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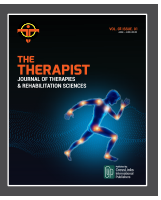

Original Article

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Pistoning versus Holding Dry Needling for Pain, Disability, and Cervical ROM in Upper Trapezius Myofascial Pain Syndrome

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ABSTRACT

Myofascial Pain Syndrome is a prevalent musculoskeletal pain that is characterized by myofascial trigger points. Myofascial trigger points often occur in the upper trapezius. **Objectives:** To determine the comparison of the effects of the use of pistoning on the pain intensity, the presence of disability, and cervical range of motion in adults with upper trapezius myofascial pain syndrome compared to holding dry needling. **Methods:** It was quasi-experimental study in which twenty-four participants were randomized in the pistoning dry needling group (twelve subjects) or the holding dry needling group (twelve subjects). The use of interventions was in three sessions weekly over a three weeks' continuous period. The outcome measures (prone to pain measured with the help of the Visual Analogue Scale, cervical range of motion assessed with the help of the goniometer, disability measured with the Disabilities of the Arm, Shoulder and Hand questionnaire) were compared at the baseline and one week after the last intervention. **Results:** The intensity of pain and disability related to the pain was reduced, and the range of motion of the cervix was higher in all directions: flexion, extension, lateral flexion, and rotation. Nonetheless, between-group analysis showed that there were not statistically significant differences in the extent of improvement in any of the outcome measures which showed that the two techniques were equally effective. **Conclusions:** Pistoning and holding dry needling method are effective in pain reduction, cervical range of motion, and disability among upper trapezius myofascial pain syndrome patients.

INTRODUCTION

Myofascial Pain Syndrome (MPS) refers to pain in skeletal muscles due to the formation of myofascial trigger points (MTPs). Despite frequently occurring in combination with other pain syndromes, MPS must be differentiated from inflammatory disorders (e.g., polymyositis), neurologic disorders (e.g., radiculopathies), soft tissue disorders (e.g., bursitis and tendonitis), and other chronic pain syndromes like fibromyalgia. The key point for the differential diagnosis of MPS is the presence of MTPs in taut bands within the skeletal muscles [1, 2]. Epidemiological studies indicate that MPS involves men and women equally, with its prevalence varying from about 20-30% in general orthopedic clinics to 85-90% in pain clinics [3, 4]. Therapeutic interventions for MPS are generally divided into pharmacologic and non-pharmacologic interventions. Drugs commonly prescribed include nonsteroidal anti-inflammatory drugs (NSAIDs) [5, 6], muscle relaxants, benzodiazepines (e.g., clonazepam and diazepam), tramadol [7], and lidocaine patches [8]. Non-pharmacological interventions encompass a wide variety

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of methods such as exercise therapies, manual therapies [9], electrotherapy modalities [10], postural and ergonomic modifications, as well as more invasive techniques like acupuncture, dry needling, and botulinum toxin injection. Myofascial Trigger Points (MTPs) are highly irritable spots within a tight band produced in skeletal muscles. These points are sensitive and painful during contraction, stretching, and stimulation and can cause sensory, motor, neurologic, and autonomic symptoms. MTPs are among the most important causes of both acute and chronic pain and may also be present in systemic, metabolic, and internal diseases, as well as traumas and joint degeneration. The pain induced by MTPs may persist even after treating the primary disorders. MTPs are characterized by local and referral pain, restriction in the range of motion, and muscle weakness due to pain [11]. Dry needling (DN) is a relatively novel therapeutic technique that has become very common among physical therapists in recent decades. It involves inserting a thin needle into a muscle, without any injection, to treat acute or chronic muscle pains, especially myofascial pain syndromes [12]. The underlying mechanism of DN is not completely understood, but several pathophysiologic effects have been attributed to it, including effects on taut bands, blood circulation, and central and peripheral neurophysiology [13]. UT is a typical location of MTPs. It helps to lift the upper limb and uplift the pectoral girdle. MTPs in UT are extremely common in shoulder pain patients; one study established that approximately 58% of participants with shoulder pain had active MTPs in their UT [14]. Local pain in the shoulder region or a referral to other, more distant regions may be caused by active MTPs in the UT [15]. Despite the widespread application of dry needling to upper trapezius myofascial trigger points, comparison of the methods of pistoning and holding has little evidence.

