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Impact of Muscle Energy Technique with and without Strain Counter Strain Technique on Individuals with Non-specific Neck Pain- A Prospective Comparative Study

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Abstract

Background: Neck pain is common and two common treatments for non-specific neck discomfort are Strain Counter Strain (SCS) and Muscle Energy Technique (MET). The purpose of this study is to evaluate how well MET and SCS work to treat non-specific neck pain. **Methods**: Sixty-two participants with non-specific. Neck discomfort was branched into two groups (A and B). Group "A" received MET with the SCS approach, while Group "B" received MET alongside traditional Physiotherapy. Interventions were administered three times a week for two weeks. Outcome measures such as the Numerical Pain Rating Scale (NPRS), Neck Disability Index (NDI) and Range of Motion (ROM) were assessed before and after each session and at the beginning and end of both weeks. **Result:** Pain, neck disability index and cervical range of motion all significantly improved in both groups. After the intervention, one week later and two weeks later, both groups' flexion and extension range of motion showed statistically significant improvements. At the end of the first or second week, there were no appreciable changes in the right-side lateral flexion, right-side rotation or left-side lateral flexion. Nonetheless, following one or two weeks of intervention, left-side rotation demonstrated a notable improvement. **Conclusion**: MET combined with SCS demonstrated superiority in reducing pain, alleviating cervical impairment and enhancing range of. motion of the cervical spine.

Keywords: Muscle Energy Technique, Non-Specific Neck Pain, Strain Counterstain Technique

1. Introduction

In today's technologically driven society, neck discomfort is the 4th most common cause of disability, primarily due to musculoskeletal disorders[1]. It is the 2nd most common Musculoskeletal issue, developing gradually and characterised by pain that is made worse by movements or postures that involve the cervical spine[2].

According to the Cochrane Review[3], simple neck pain without a known underlying illness is referred to as non-specific neck pain. Neck pain is categorised as acute if it lasts longer than four weeks, sub-acute if it lasts between four to six months, or chronic if it lasts for less than four months[4].

Non-specific neck pain may be experienced by 22% to 70% of people with a possible rise in prevalence[5]. This disorder tends to increase with age and is more common in women[6]. The symptoms are similar to whiplash-related disorders associated with Grades I-II[7]. Because of medical bills, lost productivity from work and compensation

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claims, neck pain places a heavy financial burden on individuals[8].

Non-specific neck pain is treated with manual techniques like Myofascial release, Proprioceptive Neuromuscular Facilitation, Muscle Energy Technique (MET), Strain- Counter-Strain (SCS) Technique and ischemic compression[9]. When paired with different manual techniques, multimodal non-pharmacological therapies- such as physiotherapeutic modalities like Interferential Therapy (IFT) therapy ultrasound, Transcutaneous Electrical Nerve Stimulator (TENS) and hot packs have shown promise[10,11].

The potency of the MET in lowering pain and improving the range of motion in people experiencing neck discomfort has drawn attention[8]. By isometrically contracting the impacted muscles, this method induces post-isometric relaxation in antagonistic muscle groups through reciprocal inhibition and autogenic inhibition[10,12]. The lack of sufficient data on the best interventions causes inconsistencies to endure despite an increase in research.

The relationship between MET and SCS in the treatment of low back pain has been investigated in recent research. In light of the paucity of research on the effectiveness of MET and SCS approaches in treating non-specific neck pain, this study attempts to evaluate their effects[13].

2. Methodology

According to the inclusion and exclusion criteria, sixty individuals, all between the ages of thirty and fifty, were included in the study. This research employs a prospective comparative study design. The study's main goal was to determine how well MET with SCS technique helps participants with non-specific neck pain. Its second goal was to find out how well MET with SCS technique and MET with conventional physiotherapy treatment help participants with non-specific neck pain function better. The MGM Physiotherapy Department, Chhatrapati Sambhaji Nagar conducted the study. The intervention was administered for two weeks with three 45-minute sessions each week. On December 11, 2019, the ethics committee of the institution approved the study. Signatures of all the participants on written informed consent were taken and they were all informed about the assessment and treatment protocol. The study ran for a full year following ethical approval.

