Dry needling of upper trapezius for pain relief: Can number of sessions decide the outcome?

Asia Pacific Journal of Multidisciplinary Research
Vol. 8 No.1, 112-116
February 2020
P-ISSN 2350-7756
E-ISSN 2350-8442
www.apjmr.com
ASEAN Citation Index

Nancy Singla[1], Shabnam Joshi (PhD)[2,] Alka Pawalia (PhD)[3], Vikram Singh Yadav[4]
[1-3]Physiotherapy, GJUS&T, Hisar, Haryana, India; [4]Physiotherapy, Pt. B.D. Sharma University of Health Sciences, PGIMS, Rohtak, India
shabnamphysio@gmail.com[2],alkapawalia@gmail.com[3],vikramsinghyadav@gmail.com[4]

Date Received: October 26, 2019; Date Revised: February 5, 2020

Abstract *–The purpose of the study was to investigate the effect of three different durations of dry needling sessions, [2, 4 and 6 sessions] in treating neuromuscular pain, due to myofascial trigger points [MTP] in upper trapezius muscle, with a follow-up of 20 days. Convenient samples of 30 participants with upper trapezius trigger points were randomly divided in three groups for each treatment session of 2, 4 and 6 sessions. Pain intensity measured by VAS was assessed before the treatment, at the end of treatment and at follow-up of 20 days. Repeated measures ANOVA showed significant differences between the pre, post and follow-up period for VAS in three groups[p<0.00]. Also between group comparisons for VAS at post reading and follow-up were statistically significant for all the three groups with maximum reduction of pain reported in group C[6 sessions] followed by group B[4 sessions] and A[2 sessions] respectively[p<0.00]. Dry needling is effective in reducing pain in myofascial trigger points in upper trapezius muscle. However, more number of sessions of dry needling showed better results for reduction of pain than less with results maintained at post as well as follow-up of 3 weeks.*

Keywords *–Dry needling, Myofascial trigger points, neuromuscular pain*

INTRODUCTION

A tight band within the skeletal muscles which is palpable as a local hypertensive point is called myofacial trigger point[MTP]. These trigger points are a primary source of pain with various neuromusculoskeletal dysfunctions[1]. The etiology and mechanism of formation of trigger points and somatic symptoms is not fully explained. However, it is suggested that the formation of taut band at the muscle endplates leads to chemical changes and irregular activity of endplate on the neuromuscular junction[2]. Regular provocation of the endplate result in excessive release of acetylcholine which result in a consistent muscle fiber contraction, leading to formation of taut nodules[3]. In postural muscles of upper quadrant, maximum number of trigger points are reported in trapezius muscle.

Neck and shoulder pain are the most commonly treated problem in physical therapy practice [4]. Existence of myofacial trigger points is commonly found in jobs requiring desk or computer work with static neck posture and more visual stressors, or related with radiculopathy i.e. when trigger points cause radiating pain[5],[6]. Myofascial trigger points are also commonly prevalent in tension type headache and migraines[7]. Increased pressure on the trigger area produce pain along the dermatome and it causes radiating pain. A local tenderness on the adjacent area to the nodule and features like redness, raised temperature etc. could also be seen as an autonomic reaction [8]. Characteristically myofacial trigger points may be active or inactive. Although active trigger points produce an unintended complain of ache, inactive myofacial trigger points are scientifically quiet and will be painful when well accelerated[8].

Flexibility and mobility have long been integral part of many rehabilitation and fitness training programs for patients with non-traumatic neck or shoulder pain[9]. There are many invasive and non- invasive techniques for treatment of myofacial trigger points. Laser therapy, stretching, ultrasound, trans-cutaneous electrical nerves stimulation and biofeedback all are included in non-invasive technique. Dry needling is comparatively a latest invasive method, which is widely used for managing myofacial trigger points. Dry needling involves insertion of needle into a myofacial trigger point without injecting any injectate. Dry needling is adequate and efficacious treatment for decreasing pain and dysfunction related with myofacial trigger points [10]. Though, it has been found to be effective in managing myofacial trigger point pain there are not any studies reporting the effect of the duration of the dry needling on myofacial trigger points pain relief. Following on the same concept we hypothesized that

more number of sessions of dry needling will be more effective in reducing pain in patients. Therefore, the aim of present study is to determine the effect of different durations of dry needling sessions on myofacial trigger points in trapezius muscle in people with neck pain.

