

Myofascial Release vs. Thermotherapy: A Comparative Approach to Cervical Radiculopathy Pain Management

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Abstract: Myofascial Release vs. Thermotherapy: A Comparative Approach to Cervical Radiculopathy Pain Management. **Methodology:** - Total 50 participants with cervical radiculopathy were included. Participants were randomly assigned into group A(n=25) and group B(n=25). VAS score was taken for every participant. The group A was provided myofascial release with IFT for 7 consecutive days. The group B was provided thermotherapy with IFT for 7 consecutive days. VAS score was measured after 7 days on 10th day of follow up. Data was analyzed by paired or unpaired T- test. **Result:** - The comparison of VAS score within the group is calculated by using paired t-test and comparison of VAS score between the group is calculated by unpaired t- test. In the group A the VAS score before session was 7.40 ± 1.354 and after session it was 0.64 ± 0.569 . In the experimental group B the VAS score before session was 7.04 ± 1.513 and after session it was 1.04 ± 0.735 . All the results are significant at $p < 0.005$. **Conclusion:** - The present study concludes that there is a significant effect of myofascial release and thermotherapy with IFT in reducing pain in Cervical Radiculopathy.

Keywords: Pain, Myofascial release, Thermotherapy, Cervical Radiculopathy, IFT, Visual Analogue Scale.

I. Introduction

Cervical radiculopathy is the clinical explanation of nerve root in the cervical spine. It is inflamed or damaged, resulting in a change in neurological function. Neurological deficits, such as numbness, altered reflexes, or weakness, may radiate anywhere from the neck into the shoulder, arm, hand, or fingers. Pain can range from aching to shock-like or burning or it may also radiate down into the arm or hand. Cervical Radiculopathy peaks in patients, and risk factors with race, female gender, cigarette smoking, axial load bearing and prior lumbar radiculopathy (Caridi, JM, et al. 2011). The human body has 8 cervical nerve roots and 7 cervical vertebrae. However, a nerve root comes out of the spinal column between C7 and T1, hence C8 as T1 already exists (Eubank, JR.2010).

The intervertebral foramina were shaped like a funnel with the entrance zone being the narrowest part. This was considered the place where the compression of the nerve roots in the intervertebral foramina occurs. Compression of the roots at the anterior side was ascribed to protruding discs and osteophytes of the uncovertebral region. Compression on the posterior side was caused by the superior articular process, the ligamentum flavum, and the periradicular fibrous tissues. fig. 1- cervical nerve roots distribution. Typical symptoms of cervical radiculopathy are: radiating pain in the arm corresponding to a dermatomal pattern, neck pain, muscle weakness in a myotomal pattern, paresthesia, reflex impairment/loss, scapular pain, headaches, sensory and motor dysfunction in upper extremities and neck. (Eubank JR. et al. 2010).

Unidirectional and multidirectional movements generally amplify the symptoms; reduce the space available for the nerve

root to exit the foramen causing impingement (Eubank, JR.2010). It causes the patient neck stiff and a decrease in cervical ROM. It can further affect movement mechanisms of the rest of the body. Related guidelines define cervical radiculopathy as “a pain in a radicular pattern in one or both upper extremities related to compression and/or irritation of one or more cervical roots.” (Onks, CA, Gregory, B 2003). The trapezius muscle is a superficial muscle that presents from the occipital bone to the lower thoracic vertebrae and laterally to the spine of scapula (shoulder blade). (Dela-Penas CF et al.2005).

The pain is present during rest and aggravated during activity; it may be referred to other areas from the site of primary inflammation. Passive range of motion may be painful & restricted due to pain and protective spasm in antagonist muscle group (Hou CR et al.2002). Muscular tightness is mainly caused due to stress and tension, repetitive movements, head forward posture, sitting without back support, working with the no arm support, prolonged head bending activity, using thick pillow, tight pectoral major muscle, severe neck spasm. (Gemmell H. et al. 2011) Moist Hot Pack (MHP) or Silica gel pack causes greatest temperature elevation in skin and subcutaneous tissue. Heating the tissue can cause rise in temperature which results in increased metabolic activity, increased blood flow, stimulation of neural receptors in skin or tissues. These changes in the tissue may be produced by local, general or remote effects. It has been found to be helpful in diminishing pain and decrease local spasm. Main use of moist heat pack is to decrease pain, muscle relaxation (Hou CR et al.2002).