3. Inclusion Criteria

- Participants with either gender with an age range between 30 to 50 suffering from non-specific neck pain.
- Participants who signed an informed consent form showing their willingness to participate in the study.

4. Exclusion Criteria

- Patients with intervertebral disc prolapse.
- Those with cervical spondylosis syndromes.
- Those with recent cervical fractures.
- Individual with vertebrobasilar insufficiency.
- One with chronic low back pain.
- Patients with compromised psychological conditions.

5. Procedure

5.1 The Muscle Energy Technique (Figure 1)

The MET was applied in accordance with Lewit's description. The method was as below.

- The hypertonic muscle was stretched to a point where resistance was barely noticeable or just short of pain.
- Between five and ten seconds, a submaximal contraction of the hypertonic muscle (between 10 and 20 percent) was carried out away from the barrier. The therapist put on resistance in the reverse direction of the patient's intended inhalation during the work.
- Once the patient completes the isometric contraction, a gentle stretch is applied to take up any remaining slack until the next barrier. The process was carried out twice or three times beginning at this new barrier.

5.2 Strain-Counter-Strain Technique (Figure 1)

- The Strain-Counter Strain technique was used in accordance with Lawrence H. Jones, D.O.'s instructions[14].

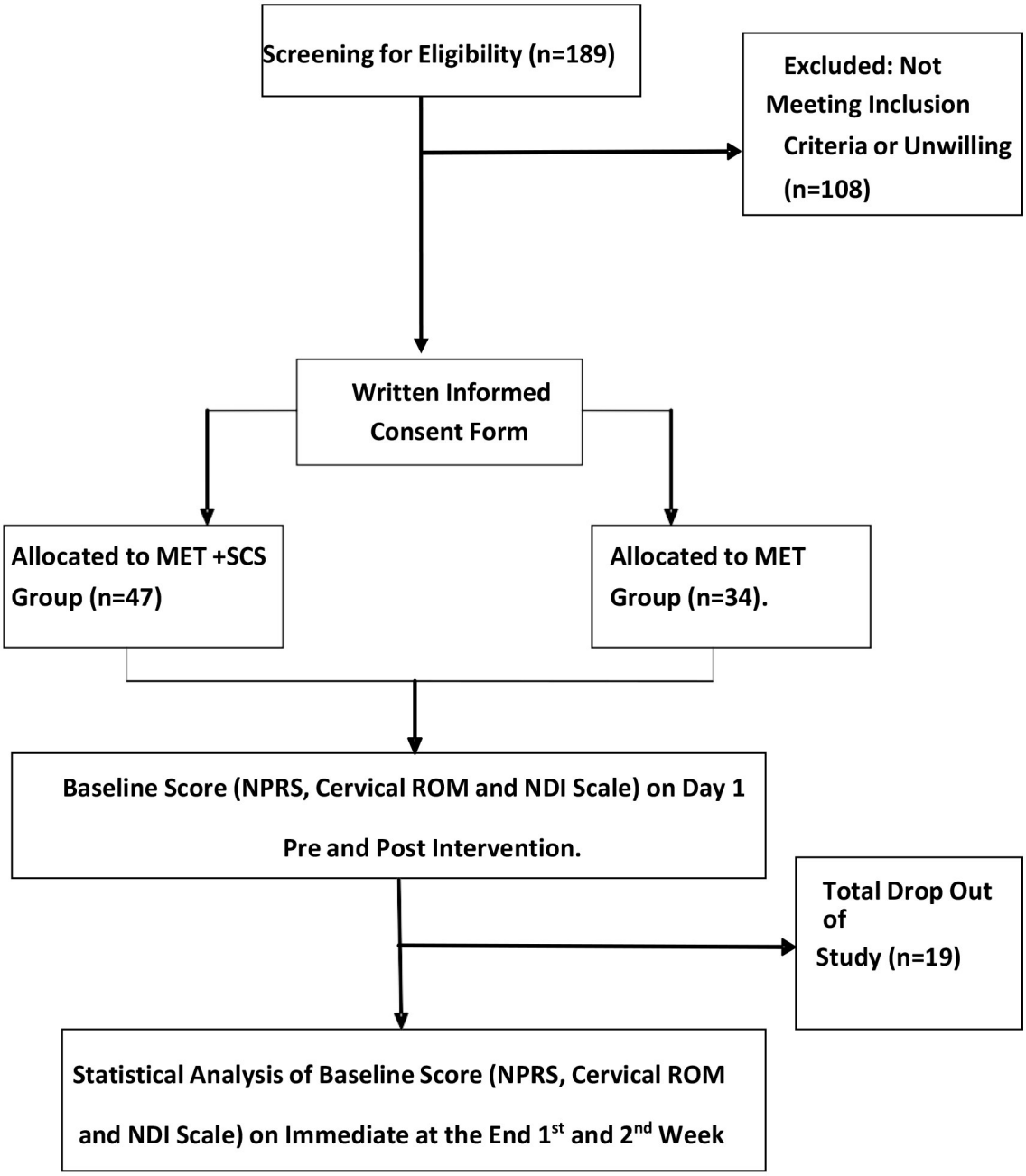

Figure 1. Flow Chart of the study.

- The following are the fundamental actions needed to execute Strain-Counter Strain (SCS) in any part of the body.
- Locate a Trigger Point.
- Measure the soreness with a pain scale.
- Position the patient in a way that will cause the least amount of discomfort at the TP while remaining passive and gentle. First, make an approximate estimate of the position and then adjust with tiny movement arcs. With a target of 100%, try to reduce tenderness by at least 70%.
- Hold the posture for ninety seconds while keeping an eye on the patient and TP.
- Coming back the patient to a neutral position in a passive manner.
- Recheck the TP for tenderness.

6. Outcome measures

6.1 Numerical Pain Rating Scale

Formerly the intervention, right after the first session and after the completion of 2 weeks, the NPRS was used to measure the intensity of pain. It shows moderate reliability, with a score of 0.67[15].

6.2 Range of Motion of Cervical Spine

