EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 5
Issue: 9
551-561
Year: 2018

SUPERFICIAL DRY NEEDLING AS AN ADJUNCT THERAPY IN THE TREATMENT OF TRIGGER POINT IN TRAPEZIUS MUSCLE IN YOUNG ADULT INDIVIDUALS

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Article Received on 14/07/2018 **Article Revised on 04/08/2018** **Article Accepted on 25/08/2018**

ABSTRACT

Background: The aim of the present study was to assess the effectiveness of superficial dry needling as an adjunct therapy in the treatment of trigger point in trapezius muscle. Comparing electro-neurophysiological effects between patients treated with superficial dry needling and exercise and exercise alone. **Method and methodology:** A prospective, case control study was designed and conducted in two parts. In the first part of the study; patients with upper trapezius MTrPs and asymptomatic subjects were included for comparison of base parameters to establish the clinical difference between them for parameters of pain intensity (VAS), pressure pain tolerance (PPT), decremental percentage and SDC parameters. Part two of the study comprised the patients with upper trapezius MTrPs as the experimental group.. This group was divided into two sub-groups; one treated with one session of combination of superficial dry needling with exercise (n=30) and second, only exercise (n=30). The primary outcome measures were SDC (sensory and motor rheobase and chronaxie) and RNS response presented as decremental percentage. Data was collected at baseline, immediate effect and post 48hrs after intervention. **Results:** At the baseline rheobase and pain pressure tolerance, was lesser in trigger point subjects as compared to asymptomatic subjects ($p<0.05$); decremental percentage (RNS response) was higher in subjects with trigger point in trapezius group as compared to the asymptomatic volunteers. Moreover, post treatment parameters recorded immediately and 48 hours post treatment yielded a higher Pain pressure tolerance and sensory rheobase in the patients treated with dry needling, sensory chronaxie values and decremental percentage values showed an increase immediately post treatment however 48 hours after treatment there was a drop in the values in patients with dry needling. **Conclusion:** Superficial dry needling is a safe and an effective physiotherapy tool for treatment of trigger points.

KEYWORDS: superficial dry needling, trigger point, SDC, pain pressure tolerance, decrement, trapezius.

INTRODUCTION

Myofascial trigger points (MTrps), are common source of musculoskeletal pain presenting in primary care.[1,2] General practitioners frequently refer these patients for physiotherapy treatment. Identifying MTrps require training and clinical expertise.[1,3] Myofascial trigger points is defined by Travell and Simons as a highly localized and hyperirritable spot in a palpable taut band of skeletal muscle fibers. Pressure stimulation of a typical MTrP can elicit pain, referred pain, and local twitch response. The pain elicited by compression of this spot is familiar to the patient as the usual pain complaint (pain recognition).[4,5] It has been suggested that "spot tenderness", "taut band", and "pain recognition" are the three important criteria for the diagnosis of MTrP, and "referred pain" and "local twitch responses" can be "confirmatory signs" for MTrP diagnosis.[3,4]

Appropriate treatment to MTrPs can effectively relieve the clinical pain of myofascial pain syndrome (MPS). The most important strategy in MPS therapy is treating the underlying etiological lesion that causes the activation of MTrP[4,5,6,7,8] If the underlying pathology is not appropriately and completely treated, the MTrP can only be inactivated temporarily and never completely. Conservative treatment, such as appropriate systemic nonsteroidal anti-inflammatory drug (NSAID) or local NSAID gel or patch, thermotherapy, manual therapy, and other physical modalities, should be performed prior to more aggressive therapy, such as local steroid injection, spinal facet joint injection, MTrP injection, dry needling,

or acupuncture (AcP), especially for acute lesions or mild lesions[4,5,7,8,9] It is important to eliminate any perpetuating factors causing persistent existence or recurrence of active MTrPs, and to provide adequate education and home programs to patients to avoid recurrent or chronic pain.[4]

