Radiographic Interpretation of Horses with Clinical Signs of Infection or Joint Disease

I. Radiographic Interpretation of Soft Tissue Infection

1. Cellulitis
2. Fistulography

II. Radiographic Interpretation of Bone Infection

1. Osteomyelitis in the Adult Horse
   A. Distinct Cortex of Compact Bone and Well-Defined Periosteum
   B. Indistinct Cortex of Compact Bone and a Poorly Defined Periosteum
2. Osteomyelitis in the Immature Horse

III. Radiographic Interpretation of Joint Disease

1. Infectious Arthritis
2. Secondary Joint Disease

I. Radiographic Interpretation of Soft Tissue Infection

1. Cellulitis

Radiographic evaluation of a horse with clinical signs of cellulitis is done primarily to determine the presence of a radiodense foreign body and signs of osteomyelitis. **The radiographic findings to be evaluated with cellulitis are the presence of the following:**

- **Extracapsular soft tissue swelling (E-STS)**
- **Radiodense foreign body**
- **Gas in the soft tissues (Figure 3-1)**
- **Periosteal reaction or cortical destructive change in the area of the STS**

E-STS is identified by increased density and a loss of normal soft tissue planes. Horses with chronic cellulitis often have a draining tract (Figure 3-2). These patients should have a special radiographic examination with a positive contrast agent injected into the tract. This special procedure is called "fistulography."

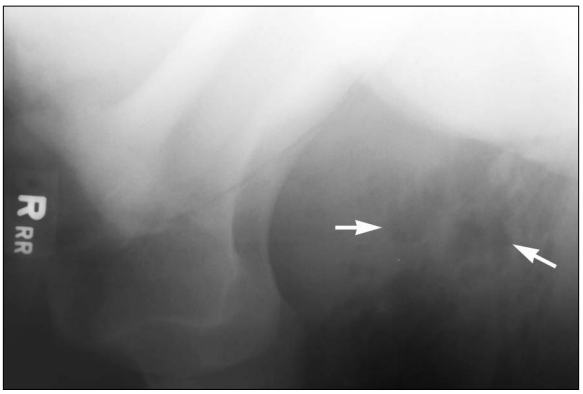

Figure 3-1. *Gas within the soft tissues is one of four radiographic signs associated with a diagnosis of cellulitis. The gas seen in the tissues caudal to the stifle was produced by a gas-forming bacterial infection. Penetrating wounds, fistulous tracts, compound fractures, and iatrogenic lesions are the other causes for gas accumulations in the soft tissues.*

Figure 3-2. *Extracapsular soft tissue swelling and a chronic periosteal reaction at the lateral aspect of distal P1 without gas in the soft tissues were identified radiographically in a horse with a chronic draining tract. The radiographic quality was enhanced by reducing the exposure time by a factor of two permitting better visualization of the soft tissues and periosteal reaction. Fistulography was indicated to evaluate for the presence of a radiolucent foreign body and to determine if the fistulous tract communicates with the chronic periosteal reaction.*

2. Fistulography

Fistulography is extremely valuable in determining the cause, direction, and extent of the soft tissue tract(s) as well as identifying a lucent foreign body. Common causes of the chronic cellulitis with a draining tract are a foreign body, osteomyelitis with or without sequestration, or chronic infection.

A positive contrast agent and sterile delivery agents are required to produce this special examination. The contrast agent used is water-soluble, tri-iodinated compound. A commonly used agent is meglumine diatrizoate and sodium diatrizoate (RenoCal–76 distributed by Bracco Diagnostics, Princeton, NJ but many agents with high iodine concentration can be used). Contrast agents with 50-76% concentrations are utilized in equine fistulography because the soft tissue thickness is often great. An assortment of delivery agents is recommended for this procedure including teat cannulas, plastic intravenous catheters, and Foley catheters. A 4-inch, 10 or 12-gauge teat cannula is the preferred delivery agent used in our practice. An assortment of Foley catheter sizes is desirable, but the recommended size for common use in equine practice is a 30-French with a 35-cc inflatable cuff.

The opening of a draining tract should be marked using a BB or other small dense marker taped to the skin at the opening of the draining lesion prior to producing the radiographs (Figures 3-3A, B, C). If the relationship between a chronic periosteal reaction and a fistulous tract is unknown, fistulography is indicated to establish the relationship (Figure 3-3D). Survey radiographs must be taken and interpreted for signs of cellulitis prior to insertion of a catheter. Clipping the hair coat and cleaning the region is advised to aid in reducing artifacts. It is recommended that as aseptic a technique as possible be used. Insert the sterile catheter into the draining tract, carefully probing the tract to get as deep into the lesion as possible. When the tract opening is large, the use of a Foley catheter is recommended. The balloon on the Foley catheter should be inflated with sterile water to provide a soft tissue-equivalent background density. The volume of contrast agent varies greatly according to the tract size, depth, and communicating regions. For a simple tract on the distal limb, 10-20 cc of contrast is usually sufficient. Inject the contrast agent in the area and continue to do so as the catheter is slowly retracted. Digital pressure should be applied at the tract opening and an absorbing material should be used to minimize outflow of the agent onto the skin. Radiographs are made using at least two orthogonal projections that profile the area. A second examination should be done *approximately 10-15 minutes* after the first to help identify or confirm radiolucent foreign bodies. When multiple draining tracts are present, each should be injected if contrast does not flow out following prior injections (Figure 3-4). If there is a question of the tract communicating with a joint space, it may be easier to do an aseptic intra-articular contrast injection of the joint. The joint should be injected at a site away from the tract. The increased intra-articular pressure created by the contrast injection should permit the communication between the joint space and draining tract to be identified if one exists (Figure 3-5).

Interpretation of the fistulogram should be directed at determining the cause of the draining tract, direction and extent of the tract, and communication of the tract with a tendon sheath, joint space, or bursa. The cause of the tract may be a foreign body, osteomyelitis with or without sequestration, or chronic infection. The most difficult cause to identify is a lucent foreign body. The radiographic signs of a radiolucent foreign body are a filling defect in the contrast and straight, sharp margination of the defect (Figure 3-6). The foreign body often can be identified more easily on the 10 to 15-minute follow-up radiographs because the contrast volume is reduced and the foreign body may be highlighted by a thin coat of contrast material.