

# Assessment of predisposing factors in myofascial pain syndrome and the analgesic effect of trigger point injections - A primary therapeutic interventional clinical trial

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## ABSTRACT

**Background and Aims:** Myofascial pain syndrome (MPS) is a common cause of chronic musculoskeletal pain, characterised by myofascial trigger points (TPs). TP injection is an established technique for management of MPS. In this study, we analysed the efficacy of myofascial TP injection of lignocaine and the influencing biomechanical factors on MPS. **Methods:** After obtaining ethical committee approval, we included the first 100 adult patients of MPS with failed physical therapy aged above 18 years, and with TPs in the trapezius, infraspinatus, and/or the levator scapulae muscles and Visual analog scale (VAS) >4. TP injection of 2% (2 ml) lignocaine was performed. Visual analogue scale (VAS) scores were recorded immediately and after 1 month. Number of repeat TP injections and use of oral analgesic in one month was noted. Results were analysed with the analysis of variance test. **Results:** The mean VAS reduced significantly both immediately and 1 month after therapeutic injections ( $8.57 \pm 0.77$ ,  $2.67 \pm 1.43$  and  $2.82 \pm 1.4$ , respectively,  $P < 0.01$ ). Keeping the palm below the head during sleep was the major contributing factor for myofascial TP, followed by slanting the neck to use mobile phones. Repeat TP injection was used in 4% of cases. **Conclusion:** TP injection of 2 ml of 2% lignocaine along with correction of predisposing biomechanical factors provided significant pain relief for MPS in patients with failed physical therapy without any side effects.

**Key words:** Factors, myofascial, pain, trigger point

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## INTRODUCTION

Myofascial pain syndrome (MPS) is a common musculoskeletal painful disorder characterised by myofascial trigger points (TPs). This disorder can affect any skeletal muscle in the body and the prevalence varies by medical specialty. It usually accounts for 21% of orthopaedic clinic visits, 30% of general medicine, and around 85% - 93% of patients reporting to pain management clinic.<sup>[1]</sup> The commonest feature in MPS is muscle pain along with taut or rope like bands in the muscles. In MPS, the painful points in the “taut bands” are called “TPs.” These points are very precise and painful that on their palpation, the patient shows a “jump sign” associated with referred pain.<sup>[2]</sup>

The treatment modality of MPS is multidisciplinary, and includes needling, cold with muscle stretching, massage and manipulation, physical therapies, deep laser, ultrasonic wave, infrared light, microwave, shockwave, electrical stimulation, muscle stretching, exercise therapy, massage, and manipulation. Medications like paracetamol, centrally acting

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muscle relaxants, nonsteroidal anti-inflammatory drugs, cyclooxygenase -2 inhibitors, narcotic analgesics, adjuvant analgesics like antidepressants or anticonvulsants also form part of the armamentarium of the management of MPS. TP injection forms one of the important management strategies in such cases. Identification of TPs, many times distal from the area of pain, becomes a clinical challenge. Even though an injury precipitates such a disease, there are other factors like stress and biomechanical imbalance and chronic bad posturing that can lead on to MPS.<sup>[3]</sup> Hence in this study, we tried to elucidate such factors in changed posture which may influence the pain. The primary outcome measure studied was the effect of injection of lignocaine in TPs in providing pain relief. The secondary outcomes studied were the need of repeat injection, side effects like bleeding, the necessity of prolonged analgesics, and the analyses of influencing factors which increased pain in such patients.

## METHODS

After obtaining institutional ethical committee approval, the first 100 patients of upper limb MPS was diagnosed by neck or shoulder pain, which may or may not be accompanied by the typical pattern of referred pain in the compromised muscle but with definite jump sign. Patients with MPS attending the pain clinic and fulfilling inclusion criteria [(age >18 years, patients with persisting neck or shoulder pain after 6 weeks of physiotherapy, TPs in one or more of the following muscles: the trapezius, the infraspinatus, and/or the levator scapulae (cervical portion) and Visual analog scale (VAS) >4], were included. Patients on anticoagulation or bleeding disorders, aspirin ingestion 3 days prior to intervention, patients with local or systemic infection, any allergy to local anaesthetic agents, patients with acute muscle, or bony trauma were excluded.

After routine history and thorough physical examination, patients were questioned about the pain, influencing factors relative to MPS causing biomechanical imbalance. We focussed on the following three positions: Keeping the palm below the head during sleep, keeping the mobile phone in the ear and turning the head [Figures 1 and 2], and sleeping without pillows.

These are the possible influencing factors which may cause biomechanical imbalance. All patients were



**Figure 1:** Showing “palm under the head” as biomechanical imbalance or influencing factor

explained about the study protocol and pain scores. Informed consent was obtained from all of them. Patients were asked to sit comfortably and under strict aseptic precaution trigger points were identified by manual palpation method by eliciting the jump sign [Video 1]. The initial level of pain (VAS 1) was assessed (VAS 0- no pain to 10-severe and worst pain possible). After stabilising the TP, 2 ml of 2% lignocaine injection was given by using 23G needle. The prick was sudden and the needle was inserted exactly into the TPs so that the patients felt a vague undescribed feeling. Only one TP was classically identified in the trapezius region in all the cases. The injection was given by an operator who has got two decades of experience in such interventions with more than 3,000 cases. As such, the study involves an intervention like this, it is difficult to blind the other observer who notes the pain scores. The VAS scores immediately after injection (VAS 2) and 1 month (VAS 3) later were noted after a telephonic call. The patients were kept for observation for 20 min for any undue complaints. Vitals were monitored. Patients were advised to do day-to-day activities and to avoid the influencing factor. Follow-up was done 1 month later. In case of pain anytime, patients were advised to take tablet Tramadol 50 mg and were also requested to review in pain clinic for repeat TP injections. The number of repeat TP injections required in 1 month and any adverse events were noted. The study was terminated at 1 month. The need for analgesic drug tramadol was noted.

