

TABLE 11.1-1

Lameness-Scoring Systems Described for Cattle

ANDERSON DESCRIPTION	GREENOUGH	SPRECHER ET AL, 1997	WELLS DESCRIPTION
0—Normal gait	1—Normal: gait	1—Normal: Stands and walks normally, flat back topline	0—Gait abnormality not visible at a walk: not reluctant to walk
1—Mild: walks easily, readily; bears full weight on foot and limb but has an observable gait alteration; stands on all four limbs; line of back bone normal	2—Slightly abnormal: stiff uneven gait	2—Mildly lame: Stands with flat back topline; arches back during ambulation; slightly abnormal gait	1—Mild variation from normal gait at walk; includes intermittent mild gait asymmetry of mild bilateral or quadrilateral restriction in free movement
2—Moderate: reluctant to walk and bear weight but does use the limb to ambulate; short weight-bearing phase of stride; rests the affected limb when standing; increased periods of recumbency, may see arching of back bone	3—Slight lameness: Moderate and consistent lameness	3—Moderately lame: Stands and walks with arched back topline; shortened phase of stride	2—Moderate and consistent gait asymmetry or symmetric gait abnormality but able to walk
3—Severe: reluctant to stand; refuses to walk without stimulus, non-weight-bearing on affected limb; “hoops” over limb rather than bear weight; does not use limb when standing and lies down most of the time; backbone arched with caudoventral tip to pelvis	4—Obvious lameness: Still weight-bearing	4—Lame: Arched back topline when standing and walking; obvious diminished weight-bearing in one or more limb(s)	3—Marked gait asymmetry or severe symmetric abnormality
4—Catastrophe: recumbent; unable to rise; humane euthanasia often indicated	5—Severe lameness: non-weight-bearing	5—Severely lame: constantly arched back; difficulty moving	4—Recumbent

TABLE 11.1-2

Joint Communications in Cattle

JOINT	COMMUNICATION	FREQUENCY (%)
Fetlock	Medial to lateral digit	99%
Stifle	Femoropatellar to medial femorotibial	100%
	Lateral femorotibial to medial femorotibial and femoropatellar	65%
	All three together	57%
Carpus	Antebrachiocarpal—no communications	96%
	Middle carpal to carpometacarpal joint	86%
	Middle carpal joint to antebrachiocarpal and carpometacarpal joints	14%
	Carpometacarpal joint to middle carpal joint	86%
	Carpometacarpal joint to middle carpal and antebrachiocarpal joints	22%
Tarsus	Tibiotarsal to proximal intertarsal	100%
	Proximal intertarsal to distal intertarsal	0%
	Distal intertarsal to tarsometatarsal	21%
	Tarsometatarsal joint to distal intertarsal joint	43%



Table 7.7 Common paralyzes of cattle.

	Obturator	Peroneal	Femoral	Sciatic	Radial
Aetiology	Dystocia	Falls, postpartum recumbency	Large neonatal calves unique stretch injury (dystocia)	Pelvic fractures	Prolonged lateral recumbency in GA; some humeral fractures
Signs	Often bilateral Hindlimbs abducted	Knuckling of fetlock	Partial weightbearing possible lateral patellar luxation, discrete quadriceps atrophy in one week	Non-weightbearing	Dropped elbow, knuckled fetlock, inability to advance limb
Diagnosis	Confirmatory signs of pelvic injury	Loss of skin sensation dorsally	Specific neurogenic atrophy, possibly limited skin analgesia	Loss of all distal skin sensation	Signs and some sensory loss over elbow laterally
Differential	Adductor rupture, separated pubic symphysis	Dorsal patellar luxation	Femoral, pelvic fractures hip dislocation (dystocia) muscle tendon rupture	Femoral fracture	Humeral fracture, elbow infection
Treatment	In all five forms of paralysis only supportive treatment can be given: soft bedding, non-slip surfaces, analgesics, and vitamin B complex injection				
Prognosis	Good, but risk of a secondary hip dislocation in struggling (keep hocks together in 'figure of 8' rope until able to stand)	Good	Guarded	Guarded	Good if not sectioned (humeral fracture ends)

Sand cracks

1. Horizontal sand cracks

These are seen in cattle of all ages and occur after a stress in the life of the animal. This stress may be a period of very poor nutrition, e.g. a drought in range cattle, or a disease, e.g. foot-and-mouth disease (FMD) in Africa, or it may occur in a cow carrying twins but still suckling her previous year's calf. The crack will go all the way round the claw and may occur in several claws. Lameness will occur when either the crack becomes infected or causes physical pain. Animals should receive antibiotics and NSAIDs when appropriate.

