

## RESEARCH REPORT

# COMPARISON OF TRIGGER POINT PRESSURE RELEASE WITH ULTRASOUND THERAPY TO DECREASE RHOMBOIDS TRIGGER POINTS PAIN

### ABSTRACT

#### OBJECTIVE

To compare the effects of trigger point (TrP) pressure release with ultrasound therapy to reduce rhomboid pain due to TrP.

#### STUDY DESIGN

Experimental study

#### STUDY SETTINGS

Outpatient department of Ziauddin Hospital, Clifton campus, Karachi, Pakistan.

#### SAMPLE SIZE

50 patients

#### SAMPLING TECHNIQUE

Simple random sampling. The patients were divided into two groups of 25. Group A were given TrP pressure release treatment with exercise and group B were given ultrasound (u/s) treatment with exercise.

#### OUTCOME MEASURES

The outcome measures were visual analog scale (VAS) for pain and functional rating index (FRI) for functional performance

#### RESULTS

In group A, mean pain score on VAS before the treatment were  $5.88 \pm 1.130$  and after treatment were  $1.80 \pm 1.041$  with a p-value of  $<0.006$ . Group B, mean pain score on VAS before treatment were  $6.56 \pm 1.446$ , after treatment were  $2.72 \pm 1.208$ , with a p-value of  $<0.006$ . The mean FRI in group A before treatment was  $39.92 \pm 2.691$  and after treatment was  $29.60 \pm 5.454$ , with a p-value of  $0.002$ . The mean FRI in Group B before treatment was  $41.12 \pm 2.505$  and after treatment was  $35.92 \pm 4.183$ , with a p-value of  $0.002$ .

#### CONCLUSIONS

The study indicates that there is no significant difference between TrP pressure release and u/s therapy in relieving pain and improving functional performance in subject with rhomboid TrP.

#### KEYWORDS

Rhomboid Spasm, Rhomboid Sprain, Upper Back Pain, Ultrasound, Trigger Point, Functional Rating Index.

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## INTRODUCTION

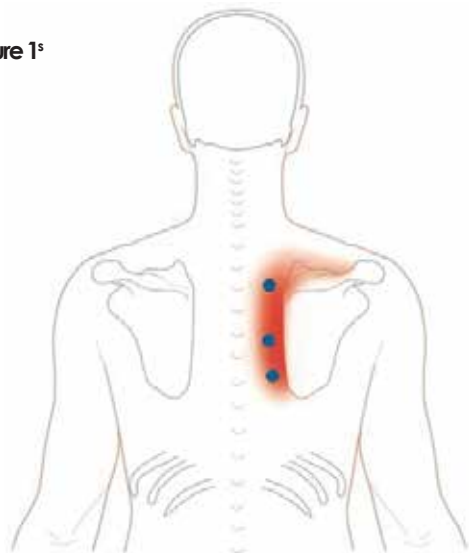
Myofascial trigger point pain is a hyperirritable spot in skeletal muscle that is associated with a hyper-sensitive palpable nodule in a taut band<sup>1,2</sup>. The spot is tender when pressed and can give rise to characteristic referred pain, motor dysfunction and autonomic phenomena<sup>3</sup>.

It is a particularly established reason of constant pain disorder in all areas of the body. Diagnosis is made on the basis of precise palpation with 2–4 kg/cm<sup>2</sup> pressure for 10–20 seconds on the deduced trigger point to elicit the referred pain pattern to build up<sup>4</sup>.

There are two rhomboid muscles, which extend from the spine to the medial aspect of the scapula in the middle back. It is present under the Trapezius. The function of the rhomboids is to arrange the scapula throughout different movements of the shoulder and arm. EMG has shown that these muscles are highly active in Shoulder Abduction and slightly active in flexion and extension (arm swinging movement) during walking which indicates that these muscles, along with some other muscles of the shoulder joint, provide stability to the scapula. The weakness in rhomboids arises from rounded shoulders and depressed sternal posture, commonly<sup>5</sup>. Strain in rhomboid muscle or spasm in rhomboid muscle is most of the times caused by repetitive movement or overuse of the shoulder and arm in forward elevation, usually in activities such as serving a tennis ball or reaching to put objects on a high shelf, and prolong computer use<sup>6</sup>.

The trigger point of rhomboid minor is present medially to the internal edge of the scapula along with the spine of scapula. The trigger points in the rhomboid major are two in number (as shown in Fig. 1) one above the other, along the medial edge and lower part of the scapula<sup>5</sup>.

