EFFECTS OF MOBILIZATION IN SUB-ACUTE AND CHRONIC FROZEN SHOULDER (ADHESIVE CAPSULITIS) MANAGEMENT

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Abstract

Objectives
To find out consequences of sub-acute (EARLY) as well as late (chronic) mobilization in the frozen shoulder management.

Study Design
The research design is Quasi Experimental study.

Study Settings & Participants
Total 100 patients were enrolled with a history of frozen shoulder; they were randomized selected. This is experimental study. In the following two different groups, group A for early mobilization which is known as sub-acute while other was group B for late mobilization which is also diagnosed as chronic. All participants received alternate treatment sessions for six weeks. All individuals got same mobilization technique for their range of motion that was restricted along with T.E.N.S for pain management and heating pads for muscle relaxation. All the participants in group A and group B were examined by SPADI scoring before as well as after the treatment sessions.

Results
Total 85 patients out of 100 were present to be re-assessed after the all sessions. It has been observed that there is a difference in the mean of pain score that is assessed by VAS scale. Both groups show decreased pain intensity. There is a significant difference in SPADI score before and after mobilization. Before treatment group ‘A’ mean SPADI score baseline treatment was 67.72 and after treatment it was 54.28. In group ‘B’ before treatment, mean SPADI score baseline treatment was 63.76. While at the end of treatment sessions for group B it was 53.24. p-value is less than 0.05.

Conclusions
The result evident that earlier mobilization technique was found to be more effective as compared to late mobilization applied for improving range of motion in the participants who were suffering from restricted range of motion due to adhesive capsulitis (frozen shoulder). Both groups show a significant decrease in the SPADI score.

Keywords: Adhesive Capsulitis, Mobilization, Manual Therapy, SPADI, Joint Mobilization, End range Mobilization, High grade mobilization.

Introduction
The frozen shoulder is used to describe painful and disabling condition of the shoulder joint; the symptoms indicate tightness and stiffness of the structures. These symptoms result in greatly restricted range of motion; condition is also known as adhesive capsulitis or frozen shoulder. These all symptoms or conditions attempt to refer to underlying pathophysiology condition. These conditions might be muscular origin or could be bursa. Shoulder is a complex joint including joint of it and soft structures, which make it complex to understand, treat or explain.1,2

These Conditions are very complex and confusing the term frozen shoulder or adhesive capsulitis, comprises of several theories such as paricapsulitis, adherent bursitis, obliterator bursitis. It is too confusing. The true global decline in shoulder movements also known as shoulder range of motion and is defined by the term knows as adhesive capsulitis, it related to the findings after surgery definitive adherence of the capsular part of the joint, capsule adhere to the head of humerus.3
In another word Adhesive capsulitis is defined as syndrome as its purest understanding it is idiopathic, painful and limited movements of the shoulder complex the results show globally restricted and painful shoulder joint. The causes of frozen shoulder is not understood and not related with specific underlying conditions. This condition is defined as a case of unidentified cause and categorized as a condition that is painful and disabling disorder or limitation of all joint motion. This partial or complete restoration of motion is gradually progressive over month to year, and this restoration is spontaneous.

In 1945 Neviaser\(^4\) was given the term ‘adhesive capsulitis’ for painful stiffening of the shoulder. In other study Codman\(^4\) describe the frozen shoulder as a Painful and stiff problems of shoulder complex which have onset that is insidious with stiffness and chronic pain. Being impossible to sleep on the effected side. However in 1872 Duplay the person originally described the problem as periarthritis capulo-humeral\(^5\). Now the terms commonly known as frozen shoulder\(^6\). The condition affects 2-5% of general adult population, 20% with diabetes\(^7\). Total effected population includes 70% adult women\(^8\). Males suffer from greater disability and recovery may also take longer\(^9\). Still the exact cause of this pathology is unknown. In literature two types recognized that is idiopathic and secondary adhesive capsulitis.\(^10\)

If frozen shoulder arises spontaneously without a specific precipitating incident it called idiopathic (primary) frozen shoulder. An abnormal response of immune system causes chronic inflammation response with fibroblastic proliferation\(^11\), which may really cause of primary adhesive capsulitis. After a shoulder injury or surgery arise Secondary adhesive capsulitis (Frozen Shoulder), Or might be related to any other condition, which may include injury to the rotator cuff, diabetes as 71%, and cardiovascular disease or (CVA) cerebro vascular accident as happen to be 25% of the accidents which occurred within the period of six months may limit the maximum recovery of the condition and also affect the outcome of the disorder\(^12\).