A universal Goniometer was used to measure the range of motion before the intervention, right after the first session and at the conclusion of the 2-week intervention period with a 0.98 reliability score, it was very reliable[16].

6.3 Neck Disability Index

Earlier in the intervention, right after the first session and after 2 weeks, the degree of disability was evaluated using the Neck Disability Index. The maximum stated reliability is 0.88[17,18].

7. Statistical analysis

The gathered level of significance was set at $p<0.05$. The data was entered into Microsoft Excel and analysed using SPSS version 24.0 and Graph Pad Prism 7.0. The data's normalcy was evaluated with the Chi-square Test. All of the variables were found to be normally distributed using the Z-test for the difference between the two means and the student-paired t-test. Consequently, a parametric test was used to analyse this data. For quantitative variables, the mean and standard deviation were computed while proportions were computed for categorical variables. Additionally, the data was displayed visually using bar diagrams, pie charts and other formats. To compare the outcomes of the two groups an unpaired t-test was utilised. A paired t-test was used to conclude whether there was a significant difference between the pre-and post-treatment interpretations. The P-value was verified at the 5% significance level.

8. Result

In order to compare the effects of the strain counterstain technique and the muscle energy technique on neck pain and the Neck Disability Index (NDI) in individuals with nonspecific neck pain, this study was conducted. Due to this, the lead investigator collected data for each outcome measure as soon as possible during the first week after the intervention and after the second week. Statistics were done using the SPSS software trial version 24. P values less than 0.05 indicated that the results were significant. Students' paired and unpaired t-tests were used as significance tests.

9. Demographics

The study included 62 people with nonspecific neck discomfort who met the inclusion and exclusion criteria. The average age and Body Mass Index (BMI) of the participants in the strain-counter-strain group were 40.60±7.76 years and 26.05±2.48 kg/m^2, respectively. The average age and BMI of the participants in the MET without strain counter strain group were 44.60±6.61 years and 25.92±1.63 kg/m^2, respectively. The mean difference across all data was statistically not significant ($p>0.05$). The baseline clinical and demographic data were comparable.

