Journal of Medicine and Allied Health
Journal Homepage: www.jomah.org
ISSN: XXXXX-YYYYY
Email: editoric@jomah.org

Original Article

Assessing the effectiveness of ischemic compression withhold-relax technique for trigger points in Non-specific neck pain

* Saira Hanif, Aisha Hanif[1], Neelam Noor Gichki, Muhammad Hashir Siddiqui, Javeria Ahmed, Amna Yaseen

[1] Clinical Psychologist, DIPMR, DUHS

ARTICLE INFO

Article history:
Received 12 October 2024
Revised 23November 2024
Accepted 12 December 2024
Available online 29 December 2024

Keywords:
Myofascial trigger point (TrPs), hold relax (HR), Ischemic compression technique (ICT), Visual Analogus Scale (VAS), Neck pain, lateral neck flexion.

* **Corresponding author**
Javeria Ahmed

E-mail address:
jiakhan532@gmail.com

Page No. 11 to 15

https://doi.org/10.5281/zenodo.15971147

ABSTRACT

ABSTRACT

***Background**: Pain from unknown origin can lead to miss interpretations as a result pain lingers and continues for up to month or longer like myofascial trigger points. These can affect neck, shoulder, upper back causing pain and reduced range of motion. There are lot of manual and non-manual therapies available to treat myofascial trigger point but the combination of different treatment approaches can enhance the outcome measures. The purpose of this study is to compare the efficacy of Ischemic compression technique in conjunction with proprioceptive neuromuscular technique (Hold relax) and Ischemic compression alone. In addition, improvement in range of motion is also considered.*

***Subject and methods**: The Experimental, Randomized control trail (RCT), Group one received ICT i.e., pincer technique and group two ICT +Hold Relax for three sessions per week up to nine weeks on trigger point of upper trapezius. Baseline of six weeks and nine weeks used to assess the outcome measures. Pain intensity measure by visual analogous scale while range of motion was measured by goniometer.*

***Results**: Both interventions reduced pain intensity and increase range of motion. Group one post pain -score is (6.6± 0.5) while group two post pain -score is (7.0±1.0) at base line of nine weeks. Clients received ICT +HR shown marked improvement in neck pain at baseline of six weeks (4.1± 2.1) as compare to ICT group (5.4 ±2.0). Pre and post lateral flexion of neck. Both groups proved significant improvement in home and work activities in neck pain.*

***Conclusion**: Ischemic compression technique with holding relaxes shown more significant impact on pain intensity and range of motion. However, both groups reveal significant effect on reduction of pain intensity as well as range of lateral flexion improved.*

1. Introduction

Trigger point pain is a common missed problem among musculoskeletal disorders. Most of the people suffered with pain for many months or longer were goes untreated who often are seen reducing their physical activities, limiting participation, impairing sleep, having minor or major degree of depression affecting their personal life as well as occupational responsibilities. This leads to loss of employment and depersonalization of belief that their pain is not real but psychogenic. However, the reason of it might be that site of pathology is mostly away from the site of pain1.

Myofascial pain syndrome is supposed to be the main cause of headache and neck pain2. Literature review reveals that MPS was the primary diagnosis in thirty-six percent of 431 clients with pain arises in former week3. In six-month prevalence rate of fifty-four percent4 with up to thirty seventh percent of people developing persistent symptoms, neck pain could be a condition that places an outsized economic burden on the health care system5. Although, the etiology of TrP development is presently unknown, recent studies have hypothesized that the pathological process results from the overloading and injury of muscle tissue, resulting in

