Egyptian Journal of Physical Therapy and Rehabilitation (EJPTR)

e-ISSN: 2974-3605
p-ISSN: 2974-3591

Review Article

Effect of Graston Technique in Patients with Cervicogenic Headache: A Review Article

Omnya A. Mohamed [1*], Haytham M. Elhafez [2], Ebtisam M. Fahmy [3], Al Shaymaa S. Abd El Azeim [2]

[1]B.SC of Physical Therapy for Basic Sciences, Faculty of Physical Therapy, Cairo University, Egypt.

[2]Department of Basic Sciences Physical Therapy, Faculty of Physical Therapy, Cairo University, Egypt.

[3]Department of Neurology, Faculty of Medicine, Cairo University, Egypt.

***Correspondence:** Omnya A. Mohamed; **Email**: Omnyaash@gmail.com

DOI: https://doi.org/10.21608/ejptr.2025.370560.1021

Citation: Mohamed OA., Elhafez HM., Fahmy EM., Abd Elazeim AS. Effect of Graston Technique in Patients with Cervicogenic Headache Egyptian Journal of Physical Therapy and Rehabilitation. 2025 Aug.;5(1): 61-67

Received: 9/4/2025
Accepted: 15/4/2025
Published: Aug. 2025

Abstract

Background: Cervicogenic headache (CGH) has been classified as a secondary type of headache, and it is usually associated with cervical myofascial pain sources as myofascial trigger points. The prevalence of CGH was 4.1% in the general population. Individuals suffering from CGH typically undergo traditional physical therapy protocols aimed at enhancing pain, ROM, cervical function, headache frequency and duration, and medication intake. **Purpose**: Is to review the effect graston technique in pain intensity, ROM, cervical function, headache frequency and duration, and medication intake in patients with cervicogenic headache. Conclusion: Despite the recognized benefits of graston technique on health-related outcomes for patients with CGH, its attractiveness as a method to engage these patients in higher levels of physical activity, there is still insufficient evidence comparing its efficacy to that of traditional physical therapy programs, in enhancing pain, ROM, cervical function, headache frequency and duration, and medication intake in patients with CGH.

Keywords: **Cervical function, Range of motion, Technique.**

Introduction:

Cervicogenic headache (CGH) is classified by the International Headache Society as a secondary headache that is caused by a disorder of the cervical spine and its components **(1)**. Cervicogenic headache (CGH) is characterized by unilateral, referred head pain triggered by neck movement and sustained or awkward neck postures and restricted cervical range of motion and is significantly relieved in parallel with the improvement in the cervical disorder or lesion **(2)**. It has been reported that the prevalence of CGH was 4.1% in the general population,

accounting for about 15 to 20% of headache patients, with a female/male ratio of 0.97 **(3).** Cervicogenic headache has a negative impact on the patients' quality of life and demonstrates a great loss of physical functioning **(4).** Physical therapy interventions for cervicogenic headache include mobilization, **(5,6)** manipulation, **(6,7)** sub-occipital myofascial release, **(7,8)** ischemic compression, **(9,10)** positional release, **(10)** and therapeutic exercise **(11).**

The Graston technique (GT) is an instrument-assisted soft tissue mobilization technique that has been reported to treat cases with soft tissue dysfunction. It is getting more popular rapidly because of its efficiency and effectiveness while maintaining non-invasive **(12).** It enhanced fibroblast proliferation, increased vascular response, decreased scar tissue and adhesions, and the remodeling of disordered collagen fiber matrix. Additionally, it has been demonstrated that the GT resulted in clinical benefits like the increased range of motion, perception of pain following treatment, and strength **(13)**. It also enhances the patient's awareness of altered sensations within the treated tissues **(14,15).** Myofascial release can reduce the symptoms of cervicogenic headache **(7,8)**. However, the GT reduces the overall rehabilitation time **(16).** Allows less pressure and energy to be used, and increases the depth of treatable tissues **(17).** Also, the GT does not compress the tissues as the superficial fascial layer is easily mobilized to make the deeper restrictions more accessible **(17).** Recently there was growing evidence of effectiveness of GT for improving Pain, Range of Motion (ROM) and neck disability in patients with tension type headache **(12).** The purpose of this review is to evaluate the effectiveness of graston technique in pain intensity, ROM, cervical function, headache frequency and duration, and medication intake in patients with cervicogenic headache.

