

**Original Article**

Immediate Effect of Theragun Vs Transcutaneous Electrical Nerve Stimulation in Treating Non-Specific Neck Pain Among Young Adults

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ABSTRACT

The study used Theragun and TENS on non-specific neck pain among young adults. The study was conducted to evaluate the immediate effect of the two modalities for the treatment of non-specific neck pain. Evaluation was made according to the results to determine which treatment is more effective. **Objectives:** To find out the immediate effects of Theragun vs transcutaneous electrical nerve stimulation (TENS) in treating non-specific neck pain among young adults. **Methods:** This quasi-experimental study was conducted on 60 young adults with non-specific neck pain, equally divided by gender and assigned to two groups: Group 1 received TENS therapy, and Group 2 received Theragun treatment. Pain was assessed using the Visual Analog Scale (VAS), and cervical range of motion was measured with a universal goniometer pre- and post-intervention. Data were analyzed using SPSS version 22.0. **Results:** A total of 60 participants were included in the trial of TENS and Theragun, with 30 in each group, equally distributed between males and females. The significance value of Theragun was found to be 0.699 (>0.05), and that of TENS intervention was 0.223 (>0.05). **Conclusion:** The study concluded that both treatments are effective individually in treating non-specific neck pain, but as a comparative study, there were no significant differences observed.

INTRODUCTION

The neck is the anatomical region situated between the clavicle and mandible, containing vital structures that separate the head from the thorax and support essential functions, including respiration, speech, swallowing, metabolic regulation, and the connection of the brain with the cervical spine and circulatory and lymphatic networks. The neck clinically is separated into the anterior (front) triangle and the posterior (back) triangle. The anterior triangle can further be divided into the submental triangle, the submandibular triangle, the carotid triangle, and the muscular triangle each harboring important muscles, nerves, blood vessels, and lymph nodes that are important

in surgery and clinical practice. As an example, the carotid triangle contains the common carotid artery, internal jugular vein, vagus nerve, and other important neural structures, emphasizing the importance of caution during interventions in this region. The posterior triangle, bounded by the sternocleidomastoid, trapezius, and clavicle, includes the occipital and subclavian (supraclavicular) triangles and contains nerves, vessels, and muscles such as the spinal accessory nerve, roots of the brachial plexus, and subclavian artery, which are also clinically significant. The neck muscles, including the platysma, sternocleidomastoid, trapezius, digastrics,



mylohyoid, geniohyoid, sternohyoid, sternothyroid, thyrohyoid, and omohyoid, coordinate complex head and neck movements, maintain posture, and facilitate functions such as swallowing and respiration. Each muscle has specific origins, insertions, innervation, and vascular supply, making them essential in both physiological and clinical contexts [1]. Neck pain is one of the most common musculoskeletal disorders in the world, with a given yearly prevalence of 42–67% among young adults. Research has noted that the prevalence of pain lasting more than 90 days has risen by 21% in the population between 2006 and 2016. Disability and poor quality of life are related to neck pain and decreased productivity, resulting in a significant economic burden due to healthcare costs and work loss. Young adulthood, defined as the period from 18 to 29 years of age, represents a critical time for establishing long-term health behaviors. During this phase, individuals experience significant physiological, social, and occupational transitions, making them vulnerable to musculoskeletal disorders, including neck pain [2]. Non-specific neck pain (NCNP), characterized by pain in the lateral and posterior neck without identifiable pathology, often resolves spontaneously but can become chronic if symptoms persist beyond 12 weeks. Contributing factors include biomechanical strain, postural deficits, and psychosocial stressors such as anxiety and depression, which influence pain perception and functional outcomes [3, 4]. Recent non-pharmacological interventions for neck pain include percussive therapy using handheld devices such as the Theragun and transcutaneous electrical nerve stimulation (TENS). Theragun delivers repetitive mechanical vibrations to soft tissues, enhancing blood and lymphatic flow, reducing lactic acid, relaxing muscles, and increasing range of motion, thereby improving recovery, performance, and overall well-being [5–7]. TENS is a non-invasive electrotherapeutic modality that delivers electrical impulses through the skin to modulate nociceptive transmission, providing analgesia for various musculoskeletal and neuropathic conditions [8–10]. Both modalities offer accessible, self-administered, and complementary approaches for managing neck pain, with potential benefits for functional outcomes and quality of life. According to the literature review, both Theragun and TENS have shown beneficial effects alone in the treatment of non-specific neck pain, so it is necessary to identify if they have a better impact when given in combination in order to achieve quick pain relief and early recovery. Non-specific neck pain is common among young adults, causing discomfort and limiting daily activities. While TENS and Theragun have been used to reduce pain and improve cervical mobility, there is limited research directly comparing their immediate effects in this population. Most