The condition will only be resolved when all the horn distal to the crack has been removed, either by wear or trimming, and the healthy horn is weight bearing.

2. Vertical sand cracks

This condition is secondary to excessive drying of the superficial layers of the hoof wall and subsequent trauma. The crack starts from the weight-bearing surface of the hoof and extends proximally. These will occur in two ways, either from the top when there is damage to the coronary band or from the bottom as a result of damage to the sole and wall.

In both instances, there is likely to be lameness from infection and physical movement above the underlying sensitive tissue. If there has been damage to the coronary band, stability is vital, so that in the first instance the claw and the foot must be kept bandaged for at least 3 weeks.

The first part of treatment is thorough debridement of the crack. This can be done with a curved hoof knife or motorized burr. Debridement should be carefully done, so that the intact sensitive lamina is not too traumatized.

A 1-cm bar or triangle may be used to make grooves at the end of the crack to redistribute the force and prevent the crack from extending further. Wiring of the crack also prevents further extension and decreases the pain engendered by movement of the wall on the sensitive laminae.

If there is no improvement, the sand crack should be widened from the proximal end and the claw and foot bandaged again.

If the dermis is not infected, polymethylmethacrylate can be applied to fill the defect (Figure 11.4-1). If the sensitive laminae are exposed or infection is present, polymethylmethacrylate application should be delayed until the infection is controlled, and the exposed laminae are covered with keratinized tissue (i.e., dry surface). In severe cases, a wooden block should be applied on the healthy digit, and the animal should be rested in a stall.

The prognosis is good to excellent if the sensitive laminae are not infected. Hoof ointment may be applied to the hoofs to prevent further desiccation. If there is still no improvement, two farrier's sand-crack clips should be hammered into the claw under sedation.

The prognosis for healing must be guarded. If the sand crack is coming from the sole, the prognosis is much more favourable; the wall can be trimmed back in a V shape from the bottom of the crack and it will grow out.

3. White line infection

This is an ascending infection and can be linked with a vertical sand crack. The black area of infection, which often contains very small stones, must be cut out with a hoof knife and the claw and foot bandaged. The animal should be given antibiotics and NSAIDs.

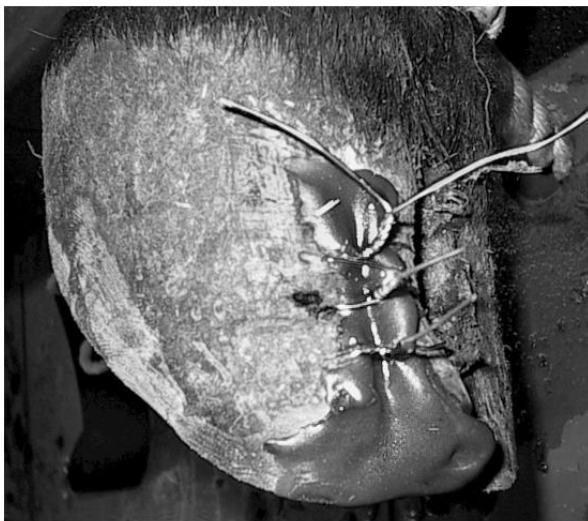


Figure 11.4-1 Vertical crack in the dorsal wall filled up with polymethylmethacrylate and tighten with wires.



Figure 11.4-2 Interdigital hyperplasia lesion with a vertical crack on the lateral digit.

Fracture of the Distal Phalanx

Fracture of the distal phalanx is secondary to trauma or fluorine intoxication. Pathologic fracture secondary to osteitis of the distal phalanx has also been reported. Cattle show a sudden onset of severe lameness and a typical stance: bearing weight on the healthy digit of the affected leg. The lateral hind digit or medial front digit often is affected. In the authors' experience, the front digits are affected more commonly. Examination is important to rule out sole abscess, white line abscessation, or digital interphalangeal (DIP) joint abnormalities that cause similar clinical signs.