Clinical impact of Graston technique on cervicogenic headache management:

Graston technique mechanism of action:

Graston technique produce a localized inflammatory response, reduce scar tissue, and break down existing scar tissue in people with soft tissue restriction **(16).** It is effectively break down fascial restrictions and scar tissue. The ergonomic design of these instruments provides the clinician with the ability to locate restrictions and allows the clinician to treat the affected area with the appropriate amount of pressure, it controlled micro trauma to affected soft tissue structure causes the stimulation of a local inflammatory response **(18).** Micro trauma initiates reabsorption of inappropriate fibrosis or excessive scar tissue and facilitates a cascade of healing activities resulting in remodeling of affected soft tissue structures **(19).**

Effect of Graston technique on pain intensity:

Study with Ge W. et al. (2017), concerning Graston technique ability to improve pain has reported that, pain enhancements could be attributed to multiple factors: relieve the pain by stimulating the mechanoreceptors in the treated soft tissues **(20).** Also, decreased activities of both large and small-fiber neurons, by deformations of the skin and provide an additional form of analgesic response **(21)**. Some studies have shown the effectiveness of Graston technique on pain in patients with cervicogenic headache.

Study with Abdel-Aal. et al. (2021), evaluated the impact of 2 weeks as well as after 4 weeks of Graston technique on sixty patients with CGH. The pain was improved in terms of decrease pain scores on visual Analogue Scale. However, the study was limited to its short four-week timeline and relatively small sample size **(22).** Study with Kumar. et al. (2020), evaluate the effect of sub occipital release and myofascial release (MFR) with IASTM tool on cervicogenic headache on 34 patients. They assigned randomly in the experimental group: sub occipital release, MFR with IASTM and exercises, and in conventional group: sub occipital release, MFR manually and exercises were given for twelve sessions i.e., three sessions in a week to each group. The

results have shown that experimental and conventional group showed significant changes in post intervention ($p<0.05$). when compared between the groups none of the outcome measures was significant statistically but showed clinical significance in both the groups in pain **(23).**

Study with Gulick. (2018), randomized control trial done on healthy individuals performed to investigate the effect of Instrument-assisted soft tissue mobilization on myofascial trigger points in upper trapezius muscle and its results shows, 5-min intervention using three IASTM techniques can effectively increase pain threshold of trigger points **(24).**

While investigating the analgesic effect of Graston technique, a study that was done on thirty patients of chronic low back pain, Assessment was done before and after a 4-week intervention program. The result showed that the Graston technique showed a significant improvement in pain compared to general exercise program. In addition, there is significant increase in ROM in favor of Graston Group compared to control group **(25).**

Effect of Graston technique on cervical range of motion:

Population is vulnerable to overuse syndrome and acute injuries due to insufficient joint range of motion and decreases flexibility, which are important for optimal musculoskeletal functions **(26, 27).** Study with Abdelhamid. et al. (2020), investigated and compared the effects of instrument assisted soft tissue mobilization (IASTM) and trigger point release (TPR) in terms of neck lateral flexion and rotation range of motion on upper trapezius (UT) myofascial trigger points (MTrPs) in mechanical neck pain on Forty patients. The results recorded that, IASTM and TPR were effective in treating patients with mechanical neck pain and UT MTrPs **(28).**

Another study with Motimath. et al. (2017), show important mechanism of ISTUM in CGH was the desensitization of the trigeminocervical nucleus, which played a crucial role in reducing the tone of suboccipital and neck muscles which lead to increase ROM **(29).**

Study on the effects of instrument-assisted soft tissue mobilization on musculoskeletal properties, this study was randomized, controlled; crossover study included 14 healthy volunteers. IASTM was performed on the skin over the posterior part of the lower leg for 5 min and targeted the soft tissues; this study revealed that IASTM over the posterior part of the lower leg could improve the ankle joint dorsiflexion range of motion and stiffness **(30)**. Also, a study with Rowlett. et al. (2019), applied on 60 participants to investigate the efficacy of instrument-assisted soft tissue mobilization in comparison to gastrocnemius-soleus stretching for dorsiflexion range of motion. It concluded that there was significant difference only for IASTM compared to stretching when measuring ankle dorsiflexion ROM in non-weight bearing positions with the knee flexed, suggesting that IASTM may have greater effects on the soleus muscle flexibility, while there were no significant differences between IASTM and stretching in weight bearing positions **(31).**

Effect of Graston technique on cervical function:

A study with Mona. et al. (2023), compare the effects of muscle energy technique (MET) with IASTM in terms of pain intensity level, pain pressure threshold (PPT), cervical range of motion (CROM), and neck functional disability level in patients with upper trapezius myofascial trigger points. The study included forty-five participants had bilateral upper trapezius MTrPs, the result of study shown that MET and IASTM can improved all outcome specially neck functional disability level more than the conventional PT alone without significant difference between them, the study limitation is didn't study the long-term effects of MET or IASTM **(32).**

