

Surgical Management of Fractures and Tendons



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KEYWORDS

• Ruminant • Fracture • Tendon • Surgery

KEY POINTS

- Orthopedic issues are common in ruminants, and many orthopedic issues involve fractures and diseases affecting the tendons.
- Although fractures and tendon pathology can have serious and debilitating consequences, many can have a successful outcome with proper veterinary management.
- Proper fracture management begins with good stabilization at the time the fracture is found.
- Spastic paresis can take on multiple forms, only 1 of which responds well to surgical intervention.

FRACTURES

Fractures occur commonly in cattle and other ruminant patients.¹ Ruminants are excellent surgical candidates because of their ability to tolerate long periods of convalescence, predominance of time spent lying down, rapid bone healing, tolerance for fixation constructs, and relatively low risk of contralateral limb breakdown. Injuries to the axial skeleton, digits, and skull are also reported with some frequency; however, management of these fractures will not be discussed in further detail. Rather, the discussion will focus on long bone fractures.¹ External coaptation remains a valuable treatment option for selected fracture configurations and particularly for distal limb fractures, and it may be used concurrently with surgical management of long bone fractures in ruminants to improve stability and longevity of internal and external fixation constructs.

Fractures occur commonly in neonates and juvenile patients secondary to dystocia or trauma sustained during restraint and handling, and successful surgical treatment is

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more likely among younger and lighter patients. The most commonly affected long bone fractures diagnosed include metatarsus/metacarpus (approximately 50%), followed by tibial, radius/ulna, humerus, and femur fractures in order of frequency. Decision making regarding fixation of long bone fractures must include consideration of the cost of treatment, likelihood of successful outcome, perceived potential economic or genetic value of the animal, and the location and type of fracture. Many fractures may be addressed by more than 1 fixation type, with varying degrees of potential success and risk of complications; the owner's perceived economic and sentimental value in conjunction with the availability of specialized equipment and surgeon experience dictates which fixation option is elected.

EMERGENCY TREATMENT

The success of fracture repair is predicated on prompt, aggressive, and appropriate emergency care provided at the site and time of injury. Temporary stabilization of long bone fractures improves prognosis by decreasing the risk of closed fractures becoming open, reduces eburnation of the fracture ends and further fragmentation of fracture fragments, provides pain relief, and improves the ability to handle the patient. Management of wounds, shock, or concurrent morbidities improves the chances of survival and fracture healing. Thorough patient evaluation may reveal life-threatening injuries that require treatment prior to transport. Appropriate resuscitation with intravenous fluids can be initiated prior to transport along with early, aggressive treatment of wounds including debridement, bandaging, and parenteral and regional intravenous perfusion of antibiotics. For neonates, the focus on fracture management should not impede the ingestion of sufficient colostrum during the first hours of life. Failure of transfer of passive immunity provides additional management challenges during fracture repair and increases the risk of morbidity associated with surgical site and systemic infections.

As a general rule, fractures below the level of the midradius or midtibia can be stabilized temporarily with splints or casts. Fractures proximal to this level should not be stabilized prior to transport, as the risk of creating a fulcrum effect with splints or casts increases the risk of complications. Increased muscle and soft tissue around the fracture site provides some inherent support to the limb, and improperly placed splints can worsen outcomes by exacerbating trauma to the soft tissues adjacent to the fracture ends, potentiating injury to important neurovascular structures, and leading to skin perforation. Most cattle will adequately protect the affected limb during transport if handled calmly during loading and if allowed to lie down prior to starting transport.

External coaptation using splints for distal fracture stabilization should include a caudal splint extending at least 1 joint proximal to the fracture. In many cases, a second splint lateral to the fracture provides superior support to the injured limb ([Fig. 1](#)). Any nonflexible, sturdy material at hand may be used as a splint including boards, broomsticks, or PVC pipe pieces. Initial disinfection or debridement of any wounds occurs first, followed by placement of a padded bandage. The splints extend to the level of the ground, are applied at 90° angles, caudally and laterally, and are held in place with a firmly applied external tape. Splints extend to the midradius or midtibia for injuries located below the carpus or tarsus, respectively. Fractures located proximal to the carpus but distal to the midradius must include a lateral splint extending to the proximal scapula, and fractures located proximal to the tarsus but distal to the midtibia must include a splint extending to the level of the pelvis.

Fiberglass casts provide an alternate method of temporary fracture stabilization for transport. Some fractures may not be amenable to long-term stabilization using

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