10. Pain Relief (Figure 2)

The intragroup associations showed a significant change immediately after the intervention, after one week and at the end of two weeks ($p<0.05$), but there was no significant difference in the intergroup comparison on pain reduction ($p>0.05$).

11. Neck Disability Index (Figure 3)

After one and two weeks of intervention, there was a significant improvement in the NDI score between groups ($p<0.001$). The intergroup comparison also showed a statistically significant improvement ($p<0.001$).

12. Active Cervical Range of Motion

The rotations, side flexions, extensions and active cervical flexions were all measured with the Universal Goniometer. The ranges were measured one week after the intervention, at the start of the second week and right after. Intergroup comparisons at the end of the second week showed statistically significant improvement in all of the previously mentioned ranges.

Table 1. Intragroup and Intergroup comparisons of active cervical range of motion

Acrom	Immediate	Group 1 Mean ± Standard Deviation 1st Week	2nd Week Immediate		Group 2 Mean ± Standard Deviation 1st Week	2nd Week
Flexion	50.64±	59.64 ±	69.64±	40.40 ±	40.80 ±	41.40 ±
	12.35	12.67	11.67	11.39	11.38	11.80
Extension	41.54 ±	49.22 ±	59. ± 7.90	31.60 ±	34.00 ±	37.40 ±
	8.37	7.75		1.51	7.84	8.64
Right Side	34.38 ±	39.55± 5.87	43.00 ±	25.20 ±	30.6 ± 5.85	32.60 ±
Flexion	7.68		3.18	5.21		6.76
Left Side	29.00 ±	37.00 ±	42.00 ±	28.40 ±	29.40 ±	31.8 ± 5.49
Flexion	8.21	6.70	2.73	9.39	7.925	
Right Side Rotation	56.2 ± 8.78 65.6 ± 8.01 73.00 ± 2.12			42.20 ± 6.72	51.8 ± 7.19 63.20 ± 4.81	
Left Side Rotation	48.40 ± 60.40 ± 70.2 ± 3.56 48.2 ± 6.94 58.4 ± 5.41 66.40 ± 7.02 6.69 2.24					
P Value	Intragroup					
Flexion	p = 0.0001 p = 0.0010 p = 0.0001			p = 0.05	p = 0.71 p = 0.41	
Extension	p = >0.021 p = 0.001 p = 0.001			p = 0.21	p = 0.27 p = 0.073	
Right Side Flexion	p = 0.005	p = 0.018	p = 0.016	p = 0.19	p = 0.031	p = 0.022
Left Side Flexion	p = 0.005	p = 0.005	p = 0.003	P = 0.033	p = 0.022	p = 0.013
Right Side Rotation	p = 0.001	p = 0.001	p = 0.003	p = 0.001	p = 0.001	p = 0.001
Left Side Rotation	p = 0.005 p = 0.0001 p = 0.0001			p = 0.005	p = 0.0001 p = 0.0001	
Intergroup (Group1 and 2)						
Flexion	p = 0.85	p = 0.25	p = 0.046			
Extension	p = 0.94	p = 0.13	p = 0.010			
Right Side Flexion	p = 0.37	p = 0.46	p = 0.046			
Left Side Flexion	p = 0.91	p = 0.14	p = 0.006			
Right Side Rotation	p = 0.022	p = 0.021	p = 0.003			
Left Side Rotation	p = 0.96	p = 0.61	p = 0.20			

