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VIEWPOINT

Sound-assisted soft tissue mobilization: an innovative approach for musculoskeletal disorders

Tahir Mahmood [1], Ashfaq Ahmad [1], Alberto Sumiya [2]

1: University Institute of Physical Therapy, The University of Lahore, Pakistan

2: Departamento de Biociências e Saúde Única (BSU), Universidade Federal de Santa Catarina, Curitibanos, SC, Brasil

Email ✉ : tahirmahmoodphysio@mail.com

Contact #: +92-300-6741320

ABSTRACT

Musculoskeletal disorders remain a major contributor to injury, functional limitation, and long-term disability worldwide. This viewpoint explores emerging approaches to soft tissue mobilization, with a particular focus on sound-assisted soft tissue mobilization (SASTM) as a novel physiotherapy intervention. A broad review of the literature was undertaken, encompassing all available forms of evidence on soft tissue mobilization techniques without restrictions on study design or database source. Instrument-assisted soft tissue mobilization (IASTM), SASTM, manual cross-fiber massage, and related techniques are widely integrated into contemporary rehabilitation programs. Both IASTM and SASTM operate on similar biomechanical principles, applying controlled mechanical forces to soft tissues to disrupt adhesions, enhance local circulation, and facilitate tissue healing. While IASTM employs steel-based instruments to detect and treat soft tissue restrictions through tactile feedback, SASTM utilizes ceramic polymer tools that identify tissue irregularities through sound-based feedback. Although each modality has defined indications and contraindications, SASTM may offer greater specificity in targeting adhesions. Nevertheless, its application should remain adjunctive, used alongside established therapeutic interventions and only by appropriately trained practitioners in accordance with prevailing professional regulations and state bylaws.

Keywords: Musculoskeletal Disorders (MeSH); Muscular Diseases (MeSH); Soft Tissue Injuries (MeSH); Therapy, Soft Tissues (MeSH); Instrument-assisted soft tissue mobilization (Non-MeSH); Sound-assisted soft tissue mobilization (Non-MeSH); Rehabilitation (MeSH); Pain (MeSH); Pain Management (MeSH).

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INTRODUCTION

According to the Global Burden of Disease study, musculoskeletal disorders affect approximately 1.71 billion individuals worldwide, with low back pain being among the most prevalent conditions, often resulting in restricted mobility, diminished well-being, and reduced participation in community life-outcomes that underscore the urgent need for effective rehabilitation strategies.[1,2] Demographic transitions driven by aging populations and sedentary lifestyles have further increased the demand for conservative interventions aimed at managing low back pain. Such approaches play a critical role in improving physical function and mitigating disability associated with musculoskeletal conditions. A range of therapeutic techniques may be employed, including myofascial release for upper and lower extremity musculoskeletal disorders or injuries, particularly in short-term tendinopathies and lateral epicondylitis. Additionally, localized relaxation massage, when combined with multimodal care, has been shown to provide short-term symptomatic relief in conditions such as carpal tunnel syndrome.[3] Collectively, these soft tissue mobilization therapies represent valuable adjuncts to comprehensive rehabilitation programs and may enhance clinical outcomes when integrated with other evidence-based interventions.

Soft mobilization techniques (STM): Soft tissue mobilization devices are available in various forms, largely determined by the material composition and the therapeutic technique employed. Instrument-assisted soft tissue mobilization (IASTM) involves the controlled handling and sweeping of specialized instruments over the skin surface, typically using a lubricant to minimize friction.[4] The primary objectives of IASTM are pain reduction and functional improvement,[5] achieved through targeted application to tendons, ligaments, and muscles.[6] By delivering focused pressure and specific stroking techniques,[7] IASTM is capable of reaching deeper tissue layers compared with manual hand-applied techniques alone.[8] Consequently, it has gained recognition as a valuable adjunct for clinicians in musculoskeletal rehabilitation[9] and may also contribute to the prevention of work-related musculoskeletal injuries among healthcare professionals.[10]

Sound-assisted soft tissue mobilization (SASTM): Soft tissue mobilization has been used with a variety of modifications; for example, SASTM is a new approach, using ceramic-based polymer tools. Its resonating capability is possible to shape and contour body-specific surfaces and glide easily on them. SASTM mobilizes muscle fibers controlling fibroblastic production, facilitating alignment.[11] It allows clinicians to apply greater pressure to the edge surface, effectively loosening fibrous adhesions from surrounding soft tissue areas. The edge surface can then be manipulated along the skin to break up the loosened fibrous adhesions and pull them away from the impaired soft tissue area. There is production of "crunching sound" that comes from "scraping" the soft tissue.[12] The underlying principle of SASTM is that as acoustic energy dissipates and contributes to the disruption of scar tissue, the intensity of the emitted sound progressively decreases with the breakdown of adhesions, thereby indicating the potential for meaningful clinical improvement.

