### Lameness in Cattle

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Lameness accounts for tremendous production loss in the cattle industry and has been identified as a particular concern to animal welfare. Cattle are relatively stoic animals and often do not show lameness until significant pathology is present.

# **Anatomy and Conformation**

Any discussion of lameness must begin with a review of normal anatomy. Conformation refers to the dimensions and shape of an animal and posture refers to the manner in which an animal stands. Conformation traits may lead to unsoundness as animals grow due to abnormal stressors on bones, tendons, ligaments and joints. When viewed from the rear cattle should stand with feet approximately as far apart as their hips. Base-wide stance (feet farther apart than the width of the hips) is much less common than base-narrow stance, which occurs frequently, especially in beef breeds.

Base-narrow conditions of the rear limbs may contribute to the formation of screw claw as the animal grows. Animals with screw claw frequently develop bruises on the sole of the lateral claw as the lateral (abaxial) hoof wall grows under the hoof displacing the sole dorsomedially. These bruised areas frequently lead to sole ulcers or subsolar abscesses. Likewise, due to abnormal lines of stress on the hoof during weight bearing, vertical cracks frequently develop in the axial hoof wall. Additionally, arthritis frequently develops prematurely in the coffin, pastern, and fetlock joints of affected animals. This condition is common in continental breeds of beef cattle and their crosses. Although the classic twisted or cork screw claw frequently doesn't develop until the animal is 2 or more years of age, the conformation leading to this condition is evident at weaning. Animals with this conformation are usually heavily muscled and base-narrow when viewed from the rear.

When viewed from the side, there should be obvious but not excessive angulation of the joints of the rear limb. Animals with excessively straight rear legs (post legs) are more prone to develop joint, tendon, and hoof diseases. In the authors' experience, large breed beef cattle that are post-legged are more likely to develop cartilage disease in the stifle and hock.

Front limb conformation is also correlated with soundness. When viewed from the front the distance between the feet should be slightly less than the width of the shoulders and the hooves should point straight ahead. Cattle that have toes that point out (laterally) are more likely to develop abnormal hoof growth similar to screw claw in the rear hooves. The adjacent toes on one hoof should be equal length and the distance from the coronary band to the sole at the heel should also be equal.

# Laminitis

Cattle with acute laminitis are generally not as severely lame as are horses with the similar condition. However, chronic laminits is quite common, especially due to high concentrate feeding for high yearling weights in beef cattle. Animals with laminitis develop overgrown "slipper" hooves and frequently suffer vertical or horizontal fissures in the hoof wall due to loss of flexibility of the hoof. Subsolar hemorrhage, bruising and ulceration are frequent sequelae to chronic laminitis. As the hoof grow long, toes the angles of the coffin, pastern, and fetlock joints

change leading to abnormal stresses on these joints and their supporting soft tissue structures. Premature degenerative joint disease is a common occurrence in severely affected cattle.

# Sole Ulcer (Typical Sole Ulcer, Rusterholz Ulcer)

Sole ulcers occur at specific location at the junction of the sole and bulb of the heel in cattle, where there flexor process of P3 exerts additional pressure onto the corium. Subacute or chronic laminitis, abnormal hoof conformation (e.g., screw claw) and hard walking surfaces contribute to the formation of sole ulcers. Bilateral lesions are quite common. Treatment consists of hoof trimming, curettage of the ulcerated tissues, perhaps application of topical antibacterial medication, and placement of a block under the adjacent claw to elevate the affected claw for pain relief. Untreated sole ulcers frequently result in infection of deeper structures such as the coffin joint, deep digital flexor tendons, flexor tendon sheath, navicular bone etc.

### **Interdigital Fibroma**

Interdigital fibroma, (interdigital hyperplasia, corn) are proliferative growths of the skin of the interdigital space caused by chronic irritation or dermatitis. The condition is more common in bulls than females and more common in heavy than lighter weight animals. *Bos indicus* crossbred cattle appear to have a higher incidence of interdigital fibroma than *Bos taurus* cattle. Cattle with splayed toes (very wide interdigital space) or those with an extremely narrow interdigital space appear more at risk for development of corns. Rarely does the problem develop in cattle less than 2 years of age and most animals presented for treatment are 4-7 years of age.

Treatment involves surgical excision of the hyperplastic tissue. Administer local anesthetic and after thoroughly cleansing the area grasp the apex of the interdigital mass with

towel forceps. Make a longitudinal incision along each side of the mass being careful to preserve the axial coronary band. If the interdigital fat pad is incised, it should be removed. Apply topical antibacterial powder on a sterile surgical gauze over the incision. Wire the toes together to hold the bandage and to prevent separation of the claws. Remove the bandage after approximately 2-3 days and continue to confine the animal to a dry area for another 2 weeks. Systemic antibiotics are rarely indicated unless the interdigital fat pad is infected prior to surgery. Some surgeons routinely remove the interdigital fat pad although this technique slightly prolongs postoperative healing.

