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"Instrument-Assisted Soft Tissue Mobilization (IASTM): A Comprehensive Educational Review For Physiotherapy Practice"

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Abstract

Instrument-Assisted Soft Tissue Mobilization (IASTM) is an emerging manual therapy technique increasingly integrated into physiotherapy practice for the treatment of soft tissue dysfunctions. Utilizing specialized instruments, IASTM enables clinicians to detect and treat myofascial restrictions, scar tissue, and chronic soft tissue injuries more effectively than manual therapy alone. This comprehensive educational review aims to provide physiotherapists with a detailed understanding of the history, principles, biomechanical mechanisms, clinical applications, and current evidence surrounding IASTM. IASTM improves tissue extensibility, reduces pain, enhances functional mobility, and stimulates the body's healing processes through controlled microtrauma and fibroblast activation. The review also explores various IASTM tools, such as the Graston Technique®, The Myofascial Mobility Tool (M2T) Blade, Astym® therapy, Gua Sha technique and EDGE Mobility Tools, highlighting their specific features and uses. Despite promising clinical outcomes, the review emphasizes the need for higher-quality randomized controlled trials to strengthen the evidence base. Overall, IASTM represents a valuable adjunct in physiotherapy, offering both therapeutic and diagnostic benefits. This review serves as an educational resource to guide evidence-informed implementation of IASTM in clinical settings.

Keywords: Instrument-Assisted Soft Tissue Mobilization (IASTM), Soft Tissue Manipulation, Manual Therapy, Myofascial Release Techniques, Tissue Remodelling

Instrument Assisted Soft Tissue Mobilization

The term "instrument-assisted soft tissue mobilization" (IASTM) dates back to Cyriax's cross-friction massage technique and refers to the use of particular hard tools to manipulate soft tissues. Despite the fact that IASTM has recently become more popular as an alternative to conventional manual therapy techniques, the first controlled study examining its effects was published in 1997.[1] A strigil, a small metallic instrument, was frequently used in bathhouses for therapeutic purposes in ancient Greece and Rome. These practices are likely to have influenced the development of modern IASTM.[2] Additionally, IASTM has its origins in gua sha, a traditional Chinese therapy that uses a tool to press or scrape the skin in order to create petechiae (or "sha") that enhance local blood circulation and make it easier for soft tissues to receive nutrients and oxygen.[3]

The term "instrument-assisted soft tissue mobilization" (IASTM) encompasses a variety of techniques, including the Fascial Abrasion Technique, the Graston Technique, Sound-Assisted Soft Tissue Mobilization, and Augmented Soft Tissue Mobilization (ASTYM).[2,4,5] Despite their different names, these techniques differ primarily in the shape of the instruments and the composition of the material. In the past, natural materials such as rocks, wooden sticks, and animal bones were used to stimulate the skin and underlying tissues. In contemporary practice, stainless steel is the most widely used material for instrument construction due to its exceptional durability, accuracy, and hygienic qualities. IASTM is thought to be a simple, practical, and effective treatment for soft tissue dysfunction.[6] Using instruments for soft tissue mobilization is theorized to increase vibration sense by the clinician and patient. The increased perception of vibration may facilitate the clinician’s ability to detect altered tissue properties (e.g., identify tissue adhesions) while facilitating the patient’s awareness of altered sensations within the treated tissues.

Mechanism of Action:

The specialized connective tissue called fascia, which is mostly made up of collagen fibres, is located beneath the skin. Not only does it support, separate, and stabilize muscles and internal organs, but it also keeps arteries open and permits tissue flexibility. Normal physiological conditions allow muscles to move freely and smoothly over one another. On the other hand, after injury or repeated strain, activated fibroblasts build more collagen into the fascia. Increased fascial density and adhesions are the results, and these can impair muscle function, reduce tissue mobility, trap blood vessels and nerve fibres, and ultimately lead to chronic or recurrent pain syndromes.

