

Effect of Gross Myofascial Release of Upper Limb and Neck on Pain and Function in Subjects with Mechanical Neck Pain with Upperlimb Radiculopathy- A Clinical Trial

Peeyoosha Nitsure¹, Aarti Welling²

1- Assistant Professor, Dept. of Orthopaedic Physiotherapy, KLE University Institute of Physiotherapy, Belgaum, India.

2- 2nd year Orthopaedic Physiotherapy, KLE University Institute of Physiotherapy, Belgaum, India.

Correspondence to:

Dr Aarti Welling,

MPT- II Year Orthopaedic Physiotherapy, KLE University Institute of Physiotherapy, Belgaum.

Contact Number: 9448814569

Email: aartiwell88@gmail.com

Contact Us : editor@ijdmr.com

Submit Manuscript : submissions@ijdmr.com

www.ijdmr.com

ABSTRACT

BACKGROUND

Mechanical neck pain is also known as nonspecific neck pain. It is a common complaint which affects 45-54% of the general population. Pain develops in the neck and may spread to the shoulder or base of the skull. It is most common in people with a working age group of 20-50yrs. Myofascial Release (MFR) is a hands-on approach to healthcare. It is a form of manual therapy technique that has a profound effect upon the musculoskeletal system. The objective of the study was to determine the effect of gross myofascial release on upper limb and neck in subjects with mechanical neck pain in order to reduce pain and improve functional abilities.

MATERIALS AND METHODS

Fifteen participants with mechanical neck pain along with referred pain to unilateral upper limb were included for the study. Pre and post assessment was done using Visual Analog Scale (VAS), Northwick Park Questionnaire (NPQ) and Disabilities of Arm, Shoulder and Hand Questionnaire (DASH). All the participants of the study were given gross stretch of upper quarter (arm pull) and gross stretch of posterior cervical musculature along with TENS for 5 days.

RESULTS

The subjects showed significant reduction in pain according to VAS and improvement in functional activities according to NPQ and DASH with $p < 0.001$ in all domains.

CONCLUSION

Gross MFR is effective in reducing mechanical neck pain and in improving functional abilities.

KEYWORDS: Gross myofascial release, Manual therapy, Mechanical neck pain, Upper limb radiculopathy, TENS.

INTRODUCTION

Neck pain is a common complaint in general population. Among diverse neck pain, mechanical neck pain is the most common type with pain confined in the posterior aspect of neck. Among diverse neck pains, mechanical neck pain affects 45-54% of the general

population sometime during their lives and can result in severe disability.¹

Mechanical neck pain also known as nonspecific neck pain has an acute or sudden onset of pain. Neck pain can be subdivided into upper cervical segment pain in which the pain is usually referred to the head and lower cervical

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segment pain in which the pain is referred to scapular region, shoulders, and upper limb.² Pain develops in the neck and spreads up to the shoulder or to the base of the skull. Movement of the neck feels restricted and moving the neck may make the pain worse. Clinically it is common that patients with non-specific neck pain report problems with upper limb function in which the pain spreads down the arm, as far as to the fingers.³ Neck pain is most common in people with a working age group of 20-50 years and people employed in various jobs for example people who spend most of their working day at a desk with neck bent forward posture.³ Mechanical neck pain can also result in referred pain to unilateral upper limb. A survey which was done in Kolkata on mechanical neck pain patients found that 67% of patients presented with associated upper limb pain without neurological deficit.⁴

Clinically it is common for patients with non-specific neck pain to report problems with upper limb function. Yet the extent of upper limb deficits in patients with neck pain is not well known and there are few measures available for clinicians to help quantify upper limb capacity in patients with neck pain. Literature also suggests that baseline neck pain/disability measured using the Northwick Park Neck Pain Questionnaire (NPQ) and baseline upper limb disability which is measured using the Disabilities of Arm, Shoulder, Hand questionnaire (DASH) are considered reliable and the pair wise analysis revealed a positive correlation between NPQ score and DASH score. Studies have also stated DASH and NPQ to be reliable tools in measuring upper limb disability in non-specific neck pain.^{5,6}

