

Hoof Care in the Field – Traumatic Injuries to the Hoof

Avery F. Loyd, DVM, CF

Department of Clinical Sciences, JT Vaughan Large Animal Teaching Hospital, Auburn
University - College of Veterinary Medicine, Auburn, Alabama

Correspondence:

Avery F. Loyd, DVM, CF

afl0020@auburn.edu

JT Vaughn Large Animal Teaching Hospital

Auburn University

1500 Wire Road, Auburn, AL 36832

(334)752-1012

Abstract

Traumatic injury to the hoof capsule is commonly encountered in the field and can result in acute lameness. Ultimately, chronic lameness can transpire if the injury is not addressed. In general, timely evaluation, proper identification of involved structures, and prompt treatment of traumatic hoof injuries are essential to improving recovery and long-term outcome. Additionally, having a good working relationship with a farrier and setting realistic expectations with owners are key to successful management in podiatry related cases. Common traumatic injuries to the hoof will be discussed, as well as application of a foot cast.

Keywords

Hoof Care, Podiatry, Equine, Traumatic Injury, Penetrating Injury, Abscess, Heel Bulb Laceration, Quittor, Hoof Wall Crack, Avulsion, Fracture, Foot Cast

Penetrating Injuries to the Foot

A street nail is a sharp object such as a nail or screw that penetrates the bottom of the foot. Superficial penetrating injuries can seal quickly, and abscess formation can commence. Deep penetrating injuries can result in infection of the coffin bone, coffin joint, navicular bone, navicular bursa, deep digital flexor tendon, and digital flexor tendon sheath. Diagnosis is based on visual examination, radiography (+/- contrast), and synoviocentesis. Treatment is based largely on which structures are involved but in general includes debridement of the tract, synovial structure flushing, arthro-/burso-/tenoscopy, antibiotics (systemic vs regional limb perfusion (RLP)), non-steroidal anti-inflammatories (NSAIDs), tetanus toxoid, and rest. The prognosis good for penetrating injuries that do not have bone, tendon, or synovial involvement, however, prognosis is generally poor if a synovial structure is involved [1].

Abscess

Abscess formation can result from penetrating injuries to the foot by a foreign body (street nail, rocks, sticks, horseshoe nail, sole bruise, etc.). Penetration of the insensitive portions of the hoof allows bacterial infection of the underlying sensitive tissue which results in accumulation of pus. Pressure of the abscess within the hoof capsule can result in moderate to severe lameness, and sometimes non-weight bearing lameness. Other clinical signs associated with a foot abscess are

generalized distal limb swelling, bounding digital pulses in affected limb, and heat in the affected foot. Diagnosis is made based on history of acute lameness, presence of draining tract, hoof testers, local anesthetic nerve blocks, and radiographs. Treatment involves paring out the abscess, removal of undermined horn, daily soaking with warm diluted betadine and Epsom salts for approximately three days, keeping the foot bandaged (+/- poultice pad), NSAIDs, and finally shoeing the foot once the abscess is no longer draining. Subsolar abscesses carry a very good prognosis following a single episode. However, if deeper structures are involved and co-morbidities are present, the prognosis reduces [2].

Heel Bulb Laceration

Lacerations involving the heel bulbs are plagued by proximity to important structures, motion, infection, and repair dehiscence. Severity of the injury and lameness depends on the structures involved which can include the coronary band/hoof wall, collateral cartilages, coffin joint, navicular bursa, digital flexor tendon sheath, superficial and deep digital flexor tendons, palmar/plantar neurovascular bundle, as well as the ligaments distal to the fetlock. If significant hemorrhage occurs, a tourniquet and pressure bandage should be applied. Like other wounds, proximity to synovial structures should be evaluated and synoviocentesis may be necessary to determine involvement. Following aseptic preparation, primary closure of the wound should be performed if possible and application of a foot cast which can help minimize motion and promote wound healing. Additional treatments include systemic antibiotics (+/- RLP), NSAIDs, tetanus toxoid, and rest. It should be noted that lacerations involving the coronary band may result in permanent hoof wall defect. The prognosis for superficial laceration involving the heel bulbs and coronary band is good if primary closure is achieved and the foot is stabilized. The

prognosis may reduce with soft tissue and synovial structure involvement, as well as the presence of infection [3-5].

Quittor

Quittor is infection and necrosis of the collateral cartilages within the hoof capsule. This can occur via a laceration involving the collateral cartilages proximal to the coronary band or a penetrating injury from the sole. A characteristic, chronic draining tract/fistula forms above the coronary band in the quarters. Lameness may be apparent in the acute phase however the lameness may resolve as the lesion becomes chronic. Diagnosis is made based on history, presence of a characteristic fistula, and radiography (+/- contrast). Treatment of quittor is surgical debridement, trephination of hoof wall for ventral drainage, serial flushing, antibiotics (systemic vs RLP), and NSAIDs. The prognosis for conservative management alone is poor, however, surgical treatment carries a favorable prognosis [6].

