International Journal of Health Sciences and Research
Vol.12; Issue: 4; April 2022
Website: www.ijhsr.org
Original Research Article *ISSN: 2249-9571*

Immediate Effect of Myofascial Release Technique on Current Mood State and Pain Intensity in Patient with Tension Type Headache

Khujistanazar Mohammadrafiq Momin[1], Gira Thakrar[2]

[1]Second Year MPT Student, JG College of Physiotherapy, Ahmedabad
[2]Senior Lecturer & PG Guide (MPT – Rehabilitation), JG College of Physiotherapy, JG Campus of Excellence, Opp. Gulab Tower, Sola Road, Ahmedabad – 380061

Corresponding Author: Khujistanazar Mohammadrafiq Momin

DOI: https://doi.org/10.52403/ijhsr.20220413

ABSTRACT

Background: Tension-type headache (TTH), which makes up the highest proportion of headaches. Myofascial trigger point (ATrP) which causes pain in the muscles of the back of the head. Paracranial muscle contracture and stress also played an important role in headache's physiology. This justifies the presence of paracranial pain hypersensitivity and decrease pain threshold. Studies suggest that a headache is associated with behavioral changes. Myofascial release technique (MFR) restores the length and health of restricted connective tissue, pressure can be relieved on pain sensitive structures such as nerves and blood vessels and also improve the mood state.
Purpose: To investigate whether the myofascial release technique shows an immediate effect on current mood state and pain intensity.
Methodology: 24 subjects with TTH of 20 to 30 years female participated in the study. All participants were screened by HSQ (headache screening questionnaire). 24 patients were divided into two groups. Experimental group received MFR for 30 to 45 min single session and control group did not receive any treatment. Outcome measure for the current mood state was BMIS (brief mood introspection scale) and NPRS (numeric pain rating scale) was used to determine pain intensity.
Results: Data was analysed by SPSS version 20. Independent Sample T-Test, Mann-Whitney U Test used for between group analyses. Result of the between-group analysis revealed a statistically significant difference ($p<0.05$) in both outcome measures BMIS and NPRS.
Conclusion: Myofascial release technique shows an immediate effect on reducing pain intensity and improving the current mood state.

Keywords: TTH, MFR, current mood state, pain intensity

INTRODUCTION

Through varies studies, headache is found to be one of the most prevalent worldwide public health problem. Three billion individuals were estimated to have a migraine or tension-type headache in the year 2016 there were 1.89 billion individuals suffered with (95% uncertainty interval [UI] 1·71–2·10) with tension-type headache. After dental caries and latent tuberculosis infection, tension-type headache turned to be the third most prevalent disorder. Headache is particularly burdensome in people with 15-49 years, but the effect is minute in 5-14 years or among 50-69 years and ≥70 year subjects[(1)]. In the year 2016 adult population with tension-type headache (TTH) has a 42 % mean global prevalence .[(2)] Headache is responsible for disability in nearly 3% of women and almost 1.5% in men.[(1)] Tension

type headache is more often present in women than men.

Headaches were formerly acknowledged by several different terms as, psychogenic headache, stress headache, psychomyogenic headache, and muscle contraction headache and so on. However, the term "tension type headache" (TTH) has been elected by the International Classification Headache diagnosis I (ICHD I) [(3)] in 1988 and recollected by ICHD II.[(4)]

Classification by IHS (International Headache Society) in ICHD-3, [(5)]of tension type headache, into four type 1) Infrequent Episodic Tension Type Headache, 2) Frequent Episodic Tension Type Headache, 3) Chronic Tension Type Headache And 4) Probable Tension Type Headache.

Infrequent Episodic Tension-Type Headache: Infrequent episodes of headache, commonly bilateral in location, pressing or tightening type and of mild to moderate intensity, lasting minutes to days. The pain does not get worse with daily physical activity and is not always present with nausea, despite that photophobia or phonophobia may be present. It typically occurs in almost the complete population and has little or no impact on the individual, in most instances; it doesn't need any attention from the medical profession.

Frequent Episodic Tension-Type Headache: Frequent episodes of headache, commonly bilateral in location, pressing or tightening type and of mild to moderate intensity, lasting minutes to days. The pain does not increase with daily physical activity and is not always associated with nausea, despite that photophobia or phonophobia may be present. Frequent episodic tension-type headache is more often related to significant disability, and sometimes warrants treatment with overpriced drugs.

