disorders.

Untreated capsulitis usually resolves on its own in 1 to 3 years and does not return to the same shoulder.<sup>3</sup> However, the condition causes severe pain that may require medication for several months.

Physiotherapy,<sup>4</sup> injections with local anesthetics and corti-

sone,<sup>5</sup> and manipulation under anesthesia<sup>6</sup> have been used to speed up recovery. The effects of the treatments for shoulder symptoms have rarely been evaluated in randomized comparative studies thus far.<sup>7</sup> However, 1 study<sup>8</sup> showed that intra-articular corticosteroid injections were more effective than physiotherapy. Injections have also been used in combination with manipulation under anesthesia.<sup>9</sup>

This study sought to compare the effectiveness of 2 of the currently used treatment methods for capsulitis, manipulation and manipulation plus corticosteroid injections.

## METHODS

Thirty patients admitted to the Jorvi Regional Hospital, Finland, between June 1995 and March 1996, were included in the sample base. The diagnosis of capsulitis was determined on the basis of a typical anamnesis and the restriction of passive joint movements in a clinical examination. Anteroposterior x-rays were taken to exclude other shoulder disorders.

Two specialists in physiatry (JK, TP) examined and treated the patients. Patients were asked about previous diseases, medication, and shoulder symptoms. Passive mobility in flexion, abduction, and external rotation was measured by using a goniometer. Mobility in flexion and abduction was defined by the maximal angle between the arm and midline of the body while the subject was in an erect position. Mobility in external rotation was defined by the maximal angle between the vertical line and the antebrachium when the patient was supine and his/her elbow was flexed 90°. Mobility in inner rotation was graded from 1 to 15, according to the patient's ability to bring his/her hand behind his/her back<sup>10</sup>: hand at hip level was graded as 1, hand at the level of vertebra L4 as 7, and hand at the level of vertebra T5 as 15.

Manipulation under anesthesia was recommended for the patients whose glenohumeral flexion was less than 140°. These 30 patients were informed of the possible effects of manipulation, and about the randomization into corticosteroid and non-corticosteroid groups. No patient refused treatment.

Manipulation under anesthesia was performed by 1 of the 2 physiatrists. Relaxation for the procedure was achieved by using a barbiturate administered intravenously by an anesthesiologist. The patient's arm was first moved toward flexion while the scapula was fixed. Thereafter, the arm was stretched in inner and outer rotation.

Half of the patients were randomized into the corticosteroid group; they received an intraarticular injection of 1mL of betamethason (6mg/mL) and 4mL of lidocaine (10mg/mL). The anesthesiologist prescribed pain medication according to the estimated postmanipulation pain.

The ranges of the shoulder movements were remeasured at 1 day and at 4 months after manipulation.

During the follow-up examination, 4 months after manipulation, patients were asked whether, in their opinion, the procedure had been useful, harmful, or neither. Patients were also asked to evaluate the length of time their shoulder pain had hindered dressing or sleeping after manipulation. Six of the 30 patients were unable to attend the follow-up examination be-

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**Table 1: Shoulder Mobility Before, at 1 Day After, and at 4 Months After the Manipulation**

	Manipulation With Steroid Injection (n = 13)			Manipulation Without Steroid Injection (n = 11)		
	Mean	SD	p <sup>xy</sup>	Mean	SD	p
<b>Flexion (deg)</b>						
Before manipulation	101	14		109	21	
1 day after manipulation	148	18		157	18	
4 months after manipulation	156	24		159	24	
			<.001			<.001
<b>Abduction (deg)</b>						
Before manipulation	83	15		85	14	
1 day after manipulation	145	17		144	18	
4 months after manipulation	147	18		150	15	
			<.001			<.001
<b>Outer rotation (deg)</b>						
Before manipulation	27	22		28	14	
1 day after manipulation	43	20		48	17	
4 months after manipulation	49	22		47	20	
			<.001			<.001
<b>Inner rotation (rating 1-15)</b>						
Before manipulation	2.5	2.0		1.6	0.9	
1 day after manipulation	3.5	1.6		4.7	3.6	
4 months after manipulation	5.9	3.8		8.4	4.1	
			<.001			<.001

Abbreviation: SD, standard deviation.

cause they were no longer living or working near the hospital. Therefore the results of only 24 patients (12 men, 12 women) have been used in our comparison.

Among the patients attending the follow-up examination, 13 patients received the corticosteroid injection and 11 did not. The mean age of the entire group was 51 years (range, 35-68yr). The mean duration of the shoulder symptoms was 7 months (range, 3-18mo). For 12 patients, capsulitis affected their right shoulders; for the other 12, it was the left shoulder. Diabetes had been diagnosed for 1 patient. Another had previously had surgery and radiotherapy for breast cancer; she had not had any recurrence of the cancer. Two other patients had had a shoulder distension injury some weeks before the capsulitis was verified.

**Data Analysis**

The chi-square test was used for the statistical testing of contingency tables, and the result were considered statistically

**Table 2: Postmanipulation Shoulder Symptoms**

Duration of Symptoms	Pain Hampering Sleep (n = 24)	Pain Hampering Dressing (n = 24)
1 week after manipulation	17	10
1 month after manipulation	4	7
More than 1 but less than 3 months after manipulation	2	4
3 months or more after manipulation	1	3

**Table 3: Medication for Shoulder Pain Due to the Manipulation\***

Postmanipulation Pain Medication	Women (n = 15)	Men (n = 9)
None	0	3
Only anti-inflammatories	5	5
Only euforizing analgetics	1	0
Anti-inflammatories and euforizing analgetics	9	1

\* p < .01.

significant when p was less than .05. The effect of manipulation on shoulder mobility was studied with the regression analysis.

**RESULTS**

Under anesthesia, shoulder stiffness was noted, and during manipulation a typical rasping noise occurred for all the patients. These findings indicated that the clinical diagnosis had been accurate.

After the procedure, average shoulder mobility improved (table 1). For 22 patients, manipulation clearly increased shoulder mobility, and the improvement was still evident after 4 months. For the other 2 patients, shoulder mobility remained significantly restricted.

In the follow-up examination at 4 months, all the patients indicated that the procedure had diminished their shoulder symptoms. Only 3 of the 24 reported that their shoulder pain still hampered their dressing or sleeping (table 2).

Medication for postmanipulation shoulder pain was not related to the patients' age, duration of shoulder symptoms, shoulder mobility prior to manipulation, or the intraarticular corticosteroid injection. The women received more effective pain medication than the men (table 3).

The increase in shoulder mobility and the decrease in shoulder pain was equal in the corticosteroid and noncorticosteroid groups. Patients' age, gender, other disorders, and duration of shoulder symptoms were not related to the effect of the manipulation.

**DISCUSSION**

In this study, a prompt increase in shoulder mobility and decrease in shoulder symptoms followed manipulation under anesthesia. Such changes are not known to occur in untreated capsulitis, hence they are related to the manipulation. In an earlier study,<sup>10</sup> also done at our hospital, 82% of 113 patients reported that the manipulation procedure had helped them. Both that study and the present one indicate that manipulation under anesthesia is a useful way to treat frozen shoulder. We recommend further studies in which patients with frozen shoulder are randomized to "manipulation" and "no manipulation" groups. In this study, we manipulated all our patients. A control group with anesthesia but without manipulation was not used.

**CONCLUSION**

Intraarticular corticosteroid injection in conjunction with manipulation under anesthesia is not beneficial for capsulitis. However, manipulation under anesthesia is recommended for treating capsulitis.

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