

# On-farm facilitated ankylosis in cattle and other hoof-related lameness treatment methods

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## Abstract

Lameness is an important cause of economic loss in the beef industry due to reproductive inefficiency, weight loss and recumbency leading to increased risk of the affected animal dying or being culled. Lameness must be viewed as an important bovine welfare issue as well. Most lameness in cattle is hoof-based. To do a thorough hoof examination, good hoof restraint is necessary. In many cases where invasive procedures are necessary, regional limb anesthesia (RLA) using lidocaine in the dorsal digital vein (Bier Block) is beneficial. Post-op analgesia using an NSAID such as meloxicam is both important and beneficial. RLA allows one to perform invasive procedures necessary for treatment of septic joints and subsolar abscesses. Treatment of a septic P2-P3 joint involves antibiotics and might involve amputation, facilitated ankylosis via joint lavage/abscess drainage or facilitated ankylosis via drilling through P2-P3 to provide abscess drainage. All these procedures can work. The environment the cow lives in will be important in deciding the best method to resolve the septic joint. It is important to communicate to the client that any treatment of septic arthritis of P2-P3 will be expensive and will require several treatment sessions and owner-delivered aftercare. It will take one to two months before ankylosis has occurred.

**Key words:** bovine lameness, animal welfare, regional limb anesthesia, facilitated ankylosis, post-op analgesia, NSAID

## Septic distal interphalangeal joint (DIJ) interventions performed by veterinary practitioners on farm

Lameness in beef cattle is a common problem in the beef cow-calf industry. Lameness in beef cattle leads to weight loss, impaired reproductive performance, decreased calf weaning weight and sometimes death.<sup>1</sup> I've been in practice since 1988 and I have routinely treated lame cattle, both beef and dairy. I had never found foot work particularly enjoyable. About 10 years ago, I had a narrow escape from disaster while treating a tranquilized, recumbent bull for a claw abscess. The bull woke up from sedation and tossed the owner and helpers off and stood up. Eventually I was able to get the bull down and complete the procedure. That evening I found and bought a used portable hoof chute. I decided that I was done with risking people's (including my own) lives to treat lameness in cattle with ropes and sedatives. Since doing this, I found that I enjoy hoof work with proper restraint and have come to see the importance of hoof health in the welfare of cattle and the financial interest of the owners. Now, I do a fair bit of hoof work, commonly treating hoof rot, traumatic injury, ulcers secondary to screw claw, laminitis sequelae, white line abscesses and hoof wall cracks, etc.

Periodically, I will examine an animal that has a non-weight-bearing lameness and exhibits severe swelling immediately proximal to the coronary band. The history usually involves a

producer who has diagnosed "foot rot" and has treated with a single or multiple doses of an antibiotic. I evaluate these cases first by observing movement before putting animal in chute. In addition to gait evaluation, it is advisable to mouth age the animal and assess reproductive status by examining for pregnancy in a female or breeding soundness exam in a male. I then move animal into hoof chute, place in lateral recumbency and restrain the legs. If the cow is non-weight-bearing on the affected limb, I first try to find if the cause is joint sepsis or a non-septic process like a fracture or a tendon avulsion. I do not have an X-ray unit, so I make a diagnosis based on physical exam and history. If a radiograph is felt necessary, I have a colleague in equine practice who performs that. Hoof-related joint sepsis in cattle usually involves the distal interphalangeal joint (DIJ) and often the navicular bone/navicular bursa/deep digital flexor tendon.<sup>1-6</sup> This condition often originates from hoof rot, puncture of sole or the inner sidewall of the claw, or from pressure necrosis ulcers (Rusterholz ulcer or Pododermatitis Circumscripta).

Diagnosing this will involve trimming the bottom of the hoof and often use of hoof testers. If the exam indicates joint sepsis, I describe to the owner the gravity of the situation and then ask if the owner wants to pursue therapy. Sometimes euthanasia or slaughter is the best course of action in the interest of the animal. This is especially true if the cow has multiple claws with ulcers, etc.

