

Effect of Instrument Assisted Soft Tissue Mobilization on Patients with Chronic Mechanical Neck Pain: A Review Article

Fatma A. Shalaby*, Ragia M. Kamel, Sahar A Abdallah

Physical Therapy, Basic Science Department, Faculty of Physical Therapy, Cairo University, Egypt (12511)

*Corresponding author: Fatma A. Shalaby, E-mail: Fatma311ahmed@gmail.com, Mobile: 01050366830

ABSTRACT

Background: Mechanical neck pain (MNP) is characterized by pain originating from the cervical spine's musculoskeletal structures, such as muscles, ligaments, facet joints, or intervertebral discs. It is typically aggravated by movement or sustained posture and relieved by rest, without signs of nerve root involvement or serious underlying pathology. Mechanical neck pain influences forty-five to fifty-four % of the all-general community eventually during their lives and can come about extreme inability. Individuals suffering from MNP typically undergo traditional physical therapy protocols aimed at enhancing pain, range of motion and function.

Aim of study: Is to review the effect of instrument assisted soft tissue mobilization on pain intensity, cervical range of motion and functional status on patients with chronic mechanical neck pain.

Conclusion: Instrument assisted soft tissue mobilization shows a great improvement in pain intensity, the cervical range of motion, and functional status on patients with chronic mechanical neck pain.

Keywords: Instrument assisted soft mobilization, Mechanical neck pain, Arabic neck disability index.

INTRODUCTION

Physical therapists treat neck discomfort, a common musculoskeletal condition, all around the world. In terms of years spent with a disability, it is among the most common complaints. Between 10% and 20% of people have neck discomfort overall, while between 10% and 50% of people get new neck pain ⁽¹⁾. Between 45 and 54 percent of the general population may experience mechanical neck pain at some point in their lives, which can result in severe disability ⁽²⁾.

With no underlying significant pathology, mechanical neck pain (MNP) is a common musculoskeletal ailment that is defined by discomfort that comes from the muscles, ligaments, intervertebral discs, and facet joints that support the cervical spine. It is one of the most prevalent causes of impairment in adults and is frequently made worse by prolonged postures or repetitive cervical movements. According to epidemiological research, neck pain is still a major global health concern that significantly increases the number of years spent disabled and limited in one's ability to operate ⁽³⁾.

According to the Clinical Practice Guideline (CPG), central and/or unilateral neck discomfort, limited cervical range of motion (ROM), neck pain that is replicated at end ranges of ROM, and restricted cervical and thoracic segmental mobility are typical indications of mechanical neck pain ⁽⁴⁾.

Neck pain has a major impact on patients' social, emotional, and physical well-being. It can significantly limit daily activities such as driving, sleeping, exercising, and typing on a computer. Long-term neck pain is often associated with emotional misery, a worse quality of life, and decreased productivity at work. Anxiety, despair, and fear-avoidance behavior are

examples of psychosocial consequences that might exacerbate disability and complicate recovery ⁽⁴⁾.

Using specialized stainless-steel tools, instrument aided soft tissue mobilization (IASTM) is a manual therapy technique used to identify and treat soft tissue dysfunction, including chronic inflammation, scar tissue, and myofascial limitations. By encouraging tissue remodeling and enhancing mobility and functionality, the objective is to trigger a healing response ⁽⁵⁾.

IASTM is said to use specialized tools to identify and treat soft tissue dysfunctions by applying lubricant and sweeping controlled mechanical pressure. It is believed that IASTM seeks to improve tissue mobility, promote the body's healing processes, and reduce discomfort. It can raise the pressure pain threshold (PPT), which will lessen pain. It can encourage fluid to leave the fascia and raise its water content through the super compensatory effect, which will increase range of motion and flexibility. It can encourage fibroblast activation and proliferation, which will aid in the healing of injured soft tissues and restore function ⁽⁶⁾.