https://doi.org/

involuntary shortening of localized fibers6,7. TrPs are found to often occur in people with mechanical neck pain as compared to their age matched controls8. TrPs are associated to hyperalgesia and restricted range of motion (ROM), thus clinically important to spot as these possess the potential to limit practical activies9 pattern of clinical signs on physical examinations important diagnostic tool10. Signs that will characterize the presence of pea like nodule or taut band in a skeletal muscle10, a palpable or visible local twitch response upon palpatory assessment, and/or needle examination of the TrP (called a jump sign), the typical pain referral pattern and later restricted ROM of the affected joint or muscle10,11. The injured or stressed part of muscle receive less oxygen and nutrient delivery as result of it metabolic waste product accumulate in muscle. This cascade of events causes excessive local actin and myocin overlapping leads to pain and finally the development of TrPs.12 However, there is manual and non- manual intervention is available to treat taut band or TrPs successfully. Injection, dry needling, acupuncture and cold spray use to deactivate the trigger point while myofascial, strain–counter strain, muscle energy techniques, ischemic compression technique and proprioceptive technique deactivate TrPs successfully. Trials examining manual techniques recommend that such approaches could also be effective; but, the extent of the effectiveness as placebo nowadays is recognized but its effect beyond this is still unknown.13, 14

Ischemic compression technique is one of the manual technique frequently use to deactivate the trigger point.14,15 Direct sustain digital pressure is applied to TrPs with adequate force for specific time period while the pressure is gradually increasing, maintained and gradually release as a result of it blood supply is reduce 15 and reactive hyperemia produce or spinal reflex activate ,finally lead to muscle relaxation and pain reduction16 .on the other hand, PNF technique “hold relax” active GTOs gives additional relaxation to muscle17. The purpose of the study was to compare the efficacy of ICT alone or to determine the effect of ischemic compression technique with holding relax.

2. Materials and Method

Study Design: This study is a single blinded, randomize control trail (RCT) was conducted in ten months between February 2022 to December 2022, client referred by consultant were selected for the study via convenience sampling.

Inclusion criteria

The study population consists of participant between 18 to 50 years old as well as working at least six hours at their job places. Only those clients are selected for the study who have active trigger point or taught band in upper trapezius and levator scapula causing non- specific neck pain of less than two-month extent in a single side or both sides.

Exclusion criteria

Client those were history of radiculopathy or myelopathy, sign of serious pathology (like malignancy, tumor, infection, spinal cord compression), diffuse weakness, hyperreflexia, clonus, history of neck surgery, sever osteoarthritis, autoimmune disease (e:g rheumatoid arthritis, fibromyalgia) or history of trigger point injection/acupuncture in last six month were excluded.

Methodology

Participants were selected by introducing a questionnaire. The total of 36 clients (17 males, 19 female) were recruited randomly out of 42 and divided into two group (each group consist 18 clients. Before treating the trigger point, VAS were used to document the pain intensity, which is valid and reliable outcome measure and has been used in neck ache researches18. VAS measure the pain intensity between 0 to 10 on straight line 19 and therapist encircle the pain intensity as well as mark the referred pain on body chart while goniometer was used to measure range of motion17. Functional level of normal work and home activities were measure in percentage minimum zero to hundred percent. The primary outcome measure is pain intensity as well as lateral flexion were taken at baseline of six and ninth session.

Clients of both groups were individually explained about the specific procedure and give know-how regarding effect and side effect such as excessive compression or discomfort 1.

Intervention

Group one received only ischemic compression technique for neck pain relief while group two treated with ischemic compression followed by proprioceptive neuromuscular facilitation technique that is hold relax.

Upper trapezius muscle:

The primary emphasis is to deactivate the trigger point. Following steps were followed by Practitioner

1. First locate the trps in upper trapezius
2. Then place the subject in supine position to decrease the tension in affected muscle.
3. Arm was placed in slightly abduction at shoulder with elbow flex and hand rest on client stomach.
4. Practitioner use pincer grip along the whole muscle to locate the trps, when the active trps were diagnose treatment initiated.
5. Ischemic compression was used to deactivate the trps. The practitioner places the thumb and index finger over the active trps to apply pincer grip. 1
6. Practitioner slowly increasing the pressure and maintain the pressure when resistance was felt.
7. The procedure was continued until tenderness reduced or up to 90 second maximally. 14, 17
8. Clients were received treatment session three times per week upto maximum three consecutive week’s treatment.