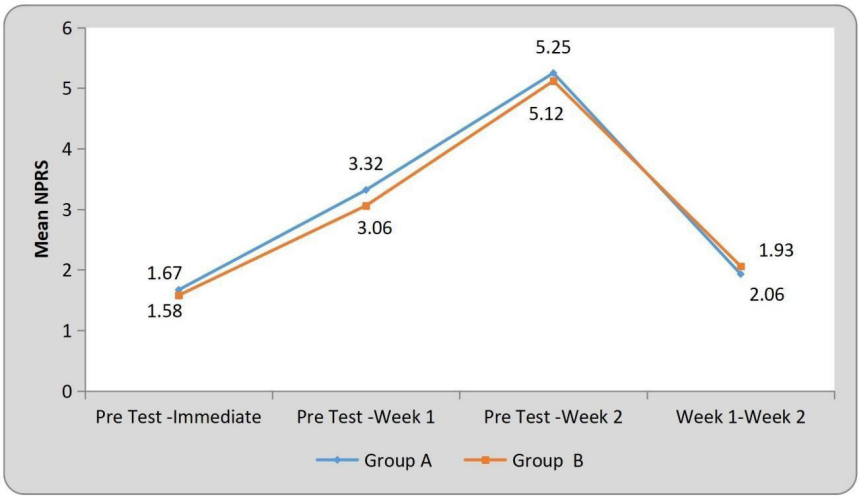

Figure 2. Comparison of mean difference in NPRS week 1 and week 2 in two groups.

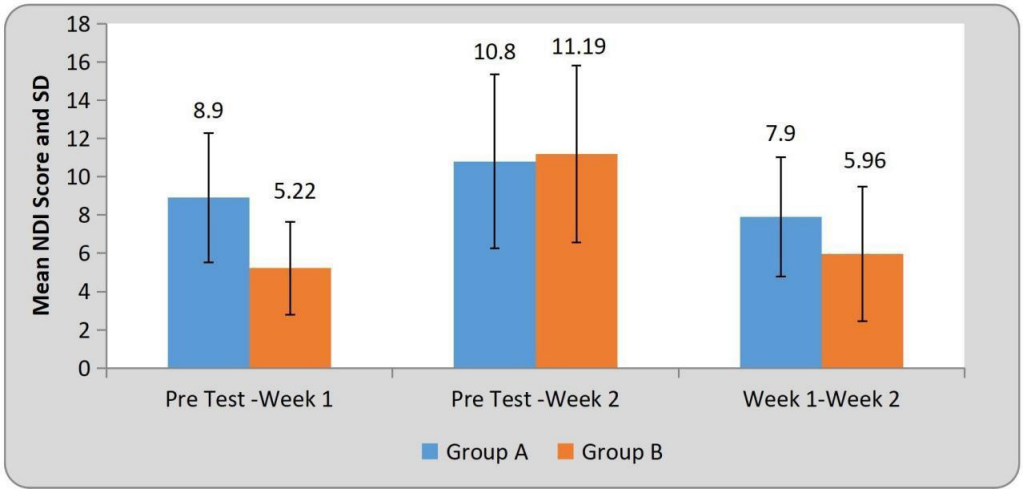

Figure 3. Comparison of mean difference in NDI week 1 and week 2 in two groups.

The outcomes of the range of motion tests for flexion, extension, left side flexion and right side flexion were found to be more significant following two weeks of intervention, but not on the first day of the intervention or the first week following it, according to an intragroup comparison. The baseline characteristics of the two groups are summarized in Table 1. The BMI, weight, height, age and gender of the two groups did not differ noticeably from one another. (P is more than 0.05).

13. Discussion

For patients with nonspecific neck pain, every cervical spine therapy administered to groups A and B in the current trial improved every outcome measure. However, compared to Group B, Group A displayed a greater overall improvement.

13.1 Pain Relief

In the current study, both groups had a significant decrease in pain severity at one and two weeks. Possible explanations for the decrease in pain intensity include proprioceptive stimulation, the release of tension from tender spots, a localised increase in blood flow that removes substances causing pain and most importantly the post-isometric relaxation that occurs after isometric contraction[19,20].

Additional possibilities include changes in neurophysiology or adaptations to neuromuscular activity through the muscle spindle. Similar findings from a study by F. Okhovatian *et al.*, showed that soft tissue massage therapy was effective in reducing pain at the pain pressure threshold[21,22].

13.2 Active Cervical Range of Motion

According to the research, discomfort, muscular spasms, muscle shortening, joint stiffness, etc., can all contribute to reduced range of motion. Whenever pain limits mobility, it must be facilitated. The soft tissue techniques used in this investigation, such as the muscle energy and strain counterstain techniques, may have contributed to this increase in active cervical range of motion by reducing pain and increasing cervical range of motion[19-21].

