Efficacy of MFR Combined with Aerobic Exercise Among Health Care Student with Chronic Neck Pain

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Abstract- Neck pain is one of the most common musculoskeletal condition on a global scale in India, 67% of population experience neck pain and out of that 20% develop chronic type neck pain. In health care students neck pain is caused due to lower mobility in daily life, sleep disturbance and poor ability to perform activity of daily living due to neck pain. MFR is a manual therapy technique used to improve range of motion, decrease pain and enhance tissue recovery. Aerobic exercise promote anti-inflammatory cytokines. **Aim & Objectives:** To evaluate the effect of aerobic exercise in terms of pain, endurance and functional activity. To estimate the effect of aerobic exercise and MFR with foam roller in improving pain among health care students in term of functional outcome, reducing pain, muscles relaxation and enhancing Lymphatic drainage and posture correction. **Methodology:** An observational study conducted among healthcare student with 60 participant. Inclusion criteria- No history of fracture, no neurological, chronic neck pain without medication Age group 18-30 years with both male and female participants, chronic neck pain without administration of medications. Exclusion criteria -underwent any recent therapeutic intervention, any associated psychological illness, neck instability and other degenerative disorder, acute neck pain with/without radiculopathy, vertigo, and headache**. Result:** There is beneficial effect of using MRF technique with foam roller and aerobic exercise among healthcare students with chronic pain. **Conclusion:** This study helps us to conclude that aerobic exercise using MFR with foam roller has more positive effect in terms of reducing neck pain and increasing functional function activity.

Clinical Relevance: There is reduction in pain and it will improved mobility**.** Prolong sitting and improper ergonomics can contribute to poor posture**.** Combination of MFR and aerobic exercise can enhance all over functional performance.

Key words: Myofascial Release, NDI, Aerobic Exercise, Foam Roller, Neck Pain

1. INTRODUCTION

Now a days, neck pain is complex disorder in modern society. It is a musculoskeletal disorder that affects people of all age group in certain point of their lives. Neck pain is usually defined upon duration of pain and as acute, subacute or chronic. The most frequently and 4th leading cause of musculoskeletal disorder worldwide is non-specific neck pain (NSNP).

At some point non – specific neck pain can lead to headache. Chronic neck pain affects people's quality of life and physical-mental health and in the main cause of dysfunction and is often manageable [(1)] NSNP increases the chance of not only developing server's cervical spinal pathologies and functional disability, but also it is lowering worker's quality of life and productivity [(2)] In this world, approx.67% of population experience neck pain during their lifetime, and 20% of them develop the chronic type neck pain. The symptoms of chronic neck pain mainly include pain over the neck, difficulty performing neck movements, associated shoulder or upper limb pain, muscle dysfunction, and abnormal breathing patterns. [(1)] At present, physical therapy, works as an integral part of non-pharmacological treatments that consist of exercises, postural correction, relaxation, massage, dry needling, hot and cold packs myofascial release and electrical stimulation including TENS and ultrasound. Out of these, one of them is myofascial release technique it is the soft tissue technique that involves application of low load and long duration stretch applied through knuckles or elbows on the restricted fascia, facilitated by detection of restriction in fascia. [(2)] It decreases pain, increases blood flow and lymphatic drainage, and relaxes the muscles, because the slow movement in the contracted muscles stimulates the parasympathetic

nervous system that produces the feeling of relaxation. The main part of MFR technique focuses on deltoid, Pectoral and upper trapezius muscle group. For people with mechanical neck pain gross MFR of the upper limb and neck is a useful therapy, with quick rate of improvement.(5) Neck pain is becoming very common now a days due to various reasons. Neck pain is very common in trapezius muscle about 2/3rd of the people experienced at some point in their lives. Prevalence is higher in middle aged people. Females are more affected than males. (13, 14) Prevalence for neck pain varies widely on different end research studies with mean point of 13% and mean lifetime of 50%.(16) Myofascial release (MFR) is a soft tissue mobilisation technique in physiotherapy which is used to treat Myofascial pain syndrome it is also defined as the facilitation of mechanical, neural and psychophysiological adaptive potential as interfaced via myofascial system. (15) Myofascial therapy basically involve low load long duration mechanical force to manipulate the myofascial complex and it further intends to restore its optimal length, decrease pain and functional improvement.(13,15)

2. NEED OF THE STUDY: In day to day life neck pain is very common condition seen in healthcare students. To know the problem of health care student due to neck pain in daily living and to reduce pain and improve functional activity by using aerobic exercises with foam roller. To evaluate the effectiveness of aerobic exercises with foam roller in healthcare students.