Chronic Tension-Type Headache: It is a disorder developed by frequent episodic tension-type headache, which is present everyday or present with the very frequent episodes of headache, typically bilateral in location, pressing or tightening in type and of mild to moderate intensity, lasting from hours to days, or unremitting. The pain does not worsen with daily physical activity, but may be associated with mild nausea, photophobia or phonophobia.

Probable Tension-Type Headache: Presence of Tension type headache missing one of the features required to fulfill all criteria for a type or subtype of tension-type headache coded above, and not fulfilling criteria for another headache disorder.[(5)]

Peripheral activation or sensitization myofascial nociceptors could be responsible for increased pain sensitivity. Peripheral mechanism has mostly the major importance in episodic TTH. Sensitization of pain pathways in CNS (Central Nervous System) due to prolonged nociceptive stimuli from pericranial myofascial tissue mostly seem as responsible factor for the conversion of episodic TTH to chronic TTH.[(6)] Factors responsible for tension type headache are divided into two types which are; Muscular factors and Central factors.

Muscular factors: Considerable increased tenderness in pericranial muscle found in subject with tension type headache, when it is compared to the subjects with migraine type of headache and subject who are not suffering from TTH. In both gender as the frequency of headache increases there is simultaneous increase in tenderness. Female were more frequently affected with TTH than males, younger subjects has increased frequency than older individuals of TTH. Mechanical pressure pain sensitivity and tenderness found to be increased in female than males, and young individuals were more pain sensitive than older individuals. [(7)] Some studies also suggest that pain in TTH traditionally occur due to increased contraction of head and neck muscle. [(8)]

Central factors: The increased myofascial pain sensitivity in TTH also can be result of central factors, including sensitization of second-order neurons at the level of the spinal dorsal horn/trigeminal nucleus, sensitization of supraspinal neurons, and reduced antinociceptive activity from supraspinal structures. [(9)] Decreased

antinociceptive activity from supraspinal structures (i.e., deficient descending inhibition) also may be responsible for increased pain sensitivity in chronic TTH. (10)

Subject with headache has increased risk for mood and anxiety disorders compared to general population.(11) Furthermore, psychologic state which include anxiety or depression can affect in QOL (quality of life) and other clinical parameter in patient with CTTH(chronic tension type headache).(12) Patient with Chronic tension-type headache suffer from significant impairment of anger control. There is relationship between anger and duration of headache. (13)

There are many therapeutic approaches aimed attracting benign chronic and recurrent headaches such as TTH, including pharmacotherapy, cognitive therapy, relaxation therapy, biofeedback, and physical therapy.(14) Some manual therapies, such as soft tissue manipulation techniques, connective tissue treatment, transverse friction massage, and myofascial trigger point treatment, are being used for treatment of TTH.(15) Studies suggest that Myofascial Release Technique significantly more effective than slow stroking for decreasing the frequency of tension-type headache.(16)

Myofascial Release Technique includes application of low load and longer period of stretch to the myofascia, intend to restore the optimal length if this complex, decreased pain and improve function. (17) Myofascial release technique involves various rational responsible for reduction of pain including plastic, viscoelastic and piezoelectric properties of connective tissue. Myofascial manipulation is immediate tissue release felt by examiner, which occur due to mechanical properties of connective tissue. Fascia is densely innervated by mechanoreceptors which are stimulated by manual pressure stimulation of these receptors lower the sympathetic tonus. (18)

Many studies shows that myofascial release technique is effective method to relieve tension type of headache but, immediate effect of myofascial release technique need to be found. Therefore, purpose of the study was to investigate immediate effect of myofascial release technique on current mood state and pain intensity in patient with tension type headache.

METHODOLOGY

An experimental study was accomplished by 24 subjects with the tension-type headache. All participants were screened based on inclusion and exclusion criteria. Females with age of 20 to 30 years and presence of trigger point in suboccipital region were included. They all were screened by Headache Screening Questionnaire to determine tension type headache. Individuals with any history of medication before treatment, history of vertebrobasilar insufficiency, history of trauma in cervical region were excluded.

Samples were divided into two groups of 12 subjects each. The experimental group received myofascial release technique which involves upper trapezius release, trigger point pressure release of trapezius, gross stretch of posterior cervical musculature, cranial base release for 30 to 45 min single session and the control group did not receive any treatment.