Considering the different causes of trigger point formation, there are a variety of invasive and non-invasive treatments proposed for managing MTrps. Non-invasive methods used in physiotherapy include stretching, laser therapy, ultrasound, transcutaneous electrical nerve stimulation and biofeedback.[10,11] Trigger point dry needling (Trp-DN), also referred to as intramuscular stimulation (IMS), is a relatively new invasive method, which is increasingly used, for treatment of MTrps. Dry needling involves inserting a needle into an MTrp without injecting any medication4. Physical therapists around the world practice Trp-DN as part of their clinical practice and use the technique in combination with other physical therapy interventions[12] Kalichman and Vulfsons suggested that superficial dry needling is a cheap, easy to learn with appropriate training, caring lower risk, and minimally invasive treatment modality.[4,11]

The present research work is carried using superficial dry needling technique. This technique is reported to be an effective and efficient treatment for reducing somatic pain and dysfunction associated with MTrps in a muscle.[10,11,13] A previously published systematic review of 7 studies of acupuncture/dry needling for the management of MTrPs in various body regions, found limited evidence regarding superficial dry needling had an overall effect compared to standardized care.[14] Meta-analysis of 4 studies comparing superficial dry needling to a sham (placebo) treatment did not show statistical significance between interventions but noted an overall positive treatment effect of superficial dry needling for MTrP pain.[15]

There is no study that has established the variation in Electro-neurophysiological parameters in pain patients. There is no study investigating the effect of superficial dry needling on neuromuscular junction responses in a population with trigger points. Therefore for ascertaining safe practice and establishing the efficacy of superficial dry needling in treatment of trigger points it was important to study the Electro-neurophysiological responses to superficial dry needling in participants with MTrps.

AIM

To assess the efficacy of superficial dry needling (S-DN) as an adjunct therapy in the treatment of trigger point in trapezius muscle. Efficacy was observed by comparing the electro-neurophysiological parameters between patients treated with superficial dry needling and exercise and exercise alone. We also established the variation in electro-neurophysiological parameters in pain patients.

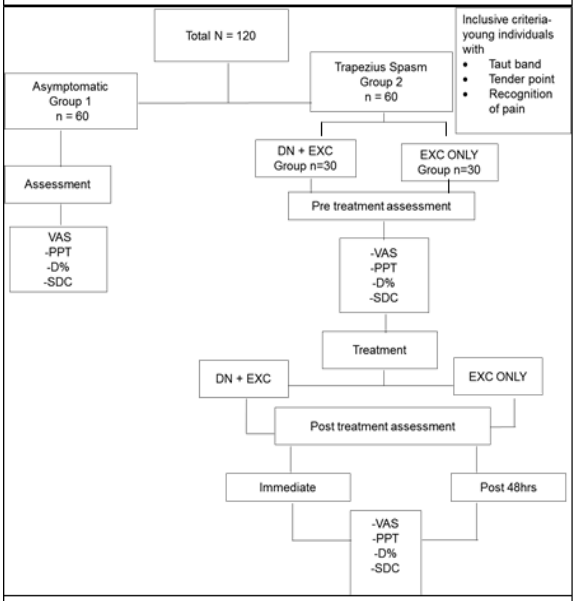
METHODOLOGY

A multi-centric, case-control type of prospective study including conducted in a period of 1 year with 120 subjects in two groups (matched for height, weight, body mass index and age), between the age group 18-25 years; Group 1 (n=60) comprising asymptomatic subjects (Control group) and Group 2 (n=60) comprising subjects presenting with trapezius trigger point were further divided into two subgroups (n=30 each) who were treated using two methods. One of the experimental subgroup was treated with combination of one session of dry needling (group 2a) and exercises and the other subgroup with exercises alone (group 2b). (Refer Figure 1).

A written consent was also procured from the enrolled subjects before starting the experiment. The methodology of the study was sanctioned by the ethics committee of D.Y.Patil University, Nerul, Navi Mumbai. In both the groups, Subjective visual analogue scale of pain (VAS), pressure pain tolerance (PPT), decremental percentage, and Strength duration curve (SDC) parameters like sensory rheobase, motor rheobase, sensory chronaxie and motor chronaxie were evaluated.

RNS (repetitive nerve stimulation) is an electrodiagnostic technique of repetitive nerve stimulation used to assess Neuro Muscular Junction Reaction (NMJR). This is the most widely used method in the evaluation of NMJR. The RNS method is based on the repetitive supramaximal stimulation and the measurement of decremental/incremental responses.