studies focus on chronic pain or long-term outcomes, leaving a gap in evidence for quick, effective interventions. Comparing these modalities can help clinicians choose the most effective treatment for rapid pain relief and improved neck function, preventing chronic symptoms and enhancing daily performance.

This study aims to find out the immediate effects of the Theragun vs transcutaneous electrical nerve stimulation in treating non-specific neck pain among young adults.

METHODS

This quasi-experimental study was conducted in various colleges, universities, hostels, and gyms in Karachi to compare the short-term effects of Theragun and TENS therapy on pain and cervical range of motion in participants with non-specific neck pain. The study duration was October to December 2024. A total of 60 participants aged 18–26 years (30 per group) were included, with equal representation of male and female. The sample size was determined based on feasibility and previous similar studies. Participants were assigned to the two groups using simple random sampling, but full randomization with allocation concealment was not performed. Inclusion criteria comprised willingness to participate, presence of non-specific neck pain, and age between 18 and 26 years, while exclusion criteria included fracture or healing fracture of the neck, dermatitis, any known cervical pathology, cancer or tumor of the cervical spine, and unwillingness to participate. All the participants had given informed consent. The extent of pre- and post-treatment pain was assessed using the Visual Analog Scale (VAS), and cervical range of motion was measured with a goniometer. Data were compared in SPSS version 22.0. The Isra University granted ethical approval, and all participant information was kept confidential, with permission obtained for the use of data in research and publication.

RESULTS

The age distribution of participants is shown. In the Theragun group, most participants were 24 years old (26.7%), with ages fairly evenly distributed between 20 and 26 years. In the TENS group, ages 23 and 25 were the most frequent (30% each), indicating a higher concentration in these age groups compared to the more balanced Theragun group (Table 1).

Table 1: Age Distribution of Participants in Theragun and TENS Groups

Age (Years)	Theragun (n=30)	TENS (n=30)
20	4 (13.3%)	1 (3.3%)
21	5 (16.7%)	3 (10.0%)
22	5 (16.7%)	3 (10.0%)
23	5 (16.7%)	9 (30.0%)

24	8 (26.7%)	3 (10.0%)
25	2 (6.7%)	9 (30.0%)
26	1 (3.3%)	1 (3.3%)

This study presents the gender distribution of participants. Both groups had equal representation of males and females, with 15 males and 15 females in each group (50% each), ensuring no gender bias in participant selection (Table 2).

Table 2: Gender Distribution of Participants

Gender	Theragun (n=30)	TENS (n=30)
Male	15 (50.0%)	15 (50.0%)
Female	15 (50.0%)	15 (50.0%)

The duration of neck pain for both groups is shown. In the Theragun group, 20% of participants experienced pain for 1-2 weeks, 43.3% for 3-4 weeks, and 36.7% for more than 4 weeks. In the TENS group, the majority (66.7%) had pain for more than 4 weeks, indicating longer-standing symptoms in this group (Table 3).

Table 3: Duration of Neck Pain Among Participants

Duration	Theragun (n=30)	TENS (n=30)
1-2 Weeks	6 (20.0%)	1 (3.3%)
3-4 Weeks	13 (43.3%)	9 (30.0%)
>4 Weeks	11 (36.7%)	20 (66.7%)

Results show the mean pain scores before and after interventions. Both groups demonstrated a reduction in pain, though the changes were not statistically significant ($p>0.05$) (Table 4).