Trigger point of group two clients were resolve by pincer technique which was immediately directed by hold relax technique of PNF toward the affected muscle. Each step of hold relax was delivered by physical therapist in following pattern.20

1. The client was place in supine position
2. Therapist stabilizes the affected shoulder with one hand, while other hand was placed on mastoid area.
3. Then muscle was place in achievable lengthen position, (contralateral side bending, flexion and ipsilateral rotation of head and neck) until the restriction barrier felt.
4. Afterward therapist gave instruction to shrug the affected side shoulder simultaneously resist the contraction with in pain free limit.
5. Isometric contraction maintain for 10 seconds.
6. In relaxation phase therapist instruct patient further bent the neck.
7. This procedure was repeated five times per session.

On completion of both group intervention pain intensities were recorded after five minutes. The duration of the treatment session were three visits per week until the pain subsides and were taught to maintain their normal activities while avoiding any excessive stress to the neck. On ninth session therapist measure neck lateral flexion through goniometer.21,22

Data analysis

Data analysis done on SPSS version 20. mean and standard deviation were used to describe the baseline

https://doi.org/

characteristics<0.05 was used as an indicator of statistical significance. Pain intensity and lateral neck flexion outcome measure were calculated for the time phase of baseline at 6 week and 9 weeks. Paired sample t- test used to compare both group outcome measure difference while descriptive analysis was done to calculate the frequency of variables.

3. Result

Forty-three clients were entertained out of which three failed to meet inclusion criteria while four clients did not complete the treatment. Thirty-six clients were divided into two group of eighteen with mean age of 38.36 ±15.1 in ICT group and ICT WITH PNF.55.6 5 male and 44.4% female were included in this study. The baseline characteristic were significant in both group (P< 0.05);however ICT +PNF were shown result that was -10.06± 8.07 (ICT+PNF) and-8.05± 5.3 (ICT).Pain intensity significantly improve in both group at the baseline of 6 and 9 week follow up(p< 0.05) while inter group analysis at the base line of six week ICT with PNF shown more improvement (5.4± 2.0)as compare to ICT (4.11± 2.1).However in intra group analysis of pain intensity shown that ore client in group two get better at six week whereas in group one most of the client shown improvement at nine week.(table 1 & 2).

Table 1

			Mean	Std. Deviation	P –Value
ICT	Pair 1	Intensity of pain baseline - Intensity of pain (after treatment)	1.88889	1.02262	.000
	Pair 2	Intensity of pain baseline - Intensity of pain (after 6 session)	4.11111	2.11128	.000
	Pair 3	Intensity of pain baseline - Intensity of pain (after 9 session)	6.61538	.50637	.000
ICT + PNF	Pair 1	Intensity of pain baseline - Intensity of pain (after treatment)	2.55556	.98352	.000
	Pair 2	Intensity of pain baseline - Intensity of pain (after 6 session)	5.44444	2.00653	.000
	Pair 3	Intensity of pain baseline - Intensity of pain (after 9 session)	7.00000	1.05409	.000

Table 2

		Mean	Std. Deviation
Pair 1	Intensity of pain baseline	7.3056	.92023
	Intensity of pain (after treatment)	5.0833	1.40153
Pair 2	Intensity of pain baseline	7.3056	.92023
	Intensity of pain (after 6 session)	2.5278	2.65638
Pair 3	Intensity of pain baseline	7.6087	.94094
	Intensity of pain (after 9 session)	.8261	1.26678

Table 3

			Mean	Std. Deviation	P-Value
ICT	Pair 1	Lateral flexion (Rt/Lt) (Pre) - Lateral flexion (Rt/Lt) (Post)	-8.06250	5.35996	.000
ICT + PNF	Pair 1	Lateral flexion (Rt/Lt) (Pre) - Lateral flexion (Rt/Lt) (Post)	-10.06250	8.07026	.000

Pre and post home activities.

