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Combined effects of dry needling and strain counter strain technique in myofascial trigger points of upper trapezius

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ABSTRACT. The aim of the study was to evaluate the combined effects of dry needling and strain counter strain in myofascial trigger points of upper trapezius. A randomized control trial was conducted in physiotherapy department of Mayo Hospital, Lahore, Pakistan between July and September 2020. Patients had rigid band, local tenderness, referred pain, localized twitch response and jump sign, both gender male and female, age 20-40 years, the presence of active symptomatic trigger points in upper trapezius, pain presented in the cervical and occipital region were included. Total 28 patients which had been divided into two groups by randomization (study group & control group). Interventions/data collection tools; conventional physiotherapy in study group-A (n = 14) and strain counter strain only with baseline treatment in control group-B (n = 14). Patients were treated in the span of 8 weeks (2 treatment sessions/0-2 week then 1 treatment session/2-4 week and baseline treatment session/4-8 week). The data was collected using VAS, goniometer and neck disability index questionnaire. The mean age of 25.65 ± 4.05 years in group-A and 20.55 ± 3.25 in group-B. At the end of treatment, the mean pain score was 1.07 ± 0.27 for study group and 1.86 ± 3.63 for control group ($p \leqslant 0.05$). The mean of neck disability index score was 1.79 ± 0.58 for study group and 2.64 ± 0.50 for control group ($p \leqslant 0.05$). The mean of cervical right lateral flexion was 35.93 ± 3.81 for study group and 30.79 ± 3.24 for control group ($p \leqslant 0.05$). The study concluded that combined technique of dry needling and strain counter strain is effective in trigger point's reduction, pain improvement and also improved ranges of motion.

Keywords: Dry needling; strain counter strain; trigger points; trapezius; visual analogue scale.

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Introduction

Myofascial trigger point (MTrPs) is actually a highly irritable point present in the skeletal muscle rigid band that is highly painful when it is compressed and can be linked with motor dysfunction, as a referral pain and autonomic phenomena as well (Celik & Mutlu, 2013). Sensory changes that occur by myofascial trigger point are hyperalgesia, dysesthesia while sweating, increase in skin temperature, redness of skin are its autonomic features (Shah et al., 2015). Most common cause of muscular joint pain in patients who present to physical therapist for the treatment is myofascial trigger points (MTrPs). Severe pain and disability are very common in skeletal muscles by trigger points while most commonly involve muscle is upper trapezius (Ziaeifar et al., 2016). By Fischer the most sensitive muscle is upper trapezius among the 8 distinct muscles that are pectoralis major, levator scapulae, upper trapezius, teres major, para spinals, supraspinatus, infraspinatus (Manafnezhad et al., 2019). In the upper trapezius two trigger point location commonly pain that is referred at the back of the ear and posterior and lateral side of the neck region (Fernández-de-Las-Penas et al., 2015). There is an association between activated points in myofascial and headache as myofascial trigger points of head and neck muscles join up as an etiological role in headache of tension type (TTH) (Ourieff et al., 2023). As chronic tension type headache is associated with active trigger points in sternocleidomastoid, temporalis and trapezius muscles. Both non-invasive and invasive techniques are available for the management of trigger points (MTP) myofascial. Dry needling (DN) and injection therapy are included in invasive technique while strain counter strain (SCS), ischemic compression, massage are non-invasive procedures (Lluch et al., 2015). Dry needling is an invasive procedure in which under the skin and muscle needle is inserted for the intramuscular stimulation (IMS) (Taleb et al., 2016). There are many benefits

of dry needling in immediate improvement in regional, or referred, restore the rages of motion and improve muscle activation pattern. Dry needling quickly reduces the myofascial trigger point pain and reduce the effect of trigger points (Ribeiro et al., 2018).

Strain counter strain is an osteopathic approach in which there is a specific positioning of the patient made passively by physical therapist or osteopath for 90 seconds for the reduction of trigger point sensitivity (Lytras et al., 2020). Strain counter strain for upper trapezius is side flexion ipsilateral with opposite side rotation, external rotation and ipsilateral shoulder abduction and this state of body is sustained up to ninety seconds (Kojidi et al., 2016).