These pathological alterations in the soft tissues and fascia are intended to be addressed by instrument-assisted soft tissue mobilization (IASTM). By employing ergonomically designed tools, medical professionals can precisely identify soft tissue dysfunctional regions and apply mechanical pressure. An important step in starting the healing process is triggering a localized inflammatory response through the application of controlled microtrauma via IASTM. In addition to improving fibroblast recruitment and activation, this microtrauma encourages the resorption of excessive fibrosis and scar tissue. The tissue's

mechanical qualities are subsequently restored as a result of the more ordered laying down of freshly produced collagen fibres.

Graston Technique®

The Graston Technique® is a state-of-the-art method in the field of instrument-assisted soft tissue mobilization (IASTM) that is widely recognized for its efficacy in identifying and treating soft tissue dysfunction.[7] This technique uses concave and convex edges and contours to conform to various anatomical regions using a set of six expertly made stainless steel tools. Because the tools enable doctors to more accurately and sensitively palpate and mobilize areas of scar tissue and fascial adhesion, they are crucial for diagnosing and treating myofascial restrictions.[8]

Stainless steel is the preferred material for precisely detecting textural changes in soft tissues because of its exceptional tactile feedback and optimal rigidity. Using these tools, the Graston Technique modifies the soft tissues' mechanical characteristics and structural integrity. The abnormal cross-linking in the fibrotic tissue is broken, excessive collagen deposition is more easily reabsorbed, and facial mobility is improved. By encouraging fibroblast activity, the method also facilitates connective tissue remodelling, which aids in collagen fibre regeneration and realignment, two processes crucial for tissue repair and functional recovery.[9]

Mechanism of action:

It primarily promotes healing by mechanically activating fibroblasts, which are vital cells for tissue repair and collagen synthesis. Research indicates that the degree of fibroblast proliferation is influenced by the pressure applied during IASTM, suggesting a dose-dependent response. Fibroblasts contribute to the healing process by producing new collagen fibres and essential mediators required for restoring tissue structure and function. Activated fibroblasts exhibit distinct morphological changes, including a prominent nucleus, rough endoplasmic reticulum, and an increase in ribosomes, all of which are signs of active collagen production.[10]

The presence of such activated fibroblasts has been demonstrated in both this study and previous investigations (Davidson et al.[11], for instance), supporting the notion that IASTM stimulates fibroblast recruitment and activity to support tissue regeneration. This mechanobiological response is the basis for the therapeutic benefit of IASTM in the treatment of soft tissue injuries, particularly tendinopathies.[10]

Benefits:

These devices' mechanical stimulation improves local circulation by encouraging increased blood flow, which helps the affected area receive nutrients and eliminate waste. Patients usually recover more quickly and require less time to recover when the Graston Technique is incorporated into treatment plans. Additionally, it greatly increases joint flexibility and range of motion by dissolving adhesions and reestablishing normal tissue mobility. Furthermore, the method provides a non-pharmacologic approach to pain and inflammation management, which lessens the need for anti-inflammatory drugs. It can

occasionally be used as a non-invasive substitute for surgery in the treatment of persistent soft tissue disorders. Crucially, Graston treatments are tailored to the specific condition of each patient, offering personalized care that improves therapeutic results.[12]

Dosage Parameter

Variables	Effect
Size of GT Instrument	Large instrument less intense vs smaller
Size of Treatment Edge	Broader/ longer edge is less intense vs. Smaller
Shape of Instrument vs. Shape of the body part	Concave on convex (least aggressive) Convex on Concave (more aggressive) Convex on Convex (most aggressive)
Speed of stroke	Faster strokes are more intense
Targeted tissue length	Slacken target tissue to achieve deeper penetration
Treatment time	Longer duration increase intensity

Literature review on Garston technique:

This randomized clinical trial evaluated the effectiveness of using the Graston Technique® (GT) in combination with conventional physical therapy (CPT) to treat chronic plantar fasciitis. The study lasted four weeks and involved thirty patients. When compared to CPT alone, GT significantly enhanced foot function and reduced pain, according to the results of the visual analog scale and the Modified Foot Health Status Questionnaire. The general condition of the feet, however, did not appear to have changed. These findings suggest that, when used in conjunction with conventional therapy, GT can speed up recovery and improve functional outcomes for patients suffering from plantar fasciitis.[13]

