

# Analgesic Efficacy of Ultrasound Identified Trigger Point Injection in Myofascial Pain Syndrome: A Pilot Study in Indian Patients

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## Abstract

**Background:** Myofascial pain syndrome (MPS) is described as sensory symptoms, sometimes with motor and autonomic symptoms caused by myofascial trigger points (TPs). Injection at TPs is most likely to benefit patients with such disorder. The identification of TPs is usually clinical. However, in sites where there are major vital structures, ultrasound guidance and real-time visualization may help in decreasing complications. **Methodology:** Twenty patients who presented to pain clinic with classic symptoms of MPS in the neck and shoulder area with clinically detectable TPs were selected. The points were imaged with ultrasound to find correlation with clinical positions. They were injected with a mixture of local anesthetic and steroid on TPs with real-time ultrasound guidance and needle visualization. Pretreatment visual analog scale (VAS) scores and posttreatment (immediate and after 1 month) were noted. The mean reduction in VAS scores was analyzed with paired Student's *t*-test. Any side effect was observed and managed. **Results:** Clinically detectable TPs coincided with an echogenic point on the undersurface of the trapezius. There was a significant reduction in pain scores at both times. The needle sign was positive in all the cases. There were no major complications. **Conclusion:** The clinically identified TPs in trapezius muscle coincided well with ultrasound imaged echogenic structure in the muscle in all the cases. Ultrasound-assisted injections also produced the needle sign in all the cases. The achieved analgesia both immediately after the injection and a month later was satisfactory in the majority of cases. The echogenic mass corresponding to the TP is found to be on the undersurface of the muscle rather than inside the mass of the muscle.

**Key words:** Myofascial pain, trigger point, ultrasound

## INTRODUCTION

Myofascial pain syndrome (MPS) is one of the common, painful musculoskeletal disorders characterized by the presence of trigger points (TPs) in muscles at discrete places. The presence of myofascial TPs in patients complaining of pain somewhere else in the body ranged from 30% to 93%.<sup>[1]</sup> Even though the most important component in the treatment of MPS is to identify the cause and to treat it, TP injections is still a commonly practiced pain interventional technique for symptomatic relief. Injection of local anesthetics with or without additional low dose steroids forms the mainstay of the analgesic management.<sup>[2]</sup> However, such injections can produce complications such as pneumothorax and vascular injury. Using ultrasound to confirm position may increase efficacy with less incidence of complications.<sup>[3]</sup> Hence, we

decided to attempt visualization of TPs in a specific trapezius muscle with a correlation of a clinical picture to confirm the position of such points in our cases of MPS.

## Aims

1. To clinically identify the TPs in trapezius muscle
2. To visualize such points in ultrasound as discrete echogenic points
3. To inject local anesthetics using ultrasound and evaluate the analgesic efficacy.

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## METHODOLOGY

After informed consent and necessary approval, twenty consecutive patients presented with typical symptoms of myofascial syndrome presented to the pain clinic of a hospital near Puducherry from July 2016 for 4 months were selected for the study. The inclusion criteria were:

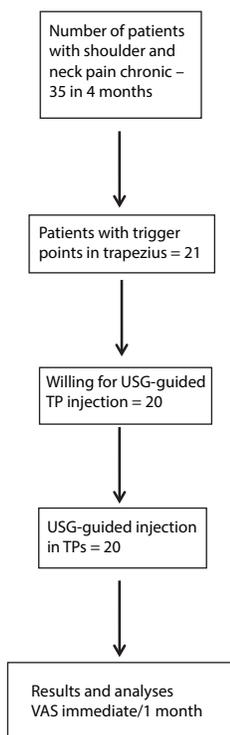
- There is a definite pain in the shoulder and the upper arm
- There are neither systemic symptoms nor a local muscle injury
- There is no motor defect or any other abnormal pathology
- Visual analog scale (VAS) score of pain more than 5
- Routine analgesics and interferential therapy for 6 weeks have not produced the necessary analgesic effect
- Clinically identifiable TP in the trapezius muscle.

Any patient who was not willing for the invasive procedure or with any infection at the site, coagulation abnormalities or symptoms on both sides was excluded from the study. This is a simple prospective interventional pilot clinical trial. The obese patients were also excluded [Flowchart 1]. The skin corresponding to the injection of TP was identified with clinical examination. The hypersensitive palpable taut band in the muscle with jump sign positive without any evidence of local site inflammation was considered as TP. After marking the TP injection site by indenting the skin with a plastic needle cover, the skin over that area is prepared by applying betadine. The indent created by the plastic needle cover remains visible throughout. The ultrasound (sonosite usg machine exporte) was used with a high-frequency linear probe in the musculoskeletal mode. On