Table I: Comparison of SASTM vs IASTM

Property	Sound-assisted soft tissue mobilization (SASTM)*	Instrument-assisted soft tissue mobilization (IASTM)
Specificity	Only specific muscle adhesions can be mobilized.	The complete muscle area is mobilized.
Formulation	Ceramic Polymer Tools	Stainless Steel Tools
Edges	Non-beveled Edges	Beveled Edges
Audible	Audible adhesions, can be located more quickly, enabling the clinicians to locate restrictions.	Non-audible adhesions can be located in a complete muscle area.
Pain & discomfort	Less Painful	Painful sometimes.[18]
Identification of soft Tissue restrictions	Scar tissue can be located through sound waves.[11]	Scar tissue can be differentiated from healthy tissue using resonance.[19]
Weight	Lightweight Tools	Heavyweight tools

*SASTM information is taken from SASTM official website.[20]

An important advantage of mobilization tools is their ability to assist clinicians in identifying fibrous adhesions on soft tissue surfaces that may not be readily detectable through manual palpation alone. The targeted pressure applied by SASTM instruments may offer greater specificity toward fibrotic adhesions, facilitating their disruption in a more efficient manner.[13] This effect is thought to be mediated through tissue responses that contribute to soft tissue healing[14] and subsequent improvements in physical function.[15] Current literature supports the role of sound-assisted soft tissue mobilization as a therapeutic option in the management of musculoskeletal disorders. Nevertheless, SASTM should be implemented as part of a comprehensive rehabilitation strategy rather than as a standalone intervention. Standardized protocols typically involve a structured sequence of steps, including clinical examination of the affected area, warm-up exercises, application of instrument-assisted soft tissue mobilization, incorporation of stretching exercises, and the use of cryotherapy following treatment.[16] Despite its clinical utility, soft tissue–assisted mobilization techniques are contraindicated in certain conditions, such as hypersensitive skin, open wounds, unhealed fractures, and osteomyelitis; however, emerging consensus supports cautious use in patients with osteoporosis and diabetes mellitus.[17]

SASTM is not only effective but also cost-effective compared to other original tools of IASTM, like Graston Tools®, Hawk grips®, ASYTM®, etc. This affordability does not compromise its quality, as SASTM can be improved by incorporating adhesion, which can be detected through a sound audible with any type of amplifier. These tools are similar to IASTM, which has already been proven in the literature. However, the key difference lies in the materials used: IASTM tools are made of stainless steel, whereas SASTM tools are made of ceramic polymer, which is lightweight and provides tactile feedback. The other key differences are given in Table I.

CONCLUSION

SASTM may serve as a useful adjunct to established therapeutic modalities in musculoskeletal rehabilitation. Through direct soft tissue mobilization, SASTM has the potential to enhance local circulation, stimulate fibroblast activity, and facilitate tissue healing, thereby supporting functional recovery and improving quality of life. A distinctive characteristic of SASTM is the audible feedback generated during instrument sweeping, which may assist clinicians in more precisely identifying and targeting affected musculature. However, current evidence regarding its clinical effectiveness, underlying mechanical benefits, and overall quality remains limited, with most available studies providing low-level evidence. Further high-quality research is warranted to elucidate its mechanisms of action, define its unique therapeutic advantages, and determine its clinical outcomes across a range of musculoskeletal disorders.