Another study evaluated the effects of exercise and the Graston Technique (GT) on patients with chronic non-specific low back pain (CNLBP) were examined in this randomized controlled trial. Over the course of four weeks, 30 participants took part in the study. Pain, disability, and quality of life all significantly improved for both groups, according to the results, with the GT group showing larger decreases in pain and disability. Although intergroup differences in quality of life, flexibility, and pressure pain threshold were not statistically significant, GT also improved proprioception and flexibility. All things considered; GT seems to be a useful supplemental treatment for CNLBP recovery.[14]

The short-term efficacy of the Graston Technique (GT) in conjunction with exercise in treating cervicogenic headaches was investigated in this randomized controlled trial. Over the course of four weeks, sixty patients between the ages of 35 and 50 were randomized to receive either GT with exercise or exercise alone. According to the results, the GT group outperformed the control group in terms of pain

intensity, headache frequency and duration, cervical range of motion (with the exception of neck extension after two weeks), and medication intake.[1]

The Myofascial Mobility Tool (M2T) Blade

The Myofascial Mobility Tool (M2T) Blade is a specialized instrument used in instrument-assisted soft tissue mobilization (IASTM) for the purpose of myofascial release and the management of myofascial pain. Introduced by Mr. Adam Boger in Canada, the M2T Blade is constructed from 100% surgical-grade stainless steel.[16] This material offers several advantages, including hypoallergenic properties, ease of sterilization, and the ability to deliver controlled microtrauma to soft tissues, thereby facilitating tissue repair and remodelling. Additionally, the stainless-steel construction enhances tactile sensitivity, allowing clinicians to detect soft tissue restrictions that may be too subtle or deep to palpate manually.

The M2T Blade features eight distinct treatment planes, each designed for specific therapeutic purposes. Planes 1 and 2 are typically used for superficial tissue mobilization, while planes 3 and 8 are suited for deeper tissue interventions. The tool includes double-beveled edges angled at 35° for assessment and superficial treatment, and 55° for deep tissue mobilization. It is ergonomically designed for both left- and right-handed practitioners.[17]

During treatment, a thin layer of lubricating gel- is applied to the patient's skin to reduce friction. The blade is used unidirectionally either distal to proximal or vice versa and in multiple directions during assessment. Treatment is performed at a 45° angle with moderate pressure until fascial adhesions are reduced, typically indicated by tissue redness.[18]

Mechanism of action:

The M2T Blade works on the basis of myofascial release, which restores mobility by applying prolonged stretching to restricted fascial tissue. In traditional myofascial release, the tightened fascia is effectively lengthened by maintaining a stretch for 90 to 120 seconds. In a similar manner, the M2T Blade applies focused pressure until fascial adhesions are broken, allowing a mechanical stretch of the constrained fascial structures. By helping to release the fascia, this procedure increases tissue suppleness and lessens pain.[16,19]

Literature review on The Myofascial Mobility Tool (M2T) Blade:

The immediate effects of the Myofascial Mobility Tool (M2T) Blade on shoulder pain and range of motion in 18–30-year-old recreational athletes are investigated in this study. The study, which was conducted at KLE University in Belagavi, involved seven participants who had shoulder discomfort. The Visual Analog Scale (VAS) and a universal goniometer were used to measure range of motion (ROM) and pain levels before and after the M2T intervention. The results showed a statistically significant improvement ($p<0.05$) in shoulder range of motion (flexion and extension) and pain reduction following treatment. The findings suggest that the M2T Blade can improve shoulder mobility and provide short-term pain relief.[16]

a pilot study demonstrated the effectiveness of the M2T Blade in reducing acute heel pain and improving foot function in young adults. Conducted on 15 participants aged 18–40 the intervention involved M2T Blade therapy with outcomes measured using the Foot Function Index. Results showed a significant 48.7% reduction in pain intensity post-treatment. The findings suggest that the M2T Blade is a promising, non-invasive tool for immediate relief from heel pain by targeting fascial adhesions. This technique may offer functional benefits and improve mobility in individuals with acute foot discomfort.[17]