Effect of Graston Technique on headache frequency, duration and medication intake:

Musculoskeletal impairments are associated with increase the prevalence of pain and disability **(33)**. Therefore, it is important to use the most effective interventions to enhance the patient outcomes, improve the quality of life and decrease the burden on the society. Using a Graston technique provide the therapist with mechanical advantage to reduce the pressure on the fingers and hand while allowing deep penetration into the affected soft **tissues (34, 35, 36)**. The result of studies **(37,38,39)**, showed significant improvement of function after two weeks and after the end of treatment program in favor of experimental group.

In study with Nambi. et al. (2024), investigated the long-term effects of instrument assisted soft tissue mobilization along with spinal manipulation therapy in patients with cervicogenic headache, on 64 participants, for 4 weeks. Results showed that spinal manipulation therapy with instrument assisted soft tissue mobilization provided better long-term on CGH frequency CGH pain intensity, CGH disability, neck pain frequency, neck pain intensity, neck disability index, and quality of life in patients with cervicogenic headache. But the study limited by following: First, the sample size was small which increasing the risk of a type 2 error. Second, while both sexes were included, the data were not analyzed separately, meaning sex differences may have impacted the outcomes. The study was not adequately powered for sex subgroups. Third, the lack of a placebo group limited the assessment of the actual efficacy of the intervention. Fourth, adding IASTM took more time. Lastly, the study was difficult to reproduce since the treatment was on the basis of the therapist's judgment **(40).**

Study with Saad. et al. (2021), who investigate the impact of instrument-assisted soft tissue mobilization on trigger points of tension headache. Thirty patients with tension headache contributed to the study. Cases randomly were categorized into 2 equal number groups: control group, instrument-assisted soft tissue mobilization group. Measurement variables were visual analog scale for pain intensity, neck disability index for function disability, pressure algometer for pressure pain threshold (PPT), and headache frequency. These variables evaluated pretreatment and after four weeks post treatment. The finding results were that IASTM group is statistically significantly increased in all outcome variables. This study was limited to the female gender. Also, it did not investigate the long-term effects of the used treatment **(12).**

Study with Abdelhamid. et al. (2020), IASTM making loosening and removal of scar tissues and adhesions secondary to skin scraping which decreased soft tissue consistency and improved range of motion. It also induced vasodilation response and microv-ascular hemorrhage; so, provided oxygen, nutrients and removed metabolic end products and inflammatory mediators which lead to decrease in headache frequency and duration **(41).**

Conclusion:

This review's findings propose a potential beneficial impact of graston technique in pain intensity, ROM, cervical function, headache frequency and duration, and medication intake outcomes in patients with cervicogenic headache. Nevertheless, the limited and diverse nature of available research prevents a conclusive determination of whether graston technique can effectively improve pain intensity, ROM, cervical function, headache frequency and duration, and medication intake especially in patients with cervicogenic headache.

References:

1. **Headache Classification Committee of the International Headache Society (IHS)**. The International Classification of Headache Disorders, 3rd Edition. *Cephalalgia*. 2018; 38:1–211.
2.**Andres Jung, Gabriela F Carvalho, Tibor M Sziksza, (3) et al.**: Physical Therapist Interventions to Reduce Headache Intensity, Frequency, and Duration in Patients with

Cervicogenic Headache: A Systematic Review and Network Meta-Analysis PTJ: Physical Therapy & Rehabilitation. J *Phys Ther*. 2024; 104: 1–15.

3. **Xia C, Zhao Y, Lin L, (4) et al.:** Comparison of Extracorporeal Shock Wave Therapy and Manual Therapy on Active Trigger Points of the Sternocleidomastoid Muscle in Cervicogenic Headache: A Randomized Controlled Trial. Turk J Phys Med Rehab. 2025; 71(x): i-x.

4. **Bini P, Hohenschurz-Schmidt D, Masullo V, (2) et al:** The effectiveness of Manual and Exercise Therapy on Headache Intensity and Frequency among Patients with Cervicogenic Headache: A Systematic Review and Meta-Analysis. Chiropractic Manual Therapies, 2022; 30:49.

5. **Youssef EF, Shanb AS.** Mobilization versus Massage Therapy in the Treatment of Cervicogenic Headache: A Clinical Study. J Back Musculoskeletal Rehabil, 2013; 26:17–24.