In the present knowledge and prospect found in some databases, there is hardly any study found that show the combined consequence of strain counter strain and dry needling in myofascial trigger point of upper trapezius. Furthermore, prior or introductory data is not present to find out the effect of dry needling (DN) with stain counter strain (SCS) on pain intensity and functional disorder in patients of myofascial trigger points in upper trapezius. The study objectifies was to determine the effects of dry needling and strain counter strain technique in myofascial trigger points of upper trapezius.

Methodology

A randomized control trial (Registration No. NCT04285216) was commenced at physiotherapy department of Mayo Hospital, Lahore, Pakistan between July and September 2020. A sample technique i.e., non-probability consecutive sampling technique was incorporated with a sample size of 28 i.e., 14 in each group (Figure 1). The WHO sample size was used to calculate the sample. The participants were recruited in the groups according to the inclusion criteria which was as follow:Patients had rigid band, local tenderness, referred pain, localized twitch response (LTR) and jump sign, both gender male and female, age 20-40 years, the presence of active symptomatic MTPs in the upper trapezius, patients presented with chronic pain past 3 months, pain in both the trapezius, pain presented in the cervical and occipital region. The exclusion criteria was as follow: Any fractures or traumatic injuries, patient's suffering from any systematic illness, those having any surgery of cervical spine, any disorder associated with temporomandibular joint, neuronal disorders like occipital neuralgia and trigeminal neuralgia, migraine or tension type primary headache, myelopathy or cervical radiculopathy by clinical diagnosis, history of last 6 month about physical therapy treatment of cervical region, use of anticoagulants, opioids or antiepileptic medications.

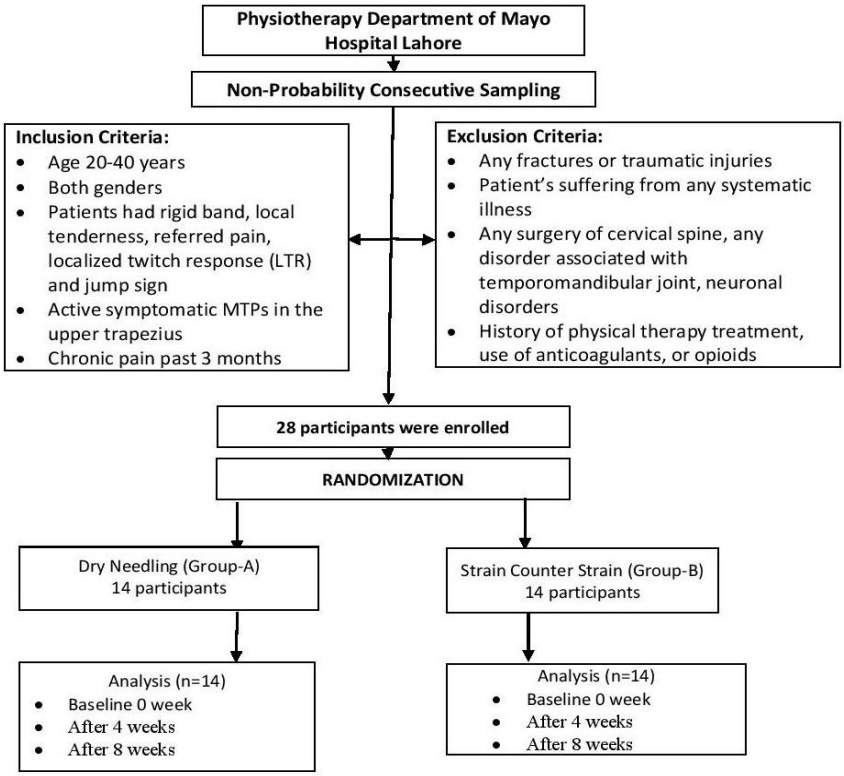

Figure 1. Consort diagram.