Figure 1\*



It is evident from figure 1 that the trigger points in rhomboids are beneath the trapezius muscle so it may be hard to identify them if the trapezius is tense or has trigger points. That is why it is pertinent to rule out the trapezius trigger points. Figure 1 also indicates the referred pain site of the rhomboid trigger points. The pain is mainly present in the part between the medial borders of the scapula and the spine. There is also indication that the pain may radiate upwards in the shoulder. It is also noticeable that the trigger point pain patterns of rhomboid and levator scapulae are very identical with only one exception that the pain pattern of rhomboid does not radiate to neck<sup>5</sup>.

The clinical findings or symptoms may include aching; but not deep pain inside the shoulder blade, resting pain; not aggravated or relieved by movement and the pain is relieved by rubbing. Rounded shoulders, sunken chest posture, tight pectoralis, cracking or grinding sounds around the shoulder medial aspect during arm movements are all the indications of rhomboid weakness or trigger points<sup>5</sup>.

Given that trigger point is the tightening mechanism of the muscle in a shortened position, the management of the trigger point should include loosening the contracted state of the muscle<sup>7</sup>.

This may be possible by applying different management and treatments. Aggravating factors that may cause prolong overuse or stressed injuries on muscles, must be reduced. Pharmacologic cure in musculoskeletal pain consists of painkillers and medications to encourage sleep and loosen up muscles. 'Antidepressants, neuroleptics, or nonsteroidal anti-inflammatory drugs (NSAIDs)' are usually given to such patients<sup>8</sup>.

Treatment modalities other than pharmacotherapy may consist of acupuncture, osteopathic manual medicine techniques, massage, acupressure, ultrasonography (ultrasound [u/s] therapy), application of heat or ice, diathermy, transcutaneous electrical nerve stimulation (TENS), ethyl chloride spray and stretching techniques, dry needling, and trigger-point injections with local anesthetics, saline, or steroids<sup>8</sup>.

Trigger Point Pressure Release involves applying pressure with a finger or other instruments to the trigger point and increasing the pressure as the trigger point "releases" and softens<sup>7</sup>.

The pressure applied to relieve a trigger point should induce a pain of not more than 5/10 on a VAS scale. The time needed to press the trigger points can be nearly 8 – 12 seconds<sup>9</sup>.

According to Srbely et al, ultrasound (u/s) is an effective tool to reduce the sensitivity of trigger

points. They stated that u/s helps in instant and intense reduction in trigger point sensitivity. Furthermore, u/s can be effectively included in any rehabilitation protocol. It was identified in their research that five minute u/s helps in the reduction of sensitivity of trigger points by 44.1% in patients with myofascial pain syndrome. They surmised that u/s may be used as a gainful apparatus for the management of trigger points and myofascial pain syndrome<sup>10</sup>.

The aim of this research is to find out the effectiveness of trigger point pressure release or ultrasound therapy in the management of rhomboid trigger point pain.

## METHODOLOGY

### Study design

Experimental study

### Sample size

A sample size of 50 patients was calculated through Open Epi with a point prevalence of 18.1% at 95% of confidence interval. Margin of error is 0.05.

### Study settings and participants

50 patients who met the inclusion criteria were selected from the outpatient department of Ziauddin Hospital, Clifton campus, Karachi, Pakistan.

### Study duration

The total duration of the study was 6 months

### Sampling technique

Simple random sampling technique with two groups A and B, each comprising of equal number of members i.e. n=25

### Inclusion criteria

- 20 – 50 years of age
- Upper and middle back soreness for more than 3 months
- Restricted shoulder movements due to upper and middle back pains
- Medically stable
- Males and females

### Exclusion criteria

- No history of previous injury to upper or middle back regions
- No previous trapezius or levator scapulae trigger points
- No Systemic or psychological problems nor any nerve root involvement
- No Orthopedic problems other than rhomboids' strain or spasm nor any history of back surgery
- No Red flags such as cancer and yellow flags such as ankylosing spondylitis

### Ethical considerations

Written consent was taken from the participants and the management for the conduction of this

research keeping in mind the confidentiality of the patient's information

### Outcome Measures

Functional disability was measured by Functional Rating Index (FRI) Visual analog scale (VAS) was used to measure pain

### Interventions

Patients in group A (n=25) were given 10 sessions of Trigger Point Pressure Release treatment and exercise therapy for about 20 minutes. Whereas, the patients in group B (n=25) were given exercise therapy and ultrasound therapy at 1 MHz frequency with an intensity of 1.5 W/cm<sup>2</sup> using Grey's formula to estimate the total time period for u/s application on each individual<sup>11-13</sup>. The ERA of the transducer was written as 5 cm sq. The total treatment time calculated was 8 minutes. Exercise therapy included supervised workout plan starting with warm ups and stretching routine for upper extremities and upper back. Abdominal toning and paravertebral strengthening were added according to patient's condition. Both the groups received the treatments for a time period of 4 weeks.

### Data analysis

Data analysis was done by SPSS version 20 and t-test was applied.