Manual therapy is commonly used in the treatment of mechanical neck pain; there are numerous systematic reviews for the treatment

of neck pain using manual therapy. Techniques such as positional release therapy, trigger point release therapy, muscle energy technique, myofascial release therapy, cyriax, spinal mobilization such as NAGS and SNAGS are the most commonly used manual therapy techniques in the treatment of mechanical neck pain. In particular there is paucity of literature where gross myofascial release technique and quarter arm pull is been used in mechanical neck pain patients with upper limb radiculopathy. Hence this study was undertaken with the aim to find out effect of gross myofascial release of upper limb and neck in subjects with mechanical neck pain along with referred pain to unilateral upper limb in order to reduce pain, and functional abilities.^{7,8}

Literature also suggests that a combination of manual therapy with electrotherapy can be given for the treatment of musculoskeletal conditions. Various electrotherapeutic modalities are used in the treatment protocol of mechanical neck pain among the electrotherapeutic modalities Transcutaneous Electrical Nerve Stimulation (TENS) is considered to be simple, non-invasive analgesic technique that is used extensively in health-care settings by physiotherapists.^{9,10}

MATERIALS AND METHODS

This study was a clinical trial and was conducted at KLEU Institute of Physiotherapy College, JNMC Campus, Nehru Nagar, Belgaum. Study design was interventional. All mechanical neck pain subjects along with referred pain to unilateral upper limb, referred to physiotherapy OPD were screened for inclusion criteria and exclusion criteria.

Subjects were admitted into the study if they met the following criteria:

- Both male and female subjects clinically diagnosed with mechanical neck pain along with referred pain to unilateral upper limb
- Duration of acute pain onset less than 1 month
- Age 20 to 50 years
- Subjects willing to participate in the study

Subjects with any of the following were excluded:

- Signs of neurological involvement (paresthesia, tingling, numbness)
- Cervical disc prolapse
- Cervical spondylosis
- Spinal stenosis
- Previous spinal surgery
- History of cervical trauma (whiplash disorder)
- Congenital torticollis
- Frequent migraine
- Carcinoma
- Pregnancy

Ethical clearance was obtained from the ethical committee of KLE'S university institute of physiotherapy Belgaum prior to the commencement of the study. Based on eligibility criteria participants were included and prior informed consent forms were signed by every participant included. 15 subjects were selected for the study. Pre and post assessment was done using 3 outcome measures Visual Analog Scale (VAS), Northwick Park Questionnaire (NPQ) and Disabilities of Arm, Shoulder and Hand Questionnaire (DASH).^{11, 12}

All the participants were explained about the need for the study, confidentiality of the documentation, Brief explanation of myofascial release technique and its role in reducing pain and improving functional ability. Subjects during experimental therapy underwent a manual intervention of Gross Stretch of the Posterior Cervical Musculature (refer photo number 1, 2, 3) and Gross stretch of upper quarter: Arm Pull (refer photo number 4,5, 6,7) for duration of 10-15 min per session each stretch position was held for 90sec.¹³ After

the myofascial release therapy conventional TENS was applied for duration of 15 min with a frequency ranging from 80-120 Hz, 10 intensity was increased as per the tolerance of the patient followed. The experimental therapy was given for five days. During the therapy the subject was instructed to lie in the supine position stay relaxed not sleep during procedure. The subjects were also instructed to report the therapist if any discomfort or pain was felt during the procedure.



Figure No.1



Figure No.2



Figure No.3

Gross Stretch of The Posterior Cervical Musculature



Figure No.4



Figure No.5



Figure No.6



Figure No.7

Gross stretch of upper quarter: Arm Pull

The data of the study was computed and analyzed using SPSS (Statistical Package for Social Science) software version 16.0. Statistical analysis was done using Wilcoxon Signed Ranks Test and Paired t Test

RESULTS

Fifteen subjects who met the inclusion criteria participated in this interventional study. Table 1 describes the demographic details of the included participants.