6**. Dunning JR, Butts R, Mourad F, (4) et al.** Upper Cervical and Upper Thoracic Manipulation versus Mobilization and Exercise in Patients with cervicogenic Headache: A Multi-Center Randomized Clinical Trial. BMCMusculoskelet Disord. 2016; 17:64.

7. **Kharwandikar P, Shende M.** Effectiveness of Sub-occipital Myofascial Release and Cervical Manipulation in Patients with Cervicogenic Headache. International J. Healthcare Biomed Res. 2019; 7:25–32.

8. **Arab AM, Ramezani E.** Sub occipital Myofascial Release Technique for the Treatment of Cervicogenic Headache. J Bodyw Mov Ther. 2018; 22:859.

9**. Jafari M, Bahrpeyma F, Togha M.** Effect of Ischemic Compression for Cervicogenic Headache and elastic Behavior of Active Trigger Point in the Sternocleidomastoid Muscle using Ultrasound Imaging. J Bodyw Mov Ther. 2017; 21:933–9.

10**. Premlata PR, Singh G.** Effect of Positional Release Technique versus Ischemic Compression on Pressure Pain Threshold, Range of motion, and Headache Disability in Cervicogenic Headache patients Among College Going Student. A Ranomized Controlled Trial. Int J Physiother. 2019; 6:140–8.

11. **Ylinen J, Nikander R, Nykänen M, (2) et al.** Effect of neck exercises on cervicogenic headache: a randomized controlled trial. J Rehabil Med. 2010; 42:344–9.

12. **Saad NG, Yamany AA, Azzam AA, Grase MO.** Effect of Instrument-Assisted Soft Tissue Mobilization on Trigger Points of Tension Headache. Turkish Journal of Physiotherapy and Rehabilitation. 2021; 32(3) 2651-4451.

13. **Fousekis K, Kounavi E, Doriadis S, Mylonas K, Kallistratos E:** The Effectiveness of Instrument-assisted Soft Tissue Mobilization Technique (Graston Technique), Cupping and Ischaemic Pressure Techniques in the Treatment of Amateur Athletes´ Myofascial Trigger Points. J Nov Physiother S. 2016; 3(2).

14. **Baker RT, Nasypany A, Seegmiller JG, Baker JG:** Instrument-assisted soft tissue mobilization treatment for tissue extensibility dysfunction. Int J Athl Ther Train. 2013; 18:16–21.

15. **Lee JJ, Lee JJ, Kim DH, You SJ.** Inhibitory effects of instrument-assisted neuromobilization on hyperactive gastrocnemius in a hemiparetic stroke patient. Biomed Mater Eng, 2014; 24:2389–94.

16. **Kim J, Sung DJ, Lee J.** Therapeutic effectiveness of instrument-assisted soft tissue mobilization for soft tissue injury: mechanisms and practical application. J Exerc Rehabil, 2017;13:12–22.

17. Carey MT. Graston Technique Instruction Manual (2nd) ed. Indianapolis, IN: Therapy Care Resources, Inc.; 2001.

18. **Melham TJ, Sevier TL, Malnofski MJ, (2) et al,** Chronic ankle pain and fibrosis successfully treated with a new noninvasive augmented soft tissue mobilization technique (ASTM): a case report. Med. Sci. Sports Exerc. 1998; 30(6): 801–804.