13.3 Neck Disability Index

Reduced range of motion or inhibition brought on by pain, which prevents general function out of fear of exacerbating the pain are some of the postulated reasons for impairments. The results of this study show a discernible improvement in the range of motion and a reduction in discomfort which may have helped to improve function as measured by the neck disability index[15,23].

14. Conclusion

This study discovered that the treatment protocols MET with SCS and MET as well as conventional physiotherapy, which includes exercises and moist heat, were both effective. However, MET with the SCS group performed better than MET with conventional physiotherapy in

terms of lowering pain intensity, enhancing cervical impairment and increasing cervical range of motion.

15. Limitation

- Small sample size.
- Small period of intervention.
- Specific to non-specific neck pain.
- Smaller range of age.

16. Acknowledgment

The present study is a full-length study (extension of a previously published pilot study) for partial fulfilment of the first author's post-graduate degree course.

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17. References

1. Price J, Rushton A, Tyros I, Heneghan NR. Effectiveness and optimal dosage of resistance training for chronic non-specific neck pain: A protocol for a systematic review with a qualitative synthesis and meta-analysis. BMJ Open. 2019; 9(2):e025158. https://doi.org/10.1136/bmjopen-2018-025158 PMid:30782926 PMCid: PMC6398773.
2. Coulter ID, Crawford C, Vernon H, Hurwitz EL, Khorsan R, Booth MS, Herman PM. Manipulation and mobilisation for treating chronic nonspecific neck pain: A systematic review and meta-analysis for an appropriateness panel. Pain Physician. 2019; 22(2):E55. https://doi.org/10.36076/ppj/2019.22.E55
3. Gross A, Miller J, D'Sylva J, Burnie SJ, Goldsmith CH, Graham N, Haines T, Brønfort G, Hoving JL. Manipulation or mobilisation for neck pain. Cochrane Database of Systematic Reviews. 2010(1). https://doi.org/10.1002/14651858.CD004249.pub3
4. Binder AI. Cervical spondylosis and neck pain. Bmj. 2007; 334(7592):527-31. https://doi.org/10.1136/bmj.39127.608299.80 PMid:17347239 PMCid:PMC1819511.
5. Jahre H, Grotle M, Smedbråten K, Dunn KM, Øiestad BE. Risk factors for non-specific neck pain in young adults. A systematic review. BMC Musculoskeletal Disorders. 2020; 21(1):1-2. https://doi.org/10.1186/s12891-020-03379-y PMid:32517732 PMCid: PMC7285427.
6. Fejer R, Kyvik KO, Hartvigsen J. The prevalence of neck pain in the world population: A systematic critical review of the literature. European Spine Journal. 2006; 15:834-48. https://doi.org/10.1007/s00586-004-0864-4 PMid:15999284 PMCid:PMC3489448.
7. Binder A. The diagnosis and treatment of nonspecific neck pain and whiplash. Europa Medicophysica. 2007; 43(1):79-89.
8. Thomas E, Cavallaro AR, Mani D, Bianco A, Palma A. The efficacy of muscle energy techniques in symptomatic and asymptomatic subjects: A systematic review. Chiropractic and Manual Therapies. 2019; 27(1):35. https://doi.org/10.1186/s12998-019-0258-7 PMid:31462989 PMCid: PMC6710873.
9. Wong CK. Strain counterstain: Current concepts and clinical evidence. Manual Therapy. 2012; 17(1):2-8. https://doi.org/10.1016/j.math.2011.10.001 PMid:22030379.
10. Coulter ID, Crawford C, Vernon H, *et al.* Manipulation and mobilisation for treating chronic nonspecific neck pain: A systematic review and meta-analysis for an appropriateness panel. Pain Physician. 2019; 22(2):E55-E70. https://doi.org/10.36076/ppj/2019.22.E55
11. López-de-Uralde-Villanueva I, Beltran-Alacreu H, Fernández-Carnero J, La Touche R. Pain management using a multimodal physiotherapy program including a biobehavioral approach for chronic nonspecific neck pain: A randomized controlled trial. Physiotherapy Theory and Practice. 2020; 36(1);45-62. https://doi.org/10.1080/09593985.2018.1480678 PMid:29889599.
12. Bailey E, Heneghan NR, Cassidy NJ, Falla D, Rushton AB. Clinical effectiveness of manipulation and mobilisation interventions for the treatment of non-specific neck pain: Protocol for a systematic review and meta-analysis. BMJ Open. 2020; 10(10):e037783. https://doi.org/10.1136/bmjopen-2020-037783 PMid:33040001 PMCid: PMC7549443.
13. Jahre H, Grotle M, Smedbråten K, Dunn KM, Øiestad BE. Risk factors for non-specific neck pain in young adults. A systematic review. BMC musculoskeletal disorders. 2020; 21(1):1-2. https://doi.org/10.1186/s12891-020-03379-y PMid:32517732 PMCid: PMC7285427.
14. Thomas E, Cavallaro AR, Mani D, Bianco A, Palma A. The efficacy of muscle energy techniques in symptomatic and asymptomatic subjects: A systematic review. Chiropr Man Therap. 2019; 27:35. https://doi.org/10.1186/s12998-019-0258-7 PMid:31462989 PMCid: PMC6710873.
15. Kim D, Lee YJ, Park KS, *et al.* The effectiveness and cost-effectiveness of Motion Style Acupuncture Treatment (MSAT) for acute neck pain: A multi-centre randomised controlled trial. Medicine (Baltimore). 2020; 99(44):e22871. https://doi.org/10.1097/MD.0000000000022871. PMid:33126334 PMCid: PMC7598807.