A significant improvement was noted in all outcome parameters with p value <0.001 . The table 2 states an improvement in Visual Analog Scale of 6.5-1.9, significant improvement was also noted in Northwick Park Questionnaire from 36.3-22.2 and Disabilities of Arm, Shoulder and Hand Questionnaire from 39.5-26.1. Table No.1 Shows demographic details of the participants. Table No.2 Shows the pre and post score of VAS, NPQ, DASH. Figure No.8 states that the interventional group showed significant reduction in the intensity of pain as per Visual analog scale (VAS). Improvement in functional and independent activities in all domains was also seen which was assessed using Northwick Park Questionnaire (NPQ) and Disabilities of Arm, Shoulder and Hand Questionnaire (DASH).

DISCUSSION

The present study showed significant improvement in pain and function in subjects with mechanical neck pain with referred pain to unilateral upper limb. The respective occupation of the subjects in this present study was students, teachers and a dentist with an average age ranging from 23-40 years. Age group between 18- 50 years was taken as an inclusion criteria as several prevalent studies have shown increase in occurrence of mechanical neck in the above mentioned working age group.

Reviews have stated that mechanical neck pain is a common problem in adults and is the most common musculoskeletal problem in people with sedentary jobs. It is most commonly seen in a working age group of 18-50.^{1,13} It is also quite common in college students. Studies have shown an increase in neck pain with increased computer usage.

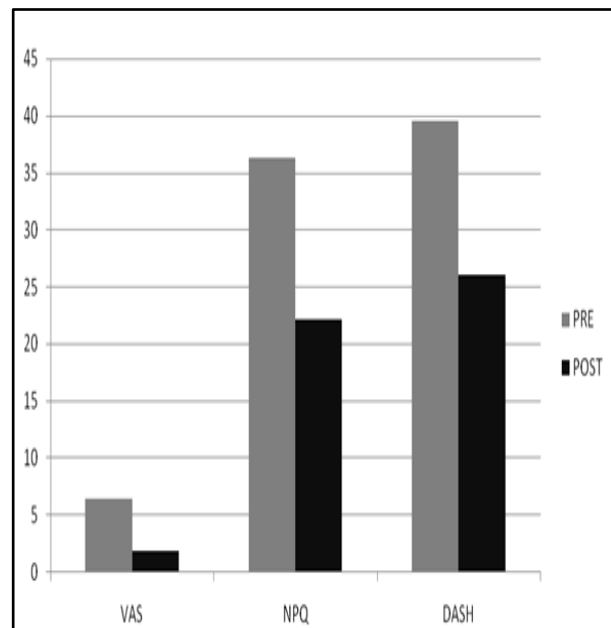
Table No.1: Showing demographic details of the participants

S.No	Sex	Age Yrs	Occupati - on	Duration Of Pain(Days)	Vas		Npq		Dash		Duration of Treatment(Days)
					pre	post	pre	post	pre	post	
1.	F	28	TCHR	4	4	1	27.7	19.4	368	248	5
2.	M	35	FAR	4	4	1	27.5	19.2	369	246	5
3.	F	27	DENT	5	5	1	30.5	20.1	375	250	5
4.	F	27	STUD	5	5	1	30.9	20	375	249	5
5.	F	23	STUD	7	6	2	35.5	21	380	259	5
6.	F	25	STUD	10	7	2	38.8	23.2	396	266	5
7.	M	40	FAR	10	7	2	39	23.2	398	266	5
8.	M	42	GOV	15	7	2	39.2	23	398	256	5
9.	M	45	PROF	15	8	2	40	24	400	268	5
10.	F	27	PROF	20	8	2	40	23	411	270	5
11.	M	35	FAR	20	8	3	40.4	24.2	420	272	5
12.	F	30	HW	20	8	3	40.4	24.2	420	271	5
13.	F	44	HW	25	8	3	42	24.2	425	271	5
14.	F	35	HW	10	7	4	40	24.7	420	270	5
15.	M	40	GOV	20	7	3	40.5	22.6	425	270	5