ultrasound, the skin usually appears hyperechoic, with adipose tissue being mixed echogenic and the muscle has a hyperechoic marbled appearance. The TP was identified as an echogenic oval band in the appropriate depth in the muscle which coincides with the clinical identification [Figure 1]. In all the patients, ultrasound examination of the contralateral trapezius muscle was done. After confirmation, the entry point in the affected side was infiltrated with lignocaine. Utilizing direct ultrasound guidance, a 25-gauge 1.5-inch needle connected to a 3 mL syringe was placed into the muscle at the exact location of the presumed TP longitudinal to the transducer, a mixture of 2 mL of 0.5% bupivacaine and 10 mg of triamcinolone was injected [Figure 2]. The elicitation of needle sign was recorded. Patients rated pain intensity using a 0–10 cm horizontal VAS, which varied from “no pain”- (VAS = 0) to “worst imaginable pain”- (VAS = 10). VAS was assessed just before (i.e., pretreatment) and immediately after the treatment (TP injection). “Success of treatment” was defined as more than 50% of the reduction in posttreatment VAS score compared to pretreatment, whereas “treatment failure” was defined as <50% reduction in posttreatment VAS score compared to pretreatment. VAS scores at 1 month were also recorded by asking the patient to review. The contact numbers of all the patients were noted. If any pain or complication did arise in between, they were asked to report. All the data were entered in an Excel data sheet. The demographic variables were subjected to simple descriptive analyses while the mean VAS scores prior and after treatment were analyzed using paired *t*-test.

## RESULTS

The mean and standard deviation for age of the patients was  $40.1 \pm 8.59$  years. The male:female ratio was 9:11. In all the twenty patients, the diagnosis of muscle TPs was elicitable on clinical examination. The mark kept by the needle cap coincided with the entry point of the ultrasound identified TP in all the cases. The ultrasound revealed the point to be in the center of under surface of the trapezius muscle in all patients. Ultrasound scanning revealed visible changes in the underlying muscle containing the palpable TPs in all the patients [Figure 1]. The TP appeared as a mixed echoic area



Flowchart 1: Consort flow diagram.

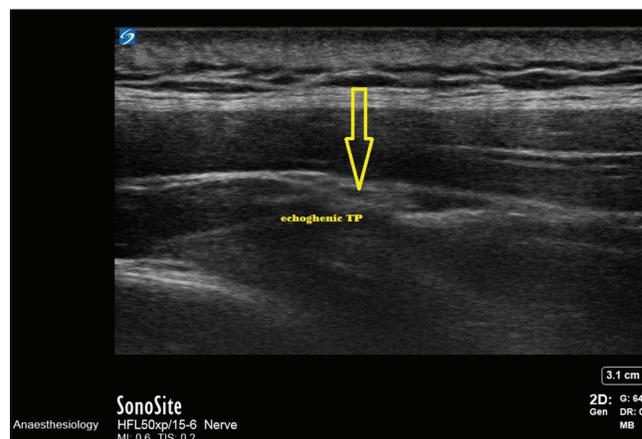


Figure 1: Echogenic trigger point on the under surface of trapezius.

in the trapezius muscle that became prominent on injection of local anesthetic solution. The needle sign was positive in all the patients. There was no such echogenic structure on the other side in all the patients.

There was a statistically significant reduction of VAS scores immediately and also after 1 month ( $P < 0.001$ ). The scores were similar in the immediate and at the 1 month intervals. When considering success and failure of treatment, there were two cases in which the VAS reduction was  $<50\%$  where analgesic gel with tramadol tablets was prescribed to get relief. They were counseled for the second injection. There was a minimal bleeding in one case which settled with compression for 1 min [Table 1].

## DISCUSSION

Myofascial pain is defined as pain which originates from myofascial TPs in skeletal muscle. It is present in many regional musculoskeletal pain syndromes, either alone or with other pain generators. The MPS is one of the largest groups of underdiagnosed and undertreated pain problems encountered in general clinical practice. Cervicothoracic TPs are common in many regional pain syndromes of neck and shoulder.<sup>[4]</sup> Injection of local anesthetics with or without the addition of steroid in TPs has got proven clinical benefits. There are two hiccoughs in using this technique. One is the difficulty in identifying such points in obese patients. The other is the possible injury to pleura, especially in our cases. We wanted to avoid problems in identification in obese by purposely omitting such patients in our study. The clinically identifiable TPs were correlating with the ultrasound image in all the patients. Botwin *et al.*<sup>[5]</sup> have done ultrasound-guided injection of TPs in a single case to successfully give pain relief. In our study, all the twenty patients had significant pain relief both immediately after the injection and also after 1 month. Suh *et al.*,<sup>[6]</sup> in their study of twenty-one patients of rotator cuff lesions and brachialis TPs, found ultrasound images to coincide well with clinically detectable TPs, and analgesic efficacy of injections at the site using ultrasound was very effective which goes along with