Figure 1- Methodology of the study



DN= superficial dry needling, EXC= exercise alone, VAS= visual analogue scale, PPT, pressure pain tolerance, D%= decremental percentage,

Amplitude of the evoked trapezius compound muscle action potential (CMAP) was measured. Recordings were made with surface electrodes with the patient in a supine/sitting position on an examination table (sensitivity 5 mV/div, sweep speed 5 ms/div and filtering of 5 Hz–5 KHz) (Refer Figure 2). Surface stimulating electrodes were placed over the spinal accessory motor nerve along the posterior border of the sternocleidomastoid muscle at the level of the upper border of the thyroid cartilage. The active electrode was placed on the skin over the upper trapezius muscle 5 cm from the C7 spinous process, and the reference electrode was located 2 cm from the C7 spinous process4 or at the acromion process.[16] Train of 9 supramaximal electrical stimulations at a rate of 3 Hz were delivered to spinal accessory nerve and the evoked trapezius CMAP was recorded.

The ratio of the amplitudes of the fifth to the first responses was used as a measure of decrement or increment expressed as a percentage.[10]

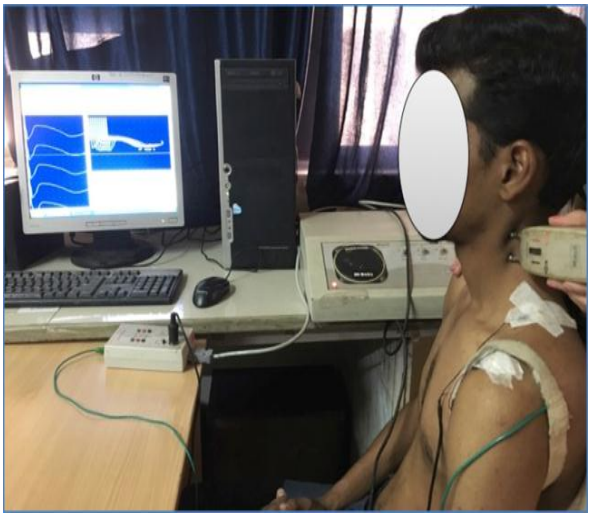


Fig. 2: Method to check decremental percentage from repetitive nerve stimulation.

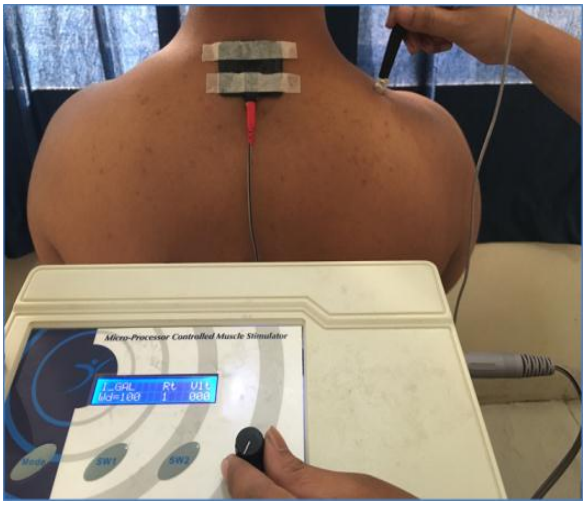


Fig. 3: Method to check strength duration curve parameters.

Strength duration curve comprises stimulation of muscles using a rectangular; monophasic pulse, typically with a frequency of 1 or 2 Hz. Reference electrode is placed proximally and active electrode over the motor point (Refer Figure 3). The test begins with using the longest duration pulse. The current is increased till a visible minimum contraction is seen and repeated till the shortest pulse. The graph of intensity vs duration is plotted. Rheobase and chronaxie was noted. Rheobase is the smallest current that will produce muscle contractions if stimulus is of infinite duration. Chronaxie is the duration of the shortest impulse that will produce a visible response with a current of double the rheobase.