# **Septic Coffin Joint**

Septic coffin joint is a relatively common sequelae to sole ulcers, untreated interdigital fibroma, toe abscesses, and other relatively simple conditions of the hoof that are left untreated. Placing a block under the adjacent claw may provide immediately pain relief. Systemic antibiotic therapy is generally necessary for resolution of the disease. Joint lavage may be beneficial in acute cases but chronic cases do not respond adequately to this therapy. For valuable animals facilitated arthrodesis may be indicated to salvage the affected joint and to return the animal to productivity. For less valuable animals, amputation of the affected joint at the distal portion of the first phalanx may be the treatment of choice. Amputation is a salvage procedure and longevity of the animals depends on animal weight, which toe was amputated, and level of confinement following surgery.

#### **Interdigital dermatitis**

Generally this condition consists of superficial inflammation of the interdigital skin by *Dichelobacter (Bacteroides) nodosus*. However, in chronic cases the infection tends to involve the claw and cause heel erosions. Most lesions resolve with currettage and topical antiseptic therapy.

### **Interdigital Phlegmon (Foot Rot)**

This necrotic infection, also called infectious pododermatitis or interdigital necrobacillosis, originates from lesions in the interdigital skin of cattle. Affected cattle are lame and may be febrile with reduced feed intake. The condition is typically initiated by trauma to the skin due to rough surfaces such as stones or plant stems and may be more prevalent when the skin is macerated by water, feces or urine. The etiologic agent is *Fusobacterium necrophorum*, which causes a characteristic necrotic odor and the infection may spread rapidly into soft tissues.

Treatment for foot rot may include both topical and systemic modalities. Procaine penicillin G, oxytetracycline, and sulfadimethoxine are all proven therapies. Most treated animals recover in a few days although unresponsive cases may quickly progress to more serious cases involving tendon sheath and joints.

# Digital Dermatitis (Hairy Heel Wart, Verrucous Dermatitis, Strawberry Heel)

This condition is a contagious superficial infection of the skin proximal to the coronary band or interdigital space. The lesion is a proliferative or erosive circumscribed lesion that causes lameness in affected cattle. The more common lesions appear to be circular proliferative areas on the palmar skin adjacent to the heel, frequently with hairs in hyperemic skin which appear erect. Alternatively, the lesion appears erosive with loss of hair and with reddish granulation tissue. In either case the involved tissue is hypersensitive and bleeds easily. Both *Treponema* spp. and *Bacteroides nodusus* have been suggested as causative agents for this disease. These lesions usually respond to topical therapy with oxytetracycline or lincomycin.

# **Fractures of the Coffin Bone**

Fractures of the coffin bone are not uncommon and develop as 2 distinct clinical entities. The first, less common scenario is an acute lameness with little or no soft tissue swelling on the affected limb. When the foot is examined, there is no overt sign of trauma or disease. However, the animal is moderately to severely sensitive to pressure when hoof testers are applied. The fracture is readily identified with radiography of the claw. These patients respond very well to application of a hoof block to the sole of the adjacent claw. The block elevates the injured claw which provides immediate relief from pain and removal of weight from the injured claw allows bone healing to occur. Most animals return to soundness in 6 - 8 weeks following the injury.

Unfortunately the more common scenario for coffin bone fracture involves chronic septic conditions of the foot such as foot rot or sole ulcer which progress to osteomyelitis of the coffin bone. The resultant septic fracture of the coffin generally has guarded prognosis for recovery. Humane slaughter or claw amputation is frequently the treatment of choice for affected animals.

## Stifle injuries

Stifle injuries are common in cattle and one or more structures may be involved. Of the common injuries, rupture of the collateral ligament produces the least degree of lameness. Cattle with this condition are slightly lame and the injury may be easily diagnosed by watching them walk away from you. There is medial-to-lateral instability and the stifle will deviate either medial or lateral, toward the affected side when the animal is full weight-bearing. Restrain the

animal and place fingers of one hand on the medial aspect of the stifle joint while abducting the lower limb. If the medial collateral ligament is torn there will be excessive joint space while the leg is abducted. Place the fingers of one hand on the lateral aspect of the stifle and adduct the lower limb to examine for excessive motion if the lateral collateral ligament is torn.

Meniscal tears cause the next most severe lameness in cattle. The most common injury is similar to other species in that the posterior horn of the medial meniscus is injured more commonly than the lateral meniscus. With acute injury there will be noticeable lameness and there may be evidence of joint effusion. The injury appears to occur more commonly in heavy muscled beef bulls than in other cattle. There may be an audible or palpable "click" during the weight bearing portion of the stride. The mass of the animal usually precludes palpation of the classical anterior drawer sign as may be detected in dogs. However, many beef cattle will tolerate flexion of the affected limb whereby the veterinarian may be able to detect excessive motion in the stifle joint and perhaps grating of bony surfaces due to loss of articular cartilage.