Clinical impact of instrument assisted soft tissue mobilization on mechanical neck pain management

Instrument assisted soft tissue mobilization mechanism of action:

One popular skilled myofascial method used in sports medicine and the treatment of musculoskeletal disorders is instrument-assisted soft tissue mobilization. IASTM therapy can remodel and repair soft tissues by inducing a localized inflammatory response that releases growth factors and cellular mediators. Collagen fix and

recovery are triggered by the IASTM's assistance with fibroblast enrollment and connective tissue redesigning by severe fibrosis re-ingestion ⁽⁷⁾.

Effect of instrument assisted soft tissue mobilization on pain intensity:

Numerous physiological and mechanical factors may contribute to pain reduction, according to studies on IASTM's capacity to alleviate pain. By activating mechanoreceptors in the soft tissues that have been treated, the approach modifies pain perception by means of the gate control theory ⁽⁸⁾. Additionally, it causes the skin and fascia to mechanically deform, which lowers the activity of small-fiber neurons that transmit pain and produces an extra analgesic effect ⁽⁹⁾.

In 2022, **Mostafa et al.** ⁽¹⁰⁾ randomly divided 30 patients with mechanical neck pain between the ages of 25 and 40 into two equal groups and assessed the impact of IASTM. While Group (B) only received traditional therapy, Group (A) received traditional therapy combined with the IASTM technology. Both groups' pain levels significantly decreased, according to the results, however the IASTM group's improvement was greater than the control group's. The authors ascribed this improvement to the improved blood circulation, myofascial adhesion release, and local tissue healing stimulus brought about by the IASTM's mechanical scraping actions.

The results of IASTM and post-isometric relaxation using muscle energy technique (MET) were also compared in 2023 by **Patel et al.** ⁽¹¹⁾ in 42 patients who had upper trapezititis, which is frequently linked to persistent mechanical neck discomfort. Although both groups' pain levels significantly improved, the IASTM group's pain decrease was more pronounced. The technique's capacity to lessen fascial constraints, enhance tissue circulation, and lessen nociceptive input from the treated muscles was associated with the improvement.

In 2024, **Bostan et al.** ⁽¹²⁾ compared the effects of exercise therapy alone and exercise in conjunction with IASTM in a trial including 48 patients with chronic mechanical neck pain. Both groups saw a considerable decrease in pain, according to the data, with the IASTM combination group experiencing a larger reduction. According to the authors, the reduction in pain may be the result of enhanced tissue flexibility and mechanical breakdown of fibrotic adhesions, which lessen the tension on the cervical region's pain-sensitive structures.

In 2024, **Halim et al.** ⁽¹³⁾ examined 90 patients with persistent, nonspecific neck pain to assess the effects of IASTM, integrated neuromuscular inhibition technique (INIT), and conventional therapy. While there was no discernible difference between the IASTM and INIT groups, the study did find that both techniques were

superior to conventional therapy in terms of lowering the severity of pain. The IASTM tool's mechanical pressure may have improved soft tissue mobility, released muscular tension, and activated local healing responses, all of which contributed to the pain reduction.

Overall, a combination of mechanical and neurophysiological actions can account for the decrease in pain that occurs after IASTM treatment. In order to modulate pain and enhance patient comfort, the technique helps to break down fascial limitations, promote local circulation, reduce ischemia, and stimulate sensory receptors ⁽¹²⁾.

Effect of instrument assisted soft tissue mobilization on range of motion:

Research on the use of IASTM has demonstrated that, primarily through its effects on soft tissue extensibility and the removal of myofascial limitations, it considerably improves cervical range of motion (ROM) in patients with persistent mechanical neck pain. Mechanical stimulation, which encourages collagen realignment, improves tissue elasticity, and increases joint mobility by decreasing adhesions and muscular tightness, is credited with the improvement mechanism ⁽¹⁴⁾.

The impact of IASTM in conjunction with traditional therapy versus traditional therapy alone was examined in 2022 by **Mostafa et al.** ⁽¹⁰⁾ in 30 patients with persistent mechanical neck pain who were between the ages of 25 and 40. Cervical range of motion improved in both groups, but the IASTM group's rise was noticeably larger. The improvement was ascribed to improved soft tissue pliability and fascial release, which allowed for more flexible cervical movement and less mechanical constraint.

