

# EFFECTIVENESS OF MANUAL THERAPY AND MYOFASCIAL TRIGGER POINT THERAPY IN MANAGEMENT OF UPPER TRAPEZIUS MYOFASCIAL TRIGGER POINTS

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## ABSTRACT

**AIM** To determine the effectiveness of manual therapy and myofascial trigger point therapy in management of upper trapezius myofascial trigger points.

**METHOD** This study was a single blinded randomized control trial conducted at outpatient service department of physiotherapy, Khyber Teaching Hospital, Peshawar. Total of 30 patients with upper trapezius myofascial trigger points (MTrPs), aged between 20-60 years were selected by consecutive sampling technique. Patients who fulfilled the inclusion criteria were randomly assigned into two groups having 15 patients each with equal male to female ratio. One group received manual therapy at C3-C4 level. Other group received MTrPs therapy. Total 6 treatment sessions, 3 sessions per week for 2 weeks duration with one week follow up were given on a schedule starting from Monday, Wednesday and Friday or from Tuesday, Thursday and Saturday. A home exercise program composed of upper trapezius stretch, deep cervical strengthening and scapular stabilization exercises were also prescribed to the patients in both groups for 3 weeks duration starting from first treatment session till last follow up session. Visual analogue scale (VAS) and neck disability index (NDI) were used as standards for assessment of pain and disability. Initial data was taken at start of the treatment prior to the treatment sessions and final follow up data by the end of third week.

**RESULTS** Results showed significant improvement in pain and disability ( $P \leq 0.05$ ) in both groups.

**CONCLUSION** It is concluded that both manual therapy and MTrPs therapy were equally effective in management of upper trapezius myofascial trigger points.

**KEY WORDS** Upper trapezius trigger points, Manual therapy, Myofascial trigger point's therapy, Upper trapezius pain.

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## INTRODUCTION

Myofascial trigger points (MTrPs) is a highly common condition worldwide having 85% prevalence.<sup>1,2</sup> It is one of the major health concern.<sup>3</sup> MTrPs are extremely frequent<sup>4</sup> and leading source of musculoskeletal neck pain seen in clinical practice affecting 45%-54% of the general

population during their life span.<sup>5,6</sup>

MTrPs resides mostly in upper trapezius muscle,<sup>2</sup> in active working adults aged 20-65 years.<sup>7</sup> MTrPs have a crucial role in causing disability which adversely affects functional activities of the individual.<sup>8</sup> Despite being an important physical and economic threat to the society,<sup>6</sup> myofascial trigger points are usually

overlooked.<sup>8</sup>

MTrPs are hyperirritable spots located in a taut band of a skeletal muscles, when compressed, overloaded or stretched generate pain in typical referred patterns.<sup>9</sup> Myofascial trigger points are divided into active and latent trigger points.<sup>9,10</sup> Active trigger points produces the patient's recognized pain pattern when stimulated by compression or movement. MTrPs can also give rise to muscle weakness, tightness, sensory and autonomic characteristics.<sup>9,11</sup> The worst of all is their improper treatment that can lead to severe disability.<sup>5</sup>

MTrPs can arise due to several different reasons and are associated with various factors.<sup>10</sup> Most common-

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ly, MTrPs develop as a result of injury, overuse, sustained contractions, eccentric and maximal concentric contractions of muscles, which result in shortening of muscles and local ischemia. Any factor that puts over load on a muscles such as prolonged postures, poor ergonomics,<sup>12</sup> occupational demands, sports or recreational activities can form a muscle TrP because muscle use goes beyond the boundary of muscle capacity and limits the normal recovery.<sup>11</sup> Hypo-mobility invariably culminate in MTrPs activation resulting in pain.<sup>13</sup> Similarly, tightness in muscles can also assist hypo-mobility in the relevant vertebral segments crossed by those muscles.<sup>13,14</sup>

An authentic etiological explanation of MTrPs is given by "The integrated hypothesis" which is a combination of energy crisis and dysfunctional motor end plate mechanism.<sup>11</sup> According to this hypothesis, trigger points are locations of dysfunctional end plates causing maximum contractions in portions of the muscle fibers. These maximum contraction regions are also known as contraction knots. This is associated with excessive acetylcholine (ACh) release, which ensures availability of calcium ions and hinders the uptake process of calcium pump. As a result sarcomere shortening and taut band formation occurs.<sup>15</sup> Ultimately compression of the local blood vessels occur while causing ischemia and a state of tissue distress. Decrease in ATP as well as release of sensitizing substances such as bradykinin and substance p occurs, which act on the local nociceptors. In addition to that Reduced PH (lactic acid production due to anaerobic compensatory mechanism) and autonomic system influences in such regions also triggers ACh release. Thus a self-perpetuating vicious cycle initiates resulting in MTrP formation.<sup>10,16</sup>

Typically, individuals diagnosed with MTrPs rely on pharmacological treatment options<sup>17</sup> that give temporary relief by partially subsiding the pain. Other management includes physical therapy interventions, which may not be readily available

for most residents of the developing world.