Generally frozen shoulder present itself within three different stages\(^13\). 1\(^{st}\) stage is defined as painful or freezing stage. Patients normally assume that pain will resolve on its own eventually with their home remedies, and may not present through this stage but the stiffness and pain progress. Pain degenerates and more limits the passive range of motion and active range of motion as well. It reflects that patient must look for medical help. This stage last between 3-9 months is considered as acute synovitis of glenohumral joint.\(^14\)

2nd stage called frozen or transitional stage; most of the participants progression take place towards traditional stage. A patient experience during 2nd stage shoulder soreness might not necessarily degenerate. Just only due to distress at the end range of motion and limited mobility of the shoulder may be causing muscular disuse. This 2nd stage frozen shoulder last between 4 -12 months. Most restricted motions are external shoulder rotation, and then shoulder flexion, and internal rotation of shoulder, called capsular pattern of historical restriction. In the frozen stage eventually becomes a point that the patient does not feel Painful end range of movement.

When range of movement starts to get improve the third stage starts. This stage is defined by gradual improvement of shoulder mobility. This stage consists of 12-42 months. A patient present with range of motion limitation. External rotation is more restricted which is known as capsular pattern. This is more limited as compare to shoulder abductors and flexors.

Main aim of the treatment is to manage the pain and restore the normal functional range of motion, so person must be able to perform their functional activities. Treatment consists of different techniques and
modalities. This includes electrotherapy, stretching exercises, strengthening exercises muscle mobilization and massage is also used with the rest of the treatment. Ultra sound, T.E.N.S, heating pad and massage are helpful in decreasing pain.\textsuperscript{15,16}

Adhesive capsulitis can be treated with physical therapy, although frozen shoulder (adhesive capsulitis) is mostly consider about to become a self-limiting issue.\textsuperscript{17,18} The normal range of movement is regained when there is application of stretching technique which is passively applied in all planes of motion. For this purpose mobilization technique is also used.\textsuperscript{19,20}

Maitland concept is based on principle of subjective / objective assessment, evaluation and treatment plan of neuromuscular skeletal disorder by the use of manipulation technique or manipulative physiotherapy. And it’s defined by The IMTA (international Maitland Teachers Association).\textsuperscript{21} If joint limitations occur by the result of pain then Maitland mobilization techniques of Grade 1 and also the grade 2 are of primarily used for treating this condition. The inhibitory effects of oscillations on the perception of painful stimuli by stimulating repetitively mechanoreceptors those are supposed to block nociceptive pathway present at the level of brain stem and spinal cord. The nutrition of cartilage is improving by the synovial fluid whereas Grade 3 and 4 have primary function of providing stretching maneuvers although non-stretch motions can help to travel the synovial fluid. Appropriate range of Maitland Mobilization techniques only supposed to take place when there is complete assessment, evaluation and examination is done.\textsuperscript{22}

As it was mentioned earlier the therapeutic determination and rehabilitation of capsulitis is very challenging. The aim of using this technique is to find out and evaluate the effects of Maitland mobilization in the treatment of frozen shoulder. Benefit connected with Maitland approach will be hypothesized that is far more effective compared to typical exercise routine in case there is adhesive capsulitis.\textsuperscript{23}

Although there are several questionnaires within this existing do the job however the (SPADI) shoulder pain and disability index can be a dependable as well as self-administered questionnaire. This questionnaire is dependent on a couple of measurements, just one pertaining to pain assessment as well as other pertaining to routine activities.\textsuperscript{24}

**Research Significance**

To gauge the capability connected with dealing with adhesive capsulitis inside shoulder together with Mobilization designed for delay treatment possibilities that is needs to be proposed. Standard or to evaluate your strength associated with dealing with adhesive capsulitis in the glenohumeral joint combined with Mobilization, suitable for proper treatment choices and this can be recommended typical.

