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Dry Needling In Myofascial Pain Syndrome– A Prospective Study

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Abstract: *Myofascial pain syndrome is a pain disorder in which unilateral pain is referred from the trigger point in myofascial structures to the muscle of head and neck. The various treatment modalities of it include medications like pain relievers, antidepressant, sedative and physical therapies include stretching, thermotherapy and ultrasound massage therapy. Dry needling is a therapeutic technique which is being widely studied as a treatment for MPS. It is also known as intramuscular manual stimulation or intramuscular needling. This technique uses a "dry" needle, one without medication or injection, inserted through the skin into areas of the muscle. The goal of dry needling is to alleviate the myofascial trigger point in the muscle, thereby restoring the muscle to its normal, tissue mobility and returning it to proper functional capacity. As the myofascial trigger points are extremely common and become a source of pain and discomfort in many patients, it is an important topic for further research into the efficacy of dry needling in treating the condition. Here we have done a study using dry needling for the treatment in a group of myofascial pain syndrome patients and the improvement in symptoms is analysed.*

Keywords: *Dry needling, Myofascial pain syndrome, trigger point therapy.*

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I. Introduction

The International Association for the Study of Pain recognizes that Myofascial pain syndrome (previously known as myofascial pain and dysfunction syndrome MPDS) is a common source of musculoskeletal pain.[1] Myofacial pain is a pain condition characterized by trigger points (TrPs) which is defined as hyperirritable spots in skeletal muscle that are associated with hypersensitive palpable nodules in taut bands Caused by tension, fatigue or spasm in the masticatory muscles(medial and lateral pterygoid, temporalis and masseter) results in pain, and in and around the masticatory apparatus or referred to other locations in the head and neck.[2]

Various treatment modalities commonly used for myofascial pain syndrome includes physical therapy like(Deep massage, Moist heat fomentation of the muscle, Massage through ultra sound, Actively lengthen muscle stretch and spray technique, TENS/pocket TENS, dry needling, Laser therapy, Magnetic therapy, Chiropractic management, Biofeedback, EMG feedback) occlusal therapy like (Reversible (splints), Irreversible (occlusal correction - surgical and nonsurgical) and pharmaceutical therapies like Tizanidine, TCA/anxiolitic, Pregabalin, Thiocolchicoside/other analgesics and anti-inflammatory drugs, Duloxetin, Levosulpride, Tramadol.[3]

Among these, dry needling is widely used because of less adverse effects, American Physical Therapy Association (APTA) defined dry needling as 'an invasive technique used by physical therapists (where allowed by state law) to treat myofascial pain that uses a dry needle, without medication or injection, which is inserted into areas of the muscle known as trigger points. [4]

The Aim and Objective of this study was to evaluate the effectiveness of dry needling in myofascial pain syndrome by measuring the pre and post treatment pain using visual analogue scale and the improvement in mouth opening after dry needling.

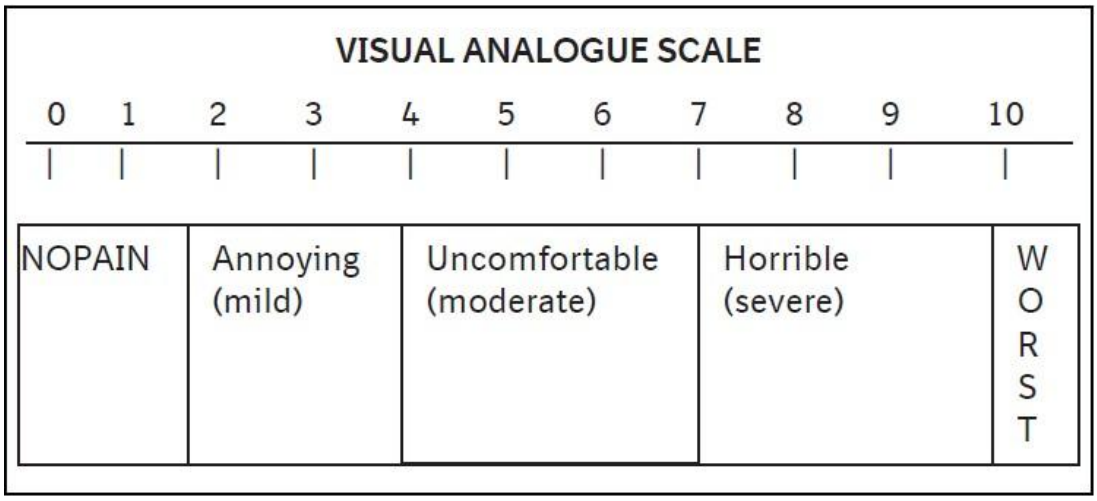
II. Materials And Methodology

Patient with clinically diagnosed myofascial pain syndrome were recruited from the Department of Oral Medicine and Radiology, Tamilnadu Government Dental College and Hospital, Chennai. Male and female patients between 20 and 60 years of age with temporo-mandibular myofascial pain were enrolled following confirmation of MPS according to clinical signs and symptoms and the results of panoramic radiography, to rule out the presence of other conditions. The patients willing to participate in the study were included in the study.

