EFFECTIVENESS OF DRY-NEEDLING OVER ISCHEMIC COMPRESSION ON TRIGGER POINTS IN QUADRATUS LUMBORUM MUSCLE- A RANDOMIZED CLINICAL TRIAL

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ABSTRACT

OBJECTIVE: To find out the effect of Dry needling and Ischemic compression on Quadratus lumborum muscle trigger point **METHODOLOGY: STUDY DESIGN**- experimental study-randomised clinical trial Settings: SCPTRC OPD, Srinivas hospital, Mangalore. Participants: 40 subjects were participated in this study. Dry needling and Ischemic compression were given for two groups of 20 subjects for one session. **OUTCOME MEASURES:** Pain pressure threshold. **RESULTS:** Both groups showed p value of 0.001 thus it is statistically significant. **CONCLUSION:** The results of this clinical trial suggest that single sessions of TrP DN shows greater improvement in terms of pressure threshold and range of motion than TrP IC. Both the groups shows similar changes in pain and functional disability.

Key words: Dry needling,Ischemic compression, Myofascial trigger point.

INTRODUCTION:

The Myofascial Trigger Point (MTrP) has been defined as a highly localized and hyper-irritable spot in a palpable taut band of skeletal muscle fibers (Travell 1983). Myofascial Pain Syndrome (MPS) is a common condition associated with Myofascial trigger points (MTrPs).[1]MTrPs are a common source of pain in patients presenting to primary care or pain clinics.[2-4]. MTrPs may develop anywhere in the body in response to sudden injury, muscle overload, or repetitive microtrauma.[5,6]Patients who have trigger point often report regional persistent pain that usually results in a decreased range of motion of the muscle. Often the muscle used to maintain body posture are affected, namely the muscle of the neck, shoulders, and pelvic girdle, including the upper trapezius, scalene, sternocleidomastoid, levator scapulae and Quadratus Lumborum.

Trigger-point dry needling is a procedure in which an acupuncture like needle is inserted into the skin and muscle in the location of an MTrP.[7]Needles are removed once the trigger point is inactivated. Dry needling is typically followed by stretching exercises.[8]The mechanism of effect of dry needling is still being debated. The localized twitch response that often occurs may interrupt motor endplate noise, eliciting an analgesic effect.[9]Eliciting a localized twitch response and stretching exercises relax the actin-myosin bonds in the tight bands.[10]

Clinically MTrP injection of local anesthetic and/or corticosteroid has been used as an effective and valuable procedure to deactivate an active MTrP and subsequently relieve the pain and tightness of the involved muscle. Dry needling, that is needling the MTrP without injection of any drug, has been reported to be as effective as injection of local anesthetics. Some studies have suggested that pain relief and ROM restoration are greater when a localized twitch response is elicited during dry needling.[11-13]It has been suggested that the pain gate theory may play a role.[8]Dry needling may correct levels of several chemicals in the affected muscles, including bradykinin, calcitonin gene-related peptide, and substance P.[9]

Simons *et al* defined ischemic compression (IC) as"trigger point pressure release" and described as follows, "Application of slowly increasing, nonpainful pressure over a trigger point until a barrier of tissue resistance is encountered. Contact is then maintained until the tissue barrier releases, and pressure is increased to reach a new barrier to eliminate the trigger point tension and tenderness."[14]It is a therapy technique used in physical therapy where blockage of blood in an area of the body is deliberately made, so that a resurgence of local blood flow will occur upon release.

The purpose of IC is to deliberately increase the blockage of blood to an area so that, upon release, there will be a resurgence of blood. This washes away waste products, supplies necessary oxygen and helps the affected tissue to heal. This increase of blood flow to the area is called a hyperemia. Sustained Pressure: 7 to 8 on a client pain scale of 10. This process is continued up to 1 min. With as much as 20 or 30m lb of pressure.

Quadratus Lumborum muscle is a flat, strong, moderately long, four sided muscle that serrations of its medial border to the transverse process of the lumbar vertebrae. According to Travell and Simons: The muscle fibres of the QL muscle can be divided into 3 groups: Iliocostal fibres, Iliolumbar fibres & Lumbocostal fibres.

Previous studies suggests that ischemic compression is having a significant effect in treating Myofascial trigger points than ultrasound, stretching, manual energy techniques etc. Recently published Systematic review suggests that Dry needling is also having the significant effect on Myofascial trigger point management to reduce pain and increase range of motion.

The main aim was to compare the effectiveness of dry-needling over ischemic compression on trigger points in Quadratus Lumborum muscle on Pain, Pressure pain threshold and Range of motion

Materials and Methods:40 Subjects within 18-40 years of age, presenting with Active Trigger points in Quadratus Lumborum muscle were included in the study. Purposive sampling was done. Subjects were recruited from SCPTRC OPD, Srinivas hospital, Mangalore.

