Physical Therapy When Used Along With Electrical Modalities In Order To Improve the Range Of Motion in Frozen Shoulder Is More Beneficial Than Using Modalities Alone

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ABSTRACT
The aim of the study is to determine that physical therapy when used along with electric modalities in order to improve the range of motion in frozen shoulder is more beneficial than using modalities alone. 20 subjects were selected for this experimental study with frozen shoulder. The subject were divided into two intervention groups; one with 10 subject treatment plan included both electrical modalities and stretching exercises, second group with 10 subject treatment consisted of only electrical modalities. Tool used for assessment were Visual analogue scale to measure pain and goniometer was used for measuring range of motion at shoulder joint. The analysis was done to measure the difference of effectiveness of both intervention, independent t-test showed significance difference between both intervention groups (<0.05 p) for both dependent variables (pain and range of motion).

KEYWORDS: ADHESIVE CAPSULITIS, EXERCISE THERAPY, DEGREE OF PAIN

INTRODUCTION
Frozen Shoulder or Adhesive Capsulitis is a joint problem characterized by severe joint pain, stiffness and with progressive restriction of movement in all planes at the shoulder joint, this condition can persist for several years (Neviaser, 1962). It is a common joint condition that affects about 2% of general population annually. Etiology of Frozen shoulder is unknown or it occurs after trauma, the term adhesive capsulitis is used for the idiopathic cases. Other associating factors of frozen shoulder includes female gender, age above 40, trauma, immobilisation, diabetes, thyroid disease, stroke, and myocardial infarction, and autoimmune diseases, cervical spine disorders and reflex sympathetic dystrophy syndrome (Neviaser, 1962) (Goldberg , Scarlat , & Harryman , 1999). Frozen shoulder typically involve three phases, first painful phase, leading to gradual joint stiffness, second stiffness phase, pain gradually reduce with marked increase in joint stiffness in all movement planes and the third thawing phase, slow regain in movement and pain relief (Reeves, 1975).
A variety of treatment interventions are used for frozen shoulder; from heating or ice pack application, Transcutaneous Electrical Nerve Stimulation (TENS), ultrasound, PNF techniques, mobilization techniques, passive and active exercises (Uysal et. al, 2004) (clan., 2009) (Nykanen et. al., 1995). Some studies suggest that joint mobilization is beneficial in increasing Range of Motion (ROM) when combined with other methods of physical therapy interventions (Yang et. al., 2007) (Van Den Hout et. al., 2005) (Aj et. al., 2007).

A study examining the effects of superficial thermal agents and shoulder stretching exercises in normal subjects produced lasting changes in soft tissue extensibility than stretching alone. Author suggested this occurs because superficial heating can cause muscle relaxation leading to reduce tissue resistance therefore increasing joint ROM (Lentell, Hetherington, Eagan, & Morgan , 1992). On the other hand, another study suggested that stretching exercises alone could increase the extensibility of soft tissues thus increasing the ROM of shoulders (Vermeulen , Oberman , Burger, Kok, Rozing, & Van DEn Ende, 2000). There is a lack of evidence to support the use of electrical modalities along with stretching in managing patients with frozen shoulder. Therefore, the aim of this study was to determine whether the combination of electrical modalities with stretching exercises would produce more effective results than heating alone in the management of frozen shoulder.

METHODOLOGY
The study was conducted in the physical therapy department of Liaquat National Hospital & Medical College, Karachi. 20 subjects, 15 male and 5 female between the ages of 30 to 70 were selected for this study from the Out Patient Department. All these patients were diagnosed with Frozen Shoulder in the first phase of disease with decreased Range of motion and different degrees of pain. Patients with other shoulder problems like, Gleno Humeral Arthritis, Rotator cuff tendinitis and bicipital tendinitis and those who refused participation were excluded. Each subject's score of Range of Motion we measured through goniometry and pain was measured through visual analogue scale and were recorded at baseline, after every 6th session. A total number of 24 treatment sessions were there with 3 sessions per week. The study was conducted for a period of 2 month.
**Treatment Plan and Procedure**
This was an experimental study and the subjects were divided randomly into two groups on the therapist discretion. The subjects for both groups have comparable characteristics in terms of pain status, and reduced joint range.

