

A 36-year-old Man with Right Dorsal Ankle Pain – Ultrasound Examination for Inferior Extensor Retinaculum Injury

CME Credits

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SECTION 2 – ANSWER

CASE

A 36-year-old man experienced pain in the dorsal area of his right foot after being struck by a stone 2 weeks ago. Initially, there had been visible bruising which was absent by the time he visited the ultrasound (US) examination room. However, the swelling was still present on the dorsal side of his right foot. There was not any instability of the ankle. The US transducer was placed on the dorsal side of his right foot [Figure 1a] and gradually moved to the plantar surface [Figure 1b]. US image of the unaffected/asymptomatic side is given in Figure 2. Based on these findings, what is your suggestive diagnosis?

INTERPRETATION

In this case, US examination of the right ankle revealed normal anterior talofibular and calcaneofibular ligaments. However, the inferior extensor retinaculum appeared thickened and showed a loss of fibrillary patterns, particularly in its lateral root [Figure 1]. The extensor digitorum longus tendon seemed to be normal. Herewith, the left inferior extensor retinaculum maintained its fibrillary pattern and was thinner compared to the right side [Figure 2]. The diagnosis of an inferior extensor retinaculum injury was confirmed. Subsequently, the patient underwent physical therapy, including US diathermy and transcutaneous electrical stimulation. After 1 month of treatment, the patient's pain subsided. As the patient experienced substantial symptom improvement after treatment, a follow-up US examination for the affected ankle was not scheduled.

DISCUSSION

The ankle region harbors three main retinacula. The anterior retinaculum covers the anterior aspect of the ankle and consists of the superior and inferior extensor retinacula.^[1] The lateral aspect of the ankle is protected by the superior and inferior peroneal retinacula, while the medial ankle is reinforced by the flexor retinaculum. These retinacula are thickened extensions of the crural fascia, a connective tissue that surrounds the muscles of the lower leg. Their primary function is to stabilize the tendons of the ankle and foot. Since the anterior aspect of the ankle is more susceptible to traumatic injuries, pathologies involving the superior and inferior extensor retinacula are theoretically more common as compared to the flexor and peroneal retinacula.

In this particular case, the primary pathological findings were observed in the inferior extensor retinaculum which consists of four components: the frondiform ligament, oblique inferomedial, oblique superomedial, and oblique superolateral bands.^[1] Herein, it is noteworthy that the oblique superolateral band may not be present in all cases, where the inferior extensor retinaculum is likely to appear as a Y-shaped structure.^[2] The frondiform ligament primarily - comprising lateral, intermediate, and medial roots - wraps the extensor digitorum longus. All three roots can be visualized by US imaging in the axial plane of the foot.

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Received: 24-05-2023 Revised: 10-07-2023 Accepted: 14-07-2023 Available Online: 03-11-2023

Access this article online

Quick Response Code:



Website:
<https://journals.lww.com/jmut>

DOI:
10.4103/jmu.jmu_62_23

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How to cite this article: Chang KV, Wu WT, Özçakar L. A 36-year-old man with right dorsal ankle pain – Ultrasound examination for inferior extensor retinaculum injury. J Med Ultrasound 2024;32:365-6.

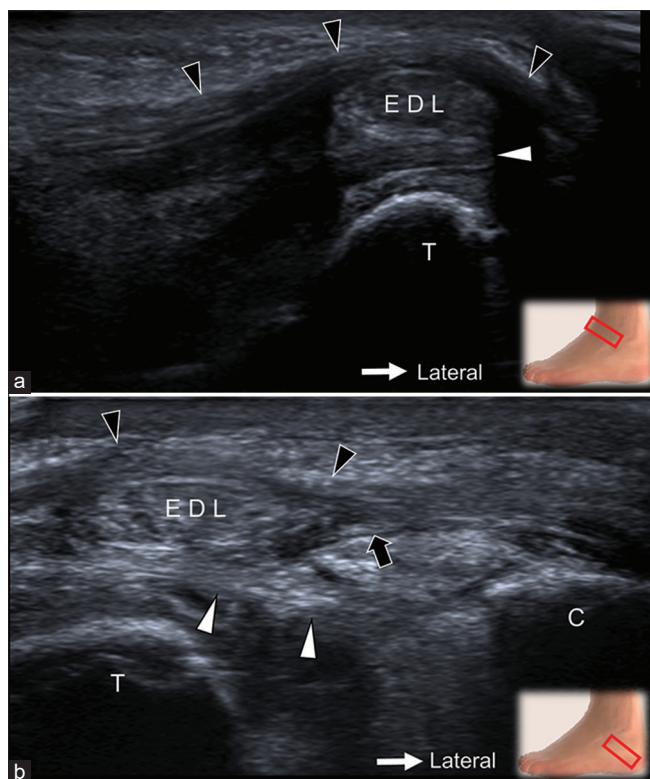


Figure 1: Ultrasound imaging of the right anterolateral (a) and inferolateral (b) ankle. Black arrowheads: Lateral root of the inferior extensor retinaculum, black arrow: Intermediate root of the inferior extensor retinaculum, white arrowheads: Medial root of the inferior extensor retinaculum, T: Talus, C: Calcaneus, EDL: Extensor digitorum longus tendon

When the inferior extensor retinaculum is injured, it frequently becomes thickened.^[3] Traumatic cases may exhibit avulsion from its attachments on the calcaneus, tibia, cuneiform, and navicular bones. Partial or complete tears can result in discontinuity of the inferior extensor retinaculum. In addition, tenosynovitis of the extensor digitorum longus may well be present. Further, in cases where the retinaculum is lax, the extensor digitorum longus can become subluxated whereby dynamic US examination would definitely be contributory. Last but not least, in patients with injured inferior extensor retinaculum, it is crucial to investigate the branches of the superficial peroneal nerve for potential collateral damage.^[4]

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent form. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that name and

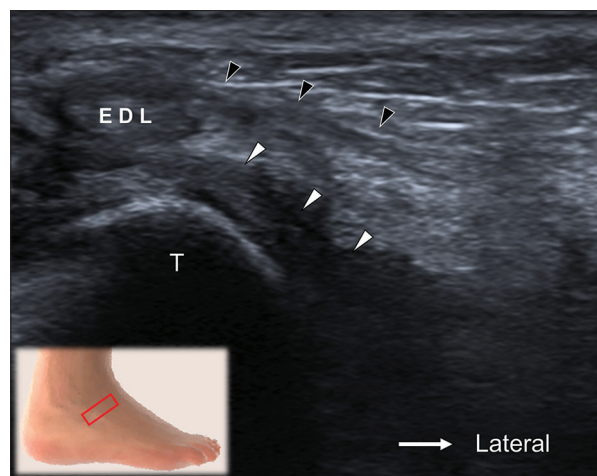


Figure 2: Ultrasound imaging of the left inferolateral ankle. Black arrowheads: Lateral root of the inferior extensor retinaculum, black arrowheads: Intermediate root of the inferior extensor retinaculum, white arrowheads: Medial root of the inferior extensor retinaculum, T: talus, EDL: Extensor digitorum longus tendon

initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

This work was funded by the National Taiwan University Hospital, Bei-Hu Branch; Ministry of Science and Technology (MOST 106-2314B-002-180-MY3 and 109-2314B-002-114-MY3); and the Taiwan Society of Ultrasound in Medicine.

Conflicts of interest

Dr. Ke-Vin Chang, an editorial board member at *Journal of Medical Ultrasound*, had no role in the peer review process of or decision to publish this article. The other authors declared no conflicts of interest in writing this article.

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