TableNo.2: Showing the pre and post score of VAS, NPQ, DASH

	Pre Treatme nt	Post treatm ent	Difference	P value
Visual analog scale (VAS)	6.5±1.56	1.9±0.76	4.6±0.96	0.001
Northwick Park Questionnaire (NPQ)	36.3±5.24	22.2±1.95	14.1±3.35	<0.001
Disabilities of Arm, Shoulder and Hand Questionnaire (DASH)	39.5±20.16	26.1±9.95	13.4±11.10	<0.001

Figure No.8: Showing the graphical representation of VAS, NPQ, DASH



College students therefore are susceptible to having neck and upper back pain because of hours spent in studying and working on computer. All these activities are done in a static sitting position with the head bent forward. Using laptops can contribute to neck pain since the keyboard and monitor is held close together, resulting in a slouched posture.¹³

A study done by Mustafa Ahmed et al on prevalence and factors associated with neck, shoulder and low back pains among medical students in a Malaysian medical college. In this study, medical students reported musculoskeletal problem most commonly at their lower back, Neck and upper limb. Clinical practice was shown to be associated with

musculoskeletal problem probably because students in clinical years spend more time in standing position during bedside teaching, clerking or attending surgical operation.¹⁴

Thomus T. W et al stated that neck pain and upper limb pain were highly prevalent in secondary school teachers in Hong Kong. It was stated that Gender, age, head down posture and some psychological factors were found to be significant risk factors. High workload, low colleague support and high anxiety were also found to be significant on affecting the neck pain and upper limb pain developed after becoming teachers.¹⁵

In order to assess and manage neck pain and upper limb disability in mechanical neck pain subjects, a valid, reliable and simple-to-use measure of pain and upper limb disability which can be used to assess baseline disability and which can detect changes in upper limb performance as rehabilitation progresses is needed. The Northwick park questionnaire and Disabilities of Arm, Shoulder, Hand questionnaire is a patient-completed upper limb disability questionnaire which has recently been validated for use in the neck pain population, it is the only upper limb disability questionnaire that has been validated for use in the neck pain population.¹⁶

S.M.McLean et al in a study on measuring upper limb disability in non specific neck pain which was a clinical performance measure stated the mechanisms that lead to the development of upper limb problems in patients with non-specific neck pain is related to mechanical loading, minor peripheral nerve damage and deconditioning. As the upper limb is mechanically connected to the neck and shoulder girdle via skeletal and muscular structures mechanical loading of the upper limbs may cause neck pain as a direct consequence of increasing the mechanical loading to the articular and ligamentous structures of the neck or by creating protective spasm.¹⁷ This may result in pain,

decreased range of motion and functional disability inhibiting the patient from using their affected upper limb.^{3,17} In this study it was also noted that that baseline neck pain/disability and baseline upper limb disability can be measured using the Northwick Park Neck Pain Questionnaire (NPQ) and Disabilities of Arm, Shoulder, Hand questionnaire (DASH) which are considered reliable, as the pair wise analysis revealed a positive correlation between NPQ score and DASH score.

All the fifteen patients showed significant relief of pain and disability of neck and upper limb this can be attributed firstly because Myofascial release (MFR) is an approach that focuses on freeing restrictions of movement that originate in the soft tissues of the body. It is a form of soft tissue therapy that is intended to reduce pain and increase mobility in patients that are suffering from chronic pain conditions. Secondly by applying pressure and administering fascial release to areas of the body, this therapy aims to improve the health of fascia tissue. Fascia is a connective tissue along with tendons, ligaments, bone, and muscle. A slow gentle pressure allows the body's tissue to reorganize, release physical restrictions and release the body's unconscious holding and bracing patterns.¹⁸ As this technique produces heat and increases blood flow which releases tension from fibrous band of connective tissue it thus results in softening, elongating and realigning the fascia and removing restrictions or blockages in the fascia. It is theorized that the alterations in the tissue texture and tension resulting from myofascial release come from dynamic changes in the connective tissue and neuromuscular systems of the body.^{19, 20}