19. **Fowler S, Wilson JK, Sevier TL.** Innovative Approach for the Treatment of Cumulative Trauma Disorders. Work. 2000;15(1):9–14.
20. **Ge W, Roth E, Sansone A.:** Aquasi-experimental study on the effects of instrument assisted soft tissue mobilization on mechanosensitive neurons. J Phys Ther Sci. 2017; 29:654–7.
21. **Cheatham SW, Kreiswirth E, Baker R:** Does a light pressure instrument assisted soft tissue mobilization technique modulate tactile discrimination and perceived pain in healthy individuals with DOMS? J Can Chiropr Assoc. 2019; 63:18–25.
22. **Abdel-Aal NM, Elsayyad MM, Megahed AA,** "Short - term effect of adding Graston technique to exercise program in treatment of patients with cervicogenic headache: a single-blinded, randomized controlled trial". Eur. J. Phys. Rehabil Med. 2021; 57 (5):758-766.
23. **Kumar VN, Saini S, Palekar, T J, (1) et al,** Effect of Sub Occipital Release, Myofascial Release with Iastm Tool on Cervicogenic Headache,Indian Journal of Physiotherapy and Occupational Therapy. 2020; 14(4): 204- 210.
24. **Gulick DT.** Instrument-assisted soft tissue mobilization increases myofascial trigger point pain threshold. Journal of bodywork and movement therapies. 2018;22(2):341-5.
25. **Lee J-H, Lee D-K, Oh J-S.** The effect of Graston technique on the pain and range of motion in patients with chronic low back pain. J Phys Ther Sci. 2016;28(6):1852–5.
26. **Hreljac AL, Marshall RN, Hume PA.** Evaluation of lower extremity overuse injury potential in runners. Medicine & Science in Sports & Exercise. 2000;32(9):1635-41.
27. **de Baranda PS, Ayala F.** Chronic flexibility improvement after 12 weeks of stretching program utilizing the ACSM recommendations: hamstring flexibility. International Journal of Sports Medicine. 2010;31(6):389-96.
28. **Abdelhamid MN, Youssef EF,** Azzam AH and Mohammed MM, Trigger Point Release versus Instrument Assisted Soft Tissue Mobilization on Upper Trapezius Trigger Points in Mechanical Neck Pain: A Randomized Clinical Trial, Med. J. Cairo Univ. 2020; 88:5,2073-2079.
29 **Motimath B, Ahammed N, Chivate D,** Immediate effect of instrument assisted soft tissue mobilization (IASTM) with M2Tblade technique in trapezitis: an experimental study. J Int Appl Res. 2017; 3:527–9.
30. **Ikeda N, Otsuka S, Kawanishi Y, Kawakami Y.** Effects of instrument-assisted soft tissue mobilization on musculoskeletal properties. Medicine And Science in Sports and Exercise. 2019;51(10):2166.
31- **Rowlett CA, Hanney WJ, Pabian PS, McArthur JH, Rothschild CE, Kolber MJ.** Efficacy of instrument-assisted soft tissue mobilization in comparison to gastrocnemius-soleus stretching for dorsiflexion range of motion: A randomized controlled trial. J Body w Mov Ther. 2019; 23(2):233–40.
32. **Mona I. Elagamawy, Wadida H. Elsayed, Magda R. Zahran:** Effect of Muscle Energy Technique versus Instrument-assisted Soft Tissue Mobilization in Upper Trapezius Myofascial Trigger Points. EJPT. 2023; 16:7-16.
33. **Lambert M, Hitchcock R, Lavallee K, Hayford E, Morazzini R, Wallace A, Conroy D, Cleland J.** The effects of instrument-assisted soft tissue mobilization compared to other interventions on pain and function: a systematic review. Physical Therapy Reviews. 2017;22(1-2):76-85.
34. **Baker RT, Nasypany A, Seegmiller JG, Baker JG.** Instrument-assisted soft tissue mobilization treatment for tissue extensibility dysfunction. International Journal of Athletic Therapy and Training. 2013;18(5):16-21.
35. **Loghmani MT, Warden SJ.** Instrument-assisted cross fiber massage increases tissue perfusion and alters microvascular morphology in the vicinity of healing knee ligaments. BMC complementary and alternative medicine. 2013;13(1):240.
36. **Hammer WI.** The effect of mechanical load on degenerated soft tissue. Journal of Bodywork and Movement Therapies. 2008;12(3):246-56.

37. **Markovic G.** Acute effects of instrument assisted soft tissue mobilization vs. foam rolling on knee and hip range of motion in soccer players. Journal of bodywork and movement therapies. 2015;19(4):690-6.
38. **Laudner K, Compton BD, McLoda TA, Walters CM.** Acute effects of instrument assisted soft tissue mobilization for improving posterior shoulder range of motion in collegiate baseball players. International journal of sports physical therapy. 2014;9(1):1.
39. **Blanchette MA, Normand MC.** Augmented soft tissue mobilization vs natural history in the treatment of lateral epicondylitis: a pilot study. Journal of manipulative and physiological therapeutics. 2011;34(2):123-30.
40. **Nambi G. Alghadier M. Khanam H (7) et al.:** An Additive Effect of Instrument-Assisted Soft Tissue Mobilization with Spinal Manipulation in Cervicogenic Headache: A Randomized Controlled Trial Pain Ther. 2024; 13:1679–1693.
41. **Abdelhamid MN, Youssef EF, Azzam AH and Mohammed MM,** Trigger Point Release versus Instrument Assisted Soft Tissue Mobilization on Upper Trapezius Trigger Points in Mechanical Neck Pain: A Randomized Clinical Trial, Med. J. Cairo Univ. 2020; 88:5,2073-2079.