This study aims to compare their effect on pain, range of motion of the cervical joints, and upper extremity activity so as to inform clinicians in choosing which approach is most effective.

METHODS

This experimental study was a quasi-experimental study conducted at the Department of Physiotherapy, Government Hospital, Qom, Iran. The total duration of the study was six months following the approval of the synopsis (July to December 2024). The sample size was calculated as 24 participants (12 in Group A and 12 in Group B) using Open Epi version 3. Although the minimum sample size derived from Visual Analogue Scale (VAS) scores of a related study was 18 (9 per group), it was increased to 24 to compensate for potential dropouts. Participants were recruited using a non-probability convenience sampling method via an opaque envelope method. Twenty-four subjects with a definite diagnosis of an active MTP in the UT muscle were recruited. The inclusion criteria were: age between 18 and 65 years; no sensitivity to needles; the presence of unprovoked pain for at least three months in the neck/shoulder girdle region; the presence of an MTP in one or more specific locations within the UT; and the presence of at least one active MTP in the UT muscle, identified by palpating a taut band with a tender spot. Exclusion criteria included rheumatological and neurological diseases (e.g., radiculopathies, cervical disk lesions); fibromyalgia or active infection; pregnancy; a history of neck or shoulder surgery; current use of acupuncture, steroidal analgesics, anti-inflammatory drugs, or muscle relaxants; and progressive pain or an unwillingness to attend follow-up sessions. Participants were non-randomly allocated to either the pistoning or holding dry needling group based on their order of enrollment (alternate). Random allocation to either the pistoning or holding dry needling group was performed using opaque envelopes. After recording demographic data and obtaining written informed consent, participants were randomly allocated into one of two intervention groups. In the Holding Method DN group (n=12), the needle was retained for 10 minutes after insertion. In the Pitoning Method DN group (n=12), the needle was ejected immediately after insertion. Dry needling was administered three times per week for three consecutive weeks. A 0.3 × 50-mm Huan-Qiu® acupuncture needle with a guiding tube was used. With the patient in a prone position, the therapist identified the taut band and inserted the needle directly into the MTP. Patients were blinded to their group allocation. Outcomes were assessed at baseline and one week after the final treatment session. Pain intensity was measured using the Visual Analogue Scale (VAS), which ranges from 0 (no pain) to 10 (worst perceivable pain). Cervical Range of Motion (ROM) was assessed in three planes (sagittal, frontal, transverse) using a hand goniometer. Movements evaluated included flexion, extension, right and left lateral flexion, and right and left rotation. The disability level was evaluated using the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire, a 30-item reliable and valid tool where each item is scored from 1 (no symptom) to 5 (very severe symptom). Data were analyzed using SPSS version 20. Data normality was tested using the one-sample Kolmogorov-Smirnov test and found to be normal. Parametric tests were used: paired t-tests for within-group and independent t-tests for between-group comparisons. A p-value <0.05 was considered significant. Written informed consent was obtained from all participants. Confidentiality was maintained by replacing names with identification numbers. Only the researcher and supervisor had access to

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the data, which were stored on secured, password-protected computers. Participants retained the right to discontinue the study at any stage, and no financial benefits were provided for participation.

RESULTS

According to the results obtained, both methods significantly improved main outcome measures (pain, disability, and cervical ROMs) in patients with active MTP in the UT muscle. However, between-group comparisons of data revealed no statistically significant change between the two DN methods. These findings imply that there is no superiority of one technique over the other. In our study, 24 individuals with active MTP of UT were randomly assigned to the pistoning (n=12) and holding (n=12) groups. Both groups were matched, and no between-group difference was observed at baseline of the trial regarding demographic data (age, height, and weight) (Table 1).

Table 1: Patients' Demographic Data

Variable	Pistoning Dry Needle	Holding Dry Needle	p-Value
Age	26.50 ± 4.14	24.08 ± 4.69	0.195
Height	169.41 ± 10.47	167.91± 9.38	0.715
Weight	62.16 ± 11.59	66.25 ± 10.44	0.375

Pain intensity (VAS), disability level (DASH score), and cervical ROMs are compared between the two groups. Average values of outcomes were compared before and after the trial by Paired-Samples t-Test, and a p-value<0.05 was considered as a statistically significant change. Findings indicated considerable improvements in all the variables, following treatments (p-value) (Table 2).