The outcome measure for the current mood state was BMIS (Brief Mood Introspection Scale) include 16 items 8 positive and 8 negative. list of mood includes, lively, happy, sad, tired, caring, content, gloomy, jittery, drowsy, grouchy, peppy, nervous, calm, loving, fed-up, and active. Four mood states are included in it which is pleasant-unpleasant, arousal-calm, positive-tired, and negative-relaxed and each mood state scored. Score of each mood state determine by reverse scoring method on four pint response scale. (19)

Reliabilities for the pleasant-unpleasant of $\alpha = 0.83$, arousal calm mood scale's reliability lower at $\alpha = 0.58$, positive-tired of $\alpha = 0.77$, and negative-

relaxed α = 0.76. [20] and NPRS (numeric pain rating scale) was used to determine pain intensity. Test–retest reliability r = 0.96 and 0.95, respectively. [21]

RESULT

The present study was done to evaluate the immediate effect of myofascial release technique where a total of 24 patient participated in the study 12 patient in experimental group and 12 patients in the control group. The Statistical Analysis was done using the software: Statistical Package for Social Science (SPSS Version 20.0). Before applying a statistical test, data was screened for normal distribution. Outcome measurement was analyzed after the 30 to 45 min of single session.

Data was found to be half skewed and half normally distributed so both non parametric tests and parametric test were applied. Mean and SD were calculated for numeric data. Within the group and between the groups analysis of outcome measure was done after single treatment session.

Features	Experimental Group	Control Group
	Mean± SD	Mean± SD
Age(years)	22.75±1.29	22.91±2.06

In present study Pre value of positive-tired, Pre value of negative-relaxed, Difference value of NPRS was not normally distributed. Rest of the data of Experimental group was normally distributed. Difference values of arousal-calm, positive-tired, and negative-relaxed were not normally distributed, rest of the data of control group was normally distributed.

Pre and post data of within the group analysis was done using Paired T-Test, and Wilcoxon Matched Pair Signed Rank Test. Between groups analysis was done Using Independent Sample T-Test and Mann-Whitney U Test.

WITHIN GROUP ANALYSIS

Experimental group		Mean±SD	Wilcoxon test	P value
Positive-Tired	Pre	17±2.69	2.938	0.003
	Post	22±2.37		
Negative-Relaxed	Pre	17.08±4.05	-2.712	0.007
	Post	12.17±2.44		

Wilcoxon test was applied for within group analysis of experimental group Positive-Tired, Negative-Relaxed mood state showed statistically significant difference. ($p<0.05$)

Experimental group		Mean±SD	Paired sample T test	P Value
Pleasant-Unpleasant	Pre	36.50±7.24	-6.177	0.000
	Post	49.67±4.52		
Arousal-Calm	Pre	30±2.73	-3.249	0.008
	Post	33.08±2.54		
NPRS	Pre	5.33±0.98	18.762	0.000
	Post	1.33±0.89		

Paired Sample T-test was applied for within group analysis for Pleasant-Unpleasant, Arousal-Calm mood state and NPRS of experimental group showed statistically significant difference. ($p<0.05$)

Control group		Mean±SD	Paired sample T test	P Value
Pleasant-Unpleasant	Pre	33.42±5.35	2.028	0.067
	Post	32.83±5.70		
Arousal-Calm	Pre	30.92±3.53	0.233	0.820
	Post	30.75±2.38		
Positive-Tired	Pre	14.83±0.96	-2.171	0.053
	Post	14.75±1.05		
Negative-Relaxed	Pre	16.91±2.41	0.248	0.809
	Post	17.25±2.56		
NPRS	Pre	5.25±2.23	-1.773	0.104
	Post	5.75±2.59		

Paired Sample T-test was applied for within group analysis for Pleasant-Unpleasant, Arousal-Calm, Positive-Tired, Negative-Relaxed mood state and NPRS of Control group showed statistically significant difference. ($p<0.05$)