To date, a number of physical therapy invasive and non-invasive interventions<sup>18</sup> have been employed for management of MTrPs which consist of acupuncture,<sup>19,20,21</sup> dry needling,<sup>19,20,21</sup> anesthetic injections, steroidal and non-steroidal injections,<sup>18</sup> spray and stretch,<sup>19</sup> ultrasound,<sup>22,23</sup> myofascial therapy or ischemic compression, Myofascial release, passive stretching, transcutaneous electrical nerve stimulation, laser,<sup>18</sup> muscle energy techniques and Myofascial manipulation. Myofascial TrP therapy and dry needling are mainly chosen options.<sup>24,25</sup> But there is no universal recognition of one standard intervention. Other manual therapies such as mobilization and manipulation<sup>14,26</sup> of hypomobile cervical spine segments have also gained significant attention but have yet to reach clinical practice.<sup>27</sup>

A strong relationship exists between MTrPs in upper trapezius muscle and joint hypo mobility at the C3-C4 segmental region.<sup>26,28</sup> A study recommended that spinal manipulation applied at C3-C4 level caused remarkable reduction in pain as well as stiffness due to upper trapezius MTrPs.<sup>28</sup> Another scientific research showed that facet injections at C4-C5 or C5-C6 levels inactivated trigger points of upper trapezius muscle.<sup>2</sup> These approaches are based on activation of mechano-sensory systems both central and peripheral that feed into Trigger Points.<sup>15</sup>

Due to complexity of the problem, it is necessary to develop a "personalized" strategy for treating MTrPs in which all precipitating and perpetuating factors must be taken into consideration for each MTrPs patient.<sup>17</sup> A large number of studies evidenced Myofascial therapies as an effective treatment for relieving MTrPs in upper trapezius. This technique cause local hyperemia, stretching, reflexive and counter-irritant effects is considered as an excellent approach for resolving abnormality at peripheral level in the locality of MTrPs.<sup>9,29</sup>

Although mobilization a low velocity rhythmic oscillatory movement<sup>30</sup> remains in its infancy, yet, this technique has shown promising results in preliminary studies for management of upper trapezius MTrPs.<sup>27,8</sup> In order to become clinically acceptable intervention for treating MTrPs, more data needs to be accumulated to undoubtedly prove its effectiveness.<sup>27</sup>

There were no studies available comparing mobilization with Myofascial therapy in treating upper trapezius MTrPs. The aim of this study was to compare the effectiveness of manual therapy and myofascial trigger point therapy in management of upper trapezius myofascial trigger points.

## METHODS

This study was a single blinded randomized control trial conducted at outpatient service department of physiotherapy, Khyber Teaching Hospital, Peshawar. Total 30 patients with upper trapezius active MTrPs (age range 20-60 years) were included in the study. Informed consents were attained from the patients.

Inclusion requirements for participants were age 20 to 60 years. Patients from both genders, Palpable MTrPs in upper trapezius, Active MTrPs in upper trapezius, Jump sign plus radiating pain produced in respective pattern when pressure applied, Pain during rest or upper trapezius contraction, Ipsilateral neck stiffness and at least 3 points pain recorded on VAS.

Subjects underwent a screening process to establish the presence of active MTrPs in upper trapezius and hypo mobility at C3-C4 spinal segments. Diagnosis of active MTrPs was done by following the criteria suggested by Travell and Simon which consist of presence of point tenderness, taut band, local twitch response and specific pain pattern production easily recognized by the patient. All the patients enrolled were diagnosed with having active TrP1 with referred pain in a unilaterally upward directed pattern covering posterior lateral region

of neck ending on mastoid process where as in severe cases followed a question mark shaped pain pattern.

Patients with Same pain due to any other reason not related to trapezius MTrPs, acute trauma, inflammation, advanced cervical osteoporosis, history of neoplasm or malignancy, fibromyalgia, Infections, surgery of cervical spine or neck, lesions within upper trapezius, cardiovascular abnormality, fractures, skin disease in target area, vascular abnormalities (VBI), sensory impairment in trapezius region, treatment or medication taken at time of study were excluded from the study.

Patients were randomly allocated into two groups by using consecutive sampling. Group 1(n=15) received manual therapy and group 2(n=15) received myofascial trigger point therapy as a treatment techniques.