The third common and most severe stifle injury is rupture of the anterior crucial ligament (ACL). This injury causes marked lameness and usually obvious joint effusion. The animal is very reluctant to bear weight on the affected limb.

These injuries are discussed together as they all appreciably shorten the productive life of cattle. Animals with only collateral ligament tears develop degenerative joint disease due to joint instability and abnormal wear of joint surfaces. Animals with meniscal tears do likewise with the added risk of suffering cruciate ligament tears due to the atrophy of leg muscle that frequently rapidly accompanies this injury and more severe loss of stability of the stifle joint. Animals with cruciate ligament tears suffer severe joint instability, rapid muscle atrophy and frequently quickly suffer meniscal tearing and loss of articular cartilage.

Therapy for any of the above conditions consists of confining the animal to a stall or small paddock that is level and free of mud for 6 - 8 weeks. Bulls with anterior cruciate ruptures should not be used for breeding for a minimum of 6 months. Animals with this injury usually do not return to soundness and have permanent muscle atrophy on the injured limb. Analgesics are not recommended during the acute phase of the injury as animals so treated may use the limb excessively and sustain additional trauma to the joint. However, anti-inflammatory agents may prove beneficial after a few months convalescence to assist a bull through a breeding season.

Alternatively, application of a Walker Splint on the affected limb may improve longevity in bulls with ACL ruptures. This device immobilizes the limb for 6 weeks preventing motion and additional soft-tissue damage in the joint while simultaneously allowing fibrosis of the joint capsule. Negative effects of the splint are the additional expense incurred and the degree of pressure necrosis in the flank inherent with this type splint. Following removing the splint the bull should be confined to a stall for an additional 2 - 4 weeks as the bull regains muscle tone on the immobilized leg. He should not be used for breeding for a minimum of 6 months from the original injury.

#### **Coxofemoral luxation**

Coxofemoral luxation probably occurs more commonly in dairy cattle than in beef animals. In beef cattle, the injury occurs more commonly in females than in bulls. The injury is easily diagnosed by physical examination. The animal is acutely lame and the leg and hoof toe out away from the midline. Measure the distance from the greater trochanter of the femur to the tuber ischii on each side. The distance should be the same. Measure the distance from the greater trochanter of the femur to the dorsal spine. The distance should also be the same on each side. Most commonly the head of the femur will displace craniodorsally.

Within 24 hours closed reduction of the coxofemoral luxation may be successful. Heavily sedate or anesthetize the animal with the affected limb uppermost. Place the butt plate of a calf jack in the groin and attach the hook of this instrument to a rope or web strap securely fastened above the coronary band of the animal's foot. Apply steady traction with the calf jack to fatigue the contracted muscles of the upper limb and rotate the leg until the head of the femur is reduced back into the acetabulum. Place hobbles around the rear feet such the legs may abduct approximately as wide as the hips. Leave the hobbles in place for 2 to 4 weeks and confine the animal to a stall or small flat paddock for this time. Although the femur may be reduced more than 24 hours after the injury, the reduction is usually temporary and the femoral head does not remain within the acetabulum.

#### **Femoral Fracture**

Fractures of the femur are uncommon in cattle and this bone is generally difficult to radiograph in adult cattle. Most femoral fractures are readily diagnosed by physical examination. Affected cattle should be confined to a stall for a minimum of 8 weeks. Contracture and swelling of the heavy muscles of these animals serve to reasonably splint the injured bones. These animals should be confined to a flat paddock for at least an additional 4 months. We do not recommend analgesic therapy as freedom from pain may induce the animal to excessively use the injured limb creating additional trauma injury and potentially further displacing bone fragments.

# **Shoulder Injuries in Cattle**

Fortunately, shoulder injuries are relatively uncommon in breeding cattle. Fractures or bruises of the shoulder are occasionally encountered in lightweight cattle while being worked in a chute. This is usually due to excessively wild or excited cattle and/or inadequate footing, maintenance, or design of the working chute.

Fractures of the scapula or humerus occasionally result from bulls fighting. These injuries are readily diagnosed by the degree of lameness and swelling accompanying the injury. In very light muscled cattle, such as dairy breeds, the spine of the scapula, humerus and shoulder joint are readily palpable which is rarely the case with heavily muscled beef cattle, especially beef bulls. Additionally, due to the size and conformation of these animals, these bones and joints are quite difficult to obtain diagnostic quality radiographs.

Fortunately, scapula or humerus fractures usually heal with stall rest in beef cattle. Contracture and swelling of the heavy muscles of these animals serve to reasonably splint the injured bones. These animals should be confined to a stall for a minimum of 8 weeks followed by at least 4 months confinement in a flat paddock area. We do not recommend analgesic therapy as freedom from pain may induce the animal to excessively use the injured limb creating additional trauma injury and potentially further displacing bone fragments.