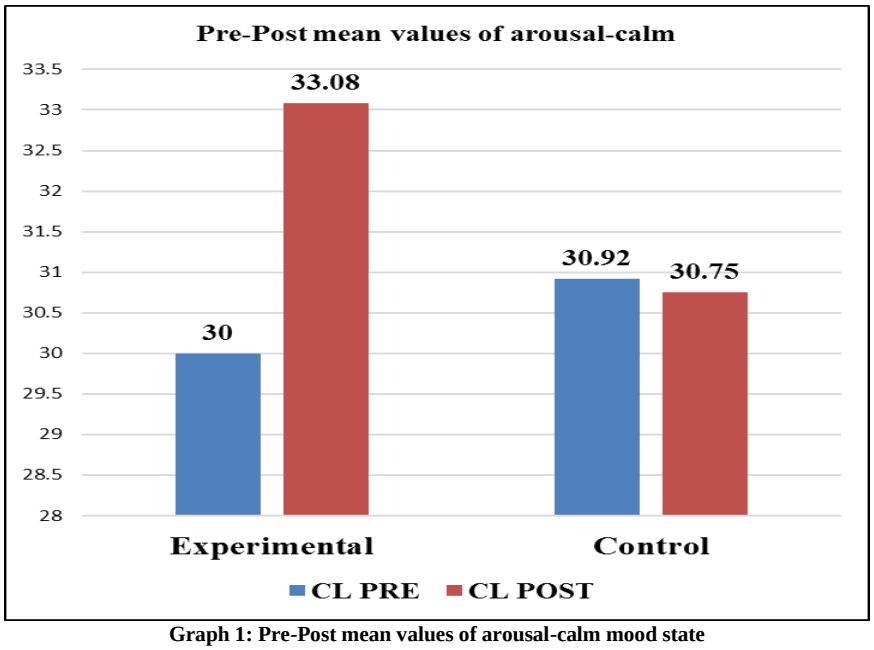
BETWEEN THE GROUPS ANALYSIS

		Mean± SD	Mann-Whitney	P Value
Arousal-Calm	Experimental group	3.08±3.28	27.5	0.083
	Control group	-0.16±2.48		
Positive-Tired	Experimental group	5±3.35	9	0.003
	Control group	-0.083±1.16		
Negative-Relaxed	Experimental group	-4.92±4.21	13	0.001
	Control group	0.33±0.65		
NPRS	Experimental group	4±0.74	0.000	0.000
	Control group	0.5±0.79		

Mann-Whitney Test was applied for between-group analysis for Arousal-Calm, Positive-Tired, Negative-Relaxed mood state and NPRS showed statistically significant difference. ($p<0.05$)

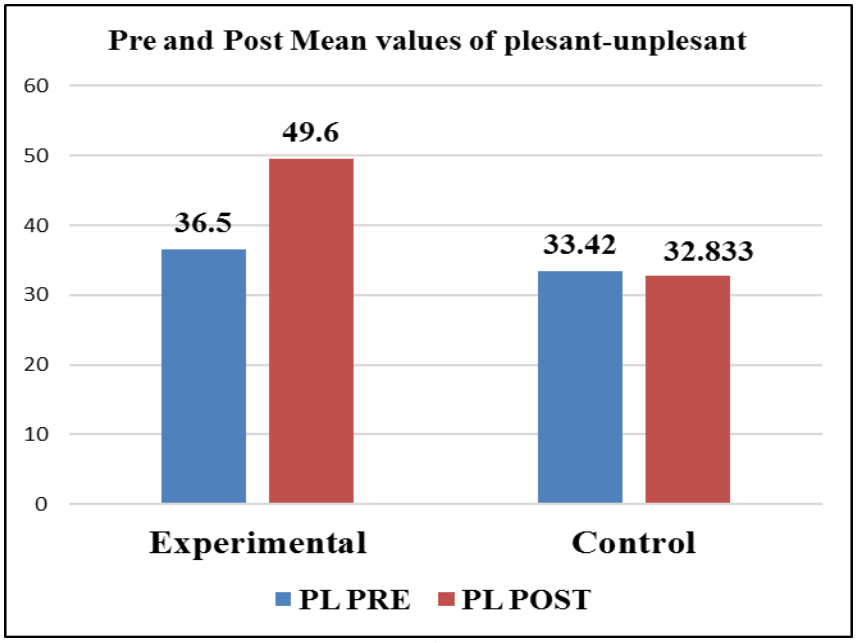
Control group		Mean± SD	Unpaired t test	P Value
Pleasant-Unpleasant	Experimental group	13.17± 7.38	6.393	<0.001
	Control group	-0.58± 0.99		