Astym® therapy

Astym® therapy is a relatively new non-invasive treatment method for soft tissue dysfunction that was created by Performance Dynamics (Muncie, Indiana).[20] The technique applies specially designed handheld instruments topically over the skin to identify and treat dysfunctional tissue. These tools enhance the clinician's tactile perception and make it possible to detect irregular or disorganized soft tissue through amplified feedback. Once dysfunctional areas have been identified, specific protocols involving controlled pressure and shear forces are applied to the targeted tissues. By initiating a reparative cellular response, these mechanical stimuli aim to restore the tissue's original structure and functionality through physiological changes. The techniques used in Astym therapy are evidence-based and backed by clinical and scientific research.[21]

Mechanism of action

It operates by stimulating the body’s natural healing mechanisms, specifically through the activation of cellular mediators and growth factors. These biological responses facilitate scar tissue resorption, promote tissue remodelling, and support the regeneration of healthy soft tissue.[20]

Literature review on Astym® therapy

The immediate effects of Astym® therapy on muscle function in patients with lower extremity injuries were assessed in this randomized controlled study. The 45 participants were split up into three groups: Astym therapy, placebo, and control. Prior to and following treatment, the maximal force produced during a unilateral isometric squat was measured. The Astym group ($15 \pm 18\%$) significantly outperformed the control ($-1 \pm 17\%$) and placebo ($-6 \pm 11\%$) groups in terms of force output ($p < 0.01$). There was no discernible difference between the control and placebo groups. According to the results, after a lower extremity musculoskeletal injury, Astym therapy may provide instantaneous muscle strength gains.[22]

This prospective randomized controlled study assessed how well patients with Achilles tendinopathy responded to a combination of eccentric exercise and Astym® soft tissue treatment. Results were assessed at various intervals up to 52 weeks after 16 participants were randomized to either the Astym plus eccentric exercise group or the eccentric exercise-only group. Throughout the intervention and follow-up periods, the Astym group demonstrated noticeably more functional improvement on the VISA-A scale. At 12 weeks, more subjects in the Astym group had a successful outcome, despite the fact that pain levels in

both groups improved similarly. In clinical practice, these results validate Astym as a useful supplement to eccentric exercise.[23]

This case study demonstrated how a multimodal strategy, including Astym® therapy, was used to successfully manage knee stiffness nonoperatively after total knee arthroplasty (TKA). Reduced range of motion (ROM), patellar baja, and soft tissue dysfunction were observed in a 38-year-old professional skier who had undergone a right total knee arthroplasty (TKA) and had continued knee stiffness after two anesthesia-induced manipulations. The patient showed notable improvements in range of motion, decreased pain, and improved functional ability over the course of 12 physical therapy sessions, which included Astym® treatment, patellar and tibiofemoral mobilizations, and home-based knee extension bracing. Patellar baja resolution was demonstrated by radiographic imaging. According to the results, Astym® was successful in treating persistent knee stiffness following total knee arthroplasty when used as part of an all-encompassing rehabilitation plan.[24]

Gua Sha technique

The Gua Sha technique is a traditional Chinese medicine (TCM) method that has prehistoric roots. Indigenous communities also use it, as they have a custom of massaging their bodies to alleviate pain. This is among the TCM1's most widely used strategies.[25] It involves using therapeutic scraping with tools like buffalo horn, porcelain spoons, and jade stones to stimulate particular areas, produce local therapeutic effects, and restore organic functions. It can also be used as a diagnostic technique.[26]

"Gua" means to scrape, brush, or scratch, while "Sha" has a more nuanced meaning, like "sand" or "dirt." This method was and is still widely used by the peasants in China. Seventy-four percent of people in Hong Kong report using the technique to treat pain, respiratory issues, and other illnesses like fever, diarrhoea, vomiting, constipation, infections, and light-headedness. The prevalence of usage is 22.7% for the entire year and 6.6% for a single month. This study looked at 3209 individuals from Hong Kong, to confirm the Gua Sha's usage and prevalence.[27]