**Treatment Regimen for Group 1:**
The subjects participated in a 50 to 60 minute’s physical therapy session. 3 days a week for 8 weeks (2 months). The session consisted, the application of electrical modalities following stretching exercise and mobilization of the joint. The electrical modalities and their application times were as.
- Short Wave Diathermy (S.W.D) applied for 15 min.
- Therapeutic Ultra Sound (U / S) with Duty cycle of 75% applied for 3 minutes
- Stretching exercise and Mobilization session 15 minutes*
- Transcutaneous Electrical Nerve Stimulation (TENS) applied for 20-25 minutes.
*During the stretching and mobilization sessions there were 5-10 minutes relaxation / Rest period were also provided.
Treatment Regiment for Group 2:
The subjects participated in a Non exercise Group who only taken different modalities for a period of 40-50 minutes, 3 days a week and for 2 months (8 weeks). Modalities were same as for group as for group 1 and for the same time duration but no manual therapy were employed.

Analysis
An assessment record was kept for the two dependent variables that is reduced range of motion and degree pain. The assessment data was recorded after each treatment session for both the group. For data analysis and test of significance for group comparison was done through SPSS 16. Independent t-test was used to compare the effectiveness of both interventions.

RESULT
Characteristics of the Data Presided Through Tables and Graph
The baseline assessment of both group showed severe degree of pain on VAS 80% patients’ scores we found between 8 to 10 values (Table 1). Almost all of the patients showed marked reduced in their range of motion with 90% of patients had 60% reduce in range of motion (Table 2) The result from 6th session assessment showed reduction in pain both groups but the percentage of reduction was twice in group 1 as compared to group 2. However no change in ROM was reported in the assessment in both groups (Fig 1: 6th session assessment).
The result from 12th session assessment showed further reduction in pain both groups and the percentage of reduction was 100 in group 1. Change in ROM was reported in the assessment in four patients in group 1 where 20% range of motion increase was reported (Fig 2: 12th session assessment).
The result from 18th session assessment showed further reduction in pain both groups and the percentage of reduction was 100 in both groups. Change in ROM was reported in the assessment in all the patients in group 1 where 20% range of motion increase was reported in four patient and remaining six had 40% increase in range of ROM from baseline assessment (Fig 3: 18th session assessment).
The result from 24th session assessment showed further reduction in pain both groups with patients reported mild pain with movement. Change in ROM was reported in the assessment in all the patients in group 1 where 40% range of motion increase was reported in two patient and eight had 60% increase in range of ROM from baseline assessment and patients in group 2 also showed increase in Rom with 20% increase reported in five patients, 2 showed 40% increase and only one patient showed 60% increase in range of motion.(Fig 4: 24th session assessment).

For Comparing Both Intervention Groups
The result from independent t-test showed significant difference between the 2 intervention groups (all p < 0.05) at 95% confidence interval for both the dependent variables i.e. degree of pain and change in range of motion.

DISCUSSION
Study suggest that the use of modalities with the mobilization and stretching exercise can increase the functional capacity of the shoulder joint as early as compared with the patient who only taking electrical modalities, similar study comparing the effectiveness
of short wave diathermy (deep heating agent) and superficial heating in combination with stretching exercise suggested that using heating modalities in conjunction with stretching lead to early increase in range of motion (Leung & Cheing, 2008). Another study suggested ultrasound and interferential treatment are not very effective as used in combination of manual exercises (Van Der Heijden, et. al., 1999). However the author considers that for better statistical evidence a larger sample must be studied which includes data from other settings as well, as present data was only collected from physiotherapy and rehabilitation department of Liaquat National Hospital & Medical College.
REFERENCES


Annexure

Table 1: Degree of pain (Visual Analogue Scale)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate 4-7</td>
<td>4</td>
</tr>
<tr>
<td>Server 8-10</td>
<td>16</td>
</tr>
<tr>
<td>20</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 2: Range of Motions

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>60% reduced</td>
<td>18</td>
</tr>
<tr>
<td>40% reduced</td>
<td>2</td>
</tr>
<tr>
<td>20</td>
<td>100.0</td>
</tr>
</tbody>
</table>

6th Session Assessment

- Group 1: 6
- Group 2: 3

Number of Patients

Reduce Pain

Change in ROM