The investigator used a pressure algometer to measure the Pressure pain tolerance (PPT). To measure PPT, the participant was placed in a comfortable sitting position and the most painful spot in the upper trapezius MTrP region was identified. The metal disc of the algometer was pressed perpendicular to the skin over the identified trigger points in the upper trapezius muscle (Refer Figure 4). The applied pressure was increased at the rate of 1 kg/m2. The participant in the control group were asked to say ‘yes’ as soon as they were not able to tolerate the pain. This procedure was repeated three times at 40 seconds intervals. The average of the three values was determined as the PPT.[10]

In the experimental group 2a trigger point was palpated. Pre assessment was done using VAS, PPT, decremental percentage and SDC parameters. This group of patients was treated using a combination of Superficial Dry Needling and exercises. A stainless steel acupuncture needles (25 x 0.30mm) were used. Cephalic Direction of the needle was used. The needle was inserted to the depth allowed by the guide tube (Refer Figure 5). If not secured further gentle pressure was applied, fractionally increasing penetration4. The needle was kept in for 10min and then removed. For soreness ice was advised. Exercises taught were shoulder shrugs, shoulder retractors, trapezius stretches. Immediate post treatment assessment was done using VAS, PPT, decremental percentage and SDC. Patient was asked to continue with the exercises for 2 days. After 48hrs post treatment assessment was done using the same outcome measures.

In the experimental group 2b Trigger point was palpated. Pre assessment was done on the basis of the above mentioned outcome measures. Exercises taught were shoulder shrugs, shoulder retractors, trapezius stretches. Immediate post treatment assessment was done. Patient was asked to continue with the exercises for 2 days. Again, after 48hrs post treatment assessment was done.

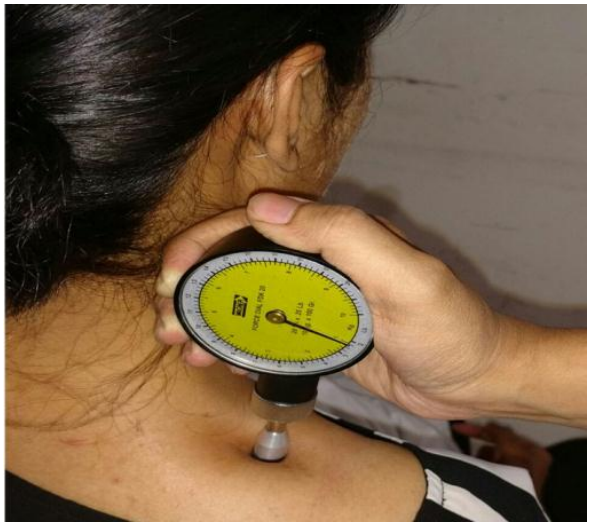


Fig. 4: Assessment pressure pain tolerance.

Fig. 5: Superficial dry needling.

RESULTS

Data analysis was done using SPSS version 16. INTRAGROUP COMPARISONS: Quantitative variables like PPT, Decremental percentage and strength duration curve (sensory rheobase and chronaxie), we had to compare baseline, immediate and 48hrs effect on the subjects. So we use repeated measure and ANOVA test to compare the differences between means of related samples, whereas as for qualitative variable VAS, we use Friedman Anova test to compare the differences between the ranks of related sample.

Part I- INTERGROUP COMPARISONS: Unpaired T-test was used for quantitative variables and Mann-Whitney test for comparing qualitative variable VAS.
As seen in Table 1 the mean of pressure pain tolerance was less in trigger point group and more in asymptomatic, Mean of Sensory rheobase and chronaxie was lesser in trigger point than in asymptomatic, Mean of decrement percentage was less in asymptomatic than in trigger point group. Not much difference was seen in mean values motor rheobase and motor chronaxie. Hence for our further research motor rheobase and motor chronaxie was not taken as an assessment tool.

In the first step, comparing the control (asymptomatic) group with the experimental group; statistical analysis showed a significant difference at $p<0.05$ for PPT, sensory rheobase and chronaxie and decremental percentage. (Refer Table 2) But there was no significant difference noted in motor rheobase and motor chronaxie. Hence for further research motor rheobase and chronaxie was not considered a parameter to be evaluated.

Descriptive pairwise comparisons of outcome measures in the experimental groups assessed at baseline, immediately post treatment and 48 hours post treatment is depicted in Table 3.

Intergroup comparison (Refer Table 4) was done at baseline with no significant difference seen in age, PPT, Decremental percentage, sensory rheobase and sensory chronaxie; Immediately post treatment showing significant difference in PPT, sensory rheobase and sensory chronaxie at $p<0.05$, but no significant difference was noted in decremental percentage. Post 48hrs treatment comparison showed significant difference in PPT, sensory rheobase and sensory chronaxie at $p<0.05$, but no significant difference was noted in decremental percentage.

