

# AABP FACT SHEET

## DEEP DIGITAL SEPSIS



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### Description

Deep digital sepsis causes severe pain and lameness. Cattle are usually unwilling to bear weight on the affected limb (**Figure 1**). Swelling above the hoof (coronary band) is always present and typically asymmetrical. The most common initial causes are sole ulcer (60%), white line disease (20%), foot rot (10%), and the remaining 10% result from other diseases. In the majority of the cases, the veterinarian will be able to determine the original lesion responsible. The lateral hind digit is the most commonly affected (82%) and the medial front digit is a distant second (11%).



**Figure 1.** Cow affected with deep digital sepsis in the lateral digit of the left hind foot.

### Diagnosis

Diagnosis of deep digital sepsis can be made by physical examination of the swollen digit. Localized, asymmetrical swelling usually begins at the coronary band and includes the heel bulb of the affected digit (**Figure 2**). Often a hoof block has been applied to the unaffected digit without resulting improvement in the gait of the cow. Radiography is not considered necessary for diagnosing this condition. It is often possible to feel the tuberculum flexorium and navicular



**Figure 2.** Deep digital sepsis primarily caused by a complicated sole ulcer. Note the swelling around the heel bulb and prolapse of tissue through the ulcer site.

bone by probing the fistulous tract (sole ulcer and white line abscess) with a finger and arthrocentesis of the distal interphalangeal (DIP) joint to visually examine joint fluid may be easily performed to confirm joint infection prior to drilling.

In deep sepsis secondary to foot rot there is usually a fistulous tract extending from the interdigital space into the adjacent distal interphalangeal (DIP) joint. In those secondary to complicated sole ulcer, there is often a tract from the ulcerated sole into the DIP joint. The deep flexor tendon is often avulsed from the third phalanx or ruptured (**Figure 3**) if the affected digit can be overextended beyond the posture of the unaffected digit.

There may be fistulae into the DIP joint in the heel bulb or above the coronary band with sepsis secondary to white line disease.

Septic processes beginning in the region of the DIP joint may extend proximally along the deep flexor tendon. Tendonitis extending proximally more than 75 mm or 3 inches above the dewclaws may involve the branch of the deep flexor tendon supporting the unaffected digit resulting in a poor prognosis if surgery is performed.



**Figure 3.** Longitudinal section of a bovine digit with chronic septic arthritis, showing the widening of the distal interphalangeal joint, ruptured deep flexor tendon and sole ulcer.

### Treatment

Conservative therapy with antibiotics and analgesia seldom results in a cure or even significant improvement. In the interest of patient welfare, therapeutic choices are euthanasia, slaughter, or surgery and the AABP guidelines on treatment and handling of the severely lame cow should be followed when managing each case.

Several surgical options exist for each of the combinations of structures affected by the septic processes. Intravenous regional analgesia with 20cc 2% lidocaine injected distal to a tourniquet placed in the middle of the metatarsus or metacarpus can facilitate examination of the lesions and is essential prior to surgery.

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## Deep Digital Sepsis *continued*

Two techniques for surgery are commonly used:

### 1. Digit Amputation

Amputation of the digit has been the most common standard treatment in the field, and the median survival time after amputation is reported to be between 6 and 15 months.

Amputation may be done with obstetrical wire by cutting through the distal end of P1, the proximal interphalangeal (pastern) joint, or P2. Alternatively, the pastern joint may be disarticulated with a surgical knife. Whatever technique is chosen, the amputation should be performed high enough so that the cut surface is free of signs of infection, loose fat should be removed, and any smooth cartilage surfaces should be roughened to promote granulation and second intention healing. Control of hemorrhage is usually through the application of a non-adherent dressing and bandaging, changed at 48 hour intervals. Healing is complete over several months (**Figure 4**).



**Figure 4. Completely recovered digit amputation. Notice the thin sole and short length of the toe of the remaining digit which is now bearing all the weight.**

### 2. Digit Salvage

Digit salvage procedures offer the potential to extend the productive life of cattle with deep digital sepsis. The general principal of all digit salvage surgical techniques is to remove most necrotic tissues (corium, distal part of the deep flexor tendon, and navicular bone), provide adequate drainage of the joint, and promote ankylosis of the resected joint.

The degree of pain which cows are inflicted with differs dramatically

from case to case. Therefore, the veterinarian should evaluate the surgical candidate not only by examination of the lesion itself, but mainly by judging how likely the patient will be to remain ambulatory during the post-operative period. Cows with extreme difficulty walking are poor candidates for joint resection since pain worsens shortly after surgery. No surgical attempt should be made for those animals that are no longer ambulatory. The prognosis is less favorable for cows affected with lameness in multiple limbs.

A technique that may be readily used in the field involves opening the back of the DIP joint, either through a vertical incision incorporating a sole lesion (such as a complicated sole ulcer), or a horizontal heel incision just above the coronary band (**Figure 5**). Using either approach, a knife is used to dissect down on to the navicular bone, cutting



**Figure 5. Resection of the DIP joint (heel approach). Close up view of the DIP joint after removal of deep flexor tendon and navicular bone.**

whatever remnants of the deep flexor tendon that remain. Removal of the navicular bone allows direct access to the condyles of the DIP joint, where a drill track can accurately be placed across the joint. Removal of the navicular bone is facilitated by splitting the bone in half with a drill bit and use of a dental rongeur to elevate the edges so that collateral ligaments may be incised. A 1/2-inch diameter drill track is directed to emerge either just below or just above the coronary band and after placement of a nylon rope or penrose drain the surgical approach is sutured and the foot bandaged.

### Aftercare

Veterinarians should consult the AABP fact sheet on welfare guidelines for veterinarians presented with the severely lame cow, so that adequate care and management of the cow is provided post-surgery. **AABP**