The patients with history of acute trauma, internal derangement, migraine headache, degenerative joint disease, patient with bleeding diasthesis, phobia to needling, patients with local skin lesion, patients who were not able to communicate directly or via interpreter were excluded from the study.

Sterile stainless steel needle of size (0.25 mm*0.40mm, 0.25mm*0.13mm) was used. The preauricular area is swabbed with 90 percent alcohol and the masseter, temporalis and external pterygoid muscles were palpated to ascertain the trigger points and intramuscular needling was done. It was performed by deep needle puncture perpendicularly. Lifting and thrusting motion was done in the myofascial trigger points and then left for 20 mins in position, to provoke a local twitch response (LTR) in all cases when the needle was inserted.

The procedure was repeated for 3 visits with an interval of 3 days between visits was assessed. The pain using visual analog scale and the mouth opening was measured with a divider and metal scale. The collected data were analysed with IBM.SPSS statistics software 23.0 Version.



III. Result

Among the 20 patients included in the study 16 were females and 4 were males. It was observed that both the right and left side temporalis and masseter muscle were involved in the study subjects with involvement of right side masseter muscle, in more number of patients (figure 1)/

Mouth opening:

The mean and standard deviation of mouth opening at first visit is 41.00mm ±3.061, at second visit 42.80 ±3.139 and 44.40 ±2.981 at third visit shown in table 1. The gradual increase in mouth opening at subsequent visit is shown in figure 2. Which was proved statiscally signifacant with a p value of 0.0005 by ANOVA test with Bonferroni correction table 2.

Visual analogue scale for pain:

The mean value and the standard deviation of the VAS score at first visit is 6.80 ±1.281, 3.50 ± 0.946 at second visit and 1.25 ± 1.020 at third visit shown in table 3. The reduction of pain at subsequent visit is shown in figure 3 and it was statistically significant with the p value of 0.0005 proved by Friedman test followed by Wilcoxon signed rank shown in table 4.

Figure 1: muscle involvement

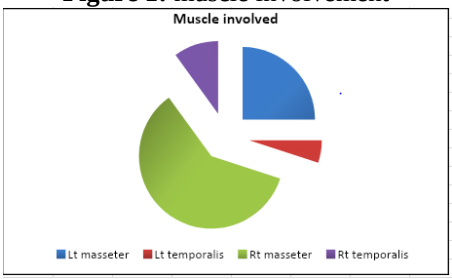


Table 1: Mean score and standard deviation of MO.

	Mean (mm)	±Std. Deviation	N
MO1	41.00	±3.061	20
MO2	42.80	±3.139	20
MO3	44.40	±2.981	20

Figure 2: Bar diagram showing gradual increase in mouth opening at subsequent visit

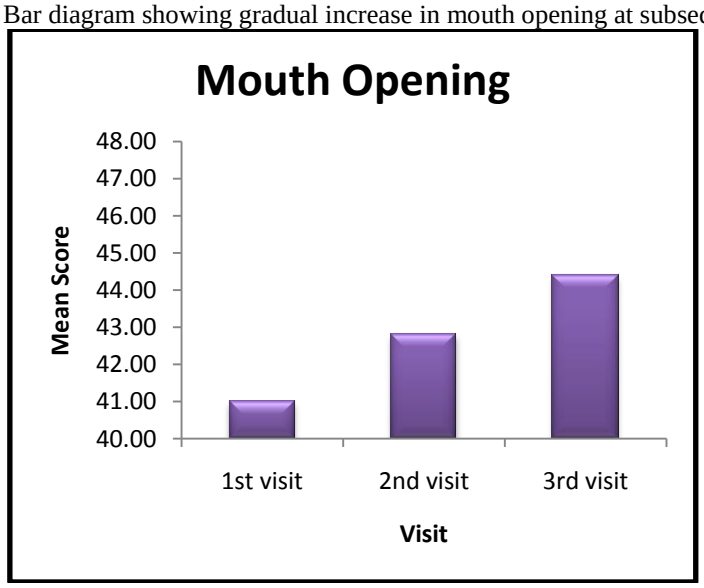


Table 2: ANOVA test with Bonferroni correction.

(I) MO	Mean Difference (I-J)	Std. Error	Sig.[b]
1st – 2nd visit	-1.800*	.321	.0005
2nd – 3rd visit	-1.600*	.311	.0005
1st – 3rd visit	-3.400*	.494	.0005

Table 3: Mean score and standard deviation of VAS score

	N	Minimum	Maximum	Mean	Std. Deviation
VAS1	20	4	9	6.80	±1.281
VAS2	20	1	5	3.50	±0.946
VAS3	20	0	3	1.25	±1.020
Valid N (listwise)	20				

Figure 3: Bar diagram showing gradual improvement of VAS score at subsequent visits.