Myofascial pain syndrome (MPS) is a common painful disorder. (MTrPs) (Rickards LD et al. 2006). A wide range of therapeutic interventions are commonly used to manage MPS, including

ischemic compression, spray and stretch, strain and counter strain, massage, thermotherapy (Dommerholt J. et al. 2011). MTrPs are hyperirritable spots which are associated with hypersensitive palpable nodules or elastic band. (Hou CR et al. 2002). They are divided into active or latent MTrPs. They are activated by emotional, physical, and metabolic mechanisms. It is claimed that prescribing postural advice can be effective to treat recurrent formation of MTrP (Iyer et al. 2016). Some passive physical therapy modalities that are also considered to be important to decrease pain and facilitate healing in managing MTrP (Shacklock MO 1995). Evidence suggests that thermotherapy and currents over the MTrP alleviate pain and improve range of motion (ROM) (Fryer G. et al. 2005). However, evidence suggests that when modalities are given as a single treatment, patients experience immediate but not short-to-long-term improvement (Kenneth A. Olson 2009). Consequently, active physical therapy, passive physical therapy, and postural advice are delivered in combination in an attempt to improve effectiveness, although the effectiveness of this combination therapy is not known. Evidence suggests that combining active & passive physical therapy with postural advice is likely to improve outcomes associated with MPS.

Manual therapy techniques included muscle energy techniques, non-thrust/thrust manipulation/mobilization of the cervical and/or thoracic spine, soft-tissue mobilization, and neural mobilization (Robert Boyles et al. 2011). Myofascial release technique is defined as the facilitation of mechanical neural and psychophysiological adaptive potential change in the viscosity of the ground substance to a more liquid state. This technique acts as a catalyst in the reduction of muscular spasm (Fryer G. et al. 2005). Myofascial release techniques relax the contracted muscle, stimulate the mechanoreceptors, and increase blood flow & neuron conductance (Gam AN. Et al. 1998, Borg-Stein J. 2002). Exercises are used to decrease muscle tightness, movement fear. By this way it enhances confidence in independent movements (Kaur K. et al. 2013). Exercises programme is combination of stretching, strengthening, scapular stability and active range of motion (AROM) (Jensen MP. et al. 2002). Exercises to improve AROM, restore normal length and flexibility of muscles (Gam AN et al. 1998). Interferential current (IFC) reportedly reduces skin impedance, can reach deeper tissues. By adjusting parameters IFC provides several different treatment possibilities (carrier frequency, amplitude modulated frequency, sweep frequency, sweep mode or swing pattern, type of application (bipolar or quadripolar), time of application and intensity). It shows significant analgesic effects in patients with neck pain, low back pain, knee osteoarthritis and post-operative knee pain. Most of its parameters seem not to influence its analgesic effects. (Érika Patricia Rampazo and

Richard Eloi Lievano, 2022).

Need of study

Patients suffering from cervical radiculopathy have a tendency to hunch their shoulders and keep forward head and they adapt this posture which then leads to a compensatory nature as they experience some relief in pain as told by them leading to spasm, tightness, pain and swelling which further leads to muscular tightness. Muscular tightness is broad and may include pain, sensory deficits, motor deficits, diminished reflexes or both.

Myofascial release used for treatment is an attempt to restore the dynamic balance between the relative movements of neural tissues and surrounding mechanical interfaces for that it is needed of time to find out more and accurate treatment for cervical radiculopathy condition with muscular tightness.

AIMS & OBJECTIVES

Aims

To investigate better treatment option between Myofascial release vs superficial thermotherapy with combined interferential therapy in management for pain in cervical radiculopathy.

Objectives

- 1) To determine the effects and reliability of myofascial release combined with interferential current therapy in relieving pain of cervical radiculopathy.
- 2) To determine the effects and reliability of Superficial thermotherapy combined with interferential therapy in relieving pain of cervical radiculopathy.

HYPOTHESIS

Alternative Hypothesis

There will be significant difference between myofascial release effect and superficial thermotherapy effect combined with interferential therapy in relieving pain of cervical radiculopathy.

Null Hypothesis

There will be no significant difference between myofascial release and superficial thermotherapy combined with interferential therapy in relieving pain of cervical radiculopathy.