Patients in group1 (experimental) received grade III unilateral mobilization at C3-C4 facet joint on the symptomatic side only. In order to apply this technique all the patients were directed to attain a prone position on the treatment couch with both hands placed under forehead and cervical spine placed in neutral position. Therapist for performance of the intervention stood near the head of the patient and placed tips of both the thumbs inclined towards patient's eyes on the C3-C4 facet joint of the symptomatic side. Mobilization session consisting of 3 sets of 30 repetitions for 30 seconds with 5 seconds gap between each set was applied. The entire process was completed within 3 minutes.

Total 6 treatment sessions, 3 sessions per week for 2 weeks duration with one week follow up were given. Treatment sessions were organized on a schedule starting from Monday, Wednesday and Friday or from Tuesday, Thursday and Saturday.

In group 2, (standard control group) Myofascial TrP Therapy consisting of a combination of ischemic compression, isometric contraction and stretch of upper trapezius in a cyclic manner were given.

For application of the treatment,

patients were directed to acquire a supine position with head fully supported on the treatment couch. Upper trapezius MTrPs were palpated by positioning the muscle in tension free state. This relax state was achieved by placing hands on abdomen and head laterally flexed towards the same side to reduce tension in the muscle. MTrPs were identified using the standard diagnostic criteria and ischemic compression were applied either with thumb or index finger for 30 seconds to 1 minute until the patient reported a decrease in the pain. This was repeated 2 to 3 times.

Following ischemic compression (IC) isometric contraction was performed and was held for 10 seconds. For this therapist's hands were placed on ipsilateral shoulder and lateral aspect of head and patients were instructed to bring head and shoulder on the symptomatic side close to each other against the resistance to the movement maintained by the therapist thus producing an isometric contraction After this stretch was given by moving apart head and ipsilateral shoulder away from each other. Three to four sets of this protocol were given to the patients in each session. Three sessions per week for 2 weeks duration on scheduled days were given with one week follow up. In addition to the interventions applied, a home exercise program composed of upper trapezius stretch, deep cervical strengthening and scapular stabilization exercises was prescribed to the patients in both groups for 3 weeks duration starting from first treatment session till last follow up session.

VAS was used for assessment of pain and NDI was used for assessment of disability using a validated questionnaire.

Initial outcome measures data was taken at day one of the treatment prior to the treatment sessions in both groups and final follow up data was taken by the end of third week. Interventions were given by one skilled physiotherapist and assessment was done by another ex-

pert who was blinded to both the groups and their respective interventions.

Data was analyzed using SPSS version 20. Treatments were defined as independent variables whereas pain (VAS) and disability (NDI) as dependent variables. T-test was applied on the dependent variables to evaluate its difference between the two groups. Chi square test was applied on the categorical variables in order to discover any association. Paired sample T-test was applied to determine difference between baselines (pre) and follow up (post) outcome measurements in both the treatment groups and hence rule out the effective treatment option. Analysis was done at 95% confidence interval. P value < 0.05 was the criteria set for to be considered statistically significant.

## RESULT

Of the Total 30 patients, there were 17 females (57%) and 13 males (43%) males). Experimental group received manual therapy, where as standard control group received Myofascial TrP therapy. The experimental group had 9 females and 6 males with mean age of 34.20±8.178 years while control group had 8 females and 7 males with mean age of 33.20±8.621 years.

There were no drop outs in the study. No significant difference existed between the groups in terms of age, gender and base line VAS (pain) and Oswestry NDI (disability) scores (Table 1). Comparison of base line and follow up pain and disability scores for all the 30 patients was done using paired T-test which showed a significant difference with a P value=.000 (p<0.05) indicating a remarkable improvement in pain and disability level after 3 weeks treatment in both the groups.(Table 2 and 3 ).

The improvement rate in both the groups was equal showing equal effectiveness of both of the treatments.

**TABLE 1: Group Statistics**

Variables	Groups	N	Mean	SD
Age of patient	Manual Therapy (Experimental Group)	15	34.20	8.178
	Myofascial Trigger point Therapy (Control Group)	15	33.20	8.621
Baseline VAS Score	Manual Therapy (Experimental Group)	15	7.93	.884
	Myofascial Trigger point Therapy (Control Group)	15	7.87	.834
Follow up VAS Score	Manual Therapy (Experimental Group)	15	1.40	.507
	Myofascial Trigger point Therapy (Control Group)	15	1.40	.507
Pre Oswestry Score	Manual Therapy (Experimental Group)	15	28.13	3.399
	Myofascial Trigger point Therapy (Control Group)	15	26.60	3.376
Follow up Oswestry Score	Manual Therapy (Experimental Group)	15	6.87	2.924
	Myofascial Trigger point Therapy (Control Group)	15	7.40	3.979

**TABLE 2: Paired T-Test on Baseline and follow up VAS scores**

Variables	Mean	N	P
Pair 1	Baseline VAS score	7.90	0.000
	Follow up VAS score	1.40	

**TABLE 3: Paired T-Test on Baseline and follow up Oswestry scores**

Variables	Mean	N	P
Pair 2	Pre oswestry score	27.37	0.000
	Follow up oswestry score	7.13	

**DISCUSSION**

The results showed that there was a mean decline in pain scores from 7.93±.884 and 7.87±.834 to 1.40±.507 during post assessment in the mobilization and MTrP therapy group respectively. Similarly, improvement in disability was also observed from a mean of 28.13±3.399 to 6.87±2.924 and 26.60±3.376 to 7.40±3.979 in the mobilization and MTrP therapy group respectively.