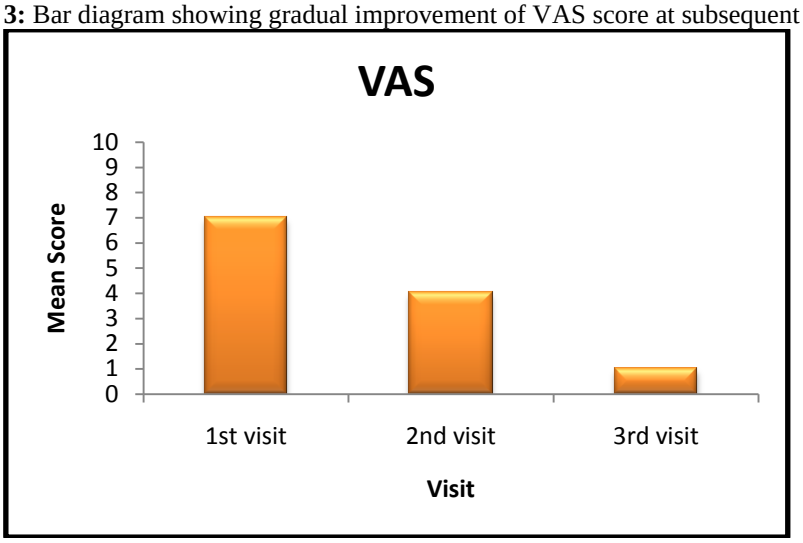


Table 4: Wilcoxon signed rank test.

	Z	Asymp. Sig. (2-tailed)
VAS2 - VAS1	3.959[a]	.0005
VAS3 - VAS1	3.970[a]	.0005
VAS3 - VAS2	3.878[a]	.0005
a. Based on positive ranks.		

IV. Discussion

Dry needling is a very old treatment modality. Sir William Osler, father of modern western medicine documented that dry needling has been used by physicians since 1820.

The work of Kellgren, grounded the scientific basis for its use in treatment of myofascial pain. He methodically mapped out the specific pain patterns caused by each painful muscle, in experiments using the injection of hypertonic(6%)saline in healthy subjects. Original techniques of anaesthetic injection and stretch with vapocoolant spray by Travell et al and Simons et al have moved towards dry needling as an effective treatment and considered as the evidence-based source for management of myofascial pain .It proved that effect of the injection is not due to the substances injected but to the mechanical stimulation of the needle itself.[5]

Gerwin et al. suggested that the abnormal endplate potential caused by excessive acetylcholine (ACh) release in the neuromuscular junction at the motor endplates leads to the development of taut band which was the first phase of trigger point formation. EMG studies show this as 'spontaneous electrical activity' (SEA). The exact mechanisms of action of direct needling in the deactivation of trigger points are not yet unravelled. Indeed, there are some similarities between acupuncture and DN, many significant differences. It differs in the 'technical' details, not only in the underlying philosophies and explanation models: one of more needles applied, the movement of the needle, the depth of needle insertion, the amount and force of stimulation and the elicitation of a 'local twitch response' (LTR). A LTR is an involuntary spinal reflex resulting in a localized contraction of affected muscle fibers that are being manually stretched, injected or dry needled. According to Hong et al. Dry needling is most effective when these LTRs are elicited.[6]

An epidemiological analysis of the examination data on a series of 277 consecutive patients treated at the Temporomandibular Joint Research Center revealed that over 80% had tenderness in one or more of the masticatory muscles. This analysis not only supports the theory of muscle spasm as a key factor, but also indicates that patients with Myofascial pain syndrome comprise the greatest percentage of those having "TMJ" problems.[7]

This study has been done to overcome the commoly occuring MPS and it shows great improvement in mouth opening & pain in MPS patients following dry needling on subsequent visits.

Gonzalez-Perez LM et al and Infante-Cossio p et al done a comparative study between dry needling and methocarbamol/paracetamol medication and the result showed improvement in both mouth opening and pain, which was proved statistically significant. From day 0 to day 70, the median pain score at rest in the DDN group decreased a rate of 68%, and 63% for the control group. For each group, the reduction in pain at rest was statistically significant on days 28 and 70 with respect to day 0, while the reduction of pain at rest produced in both groups was significantly better in the DDN group compared with the control group on day 28 (p=0.005) and on day 70 (p=0.016).[8]

The limitation of this study is that the treatment appraisal was limited only to the effects seen in the short term, one weeks following completion of dry needling on trigger point and smaller sample size. A study with a larger sample size and a longer follow-up period is required to determine the long-term benefits of dry needling in Myofascial pain syndrome.

V. Conclusion

Dry needling showed better efficacy and safety in reducing pain and improving maximum mouth opening in patients with chronic myofascial pain syndrome located. This study also suggested that patients with a poorer functional status obtained the best final outcomes after the treatment. No serious adverse effects were observed with respect to the dry needling technique. Hence, it may also be a suitable alternative for MPS patients who are allergic to NSAIDS and muscle relaxants.

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