**Methods and Material**

**Sampling Technique**
people existing with sub-acute and chronic frozen shoulder which are getting trouble in carrying out ADLs e. g. Overhead task.

**Study Design**
The design of this research was Quasi Experimental study.

**Study Setting**
This Investigation had been executed in outpatient Department associated with physiotherapy in tertiary care hospital of Karachi.
Duration of study
Duration of research is six months after approval of synopsis.

Sample size
Total 100 patients are enrolled in this research.

Sampling technique
Non-probability, purposive sampling techniques are used for this research.

Instruments And Tool
Functional activities assess by SPADI score.
VAS is used to assess pain.

Inclusion criteria:
Both genders are selected with the age group between 40-60 years. They are clinically diagnosed Adhesive Capsulitis with decreased active range of motion/passive range of motion and impaired performance of daily living (ADLs).

Exclusion criteria
Those individuals are not included in this research who had a history of fracture, dislocation, shoulder open wound, inflammatory arthritis, frozen shoulder with the history of stroke, cervical spondylosis, acute stage of frozen shoulder, maximum limitation of ROM about< 45 degree and other disease like malignancy and Systemic connective tissue disease, Elderly individuals with weakened connective tissue and Marked Osteoporosis; are also excluded in this study.

Ethical approval
Starting of the exploration concur appeared to be obtained from evaluation panel and also created agreement seemed to be gained from the actual individuals as well as the information kept confidential. The aim of this specific exploration is described before commencing the research.

Data Collection Procedure
According to inclusion criteria the patients refer to outpatient department of physiotherapy treatment for the complaint of sub-acute and chronic frozen shoulder was enrolled for this study after the written informed consent. All affected individuals were examined before starting the treatment as well as after mobilization then evaluated conclusions. Pain intensity was seemed to be determined by Visual Analog Scale, functional activities and shoulder movement was seemed by SPADI (Shoulder Pain and Disability Index).

Data analysis procedure
SPSS (Statistical package of social science) is used to review data inside the result to analyze with typical deviation of quantitative variables, result ended up being computed intended for additional qualitative variables including discomfort.

Result
Total 100 patients were evaluated to determine the pre and post treatment, SPADI score for related symptoms in tertiary care hospital. They all are randomized enrolled and divided into two groups. Total 25 patients are male and 60 female patients with the mean age of 50.89 ± SD 4.95 (range 40-60 years)] be there assigned. Frequency of patient mentioned in Table 1.
Table 1: Gender

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>percent</th>
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<tbody>
<tr>
<td>Male</td>
<td>25</td>
<td>29.4%</td>
</tr>
<tr>
<td>Female</td>
<td>60</td>
<td>70.6%</td>
</tr>
<tr>
<td>Total</td>
<td>85</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Figure 1:

Total 85 patients out of 100 were present to be reevaluated after the treatment session. 40 patients in the first group that is sub-Acute and 45 patients in the second group that is Chronic, frequency are defining in table 2 and Figure 2. All the participants in group A and in group B were examined before the treatment as well as after the treatment sessions at physiotherapy department under the supervision of physiotherapist.

Table 2: Group Distribution

<table>
<thead>
<tr>
<th>groups</th>
<th>frequency</th>
<th>percent</th>
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</thead>
<tbody>
<tr>
<td>Sub-acute</td>
<td>40</td>
<td>47.1%</td>
</tr>
<tr>
<td>chronic</td>
<td>45</td>
<td>57.9%</td>
</tr>
<tr>
<td>total</td>
<td>85</td>
<td>100%</td>
</tr>
</tbody>
</table>

Figure 2:

Both groups were experience same treatment such as T.E.N.S (transcutaneous electrical nerve stimulation), cold pack, heat pack and ROM exercises and were given Maitland mobilization grade IV and V. Practical outcomes had been evaluated while using the SPADI ranking in addition to soreness or pain had been evaluated by visual analog scale (VAS). Assessments had been attained just before treatment as well as replicated by the end of 6th weeks after treatment. Pre and post treatment SPADI score were evaluated. The
mean value of pain on VAS before treatment was 5.47±1.56 and after treatment was 1.70±0.46 p<0.23 (Table 3).
While Chronic Group that is ‘B’: the mean pain value on VAS before treatment was 5.31±1.53 and after treatment was 1.66±0.47 p<0.23 (Table 3).