Elsharkawy et al. ⁽¹⁵⁾ examined 56 patients with persistent, nonspecific neck pain in 2025 and compared IASTM, muscle energy technique (MET), and conventional therapy. Cervical flexion, extension, and rotation were significantly improved in both the IASTM and MET groups; however, the IASTM group's gains were greater. The authors attributed this improvement to increased local blood perfusion and improved tissue extensibility, which resulted in more cervical muscular flexibility.

Aly et al. ⁽¹⁶⁾ compared IASTM with trigger point release in 2023 while examining 40 patients who had mechanical neck discomfort linked to upper trapezius myofascial trigger points. Although there was no statistically significant difference between the groups, both groups showed notable improvements in cervical lateral flexion and rotation both after treatment and at follow-up. Smoother joint motion was made possible by enhanced neuromuscular relaxation and decreased myofascial tension.

Increased collagen fiber mobility, fibrotic adhesion disruption, and the restoration of normal fascial glide may be the causes of the overall improvement in cervical range of motion seen in these investigations, which results in improved movement efficiency. Furthermore, increased active cervical spine movement is made possible by improved neuromuscular coordination and decreased pain inhibition after IASTM⁽¹⁶⁾.

Effect of instrument assisted soft tissue mobilization on functional status:

Research on how well instrument-assisted soft tissue mobilization (IASTM) works to improve functional status in patients with persistent mechanical neck pain has shown some encouraging results. IASTM's ability to promote tissue extensibility, decrease fascial adhesions, and restore normal soft tissue movement may account for the improvement in functional ability. Better functional activities are made possible by these biomechanical alterations, which also result in less pain, greater range of motion, and enhanced muscle function. Furthermore, IASTM encourages collagen realignment and fibroblast proliferation, which may strengthen the soft tissues' mechanical characteristics and improve cervical function in general⁽¹³⁾.

In 2023, **Patel *et al.***⁽¹¹⁾ examined 42 patients with upper trapezititis and compared IASTM with post-isometric relaxation utilizing the muscle energy technique (MET). Although both groups' functions significantly improved, the IASTM group's improvement was more pronounced. In order to assist muscular relaxation and improve functional performance during cervical movement, the authors ascribed this improvement to the disintegration of myofascial adhesions and increased local perfusion.

In 2023, **Bostan *et al.***⁽¹²⁾ looked at 48 patients with persistent mechanical neck pain to compare the effects of exercise therapy alone with exercise plus IASTM. Pain and function improved in both groups, but the results were better when IASTM and exercise were combined. Increased soft tissue flexibility, improved muscular activation, and improved deep neck flexor endurance were linked to the improvement in functional status. These factors are crucial for preserving postural stability and functional movement.

In 2023, 33 college students with persistent mechanical neck discomfort were compared between IASTM and myofascial release therapy (MRT) by **Shewail *et al.***⁽¹⁷⁾. No discernible difference was observed between the two groups, however both methods markedly enhanced pain, function, and pressure pain threshold. IASTM restored optimal functional performance by improving circulation,

reducing soft tissue tension, and regulating muscle activation, according to the authors themselves.

In 2025, **Elsharkawy *et al.***⁽¹⁵⁾ compared the effects of muscle energy technique (MET) and instrument-assisted soft tissue mobilization (IASTM) on patients with persistent, nonspecific neck discomfort. For four weeks, forty individuals were divided into two equal groups at random and given either MET or IASTM therapies. Both groups' pain intensity, range of motion, and functional disability significantly improved after the intervention, according to the results; however, the IASTM group's functional status, as determined by the Neck Disability Index (NDI), improved more. The authors proposed that increased collagen remodeling, better tissue extensibility, and the restoration of ideal neuromuscular control could be the causes of the IASTM group's superior functional recovery.

IASTM's combined mechanical and neuromuscular effects may be responsible for the overall improvement in functional status that occurs after the procedure. By increasing muscle performance, decreasing pain-related inhibition, and improving soft tissue extensibility, the treatment enhances postural control and the capacity to carry out daily tasks with less discomfort^(16,17).