The mean rank for VAS (Refer Table 5) for group of patients treated with combination of dry needling and for exercise alone group was found to be significant at $p<0.05$ with differences between the mean ranks assessed immediately after treatment and 48 hours after treatment. Thus signifying; that VAS scores were lesser in patients treated with a combination of dry needling and exercises than in patients treated with exercise alone

Table 1: Mean and standard deviations of the various parameters in experimental and control group.

	Group	N	Mean	Std. Deviation
Tolerance (kg)	Asymptomatic	60	6.9533	2.02731
	Trp group	60	3.6633	1.09544
Motor Rheobase (mA)	Asymptomatic	60	18.1917	3.00859
	Trp group	60	17.3833	3.96635
Motor Chronaxie (msec)	Asymptomatic	60	.0405	.01352
	Trp group	60	.0393	.01784
Sensory Rheobase (mA)	Asymptomatic	60	14.1167	1.52762
	Trp group	60	10.4167	2.01092
Sensory	Asymptomatic	60	.0190	.01123

Chronaxie (msec)	Trp group	60	.0360	.01924
% Decrement	Asymptomatic	60	7.8000	1.19150
	Trp group	60	8.6410	1.12999
Trp: trigger point (Experimental Group)				

DISCUSSION

The aim of the present study was to assess immediate and post 48hrs Electro-neurophysiological efficacy of superficial dry needling in the patients with upper trapezius MTrps. In the present study, the primary outcome measures were responsible to neuromuscular junction (NMJ) and strength duration properties of the supraclavicular nerve (C3-C4) supplying trapezius muscle. Secondary outcome measures were pain intensity and pressure pain tolerance.

Electro-daignostic studies are used to demonstrate abnormal neuromuscular transmission and to exclude other diseases of motor unit that contribute to the clinical findings. Electrodiagnostic measures are also used in measuring the severity of involvement and demonstrating changes as the disease evolves or improves.

While electromyography provides extensive information as to the state of innervation of skeletal muscles, sensory conduction velocity often does not mirror the clinical state of the patient. For several reasons the quantitative examination of cutaneous sensation encounters serious problem[17,18] Both afferent and efferent fibres have been studied by various elctrodaignostic techniques: nerve excitability has been determined by the strength of the true square-wave stimuli required to elicit a barely visible nerve action potential at a recording site proximal to the stimulus.[16-20] Stimulus strength at sensory threshold has been shown to be more reproducible than the one just evoking a sensory action potential.[17] According to our findings the sensory SDC curve offers, to a certain extent, a useful method for assessing myofascial trigger points in trapezius muscle.

PART 1- Baseline parameters

There was a significant difference between the asymptomatic and patients suffering from trapezius trigger point in parameters like VAS, pressure pain tolerance, sensory rheobase and chronaxie and in decremental percentage.

Strength duration properties

There have been studies on strength duration properties as a measure of persistence sodium conductance which states that the differences in strength–duration time constant and rheobase of normal sensory and motor axons are thought to reflect differences in expression of a persistent Na conductance.[21] Increases in strength–duration time constant are observed when this conductance is activated by depolarization[21,22] or by hyper- ventilation. However, demyelination, which exposes inter-nodal membrane with a higher membrane time constant than that of the original node[23], can also increase strength–duration time constant.

Table 2: Comparison of parameters between control group and experimental group. Level of significance considered was p<0.05.

Parameters	Groups	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Pain Pressure Tolerance (kg)	Asymptomatic group	.000	3.29000	.29749	2.70089	3.87911
	Trigger point group	.000	3.29000	.29749	2.69905	3.88095
Motor Rheobase (mA)	Asymptomatic group	.213	.80833	.64270	-.46438	2.08105
	Trigger point group	.211	.80833	.64270	-.46534	2.08201
Motor Chronaxie (msec)	Asymptomatic group	.682	.00117	.00289	-.00456	.00689
	Trigger point group	.687	.00117	.00289	-.00456	.00689
Sensory Rheobase (mA)	Asymptomatic group	.000	3.70000	.32602	3.05439	4.34561
	Trigger point group	.000	3.70000	.32602	3.05391	4.34609
Sensory Chronaxie (msec)	Asymptomatic group	.000	-.01700	.00288	-.02270	-.01130
	Trigger point	.000	-.01700	.00288	-.02271	-.01129

	group					
Decrement Percentage (%)	Asymptomatic group	.000	-.84100	.21200	-1.26081	-.42119
	Trigger point group	.000	-.84100	.21200	-1.26082	-.42118

Table 3: Pairwise comparison between experimental groups (Dry needling and Excs and Excs alone) at baseline, immediate and post 48hrs of treatment.