According to Hong Kong residents who use it, the list of illnesses that can be treated in China is extensive and includes rheumatism, headaches, chronic fatigue, back and cervical region pains, sciatica, digestive issues, asthma, metabolic disorders, breast angina, hypertension, and deficiencies in the immune system. Research on treating neck, low back, and headache pains, improving blood circulation in the treated area, improving breastfeeding for mothers through improved breast engorgement, and improving hormonal control in hyperthyroidism can all be found in the literature. These studies consistently produce the best results when compared to other control groups.[28]

Mechanism of action

Gua Sha therapy exerts its therapeutic effects through a combination of biomechanical and physiological mechanisms that act simultaneously on the skin, connective tissues, lymphatic system, muscles, blood

vessels, and internal organs.[29] The technique involves the application of a lubricating medium followed by repeated unidirectional scraping of the skin surface using a specialized instrument. This mechanical stimulation induces microtrauma, resulting in transient petechiae and localized hyperaemia, which reflect increased microcirculation and metabolic activity in the targeted tissues.[30]

According to Traditional Chinese Medicine (TCM), these visible skin changes particularly the deeper pigmentation observed in certain regions indicate stagnation of Qi (vital energy) and Xue (blood) along the meridian pathways, thereby guiding diagnosis and treatment.[31] From a biomedical perspective, Gua Sha has been associated with enhanced local perfusion, lymphatic drainage, modulation of the autonomic nervous system, and the stimulation of immune responses, potentially through the upregulation of anti-inflammatory cytokines.[32]

Moreover, the therapy contributes to myofascial release and pain modulation, possibly involving the gate control theory and the reduction of nociceptive input. Although generally painless and well-tolerated, the resulting ecchymosis can be misinterpreted as bruising or bodily injury in Western medical or forensic contexts.[33] Consequently, adherence to standardized hygienic practices, including the sterilization of tools, is essential to minimize the risk of cross-contamination and ensure patient safety during Gua Sha application.[34]

Literature Review of Gua Sha technique

Gua Sha, a traditional Chinese medicine technique involving skin scraping to elicit petechiae, is commonly used to alleviate various conditions, particularly musculoskeletal pain. Despite its widespread use in Asia, systematic reviews within Western literature remain limited. A literature search across PEDro, PubMed, Scielo, and LILACS databases identified six clinical trials meeting inclusion criteria, focusing on musculoskeletal pain, primarily in spinal regions. Results indicated that Gua Sha provided short-term pain relief (7–21 days), with outcomes comparable or superior to control groups. Methodological quality, assessed via the PEDro scale, was moderate. While Gua Sha appears to be a low-cost, non-invasive therapeutic option for spinal disorders, further high-quality trials are needed, especially targeting its effects on the appendicular skeleton.[35]

A pilot randomized crossover study compared the effects of Gua Sha therapy with hydrocollator-based hot pack treatment in elderly patients with chronic low back pain. Outcome measures included pain intensity, physical disability, general health, depression, and salivary biomarkers. Although no statistically significant differences were observed between groups, Gua Sha produced greater improvements in pain reduction (21–25% vs. 16–18%) and disability (45–52% vs. 39–42%) over a one-week follow-up. Notably, Gua Sha was associated with sustained reductions in TNF-α and HO-1 levels, unlike hot packs, which showed biomarker rebound. A strong correlation was found between TNF-α reduction and improved function. The study supports Gua Sha as a potentially longer-lasting anti-inflammatory intervention for chronic low back pain management in elderly populations.[36]

EDGE Mobility Tools

The EDGE Mobility Tool was developed by Dr. Erson Religioso III, a physical therapist with expertise in manual therapy and movement science. The tool was designed as an affordable, ergonomic, and effective alternative to existing Instrument-Assisted Soft Tissue Mobilization (IASTM) instruments. Manufactured from high-grade 300-series surgical stainless steel, the EDGE tool features dual-edge configurations—one sharp and one blunt—allowing clinicians to apply varied pressure intensities and adapt the tool's use to specific anatomical regions. Its design supports ease of handling and tactile feedback, enabling precise tissue engagement while minimizing therapist fatigue.[37]

