

THE VALUE OF COMPUTED TOMOGRAPHY (CT) IN THE DIAGNOSIS OF AN INTRA-ARTICULAR FRACTURE OF THE TARSUS

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Figure 1: Shows a defect in the articular surface of the lateral trochlear ridge.

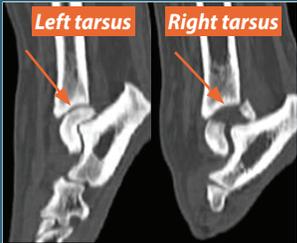


Figure 2: Sagittal planar reconstructions of the normal left tarsus (left) and the fractured right tarsus (right).



Figure 3: Frontal planar reconstructions of the normal left tarsus (left) and the fractured right tarsus (right).



Figure 4: Lateral (left) and skyline (right) post-operative views of the fracture repair.

Introduction

While radiographs are the mainstay for the diagnosis of orthopedic pathology, CT can be an invaluable tool in the diagnosis of orthopedic disease in locations where bony anatomy is complex or when radiographs are inconclusive.

Patient History

Lewis, a 7 year-old MN Labrador Retriever, became acutely non-weight-bearing lame on the right hind limb after play. Lewis was taken to his regular veterinarian where standard radiographs revealed an increased space between the talus and calcaneus and there was a smoothly, margined bone fragment at the caudal aspect of the tarsocrural joint. The distal tibia had a rim of sclerosis and there was moderate soft tissue swelling of the tarsus. Lewis was referred to another board-certified small animal surgeon for evaluation. Radiographs of the right tarsus were repeated, including oblique and skyline projections. From the oblique radiographs, it became apparent that there was a fracture in the lateral trochlear ridge of the talus (**Figure 1**). However, the margin of the distal tibia was suspiciously irregular and it was unclear if there was concurrent fracture of the lateral trochlear sulcus or lateral-most aspect of the distal tibia. **Since a concurrent tibial fracture would alter the surgical treatment plan, Lewis was referred to VSRC for a CT of the tarsus to better characterize the injury, so as to better plan the surgical repair(s) necessary.**

CT Scan (reviewed by Anthony Fischetti, DVM, DACVR)

Right Tarsus: An oblong articular chip fracture, measuring approximately 1.1 cm in its widest diameter, was associated with the plantar and lateral aspect of the lateral trochlear ridge of the right talus (**Figures 2 & 3**). **Diagnosis:** Chronic traumatic articular chip fracture of the lateral trochlear ridge of the right talus; mild subluxation of the right talo-calcaneal articulation; secondary mild degenerative joint disease of the right tarsocrural joint.

Surgical Treatment

The CT confirmed a fracture involving the lateral trochlear ridge of the talus and ruled out concurrent fracture of the articular surface of the tibia. The talo-calcaneal joint appeared mildly unstable, but it was unclear if this was associated with instability caused by the large talar fracture. With the information provided by the CT, it was decided to repair the talar fracture with divergent pins through a standard lateral approach. Since the fracture was located directly medial to the lateral malleolus of the fibula, an osteotomy of the lateral malleolus and reflection of this and the lateral collateral ligament distally was necessary to gain access to the fracture site. Two divergent K-wires were passed in a roughly plantar-proximal to dorsal-distal direction to stabilize the fracture fragment. Once the talar fracture was reduced and stabilized, the talo-calcaneal joint was grossly

stable and did not require treatment. The lateral malleolus was then reduced and cortical screws were used to secure it to the distal tibia. Post-operative radiographs revealed anatomic fracture reduction and alignment, with no visible step in the articular surface (**Figure 4**).

Clinical Follow-up

Radiographs at two months post-operatively revealed complete union of the talar fracture and the articular surface of the talus remained congruent. Lewis's lameness completely resolved. However, at three months post-operatively, Lewis developed an acute right hind limb lameness with a swelling at the medial aspect of the right tarsus. Radiographs confirmed migration of the pins distally and medially, resulting in the pins extending into the subcutaneous tissue medial to the hock. The pins were removed through small stab incisions and Lewis's lameness resolved.

Summary

This case demonstrates the value of CT in assessing bony lesions or trauma in locations where radiographs are inconclusive. Radiographs provide a 2-dimensional image of a 3-dimensional object, and in most situations, high-quality orthogonal radiographic projections provide adequate information regarding bony anatomy. However, in locations such as the elbow, carpus, tarsus, spine, and skull, it is difficult to isolate a particular region without summation artifact from adjacent bony structures. CT eliminates the superimposition of surrounding structures by providing a cross-sectional image. A small slice thickness can create a highly detailed image of the bony anatomy and the resolution is far superior to radiographs. Furthermore, the cross-sectional images can be reconstructed in a variety of planes, to re-create the anatomy in a plane that is most helpful for surgical planning in the region of interest.

Take Away

- The CT at VSRC is rapid yet powerful, and provides **highly detailed** and multi-planar **3-D reconstruction**.
- It allows us to perform scans under sedation alone, **negating the need for general anesthesia**.
- By using CT to closely examine Lewis's tarsus, and with multi-planar reconstruction, we could better characterize the talar fracture. This allowed **accurate pre-operative surgical planning**.
- We were able to **successfully stabilize** Lewis's talar fracture using the information provided by CT, allowing him to eventually return to normal function.





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Fall 2013 – Issue No. 2

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