3. **OBJECTIVE**: To analyse the benefit of aerobic exercise in terms of pain and endurance and effectiveness of functional disability for neck pain.To know the potential effect of aerobic exercise and MFR with foam roller in chronic neck pain suffering among healthcare students in terms of functional outcome, reducing pain, muscle relaxation, enhancing lymphatic drainage and corrections for posture.

4. REVIEW OF LITERATURE

1) Yangsun Ha,et al.(2021) did a study entitle "Addition of myofascial release therapy to therapeutic exercise for management of nonspecific neck pain". The study includes 18 patient who has completed the study and where recruited by randomly allocated to interventions and control group. The intervention group received a myofascial release therapy for 20 min and perform neck stabilisation exercises for 30 min twice a week for four weeks and a control group performed neck stabilisation exercises for 30 mins, twice a week for four weeks at a same as the intervention group. Treatment protocol for both the group is similar. The inclusion criteria for participants was nonspecific neck pain .The outcome measure were used is neck disability index (NDI) and World Health Organisation quality of life brief version. SPSS version used for statistical analysis. This study suggest that myofascial release therapy plus neck stabilisation exercises is effective for non-specific neck pain. But for the clinical use of this intervention for the management of non-specific neck pain for the study need to conduct with appropriate sample size.(1)

2) Zaianab Khalid et-al. (2022) did a study entitle "Effect of post isometric relaxation versus myofascial release therapy on pain, Functional disability, ROM and QOL in the management of non-specific neck pain: a randomized controlled trial". The study include 60 participants recruited by sings behind randomisation for sampling which is divided into two group. Group A and Group B. (30 participants each).Group A received post isometric relaxation with cryotherapy and isometric strengthening exercises. A total number of six session (three session per week for two weeks). Group B received myofascial relaxation therapy with cryotherapy and isometric strengthening exercise. For six session (three session per week for two weeks). Inclusion criteria for the participants were apply non -specific neck pain for two – three weeks, unilateral neck pain with age group between 25-30 years of both gender, male and female.(2)

3) So-Qi Wang et-al. (2022) did a study entitle "Effect of manual soft tissue therapy on the pain in patients with chronic neck pain: A systematic review and meta- analysis". It is understand in the research that 67% of the people gets neck pain and 20% of people suffer as chronic neck pain. Now we have an evidence that says exercise therapy, muscle energy technique, manual therapy and breathing training can effective in neck pain. Study says that at least 10-30 minutes is needed. The preferred reporting items for systematic review and meta-analysis (PRISMA). Statement was used to guide the conduct and reporting of this meta- analysis. The criteria follows PICO (participant, Intervention, comparison and outcomes) framework. Study that meets the criteria are inclusion criteria. A total of 1604 articles were searched through the established search strategy. Only 46 articles matched the study. Because no study were matching the subject in the U.S clinical trial register. In his study Steven pointed out in a trial in 2021 that the pain intensity of patient with chronic neck pain was effectively reduced immediately after MFR. Now, recent study showed by Richa and sweat et-al are saying continuous use of myofascial release for week can improve degree of neck.(4)