16. Tejera DM, Beltran-Alacreu H, Cano-de-la-Cuerda R, *et al*. Effects of virtual reality versus exercise on pain, functional, somatosensory and psychosocial outcomes in patients with non-specific chronic neck pain: A randomized clinical trial. Int J Environ Res Public Health. 2020;17(16):5950. https://doi.org/10.3390/ijerph17165950 PMid:32824394 PMCid: PMC7460130.
17. Binder AI. Neck pain. BMJ Clin Evid. 2008; 1103.
18. Binder A. The diagnosis and treatment of nonspecific neck pain and whiplash. Europa medicophysica. 2007; 43(1):79.
19. Phadke A, Bedekar N, Shyam A, Sancheti P. Effect of muscle energy technique and static stretching on pain and functional disability in patients with mechanical neck pain: A randomised controlled trial. Hong Kong Physiotherapy Journal. 2016; 35:5-11. https://doi.org/10.1016/j.hkpj.2015.12.002 PMid:30931028 PMCid: PMC6385145
20. Thomas E, Cavallaro AR, Mani D, Bianco A, Palma A. The efficacy of muscle energy techniques in symptomatic and asymptomatic subjects: A systematic review. Chiropr Man Therap. 2019; 27:35. https://doi.org/10.1186/s12998-019-0258-7 PMid:31462989 PMCid: PMC6710873.
21. Jalal Y, Ahmad A, Rahman AU; Irfanullah, Daud M; Aneela. Effectiveness of muscle energy technique on cervical range of motion and pain. J Pak Med Assoc. 2018; 68(5):811-3. PMID: 29885191.
22. Krupa Tank D, Prachi Choksi, Priyanka Makwana. To study the effect of muscle energy technique versus mulligan snags on pain, range of motion and functional disability for individuals with mechanical neck pain: A comparative study. Int J Physiother Res 2018; 6(1):2582-7. https://doi.org/10.16965/ijpr.2017.253
23. Patel VD, Eapen C, Ceepee Z, Kamath R. Effect of muscle energy technique with and without strain-counterstrain technique in acute low back pain-A randomised clinical trial. Hong Kong Physiotherapy Journal. 2018; 38(01):41-51. https://doi.org/10.1142/S1013702518500051 PMid:30930578 PMCid: PMC6385547