Mechanism of action

The mechanism of action of the EDGE Mobility Tool, consistent with other IASTM modalities, involves the application of controlled microtrauma to the affected soft tissue structures. This mechanical stimulation is believed to initiate a localized inflammatory response, promoting the upregulation of fibroblast activity, collagen synthesis, and extracellular matrix remodeling. These processes facilitate the breakdown of scar tissue and fascial adhesions while restoring normal tissue alignment and mobility.[38] Additionally, IASTM with the EDGE tool enhances local circulation, improves lymphatic drainage, and modulates neural input, thereby contributing to analgesia and improved functional outcomes. The tool's contouring and variable edge thickness allow clinicians to modulate the depth and intensity of treatment based on patient tolerance and tissue sensitivity.[39]

Literature review on EDGE Mobility Tool

Heel pain, commonly affecting up to 10% of the population, significantly impacts daily function, with plantar fasciitis being a leading cause. This condition arises from inflammation of the plantar aponeurosis at its insertion on the calcaneal tuberosity. Clinically, it presents with medial heel tenderness, pain with the first step in the morning, and discomfort after prolonged standing. Physiotherapy interventions, particularly Instrument-Assisted Soft Tissue Mobilization (IASTM) and Aggressive Manual Soft Tissue Mobilization (AMSTM), have shown promise in improving soft tissue mobility and reducing symptoms. A case report involving a 28-year-old female with plantar fasciitis demonstrated marked improvement in pain and walking ability following four weeks of physiotherapy. These findings support IASTM as an effective modality in managing plantar fasciitis and restoring function.[40]

Musculoskeletal disorders are widespread and often involve various soft tissues such as muscles, ligaments, fascia, and tendons. Soft tissue mobilization, a form of manual therapy, can be applied manually or through the use of rigid instruments. Instrument-Assisted Soft Tissue Mobilization (IASTM) is a specialized technique that utilizes tools to detect and treat areas of soft tissue dysfunction, aiding in the breakdown of scar tissue and enhancing the healing response in injured tissues. This review aimed to explore the historical background, mechanism of action, and therapeutic effects of IASTM through a comprehensive literature search of databases including PubMed, Embase, PEDro, and ScienceDirect. From 40 initially identified articles, 32 met inclusion criteria. Evidence from case studies and experimental

research supports IASTM's effectiveness in promoting soft tissue recovery, though further high-quality studies are needed to strengthen its evidence base.[41]

Summary

Instrument-Assisted Soft Tissue Mobilization (IASTM) is a contemporary manual therapy technique that employs specialized tools to treat soft tissue dysfunction by promoting healing through controlled microtrauma. Rooted in ancient practices like gua sha and historical influences such as the Greco-Roman strigil, IASTM has evolved into evidence-based clinical applications. Techniques such as the Graston Technique®, M2T Blade, and Astym® therapy, Gua Sha technique and EDGE Mobility tools have demonstrated effectiveness in improving soft tissue mobility, reducing pain, and enhancing functional outcomes in various musculoskeletal conditions including plantar fasciitis, low back pain, and tendinopathies.

The mechanism of action involves stimulating fibroblast proliferation, resorption of scar tissue, and improved collagen alignment, thereby promoting tissue regeneration. Literature reviews and clinical trials consistently support the utility of IASTM in improving range of motion, decreasing pain, and accelerating recovery. Stainless steel instruments provide tactile feedback, enhancing the clinician's ability to detect tissue restrictions and tailor treatment. While current evidence is promising, further high-quality studies are necessary to strengthen clinical guidelines and standardize treatment protocols. Overall, IASTM offers physiotherapists a practical, non-invasive, and effective approach to managing soft tissue injuries and chronic pain syndromes.

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