There are two types of myofascial release techniques direct and indirect. Direct myofascial release technique is applied in order to release the restrictive barrier, in this form technique the tissue is loaded with a constant force until release occurs. Practitioners can use

knuckles, elbows, or other tools to slowly stretch the restricted fascia by applying a few kilograms of force. It differs from indirect method in which less pressure is applied to the affected area, and a slight twist which allows the fascia to unwind itself. This gentle form of traction causes increased blood flow and heat to the area, allowing the body's natural healing mechanisms to take over.^{17,20}

A study by Ajimsha on effectiveness of direct vs indirect technique myofascial release in the management of tension-type headache. The aim of this study was to investigate whether direct technique myofascial release reduces the frequency of headache more effectively than the indirect technique myofascial release in comparison to a control group receiving slow soft stroking. This study provides evidence that direct technique or indirect technique myofascial release is more effective than the control intervention for tension headache.^{7,20}

There is paucity of literature where quarter arm pull technique is used to reduce pain and improve functional disability upper limb. A study by Paolo Tozzi et al proved the effect of Fascial release on patients with non-specific cervical or lumbar pain. In this study gross Myofascial Release (MFR) and Fascial Unwinding (FU) were the widely used manual fascial techniques (MFR), in treatment protocols to release fascial restrictions and restore tissue mobility and the effects of MFR on pain perception, the mobility of fascial layers was investigated using dynamic ultrasound (US) in patients with neck pain (NP) and low back pain (LBP).²¹

A study conducted by Patel Rakesh on effectiveness of myofascial release vs positional release technique in chronic upper trapezius spasm this was a comparative study in which the MFR group received fine longitudinal stretch which was applied along the course of trapezius muscle followed by ultrasound. But in

our study superficial stretch was applied to the entire posterior muscle group.²²

Llamosas S. on Changes in neck mobility and pressure pain threshold levels following a cervical myofascial induction technique in pain-free healthy subjects. The results of this study concluded that the application of a cervical myofascial induction technique resulted in an increase in cervical flexion, extension, and left lateral-flexion, as a result myofascial release technique causes an improvement in range of motion.²³

According to Carol J. Manheim in his book of myofascial release manual stated that The Myofascial Arm Pull technique provides a sensation of a release which is magnified through the long lever of an extremity. He also stated that a gross stretch of an entire body area or an entire muscle group is always performed first to release the more superficial tightness and restrictions and to guide the therapist to the muscles that need specific attention The remaining large area stretches proceed from a gross stretch to a focused stretch of the muscles in the same body area.⁶ In this study it was also noted that approximately 90 seconds are required for the fascial network to respond to the slow gentle pressure applied to it and a fascial release can take anywhere between 3 to 5 minutes, sometimes longer. MFR treatment allows the dysfunctional fascia to return to its position of balance. This safe and gentle treatment results in removal of restrictions that prevent free movement as a result it helps to restore motion, relieves and eliminates the soft tissue pain.^{20,23}

TENS was used in the present study as a modality to relieve pain for radiculopathy the effect is been proved in previous studies that a combination of manual therapy technique along with a electrotherapy modality can be used in the treatment program. Literature has also stated

that TENS is considered to be a standard treatment for radiculopathy.

LIMITATION

The first limitation of this study is small sample size. A large sample size would have been selected in order to see a better effect of myofascial release in subjects with mechanical neck pain; the second limitation is a control group should have been made in order to see a comparative effect of myofascial release and transcutaneous electrical stimulator.

CONCLUSION

Thus the study concludes that gross MFR is effective in reducing mechanical neck pain along with referred pain in unilateral upper limb and improving functional abilities. However Future studies are recommended with a larger sample size and comparative study on gross myofascial release and TENS on mechanical neck pain.