		f	%
Valid	10%	2	5.7
	50%	2	5.7
	70%	5	14.3
	80%	11	31.4
	90%	13	37.1
	100%	2	5.7
	Total	35	100.0
Missing	System	1	
Total		36	

https://doi.org/

4- Discussion

The result of our study may be a feasible option for treating TrPs in non-specific neck pain caused by upper trapezius TrPs; however, the addition of hold relaxes produce significantly greater result. Clients receiving ICT with HR reduced pain level at baseline of six weeks to individual that received the ICT in isolation. In addition, lateral flexion range of neck shown improvement in group treated with isometric contraction. On the other hand, regarding the duration of recovery the ICT +HR group showed an increased in range of motion after taken six-week intervention, which is most important clinical relevance whereas ICT group demonstrate minor difference in contrast with ICT +HR group. The participants of both groups improved their performance in activities of daily living as well as contribute to the increase performance at their jib places .In our study TrPs was treated in 3 session per week up to consecutive three week whereas most of the previous study used intervention like 4 week baseline17, Basak et.al used six treatment session9 and Iqbal two session per week15 .Factor which may influence in outcome was that only active trigger point was considered in this study while in previous studies was conducted on active trigger point but one study considered pressure applied on trigger point 15 .This study only focused on short term relief of pain like other studies,16,17,23 as Howard Vernon revealed in his review that evidence moderately support for long-term pain relief at MTrPs among 112 article review24. Álvarez concluded that MTrPs is effective in reducing pain threshold 25.

Use of ICT with INIT shows improvement in pain intensity on VAS scale that was 1.18 mm17,21. Whereas it was observed that consistent in pain caused by TrPs with post-isometric relaxation at 04 week follow up while our study result shown at six week follow up significant improvement in ICT+HR as compared to ICT alone. Regarding improvement in range of motion Blanco and colleagues recognized that post isometric compression on master muscle TrPs improved active mouth opening as same occurred in our study on upper trapezius TrPs as demonstrated by improvement in lateral neck flexion. Chuen-Ru Hou study shown reduction in pain intensity after 90 second ICT improved as equate to 30 second treatment as well as in range of motion as compare to it our study monitor same effects15.Aren at el also found ICT better as a co intervention to elevate pain23. The strength of our study is effectiveness of proprioceptive neuromuscular facilitation technique with ischemic compression technique which should persist the effect of decrease pain threshold as evidence shown a high level of change required for clinically meaningful result as well as long term follow up will required in future to observe the effectiveness of manual trigger point therapy and hold relax. The weakness of this study is the effectiveness of manual pressure cannot be measured by algometer because of its unavailability and the finding is limited to short term observation of pain.

Funding

This study has not been funded from any government, non-government or public/private agencies. The research was not funded by any funding agency for the public, commercial or not-for-profit sectors.

5- Acknowledgement

We acknowledge all the participants that were involved in our study, without them the study couldn't be completed. Also, all the authors were acknowledged for their contributions.

REFERENCES:

1. Kim M, Kim J. Effects of Acupressure on Pain, Flexibility, and Substance P in Middle-Age Women with Chronic Neck Pain. J Altern Complement Med. 2021 Feb;27(2):160-167. DOI: 10.1089/acm.2020.0413. PMID: 33289588.

2. Morikawa Y, Takamoto K, Nishimaru H, Taguchi T, Urakawa S, Sakai S, et al. Compression at myofascial trigger point on chronic neck pain provides pain relief through the prefrontal cortex and autonomic nervous system: a pilot study. Front Neurosci. 2017;11:186. doi: 10.3389/fnins.2017.00186. PMID: 28424569.

3. Ribeiro DC, Belgrave A, Naden A, Fang H, Matthews P, Parshottam S. The prevalence of myofascial trigger points in neck and shoulder-related disorders: a systematic review of the literature. BMC Musculoskelet Disord. 2018;19(1):226. doi: 10.1186/s12891-018-2130-y. PMID: 29940939.

