Case report

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Ultrasound imaging and Fascial Manipulation® for rigid retinacula in two cases of complex regional pain syndrome

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Abstract

Complex regional Pain Syndrome (CRPS) is a complex disease with articulate impact on the quality of life and its management is challenging. Ultrasound imaging can identify/assess different musculoskeletal structures that might have role in its pathogenesis. We present two cases of CRSP in whom B-mode ultrasonography and sonoelastography showed rigid retinacula associated with the symptomatology. Both patients were also/successfully treated with Fascial Manipulation®.

Keywords: reflex sympathetic dystrophy; ankle; fascia; sonoelastography; manual therapy

Introduction

Complex regional pain syndrome (CRPS) is a complex disease with an articulate impact on the patient's quality of life [1]. Its management is challenging as there is still not any confirmatory test or specific treatment [2]. Ultrasound (US) imaging can identify various musculoskeletal structures that might have role in its pathogenesis. Likewise, we report two cases of CRSP whereby US and sonoelastography revealed rigid retinacula as the main causes of the symptomatology.

Case 1

A 63-year-old woman was seen for right ankle pain and marked escape lameness. She previously had a fracture of the fifth metatarsal one year ago immobilized for 40 days, followed by ipsilateral tibio-talar trauma. Rest and anti-inflammatory drugs partially improved her complaints and ankle movements were limited. She also had a constant burning pain even at rest.

Physical examination revealed increased skin temperature, swelling and distal limb oedema, skin discoloration, pain and allodynia in the right ankle (fig 1A). Dorsiflexion was markedly limited (5°). US examination of the peripheral nerves [3] was non-contributory. Thickening of the oblique superomedial band of the inferior extensor retinaculum was apparent (fig 1B). Sono-palpation showed rigidity of the inferior extensor retinaculum. Power Doppler imaging was normal. On sono-elastography, the oblique superomedial band of the inferior extensor retinaculum appeared soft and elastic in small spots but the remaining parts were mainly solid and homogeneously stiff (fig 2A). Foot & Ankle Disability Index (FADI) [4] score was 65. The patient was diagnosed with CRPS according to the Budapest criteria. After four weeks of Fascial Manipulation® [5], the patient was asymptomatic (FADI: 35), maintaining the improvement in swelling and oedema (fig 1C). US (fig 1D) and sonoelastography (fig 2B) findings were also supportive.

Case 2

A 49-year-old woman - who had suffered right tarsal tunnel syndrome for the last five years and left hip pain

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for the last one month - presented with left ankle-foot pain and marked lameness. Rest and anti-inflammatory drugs have only/partially improved her complaints and ankle movements were limited. The patient also reported constant burning type pain even at rest. The medical history revealed chronic left-sided headache and moderate depression.

Physical examination revealed increased skin temperature, huge swelling with distal limb oedema, skin discoloration, pain and allodynia in the right ankle (fig 3A). Dorsiflexion was markedly limited (7°). US examination of the peripheral nerves [3] was non-contributory. US showed thickening of the oblique superomedial band of the inferior extensor retinaculum (fig 3B) and sonopalpation showed rigidity. Power Doppler imaging was normal. On sonoelastography, the oblique superomedial band of the inferior extensor retinaculum appeared soft and elastic in small spots, and the remaining parts were homogeneously solid and stiff (fig 4A). FADI score was 78 and a diagnosis of CRPS was made. After four weeks of Fascial Manipulation® [5], the patient was asymptomatic (FADI: 10) (fig 3C). US (fig 3D) and sonoelastography (fig 4B) findings were also supportive.

Fig 1. Case 1: A) (First visit) Huge swelling with distal limb oedema, skin discoloration, erythema in the right ankle; B) Ultrasound imaging (short axis view) shows thickening of the oblique superomedial band of the inferior extensor retinaculum (1.6 mm); C) (1-month follow-up) Decreased swelling and oedema; D) Follow-up ultrasound imaging (short-axis view) demonstrates reduced thickness (0.8 mm) in the oblique superomedial band. EHL: extensor hallucis longus. EDL: extensor digitorum longus.

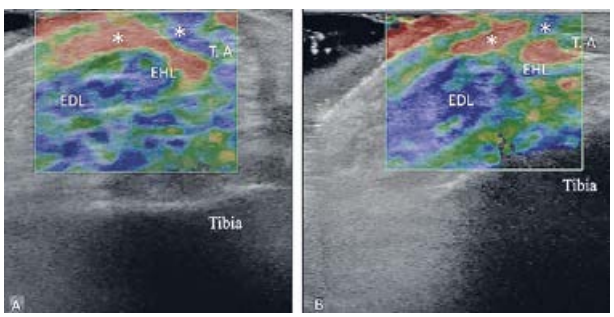

Fig 2. Case 1: A) Sonoelastography (short axis view) of the oblique superomedial band of the inferior extensor retinaculum at baseline and B) (1-month follow-up). *: oblique superomedial band of the inferior extensor retinaculum. TA: tibialis anterior tendon. Tibia: tibia bone. Talus: talus bone. EHL: extensor hallucis longus tendon. EDL: extensor digitorum longus tendon.

