



# IDIOPATHIC UNILATERAL FROZEN SHOULDER;

## COMPARISON OF KALTENBORN TECHNIQUE WITHIN AND WITHOUT RANGE OF MOTION EXERCISES IN THE MANAGEMENT OF FROZEN SHOULDER.

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**ABSTRACT... Introduction:** Frozen shoulder or adhesive capsulitis is a condition affecting the glenohumeral joint and leads to restricted painful shoulder. It is very debilitating. This not only affects the activities of daily living of a person but job related chores too. The inflammation of the capsule of the glenohumeral joint causes pain and restriction of the motion. Adhesive capsulitis can be characterized as primary or secondary. It can be secondary due to any underlying disease such as cervical spondylosis or diabetes mellitus. People affected seek different treatment options for this debilitating condition such as taking non-steroidal anti-inflammatory drugs (NSAIDs), steroid injections, taking physical therapy and some even go for surgical interventions. **Objective:** the objective of this research was to find out whether Kaltenborn mobilization technique alone improved the restricted shoulder abduction range of motion in better way or a combination of Kaltenborn mobilization and range of motion exercises was a better option. **Study Design:** randomized clinical trial (RCT). **Setting:** Fatima Memorial Hospital (FMH) Shadman Lahore. **Period:** a period of 6 months. **Material and Methods:** Group I: Thirty patients participated in this group and were treated with Kaltenborn mobilization technique along with range of motion exercises. Group II: The second group also consisted of thirty patients and were treated with Kaltenborn mobilization technique without range of motion exercises. **Sample Size:** Sixty patients were included in the research by taking 30 patients in each group. Systematic sampling was used in which all the odd ordered patients (1<sup>st</sup>, 3<sup>rd</sup>, 5<sup>th</sup> etc.) were included in group I while all the even ordered patients (2<sup>nd</sup>, 4<sup>th</sup>, 6<sup>th</sup> etc.) in group II. **Results:** For abduction the mean change was  $29.33 \pm 10.65$  in combination while for kaltenborn alone the mean change was  $12.30 \pm 4.06$ . The values obtained for shoulder abduction were significantly higher in Kaltenborn + ROM group, p-value < 0.05. **Conclusion:** A combination of Kaltenborn mobilization along with range of motion exercises showed better results in improving shoulder abduction range of motion.

**Key words:** Kaltenborn mobilization, ROM, abduction, frozen shoulder, adhesive capsulitis

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## INTRODUCTION

Adhesive capsulitis is a condition in which the individual experiences pain and loss of range of motion, either active or passive. This may occur in almost all planes particularly external rotation.<sup>1</sup> The condition progresses into fibrosis and ultimately contracture of joint capsule.<sup>2</sup> It is generally recognized as self-limiting process with unknown etiology.<sup>3,4</sup> Adhesive capsulitis is a one of the most difficult conditions to treat.

The differential diagnosis includes acromioclavicular arthropathy, autoimmune disease (e.g.,

systemic lupus erythematosus, rheumatoid arthritis), biceps tendinopathy, glenohumeral osteoarthritis, neoplasm, rotator cuff tendinopathy or tear (with or without impingement) and subacromial as well as subdeltoid bursitis.

Conservative treatments include analgesics (e.g., acetaminophen, nonsteroidal anti-inflammatory drugs), oral prednisone, and intra-articular corticosteroid injections. Home exercise regimens and physical therapy are often prescribed. Non-conservative treatments include manipulation of the joint under anesthesia and capsular release.<sup>5</sup>

Therapeutic exercises include articular stretching and pulley therapy. Passive articular stretching exercises improve ROM. Many electroanalgesic and thermoanalgesic modalities are often used in physical therapy.<sup>6,7,8</sup> To gain the glenohumeral ROM different manual therapy techniques such as mobilizations are used. Some of such mobilization techniques are Kaltenborn mobilization technique and Mulligan mobilization technique. The effects of different techniques of mobilization on the frozen shoulder had been studied by Yang et al., in which effectiveness of mobilization with movement (MWM), midrange mobilization (MRM) and end range mobilization (ERM) were compared. All of them proved to be equally beneficial.<sup>9</sup>

A dissertation was conducted by Tharanath on the comparison of KALTENBORN and Mulligan mobilization techniques in the improvement of range of motion in frozen shoulder. The abduction range of motion was measured after the application of mobilization techniques and found that Mulligan mobilization was more effective than Kaltenborn mobilization.<sup>9</sup>

Shorter lever rotational manipulations introduced by James Mannel in 1940, reduced the possibility of joint damage by preventing compressive forces on the joint. This concept is used by the physical therapists.<sup>10,11</sup>

Kaltenborn is a concept of translatory linear bone movements in the form of linear translatory traction and gliding in relation to treatment plane. These movements further reduce the compressive forces on the joint. Gliding and traction are called joint play movements which are assessed by feeling the amount of slack in the movement and sensing the end feel. It was introduced by Kaltenborn in 1954.<sup>11</sup>

In the current study a combination of Kaltenborn along with range of motion exercises was used to treat the adhesive capsulitis in one group and kaltenborn alone in the other group. Participants in both groups received mobilization treatments three times a week for 20 minutes in each session.

## OBJECTIVE

The main objective of the current study was to compare the effectiveness of kaltenborn within and without range of motion exercises for improvement in the abduction ROM.

## MATERIALS AND METHODS

### Study Design

Comparative interventional study.

### Setting

Study was conducted at Fatima Memorial Hospital (FMH) Shadman Lahore.

### Duration

Study was conducted over a time period of 6 months.

