

*AO Vet News*

*In Part I (AO Dialogue, 1/06), diagnosis and treatment of dorsal articular margin fractures of the distal radius and accessory carpal bone fractures were presented.*

Alessandro Piras and Kenneth A Johnson

# Most frequent fractures of the carpus and tarsus in racing greyhounds

## Part II



**Central Tarsal Bone (CTB) Fractures** The highest incidence of CTB fractures (96%) occurs in the right leg and some of these can be so devastating that they terminate the patient's racing career. There are several factors to consider for a thorough understanding of how these fractures occur. During the anti-clockwise racing in the bends, the right hind leg is procuring propulsion but is also counteracting the centrifugal forces (**Fig 1**). In this situation the central tarsal bone is acting as the buttress for the medial aspect of the tarsus where all the greatest compressive forces are applied as the dog is negotiating the curves. It has also been theorized by Kenneth Johnson et al that adaptative remodeling due to cycling loading can produce changes of the bone mineral density with micro-cracks, predisposing to catastrophic fracture [2-3].

According to the shape and severity, fractures of the CTB have been classified into five types [4]:

- Type I** dorsal slab fragment with no displacement
- Type II** dorsal slab fragment displaced
- Type III** medial fragment displaced
- Type IV** combination of dorsal slab fragment and medial slab fragment more or less displaced
- Type V** comminuted fracture with several fragments

Types I – II and IV are the most common.

Clinical findings vary according to the severity of the fracture; the tarsus can present a mild swelling on its dorsal aspect in Types I and II; severe swelling with crepitation and evident varus deformity are common findings in Types IV and V.

Flexion of the tarsus elicits pain and slow return to weight bearing.

Radiographic examination is mandatory to establish the severity and type of fracture. Plantarodorsal to mediolateral and lateromedial views are usually diagnostic; in Type I fractures it is useful to apply stress in extension in the lateromedial view to evaluate the degree of dislodgement of the slab; in Types IV and IV it is useful to take oblique views to better determine the amount of comminution and shape of the fragments. With very few exceptions, CTB fractures require open reduction and internal fixation to achieve anatomical reconstruction and realignment of the tarsus to improve postinjury prognosis [5].

The CTB is approached by a dorsomedial incision; surgical fixation consists of repair using lag or positional screws. Single dorsal slabs as in Types I and II are repaired with the insertion of a dorsoplantar lag screw, usually of 2.7 mm or 2.0 mm diameter (**Fig 2**).



**Fig 1** A racing greyhound engaging a bend at full speed. In this case the left tarsal region is withstanding the full weight and centripetal acceleration.



**Fig 2a–c**

A Type II fracture of the central tarsal bone treated with a 2.7 mm lag screw inserted in a dorsoplantar direction.



**Fig 3a–e**

**a–b** Preoperative x-rays of a Type IV fracture of the central tarsal bone.

**c–d** postoperative x-rays of the same fracture repaired with a mediolateral 4.0 mm partially treated cancellous screw and a 2.7 mm cortex screw inserted in dorsoplantar direction in a lag fashion.

**e** intraoperative picture: two pointed reduction forceps are holding the reduction during the repair.



The rare Type III fractures are repaired with a single medio lateral screw, although nonvisible at x-ray examination, a nondisplaced dorsal slab is often detected at time of surgery and should be repaired with an appropriate size lag screw inserted in dorsoplantar direction. In hundreds of fractures of the CTB, the authors can only recall one genuine Type III. Type IV fractures are traditionally repaired with a mediolateral 4.0 mm partially treaded cancellous screw and a dorso plantar 2.7 mm or 2.0 mm lag screw. The mediolateral screw is inserted, ensuring that the treaded portion is sunk deep in the fourth tarsal bone.

Type V fractures can be repaired with insertion of multiple lag screws, small washers or a single-hole piece of veterinary cuttable plate could be used to contain very small unfixable fragments. With the surgeon's increased expertise and the flattening of the learning curve, together with the use of appropriate instrumentation and mini implants, the number of Type V fractures considered nonreparable is decreasing.

Although these fractures tend to be quite similar as reported in the classification by Dee et al in 1976 [4], the variability of the shape and position of the fragments can complicate the surgery leading to unpleasant surprises. Recent preliminary data indicate that the degree of comminution detectable with CT scan is greater than could be appreciated, radiographically suggesting that it will probably be necessary to review the classification and the prognosis of these fractures.

Prognosis is usually very good for Types I, II and III, good to fair for Type IV and fair to poor for Type V, nonassociated to other tarsal bone fractures. Although the authors' preference is always surgical repair, there are some reports that casting of some CTB fractures has been successful, with some dogs returning to their full performance.

After surgery, the dog is confined and the tarsus is supported with a cast or a splint for a period variable from 3 to 4 weeks. The cast should be removed as soon as the radiographic control shows signs of healing, starting a physiotherapy protocol to reduce the recovery time.

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## Bibliography

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**Alessandro Piras**  
Oakland Small Animal  
Veterinary Clinic  
Newry, Northern Ireland, UK  
alexpvet@btclick.com



**Kenneth A Johnson**  
Ohio State University  
Department of Veterinary  
Clinical Sciences  
Columbus, Ohio, USA  
johnson.2064@osu.edu