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REFERENCES

- Misailidou V, Paraskevi, Anastasia B, Karagiannidis A, Godolias G. Assessment Of Patients With Neck Pain: A Review Of Definitions, Selection Criteria, And Measurement Tools. *Journal of Chiropractic Medicine*. 2010; 9: 49–59.
- Cagnie. B, Danneels. L Individual And Work Related Risk Factors For Neck Pain Among Office Workers: A Cross Sectional Study. *European Spine Journal*. 2007; 16:679–686
- S.M.McLean ,Taylour J, Ballassoubramanien T, Kulkarni M, Patekar P, Darne R, Jain V. Measuring Upper Limb Disability In Non-Specific Neck Pain: A Clinical Performance Measure. *International Journal of Physiotherapy and Rehabilitation*. 2010; 1(1): 44-52.
- Vos C, Verhagen A, Passchier J. Management Of Acute Neck Pain In General Practice: A Prospective Study. 2007; 57: 23-28
- Kron J. Myofascial Therapy. *Journal of Complementary Medicine*, 2006: 4-7
- Carol J. Manheim. *The Myofascial Release Manual*, Slack incorporated. 3rd edition, 2003: 40-50pp, 98-100pp.
- Ajimsha MS. Effectiveness Of Direct Vs Indirect Technique Myofascial Release In The Management Of Tension-Type Headache. *Journal of Body work and Movement Therapy*. 2011;15(4):431-5
- John Werenski. The Effectiveness Of Myofascial Release Techniques In The Treatment Of Myofascial Pain: A Literature Review. 2011: 2-20
- Jone B. Myofascial Release the Search for Excellence, *Integrated Myofascial Release Therapy*. 2007:18-20.
- Johnson M. Transcutaneous Electrical Nerve Stimulation. 2002: 259-282
- Reeve J, Menon D, Corabian P. Transcutaneous electrical nerve stimulation (TENS): a technology assessment. *International Journal of Technology Assessment*. 1996 ;12(2) 299-324
- Lenge.iCAHE Outcomes Calculator Musculoskeletal Version User Manual, International center of allied health evidence. 2010: 84-88pp.
- Green, B.N. A Literature Review of Neck Pain Associated with Computer Use: Public health implications. *Journal of the Canadian Chiropractic Association*. 2008: 161-167
- Mustafa Ahmed Prevalence and factors associated with neck, shoulder and low back pains among medical students in a Malaysian Medical College *BMC Research Notes*. 2013:1-7
- Therese N. A Prospective Study of Neck, Shoulder, and Upper Back Pain Among Technical School Students Entering Working Life. *Journal of Adolescent Health*. 2010 :488–494
- Gerwin RD. Classification, epidemiology, and natural history of myofascial pain syndrome. *Curr Pain Headache Rep*. 2001; 5:412-20.
- Ruth Duncan. What is Myofascial Release and How Does it Work? *Integrated Myofascial*

- Therapy. 2007; 18-20, available from: www.Myofascialrelease.co.uk
18. Lucy F, Ben D. Myofascial pain: a manual medicine approach to diagnosis and treatment. *The pain practitioner*. 2012; 22 (2):34-39
 19. Cummings M. Regional myofascial pain: diagnosis and management. *Best Prac Res Clin Rheumatol*. 2007;21(2):367-87.
 20. Salvi Shah, Akta Bhalara. Myofascial release. *International Journal of Health Sciences & Research*, 2012; 2(2):69-77
 21. Tozzi P, Bongiorno D. Fascial release effects on patients with non-specific cervical or lumbar pain. *Journal of Bodywork & Movement Therapies* Jan 2010: 1-12
 22. Patel Rakesh .Comparative study on effectiveness of myofascial release vs positional release technique in chronic upper trapezius spasm. Available from: www.rguhs.ac.in
 23. Llamosas S, Fernandez P, Rodríguez F. Changes in neck mobility and pressure pain threshold levels following a cervical myofascial induction technique in pain-free healthy subjects. *Journal of Manipulative physiotherapy*. 2009; 32(5):352-357.

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