4. Pecos-Martin D, Ponce-Castro MJ, Jiménez-Rejano JJ, Nunez-Nagy S, Calvo-Lobo C, Gallego-Izquierdo T. Immediate effects of variable durations of pressure release technique on latent myofascial trigger points of the levator scapulae: a double-blinded randomised clinical trial. Acupunct Med. 2019;37(3):149-156. doi: 10.1136/acupmed-2018-011525. PMID: 30814161.

5. Gohil D, Vaishy S, Baxi G, Samson A, Palekar T. Effectiveness of strain-counter strain technique versus digital ischemic compression on myofascial trigger points. Arch Med Health Sci. 2020;8(2):267-272. doi: 10.4103/amhs.amhs_199_19.

6. Esparza D, Aladro-Gonzalvo AR, Rybarczyk Y. Effects of Local Ischemic Compression on Upper Limb Latent Myofascial Trigger Points: A Study of Subjective Pain and Linear Motor Performance. Rehabil Res Pract. 2019;2019:5360924. doi: 10.1155/2019/5360924

7. Alghadir AH, Iqbal A, Anwer S, Iqbal ZA, Ahmed H. Efficacy of Combination Therapies on Neck Pain and Muscle Tenderness in Male Patients with Upper Trapezius Active Myofascial Trigger Points. Biomed Res Int. 2020;2020:1930961. doi: 10.1155/2020/1930961.

8. Müggenborg F, Moreira E, Dennett L, Sobral AI, Mohamad N, Licht G, von Piekartz H. Effectiveness of Manual Trigger Point Therapy in Patients with Myofascial Trigger Points in the Orofacial Region—A Systematic Review. Life. 2023;13(2):336. doi: 10.3390/life13020336.

9. Basak T, Pal TK, Sasi M, et al. A comparative study on the efficacy of ischaemic compression and dry needling with muscle energy technique in patients with upper trapezius myofascial trigger points. Int J Health Sci Res. 2018;8(4):74-81.

10. Gohil D, Vaishy S, Baxi G, Samson A, Palekar T. Effectiveness of strain-counterstrain technique versus digital ischemic compression on myofascial trigger points. Archives of Medicine and Health Sciences. 2020;8(2):191.

11. Khan U, Akhter S, Khan M, Mirza Baig A. Effectiveness of ischemic compression pressure versus spray and stretch technique in the management of active myofascial trigger points of trapezius muscle. IJEHSR [Internet]. 1Sep.2021 [cited 13Apr.2023];9(3):315-21. Available from: https://aeirc-edu.com/ojs14/index.php/IJEHSR/article/view/635

12. Müggenborg F, de Castro Carletti EM, Dennett L, de Oliveira-Souza AIS, Mohamad N, Licht G, et al. Effectiveness of Manual Trigger Point Therapy in Patients with Myofascial Trigger Points in the Orofacial Region—A Systematic Review. Life [Internet]. 2023 Jan 27;13(2):336. Available from: http://dx.doi.org/10.3390/life13020336Kashyap, R., Iqbal, A., & Alghadir, A. H. (2018). Controlled intervention to compare the efficacies of manual pressure release and the muscle energy technique for treating mechanical neck pain due to upper

trapezius trigger points. Journal of pain research, 11, 3151–3160. https://doi.org/10.2147/JPR.S172711

13. Lv, S., Wang, Q., Ni, Q., Qi, C., Ma, Y., Li, S., & Xu, Y. (2022). Progress of Muscle Chain Theory in Shoulder Pain Rehabilitation: Potential Ideas for Pulmonary Rehabilitation. Evidence-based complementary and alternative medicine : eCAM, 2022, 2537957. https://doi.org/10.1155/2022/2537957

14. Rao M, Shafaq S. Effectiveness of Ischemic Compression on Trigger Points for Reduction of Pain and Spasm of Trapezius Muscle. Pak. j. rehabil. 2018;7(1):21-27

15. Kodama K, Takamoto K, Nishimaru H, Matsumoto J, Takamura Y, Sakai S, Ono T and Nishijo H (2019) Analgesic Effects of Compression at Trigger Points Are Associated With Reduction of Frontal Polar Cortical Activity as Well as Functional Connectivity Between the Frontal Polar Area and Insula in Patients With Chronic Low Back Pain: A Randomized Trial. Front. Syst. Neurosci. 13:68. doi: 10.3389/fnsys.2019.00068

16. Gilani MHZ, Obaid S, Tariq M. Comparison between Effectiveness of Ischemic Compression and Muscle Energy Technique in Upper Trapezius Myofascial Trigger Points. Isra Med J. 2018; 10(4): 230-234.