Traumatic Hoof Wall Crack

Cracks can be superficial or deep and penetrate sensitive tissues. Cracks can result in instability or can be a result of instability of the hoof capsule. Diagnosis is based on visual examination and manipulation. Hoof testers and local anesthetic nerve blocks can be useful in determining pain associated with the crack. Treatment of the crack is based on the underlying cause. Most superficial cracks are non-painful and may not require further treatment other than routine hoof care. Depending on the level of instability and pain, deep or unstable crack may require debridement of affected tissues, stabilization of the crack if present, and supportive shoeing such

as a bar shoe with a pad. The prognosis for a traumatic crack and resolution of associated lameness is good with appropriate stabilization [7].

Hoof Wall Avulsion

Hoof wall avulsions can be partial or complete and are a result of acute trauma or chronic insult to the hoof wall that results in weakening and subsequent avulsion. Radiographs may be warranted in cases of traumatic hoof wall avulsion to evaluate underlying structures. Partial avulsion of the hoof wall involving superficial structures may only require removal of detached insensitive horn and supportive shoeing. However, avulsions of the hoof wall involving deep structures can become infected and require debridement, RLP, and supportive shoeing.

Complete avulsion of the hoof capsule is uncommon that can result from trauma, laminitis, and systemic events (such as selenium toxicity, sepsis, endotoxemia, etc.). Trauma to adjacent structures should be evaluated. Treatment includes pain management, application of a heart bar shoe to the contralateral limb, daily wound cleaning/bandaging in the acute phase followed by long term application of a foot cast changed every two-four weeks. The prognosis for complete avulsion of the hoof capsule is guarded to grave for long-term soundness [8].

Fracture of the Distal Phalanx and Navicular Bone

The distal phalanx and navicular bone can be primarily fractured due to trauma. The distal phalanx can fracture secondary to concurrent disease such as pedal osteitis, laminitis, keratomas, etc. The treatment depends on the type of fracture observed but can include external coaptation (bar shoe and pad vs. foot cast), internal fixation, pain management, and rest. The prognosis for

fracture of the distal phalanx and navicular bone varies depending on articular involvement, fracture healing, development of osteoarthritis, and athletic goal for the horse [9-10].

Injury to the Collateral Ligaments of the Distal Interphalangeal Joint

Traumatic injury to the collateral ligaments of the distal interphalangeal joint (DIPJ) can occur in conjunction to other injuries to the hoof or be presented as occult challenging lameness conditions. While ultrasound can be helpful to diagnose tears in the origin of the DIPJ collateral ligaments, these ligaments lie primarily within the hoof capsule. Therefore, MRI remains the gold standard for diagnosis of these injuries. Injury to the collateral ligaments of the DIPJ carry a fair to good prognosis for return to work [11].

Application of a Foot Cast

Indications for application of a foot cast (phalangeal cast), considerations for differences between forelimb and hindlimb casting, complications of casting, and how to apply a foot cast will be discussed.

References

1. Kilcoyne I, Dechant JE, Kass PH, et al. Penetrating injuries to the frog (cuneus ungulae) and collateral sulci of the foot in equids: 63 cases (1998–2008). J Am Vet Med Assoc 2011;239:1104–1109.
2. Findley JA, Pinchbeck GL, Milner PI, et al. Outcome of horses with synovial structure involvement following solar foot penetrations in four UK veterinary hospitals: 95 cases. Equine Vet J 2014;46:352–357.

3. Janicek JC, Dabareiner RM, Honnas CM, et al. Heel bulb laceration in horses: 101 cases (1988–1994). *J Am Vet Med Assoc* 2005;226:418.
4. Ketzner KM, Stewart AA, Byron CR, et al. Wounds of the pastern and foot region managed with phalangeal casts: 50 cases in 49 horses (1995–2006). *Aust Vet J.* 2009;87(9):363–368.
5. Sloan PB, Self KA, Kang Q, Lutter JD. Equine heel bulb lacerations: 62 cases (2004–2018). *J Am Vet Med Assoc* 2022;260(12):1541-1546.
6. Smith MR. Infection of the cartilages of the foot. *Equine vet. Educ.* (2014) 26 (11):580-583.
7. Dabareiner RM, Moyer WA, and Carter GK. Trauma to the sole and wall. In: *Diagnosis and Management of Lameness in the Horse*, 2nd edn., Eds: Ross MW and Dyson SJ. St Louis: Elsevier Saunders; 2011. p. 309-315.
8. de Gresti A, Zani DD, D'Arpe L, and Scandella, M. A singular case of traumatic total hoof capsule avulsion. *Equine vet. Educ.* 2008;20(8):406-410.
9. Baxter GM. Coffin Joint and Distal Phalanx. In: *Adams and Stashak's Lameness in Horses*, 7th edn., Ed Baxter GM. Hoboken, NJ : Wiley-Blackwell, 2021. p. 465-471.
10. Lillich JD, Ruggles AJ, Gabel AA, et al. Fracture of the distal sesamoid bone in horses: 17 cases (1982–1992). *J Am Vet Med Assoc* 1995;207:924–927.
11. Beasley B, Selberg K, Giguere S, et al. Magnetic resonance imaging characterisation of lesions within the collateral ligaments of the distal interphalangeal joint – 28 cases. *Equine vet. Educ.* 2020; 32(10):11-17.