REFERENCES

1. Cieza A, Causey K, Kamenov K, Hanson SW, Chatterji S, Vos T, et al. Global estimates of the need for rehabilitation based on the Global Burden of Disease study 2019: a systematic analysis for the Global Burden of Disease Study. Lancet 2020;19;396(10267):2006-17. http://doi.org/10.1016/S0140-6736(20)32340-0.
2. World Health Organization. Musculoskeletal health. 12 July,2022. [Accessd on: September 16, 2025]. Available from URL: https://www.who.int/newsroom/fact-sheets/detail/musculoskeletal-conditions.
3. Piper S, Shearer HM, Cote P, Wong JJ, Yu H, Varatharajan S, et al.The effectiveness of soft-tissue therapy for the management of musculoskeletal disorders and injuries of the upper and lower extremities: A systematic review by the Ontario Protocol for Traffic Injury management (OPTIMa) collaboration. Man Ther 2016;21(0);18-34. https://doi.org/10.1016/j.math.2015.08.011
4. Cheatham SW, Baker RT, Larkins LW, Baker JG, Casanova MP. Clinical Practice Patterns Among Health Care Professionals for Instrument-Assisted Soft Tissue Mobilization. J Athl Train 2021;56(10):1100-11. http://doi.org/10.4085/1062-6050-047-20.
5. Tang S, Sheng L, Wei X, Liang M, Xia J, Chen J. 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 2025;14;26(1):257. http://doi.org/10.1186/s12891-025-08492-4..
6. 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;28;13(1):12-22. http://doi.org/10.12965/jer.1732824.412.

7. Cheatham SW, Baker R, Kreiswirth E. Instrument assisted soft-tissue mobilization: a commentary on clinical practice guidelines for rehabilitation professionals. Int J Sports Phys Ther 2019;14(4):670-82.
8. Fousekis K, Varda C, Mandalidis D, Mylonas K, Angelopoulos P, Koumoundourou D. et al. Effects of instrument-assisted soft-tissue mobilization at three different application angles on hamstring surface thermal responses. J Phys Ther Sci 2020;32(8):506-9. https://doi.org/10.1589/jpts.32.506
9. Pianese L, Bordoni B. The use of instrument-assisted soft-tissue mobilization for manual medicine: aiding hand health in clinical practice. Cureus 2022;14(8):e28623. http://doi.org/10.7759/cureus.28623.
10. Mahmood T, Hafeez M, Ghauri MW, Salam A. Instrument assisted soft tissue mobilization- an emerging trend for soft tissue dysfunction. J Pak Med Assoc 2021;71(3):977-81. http://doi.org/10.47391/JPMA.1168.
11. Beer JA. Acute effects of sound assisted soft tissue mobilization (sastm) on lower extremity flexibility, isokinetic and isometric strength. Indiana University-Purdue University Indianapolis.2019. [Accessed on: September 15, 2025]. Available from URL: https://www.proquest.com/openview/f772abfa7c9b8142d34f117dc0b6e17b/1?pqorigsite=gscholar&cbl=18750&diss=y
12. Schiottz-Christensen B, Mooney V, Azad S, Selstad D, Gulick J, Bracker M. The role of active release manual therapy for upper extremity overuse syndromes-a preliminary report. J Occup Rehabil 1999;9(3):201-11. https://doi.org/10.1023/A:1021305902201
13. Markovic G. Acute effects of instrument assisted soft tissue mobilization vs. foam rolling on knee and hip range of motion in soccer players. J Bodyw Mov Ther 2015;19(4):690-6. http://doi.org/10.1016/j.jbmt.2015.04.010.
14. Sevier TL, Stegink-Jansen CW. Astym treatment vs. eccentric exercise for lateral elbow tendinopathy: a randomized controlled clinical trial. Peer J 2015;19;3:e967.http://doi.org/10.7717/peerj.967
15. Black DW. Treatment of knee arthrofibrosis and quadriceps insufficiency after patellar tendon repair: a case report including use of the graston technique. Int J Ther Massage Bodywork 2010;23;3(2):14-21.
16. Stow R. Instrument-assisted soft tissue mobilization. Int J Athl Ther Train 2011;16(3). https://doi.org/10.1123/ijatt.16.3.5
17. Cheatham SW, Baker RT, Loghmani MT, Schleip R. International expert consensus on instrument-assisted soft-tissue mobilization precautions and contraindications: a modified Delphi study. Healthcare (Basel) 2025;13(6):642. http://doi.org/10.3390/healthcare13060642.
18. Ge W, Roth E, Sansone A. A quasi-experimental study on the effects of instrument assisted soft tissue mobilization on mechanosensitive neurons. J Phys Ther Sci 2017;29(4):654-7. http://doi.org/1010.1589/jpts.29.654
19. Loghmani MT, Bane S. Instrument-assisted Soft Tissue Manipulation: Evidence for its Emerging Efficacy. J Nov Physiother 2016;S3:012. https://doi.org/10.4172/2165-7025.S3-012.
20. Sound assisted soft tissue mobilization. [Accessed on: November 06, 2025]. Available from URL: https://sastm.com/pages/patients

CONFLICT OF INTEREST

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KMUJ web address: www.kmuj.kmu.edu.pk
Email address: kmuj@kmu.edu.pk