Research Methodology

A comparative study done on 50 patients recruited from Om Multi-speciality Hospital and Trauma centre and Rotary Physiotherapy Centre, Rohtak. Simple random sampling method was used to take sample from population. 50 patients were equally divided in 2 groups i.e., 25 in Group A and 25 in Group

B. Both male and female patients of age 30-40 yrs with cervical radiculopathy due to any underlying cause, pain in neck region referring to any arm, muscular pain and pain during movements were included in the present study. Any patient with recent neck, head or upper limb injury/surgery, history of significant orthopaedic and neurological disorder that impairs range of motion of shoulder joint & neck and cervical malignancy were excluded from the study.

In this study, dependent variables were IFT, MFR and MHP where as independent variables were (VAS) and ROM. Patients were recruited as per inclusion and exclusion criteria. Then patients were divided into two groups:

Group A: The participants from group A had the treatment of Myofascial Release along with interferential therapy in 4PV for 20 min.

Group B: The participants from group B had the treatment of Superficial thermotherapy over the area along with the interferential therapy in 4PV for 20 min. Both the groups had the 7 consecutive sessions and 10th day of follow-up.

Treatment Procedure

Firstly, the participants were selected randomly amongst the population of cervical radiculopathy with neck pain. The participants were told to do shoulder shrug movements and neck side flexions and rotations, if found painful, Then participants were included in the study.

The Participants were then divided into two groups:

Group A: The participants from group A had the treatment of Myofascial Release along with interferential therapy in 4PV for 20 min.

Group B: The participants from group B had the treatment of Superficial thermotherapy over the area along with the interferential therapy in 4PV for 20 min.

Both the groups had the 7 consecutive sessions and 10th day of follow-up.

DATA ANALYSIS

The data analysis was done by statistical tests using SPSS Software version 16.

Paired t-test was used for comparison of VAS score within the groups. Unpaired t-test was used for comparison of VAS score between the groups.

Table: 1 Comparison of VAS score of group A

VAS SCORE	Pre Value	Post Value
Mean± S.D.	7.40±1.354	0.64±0.569
Number	25	

t-value 27.385

p value > 0.05 Non-Significant (NS) p

Table: 1 shows the comparison of VAS score within Group A using Paired t test at 0.05 level of significance.

The results showed that in Pre-test, Mean±SD was 7.40±1.354. Whereas Post-test Mean±SD was 0.64±0.569. The calculated value of Paired T Test was 27.385 which were more than the table value at 5% level of significance. Therefore, statistically significant difference of VAS score within Group A.

Table: 2 Comparison of VAS score of group A

VAS SCORE	Pre Value	Post Value
Mean± S.D.	7.04±1.51	1.04±0.73
Number	25	
t-value	17.823	

The results showed that in Pre-test, Mean±SD was 7.04±1.51. Whereas Post-test Mean ± SD was 1.04±0.73. The calculated value of Paired T Test was 27.385 which were more than the table value at 5% level of significance. Therefore, there was statistically significant difference of VAS score within Group A.