4) Sweat V Gauns et-al. (2018) did a study entitle "A randomised controlled trial to study the effect of gross myofascial release on mechanical neck referred to upper limb. It is seen that neck pain problem is more in women by 15%

then in male. Women have highest incident at 45 whereas male at 60 years. Neck pain can be of two type's specific neck pain and non-specific neck pain. Myofascial release technique involves gross stretch of the upper quarter called as "arm pull technique and gross stretch of posterior cervical spine". The total sample size he took is 40 with two group. Group A will have 20 people and Group B will have 20 people. Inclusive criteria are that subject which should be clinically diagnosed with mechanical neck pain also with referred pain to unilateral upper limb between the age group 20-50 years of both gender. Also who all are willingness to participant in study?And the exclusive criteria involve carcinoma, pregnancy, history of congenital torticollis, frequent migraine, history of cervical trauma, previous neck and upper limb surgery, specific neck pain.(5)

5) Mohammad Hosseinifar etal. (2016) did a study entitle "Effectiveness of neck myofascial release technique and exercise therapy on pain intensity and disability in patients with chronic tension- type headache. Around 42%of adults is suffering from tension type headache and 20% of the people go for pharmacological treatment. A critical symptom in headache is neck pain and massage can be beneficial in improvement of pain. It is performed in two weeks and total ten session that is per week five sessions. It is reported that six month performance of head and neck postural exercise was performed. Total 30 females with tension type headache, myofascial release is given to the treatment group four times a week for three weeks, each session last for around 45 minutes and sample was divided into two group that is 15 in each group. Participants ranges from 18-55 years inclusion criteria for the study is tension type headache last at least for four hours for more than three months no sign of vomit, photo phobia, phono phobia ,taking no anti-anxiety or anti depression, not being involved in any manual therapy. Previously two month no history of fracture, neurological and severe spinal disorder in cervical spine.(6)

6) Leticia Bojikian calixtre etal. (2021) did a study in tittle "Effects of myofascial release applied to neck muscles and cranio-cervical flexor training in patients with chronic myofascial TMD: A single arm study" The study was conducted for over 8 weeks. In the study total nineteen subjects with self-reported orofacial pain contacted the researchers and fifteen women with their mean age of 23.9+/-3.41 were included in the study. The PPT over massager and temporalis muscles were significantly different in between E1, E2, and E3. But when Wilcox on post-hoc analysis showed little improvement from E2 to E3 but it is not seen in E1 to E2 on the left masseter and temporalis. The protocol include strain or counter strain technique applied to myofascial trapezius in neck muscles. The SCS therapy based intervention is used with the combination with stabilisation exercises to treat myofascial TMD demonstrated positive effect in terms of decreasing in terms of orofacial pain, improve deep cervical muscle and mandibular function.(7)

7) Ramya k et-al. (2023) did a study in title "The effect of myofascial Release technique on pain and neck disability over conventional neck exercises on patients with cervicogenic headache". It is a referring pain which is secondary and unilateral headache which is coming from soft or hard cervical structures to occipital, temporal, frontal and also it can be from pre-orbital regions. It start from dull feel and can lead to vomiting, blurring of vision but it has clear distinction from migraine headaches. It accounts for 15-20% in all chronic headaches. The patho is afferents from cervical nerve root C1-C3 with the afferents from occipital and trigeminal nerve. The treatment ranges from cervical joint mobilization, facet joint mobilization, ultrasound therapy, laser therapy, trigger release therapy, posture corrections exercise session including cervical and upper thoracic strengthening. The study is done by taking two group that control group and experimental group. The subjects on human volunteer's female in specific residing at Salem district, thirty six females between the ages 35-45 years were selected with the history of at least 2-3 episodes of cervicogenic headache in past 3 months. Both the groups underwent a pre-test assessment for pain and neck durability through visual Analog scale (VAS) and Neck Disability Index (NDI) respectively.(8)