Data was collected after getting approval from ethical committee of the institute. After informed written consent, 28 patients who had complain of taut band, tenderness and referred pain and fulfill the inclusion criteria were included. Patients were allocated into the two treatment groups using lottery generated randomization method. The study groups were: Group-A (n = 14) was experimental group treated by dry needling and strain counter strain with baseline treatment. Group-B (n = 14) was a control group treated by strain counter strain with baseline treatment. The baseline physiotherapy treatment protocol that was given to every patient: Hot pack for 10 minutes, trapezius muscle stretching and cervical muscle strengthening exercises (2 sets of 5 repetition each). Frequency of treatment was 2 days a week for 8 weeks. The outcome measures used for data collection were: Visual analogue scale (VAS), Neck disability index (NDI) questioner and Goniometer used to measure cervical spine (CLF) ranges of motion.

The data was analyzed and entered through the SPSS version 23. The quantitative variables were reported in the form of mean and standard deviation, whereas qualitative data was presented in the form of percentages and frequencies. Repeated measure ANOVA was used to find the difference within the group, independent sample t-test was applied to compare the mean differences of quantitative variables. A p-value ⩽ 0.05 was taken as significant.

Results

A total of 28 patients were recruited with the mean age of 25.65 ± 4.05 years in group-A and 20.55 ± 3.25 in group-B. The study showed that 64% were male and 36% were female present in study group-A, whereas 43% males and 57% females were present in control group-B. The patient presented in study group-A were 21% labors, 36% were sedentary worker, and 7% were house wife and 35% others. While patient presented in control group-B were 28.6% labor, 28.6% were sedentary worker, 21% were house wife and 21% others.

Repeated measure (aka within subjects) ANOVA was applied with time as independent variable (pre-treatment, post-treatment and follow-up) and visual analogue scale score, neck functional index, difficulty, activity limitation as dependent variables (Table 1).

Table 1.Comparison of pre, post and follow-up intervention for pain, neck disability index and range of motion within the groups; n = 28.

,	Time	Study Group-A (n = 14) Mean ± SD	Control Group-B (n = 14) Mean ± SD
Pain (Visual Analogue Scale)	At week 0	2.93 ± 0.27	3.00 ± 0.46
	At week 4	1.93 ± 0.27	2.29 ± 0.50
	At week 8	1.07 ± 0.27	1.86 ± 3.63
	p value	0.001	0.001
Function (Neck Disability Index)	At week 0	3.50 ± 0.52	3.64 ± 0.50
	At week 4	2.43 ± 0.51	3.00 ± 0.56
	At week 8	1.79 ± 0.58	2.64 ± 0.50
	p value	0.001	0.02
Right side flexion	At week 0	21.50 ± 3.63	21.50 ± 3.63
	At week 4	29.71 ± 3.60	26.86 ± 3.48
	At week 8	35.93 ± 3.81	30.79 ± 3.24
	p value	0.001	0.001
Left side flexion	At week 0	22.21 ± 3.22	22.36 ± 3.10
	At week 4	28.43 ± 2.90	25.93 ± 3.00
	At week 8	35.71 ± 2.91	27.57 ± .3.01
	p value	0.001	0.001

Independent sample t-test was applied (aka between groups) and both groups were similar in visual analogue scale, neck disability index, cervical lateral flexion ranges at baseline treatment were insignificant (p ⩾ 0.05). After week 4 & 8 treatment, the visual analogue scale, neck disability index, cervical lateral flexion ranges were significant (p ⩽ 0.05) (Table 2).

Table 2. Comparison of pre, post and follow-up intervention for pain, neck disability index and range of motion between the groups; n = 28.

Variables	Time	Study Group-A (n = 14) Mean ± SD	Control Group-B (n = 14) Mean ± SD	p value
Pain (Visual Analogue Scale)	At week 0	2.93 ± 0.27	3.00 ± 0.46	0.336
	At week 4	1.93 ± 0.27	2.29 ± 0.50	0.022
	At week 8	1.07 ± 0.27	1.86 ± 3.63	0.001
Function (Neck Disability Index)	At week 0	3.50 ± 0.52	3.64 ± 0.50	0.464
	At week 4	2.43 ± 0.51	3.00 ± 0.56	0.009
	At week 8	1.79 ± 0.58	2.64 ± 0.50	0.001
Right side flexion	At week 0	21.50 ± 3.63	21.50 ± 3.63	0.522
	At week 4	29.71 ± 3.60	26.86 ± 3.48	0.043
	At week 8	35.93 ± 3.81	30.79 ± 3.24	0.001
Left side flexion	At week 0	22.21 ± 3.22	22.36 ± 3.10	0.906
	At week 4	28.43 ± 2.90	25.93 ± 3.00	0.034
	At week 8	35.71 ± 2.91	27.57 ± .3.01	0.001

Discussion

The aim of this study was to find the combined effect of dry needling and strain counter strain technique along conventional physical therapy in decreasing pain and improve functional status, and cervical ranges of motion in patients of myofascial trigger points of upper trapezius. A significant reduction in score of pain was reported with the group when readings were obtained pre-treatment and post-treatment.