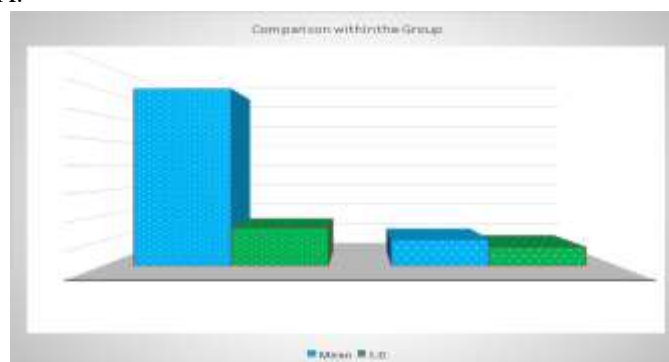


Figure :1 Comparison of VAS score within Group A and Group B

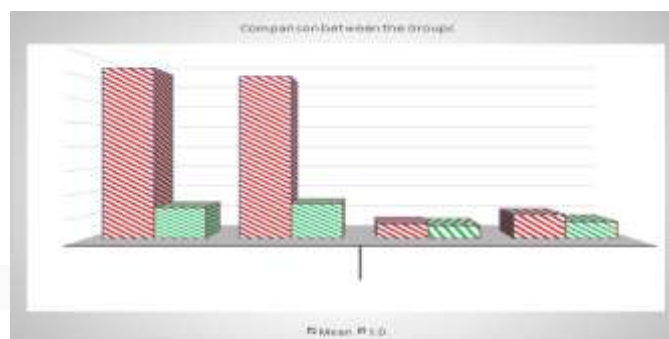


Figure :2 Comparison of VAS score between Group A and Group B

Group A, Pre-test Mean \pm SD value was 7.40 \pm 1.354 and in Group B, Pre test Mean \pm SD was 7.04 \pm 1.513. The calculated value of Unpaired T Test was 0.886 less than the table value at 5% level of significance. Therefore, there was statistically non-significant difference of Pretest VAS score between both groups.

DISCUSSION

The cervical pain is present during rest and aggravated during activity; it may be referred to other areas from the site of primary inflammation. Passive range of motion may be painful & restricted due to pain and protective spasm in antagonist muscle group (Dommerholt J. et al. 2011).

Muscular inflammation is mainly caused due to stress and tension, repetitive movements, head forwarded posture, sitting without back support, working with the no arm support, prolong head bending activity, using thick pillow, tight pectoral major muscle, severe neck spasm (Gemmell H et al. 2011).

Hot moist pack (HMP) (Silica gel pack) causes greatest temperature elevation in skin and subcutaneous tissue. Heating the tissue can cause rise in temperature, enhances metabolic activity by increasing blood flow, stimulation of neural receptors. These changes the tissue may be produced by local, general or remote effects. It has been found to be helpful in diminishing pain and decrease local spasm. Main use of hot moist pack is to decrease pain, muscle relaxation (Hou CR et al. 2002).

Myofascial release technique is defined as the facilitation of mechanical neural and psychophysiological adaptive potential which change in the viscosity of the ground substance to a more fluid state which element the fascia's excessive pressure on the pain sensitive structure and resorts proper alignment. This technique acts as a catalyst in the reduction of muscle spasm. (Fryer G, Hodgson L, 2005)

Deep friction massage is developed by James Cyriax (Gam AN. Et al., 1998). The purpose of deep friction massage is to maintain the mobility of soft tissue structures of ligament, tendon, and muscle. It prevents adherent scars from forming. The massage is deep and must be applied transversely to the specific tissue. Myofascial pain syndrome (MPS) is a painful disorder defined as Sensory, motor, and autonomic symptoms caused by myofascial trigger points (MTrPs) (Rickards LD, 2006). (Dommerholt J, McEvoy J, 2011).

They can be divided into either active or latent MTrPs, which are activated by emotional, physical, and metabolic mechanisms. A wide range of therapeutic interventions are including ischemic compression, spray and stretch, strain and counterstrain, trigger point pressure release, transverse friction massage, thermotherapy, ultrasound therapy, low-level laser therapy, transcutaneous electrical nerve stimulation (TENS), and

interferential current therapy (IFT) (Dommerholt J, McEvoy J, 2011).

A variety of therapeutic interventions are also used to manage MTrPs. Myofascial release techniques are used to relax contracted muscle, stimulate the mechanoreceptors, and increase blood flow and neuron conductance (Gam AN et al. 1998). Exercises are used to reduce muscle tightness and fear of movement. (Kaur K et al. 2013). These include stretching, strengthening, and exercises to improve scapular stability and active range of motion (AROM) (Jensen MP et al. 2002). Exercises to improve AROM are believed to restore normal length and flexibility of muscles (Gam AN et al. 1998). It is claimed that postural advice can prevent recurrent formation of MTrP during and after treatment (Iyer et al. 2016).

In this 50 Participants included who were suffering from cervical radiculopathy, then divided into two groups. First group was given treatment interferential therapy combined with myofascial release and the other group were given the treatment of combined interferential therapy with superficial thermotherapy. The study finds that Both the groups have shown very good effect in relieving the pain of the patients with the condition of cervical radiculopathy. The MFR group have been found more effective at p level 0.36 that is not much significant. The result of significance at p < 0.005.

Limitation of study

Sample size- The sample size is small and taken randomly. Calculated sample could have created more significant relationship with data set and also decreases biasness.