Inclusion Criteria:

1 Homogenous samples

2 Age range : 18–40 years,

3 Active trigger points in Quadratus Lumborum muscle

MTrPs diagnostic criteria by Simons et al and Gerwin et al:

-- In Quadratus Lumborum muscle

1. Presence of palpable taut band.

2. Presence of a hypersensitive tender spot in the taut band.

3. Local twitch response provoked by the snapping palpation of the taut band.

4. Reproduction of the typical referred pain pattern of the MTrPs in response to compression.

5. Spontaneous pain (referred pain - only for active MTrPs).

Exclusion Criteria:

1 Anticoagulation or bleeding disorders

2 Acute muscle trauma

3 Local or systemic infections

4 Anticoagulation drug in-takers.

Procedure:

Consent was taken from the institute ethical clearance committee. 40 subjects meeting the selection criteria were included for the study. Based on the convenient random sampling the subjects were assigned to 2 groups namely

Group 1 (20 subjects) treated with Dry needling

Group 2 (20 subjects) treated with Ischemic Compression

The purpose of the study was explained to all the participants and an informed consent was taken from each subject. All the subjects were given the VAS score, pressure pain threshold (PPT) score, Range of motion (ROM) and patient specific functional score(PSFS) and the pre test score and the post test scores were determined before and after treatment session.

- The outcome measures were measured by an independent assessor who remains blinded to the treatment allocation.
- The Pain severity, Pressure pain threshold, functional disability and ROM measures were performed at before and after the treatment session immediately.

Description of treatments:

Group-1:

Trigger points were palpated and marked with a small dot on the skin. Then the needle is inserted gently over the trigger point until it reaches trigger point. And Wait for getting brisk contraction from the trigger point, that indicates inactivation of trigger point, then slowly remove the needle. (**FIGURE 1)**

Group-2:

Ischemic compression was applied with the thumb over trigger point region, if the pressure is not sufficient to inactivate trigger point, then the other thumb also can use to reinforce. This process is continued up to 1 min with as much as 20 or 30m lb of pressure (**FIGURE 2)**

Total duration: single session

Statistical analysis:

Descriptive statistics was used to calculate the mean, Standard deviation and standard error for the purpose of summarizing the data and for further analysis for the difference between the groups. Independent t test was used to find out the mean, SD and p-value in the demographic data. Paired t test is used to compare the pre and post treatment values in both the groups and Mann-Whitney U test has been used to find out the p-value between the groups (Group-1, Group-2). Each protocol was compared with each other to know the comparative effect. The p level was kept as 0.05. Analysis was done using the SPSS version 16.

Result:

Data was analysed by using SPSS (version 16) for windows. A total of 40 subjects were recruited in our study, of which 21 were male and 19 were female. Paired t- test was used for statistical analysis to compare mean (pre and post) within the group. The test of normality was done on the data. Independent t- test was used for statistical analysis to compare mean (pre and post) between the groups. The test of normality was done on the data

Data was assessed with 95% CI for statistical analysis.

Table. 5.2: Demographic Data of Group 1 and Group 2.

PARAMETER	Group 1	Group 2	P VALUE
AGE	29.40 ± 3.99	29.50 ± 6.90	0.12
WEIGHT	59.50 ± 5.44	55.95 ± 5.00	0.69
HEIGHT	1.6 ± 0.71	1.59 ± 0.071	0.64
BMI	23.57 ± 3.17	22.12 ± 2.69	0.27

Table 5.2 shows descriptive statistics shows the mean values and standard deviation with respect to age (29.40 ± 3.99), weight (59.50 ± 5.44), height (1.6 ± 0.71) and BMI (23.57 ± 3.17) of all the patients in both groups.

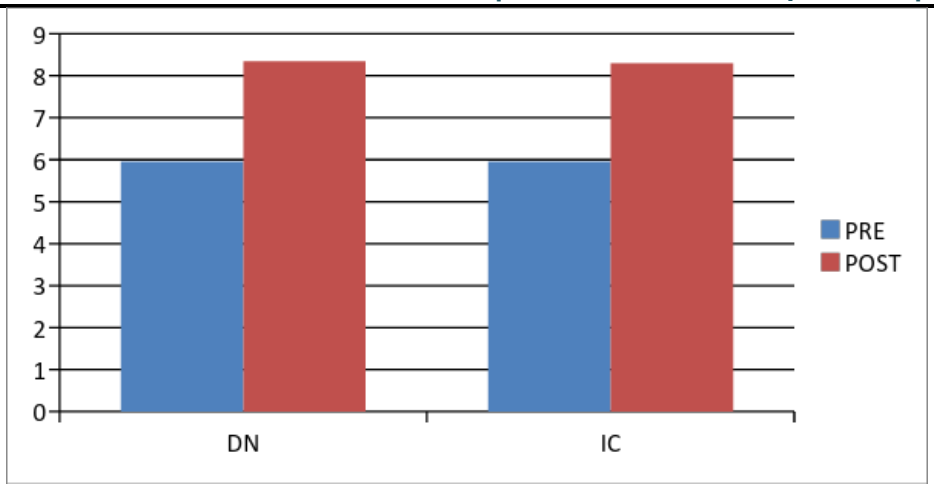
MEAN DIFFERENCE & STANDARD DEVIATION WITHIN AND BETWEEN THE GROUPS:

- **PSFS:**

Table. 5.3: PSFS within the group and between the groups.

		Mean ± SD	p value within the group	p value between the group
Dry Needling	PRE	5.95 ± 0.887	0.001	0.98
	POST	8.35 ± 0.933		
Ischemic Compression	PRE	5.95 ± 0.887	0.001	
	POST	8.30 ± 1.218		

Table 5.3 shows pre and post PSFS values of dry needling group shows statistically significant with p value <0.005, similarly pre and post PSFS values of ischemic compression group shows statistically significant with p value <0.005. So based on these values no group was superior on other group.



- **VAS WITHIN THE GROUP AND BETWEEN THE GROUP:**

Table. 5.4: VAS within the group and between the groups.

		Mean ± SD	p value within the group	p value between the group
Dry Needling	PRE	7.50 ± 0.827	0.000	0.674
	POST	3.90 ± 0.968		
Ischemic Compression	PRE	7.65 ± 1.348	0.000	
	POST	5.55 ± 1.234		

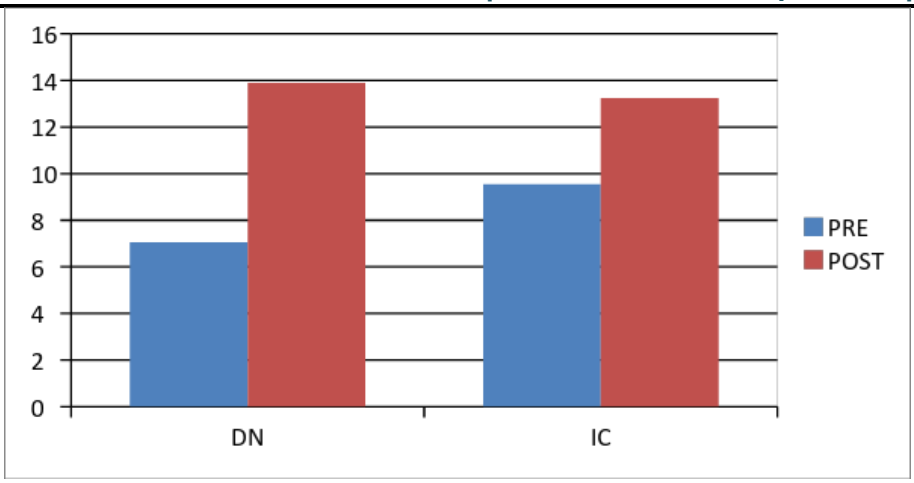
Table 5.4shows pre and post VAS values of dry needling group shows statistically significant with p value <0.005, similarly pre and post VAS values of ischemic compression group shows statistically significant with p value <0.005. so based on these values no group is superior on other between both the groups.

- **PPT WITHIN THE GROUP AND BETWEEN THE GROUP:**

Table. 5.5: PPT within the group and between the groups.

		Mean ± SD	p value within the group	p value between the group
Dry Needling	PRE	7.05 ± 1.791	0.000	0.000
	POST	13.90 ± 1.971		
Ischemic Compression	PRE	9.55 ± 1.572	0.000	
	POST	13.25 ± 1.372		

Table 5.5 shows pre and post PPT values of dry needling group shows statistically significant with p value <0.005, similarly pre and post PPT values of ischemic compression group shows statistically significant with p value <0.005. So based on these values both the groupswere significant, but dry needling was more superior than the ischemic compression group.