CONCLUSION

The results of this review suggest that instrument-assisted soft tissue mobilization may have a positive effect on cervical range of motion, functional status, and pain severity.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Competing interests

The authors declare that they have no competing interest.

REFERENCES

1. **Baumann A, Youngquist M, Curtis D *et al.* (2023):** Utilization of clinical practice guideline interventions in the conservative management of mechanical neck pain. *Cureus*,15(2): e34794.
2. **Gull M, Khalil W, Jaffar M *et al.* (2021):** Prevalence of mechanical neck pain among university students: observational study. *Pak J Med Health Sci.*, 15(6):1963.
3. **Hoy G, Protani M, De R *et al.* (2014):** The epidemiology of neck pain. *Best Pract Res Clin Rheumatol.*, 24(6):783–92.
4. **GBD 2021 Neck Pain Collaborators (2024):** Global, regional, and national burden of neck pain, 1990–2020, and projections to 2050: a systematic analysis of the Global Burden of Disease Study 2021. *Lancet Rheumatol.*, 6(3):e142-55.

5. **Kim D, Cho M, Park Y *et al.* (2015):** Effect of an exercise program for posture correction on musculoskeletal pain. *J Phys Ther Sci.*, 27(6):1791-4.
6. **Tang S, Sheng L, Wei X *et al.* (2025):** The effectiveness of instrument assisted soft tissue mobilization on pain and function in patients with musculoskeletal disorders: a systematic review and meta-analysis. *BMC Musculoskelet Disord.*, 26:257.
7. **Sharma R (2022):** Application of instrument-assisted soft tissue mobilization in frozen shoulder – a review article. *SALT J Sci Res Healthc.*, 2(1):17-9.
8. **Bakar Y, Tamer S (2020):** The effectiveness of instrument-assisted soft tissue mobilization on pain and function: a review. *J Bodyw Mov Ther.*, 24(3):451-7.
9. **Hammer I, Pfefer T (2005):** Treatment of a case of subacute lumbar compartment syndrome using the Graston technique. *J Manipulative Physiol Ther.*, 28(3):199-204.
10. **Mostafa S, Abdelatif N, Salah Z *et al.* (2022):** Effect of instrument assisted soft tissue mobilization on mechanical neck pain: a randomized controlled trial. *Turk J Physiother Rehabil.*, 32(3).
11. **Patel M, Soni M (2023):** Effect of IASTM versus MET on pain, cervical range of motion and functional disability in patients with upper trapezititis: an interventional comparative study. *Int J Sci Res.*, 12(5).
12. **Bostan F, Kaya D (2024):** Comparison of the effectiveness of instrument-assisted soft tissue mobilization and stretching–strengthening exercises in chronic neck pain: a randomized controlled trial. *J Exerc Rehabil.*, 20(4):226-34.
13. **Halim M, ElSayed D, Mohammed A *et al.* (2024):** Comparison of instrument assisted soft tissue mobilization and integrated neuromuscular inhibition technique on chronic neck pain. *Bull Fac Phys Ther.*, 31(2):75-82.
14. **Laudner G, Compton D, McLoda A *et al.* (2014):** Acute effects of instrument-assisted soft tissue mobilization on range of motion, strength, and pressure pain threshold in the lower extremity. *J Strength Cond Res.*, 28(1):155-60.
15. **Elsharkawy M, Ahmed S, Gabr A *et al.* (2025):** Comparative study between instrument-assisted soft tissue mobilization and muscle energy technique on chronic nonspecific neck pain. *Bull Fac Phys Ther.*, 30(1):23-31.
16. **Aly M, Mahmoud M, Hassan M *et al.* (2023):** Immediate effects of instrument-assisted soft tissue mobilization and trigger point release on cervical range of motion. *J Phys Ther Sci.*, 35(6):467-73.
17. **Shewail A, Hassan M, El-Sayed D *et al.* (2023):** Effect of instrument assisted soft tissue mobilization versus myofascial release on pain and function in chronic mechanical neck pain. *Phys Ther Rehabil J.*, 29(2):88-95.