Table 2: Within-Group Comparisons of Pain Intensity (VAS Score), Disability Level (DASH Score), and Neck ROMs

Variables	Pistoning Dry Needle			Holding Dry Needle		
	Pre-interventions	Post-interventions	p-Value	Pre-interventions	Post-interventions	p-Value
Pain Intensity (VAS)	5.75 ± 1.35	2.83 ± 1.80	<0.001	6.08 ± 1.56	2.16 ± 0.93	<0.001
Disability Level (DASH Score)	86.41 ± 19.95	60.91 ± 19.95	0.001	87.25 ± 26.99	64.25 ± 33.65	<0.001
Flexion	41.66 ± 11.77	49.66 ± 12.76	<0.001	46.41 ± 13.14	56.08 ± 10.61	0.002
Extension	51.16 ± 9.07	61.33 ± 9.05	<0.001	51.41 ± 13.99	62.66 ± 11.97	<0.001
Ipsilateral Lateral Flexion	43.16 ± 9.17	47.16 ± 8.18	<0.001	42.16 ± 5.40	48.91 ± 5.43	<0.001
Contralateral Lateral Flexion	43.58 ± 7.46	48.50 ± 8.14	0.001	45.75 ± 5.64	50.91 ± 7.45	<0.001
Ipsilateral Rotation	60.58 ± 5.68	64.75 ± 6.18	<0.001	64.58 ± 5.82	69.16 ± 6.26	0.001
Contralateral Rotation	61.16 ± 5.65	65.25 ± 6.48	0.001	64.25 ± 0.89	69.66 ± 0.46	<0.001

The Independent-Samples t-Test was applied to compare the results of the pre-post difference of the outcome measures between the two groups. To also measure the extent of the differences, Cohen's d was used to estimate the effect sizes. The values of all between-groups comparisons were small to medium, with the range of d = 0.15 for disability (DASH score) and d = 0.64 for pain intensity (VAS). No statistically significant difference was found between the two groups. p-value >0.05. The result of this finding indicates that the good effects of the two DN techniques were equal (Table 3).

Table 3: Between-Group Comparison of Pain, Disability, and Neck ROMs

Variables	Pistoning Dry Needle (Pre-Post Change) (Mean ± SD)	Holding Dry Needle (Pre-Post Change) (Mean ± SD)	p-Value	Cohen's d (Effect Size)
VAS	2.91 ± 1.50	3.91 ± 1.62	0.132	0.64 (Medium)
DASH score	25.50 ± 19.75	23.00 ± 13.54	0.721	0.15 (Small)
Flexion	8.00 ± 5.49	9.66 ± 8.46	0.573	0.23 (Small)
Extension	10.16 ± 3.88	11.25 ± 7.60	0.665	0.18 (Small)
Ipsilateral Lateral Flexion	4.00 ± 2.73	6.75 ± 4.30	0.075	0.76 (Medium)
Contralateral Lateral Flexion	4.91 ± 4.03	5.16 ± 3.01	0.865	0.07 (Small)
Ipsilateral Rotation	4.16 ± 2.51	4.58 ± 3.34	0.733	0.14 (Small)
Contralateral Rotation	4.08 ± 3.28	5.41 ± 2.57	0.281	0.0

DISCUSSION

The results of the current research proved that not only the holding but also the pistoning technique of dry needling (DN) was effective in relieving pain, cervical range of motion (ROM), and functional status of the upper extremity evaluated using the DASH questionnaire. These findings are corroborated by Navarro *et al.* who have found DN as effective as local lidocaine injection in reducing pain [16] in upper trapezius myofascial trigger points (MTPs), and by Jimbo *et al.* who have found DN to be as effective as local lidocaine injection in reducing pain [17]. Nonetheless, the