						Pairwise Comparisons of Superficial dry needling and exercise at baseline, immediate and post 48hrs of treatment.			**Pairwise Comparisons of Exercise only at baseline, immediate and post 48hrs of treatment.**
	Sample size	**Descriptive Statistics dry needling and exercise Group 2a**		**Descriptive Statistics exercise only Group 2b**		**factor**	**factor**	**Significance at p<0.05.**	**Significance at p<0.05.**
		Mean	**Std. dev**	**Mean**	**Std. dev**				
Pain pressure tolerance (kg)									
Baseline (1)	30	3.7	1.18	3.62	1.02	1	2	0.00	0.065
Immediate (2)	30	4.61	1.25	3.79	1.17		3	0.00	0.004
Post 48hrs (3)	30	5.65	1.23	3.9	1.13	2	1	0.00	0.065
							3	0.00	0.054
						3	1	0.00	0.004
							2	0.00	0.054
Sensory Rheobase (mA)									
Baseline	30	10.5	1.17	10.33	2.62	1	2	0.00	0.003
Immediate	30	14.23	3.26	11.83	1.82		3	0.00	0.00
Post 48hrs	30	13.87	3.26	12	1.17	2	1	0.00	0.003
							3	0.05	0.657
						3	1	0	0.00
							2	0.05	0.657
Sensory Chronaxie (msec)									
Baseline	30	0.037	0.019	0.035	0.02	1	2	0.116	0.003
Immediate	30	0.044	0.014	0.021	0.018		3	0.068	0.765
Post 48hrs	30	0.023	0.019	0.041	0.017	2	1	0.116	0.003
							3	0.00	0.00
						3	1	0.068	0.765
							2	0.00	0.00
Decremental percentage (%)									
Baseline	30	8.5	1.09	8.7	1.17	1	2	0.00	0.00
Immediate	30	9.8	1.31	9.23	1.3		3	0.00	1.00
Post 48hrs	30	8.95	0.99	8.8	1.15	2	1	0.00	0.00
							3	0.00	0.004
						3	1	0.00	1.00
							2	0.00	0.004

Table 4: Intergroup comparison between experimental groups (Dry needling and Exercise, Exercise alone) at baseline, immediate and post 48hrs of treatment.

Parameters	Groups	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
AGE (years)	SDN + EXC	1.000	.000	.483	-.966	.966
	EXC ONLY		.000	.483	-.967	.967
Baseline parameters						
Baseline PPT (kg)	SDN + EXC	.780	.08000	.28508	-.49064	.65064
	EXC ONLY		.08000	.28508	-.49092	.65092
Baseline Decremental %	SDN + EXC	.363	-.26800	.29215	-.85281	.31681
	EXC ONLY		-.26800	.29215	-.85287	.31687
Baseline Sensory rheobase (mA)	SDN + EXC	.752	-1.6667	.52322	-1.21400	.88066
	EXC ONLY		-1.6667	.52322	-1.22405	.89072
Baseline Sensory Chronaxie (mec)	SDN + EXC	.791	.00133	.00501	-.00869	.01136
	EXC ONLY		.00133	.00501	-.00869	.01136
Immediate Parameters						
Immediate PPT (kg)	SDN + EXC	.012	.81667	.31339	.18935	1.44399
	EXC ONLY		.81667	.31339	.18929	1.44404
Immediate Decremental %	SDN + EXC	.096	.57067	.33710	-.10412	1.24545
	EXC ONLY		.57067	.33710	-.10412	1.24545
Immediate Sensory Rheobase (mA)	SDN + EXC	.000	-2.40000	.68105	-3.76327	1.03673
	EXC ONLY		-.2.40000	.68105	-3.77127	1.02873
Immediate Sensory Chronaxie (mec)	SDN + EXC	.000	.02333	.00417	.01499	.03167
	EXC ONLY		.02333	.00417	.01498	.03168
Parameters assessed Post 48 hours						
Post 48hrs PPT (kg)	SDN + EXC	.000	1.75333	.30565	1.14152	2.36515
	EXC ONLY		1.75333	.30565	1.14142	2.36525
Post 48hrs Decremental %	SDN + EXC	.603	.14500	.27712	-.40972	.69972
	EXC ONLY		.14500	.27712	-.40999	.69999
Post 48hrs Sensory Rheobase (mA)	SDN + EXC	.0005	-1.86667	.63197	-3.13169	-6.0164
	EXC ONLY		-1.86667	.63197	-3.14785	-58.548
Post 48 hrs Sensory Chronaxie (msec)	SDN + EXC	.001	-.01733	.00470	-.02675	-.00792
	EXC ONLY		-.01733	.00470	-.02675	-.00791
SDN: superficial dry needling, EXC: exercise only						