METHODS

This is an experimental study with pre post design. Data was collected over a period of five months in 2018 in the OPD of Guru Jambheshwar University of Science & Technology and a physiotherapy center of Hisar. A total of 30 patients, suffering from mechanical neck pain due to upper trapezius muscle spasm who were willing and gave a written consent for the study were chosen for treatment using the dry needling technique. Further, they were randomly divided in three groups as per the number of dry needling sessions given in each group. Group A had two sittings for dry needling, while group B and group C had four and six sessions each. Necessary ethical approval for the study was obtained from Institutional Ethical Committee. Measurements for pain intensity were done using visual analog scale [VAS] before and after the dry needling session for each group. The post reading for three groups was 2 days, 4 days and 6 days for group A,B and C respectively. Subjects were included if they were between the age of 20-40 years, and had Unilateral/ Bilateral upper trapezius muscle spasm with mechanical neck pain. They were excluded if they had any shoulder disorders [Periarthritic shoulder, Impingment syndrome], Spinal, neck and upper extremity disorders, musculoskeletal disease, neurological conditions and Systematic disorders such as parkinson's disease, poly-neuropathy, pregnancy, inflammatory disorders, edema at the motor trigger point site, any gait pathologies, any spinal and upper extremity fractures.

Readings for pain were measured at three time points i.e. at pre intervention[time I], post intervention[time II] and at follow-up of 20 days for each group[time III]. Study protocol is shown in Figure 1. They were measured for pain intensity using visual analog scale [VAS] which is a 10 cm long scale. The starting pointsignifies least pain while the other end signifies extreme pain. Patients were instructed to mark appropriately their present pain intensity.

Dry Needling Protocol

A single therapist on all the patients gave intervention. Upper trapezius was assessed for isolation of trigger points which caused reproduction of pain. Therapeutic needling was performed with 0.30 mm diameter, 25 mm long sterile acupuncture needles. Trigger point was palpated, skin was cleaned with a sanitizer. After picking up the muscle bulk, with the trigger point between the thumb and finger pad, needle was inserted perpendicular to avoid apex of the lung. To locate the right spot 'fishing' was done followed with to, fro and twirling movement with the needle till a taut band or nodule was felt making further insertion of needle difficult. After each session of dry needling a passive stretch was given to the patient 3 times with a hold of 10 seconds. They were also advised to apply a cold pack if they observed any blue spot at the site of needling for home care.

RESULTS AND DISCUSSION

The following section presents the study findings in the form of tables after analysis. Data was analyzed by using software IBM SPSS 21.0 version.

Table 1. Baseline values for Age and Pain [VAS] for the three groups.

Groups/ Variable	Group	Group B	Group C	F	p
Age	30±5.77	27.6±6.83	28.3±4.85	0.441	0.648
Pre VAS	5.40±0.52	5.70±0.48	5.80±0.42	1.918	0.166

Mean, standard deviation, mean differences and one way ANOVA test was used for comparison between groups. The three groups had comparable age and pain readings at the beginning of the study as shown in table 1.

Table 2. Showing the pre, post and follow-up readings for VAS between groups A, B and C.

NO. OF SITTINGS	PAIN INTENSITY [VAS]				
	PRE [1]	POST [2]	AFTER 20 DAYS [3]	F	p
2 sessions [MEAN]	5.4	3.8	4	20.52	0.00*
4 sessions [MEAN]	5.7	2.3	2.5	146.68	0.00*
6 sessions [MEAN]	5.8	0.7	1.6	327.98	0.00*

**significance set at p<0.05*

On comparing the pain scores for each groups on three time points of pre treatment, post treatment and at a follow-up of 20 days, it showed statistically significant reduction of pain in all the three groups [Table 2]. Maximum reduction in pain was reported in group with six [p=0.00], four[p=0.00] and two[0.00]

dry needling sessions respectively. These were both at post and follow-up readings.

Table 2[a] Post hoc comparisons for three groups for pain at three time points.

Group	Comparison by duration	Diff. of mean	significance
A	1 &2	1.60	**0.000**
	1&3	1.40	**0.000**
	2&3	-0.20	0.469
B	1 &2	3.40	**0.000**
	1&3	3.20	**0.000**
	2&3	-0.20	0.377
C	1 &2	5.10	**0.000**
	1&3	4.20	**0.000**
	2&3	-0.90	**0.000**

On doing the post hoc analysis for the same it was found that there were significant differences between the pre vs. post and pre vs. follow-up reading of pain for all the three groups i.e. pain was reduced at post reading as well as at 20 days follow-up when compared to pre reading. However, group C also showed significant differences in post reading and follow-up readings for pain [Table 2[a]].

Table 3. Showing effect of number of dry needling session on at post reading & 20 days follow-up using one way ANOVA between groups.

	Group A	Group B	Group C	F	P
VAS Post	3.8±0.63	2.3±0.48	0.70±0.48	83.19	0.00*
VAS Follow-Up	4±0.66	2.5±0.53	1.60±0.52	44.59	0.00*

**significance set at p<0.05*

Table 3 shows the comparison between three groups for pain at post reading as well as a follow-up at 20 days. Group C reported significant reduction in pain followed by group B and A for both post [p=0.00] and follow-up readings [p=0.00].