## STUDY GROUP

### Group I (Experimental group)

Thirty patients participated in this group and were treated with Kaltenborn mobilization technique along with range of motion exercises

### Group II (Control group)

The second group also consisted of thirty patients and were treated with Kaltenborn mobilization technique without range of motion exercises.

### Sample Size

Sixty patients were included in the research by taking 30 patients in each group.

### Sampling Technique

Systematic sampling was used in which all the odd ordered patients (1<sup>st</sup>, 3<sup>rd</sup>, 5<sup>th</sup>etc.) were included in group I while all the even ordered patients (2<sup>nd</sup>, 4<sup>th</sup>, 6<sup>th</sup>etc.) in group II.

## SAMPLING SELECTION CRITERIA

### Inclusion Criteria

All the patients with idiopathic frozen shoulder within age limit of 40-60 years were included in the study.

### Exclusion Criteria

- Diabetes (according to the clinical data)
- Arm fracture (according to the clinical data)
- Heart disease (according to the clinical data)

- CVA (according to the clinical data)
- Post surgical stiffness of involved side (according to the clinical data)
- Dislocation of the shoulder (according to the clinical data)
- Malignancy (according to the clinical data)
- Tendonitis (according to the clinical data)

**METHODOLOGY**

Participants in both groups received mobilization treatments three times a week for 20 minutes in each session.

The subjects were given analgesics to subside pain so that they would in a position to tolerate the range of motion exercises and Kaltenborn mobilization techniques. No other interventions—including physical modalities (i.e.ultrasound, short-wave diathermy, and electrotherapy), intra articular steroid injection, or arthrographic joint distension ---were allowed for the duration of the trial as theses modalities may soften the stiff capsule and affect the outcomes of the main intervention.

ROM was measured by a Goniometer.<sup>12</sup> The ROM was measured for shoulder abduction.

The materials used in the research were the mobilization belts, towel rolls and treatment table.

**RESULTS**

Table-I the following table shows the changes in ROM before and after the application of techniques.

	Study groups	Mean	S.D	p-value
Abduction Change	Kaltenborn + ROM	29.33	10.65	<0.001
	Kaltenborn	12.30	4.06	

For abduction the mean change was 29.33±10.65 in combination while for kaltenborn alone the mean change was 12.30±4.06.

The values obtained for shoulder abduction were significantly higher in Kaltenborn + ROM group, p-value < 0.05.

**DISCUSSION**

Adhesive capsulitis or frozen shoulder is a debilitating condition in which all of the movements of shoulder joint are restricted. Patient feels pain and difficulty in performing the activities of daily livings. Both active and passive range of movements of the joint are restricted especially the external rotation.<sup>1</sup>

This condition is characterized by the inflammation of joint capsule due to fibrosis and produces the contractures in the joint.<sup>2</sup> It is mostly accepted that the injury to the shoulder joint can lead to scar formation, which can lead to the adhesion formation and movement restriction.<sup>3</sup>

There are different types of treatment that people use for adhesive capsulitis. The treatment options include surgery, medications, acupuncture and physiotherapy.<sup>14</sup> Even this condition can also be cured with a natural process and needs not any medical treatment to seek.

In one of the study conducted by vastamakiet al., it was observed that the frozen shoulder patients recovered naturally without any medical treatment but it was time taking. Duration of the disease averaged 15 months in untreated group.<sup>15</sup>

While this study showed the improvement in the restricted abduction ROM in a shorter period of time using a combination of Kaltenborn and ROM exercises.

In one of the study Tashjan established that in adhesive capsulitis pain, ROM and overall outcome were improved by steroid injections, laser therapy, some mobilization techniques, arthrographic distension and supra scapular nerve block.<sup>16</sup>

This study demonstrated that only the combination of kaltenborn along with ROM exercises improved the range instead of using multiple treatment options at the same time.

Another study which was conducted by De Carleiet al., said that manipulation and arthroscopic arthrolysis or intra-articular steroid injection were

equally beneficial in improving ROM of shoulder joint.<sup>17</sup>

In this study non-invasive treatment option was used to achieve the same result i.e. the improvement in the restricted range of the glenohumeral joint.

Another study conducted by Roh et al., it was established that the corticosteroid injection decreases the pain perception, so rapid up the functional recovery. But these improvements were present more obvious in the early post injection period.<sup>18</sup>

While the combination therapy comprising grade 1 and grade 2 mobilization reduced pain due to adhesive capsulitis instead of giving steroid injections.

Park et al. suggested another treatment option which was sono-guided capsular distension and fluoroscopically guided capsular distension for the treatment of adhesive capsulitis. It had comparable effectiveness. Fluoroscopic capsular distension method of treatment can have disadvantages as far as radiation hazard mitigation, time, cost-effectiveness and convenience is concerned.<sup>19</sup>

This study was cost effective non-invasive and radiation hazard free for achieving the same results.

There is a limited data available regarding mobilization technique used for the treatment of adhesive capsulitis. None of the above mention studies suggested the use of mobilization technique as a primary or important treatment option. In this study Kaltenborn mobilization technique along with ROM exercises in idiopathic unilateral frozen shoulder was used for improving abduction. This combination of treatment proved good in establishing the near to normal ROM of the shoulder joint.

## CONCLUSION

This research established that Klatenborn mobilization technique along with ROM exercises proved to be more beneficial than mobilization

alone in improving abduction ROM affected due to idiopathic frozen shoulder.

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*You can't soar like an eagle if you hang out with pigeons.*

– Unknown – ”

**AUTHORSHIP AND CONTRIBUTION DECLARATION**

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