8) Lea overmann et-al. (2023) did a study in tittle "Effectiveness of myofascial release for adults with chronic neck pain: A meta-analysis" The western society is expected to have 88% of chronic neck pain. When it persist more than three months in effects more than one anatomical region of the body. In western society a survey is conducted which has involve 4839 participants that reveals 46% experienced constant pain lasting over two years and 19% had lost their job because of constant neck pain. If there is any trauma, inflammation, or infection and structural imbalance of the body can leads to tightening of the fascial strain. If it last for long terms it can lead to pain lack of flexibility and also limitation in movement. Myofascial release influences fascial alteration so it is used in chronic pain. It is based on the method preferred reporting items for systematic review and meta-analysis (PRISMA). PICO is used to create research questions. In the study passive Myofascial release or hands on MFR is used with myofascial release therapy used the hand with gentle sustained pressures to the target area of body. The outcome measure are based on the pain intensity (VAS/ PPT) and / or Range of motion of the cervical spine. Data is extracted with the help of visual analysis scale, pressure pain threshold and range of motion.(9)

9) Palem altindag et-al. (2017) did a study entitle "Efficiency of myofascial release method on pain in patients with cervical radiculopathy associated with myofascial pain". Annually 83.2 per 100 cervical radiculopathy is seen. Triggering point may cause painful symptoms that is attributed to radiculopathy. Myofascial release is useful in decreasing pain and immobility. In Gaziantep university research hospital total 16 patient are admitted with mechanical neck pain. All patients were told to have MRI. Inclusion criteria -25-55 years, that can be for both male and female, upper trapezius trigger point, single side pain radiation to the arm and also pain patient showing positive cervical foramina compression test. Visual Analogue Scale was performed on all patients. Focused MFR is given with the help of two finger in small area of upper trapezius and also this hold is maintained for 90-120 seconds. All subjects received 45 minutes of therapy and was for 5 times a week for 3 weeks.[10]

10) Scott W cheatham et-al. (2015) did a study entitled "The effects of self-myofascial release using a foam roll or roller massager on joint range of motion". In the study they have used athletes and active individual person. The author discover 10 studies and found that myofascial release therapies as a group significant in term of ROM but no significant change in muscle function in term of treatment. Inclusion criteria was randomised controlled trials. Nine articles were include and author found that SMR has positive effect on rom, soreness/fatigue following exercise. Total 133 articles are identified from search and out of which 131 were excluded for not fulfilling the inclusion criteria and total 14 articles were included. The conclusion of this study indicate that SMR using foam roller or roller massage may have only short term effect of increasing joint ROM without impacting on muscles performance and they also suggest further research should focus on larger sample size group and main limitation was small sample size group.[11]

11) Haytham M. El-hafed et-al. (2020) did a study in tittle "Instrument-assisted soft tissue mobilisation versus stripping massage for upper trapezius myofascial trigger point". It is seen from many study that 85% of the neck pain patient come with trigger point in the neck and also it is more common in female's than in males. In the study, total 53 subject were assessed for eligibility in that 13 were excluded 10 refused to participate and 3 have cervical radiculopathy. 40 sample size were used for study Group A received AISTM and stretching exercise for 4 week and group B received SM and stretching exercise for 4 weeks. It is collected on the basis of pain in upper trapezius, a jump sign during palpation. The age group which is selected for the study was18-23 years of both male and female. 34 female and 6 males were selected for the study. The outcome measure for the study used VAS score, PPTs and NDI scores for statistically analysed using SPSS software and for demographic data by using impaired t- test, no significant differences were found in the study between the two group (A& B) in terms of their age, weight, height or BMI. The conclusion of the study were both IASTM and SM are beneficial method for the treatment of active trapezius trigger point and they also recommended replication of this study with additional postural correction exercise for both the group.

5. METHODOLOGY

Study design – Observation study

Sampling – convenience method

Sampling size – 60 individuals

Study duration – 12 weeks

Procedure – combined therapy of neck MFR with foam roller and aerobic exercise in chronic pain among health care students.

Study setting- Department of Physiotherapy, VIMS&RC, Bangalore.

Outcome measure – VAS score (visual analogue scale), NDI scale (Neck Disability Index) and Universal Goniometer.