### Avoiding co-interventions

To avoid bias, patients were requested not to take any new pain medications or follow any other exercise regime from the start of the study till the end of it followed by follow-up.

## RESULTS

Standardized assessments forms were made to record patient's data. Outcome assessments were done by patient's answering the questionnaire.

An aggregate of 50 patients were randomized by simple random sampling technique and divided into 02 equivalent groups of 25 each. The number of male and female patients was 20 and 30 respectively [Mean age 37.62 years SD 7.44 (range 20-50 years)] were dispensed (Table: 1).

	Frequency	Percentage
Male	20	40%
Female	30	60%
Total	50	100%

All patients were available to be re-evaluated after the end of 4 weeks of treatment. 25 patients in group A (trigger release + Ex) and 25 patients in group B (u/s + Ex). The patients were dealt with for 4 weeks (Table 2).

**Table 2: Post Treatment Availability**

	Frequency	Percentage
Trigger release+ Ex	25	50%
U/S+Ex	25	50%
Total	50	100%

**Group A**

The results shown in Table 3 indicate that the mean pain score on VAS before treatment were  $5.88 \pm 1.130$ , but after treatment VAS score were decreased and intensity of pain was  $1.80 \pm 1.041$ , with a p-value  $<0.006$ .

**Group B**

It was observed that mean pain scores on VAS before treatment were  $6.56 \pm 1.446$  and after treatment it was decreased and new value  $2.72 \pm 1.208$  p-value  $<0.006$  (Table 3)

**Table 3: VAS Scores**

		Mean	SD	p-Value
Group A	Before	5.88	1.13	$<0.006$
	After	1.8	1.04	
Group B	Before	6.56	1.44	$<0.006$
	After	2.72	1.2	

It was observed that the mean of FRI in group A before the treatment was  $39.92 \pm 2.691$  and after treatment the score was  $29.60 \pm 5.454$ .

The result of group B shows that the mean of FRI before the treatment was  $41.12 \pm 2.505$  but after treatment score decreased, new value was  $35.92 \pm 4.183$ .

Both the results of group A and B are shown in table: 4

**Table 4: FRI Scores**

		Mean	SD	p-Value
Group A	Before	39.92	2.69	0.002
	After	29.6	5.45	
Group B	Before	41.12	2.5	0.002
	After	35.92	4.18	

**DISCUSSION**

The results present in our study suggest that there was no significant difference in both the groups that received trigger point pressure release technique or u/s therapy in the management of rhomboids trigger points. Unfortunately there is no published research available to identify the effects of trigger point pressure release or u/s therapy or any comparative study between the two on rhomboids. But, analogous researches to this study have been done by other researchers on different body muscles such as iliotibial band<sup>14</sup>, subscapularis muscle<sup>15</sup>, iliopsoas<sup>16</sup>, neck and upper back muscles<sup>17</sup>, scalenei muscles<sup>18</sup>, shoulder girdle muscles<sup>19</sup>, masticatory muscles<sup>20</sup>, upper trapezius muscle<sup>21</sup>.

Zaky L.A. identified that trigger points pressure release increases the blood supply in the part of the trigger point thus undoing the ongoing lack of blood supply. This helps in inhibiting the trigger points and relaxes the fascial adhesions which in turn decreases the pain and improves the functional movement. In inactivating the trigger point u/s therapy is an effective modality. U/s has also been proven to be valuable for the treatment of deep muscle trigger points<sup>22</sup>. These findings were identical in our research as well which shows no significant difference in the p – value of both groups.

The findings in an article by Kaintz B. were also supportive of our research which suggested that when manual techniques were applied with some other therapeutic modality or therapy it yields better results. The systematic review also suggested that u/s with high–power or phonophoresis may prove to be better as compared to conventional u/s<sup>23</sup>.

A case series published by Mario Pribicevic et al applied manual therapy (cross-friction massage and ischaemic pressure) with phonophoresis u/s and shoulder exercises on shoulder muscles and concluded that it was beneficial for the relief of pain and return to function, in shoulder impingement syndrome which is consistent with the results of our research<sup>24</sup>.

A study conducted by Aguilera FJ et al concluded that massage therapy along with u/s in latent myofascial trigger points of trapezius revealed no significant difference between the efficacies of the treatments further supporting our results<sup>25</sup>.

The limitation of this study is the inclusion of exercise therapy with the trigger point pressure release and ultrasound therapy in both the groups. Exercise therapy may be the factor to influence no significant difference in the outcomes of the groups. A research should be conducted that should involve the treatment with trigger point pressure release and ultrasound therapy alone on different groups.

## CONCLUSION

The present study provides evidence to support the use of trigger point pressure release and ultrasound therapy in relieving pain and improving functional performance in subjects with UBP due to rhomboids. The results also suggest that there is no significant difference between the two treatments in alleviating pain or improving functional performance of rhomboids.

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