TARSOCRURAL LUXATION

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History and Clinical Signs
Instability of the tarsocrural joint is almost always a result of trauma and involves damage to the lateral and/or medial collateral ligaments with or without concurrent injury to the local tendons. Injury to the ligaments may involve a mid-substance rupture or else an avulsion fracture of the origin. The cause is usually an awkward fall or placement of the foot down a hole whilst running. Alternatively, the instability may be a result of a scraping injury sustained by involvement in a road traffic accident. It is believed that such injuries are caused by the hock becoming trapped between a wheel and the road and the soft tissues being planed off as the wheel slides along the road. It is most often the lateral side that is affected in such a scenario.

Diagnosis
These cases will present with an acute onset, severe lameness. Pain is noted on manipulation of the hock and soft tissue swelling or injury is seen in the vicinity of the tarsocrural joint. Instability may be detectable in the conscious patient but those cases with severe trauma, and particularly those with loss of soft tissues, might be better assessed at a later stage, under general anaesthesia. It is important to assess stability, by
stressing the joint, in both flexion and extension since it is necessary to establish whether one or both components of each collateral ligament is/are injured.

Radiography may be helpful in showing the presence of avulsion fractures and joint space widening due to instability, which might require stressed views to become apparent. It may also show the extent of bone loss in "shearing" injuries, although this is usually known after clinical examination.

**Treatment**

**Non-surgical management** is indicated in cases with only partial rupture of a collateral ligament or an avulsion fracture of a malleolus, which is amenable to closed reduction. The application of a cast for 6 to 8 weeks may allow satisfactory healing and a return to normal function.

**Surgical management** is indicated in the following situations:

(a) Where avulsion fractures of the medial and/or lateral malleoli are responsible for the instability and the fragment is considered large enough to accommodate implants. Surgical management may involve re-attachment of the fragment using a lagged bone screw or pin and tension band wire.

(b) If the injury involves complete rupture of the collateral ligament, and it is treated early, it may be possible to suture the two ends together using an appropriate material such as monofilament nylon or polydioxanone (PDS, Ethicon Ltd.). Injuries to the local tendons should also be evaluated and sutured appropriately. Postoperatively, a cast should be applied to the hock for 6 to 8 weeks.
If the instability is marked and/or conservative management has failed then it may not be possible to reconstruct the ligaments due to the degree of tearing or fibrosis. In such cases it may be necessary to place prosthetic collateral ligaments of monofilament nylon, braided polyester (Ethibond, Ethicon Ltd.) or wire. Many techniques have been described to achieve this (Holt, 1976; Holt, 1977), whereby bone tunnels or bone screws have been used to anchor the prosthesis in place. The earlier methods described did not really take into account the collateral ligaments having two components and thus may not have been able to stabilise the joint in both flexion and extension. A more recently developed method (Aron & Purinton, 1985) addresses this problem and is probably the best one to use, particularly in patients that are large enough to allow placement of the bone screws. On the medial side, a screw is placed in the medial malleolus and then two are placed in the talus, one proximally and one distally, thus allowing placement of a long and a short collateral ligament. The technique is the same on the lateral aspect except that the screws are placed into the lateral malleolus and calcaneus in a similar fashion. Whichever method is used, the hock should be supported with a cast for 4 to 8 weeks postoperatively.