Inclusion criteria

- Healthcare students include medical, Dental, Pharmacy, Nursing and Physiotherapy with no history of recent fracture, neurological, and server's spinal disorder in cervical spine.
- Age group- 18-30 years
- Gender- Male and female
- Chronic neck pain without administration of medications (taking no anti-anxiety or antidepressant medicine)

Exclusion criteria-

- Underwent any recent therapeutic intervention (within 2 weeks)
- Having any other treatment method
- Not completing all the interventional sessions
- Pain increment because of the intervention
- Any associated psychological illness
- Neck instability and other degenerative disorder
- Acute neck pain with/without radiculopathy, vertigo, headache, and frequent migraines or Torticollis
- Neck surgery

6. **PROCEDURE**: Patient position will be that of sitting on the stool, hand resting on thigh. Therapist will be standing behind the patient closer to the treating area. Foam roller and aerobic exercise is used to apply pressure and glide along the neck. As the session begins, patient will be asked to do side bending and turn his/her head in the opposite direction. This session will be repeated for 3-5 times, thrice a week for 6 weeks.

7. Ethical consideration

1. The study was approved by the Research Ethical Committee and formal permission was taken from concerned authorities of the Hospital and Associated Department
2. Informed consent was obtained during the study.
3. The subject were informed that their data will be confidentiality maintained
4. The subject were informed prior that their participation was on voluntary basis and the can withdraw from the study, at any point of time
5. No ethical issues during the study

The participant underwent exercise accordingly under the supervision of a Physiotherapist, after which pre and post value were analysed and the data was managed by MS word 2013 and it is analysed by SPSS17.
Pre VAS score and Neck Disability Scale (NDI) were used as measuring tools, which assessed pre and post exercise session.

8. **Analysis**:

VAS score and NDI scale were used as an outcome measure, which were assessed before and after the exercise session. Initially, first week was taken as a base period which is compared with other time factor combination allays Different variables were studied in between 1st week-6th weeks

For the observation group, paired t test was used to compare PRE and POST values of VAS and NDI. Some test are used for others parameters too. Since p (0.000<0.05) is less than our chosen significance level. The mean VAS score, mean NDI scale for health care student's aerobics exercises with MFR with foam roller is significant.

Based on the results, we can state that independent samples paired t test are as follows

- ❖ There is significant difference in mean PRE vas score in health care students with aerobic exercise and MFR with foam roller (t=6.917)
- ❖ There is significant differences in mean PRE NDI scales in health care students with aerobic exercise and MFR with foam roller (t=27.40)
- ❖ There is significant difference in mean post VAS score in health care students with aerobic exercise and MFR with foam roller (t=2.07)
- ❖ There is significant differences in mean post NDI scales in health care students with aerobic exercise and MFR with foam roller (t=13.22)

Table 1: Paired Samples Statistics

		Mean	N	Std. Deviation
Pair 1	pre vas score	6.917	60	1.0299
	post vas score	2.07	60	.880
Pair 2	pre NDI Score	27.40	60	5.412
	post NDI score	13.22	60	2.762

Table 2: Paired Samples Test

	Paired Differences					t		P value
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1 pre vas score - post vas score	4.8500	1.0222	.1320	4.5859	5.1141	36.752		.000**
Pair 2 pre NDI Score - post NDI score	14.183	5.607	.724	12.735	15.632	19.593		.000**

**P<α we considered as significant (0.000<0.05)

9. Demographic data

Descriptive statistics

	N	Mean	Std. Deviation
Age	60	21.77	2.028
Valid N (list wise)	60		

Frequency table

Gender

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Female	33	55.0	55.0	55.0
	Male	27	45.0	45.0	100.0
	Total	60	100.0	100.0	

10. Contribution made

- The exercise are easy to perform without any pain and it is a non-invasive method
- It is cost effective, when compared with other intervention

- Exercises helps to improve the level of fitness
- It also eases the delivery
- The uses of foam roller to reduce muscles spasm in health care students
- Analysed data helps us to conclude the study.

11. Conclusion: This study concludes that aerobic exercise using MFR with foam roller is helpful in Heath care students in terms of reducing muscles spasm, neck pain and increasing their functional activity.