With the needed level of significance as 5%, power as 80%, type of test as two-sided, a necessary reduction of VAS score by 30% from a score of seven or above



**Figure 2:** Showing head tilt for mobile phones as an influencing factor

a sample size of 70 is needed. The mean and SD of VAS scores were analysed with one-way ANOVA and a *P* value of less than 0.05 was taken as significant.

## RESULTS

All the 100 patients completed the study. There were no drop outs. The mean and SD of age of patients was  $45 \pm 15.43$  years. There were 42 males and 58 females in the study. The mean VAS 1 before trigger point injection was  $8.57 \pm 0.77$ . The VAS 2 immediately after injection and 1 month later (VAS 3) were significantly lower ( $P < 0.01$ ), than the initial VAS 1 score [Table 1]. There was no statistical significant difference between VAS2 and VAS3.

Five patients out of 100 took tramadol as rescue analgesic; four of these returned to the Pain clinic and received a repeat TP injection. There was no case with more than two injections. All the repeat injections were given 15--20 days from the first one. All the patients reported complete withdrawal from factors of biomechanical imbalance. The drugs they were taking prior for systemic illnesses like diabetes mellitus and hypertension were being continued during the study period. Ten patients had a minimal oozing at the site of injection which stopped on its own. No patient had pain on the site of injection. Regarding the role of influencing/biomechanical factors, the following findings were noted. The factor of putting palms under the head constituted 71% of all, whereas 20 patients had an abnormal posturing in mobile usage. Only 5% of patients had slept without pillows while in the remaining, no influencing factor can be elicited. These four patients were the ones who had repeated injections for pain relief.

Table 1: With Mean SD VAS scores			
	VAS1	VAS2	VAS3
Mean SD	8.57±0.77	2.67±1.43	2.82±1.4

## DISCUSSION

MPS is a non-inflammatory disorder of musculoskeletal origin, associated with pain and muscle stiffness, characterised by the presence of TPs irritable palpable nodules in the skeletal muscle. Needling the TP with or without local anaesthetic forms the mainstay of its treatment along with targeting the root cause.<sup>[4]</sup> In some cases, there may be evident precipitating cause<sup>[5]</sup> but in a majority, it will not be easily elicitable. A combined approach to counter the disease with injection of TPs with local anaesthetic and taking care of the influencing factor is likely to give long-term relief in patients where there is no obvious reason. In our experience of more than two decades of practice in treating such cases, we noticed an association of trigger factors mentioned above (unpublished data). Hence, we decided to combine the modalities of treatment. Lugo *et al.*<sup>[6]</sup> have found out that with either physical therapy or TP injection, there is no difference in pain scores. But in our study, we found that a combined treatment was very effective in effecting lasting analgesia. Kamanli *et al.*<sup>[7]</sup> have established that injection of local anaesthetic in TPs is more effective and less painful in treating MPS. This finding has been validated by our study. We had more number of female patients which goes along with earlier studies.<sup>[4]</sup> Ultrasound-guided injection of TPs<sup>[8]</sup> is also proved to be effective especially where TPs were found to be close to vital structures. But in our cases, all points were in the trapezius muscle and we did not encounter major side effects except minimal oozing in a minority of cases.<sup>[9,10]</sup> Velly *et al.*<sup>[11]</sup> have described tooth clenching as a factor to trigger MPS and avoidance of the same showed improved results in management. We did not see this factor but we had bad posturing created by keeping palms under the head while sleeping as an important trigger of myofascial pain. Use of mobile phones while doing some other work is part of the habit in this part of the world. This habit puts the neck muscles into abnormal posturing and induction of TPs. This concept is being postulated by us for the first time and not described previously. As we got good results by avoiding the influencing factor, we propose a significant role of such factors in worsening MPS Karadaş *et al.*<sup>[12]</sup> have demonstrated that multiple TP injections in many sittings were useful

in decreasing pain associated with tension headache. We tried to prove that exact identification of TP by eliciting jump sign is critical in getting results with single injection. The biggest limitation of the study is that we have not elucidated the individual usefulness of either injection of TPs or avoidance of influencing factors. We thought that after completely knowing the triggering biomechanical/influencing factor, it is unethical to blind and make patients to be ignorant of such a bad posture to be the cause of his/her disease. This study opens the gate for researchers to elicit detailed history and find out a possible biomechanical factor in patients with MPS. A controlled study with or without avoidance of influencing factors may throw light on the usefulness of such management.

## CONCLUSION

TP injection of 2 ml of 2% lignocaine provided significant pain relief for MPS in patients with failed physical therapy without any significant side effects. Elicitation of proper history to detect abnormal posture and correction of biomechanical imbalance is an essential element in managing cases of MPS for long-term relief.

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## Conflicts of interest

There are no conflicts of interest.

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