5 Days Comparative Study To Evaluate The Effectiveness Of Therapeutic Ultrasound And Elastic Resistance Band Exercises Versus Therapeutic Ultrasound And Conventional Exercises In Acute Trapezitis: A Randomized Clinical Trial

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ARTICLE INFO

Article History:
Received: Feb 16, 2015
Accepted: March 4, 2015
Published: March 12, 2015

Key Words:
Pain
ROM
Therapeutic Ultrasound
Elastic resistance band

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Abstract

Background. Trapezitis is musculoskeletal condition in which inflammation of trapezius commonly seen as a result of faulty posture, overuse, stressful neck movement. Patient usually presents with complaints of pain, decreased range of motion and difficulty in activities of daily living.

Objective. To compare the effectiveness of elastic resistance band exercises and conventional exercises along with therapeutic ultrasound as a common intervention in acute trapezitis within 5 days.

Methodology. 30 participants were recruited following convenient sampling technique for elastic resistance band exercises and conventional group. Pre and post outcomes were measured by NDI, ROM and VAS

Results. Both the interventions are statistically significant within the group but have no significance difference between the groups.

Conclusion: both the interventions are effective to reduce pain, increase neck range of motion, and increase neck function. Hence, it’s cost effective for the acute trapezitis management.

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INTRODUCTION
Trapezitis is defined as the inflammation of trapezius muscle leading to stress pain which is present even during rest and is aggravated by activity. This pain may be referred to other area from the primary site of inflammation. The upper trapezius muscle is designated as a postural muscle of neck and it is highly susceptible to overuse. The percentage of Indian population to be affected with neck pain depends on the work environment and posture that is acquired all day long. The ratio of prevalence in males and females in India is 1:10 and 3-5% of the population is affected worldwide.

Professionals working at desks and computers, or individuals who drive for a long period of time are more prone for this condition as the upper trapezius muscle becomes painful and spasmodic. Limitation of range of motion along with neck pain and a feeling of stiffness may be experienced by the person which is precipitated or aggravated by neck movements.

Physiotherapy interventions for trapezitis includes treatment such as massage, stretching and different modalities like IFT, TENS, heat, cryotherapy, exercise therapy in addition to techniques like positional release therapy. Therapeutic Ultrasound is a modality which involves the generation of high frequency sound waves and their transmission through the skin to the structures desired to be affected. According to a study done, using continuous mode of ultrasound has proved to be more effective in relieving pain than the pulsed mode of ultrasound.

Exercises have proved to be very important for neck pain. These exercises strengthen the muscle, help in increasing the range of motion, and improve mobility thus reducing the chance of recurrence of trapezitis. Neck isometric exercises cause contraction and relaxation of the neck muscles thus massaging all the toxins which are responsible for causing inflammation. Also the muscle fibres are strengthened due to the same. Neck muscle exercises if given thus will prove to be beneficial in improving stability of the neck muscle.

Numerous studies using Therapeutic ultrasound along with other manual techniques such as myofascial release, positional release therapy, ischemic compression etc. which have shown improvement in relieving pain and improving function in trapezitis. However there is paucity in literature which tends to compare the effectiveness of elastic resistance band exercises and conventional exercises.

METHODS AND MATERIALS
A pre-post experimental study was conducted on 30 subjects in a tertiary care hospital. Inclusion criteria was age group between 18-30, subjects diagnosed with acute trapezitis. Exclusion criteria was history of recent surgery to neck, shoulder and upper back region, wound over the neck region, radiating pain. Ethical approval was obtained prior to the study. Written informed consent was taken from the subjects. For each patient baseline assessment was obtained and brief demonstration about intervention explained. All subjects were instructed to discontinue if they had any form of discomfort during the procedure.

PROCEDURE
Before intervention all required procedure was demonstrated and well explained to the subjects by the principal investigator and asked to stop if any discomfort developed.

Patients were divided into two groups:
Group A was treated with therapeutic ultrasound with the frequency of 3MHz, with continuous mode and an intensity of 0.1-1.5 W/cm² for a duration of 5 min was given with the patient position back rest, stretching followed by elastic resistance band exercises:
- Elastic resistance band shrugs, lateral raise, Back pull down exercise and Upright row
1 set of 10 repetitions
Group B was treated with therapeutic ultrasound, stretching and conventional exercises:
- Static neck exercises
- Strengthening exercises: shoulder shrugs and scapular retraction
1 set of 10 repetitions.

Outcome measures used in this study were visual analogue scale, neck disability index, and universal goniometer. At the end of the 5 days session again post assessment was documented for pain, movements of neck using VAS, ROM, NDI.

DATA ANALYSIS
Statistical analysis was done using SPSS software version 16. Inter group comparison of the pre intervention and post intervention outcome measures was done using students unpaired t-test whereas VAS comparison was done using Wilcoxon’s signed rank test. The probability values less than p<0.05 were considered statistically significant.

Results: On analysing the demographic profile was found that the mean age was 25.1 & 24.6 and the mean BMI was 22.6 & 23.4 for group A and group B respectively.
Group Number of participants Mean age Mean BMI

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of participants</th>
<th>Mean age</th>
<th>Mean BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>15</td>
<td>25.1</td>
<td>22.6</td>
</tr>
<tr>
<td>Group B</td>
<td>15</td>
<td>24.6</td>
<td>23.4</td>
</tr>
</tbody>
</table>

**t** = 0.368  \( t = 0.833 \)

**p** = 0.716  \( p = 0.412 \)

**VAS score** (table 2)

The difference in mean VAS after 5 days of intervention was 4.4±1.76 and 4.2 ± 1.71 in group A and group B respectively. p value by Wilcoxon signed rank test was found to be 0.210 which was statistically not significant. Whereas the p value within group A was < 0.001 and within group B was <0.001 using paired t-test which states that it was significant.