If the owner wants to pursue treatment of a septic distal interphalangeal joint/navicular bone, I will offer three options:

- Claw amputation
- Facilitated ankylosis via drilling the DPJ - navicular bone
- Facilitated ankylosis via flow through lavage and possible removal of navicular bone

The first thing to do is to establish regional limb anesthesia.<sup>8</sup> I use a Bier block. Place the tourniquet mid-metatarsal or metacarpal. I use a 1/3-inch-thick bungee cord. Draw up 15 ml 1% or 2% lidocaine and combine with 6 ml tulathromycin solution or ¼ gram sodium ampicillin. I use a 22-gauge infant scalp IV set. The set has a 12-inch extension built in. If one is using a needle alone, I would attach an extension set so if the cow moves its leg, one doesn't lose the vein. I wouldn't attempt an 18-gauge needle – it is too large to get reliable venipuncture. The vein is quite superficial. It is about an inch or two proximal to the interdigital cleft on the dorsal side. Once one tightens down the tourniquet, one has about a 45-minute window before severe tissue hypoxia occurs. It is noteworthy that septic DIJ interventions, and for that matter any invasive foot procedures, are all painful post op. Post-op analgesia is important for both animal welfare considerations and lesion resolution.<sup>7</sup> Plan ahead and discuss with owner the post-op analgesia plans. If slaughter is possibly soon, then a proper tissue residue withdrawal period must be observed.

Claw amputation has been well described. I use this for front limb septic DP joints, especially in smaller (females and younger animals) cattle. I place a hoof block on the contralateral (good) claw before I perform the amputation. Recovery is uneventful (unless the ground environment is frozen mud). I place the cow on florfenicol at labeled dose (20 mg/kg or 9.1 mg/lb) at no more than 12 ml per site for three treatments and administer meloxicam 1 mg/kg q48H for 12-14 days).

Resection of the DIJ using a drill is an option if the environment is dry (not much mud) and the animal is on pasture. I use a 12 mm (½-inch) bit starting plantar (or palmar) to dorsal from the back edge of the heel bulb exiting just distal to the dorsal coronary band. Curettage of necrotic bone is beneficial. I always place a block on the contralateral (good) claw before doing anything else. Another approach is to drill from lateral to medial about 2/3 of the way from dorsal to plantar (palmar) and about ½ the way from top to bottom of the hoof so to go through the DIJ. With this, opening the bulb of the hoof to open the plantar/palmar side of the DIJ and cut through the navicular bursa is helpful as drainage is important. This is not a procedure to be tentative about; being bold will yield more than holding back. Flush out the hole with betadine or chlorhexidine solution. Place Penrose drain through hole, plan on flushing daily for several days. Place the cow on florfenicol at labeled dose (20 mg/kg or 9.1 mg/lb.) at no more than 12 ml per site for three treatments and administer meloxicam 1 mg/kg q48H for 12-14 days). Mud has been the big problem I've seen with these (and amputations as well). The toe will tend to tip upward after this as the flexor tendon has been disrupted.

Flow-through lavage is another method of facilitated ankylosis; one can use this method in less-than-ideal conditions. I always place a block on the contralateral (good) claw before doing anything else. In doing the joint lavage one places four to five 14-gauge needles in the joint space. Usually, one needs to aim at a 60-degree angle from the coronary band to get into the DIJ. Since one does this procedure on septic joints, the contents in the septic joint capsule are under pressure so purulent fluid often shoots out when the joint space is found. I use a deworming automatic syringe hooked to an extension set, infusing about 2 L of chlorhexidine solution, moving between the needles. If there is a sole ulcer that communicates with the DIJ, I open this up aggressively. I think opening the plantar aspect of the hoof is a good idea as drainage is important. Removing the navicular bone can be done. Severe swelling on the plantar heel bulb suggests navicular involvement. The navicular bone often becomes a septic sequestrum with septic DIJ. If there is a draining tract coming out of the plantar surface, the navicular bone is probably acting as sequestrum. Resecting the deep digital flexor tendon will cause the toe to tip upward. My experience is the septic contents will ulcerate to the surface on the needle tracts if the plantar surface isn't opened; I would not be tentative here. Consider packing ulcers and incised areas with plaster of Paris pellets infused with clindamycin and cover with a bandage to hold the pellets in. I plan to re-flush the joint two or three more times in the next two weeks. I place the cow on florfenicol at labeled dose (20 mg/kg or 9.1 mg/lb) at no more than 12 ml per site for three treatments.

These three methods all can be done in the field by veterinary practitioners to resolve a septic DIJ. Studies in dairy cattle and bulls have shown that facilitated ankylosis procedures lead to longer herd retention and useful herd life than claw amputation, especially in a hind leg and in bulls. As a field practitioner I find these methods are practical and doable in the field with a minimum of labor. A hydraulic tilt table is extremely useful here though with planning, any of these procedures can be done without a tilt table.

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