ORIGINAL ARTICLE

Management of Myofascial Pain Syndrome: A Randomized Control Trial

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Abstract

Background: Myofascial pain syndrome is collection of sensory, motor, and autonomic symptoms that include local and referred pain, decreased range of motion, and weakness.

Objective: To compare outcome of physical therapy alone and physical therapy with trigger point injection in the management of myofascial pain syndrome.

Materials and methods: This prospective randomized control study was performed in a tertiary-care teaching institution of North India. Age- and sex-matched subjects with myofascial pain syndrome were enrolled in this study. Subjects were assessed by cervical ROM parameters, numerical pain rating scale, and pressure pain threshold at third day, 1 week, and fourth week.

Results: Sixty patients were included in this study with mean age-group of 25.93 + 4.65 years and 26.60 + 4.99 years, respectively, and median of 22 years and 23 years in control and intervention groups, respectively. The female–male ratio was 1.5:1 and 1.3:1, respectively. Using CF, CE, NPRS, and PPT as outcome parameters were 39.00 ± 2.49, 8.60 ± 0.62, and 1.00 ± 0.00, respectively, which improved to 66.17 ± 4.09, 67.33 ± 3.65, 1.17 ± 0.65, and 5.00 ± 0.00, respectively, at fourth week of trigger point injection.

Conclusion: Combined approach of trigger point injection with physical therapy is more effective and safe to be administered in outpatient as very good alternative for oral drugs and physical therapy alone.

Keywords: Myofascial pain, Trigger point, Visual analog scale.

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Introduction

Myofascial pain syndrome (MPS) is characterized by regional pain originating from hyperirritable spots located within taut bands of skeletal muscle, known as myofascial trigger points (MTrPs).[1] Common etiologies of myofascial pain and dysfunction may be from direct or indirect trauma, spine pathology, exposure to cumulative and repetitive strain, postural dysfunction, and physical deconditioning. Symptoms of MFPS include regional pain in the neck, shoulders, upper extremities, face, low back and lower limb, referred pain, burning sensation, tenderness of the involved muscle, poor sleep, swelling, fatigue, paraesthesia, decreased range of motion at the joints which the muscle crosses, weakness of certain movements, muscular imbalances, secondary depression, and sleep disturbances.[2,3] Differential diagnosis of MFPS include tension headaches, migraine and cluster headaches, low back syndromes, pelvic pain, intermittent claudication, bursitis, arthritis, and tendinosis.[4]

Essential diagnostic criteria for TrPs include a tender point within a taut band of skeletal muscle, patient's recognition of current pain complaint by pressure on the tender nodule (identifies active TrP), painful limit to full passive stretch range of motion, visual, or tactile identification of local twitch response, observation of a local twitch response induced by needle penetration of a tender nodule, and pain or altered sensation (in the distribution expected from a TrP in that muscle) on compression of a tender nodule.[5,6] Treating the underlying etiology is currently the most widely accepted strategy.[7] If the root cause is not properly treated, MTrPs may reactivate and MPS may persist. Nonsteroidal anti-inflammatory drugs (NSAIDs) are the most commonly used.[8] A diclofenac patch for myofascial pain of the trapezius muscle is found with statistically significant benefits. Cyclooxygenase-2 (COX-2) inhibitors have relatively more tolerable side-effect profile. Tramadol, a centrally acting mu-receptor agonist is an effective and well-tolerated agent.[8,9] Tropisetron is recently used as an analgesic with limited commercial availability.[9] Opioids are not normally indicated in the treatment for MPS. Although weak opioids are moderately effective, most studies do not support them. Lidocaine patches had statistically significant increase in pain thresholds and general activity. Muscle relaxants such as tizanidine, benzodiazepines such as clonazepam, cyclobenzaprine, and thiocolchicoside, and anticonvulsants such as gabapentin or pregablin has no established role per Cochrane literature review.[10] Antidepressants such as tricyclics, duloxetine, and sumatriptan are indicated for chronic pain. Other commonly used noninvasive methods include spray and stretch technique (which involve application of vapo-coolant spray while applying stretch to the shortened muscle), ischemic compression and stretch, transverse friction massage, acupressure, shiatsu type of massage,

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and myofascial release technique (MRT).[11–13] Invasive techniques include dry needling (hypodermic needle or acupuncture needle is inserted into the TrP and repeatedly punctured by withdrawing and re inserting) and trigger point injections (a hypodermic needle is inserted with normal saline or local anaesthetic with or without steroids).[14,15]

Aims and Objectives

The aim of this study is to compare the effect of physical therapy alone and with trigger point injections in patients with MPS. The outcome measures used are cervical spine ROM, numeric pain rating scale (NPRS), and pressure pain threshold (PPT). The objective is to compare the overall outcome at fourth week and to determine whether there is any difference in outcome at different time intervals (at 3rd day, 7th day, and 4th week).