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre treatment</th>
<th>Post treatment</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>6.8±1.30</td>
<td>2.4±1.18</td>
<td>4.4±1.76</td>
</tr>
<tr>
<td>Group B</td>
<td>7±0.79</td>
<td>2.8±1.32</td>
<td>4.2±1.71</td>
</tr>
<tr>
<td>( T )</td>
<td>0.507</td>
<td>0.727</td>
<td>0.210</td>
</tr>
<tr>
<td>( P )</td>
<td>0.616</td>
<td>0.473</td>
<td>0.835</td>
</tr>
</tbody>
</table>

**Neck Disability Index (NDI)** (table 3)

The difference in NDI after 5 days of intervention was 18.4±8.38 and 15.3±3.88 in group A and B respectively. The p value using unpaired t-test was found to be 1.308 which was statistically not significant. Whereas the p value within group A was < 0.001 and within group B was <0.001 using paired t-test which states that it was significant.

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre treatment</th>
<th>Post treatment</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>27±8.11</td>
<td>8.6±3.67</td>
<td>18.4±8.38</td>
</tr>
<tr>
<td>Group B</td>
<td>25.4±8.91</td>
<td>10.1±7.85</td>
<td>15.3±3.88</td>
</tr>
<tr>
<td>( T )</td>
<td>0.527</td>
<td>0.661</td>
<td>1.308</td>
</tr>
<tr>
<td>( P )</td>
<td>0.602</td>
<td>0.516</td>
<td>0.201</td>
</tr>
</tbody>
</table>

**Neck ROM** (Table 4) The difference in flexion range was 4.8±4.8 and 3.2±2.06 in group A and B respectively with p value 0.248 which was clinically not significant where as the p value within group A was 0.001 and <0.001 in group B which was clinically significant.

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre treatment</th>
<th>Post treatment</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>43.7±6.82</td>
<td>48.8±5.86</td>
<td>5.1±2.41</td>
</tr>
<tr>
<td>Group B</td>
<td>38.2±6.41</td>
<td>43.1±5.41</td>
<td>4.9±2.12</td>
</tr>
<tr>
<td>( t )</td>
<td>2.289</td>
<td>2.783</td>
<td>0.241</td>
</tr>
<tr>
<td>( P )</td>
<td>0.030</td>
<td>0.010</td>
<td>0.811</td>
</tr>
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</table>

**DISCUSSION**

In the present study, the age group of the subjects was in the range of 18-30 years. The mean age of the subjects in group A was 25.1 years and the mean age of subjects in group B was 24.6 years. A study stated that neck pain is common at

approximately 40 years of age. The findings of this study cannot be correlated with the results of the present study as the present study’s result showed that neck pain was found to be more common in the earlier age group that is from 18-30 years of age. The reason for this could be faulty posture, working at the computer desks, emotional stress, individuals driving for a long period of time, muscular imbalance etc.

Many authors have stated that females are more prone to neck pain than males. Study has proved that trapezitis mainly affects females more than males which can be correlated with the result of the present study as our present study consisted of 6 males and 24 females. These results contradict another research which suggested that neck pain is common and is equal in both males as well as in females. Similar results were obtained by another researcher who also suggested that neck pain is common in females than males.

An article on myofascial trigger points using different treatment modalities used continuous mode of therapeutic ultrasound for 5 mins 0.1 -1.5 watts/cm² supports the treatment parameters of ultrasound used in the present study. It concluded stating that continuous mode of ultrasound was effective in treating subjects having myofascial trigger points. But this article was contradicted by another article which proved that pulsed ultrasound is effective to treat patient with trapezius myalgia as compared to the continuous mode of therapeutic ultrasound. In the present study we have used continuous mode of ultrasound for 5 mins 0.1 -1.5 watts/cm² in treatment of acute trapezitis and found that it was beneficial for the subjects who had acute trapezitis.

A research done to investigate muscle activation in perceived loading during upper extremity resistance exercises with dumbbells versus elastic resistance bands proved that high levels of muscle activation were obtained during both the interventions and stated that therapists can choose either type in clinical practice this supports the use of elastic bands in our study.

Conventional exercises used in our study have shown improvement in subjects as they neurologically inhibit pain or involuntary muscle contraction long enough to allow movement past the barrier with isometric neck contraction, there is a stimulation of muscle proprioceptors which may produce pain relief according to the pain gate theory where in the mechanoreceptor afferents carried by the large diameter axon inhibits nociceptor afferents at the dorsal horn of spinal cord.

In the present study we have used VAS, Neck Disability Index, and Cervical Range of motion as the outcome measures and have found clinical significance with the same and hence both the treatment interventions are effective in treatment of acute trapezitis and none of the treatment intervention is superior to the other. Another research done to evaluate the effectiveness of positional release technique on trapezitis had used the same outcome measures as used in our study and found statistically significant difference in pre and post intervention.

CONCLUSION

The present study concluded that both the treatment interventions that is elastic resistance band exercises and conventional exercises along with therapeutic ultrasound have proved to be effective in reducing pain, improving range of motion and reducing disability in subjects with acute trapezitis.

Conflict of Interest: None

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