Data collection- There may be an error in recording data due to equipment errors.

Therapist fault- Error due to therapist negligence while recording data or statistic calculation.

Conclusion

The study found that both the groups have the positive effects in decreasing the pain of the cervical radiculopathy but the comparison between effects of the group have been not found significant at p < 0.005.

References

1. Asir john samuel, june 2016, DOES MYOFASCIAL RELEASE TECHNIQUE CONTRIBUTE TO CERVICAL RADICULOPATHY TREATMENT? Borg-Stein J: Cervical myofascial pain and headache. Curr Pain Headache Rep 2002;6:324Y30
2. Burcu Metin Okmen, Korgu Okmen and Lale Altan, 2018, Investigation of the effectiveness of therapeutic ultrasound with high-resolution ultrasonographic cross-sectional area measurement of cervical nerve roots in patients with chronic cervical radiculopathy: a

- prospective, controlled, single-blind study
3. Butler DS. The Sensitive Nervous System. Adelaide, Australia: Noigroup Publications, 2000. Caridi, JM, et al. (2011). Cervical Radiculopathy: A Review. Hospital for Special Surgery. 7; 3:265-272.
 4. De-la-Penas CF, Campo MS, Carnero JF, et al: Manual therapies in myofascial trigger point treatment: systemic review. J Bodyw Mov Ther 2005;9:27Y34 DeLaune V: Pain Relief with Trigger Point Self-Help. Chichester, England, Lotus Publishing, 2011, p 15
 5. Dommerholt J, McEvoy J: Myofascial trigger point approach, in: Wise C (ed): Orthopaedic Manual Physical Therapy:
 6. From Art to Evidence. Philadelphia, Davis, 2011
 7. Érika Patrícia Rampazo and Richard Eloi Liebano, Analgesic Effects of Interferential Current Therapy: A Narrative Review, 2022 Jan; 58(1): 141.
 8. Eubank, JR. Cervical Radiculopathy: Nonoperative Management of Neck Pain and Radicular Symptoms. American Family Physician 2010;81:33-40
 9. Eubanks J. Cervical Radiculopathy: Nonoperative Management of Neck Pain and Radicular Symptoms. Am Fam Physician. 2010 ;81(1):33-40.
 10. Eva Skillgate , Anne-Sylvie Bill, Pierre Côté , Peter Viklund , Anna Peterson , Lena W Holm. The effect of massage therapy and/or exercise therapy on subacute or long- lasting neck pain--the Stockholm neck trial (STONE): study protocol for a randomized controlled trial (2015 Sep 16).
 11. Fryer G, Hodgson L: The effect of manual pressure release on myofascial trigger points in the upper trapezius muscle. J Bodyw Mov Ther 2005;9:248Y55
 12. Gam AN et al: Myofascial trigger point treatment with ultrasound & massage and exercise Via randomized control trial. Pain 1998;77:73Y9
 13. Gemmell H and Hilland A: Immediate effect of electrical point stimulation (TENS) for treating latent upper trapezius trigger points: A double blind randomized placebo-controlled trial. J Bodywork Move Ther 2011;15:348Y54
 14. Hou CR et al: Immediate effect of various physical therapeutic modalities on cervical myofascial pain and trigger point sensitivity. Arch Phys Med Rehabil 2002;83:1406Y14
 15. Iyer, Sravisht; Kim, Han Jo . *Cervical radiculopathy. Current Reviews in Musculoskeletal Medicine*, 2016;9(3), 272–280. Doi:10.1007/s12178-016-9349-
 16. Jensen MP, Ehde DM, Hoffman AJ, et al: Cognitions, coping and social environment predict adjustment to phantom limb pain. Pain 2002;95:133Y42
 17. John M Rhee , Tim Yoon, K Daniel Riew, Cervical radiculopathy, 2007 Aug;15(8):486-94.
 18. Kaur K, Das PG, Lehka PK, et al: Immediate effect of posture correction of trapezius activity in computer users having neck pain Van electromyographic analysis. Int J Allied Health Sci Pract 2013;1Y16 Smith HS: Current Therapy in Pain. Philadelphia, Elsevier Health Sciences, 2008
 19. Kenneth A. Olson. Manual physical therapy of the spine. Saunders Elsevier 2009, p 253, 257, 258
 20. Kenneth A. Olson. Manual physical therapy of the spine. Saunders Elsevier 2009. 253, 257, 258
 21. Kim DG, Chung SH, Jung HB. The effects of neural mobilization on cervical radiculopathy patients' pain, disability, ROM, and deep flexor endurance. J Back Musculoskelet Rehabil. 2017;30(5):951-959
 22. Kuijper B, Tans JT, Beelen A, Nollet F, de Visser M. Cervical collar or physiotherapy versus wait and see policy for recent onset cervical radiculopathy : randomised trial. BMJ 2009;p1-7
 23. Lipetz, JS. Pathophysiology of inflammatory, degenerative, and compressive radiculopathies. Phys Med Rehabil Clin N Am. 2002. 13: 439–449
 24. Michael Costello, Emilio ‘Louie’ J. Puente dura, Josh Cleland & Charles D. Ciccone, 2016 Pages 128-140, The immediate effects of soft tissue mobilization versus therapeutic ultrasound for patients with neck and arm pain with evidence of neural mechanosensitivity: a randomized clinical trial.
 25. Michael Costello, 2013 Treatment of a Patient with Cervical Radiculopathy Using Thoracic Spine Thrust Manipulation, Soft Tissue Mobilization, and Exercise, Pages 129-135.
 26. Onks, CA, Gregory, B (2013). Evaluation and Treatment of Cervical Radiculopathy. Primary Care: Clinics in Office Practice. 40; 4: 837-848.
 27. P Nitsure, A Welling , Effect of Gross Myofascial Release of Upper Limb and Neck on Pain and Function in Subjects with Mechanical Neck Pain with Upper limb Radiculopathy- A Clinical Trial, 2014.
 28. Phyio pedia trapezius muscle Rickards LD: The effectiveness of non-invasive treatments for active myofascial trigger point pain: systematic review of the literature. Int J Osteopath Med 2006;9:120Y36
 29. Robert Boyles et al. J Man Manip Ther. 2011 Aug. Effectiveness of manual physical therapy in the