Table 4: Pre- and Post-Pain Scores (VAS) in Theragun and TENS Groups

Group	Pre-Pain (Mean \pm SD)	Post-Pain (Mean \pm SD)	p-Value
Theragun	3.5667 \pm 1.19434	1.5333 \pm 0.73030	0.699
TENS	3.9333 \pm 1.14269	1.9333 \pm 0.73968	0.223

The findings present the pre- and post-intervention mean values for cervical range of motion. No significant differences were observed between the two groups in all measured directions ($p>0.05$) (Table 5).

Table 5: Pre- and Post-Range of Motion in Theragun and TENS Groups

Movement	Theragun Pre \pm SD	TENS Pre \pm SD	Theragun Post \pm SD	TENS Post \pm SD	p-Value
Flexion	59.37 \pm 10.91	54.23 \pm 12.63	68.00 \pm 10.79	70.10 \pm 11.75	0.555
Extension	59.40 \pm 11.27	62.47 \pm 11.08	69.40 \pm 8.90	69.63 \pm 9.42	0.481
Left Lateral Flexion	38.93 \pm 5.02	39.00 \pm 5.04	44.53 \pm 2.36	43.27 \pm 4.81	0.560
Right Lateral Flexion	39.33 \pm 5.85	37.37 \pm 5.20	43.90 \pm 3.05	42.10 \pm 4.54	0.098
Left Rotation	69.97 \pm 12.38	65.37 \pm 13.17	77.40 \pm 9.49	73.50 \pm 10.37	0.729
Right Rotation	67.03 \pm 11.25	65.30 \pm 11.56	76.73 \pm 9.72	72.67 \pm 9.68	0.697

DISCUSSION

This research examined the acute consequences of two modalities, Theragun and transcutaneous electrical nerve stimulation (TENS), on the management of non-specific neck pain in young adults. The first aim was to compare the efficacy of the two interventions and to find out whether one form of modality results in better acute pain relief. Understanding these effects is clinically important for achieving rapid symptom reduction and promoting early recovery. Our findings indicate that both Theragun and TENS significantly reduced neck pain individually. The pre-treatment pain scores were slightly higher in the TENS group than in the Theragun group. Post-treatment, pain levels decreased in both groups. However, comparative analysis revealed no statistically significant differences between the two modalities ($p>0.05$). These results align with Anjana et al. who reported no significant differences between TENS and hot water bottle therapy for immediate neck pain relief, although both interventions were effective compared to placebo [11]. Similarly, previous studies observed significant pain reduction following Theragun application on trigger points in frequent mobile phone users, supporting the efficacy of percussive therapy for musculoskeletal discomfort [12]. Range of motion (ROM) outcomes further support the effectiveness of both interventions. Pre- and post-treatment measures for cervical flexion, extension, lateral flexion, and rotation did not show significant differences between the Theragun and TENS groups. Although minor improvements were observed in both groups, these changes were not statistically significant, indicating that both modalities have comparable immediate effects on cervical mobility. This is consistent with Camilleri et al. who demonstrated that TENS effectively improves cervical flexion and rotation but does not significantly affect lateral flexion [13]. The standard error values for pre- and post-treatment pain were slightly lower for the Theragun group compared to the TENS group, suggesting marginally higher precision in pain reduction with Theragun. However, the difference is minimal and does not translate into clinical significance. These findings highlight that both treatments are safe, non-invasive, and provide immediate symptomatic relief, making them suitable options for young adults with non-specific neck pain [14]. Previous studies offer additional context. Díaz-Pulido et al. reported that high-intensity laser therapy provided superior pain relief compared to TENS in patients with temporomandibular joint disorders, indicating that while TENS is effective, other modalities may offer enhanced results in specific conditions [15]. Similarly, percussive therapies like Theragun have shown promising results in reducing muscle stiffness and pain in various musculoskeletal regions [16-18]. Other studies also

confirm that both TENS and percussive therapy provide immediate analgesic effects without adverse events [19, 20]. Only a single session of each modality was administered, preventing assessment of long-term or cumulative effects.

CONCLUSIONS

The study concluded that both TENS and Theragun individually reduce non-specific neck pain; however, no significant difference was observed when comparing the two modalities. Future research is recommended to include a larger sample size, explore additional treatment modalities, and incorporate multiple treatment sessions to better evaluate their effectiveness.

Authors Contribution

Conceptualization: FH

Methodology: MU, KTU

Formal analysis: SAW

Writing review and editing: SA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

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