Table 4 Mean difference for VAS between three groups [A, B and C] at post session and at 20 days follow-up.

VAS [Pain Intensity]	Post - Pre	Follow-up– Pre
Group A	1.6	1.4
Group B	3.4	3.2
Group C	5.1	4.2

Table 4 shows that the mean differences of the pain intensity [VAS] among three groups [A,B & C].The mean differences between three groups A, B & C at post1 – pre reading are 1.6, 3.4 and 5.1 respectively, and differences at follow-up – pre are 1.4, 3.2 and 4.2 respectively. This showed that Group C patients had more relief in pain followed by Group B and Group A i.e. more the number of sittings of dry needling, the better the pain relief.

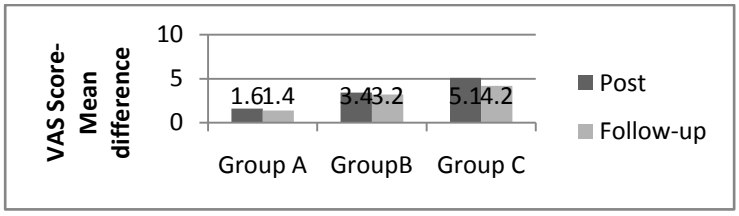

Figure 2: Mean differences in pain intensity at post reading and follow-up

Mechanical dynamic balance of dry needling is widely used by health professionals in the treatment of neuromusculoskeletal pain and movement impairments caused by myofascial trigger points [MTrPs]. In the present study, we tried to interrogate the effect of number of sittings of the dry needling in patients with Trapezius muscle spasm with neck pain, with an immediate effect to a 20 days follow-up after last session of dry needling. Our results showed group C [6 sittings] reported less pain at both post reading and at follow-up followed by group B [4 sittings] and group A [2 sittings]. Though, pain was reported to be relieved in all the groups but maximum improvement was reported in group C which had the maximum number of sittings. The difference in pain scores compared to pre reading at post reading as well as follow-up was also reported maximum in group C followed by group B and group A. We did not measure pain intensity immediately after each session based on a 2016 study, which reported no immediate improvement in pain intensity after dry needling session on upper trapezius but pain intensity was better reported after two days of treatment[11] .

A 2017 study investigated the very low- quality to moderate quality evidence of dry needling in patients with any musculoskeletal pain conditions. They found that dry needling group showed better result than control group or sham group for decreasing pain and increasing pressure pain threshold during immediate to 12 week follow-up session[12]. In present study, we used dry needling with passive stretch after each treatment session. Group C shows more effect of dry needling on decreasing pain than group A and group B. The effect on pain of group C is 0.7 at post reading and 1.6 at 20 days follow-up i.e. better than group A[3.8, 4] and group B[2.3, 2.5][Figure 2].

A comparison of dry needling to treat myofascial pain syndrome [MPS] with acupuncture needle and a sham needle given for 6 sessions over a period of 4

weeks, showed acupuncture having better results on decreasing pain and improving quality of life than sham group in patients with MPS. The VAS score of dry needling group was 4.0 and 2.2 on first and sixth session respectively. In present study too group C with six sessions of dry needling had initial VAS score of 5.8 reducing to 0.7 at the end of 6th session, while for group A and B initial VAS scores were 5.4 and 5.7 reducing to 3.8 and 2.3 respectively[13].

A 2016 study compared the effect of combination of dry needling and passive stretch with passive stretch alone on trapezius muscle in office workers having neck pain. Both groups had five sessions [with 3 days between adjacent session] in three weeks. Dry needling group showed to have better results for VAS [$p<0.001$] compared to passive stretch alone [14].'

Another 2016 study compared the effect of dry needling and stretching with only stretching on Hamstring muscle to check the flexibility of muscle in patients with knee pain. They had two sessions of dry needling, but did not get much improvement in increasing range of motion or reducing knee pain than sham group in patient with atraumatic knee pain. It could be due to the initial dry needling sessions, which cause soreness in muscle as a part of piercing process leading to less reduction in pain. In our present study too two session of dry needling were less effective in reducing pain as compared to other two groups[9].

A study had no major difference between dry needling and placebo treatment on gluteal muscles in athletes with posterior thigh pain. Since the same size of needle was used as we used in our study in trapezius muscle, it could be a reason for not getting appropriate results. Since each area requires different size needle depending on the area and depth to be treated, for thicker subcutaneous layer and deeper trigger points, longer needle is ideally needed[15]. However, there is no hard and fast rule for the same too. The present study was an attempt to find any effect of the number of sessions on reducing pain scores in patients with trigger points in upper trapezius region due to any neuromuscular disorder.