Study Design

A comparative two group clinical study (Tables 1 to 6).

Materials and Methods

Sixty patients were randomized based on computer-generated random number of tables coming to or admitted in our department due to MPS from October 2017 to February 2018. Forty patients were treated with conventional physical therapy, while 40 were given additional single dose of trigger point injection using 0.5 mL 0f 0.5% bupivacaine and 0.5 mL 40 mg methylprednisolone. Outcomes were assessed by cervical flexion, extension, NPRS, and PPT at third day, first week, and fourth week. Patients included in this study were aged 18–45 years with chronic dull aching pain associated with muscle and soft tissue tenderness, pain related to position or movement of muscle or pain associated with acute overload or chronic overuse of muscle, patients with regional pain in neck, shoulders, upper extremities, face, lower back and lower limbs, referred muscle pain with burning sensation or tenderness of involved muscle, regional or muscular pain associated with poor sleep, swelling, fatigue, paraesthesia, and decreased ROM at joints which the muscle crosses and patient willing to take participate in the study, take injection, and regular follow-up visit as directed. The exclusion criteria served to eliminate patients with an inappropriate diagnosis of MFPS and patients with inappropriate medical conditions complicating the pathology or management.

Table 1: Age distribution of patients studied

Age in years	*Group I*	*Group II*	*Total*
<20	3 (10%)	3 (10%)	6 (10%)
20–30	25 (83.3%)	23 (76.7%)	48 (80%)
31–40	2 (6.7%)	4 (13.3%)	6 (10%)
Total	30 (100%)	30 (100%)	60 (100%)
Mean ± SD	25.93 ± 4.65	26.60 ± 4.99	26.27 ± 4.79

Samples are age matched with $p = 0.594$, student *t* test

Table 2: Gender distribution of patients studied

Gender	*Group I*	*Group II*	*Total*
Female	13 (43.3%)	17 (56.7%)	30 (50%)
Male	17 (56.7%)	13 (43.3%)	30 (50%)
Total	30 (100%)	30 (100%)	60 (100%)

Samples are gender matched with $p = 0.302$, Chi-square test

Table 3: Comparison of cervical flexion in two groups of patients studied

Cervical flexion	*Group I*	*Group II*	*Total*	*p value*
1st visit	40.33 ± 5.24	39.00 ± 6.49	39.67 ± 5.88	0.385
2nd visit	45.00 ± 3.94	49.50 ± 5.47	47.25 ± 5.24	0.001**
3rd visit	48.50 ± 4.18	58.17 ± 4.64	53.33 ± 6.55	<0.001**
4th visit	52.33 ± 3.41	66.17 ± 4.09	59.25 ± 7.91	<0.001**

Student *t* test (two tailed, independent)
**p value = or <0.001

Results

The age of group I and group II patients ranged from 17 to 40 years and 18 to 38 years, respectively, with mean (±SD) 25.93 ± 4.65 years and 26.60 ± 4.99 years, respectively. Comparing the mean age of two groups, Student's *t* test showed similar age between the groups, i.e., did not differ significantly. Comparing the sex proportions (M/F) of the two groups, χ^2 test showed similar sex proportions between the groups ($\chi^2 = 0.05$, p value = 0.820), i.e., also not differed significantly. Comparing the mean cervical flexion within the groups showed significant (p value < 0.001) increase (improvement) in cervical flexion at visit 2 and visit 3 when compared to visit 1 in both the

Table 4: Comparison of cervical extension in two groups of patients studied

Cervical Extension	*Group I*	*Group II*	*Total*	*p value*
1st visit	32.00 ± 2.49	32.40 ± 2.49	32.20 ± 2.48	0.537
2nd visit	36.67 ± 2.73	36.17 ± 5.36	36.42 ± 4.23	0.651
3rd visit	42.00 ± 2.49	53.00 ± 4.28	47.50 ± 6.54	<0.001**
4th visit	47.17 ± 2.52	67.33 ± 3.65	57.25 ± 10.63	<0.001**

Student *t* test (two tailed, independent)
**p value = or <0.001

Table 5: Comparison of numeric pain rating scale in two groups of patients studied

Numeric pain rating scale	*Group I*	*Group II*	*Total*	*p value*
1st visit	8.63 ± 0.49	8.60 ± 0.62	8.62 ± 0.56	0.818
2nd visit	7.00 ± 0.00	5.97 ± 0.18	6.48 ± 0.54	<0.001**
3rd visit	3.90 ± 0.40	3.07 ± 0.25	3.48 ± 0.54	<0.001**
4th visit	2.07 ± 0.25	1.17 ± 0.65	1.62 ± 0.67	<0.001**