Results showed an improvement of P=.000 (P<0.05) on pain and disability in the experimental group (mobilization) Similar improvement P=.000 (P<0.05) was also observed in

pain and disability scores by giving MTrP therapy in the control group. Hence this study proved equal efficacy of both the treatment interventions and emphasized the concept of treating all the fundamental reasons in order to completely resolve, reduce recurrence and provide long term effects.

Several studies supported the same concept as in this study of delivering the indirect treatment at cervical spine segments in order to impose effects on the associated MTrPs in the muscles innervated by those segments. As reported by Saez et al , C3-C4 manipulation high-

ly effective in relieving associated MTrPs.<sup>26</sup>

Tasi et al had showed changes in MTrPs symptoms after delivering C4-C5 facet injections.<sup>2</sup> More, manual procedures at C7-T1 level has clinical effectiveness in reducing VAS and NDI scores in a 3 weeks time.<sup>31</sup> Mechanisms that may be associated with these indirect approaches are considered to be due to different central and peripheral activation processes leading to mechanical, hypoalgesic (endorphin releasing) and pain inhibitory (reflexive) responses.

Improvements due to MTrPs protocols like in this study were also noted in a number of studies conducted in past using the identical measuring tools. A study by Dheeraj et al on 30 subjects reported efficacy of combined approach of Ischemic compression and post isometric relaxation in reducing post treatment VAS and NDI readings.<sup>8</sup> MTrPs therapy has shown significant results.<sup>32</sup> A study by Nambi et al gave similar results by using MTrP therapy for vanishing discomforts of MTrPs within upper trapezius<sup>24</sup> Equal efficacy of integrated neuromuscular inhibition technique and post isometric relaxation was found in a study on 30 patients presenting with upper trapezius MTrPs.<sup>33</sup> The possible reasons for effectiveness of MTrP therapy in all these studies and the existing one is considered to be due to induction of local hyperemia, sarcomere lengthening, tone reduction, stretching and desensitization of the peripheral mechanisms located in the vicinity of MTrPs by interfering with the Pain Gate Theory.

Despite presence of supporting evidences for both of the treatment options several limitations were found in them. The studies which used the concept of indirect treatment for managing MTrPs included manipulation and invasive techniques as a treatment regime which were not without risks and needed highly skillful experts for its application, focused just the sensitivity of MTrPs and gave no attention to the functional level of carriers, recruited participants having latent

TrPs which was not a good sample to note effects of treatment and Last but not the least algometer was used for assessment which was thought to have contributed to the obtained results. In the same way studies on MTrP therapy also consisted of some shortcomings such as recruited mostly participants having latent TrPs, used MTrP therapy in combination with other modalities, focused just on the immediate post treatment effect, prescribed no exercises to gain prolong outcome and gave inconclusive results.

Regardless of the importance given to the association between cervical dysfunction and linked MTrPs<sup>34</sup> not even a single strategy so far is established to address all the concealed reasons which may prove effective in minimizing the recurrence rate and completely vanish the problem. For the purpose of this critical need the current study was designed to give a look at all the veiled perpetuating factors and give outstanding benefit to research, patients and clinical services.

Imperative implications of the findings of this study are this can grant essential insight regarding the treatment of upper trapezius MTrPs, can help the practitioners in efficacious management of MTrPs in patients with allodynic characteristics and can introduce cost effective ways of treatment for most inhabitants of the community.

This study is carried out in limited number of patients, so it needs further studies to reinforce the findings.

## CONCLUSION

Manual therapy directed at C3-C4 level and Myofascial Trigger point therapy are equally effective in relieving pain and disability induced by Upper trapezius MTrPs.

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## NOTES ON CONTRIBUTORS

The study was part of ZM Bachelors in Physical Therapy Education. MBAJ, DAK, MR supervised the dissertation, and were involved in every part of the analysis, idea's development, and write-up.

## CONFLICT OF INTEREST

Authors declare no conflict of interest.

## ETHICS APPROVAL

The approval/permission was obtained from Khyber Medical University Research and Ethics Board.

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