Table 5: p values of pain scores (VAS) analysed using Mann-Whitney Test.

	GROUP	N	Mean Rank	Sum of Ranks	P value
Baseline VAS	SDN + EXC	30	32.95	988.50	0.264
	EXC ONLY	30	28.05	841.50	
	Total	60			
Immediate VAS	SDN + EXC	30	20.02	600.50	
	EXC ONLY	30	40.98	1229.50	0.000
	Total	60			
Post 48hrs VAS	SDN + EXC	30	17.38	521.50	0.000
	EXC ONLY	30	43.62	1308.50	
	Total	60			
VAS: visual analogue scale, SDN: superficial dry needling, EXC: exercise only					

Hence at baseline we found that rheobase values were lesser in trigger point patients as compared to asymptomatic volunteers as the sodium are readily persisting inside the membrane, hence the muscle are excited early. Increase in chronaxie is seen when there is influx of sodium during depolarization. Therefore, sensory chronaxie values were found to be higher in the experimental group as compared to the asymptomatic volunteers.

Neuromuscular junction response (NMJR) to repetitive nerve stimulation (RNS)

In this study, motor endplate activity following the RNS test on the trapezius muscle in patients with MTrPs demonstrated an abnormal increment compared to healthy volunteers at baseline; a decrement of up to 8–10% in the amplitude of the CMAP after RNS is considered normal.[24] Abnormal NMJR values after the RNS test, noted in the patients with MTrPs in the current study, support the hypothesis put forward by Simons et al [25] that hyperactive motor endplates may contribute to MTrP formation in the muscle. Many other studies have also reported hyperactivity of the motor endplate, measured via spontaneous endplate activity (SEA) in single-fibre EMG (SFEMG) studies.[24–28] The presence of SEA is an indication of spontaneous release of acetylcholine (ACh) at the neuromuscular junction (NMJ).[1] Our study is consistent with the work of Simons et al, given that we exhibited NMJ dysfunction in MTrP patients.

It seems that the elevated NMJR is related to increased concentration of biochemicals such as substance P and calcitonin gene-related peptide (CGRP) in the vicinity of active MTrPs. It has been shown that the levels of such biochemical irritants drop immediately after DN.[13,29,30] Moreover, CGRP can increase the release of acetyl choline (Ach) from the motor endplate and decrease the effectiveness of acetylcholinesterase in the synaptic cleft and enhance ACh receptor efficiency at the same time.[31] Therefore, DN, by modulating the biochemical milieu of MTrPs, can lead to reduction of ACh efficacy and consequently decrease the irritability of the motor endplate.

Measures of pain

VAS was raised in patients presenting with Trapezius muscle trigger point (MTrP) as compared to asymptomatic volunteers. Furthermore, the PPT values of the trapezius muscle were significantly lower in patients versus healthy volunteers at baseline, which may reflect greater sensitisation of MTrP regions, as previously shown.[27,32,33] PPT is a valid clinical method of assessing MTrP sensitivity.[34]

PART II- Treatment of trapezius trigger point using Superficial Dry needling technique with follow up immediately and post 48 hours of treatment.

In the present study superficial dry needling was effective in reducing pain immediately as well as after 48 hours post treatment.