17. Cygańska AK, Tomaszewski P, Cabak A. Pain threshold in selected trigger points of superficial muscles of the back in young adults. PeerJ. 2022 Feb 1;10:e12780. doi: 10.7717/peerj.12780. PMID: 35178293; PMCID: PMC8815375.

18. Mazza, D. F., Boutin, R. D., & Chaudhari, A. J. (2021). Assessment of Myofascial Trigger Points via Imaging: A Systematic Review. American journal of physical medicine & rehabilitation, 100(10), 1003–1014. https://doi.org/10.1097/PHM.0000000000001789

19. Nahomi Kuroda M, Thomaz de Aquino Nava G, Baldini Prudencio C, Affonso Paulo D, Peixouto I, Yoshi Moroshima M, et al. Effect of ischemic compressions versus extracorporeal shockwave therapy on myofascial trigger points: A protocol of a randomized controlled trial. PLoS ONE. 2023 Mar 2;18(3):e0283337. doi: 10.1371/journal.pone.0283337.

20. Álvarez, S.D., Velázquez Saornil, J., Sánchez Milá, Z., Jaén Crespo, G., Campón Chekroun, A., Barragán Casas, J.M., Frutos Llanes, R., & Rodríguez Sanz, D. (2022). Effectiveness of Dry Needling and Ischemic Trigger Point Compression in the Gluteus Medius in Patients with Non-Specific Low Back Pain: A Randomized Short-Term Clinical Trial. International Journal of Environmental Research and Public Health, 19(19), 12468. https://doi.org/10.3390/ijerph191912468

21. Moraska AF, Schmiege SJ, Mann JD, Butryn N, Krutsch JP. Responsiveness of Myofascial Trigger Points to Single and Multiple Trigger Point Release Massages: A Randomized, Placebo Controlled Trial. Am J Phys Med Rehabil [Internet]. Lippincott Williams and Wilkins; 2017 [cited 2021 Aug 24]; 96:639–45. Available from: /pmc/articles/PMC5561477/

22. Kitahara T, Schnoz M, Läubli T, Wellig P, Krueger H. Motor-unit activity in the trapezius muscle during rest, while inputting data, and during fast finger tapping. Eur J Appl Physiol [Internet]. Springer; 2000 [cited 2021 Aug 24]; 83:181–9. Available from: https://link.springer.com/article/10.1007/s004210000277

23. Myofascial Pain and Dysfunction: The Trigger Point Manual - Janet G. Travell, David G. Simons - Google Books [Internet]. [cited 2021 Aug 13]. Available from: https://books.google.lk/books?redir_esc=y&id=8pGrvso0vnkC&q=183#v=snippet&q=183&f=false

24. Cerezo-Téllez E, Torres-Lacomba M, Mayoral-Del-Moral O, Pacheco-Da-Costa S, Prieto-Merino D, Sánchez-Sánchez B. Health related quality of life improvement in chronic non-specific neck pain: Secondary analysis from a single blinded, randomized clinical trial. Health Qual Life Outcomes [Internet]. BioMed Central Ltd.; 2018 [cited 2021 Aug 10];16:207. Available from: https://hqlo.biomedcentral.com/articles/10.1186/s12955-018-1032-6

25. Chronic Cervical Myofascial | Etiology | Pathophysiology | Arthritis [Internet]. [cited 2020 Jan 11]. Available from: https://www.spectrumphysio.info/chronic-cervical-myofascial-syndrome/