- treatment of cervical radiculopathy: a systematic review. Shacklock MO. Clinical applications of neurodynamics. In: Shacklock MO, ed. Moving in on Pain. Chatswood, UK: Butterworth-Heinemann, 1995:123–131.
30. Shacklock MO. Clinical Neurodynamics: A New System of Neuromusculoskeletal Treatment. Oxford, UK: Butterworth Heinemann, 2005 Shacklock MO. Neurodynamics. Physiotherapy 1995;81:9–16.
 31. Shin HJ, Kim SH, Hahm SC, Cho HY. Thermotherapy Plus Neck Stabilization Exercise for Chronic Nonspecific Neck Pain in Elderly: A Single-Blinded Randomized Controlled Trial. *Int J Environ Res Public Health*. 2020;17(15):5572.
 32. Shin, Ho-Jin; Kim, Sung-Hyeon; Hahm, Suk-Chan; Cho, HwiYoung. Thermotherapy Plus Neck Stabilization Exercise for Chronic Nonspecific Neck Pain in Elderly: A Single-Blinded Randomized Controlled Trial. *International Journal of Environmental Research and Public Health*, 2020;17(15), 5572
 33. Stanos SP, McLean J, Rader L: Physical medicine rehabilitation approach to pain. *Med Clin North Am* 2007;91:57Y95Yap EC: Myofascial pain An overview. *AnnAcadMed Singapore* 2007;36:43Y
 34. Sung Joon Chung , Yunsoo Soh ,Acute cervical radiculopathy after anterior scalene muscle massage. 2023 Apr 14;102(15)
 35. Tanaka N. et al, The anatomic relation among the nerve roots, intervertebralforamina, and intervertebral discs of the cervical . *Spine*. 2000 ; 25(3): 286-291
 36. Young IA,Michener LA,Cleland JA,Aguilera AJ,Snyder AR.Manual therapy, exercise, and traction for patients with cervical radiculopathy: a randomize clinical trial.*Physical Therapy* 2009;89:632-642
 37. Young IA,MichenerLA,ClelandJA,AguileraAJ,SnyderAR.Manual therapy, exercise, and traction for patients with cervical radiculopathy: a randomize clinical trial. *Physical Therapy* 2009;89:632-642