Unpaired t-test was applied for between-group analysis for Pleasant-Unpleasant mood state showed statistically significant difference. ($p<0.05$)



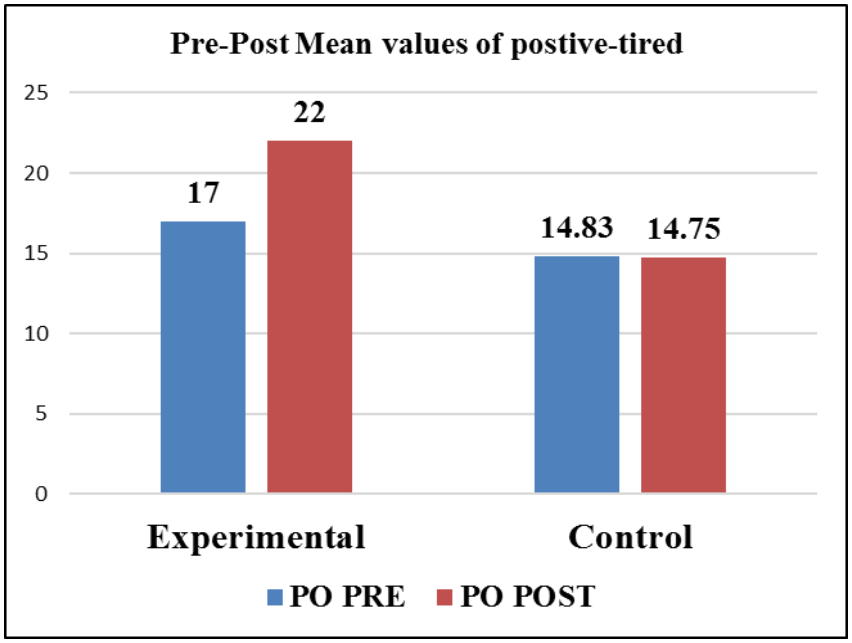
Graph 1: Pre-Post mean values of arousal-calm mood state

Interpretation: Changes in BMIS subscale pre intervention and post intervention values of arousal-calm. Statistically significant results were found in comparison of Pre-mean and Post-mean values Experimental Group ($p<0.05$) where Control Group showed no significant difference ($p>0.05$).



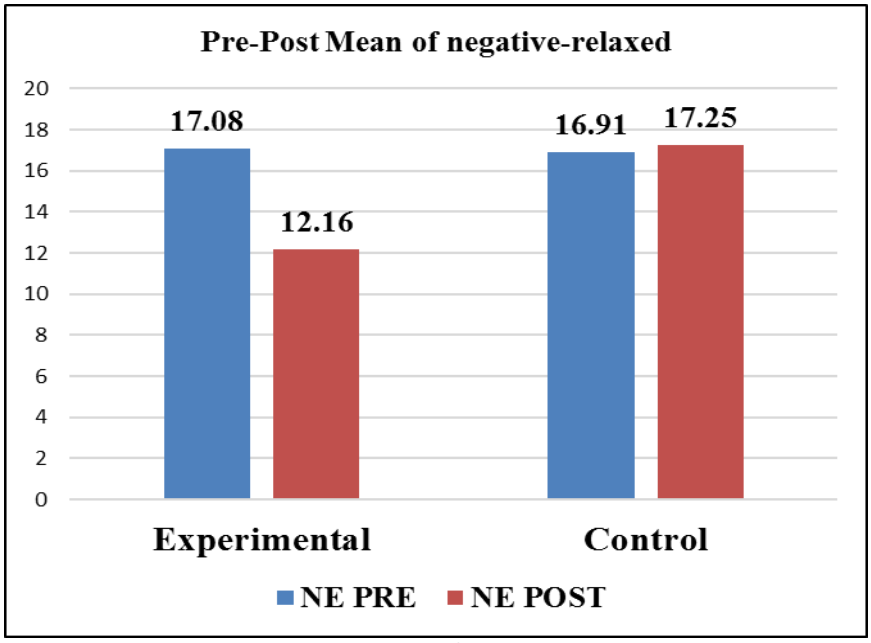
Graph 2: Pre-Post mean values of pleasant-unpleasant mood state

Interpretation: Changes in BMIS subscale pre intervention and post intervention values of pleasant-unpleasant. Statistically significant results were found in comparison of Pre-mean and Post-mean values Experimental Group ($p<0.05$) where Control Group showed no significant difference ($p>0.05$).