Such injuries in cats can prove problematic to treat because placement of implants to support collateral prostheses is difficult (due to size) and maintaining external coaptation can also be frustrating. The use of a transarticular pin may be considered whilst soft tissue healing takes place. Such a pin is placed from the proximal tibia and across the joint with the latter held in reduction and at a functional angle.
Open luxations should be considered emergencies. If the joint can be thoroughly debrided within the "golden period" of 6 to 8 hours (possibly extended to 12 to 18 hours if antibiotics are given immediately) then it may be possible to prevent the contamination from becoming established as infection. The presence of the latter in a joint, particularly one that is as tight-fitting as the tarsocrural joint, is likely to severely compromise the end result. After this it might be possible to consider ligament reconstruction or prosthetic replacement. However, it is often the case that much soft tissue has been lost and collateral replacement would require a great deal of foreign material to be left in a potentially infected site. Instead it may be worth considering the application of a transarticular external skeletal fixator. This will stabilise the joint whilst soft tissue healing takes place whilst at the same time allowing access to the wounds for daily topical treatment. Such a frame is most easily applied to the medial aspect which works quite well in most cases since the soft tissue loss is usually on the lateral aspect. In small patients, placement of the fixation pins into the metatarsi can be difficult and the use of a Rudy boot may side-step such a problem. The principle behind such a boot is to incorporate the distal pins into a cast applied to the pes rather than drilling them into the metatarsi. The fixator is left in place for about 8 weeks and then, once soft tissue healing has taken place, surgery to correct any instability (as discussed above) can be reconsidered. It is the experience of many surgeons that the soft tissue healing is sufficient to restore stability and that a second operation is often unnecessary.

In cases where the techniques mentioned above have failed or where there is concurrent articular damage which would compromise function in the long-term, it may be necessary to consider tarsocrural arthrodesis as a salvage procedure. Several techniques to achieve this have been described (Stoll & others, 1975; Klause & others, 1989; Sumner-Smith & Kuzma, 1989) but their differences revolve around the method of stabilisation. In all cases, the articular cartilage is removed either by making parallel cuts with an oscillating saw across the distal tibia and trochlear of the talus or by burring the cartilage off the subchondral bone whilst maintaining the articular contours which then provide inherent postoperative stability. If an oscillating saw is used then attention has to be paid to the angle of the cuts since this will determine the fixed angulation of the joint. The aim is to produce a weight-bearing angle which is considered to be 135-145° in the dog and 115-125° in the cat. Stability may then be achieved using a transarticular bone screw or
pin, placed through the talus and up into the tibial medullary cavity, with or without the addition of a figure-of-eight wire from the calcaneus to the tibia. Alternatively, several lagged bone screws can be placed across the joint in varying directions or a plate may be applied to the lateral aspect, after resection of the distal fibula, and contoured around the plantar aspect of the talus which then permits a bone screw to be placed through the plate and across the joint. All these methods are directed at arthrodesis of the tarsocural joint alone and each has its advantages and disadvantages. However, there has been some concern over the incidence of lameness associated with osteoarthritis of the more distal joints of the hock after successful tarsocural arthrodesis (Doverspike & Vasseur, 1991; Gorse & others, 1991). It has, therefore, been suggested that the optimum method of stabilising a tarsocural arthrodesis would be to apply a plate extending from the distal tibia right down to the proximal metatarsi (Klause & others, 1989). This stabilises all the joints of the hock and should promote ankylosis of the distal joints as well as arthrodesis of the tarsocural joint. In the past such a plate has always been applied to the dorsal aspect of the joint and the main long-term complication of this technique is that of implant loosening (DeCamp & others, 1993). More recently, it has been suggested that a bespoke plate can be applied to the medial aspect of the joint. The latter may have certain mechanical advantages but there is the additional involvement of producing a customized implant. Any such arthrodesis requires external support (cast or splinting) postoperatively until radiographic fusion is evident. This may take 6 to 12 weeks depending on the patient's age.

Prognosis
Luxation of this joint carries the worst prognosis of all the hock luxations. There is little in the way of natural laxity in the joint but a good range of movement is essential for painfree use of the hock. Unfortunately, periarticular fibrosis and post-traumatic osteoarthritis may cause a persistent lameness even when stability has been restored. In dealing with such cases it must be remembered that they carry a guarded prognosis. However, the outlook is related, to some extent, to the degree of injury and it is often possible to return a dog to reasonable function, even if this requires arthrodesis.
In the cat it has been suggested that tarsocrural luxation has a poor long-term outlook (Schmökel & others, 1994) and unless stable reconstruction can be achieved, to allow early return to function, then it may be better to consider arthrodesis from the outset.

REFERENCES / FURTHER READING
HOLT, P.E. (1979) Collateral Ligament Prostheses in the Canine Tarsus. *Canine Practice* 6, 53-60