

Management of Plantar Fasciitis with a Musculoskeletal Ultrasound Imaging Guided approach of Instrument Assisted Soft Tissue Mobilization in a Runner: Case Report

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Introduction

Plantar fasciitis (PF) is associated with degenerative changes in the plantar fascia, resulting in tissue thickening, proliferation of fibroblasts and a perpetuating inflammatory cycle.

Conservative management of PF includes: joint and soft tissue manipulation, triceps surae and plantar fascia muscle elongation. Instrument assisted soft tissue mobilization (IASTM) is a form of soft tissue manipulation that allows for deeper and localized penetration of tissues, which may result in re-stimulation of the body's natural inflammation and healing processes. IASTM may also decrease pain through stimulation of mechanoreceptors within the tissues, thus inhibiting nociceptor activity.

This case report investigated the use of Musculoskeletal (MSK) Ultrasound Imaging with guided IASTM.

Patient History/Systems Review

- 46 y.o. female yoga practitioner and recreational runner
- Pain in the plantar medial aspect of the heel and medial arch of the right foot after a 3-mile run
- Pain worse with standing, walking, the first couple of steps after prolonged inactivity
- Unsuccessful with 2 cortisone injections, 6-week immobilization in rigid brace, followed by soft brace and night splint, self-stretching and gradual return to activity

Examination

- NPRS 3/10 in the heel and 6/10 in medial arch. LEFS was 39/80.
- Pronation of the calcaneus R>L, pes planus valgus R>L, and minimal hallux valgus on the right.
- Decreased dorsiflexion of the right ankle both with knee extension and flexion, with decreased posterior/ inferior glide of talus.
- Palpation revealed a painful plantar aspect of the calcaneus. Hypertonicity of the plantar fascia R>L and pain upon palpation of the plantar fascia in the region of the navicular.
- US imaging demonstrated a 3 cm thickening of plantar fascia, distal to the calcaneal origination with a tendinosis type presentation featuring several areas of disruption of collagenous fibers within the fascia.
- MMT of tibialis posterior 3+/5, triceps surae 4/5, toe flexors 4/5. Muscle length demonstrated shortening of the triceps surae complex on the right and a positive windlass test on the right.

Clinical Impression

- Diagnosis: Plantar Fasciitis
- Problem List: limited ROM, strength impairment, soft tissue dysfunction and impaired biomechanics
- Examination findings: calcaneal pronation, decreased dorsiflexion, impaired posterior/inferior glide of talus, thickening of plantar fascia, weakness of tibialis posterior, weakness of triceps surae, weakness of toe flexors, positive windlass test on right
- Prognosis: With conservative management it has been reported that 80% of cases of plantar fasciitis will have symptom resolution within 12 months
- 8 treatment sessions including 5 mins IASTM to plantar fascia, triceps surae stretching, talocrural mobilizations and strengthening of triceps surae and tibialis posterior

Intervention

- Initial treatment focused on normalizing ankle dorsal flexion, improve talocrural joint mobility, and decrease the tone and hypersensitivity of the plantar fascia.
- Talocrural mobilization was performed in accordance with protocol described by Hartman.
- Muscle stretching of the triceps surae was performed using a contract-hold-relax-stretch technique with a stretch hold time of 30 seconds and this was repeated 3 times.
- Ultrasound was used to determine exact location of treatment area with IASTM EDGEility tool.
- IASTM application was 5-minute of short stroking to the affected portion of the fascia.
- Referred for prefabricated orthotic supports.
- Pre-test and post-test measures of dorsiflexion mobility, palpation of plantar fascia and windlass test were used each session.
- Strengthening exercises for tibialis posterior and triceps surae initiated at visit 2.
- Hip abduction strengthening initiated at visit 3.

Outcomes

Following 8 visits, patient displayed normal ankle dorsiflexion, no pain with palpation of the plantar fascia, negative windlass test, and she reported no pain during gait. MSK US displayed a normal presentation of the plantar fascia of the right foot (figure 3). She was able to initiate treadmill running without reproduction of symptoms.

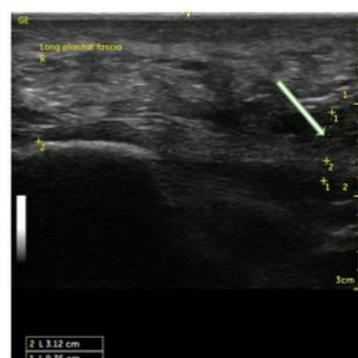
	Eval	Visit 1	Visit 4	Visit 8
Dorsiflexion ROM	8 deg with knee flexed	12 deg knee flexed	17 deg knee flexed	20 deg knee flexed
NPRS	3/10 heel 6/10 arch	2/10 heel 4/10 arch	1/10 heel 3/10 arch	0/10 heel 0/10 arch

	Eval	Visit 4	Visit 8
LEFS Score	39/80	24/80	0/80
Fascial Thickening	Present	Decreased	Absent

Clinical Implications

- MSK US imaging provides a direct dynamic repeatable view of tissues during joint motion, allowing for a more accurate method of soft tissue assessment than traditional selective loading approaches.
- MSK US imaging clearly identified thickening and degenerative changes supporting the decision that IASTM would be an appropriate intervention
- IASTM may re-initiate the healing cycle that was previously stagnated, and facilitates the release of endogenous opioids to the target tissues resulting in analgesia.
- The combined effects of analgesia and improved tissue healing allowed for improved talocrural ROM, decreased fascial thickness, decreased pain and allowed the patient to initiate pain-free treadmill running.
- This case report illustrates that complementary research is necessary to both validate the use of IASTM within the management of plantar fasciitis and to further validate MSK US imaging as the preferred method to objectivize tissue quality and guide decision-making.
- The cause-effect relationship between the treatment and positive outcome in this case report has to be further validated.

MSK US image of the plantar fascia upon initial exam

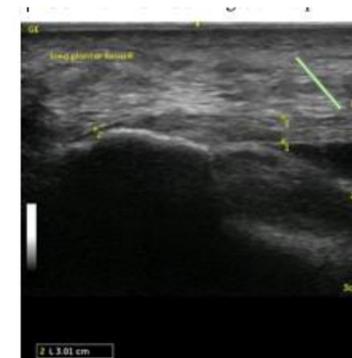


Arrow indicates area of fascial thickening

IASTM to plantar fascia



MSK US image of the plantar fascia upon discharge



Arrow indicates normal plantar fascia tissue

References: See Handout with Reference List