- There is a significant difference between pre VAS score and post VAS score
- There is a significant difference between pre NDI score and post NDI score

Bibliography:

1) Yangsun Ha,Suk- Chan Hahn (2021).Addition of myofascial release therapy to therapeutic exercise for management of nonspecific neck pain. Journal of Korean society of integrative medicine.Vol 9, Issue 2, pages 35-41.

2) Zainab Khalid Khan,Syed Imran Ahmed and Affab Ahmed Miraza Baig (2022).Effect of post isometric relaxation versus myofascial release therapy on pain, functional disability,ROM and QOL in the management of non-specific neck pain: a randomised controlled trial.BMC Musculoskeletal Disorder 2022 Jun 13;23(1):567.

3) YaoruiGuo,Xiuying Lv,Yu Zhou (2022).Myofascial release for treatment of pain and dysfunction in patients with chronic mechanical neck pain: Systematic review and meta-analysis of randomised controlled trial. Clin Rehabil.2022 Oct 27; 2692155221136108.

4) So-Qi wang, Ai-Yun Jiang, Qi GAO (2022). Effect of manual soft tissue therapy on the pain in patients with chronic neck pain: A systematic review and meta-analysis. Complementary Therapies in Clinical practice Volume 49, November 2022,101619.

5) Sweat V Gauns and Peeyoosha V Gurudutt (2018). A randomised controlled trial to study the effect of gross myofascial release on mechanical neck pain referred to upper limb. ain't J Health SCI (Qasim) 2018 Sep-Oct;12(5):51-59.

6) Mohammad Hosseinifar,Razieh Bazghandi,Zahira Azimir,Bahareh Khodaiji Bohiuli(2016).Effectiveness of Neck Myofascial Release Techniques and Exercise Therapy on Pain Intensity and Disability in patients with Chronic Tension- Type Headaches. Global Journal of Health Science; Vol.9, No.6; 2017.

7) Leticia Bojikian Calixtre, Monica Ambiel Rezende, Danilo Harudy Kamonseki, Ana Beatriz de Oliveira (2021).Effects of myofascial release applied to neck muscles and craniocervical flexor training in patients with chronic myofascial TMD: A single arm study. International journal of osteopathic medicine; volume 41, September 2021, pages 4-10.

8) Ramya K,Senthilkumar M,Prabhakaradoss D, Rajan Samuel A, Thiagarajan Subramanian(2021).The Effect of Myofascial Release Technique on Pain and Neck Disability Over Convention Neck Exercise on patients with Cervicogenic Headache.Indian Journal of Natural sciences;vol.12,Issue 65,April 2021.

9) Lea Overmann, Robert Schleip,Dennis Anheyer,Johannes Michalak(2024). Effectiveness of Myofascial Release for adults with chronic neck pain: a meta-analysis. Physiotherapy;vol,123,June 2024pages56-68

10) Ozlem Altindag,Sahin Ozaslan(2017).Efficacy of Myofascial Release method on pain in patients with cervical radiculopathy associated with Myofascial pain.DOI:10.29011/CPMT-110.

11) Scott W.cheatham,Morey J.kolber,Matt Cain,Matt Lee(2015).The Effects of self-myofascial release using a foam roller and roller massager on joint range of motion, muscle recovery, and performance :A systematic review.IJSPT;10(6):827-838.

12) El-hafez H M., et al. "Instrument-assisted soft tissue mobilisations versus stripping massage for upper trapezius myofascial trigger points". Journal of Taibah University Medical Sciences15.2 (2020): 87-93.

13) Ester Cerezo-Téllez and María Torres-Lacomba. "Prevalence of Myofascial Pain Syndrome in Chronic Non-Specific Neck Pain: A Population-Based Cross-Sectional Descriptive Study". Pain Medicine 17.12 (2016): 2369-2377.

14) Mishra D., et al. "Comparative Study of Active Release Technique and Myofascial Release Technique in Treatment of Patients with Upper Trapezius Spasm". Journal of Clinical and Diagnostic Research 12.11 (2018).

15) Genebra CVDS., et al. "Prevalence and factors associated with neck pain: a population-based study". Brazilian Journal of Physical Therapy (2017)