Table 3: Comparison of VAS before treatment and after treatment:

<table>
<thead>
<tr>
<th></th>
<th>group</th>
<th>mean</th>
<th>SD</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before treatment</td>
<td>Group A</td>
<td>5.47</td>
<td>1.56</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.70</td>
<td>0.46</td>
<td>&lt;0.23</td>
</tr>
<tr>
<td></td>
<td>Group B</td>
<td>5.31</td>
<td>1.53</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.66</td>
<td>0.47</td>
<td>&lt;0.23</td>
</tr>
</tbody>
</table>

Group A: before treatment the mean shows SPADI score baseline treatment was 67.72±12.25 and in after treatment it was 54.28±11.48 p<0.00 showed in Table 4.
Group B: before treatment observed the mean SPADI score baseline treatment was 63.76±11.51 and after treatment was 53.24±11.76 p<0.00 mentioned in Table 4.

Table 4: Comparison of SPADI before treatment and after treatment:

<table>
<thead>
<tr>
<th></th>
<th>group</th>
<th>mean</th>
<th>SD</th>
<th>P value</th>
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</thead>
<tbody>
<tr>
<td>Before treatment</td>
<td>Group A</td>
<td>75.88</td>
<td>4.48</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20.86</td>
<td>2.00</td>
<td>&lt;0.00</td>
</tr>
<tr>
<td></td>
<td>Group B</td>
<td>85.78</td>
<td>12.54</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>32.51</td>
<td>5.61</td>
<td>&lt;0.00</td>
</tr>
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</table>

Discussion

The result of this study shows satisfactory relationship in the treatment of adhesive capsulitis/frozen shoulder by the use of mobilization technique and also supports early interventions.47.1 % were those patients who were suffering from frozen shoulder and had earlier manipulation done, they showed better improvement in range of motion and greater decrease in pain.20.86 % was the mean SPADI for those individuals.32.51 were the mean SPADI for those who had late mobilization done. This difference was small and statistically considered significant p value that is 95% confidence interval of the difference. 25

The results obtained on VAS for both of the groups happened to be slightly better. The difference was not able to consider as significant p=0.23 at 95% confidence interval. The application of manipulation technique
we applied shows to improve the sign and symptoms of disorder. 38 shoulders were manipulated by 97% of patients result show relief in pain and helpful in regain the full range of motion. 25

Another study done by Hill and Bogumill in 1988, testified on 17 shoulders manipulated, and result describe 70% of the affected individuals could actually return to functional routines or work within 3 months. But In 2005 Farrell et al discovered large and also sustained development in useful activities, after on average follow-up of 15 years. They verified a long-term improvement of 70° in shoulder flexion and 53° in external rotation of shoulder joint following manipulation, and a final mean Simple Shoulder Test score was 9.5 out of 12 (12 being excellent). 26

The aims of Maitland Joint mobilization techniques usually are assumed to inspire different helpful results. The neurophysiologic result is based on the inhibition of nociceptors and also the stimulation of peripheral mechanoreceptors. Unluckily, less number of scientific researches has been done to demonstrate efficaciousness associated with articulation mobilization over other styles associated with treatments for frozen shoulder for improving ADLs. However, there is certainly technological research in which people treated along with mobilization, with or without concurrent intervention had better outcomes. 27

Conclusion
this result shows that the earlier/acute condition manipulation technique were found to be even more effective as compared to late or chronic manipulation technique. In patients with adhesive capsulitis /frozen shoulder group A and group B shows a significant reduction in score of SPADI. scapula thoracic dyskinesia should be evaluated, and Muscle imbalance of the shoulder complex should be given the importance when assessing, evaluating and planning treatment for such disorders.

Acknowledgment
I am truly fortunate on the Almighty ALLAH who's presented me personally while using the chance to examine and help make my personal fantasy possible.
I would like to be able to say thanks to my parents, siblings whose valuable support encouraged me and gave me the self-confidence during the study and I would thankful all the subjects who were a part of this study without which this task would not have been possible.

Reference