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two intervention groups did not show any statistically significant difference, which means that the level of their efficacy is the same. As far as we know, the study is the first to directly compare these two particular methods of DN to the treatment of upper trapezius MTPs. The significant reduction in pain intensity achieved by both techniques suggests that the therapeutic effect of DN may be attributable more to the fact of needle insertion itself than to the duration the needle is retained. This interpretation is supported by previous studies which concluded that post-needling pain relief is probably due to the process of insertion [18]. Literature proposes several mechanisms for this effect. DN can induce a local stretch in the muscle, relaxing the tight muscle fibers. Furthermore, it is believed to help eliminate noxious biochemical substances by enhancing local blood flow, as demonstrated by Cagnie *et al.* who showed a significant increase in local blood flow and oxygen saturation in the upper trapezius following DN [19]. The results also showed that both DN techniques induced a significant increase in cervical ROM across all planes of motion, with no significant difference between groups. This finding aligns with previous studies by Jimbo *et al.* and Gerber *et al.* which demonstrated that DN effectively restores motion in the upper trapezius by deactivating MTPs that cause pain during muscle contraction and stretching [17, 20]. Finally, both groups showed significant improvement in functional ability, as measured by the DASH score. DASH questionnaire evaluates the capacity of a patient to conduct daily activities and rates symptoms like pain and stiffness [21], the improvements in primary outcomes would logically lead to a better score. This correlation is supported by Aksan *et al.* who found a relationship between DASH scores and the prevalence of MTPs in the upper trapezius [22].

CONCLUSIONS

Both pistoning and holding dry needling techniques are effective in reducing pain, improving cervical range of motion, and decreasing disability in patients with upper trapezius myofascial trigger points. No significant difference was observed between the two methods, indicating that clinicians can choose either technique based on patient preference and clinical feasibility.

Authors Contribution

Conceptualization: ZE
Methodology: MAK
Formal analysis: HI
Writing review and editing: NB, HS

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

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REFERENCES

[1] Cao QW, Peng BG, Wang L, Huang YQ, Jia DL, Jiang H *et al.* Expert consensus on the diagnosis and treatment of myofascial pain syndrome. World Journal of Clinical Cases. 2021 Mar; 9(9): 2077. doi: 10.12998/wjcc.v9.i9.2077.

[2] Jin L and Liu Y. Clinical manifestations, pathogenesis, diagnosis and treatment of peripheral neuropathies in connective tissue diseases: more diverse and frequent in different subtypes than expected. Diagnostics. 2021 Oct; 11(11): 1956. doi: 10.3390/diagnostics11111956.

[3] Lam C, Francio VT, Gustafson K, Carroll M, York A, Chadwick AL. Myofascial pain–A Major Player in Musculoskeletal Pain. Best Practice and Research Clinical Rheumatology. 2024 Mar; 38(1): 101944. doi: 10.1016/j.berh.2024.101944.

[4] Puckett Y, Mallorga-Hernández A, Montaño AM. Epidemiology of mucopolysaccharidoses (MPS) in United States: challenges and opportunities. Orphanet Journal of Rare Diseases. 2021 May; 16(1): 241. doi: 10.1186/s13023-021-01880-8.

[5] Ago Y, Rintz E, Musini KS, Ma Z, Tomatsu S. Molecular Mechanisms in Pathophysiology of Mucopolysaccharidosis and Prospects for Innovative Therapy. International Journal of Molecular Sciences. 2024 Jan; 25(2): 1113. doi: 10.3390/ijms25021113.

[6] Gulati M, Gupta N, Potturi G, Dadia S. Pharmacological and Non-Pharmacological Treatments Available for Myofascial Pain Syndrome–A Scoping Review. Cuestiones de Fisioterapia. 2024 Dec; 53(03): 1656-70.

[7] Saindane RA and Thombre NA. Concurrent use of skeletal muscle relaxants and NSAIDs in low back pain management: A critical review of current evidence and future directions. The Thai Journal of Pharmaceutical Sciences. 2025; 49(2): 5. doi: 10.56808/3027-7922.2997.

[8] Wu X, Wei X, Jiang L, Cai J, Ju M, Zheng X. Is lidocaine patch beneficial for postoperative pain?: a meta-analysis of randomized clinical trials. The Clinical Journal of Pain. 2023 Sep; 39(9): 484-90. doi: 10.1097/AJP.0000000000001135.