Radiographic images of the affected digit are important to diagnose this condition. Radiographs usually show a fracture that extends vertically from the middle aspect of the distal interphalangeal joint to the solar surface with a fracture gap superior at the solar aspect of the distal phalanx (Figure 11.4-3). The palmar or plantar fragment may rotate because of the pull of the deep digital flexor (DDF) tendon.

Treatment consists of immobilizing the affected digit by putting a wooden block on the healthy digit of the affected limb. The affected digit is wired in slight flexion to the wooden block to prevent separation of the palmar or plantar fragment from the parent bone caused by tension from the DDF tendon on the flexor process of the distal phalanx.

The wooden block should be left in place for 6 to 8 weeks, with the animal confined to a small well-bedded stall. After 6 weeks, the block is removed, and the animal is reassessed. Determination of improvement should be based upon clinical signs, not on radiographic evaluation. The fracture gap can take 4 to 5 months to heal and sometimes 8 months.

The prognosis for return to normal function is good if the cattle are treated promptly. If bony proliferation and signs of degenerative joint disease are visible on radiographs or a septic process caused the fracture, facilitated ankylosis of the distal interphalangeal joint or digit amputation should be considered.

Pedal Osteitis

Pedal osteitis is defined as a septic process of the distal phalanx. The infection originates from solar trauma (such as a puncture wound or severe abrasion at the toe) or extension of an existing infection around the distal phalanx. The incidence could be high in feedlot cattle on a concrete floor. Cattle recently placed in a feedlot will fight around a feed bunk, and their hind digits will slip on the concrete floor, thus causing severe abrasion at the toe region and secondary infection.

A preoperative radiograph is helpful to evaluate the extent of the infection. The sole and infected corium is debrided first (Figure 11.4-4). The infected part of the distal phalanx is curetted. Lavage is performed, and the wound is bandaged. A wooden block is applied on the healthy digit of the affected limb. Bandaging and lavage should be continued until the infection is controlled and granulation tissue covers the distal phalanx. Amputation could be performed for economic reasons or if the infection is extensive.

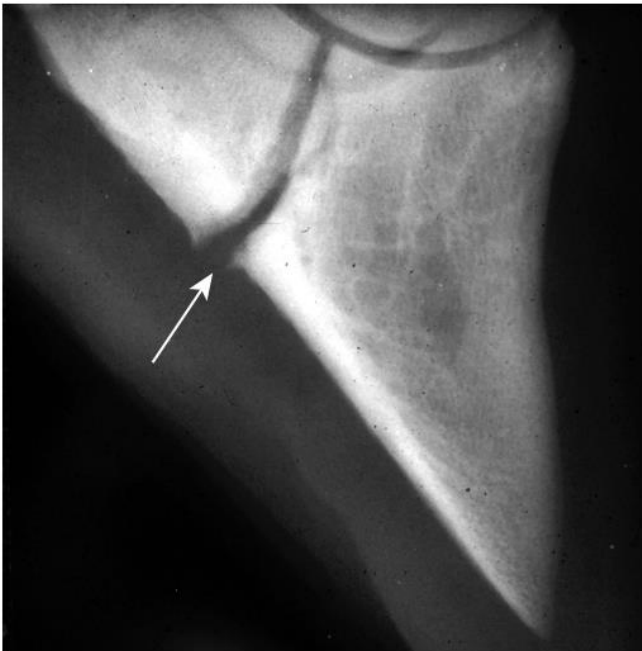


Figure 11.4-3 Interdigital radiograph of a digit. There is a displaced articular fracture of the distal phalanx (arrow) extending from the solar surface to the coffin joint.

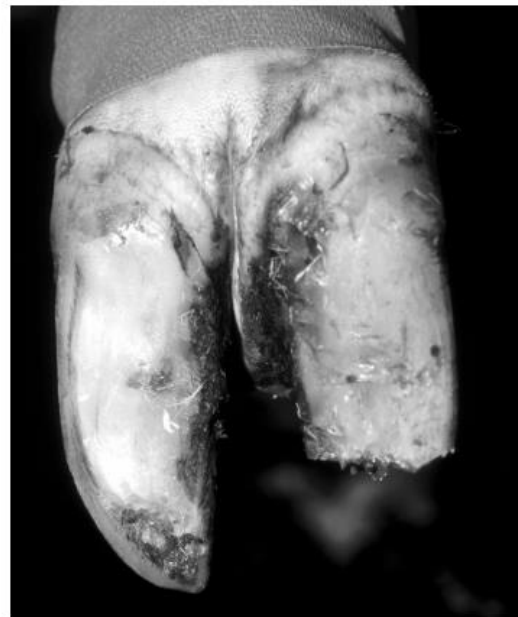


Figure 11.4-4 Severe pedal osteitis of the lateral digit treated with partial amputation.