Outcome measures used for data collection were visual analog scale for pain assessment, neck disability index for function assessment and goniometer for range of motion. Visual analog scale has ICC = 0.99 [95%CI; 0.989 to 0.992] and moderate to high reliability (Chiarotto et al., 2019). Neck disability index has ICCs range from 0.50 to 0.98 (Young et al., 2019). The goniometer was used to measure cervical spine range of motion (Farooq et al., 2016).

Somprasong et al. (2011) done RCT to see comparative effect of strain counter stain technique and dry needling at trigger points of upper trapezius. But their study showed the comparison results of dry needling and strain counter strain with sham technique and only limited sessions were done in their study that not enough to get the better results on trigger points. The results of the study showed that mean value for visual analog scale was 1.27 ± 0.37 and 1.86 ± 0.36. This is in accordance with the findings of our study.

An RCT done by Javaid et al. (2016) to see the effect of strain counter strain on trigger points of upper trapezius. After 1 week treatment protocol concluded that strain counter strain technique has strong effectiveness in ranges of motion improvement, pain reduction and improving functional disability. Their study only concluded the results of strain counter strain with one week protocol that was not enough to get the best results on trigger points. The findings of Javaid et al study was not in accordance to the findings of our study.

By study combined effect of dry needling and strain counter strain technique was found clinically superior than control group strain counter strain technique with baseline treatment in reducing pain and improving functional status as mean paired difference of pretreatment, mid-treatment & post treatment score of pain on VAS & NDI were greater for study group-A than control group-B (Lari et al., 2016).

Dry needling required number of session for better outcomes and long term effects and avoid the recurrence of trigger points in future therefore number of sessions were included in study to see better results but RCT study done by Mejuto-Vazquez et al. (2014) to see the effects of dry needling along with counter strain technique, single treatment session on active trigger points of upper trapezius in pain sensitivity reduction and improvement in cervical ranges of motion concluded that trigger point dry needling single treatment session after one week of treatment reduce the pain severity and improved ranges of notion of cervical region. The findings are in line with the findings of our study. The study incorporated similar outcome measures such as neck disability index and visual analog scale.

Study by Wong et al. (2014) concluded that there is very less evidence on improvement of trigger points palpation pain by strain counter stain technique. Only strain counter strain showed less effectiveness as compare to combined technique, so this study concluded the best results of dry needling with strain counter strain. The study is also in accordance with the findings of our study.

Iqbal et al. (2010) done study to see the effectiveness of combined effect of strain counter strain and ischemic compression concluded that after one week protocol treatment of combination therapy there is highly improvement in pain reduction by visual analogue scale, improvement in functional status assessed by NDI scale, as this combined technique cause the deactivation of myofascial trigger points. The findings of the current study are being supported by the findings of this study. The similar outcome variables are being incorporated.

Nambi et al. (2013) did a comparative study on upper trapezius trigger points of counter strain technique and dry needling to see the effect on pain reduction and improvement in ranges of motion concluded that both techniques were effective on upper trapezius trigger points but counter strain showed significant results than dry needling or combination of both. The result of this study is not being supported by findings of current study. As the sample size was small, study only incorporated male population. A study by Charles et al. (2019) revealed that combination of dry needling along with counter strain and needling technique is effective in treating the trigger points in upper fiber of trapezius. This study supports the current study. This study was meant to explore the effectiveness of dry needling and strain counter strain on pain, functional status and cervical lateral flexion.

Conclusion

The study concluded that dry needling with strain counter strain technique and solely strain counter strain technique were effective in reducing pain and improving functional level of NDI scale and cervical lateral flexion ranges of spine.

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