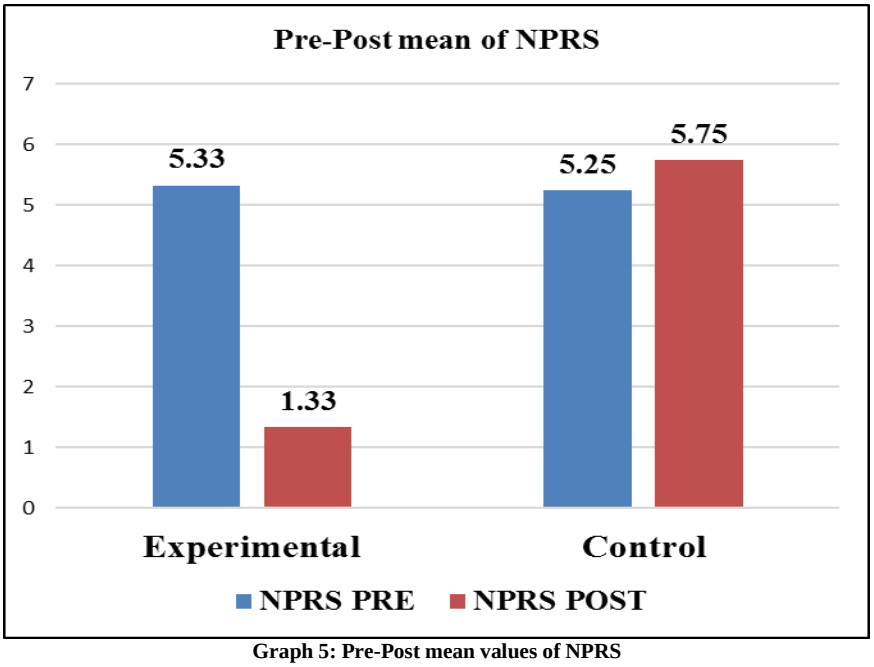
Graph 3: Pre-Post mean values of positive-tired mood state

Interpretation: Changes in BMIS subscale pre intervention and post intervention values of positive-tired. Statistically significant results were found in comparison of Pre-mean and Post-mean values Experimental Group where Control Group showed no significant difference ($p>0.05$).



Graph 4: Pre-Post mean values of negative-relaxed mood state

Interpretation: Changes in BMIS subscale pre intervention and post intervention values of negative-relaxed. Statistically significant results were found in comparison of Pre-mean and Post-mean values Experimental Group where Control Group showed no significant difference ($p>0.05$).



Graph 5: Pre-Post mean values of NPRS

Interpretation: Changes in BMIS subscale pre intervention and post intervention values of NPRS. Statistically significant results were found in comparison of Pre-mean and Post-mean values Experimental Group ($p<0.05$) where Control Group showed no significant difference ($p>0.05$).

DISCUSSION

The result of our study shows application of Single session of myofascial release technique which is aimed to improve the current mood state and pain intensity in a patient with tension-type headache. We found a significant effect of treatment on

both outcome measures. BMIS (Brief Mood Introspection Scale) all mood state shows improvement after single session of intervention. Scale determines mood states like Pleasent-unpleasent is a positive emotion in which individual mood changes from unpleasant to pleasant mood state, Arousal-calm is an emotion in which individual mood changes from negative arousal to positive calm, Positive-tired is an emotion in which individual mood changes from tense energy to calm tiredness and Negative-relaxed is a negative emotion in which individual mood changes from relaxed state to negative affect. In present study all mood state shows increase score after treatment session. Except the negative-tired mood state its score reduces because it's a negative mood state.