Effect of S-DN on Strength duration properties:

Immediate effect of S-DN led to a significantly larger increase in sensory rheobase values as compared to exercise only. After 48 hours the values reduced in both the groups with a larger difference in the S-DN group. Sensory chronaxie values showed a similar effect in the DN group.

Effect of S-DN on NMJR

There was no significant difference noted in the decremental percentage between the dry needling and exercise and exercise alone groups.

There are some evidence suggesting that, since MTrps are associated with dysfunctional motor endplates, it is conceivable that Trp-DDN(deep dry needling) damages or even destroys motor endplates and causes distal axon denervations when the needle hits an MTrp9. There is some evidence that this could trigger specific changes in the endplate cholinesterase and Ach receptors as a part of normal musle regeneration.[32,33]

Since there was no significant difference noted in decremental percentage between the dry needling and exercise and exercise alone groups, it could be said that with superficial dry needling there are no changes happening in the motor endplates hence it could be also considered a safe method.

Effect of DN on VAS and PPT

This study, based on VAS evaluation, has shown that DN is effective at decreasing pain, consistent with previous research.[11, 35–37] 'Gate control' mechanism likely

underlies the alleviation of pain after DN, although its analgesic effects are unlikely to be fully explained by one single mechanism. Analgesia may also be related to the endogenous opioid system including β-endorphin and enkephalins.[38]

Superficial dry needling is typically followed by stretching exercises.[15,39] The actual mechanism of effect of superficial dry needling is still being debated. The localized twitch response that often occurs may interrupt motor end-plate noise, eliciting an analgesic effect.[40] Eliciting a localized twitch response and stretching exercises relax the actin-myosin bonds in the tight bands.[41] Some studies have suggested that pain relief and range-of-motion restoration are greater when a localized twitch response is elicited during superficial dry needling.[7,42] Superficial dry needling causes stimulation of alpha-delta nerve fibers, thus activating the enkephalinergic inhibitory dorsal horn interneurons and causing opioid-mediated pain suppression.[43] These peptides then inhibit the intra-dorsal horn transmission of nociceptive information conveyed to the cord via group IV sensory afferents from the MTrP[24]. It may correct levels of several chemicals in the affected muscles, including bradykinin, calcitonin gene-related peptide, and substance P.[40] Needling of MTrPs is also theorized to disrupt reverberatory central nervous system circuits.[28] Confirmation that needle-induced analgesia is opioid peptide mediated comes from it having been shown that it is abolished by the administration of the endorphin antagonist naloxone.[26]

A needle inserted into the skin and subcutaneous tissues stimulates A-delta fibres not only mechanically, but also by setting up a low- intensity galvanic current of injury, brought about as a result of the difference in electrical potential that exists between the needle and the skin.[24] This current is generated not only whilst the needle is in situ, but also for an appreciable time after it has been taken out. This sustained effect occurs because 'after withdrawing the needle, the unequal distribution of electrical potential as a result of the high concentration of potassium ions round the edges of the injury creates an electrical flux potential field which acts as a stimulator of the free nerve endings in the skin for 72 hours'.[27] It follows, therefore, that when a needle is inserted into the skin and subcutaneous tissues overlying a MTrP, for the purpose of deactivating the latter, A-delta nerve fibres are stimulated briefly mechanically, and more long-lastingly by the development of an electric current.[24]

Superficial dry needling is a safe and effective method for treatment of trigger point.

During the course of the study, nobody presented with adverse reactions during the study and hence we can ascertain that dry needling is a safe method of treatment for Trps.

There are supporting studies stating superficial DN inevitably causes less discomfort to recipients than deep DN methods. There is also likely to be a lower risk of traumatic side effects, particularly in anticoagulated patients.[1] Since patient's safety and comfort should be the prime considerations in choice of needling therapy for myofascial pain[13], superficial DN followed by active stretching is an appropriate treatment choice.

Considering the results of the present study, we can conclude that dry needling provided by us is a very safe treatment.[34]

CONCLUSION

It can be ascertained that Electro-neurophysiological properties of sensory SDC and Decremental percentage can be considered as outcome measures of diagnosis and prognosis of pain in patients suffering from trapezius trigger points.

It can be ascertained that superficial dry needling is a safe and an effective physiotherapy tool for the treatment of trigger points.

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