Student *t* test (two tailed, independent)
**p value = or <0.001

Table 6: Comparison of pressure pain threshold in two groups of patients studied

Pressure pain threshold	*Group I*	*Group II*	*Total*	*p value*
1st visit	1.00 ± 0.00	1.00 ± 0.00	1.00 ± 0.00	–
2nd visit	1.50 ± 0.00	2.23 ± 0.29	1.87 ± 0.42	<0.001**
3rd visit	2.00 ± 0.00	3.48 ± 0.09	2.74 ± 0.75	<0.001**
4th visit	3.30 ± 0.47	5.00 ± 0.00	4.15 ± 0.92	<0.001**

Student *t* test (two tailed, independent)
**p value = or <0.001

groups. It is also increased (improved) significantly (p value < 0.001) at visit 3 when compared to visit 2 in both the groups. At final evaluation, the net mean improvement (i.e., mean change from visit 1 to visit 3) in cervical flexion of group II was found to be higher when compared to group I. Comparing the mean cervical extension within the groups showed significant (p value < 0.001) increase in cervical extension at visit 2 and visit 3 when compared to visit 1 in both the groups. Further, in both the groups, the mean cervical extension also increased significantly (p value < 0.001) at visit 3 when compared to visit 2. At final evaluation, the net mean improvement (i.e., mean change from visit 1 to visit 3) in cervical extension of group II was found to be higher when compared to group I. Comparing the mean numeric pain rating scale (NPRS) within the groups showed significant (p value < 0.001) decrease in NPRS at visit 2 and visit 3 when compared to visit 1 in both the groups. At final evaluation, the net mean decrease (i.e., mean change from visit 1 to visit 3) in NPRS of group II was found to be higher when compared to Group I. Comparing the mean PPT score within the groups showed significant (p value < 0.001) decrease in PPT score at visit 2 and visit 3 when compared to visit 1 in both the groups. However, at both visit 2 and visit 3, it was significantly (p value < 0.001) different and lower in group II when compared to group I. Moreover, at final evaluation, the net mean improvement (i.e., mean change from visit 1 to visit 3) in PPT score of group II was found to be higher than group I.

Discussion

Myofascial pain syndrome is characterized by regional pain originating from hyperirritable spots located within taut bands of skeletal muscle, known as MTrPs. Common etiologies of myofascial pain and dysfunction may be from direct or indirect trauma, spine pathology, exposure to cumulative and repetitive strain, postural dysfunction, and physical deconditioning Desai et al. in their review study on management of MPS concluded that pharmacologic treatments, such as tizanidine, benzodiazepines, tropisetron, and topical diclofenac and lidocaine patches, have limited efficacy, and of the modalities reviewed, dry needling and trigger point injections are the mainstay of interventional treatment.[16] This is consistent with the result of present study. Saime et al. in their study in 2009 compared the efficacy of local anesthetic injection and dry needling methods on pain, cervical ROM, and depression in MPS. In their study, 80 patients were assigned into two groups.[17] Group I received local anesthetic injection (2 mL lidocaine of 1%), and group II received stretching exercises. There were significant improvements in VAS, cervical ROM, and BDI scores after 4 and 12 weeks in both the groups compared to pretreatment results (p value < 0.05). Their study indicated that exercise associated with local anesthetic and dry needling injections were effective in decrease of pain, depressive mood, and increase of cervical ROM. The present study also shows better results in combination of injection with physical therapy. Graboski et al. in their study in 2005 compared the effectiveness of trigger point injections using BTX A vs bupivacaine, both in combination with a home-based rehabilitation program, in treatment of MFPS.[18] Both treatments were effective in reducing pain when compared to baseline (p value = 0.0067). No significant difference was found between the two groups. Considering the high cost of BTX A, bupivacaine is deemed a more cost-effective injectate for MPS. Cummings and White in their study in 2001 over needling therapies in the management of MFPS pain concluded that direct needling appears to be an effective treatment, but the hypothesis that needling therapies have efficacy beyond placebo is neither supported nor refuted by the evidence from clinical trials.[19] Han Stephanie; Harrison, in their study in 1997 concluded that a multidisciplinary approach to treatment of MPS appears to be most beneficial and may include modalities such as trigger-point injections, dry needling, stretch and spray, and transcutaneous electrical nerve stimulation.[20]

Conclusion

Combined approach of trigger point injection with local anesthetic with steroid and physical therapy proved to accelerate the recovery of MFPS. This combined approach is effective and safe to be administered in outpatient clinics by a well-trained physician, offering clear advantages (ease of application, low cost, and rare side effects) and considering that the top priority of a pain control program is restoration of function to perform usual ADL. It may prove to be a useful treatment for patients who are unfit or unwilling to drugs for very long period. Further, there are economic benefits as patients are able to return to work sooner without the need for hospitalization or spending time in physical therapy sessions.

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