CONCLUSION AND RECOMMENDATION

The present results will be useful in clinical practice where dry needling treatment is practiced for pain reduction purposes i.e. in physical therapy. When given as a treatment, only at once or twice as sitting, it might not be that effective in pain management, whereas, for a better result, even at a follow-up of about three weeks at least six sessions of dry needling needs to be given. There are no previous studies talking about the effect of number of sessions that result in pain relief, making it a new and significant finding in the field of physical therapy as well as manual therapy. This could be used accordingly in formulating and deciding the treatment plan for treating painful conditions arising from myofascial trigger points. Future studies are recommended with a larger number of patients in each group for better and more precise interpretation of results. Also, whether this duration holds true for all other neuromuscular painful conditions could be topic worth exploring. The present study concluded that more number of sessions of dry needling are more effective in reducing pain, in patients with trapezius muscle spasm with neuromusculoskeletal neck pain as comparable to less frequency of sittings of dry needling. These findings are maintained even at a follow-up of 20 days.

Conflict of interest: None

Source of funding: None

Acknowledgment: We would like to thank our patients who participated in the study along with the clinical staff at the clinic.

REFERENCES

[1] Amirdehi, M.A., Ansari, N.N., Naghdi, S., Olyaei, G., Nourbakshsh, M.R. (2013) The neurophysiological effects of dry needling in patients with upper trapezius myofacial trigger points.*BMJ Open*;3:1-5.

[2] Simons DG. (2004). Review of enigmatic MTrPs as a common cause of enigmatic musculoskeletal pain and dysfunction. *J Electromyogr Kinesiol*;14:95-81.

[3] Hong, C.Z. & Simons, D.G. (1998). Pathophysiologic mechanism of myofacial trigger points. *Arch PhysMed Rehabil*;79:863-72.

[4] Cote, P., Kristman,V., Vidmar, M., Van Eerd, D., Hogg-Johnson, S., Beaton, D., Smith, PM. (2008). The prevalence and incidence of work absenteeism involving neck pain. *Spine*;33:192-8.

[5] Kostopoulos, D & Rizopoulos, K. (2001). The manual of trigger point and myofascial therapy. *Thorofare, NJ*;2001.

[6] Zennaro, D., Laubli, T.,Krebs, D., Klipstein, A., Krueger, H. (2003). Continous, intermitted and sporadic motor unit activity in the trapezius muscle during prolonged computer work. *J Electromyogr Kinesiol*;13:113-24.

[7] Do, T.P., Heldarskard, G.F., Kolding, L.T., Hvedstrup, J., Schytz, H.W. (2018). Myofascial trigger points in migraine and tension-type headache. *J Headache Pain*;19[1]:84.doi:10.1186/s10194-018-0913-8.

[8] Travell, J.G., Simons, D.G., Simons, L.S. (1999) Myofascial pain and dysfunction: the trigger point

manual: upper half of body. Baltimore: Williams & Wilkins

[9] Mason, J.S., Crowell, M., Dolbeer, J., Morris, J., Terry, A., Koppenhaver, S., Goss, D.L. (2016). The effectiveness of dry needling and stretching VS stretching alone on hamstring flexibility in patients with knee pain: A randomized controlled trial. *Int J Sports Phys Ther*;11[5]:672-683.

[10] Kalichman, L & Vulfsons, S. (2010). Dry needling in the management of musculoskeletal pain. *J Am Board Fam med*;23:640-6.

[11] Gattie, E. & Joshua, A. (2017). Cleland, Snodgrass S. Effectiveness of trigger point dry needling for musculoskeletal conditions by physical therapists. *Int J Sports PhysTher*;47:133-148.

[12] Ziaeifar, M., Arab, A.M., Nourbakhsh, M.R. (2016) Clinical Effectiveness of Dry Needling Immediately After Application on Myofascial Trigger Point in Upper Trapezius Muscle. *J Chiropr Med*;15[4]:252–258. doi:10.1016/j.jcm.2016.08.009

[13] Tekin, L., Akarsu, S., Durmuş, O., Cakar, E., Dinçer, U., Kıralp, M.Z. (2013). The effect of dry needling in treatment of myofacial pain syndrome: a randomized double- blinded placebo-controlled trial. *Clin Rheumatol*;32[3]:309-315.

[14] Cerezo-Téllez, E., Lacomba, M.T., Fuentes-Gallardo, I., Mayoral Del Moral, O., Rodrigo-Medina, B., Gutiérrez Ortega, C. (2016). Dry needling of Trapezius muscle in office workers with neck pain: a randomized clinical trial. *J Man Manip Ther*;24[4]:223-232.

[15] Huguenin, L., Brukner, P.D., McCrory, P., Smith, P., Wajswelner, H., Bennell, K. (2005). Effect of dry needling of gluteal muscles on straight leg raise: a randomized, placebo controlled, double blind trial. *Br J sports Med*;39:84-90.