our findings. Niraj *et al.*,<sup>[7]</sup> in their limited study of ultrasound visualization of TPs in rectus muscle, found echogenic points in the muscle. However, in our cases, we found the points not in the center of the muscle but underneath the muscle. This was almost consistent in all the cases. This is possibly the first major report of using ultrasound in cervicothoracic musculature for injecting local anesthetic steroid mixture in TPs. Botulinum, saline, steroids, and diclofenac<sup>[8]</sup> have been used as adjuncts to local anesthetics to lignocaine, but we preferred triamcinolone in very low doses as our policy. Hong<sup>[9]</sup> reported that with either lignocaine injection or dry needling of TPs, the patients had almost complete relief of pain immediately after the injection if local twitch responses were elicited. On the other hand, they experienced only minimal relief if no such response occurred during injection. In our cases, the response was found in all cases which probably might have resulted in adequate relief in almost all the cases. Usually, it is described that TPs are due to undue stretch followed by ischemia, spasm, and a contracture. This may be in the center of a muscle belly continuing to tendon attachments to the bone. In our cases, we found them to be near the undersurface of the muscle [Figure 3]. There was no such echogenic point in the muscle mass on the contralateral side which confirms our findings. There were no major complications in any case.

## CONCLUSION

The clinically identified TPs in trapezius muscle coincided with ultrasound imaged echogenic structure in the muscle in all the cases. Ultrasound imaged injections also produced the needle sign in all the cases. The achieved analgesia both immediately after the injection and a month later was satisfactory in the majority of cases. Our study is limited in that it is not a controlled comparative trial either with oral drugs or injection of TPs without ultrasound guidance. Real-time imaging detected the echogenic mass corresponding to the TP to be on the undersurface of the muscle rather than inside the mass of the muscle. The facts need further evaluation with comparative studies with a larger sample size.

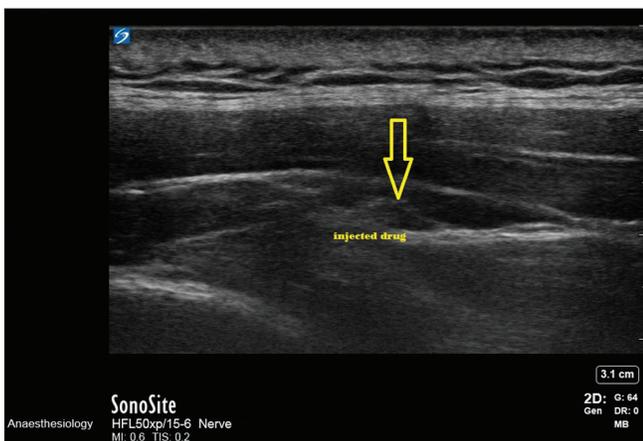


Figure 2: Local anesthetic steroid injection into the trigger point.

Table 1: Visual analog scale scores

	Pretreatment VAS (A)	Immediate VAS (B)	1 month VAS (C)
Mean±SD	8.05±2.02	2.5±1.6	2.5±1.67

A versus B- $P < 0.001$ , A versus C- $P < 0.001$ , B versus C- $P = 0.26$ .

18 patients: Successful treatment, 2 patients: Failure, 1 patient: Minimal bleeding as complication. VAS: Visual analog scale

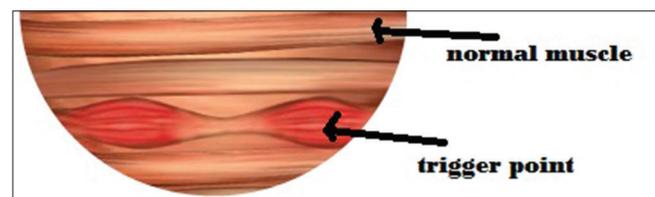


Figure 3: Possible position of trigger point.

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## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. Simons DG. Clinical and etiological update of myofascial pain from trigger points. *J Musculoskelet Pain* 1996;4(1-2):93-121.
2. Cummings TM, White AR. Needling therapies in the management of myofascial trigger point pain: A systematic review. *Arch Phys Med Rehabil* 2001;82:986-92.
3. Shafer N. Pneumothorax following "trigger point" injection. *JAMA* 1970;213:1193.
4. Kannan P. Management of myofascial pain of upper trapezius: A three group comparison study. *Glob J Health Sci* 2012;4:46-52.
5. Botwin KP, Sharma K, Saliba R, Patel BC. Ultrasound-guided trigger point injections in the cervicothoracic musculature: A new and unreported technique. *Pain Physician* 2008;11:885-9.
6. Suh MR, Chang WH, Choi HS, Lee SC. Ultrasound-guided myofascial trigger point injection into brachialis muscle for rotator cuff disease patients with upper arm pain: A pilot study. *Ann Rehabil Med* 2014;38:673-81.
7. Niraj G, Collett BJ, Bone M. Ultrasound-guided trigger point injection: First description of changes visible on ultrasound scanning in the muscle containing the trigger point. *Br J Anaesth* 2011;107:474-5.
8. Alvarez DJ, Rockwell PG. Trigger points: Diagnosis and management. *Am Fam Physician* 2002;65:653-60.
9. Hong C. Myofascial pain therapy. *Reg Musculoskelet Pain* 2004;12:37-43.