Antibiotherapy of bone and joint infections

Treatment of osteomyelitis, bone abscess and septic arthritis with systemic antibiotics presents major problems due to difficulties of penetration, especially of discrete foci of purulent infection walled off from vascularised tissues. Appropriate choice (see also Table 1.12), based on first examination, is as follows:

- streptococci: penicillin G, ceftiofur
- salmonellae: oxacillin ampicillin
- penicillinase-producing staphylococci: cephalosporin and trimethoprim and sulpha, ceftiofur
- gram negative organisms: aminoglycosides (streptomycin, kanamycin, neomycin, gentamicin)
- Arcanobacterium: amoxicillin

Treatment of acute osteomyelitis should be continued for two to three weeks after signs of lameness have disappeared. In chronic conditions of bones and joints specific indications for surgery include abscessation with a fistulous track into bone marrow, or subperiosteal sequestrum formation.

Surgery: Joint drainage procedures for cattle include:

- needle aspiration (usually inadequate)
- joint lavage through separate entry and exit portals (14 gauge needles)
- distension irrigation
- arthrotomy with and without synovectomy
- arthroscopy

Surgery has been more effective than medical treatment for septic arthritis in cattle. Delay in treatment reduces the prognosis by allowing further periarticular fibrosis and articular damage. Systemic and intra-articular administration of antimicrobial agents is indicated. If given intra-articularly, the dose rate should not exceed the once daily systemic dose rate. Treatment should start before sensitivity results are available. Ceftiofur Na is often the selected drug and should be given for two weeks after the joint has returned to normal function. In cases where the primary source of infection is the umbilicus, surgical resection is indicated.

If antibiotics and synovial aspiration do not bring improvement within 36 hours, joint lavage is indicated:

- insert two or more 14 gauge needles aseptically into different joint pouches with animal under deep sedation or light anaesthesia (e.g. ketamine) before intra-articular fibrin has developed (very acute cases)
- infuse lavage solution (polyionic) under pressure to distend joint synovial membrane and break down adhesions
- periodically block outflow needle to promote distension
- one to four litres usually used in septic joint
- arthroscopy permits large ingress and egress portal, larger volumes of solution (eight to twelve litres per session), removal of fibrin and visual inspection of the articular cartilage
- when inflammatory process becomes chronic, remove fibrin clots and abnormal synovial membrane by arthroscopy
- alternatively perform arthrotomy, and protect open joint from environmental contamination by a sterile bandage until the incision heals by secondary intention

Table 1.15 Effective therapeutic period and withdrawal times of chemotherapeutic agents in UK and USA (2004/2005). Since drugs are given in various forms and strengths, milk discard times and withdrawal times will vary accordingly: *drug labels should always be checked!*

Drug	Effective therapeutic period (days)	Withdrawal times (days)			
		Milk discard		Slaughter (meat)	
		UK	USA	UK	USA
Ceftiofur Na (Naxcel [®])	1	0	0	0	0
Ceftiofur HCl (Excenel [®])	1	0	0	8	0
Trimethoprim/Sulphadiazine	1	6.5	2.5	34	5
Oxytetracycline 100	1	4	4	21	7–22
Oxytetracycline LA	4	7	4	14	28
Procaine penicillin G	1	2–5	2	3–4	10
Procaine penicillin G + streptomycin	1	2.5	2	23	30
Ampicillin	1	1–7	2	18–60	6
Erythromycin	1	2	3	7	14
Amoxicillin	1	1–7	NP	18–42	25
Framycetin	1	2.5	NA	49	28–38
Cefalexin sodium	1	0	4	19	4
Florfenicol (Nuflor [®])	2	NP	NP	30–44	28–38
Clav. acid/amoxicillin (Synulox [®])	1	2.5	—	42	—
Enrofloxacin (Baytril [®])	1	3.5	NP	14	28

NA = not available, NP = not permitted

British readers are referred to the current data sheets and the current NOAH Compendium.

US readers should refer to the Center for Veterinary Medicine, see Appendix 3 (p. 267)