Albert F Morska et.al in their study found that Myofascial trigger point release led to immediately increase in cellular Metabolism which remains elevated for longer duration. There is increase in dialysate lactate and meagrely increase in dialysate glucose concentration, after 20 minute following trigger point release microvascular exchange was similarly increased. They concluded that Myofascial trigger point release helpful interventions designed to reduce MTrP contracture and pain. [22]

Physiological Mechanism by which technique work possibly associated with stimulation of central control mechanism[23,24] which may result in a reflex stimulation of descending inhibitory mechanisms.[24] It has following principle component which are periaqueductal grey matter, rostral ventral medulla and spinal dorsal horn after stimulation through Ascending tract stimulation reach to periaqueductal grey matter to the raphe nucleus descending pathway influences substantia gelatinosa. Monoaminoegic neurotransmitter such as noradrenaline and 5 hydroxytryptamine, which work on inhibitory interneuron of substantia gelatinosa of spinal cord. This pathway also activate spinal cord interneuron as encephalin which subsequently reduce pain transmission at spinal cord level.[25] However there are more than one mechanism which explain the effect of manual therapy.[26]

Arroyo-Morales M et. al in their study found that short-term effects after high intensity exercise which include myofascial release technique of various locations. The Myofascial release technique session differed from the placebo condition. It reduces tension-anxiety, lower anger hostility level. These changes may be associated with the ability of myofascial release technique to produce parasympathetic vegetative response associated with improvement in heart rate reserve volume and blood pressure. [27]

Myofascial release is useful technique to reduce musculoskeletal pain, it specifies by various theories, which are gate control theory, interpersonal attention, parasympathetic response of ANS (Autonomic Nervous System) and release of serotonin. Gait control theory suggest pressure which has faster conduction than pain, it interferes with painful stimulation transmission in brain and inhibit pain perception. Interpersonal attention in this theory include conscious awareness of human touch gives calming effect and reduces pain perception, its associated with stimulation of a parasympathetic response which reduce stress, depression, anxiety and pain. Serotonin release is helpful for inhibition of painful stimuli. [28]

Fernández-Pérez AM et.al study shows that myofascial technique such as, suboccipital muscle technique, deep cervical fascia technique, and compression of fourth intracranial ventricle. According to their results experimental group had a reduced anxiety state with reduced systolic blood pressure and heart rate. [29]

The result of present study found similar to previous studies that myofascial release technique improves the current mood state and pain intensity in a patient with tension-type headache immediately after single session of treatment.

CONCLUSION

Myofascial release technique shows an immediate effect on reducing pain intensity and improving the current mood state.

Limitation

Study includes mood state but personal and environmental factors can be associated with it were not considered.

Future recommendation

Future studies using 24 hour follow-up periods are needed to support the clinical relevance of the current findings.

ACKNOWLEDGEMENT

Author would like to thank all the participants for their cooperation in the completion of the study.

Conflict of Interest: None

Source of Funding: None

Ethical Approval: Approved

REFERENCES

1. Stovner LJ, Nichols E, Steiner TJ, Abd-Allah F, Abdelalim A, Al-Raddadi RM, Ansha MG, Barac A, Bensenor IM, Doan LP, Edessa D. Global, regional, and national burden of migraine and tension-type headache, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. The Lancet Neurology. 2018 Nov 1;17(11):954-76.
2. Stovner LJ, Hagen K, Jensen R, Katsarava Z, Lipton RB, Scher AI, Steiner TJ, Zwart JA. The global burden of headache: a documentation of headache prevalence and disability worldwide. Cephalalgia. 2007 Mar;27(3):193-210.
3. Headache Classification Committee of the International Headache Society. Classification and diagnostic criteria for headache disorders, cranial neuralgias and facial pain. Cephalalgia. 1988;8(7):1-96.
4. Headache Classification Subcommittee of the International Headache Society. The international classification of headache disorders. cephalalgia. 2004;24(1):9-160.
5. https://ichd-3.org/2-tension-type-headache/ 17 June 2019.
6. Bendtsen L, Fernández-de-la-Peñas C. The role of muscles in tension-type headache. Current pain and headache reports. 2011 Dec;15(6):451-8
7. Jensen R. Pathophysiological mechanisms of tension-type headache: a review of epidemiological and experimental studies. Cephalalgia. 1999 Jul;19(6):602-21.
8. Jensen R, Olesen J. Initiating mechanisms of experimentally induced tension-type headache. Cephalalgia. 1996 May;16(3):175-82.
9. Bendtsen L. Central sensitization in tension-type headache—possible pathophysiological mechanisms. Cephalalgia. 2000 Jun;20(5):486-508.
10. Langemark M, Bach FW, Jensen TS, Olesen J. Decreased nociceptive flexion reflex threshold in chronic tension-type headache. Archives of neurology. 1993 Oct 1;50(10):1061-4.
11. Baskin SM, Lipchik GL, Smitherman TA. Mood and anxiety disorders in chronic headache. Headache: The Journal of Head and Face Pain. 2006 Oct;46:S76-87.
12. Peñacoba-Puente C, Fernández-de-Las-Peñas C, González-Gutierrez JL, Miangolarra-Page JC, Pareja JA. Interaction between anxiety, depression, quality of life and clinical parameters in chronic tension-type headache. European Journal of Pain. 2008 Oct 1;12(7):886-94.
13. Perozzo P, Savi L, Castelli L, Valfrè W, Lo Giudice R, Gentile S, Rainero I, Pinessi L. Anger and emotional distress in patients with migraine and tension–type headache. The journal of headache and pain. 2005 Oct;6(5):392-9.
14. Bogaards MC, terKuile MM. Treatment of recurrent tension headache: a meta-analytic review. The Clinical journal of pain. 1994 Sep.
15. Fernández-de-Las-Peñas C, Alonso-Blanco C, Cuadrado ML, Miangolarra JC, Barriga FJ, Pareja JA. Are manual therapies effective in reducing pain from tension-type headache?: a systematic review. The Clinical journal of pain. 2006 Mar 1;22(3):278-85.
16. Ajimsha MS. Effectiveness of direct vs indirect technique myofascial release in the management of tension-type headache.