[9] Korkmaz MD, Ceylan CM. Effect of Dry-Needling nd Exercise Treatment Oon Myofascial Trigger Point: A

DOI: https://doi.org/10.54393/tt.v6i3.283

Single-Blind Randomized Controlled Trial. Complementary Therapies in Clinical Practice. 2022 May; 47: 101571. doi: 10.1016/j.ctcp.2022.101571.

[10] Alvarez LX, Medina C, Lenfest M, Niebaum K. Physical Modalities. Canine Sports Medicine and Rehabilitation. 2025 Oct: 326-64. doi: 10.1002/9781394251452.ch12.

[11] Lucas K. Effects of latent myofascial trigger points on muscle activation patterns during scapular plane elevation (Doctoral dissertation, RMIT University). 2024.

[12] Galiero R, Caturano A, Vetrano E, Beccia D, Brin C, Alfano M *et al.* Peripheral Neuropathy in Diabetes Mellitus: Pathogenetic Mechanisms and Diagnostic Options. International Journal of Molecular Sciences. 2023 Feb; 24(4): 3554. doi: 10.3390/ijms24043554.

[13] Baum P, Toyka KV, Blüher M, Kosacka J, Nowicki M. Inflammatory mechanisms in the pathophysiology of diabetic peripheral neuropathy (DN)—new aspects. International Journal of Molecular Sciences. 2021 Oct; 22(19): 10835. doi: 10.3390/ijms221910835.

[14] Bron C, Dommerholt J, Stegenga B, Wensing M, Oostendorp RA. High prevalence of shoulder girdle muscles with myofascial trigger points in patients with shoulder pain. BMC Musculoskeletal Disorders. 2011 Jun; 12(1): 139. doi: 10.1186/1471-2474-12-139.

[15] Sergienko S and Kalichman L. Myofascial origin of shoulder pain: a literature review. Journal of bodywork and movement therapies. 2015 Jan; 19(1): 91-101. doi: 10.1016/j.jbmt.2014.05.004.

[16] Navarro Santana MJ, Sánchez-Infante Gómez-Escalonilla J, Fernández de las Peñas C, Cleland JA, Martín Casas P, Plaza Manzano G. Effectiveness of dry needling for myofascial trigger points associated with neck pain symptoms.

[17] Jimbo S, Atsuta Y, Kobayashi T, Matsuno T. Effects of dry needling at tender points for neck pain (Japanese: katakori): near-infrared spectroscopy for monitoring muscular oxygenation of the trapezius. Journal of Orthopaedic Science. 2008 Mar; 13(2): 101-6. doi: 10.1007/s00776-007-1209-z.

[18] Ay S, Evcik D and Tur BS. Comparison of injection methods in myofascial pain syndrome: a randomized controlled trial. Clinical rheumatology. 2010 Jan; 29(1): 19-23. doi: 10.1007/s10067-009-1307-8.

[19] Cagnie B, Barbe T, De Ridder E, Van Oosterwijck J, Cools A, Danneels L. The influence of dry needling of the trapezius muscle on muscle blood flow and oxygenation. Journal of Manipulative and Physiological Therapeutics. 2012 Nov; 35(9): 685-91. doi: 10.1016/j.jmpt.2012.10.005.

[20] Gerber LH, Shah J, Rosenberger W, Armstrong K, Turo D, Otto P *et al.* Dry needling alters trigger points in the upper trapezius muscle and reduces pain in subjects with chronic myofascial pain. PM&R. 2015 Jul; 7(7): 711-8. doi: 10.1016/j.pmrj.2015.01.020.

[21] Stathokostas L, Little RM, Vandervoort AA, Paterson DH. Flexibility training and functional ability in older adults: a systematic review. Journal of Aging Research. 2012; 2012(1): 306818. doi: 10.1155/2012/306818.

[22] Aksan Sadikoglu B, Analay Akbaba Y, Taskiran H. Effects of ischemic compression and instrument-assisted soft tissue mobilization techniques in trigger point therapy in patients with rotator cuff pathology: randomized controlled study. Somatosensory & Motor Research. 2022 Jan; 39(1): 70-80. doi: 10.1080/08990220.2021.2005015.