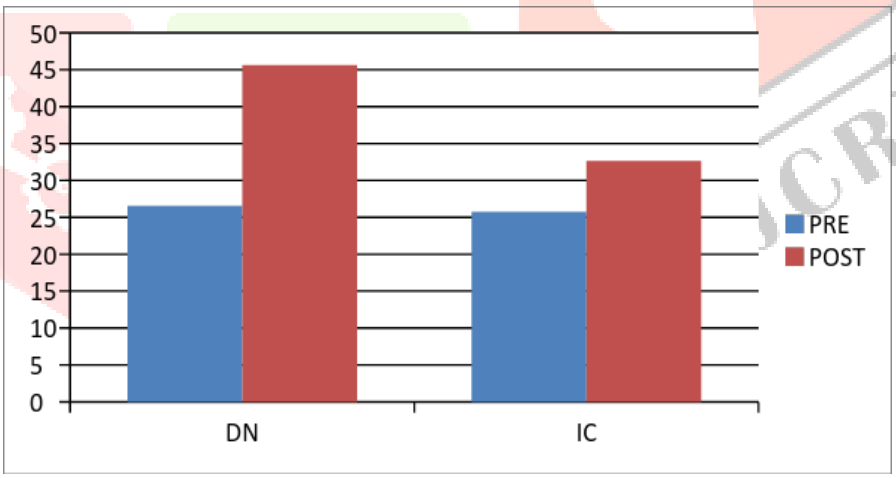


- **ROM WITHIN THE GROUP AND BETWEEN THE GROUP:**

Table. 5.6: ROM within the group and between the groups.

		Mean ± SD	p value within the group	p value between the group
Dry Needling	PRE	26.55 ± 2.645	0.000	0.321
	POST	45.65 ± 2.110		
Ischemic Compression	PRE	25.75 ± 2.381	0.000	
	POST	32.65 ± 2.346		

Table 5.6 shows pre and post ROM values of dry needling group shows statistically significant with p value <0.005, similarly pre and post ROM values of ischemic compression group shows statistically significant with p value <0.005. So based on these values both the group are significant, but dry needling was more superior than the ischemic compression group.



Discussion:

The results of the current randomized clinical trial suggest that single sessionTrP DN and TrP IC shows similar effectiveness in patients with trigger point in Quadratus lumborum muscle. Similar changes seen in functional disability and pain severity in both the groups but dry needling group shows more Pressure pain threshold variations than ischemic compression group.

Clinical guidelines have suggested that manual physical therapy (including joint mobilization and manipulation) plus the addition of exercise may result in improved outcomes in patients with mechanical low back pain with trigger points. Those same recommendations did not identify TrP DN or TrP IC as an effective intervention, not because there was evidence against these interventions but because there was a lack of quality studies on the topic. It would be interesting to compare the effects of TrP DN and TrP IC to a pragmatic approach of Manual therapy and exercise as it was used in the Walker et al trial. Because physical therapists generally use a multimodal treatment approach, it would be interesting to see if TrP DN or TrP IC would add any additional benefit to an approach including mobilization/manipulation and exercise for the management of trigger point in Quadratus lumborum.

The current randomized clinical trial found that single sessions of either TrP DN is more effective than TrP IC in pressure and range of motion. Similarly effective for decreasing pain and improving function in both the groups.

The data from the current trial identified that there was a statistically significant difference between groups for changes in PPT in favor of the group that received single sessions of TrP DN. The physiological mechanism for this remains unknown. However, there currently exists much speculation surrounding the mechanisms of TrP DN, which potentially include both segmental and central involvement.[17,18] It is plausible that TrP DN might also stimulate Aδfibers and activate noradrenergic inhibitory pain systems. Additionally, Shah et al[19] showed that TrP DN can reduce substance P and calcitonin gene-related peptide in TrPs. The mechanical stimulus of the needle into the TrP might result in an increase in microcirculation and a reduction in chemical mediators. Regardless of the mechanism, we identified an increase in PPT over the cervical spine, as have other studies, suggesting a local47 and widespread[20]antinociceptive effect of TrP DN. Another possible reason why PPT did not improve with TrP IC as much as it did with TrP DN is that PPT can increase or decrease relative to manual pressure and within the same group, resulting in less net change in PPT than the TrP DN group.[21]

There are a number of limitations of the current study that should be considered. we only collected data in single session before and after the treatment. There was not a control group in the current study, so it cannot be determined if the improvements seen in both groups may be attributed to the interventions or simply the passage of time (although this is unlikely because our patients exhibited chronic pain symptoms). Further, we also did not assess changes in other potential variables related to back pain, such as depression, anxiety, mood, or sleep disorders. Finally, our treatment interventions were only applied over single session for practical reasons and based on the authors' clinical experience, because no available data exist. We do not know if a greater number of sessions would have revealed greater changes in outcomes or differences between the interventions. Future studies should continue to examine the effectiveness of TrP DN and TrP IC alone and in conjunction with other used physical therapy interventions for the management of mechanical low back pain. We also suggest that it would be useful for future trials to include a control or placebo group and collect data at a long-term follow-up period.

Conclusion:

The results of this clinical trial suggest that single sessions of TrP DN shows greater improvement in terms of pressure threshold and range of motion than TrP IC. Both the groups shows similar changes in pain and functional disability. Future trials are needed to examine the effects of TrP DN and TrP IC over long-term follow-up periods.

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