Fig 3. Case 2: A) (First visit) huge swelling with distal limb oedema, skin discoloration, erythema in the right ankle; B) Ultrasound (US) imaging (longitudinal view) of the right ankle shows thickening of the oblique superomedial band of the inferior extensor retinaculum (1.2 mm); C) (1-month follow-up) Decreased swelling and oedema; D) Follow-up ultrasound imaging (longitudinal view) shows the reduced thickness (0.74 mm) in the oblique superomedial band. TA: tibialis anterior tendon. Tibia: tibia bone. Talus: talus bone. EHL: extensor hallucis longus tendon. EDL: extensor digitorum longus tendon.

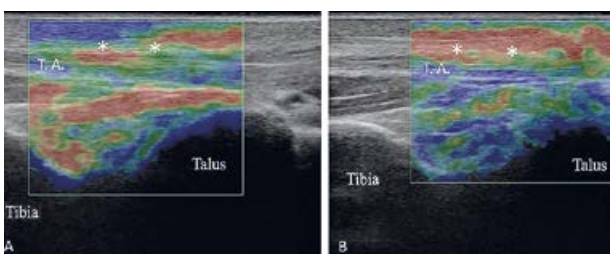

Fig 4. Case 2: A) Sonoelastography (longitudinal view) of the oblique superomedial band of the inferior extensor retinaculum at baseline and B) 1-month follow-up. *: oblique superomedial band of the inferior extensor retinaculum. TA: tibialis anterior tendon. Tibia: tibia bone. Talus: talus bone. EHL: extensor hallucis longus tendon. EDL: extensor digitorum longus tendon.

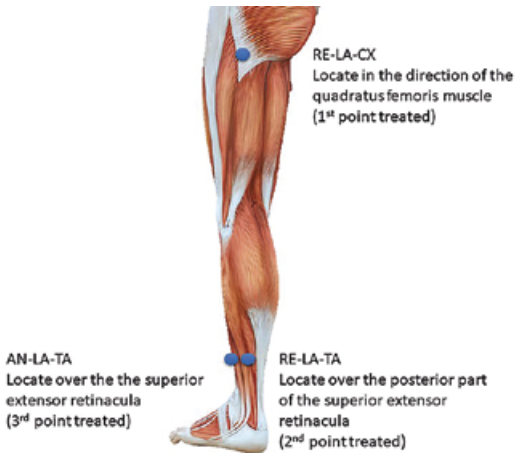

Fig 5. Location of the centre of fusion which were treated. RE-LA = retro-lateromotion; AN-LA= ante-lateromotion; CX=coxa; TA= talo. The blue dots represent the center of fusion.

Discussion

CRSP presents with clinical findings including increased skin temperature, vasodilatation, redness, increased spontaneous protein extravasation, distal limb oedema, periarticular bone loss, pain and allodynia [1]. Additionally, chronic CRPS can lead to chronic oedema, pain, weakness, contractures, and osteoporosis - resulting in serious disability in over 80% of patients [2].

US (static and dynamic) imaging plays a paramount role in the diagnosis and convenient follow up of relevant patients. Similar to "sono-palpation", strain imaging and shear wave imaging allowed us to evaluate regional compressibility [6]. Herein, abnormal thickness and stiffness of the ankle retinacula may be indirect signs of the transmission alteration of the line forces inside the deep fascia of the whole lower limb, stretching/compressing the superficial fibular and sural nerves [7]. Yet, the tension (due to stiff oblique superomedial band of the inferior extensor retinaculum) on the crural fascia is possibly transferred to those nerves, affecting mostly the thin non-myelinated axons commonplace in the superficial parts of the nerve fascicles [8-10]. Herein, as the superficial nerves have more endo/peri/epineurium tissue components compared to the more deeply located nerves [11], it is likely that they suffer a biomechanical tension/stretch/compression manifesting only with autonomic dysregulation.

In order to decrease the entrapment of the nerves (of the symptomatic area), we initially evaluated the region where the nerves go below the ankle retinacula (posterolateral ankle), following the guidelines of the method and individualizing the treatment. The more proximal region approached was the point called re-la-cx that is located above the quadratus femoris muscle on the passage of the sciatic nerve. In both cases, this point was more rigid to manual palpation than the other points. Treating this zone (far from the symptomatic area), both patients reported improvement. The second point treated was re-la-ta on the poster-lateral side of the extensor retinacula. The release of the retinacula has markedly improved the symptoms of the patients (fig 5).

In conclusion, we hypothesize that the symptoms of our patients were due more to changes in the myofascial structures that determine tension in the nerves. Likewise, we also speculate that when the myofascial tension was restored, their neuropathic symptoms decreased accordingly. We underline the importance of the use of ultrasound examination and Fascial Manipulation® in the prompt management of patients with CRPS.

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