Journal of bodywork and movement therapies. 2011 Oct 1;15(4):431-5.
17. Barnes F.Barnes. Myofascial Release: The Search for Excellence Rehabilitative Services, Paoli, Pa. 1990 January 1.
18. Schleip R. Fascial plasticity–a new neurobiological explanation: Part 1. Journal of Bodywork and movement therapies. 2003 Jan 1;7(1):11-9.
19. Cavallaro RM, Bryan V, Mayer JD. A review and evaluation of an open-source mood assessment, the brief mood introspection scale. Manuscript in Preparation.
20. Mayer JD, Cavallaro R. Brief mood introspection scale (BMIS): Technical and scoring manual.
21. Ferraz MB, Quaresma MR, Aquino LR, Atra E, Tugwell P, Goldsmith CH. Reliability of pain scales in the assessment of literate and illiterate patients with rheumatoid arthritis. The Journal of rheumatology. 1990 Aug 1;17(8):1022-4.
22. Moraska AF, Hickner RC, Kohrt WM, Brewer A. Changes in blood flow and cellular metabolism at a myofascial trigger point with trigger point release (ischemic compression): a proof-of-principle pilot study. Archives of physical medicine and rehabilitation. 2013 Jan 1;94(1):196-200.
23. Wall PD. The dorsal horn. In: Wall PD, Melzack R, editors. Textbook of pain. Edinburgh: Churchill Livingstone, 2nd ed.; 2006. p. 125.
24. Wright A. Hypoalgesia post-manipulative therapy: a review of a potential neurophysiological mechanism. Manual therapy. 1995 Nov 1;1(1):11-6.
25. Heinricher MM, Tavares I, Leith JL, Lumb BM. Descending control of nociception: specificity, recruitment and plasticity. Brain research reviews. 2009 Apr 1;60(1):214-25.
26. Pickar JG. Neurophysiological effects of spinal manipulation. The spine journal. 2002 Sep 1;2(5):357-71.
27. Arroyo-Morales M, Olea N, Martinez M, Moreno-Lorenzo C, Daz-Rodrguez L, Hidalgo-Lozano A. Effects of myofascial release after high-intensity exercise: a randomized clinical trial. Journal of manipulative and physiological therapeutics. 2008 Mar 1;31(3):217-23.
28. Orizio C. Muscle fatigue monitored by the force, surface mechanomyogram and EMG. Biomechanics and biology of movement. 2000:409-33.
29. Fernández-Pérez AM, Peralta-Ramírez MI, Pilat A, Villaverde C. Effects of myofascial induction techniques on physiologic and psychologic parameters: a randomized controlled trial. The Journal of Alternative and Complementary Medicine. 2008 Sep 1;14(7):807-11.

How to cite this article: Khujistanazar Mohammadrafiq Momin, Thakrar G. Immediate effect of myofascial release technique on current mood state and pain intensity in patient with tension type headache. *Int J Health Sci Res.* 2022; 12(4): 110-119. DOI: *https://doi.org/10.52403/ijhsr.20220413*

******