

LAMENESS IN CATTLE: PART ONE – REVIEW OF COMMON CONDITIONS

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JUDITH ROBERTS examines a wide range of common infectious and traumatic conditions of feet in cattle – pointing the practitioner at the signs to look out for while offering solutions to treatment and control – in the first of a two-part article

LAMENESS is a major animal welfare concern as well as a significant contributor to production losses on farms.

Vets play a vital role in treating lesions, as well as training farm staff to diagnose and deal with particular conditions. This article aims to review the common causes of lameness in cattle with specific reference to cause, signs, treatment and control.

Digital dermatitis

By definition digital dermatitis is an acute inflammation of the hairy skin of the digit, and it is estimated that 70 per cent of herds in the UK are affected.

- **Cause**

Invasion by the bacterium spirochete plays a primary role in the development of the disease, but other bacteria probably play a secondary role. The *Treponema* and *Borrelia* spirochetes have been isolated; they erode the epidermis and stimulate proliferation to form papillae in the affected area (hairy warts).

• Clinical signs

Lesions are usually confined to a triangle between the accessory digits and heel bulbs at the posterior end of the interdigital cleft. There is no swelling of the digit or fever compared with foul in the foot. Early lesions are discrete, circular to oval, hairless, moist, red, painful plaques, with a granular or velvety surface and a halo of white tissue.

Chronic lesions are hairy warts with fronds of fibrous tissue appearing from the lesion. The majority of lesions occur in the hindfeet of cattle that, on most farms, spend more time stood in slurry.

• Treatment

Topical antibacterial therapy is required to treat active lesions – this can be in the form of a topical oxytetracycline spray or by the off-licence use of antibiotics in foot baths. The topical spray should be applied in two coats, allowed to dry before exposure to dirty areas and repeated daily for three days.

Systemic administration of ceftiofur can also reduce the lesions. Formalin foot baths should not be used on animals with active lesions.

• Control

Infection can be spread via purchased cows, hired or purchased bulls, vets and foot trimmers, and sheep (similar spirochetes are advocated in contagious ovine digital dermatitis). All new animals should be isolated and given two antibiotic foot baths – 24 hours apart. To reduce the prevalence in infected herds:

- increase the number of scrapings per day to reduce slurry pool depth in housed areas;
- avoid moving cows through any slurry pools;
- maintain and service scraping equipment;
- use tractor and hand scraping to ensure all areas are reached; and
- disinfect all foot-trimming equipment after use.

A full discussion of foot baths is beyond the scope of this article, but good foot-bathing practice, using suitable agents, should be employed.

Foul in the foot

- **Cause**

Fusobacterium necrophorum is a bacterium shed via the faeces and, as such, high levels are found in slurry where cattle commonly congregate. The bacterium invades damaged or vulnerable skin – for example, skin infected by other organisms (*Dichelobacter nodosus*, *Bacteroides melaniogenicus*) or affected by slurry, trauma or nutrition (because of a weakened or damaged protective barrier).

- **Clinical signs**

Painful foot, pyrexia, drop in milk yield, reduced feed intake – sudden and progressive over six to 12 hours. The whole foot up to the fetlock may be swollen with tender, pink skin (both digits). Swelling causes the two digits to separate, so the cleft looks larger. Skin between the claws becomes necrotic and sloughs.

- **Treatment**

A systemic antibacterial agent course is required – for example, penicillin or cephalosporin. Intravenous regional antibiotics for 20 minutes using an agent suitable for intravenous injection is recommended if severe, progressive infection is present. NSAIDs are recommended for pain relief.

- **Control**

Foot baths reduce the bacterial load present on the animals' feet. Reduce the amount of slurry present in the same way as for controlling digital dermatitis, avoid poached areas and check housing regularly for any sites where foot damage may occur.

Interdigital dermatitis

- **Cause**

D nodosus is related to heel horn erosion – slurry heel.

- **Clinical signs**

Wet dermatitis in the interdigital space exudates and forms a crusty scab. It progresses to heel erosion and is painful.

- **Treatment**

Topical oxytetracycline, systemic penicillin or cephalosporin.

- **Prevention**

Hygiene, foot baths.

Interdigital hyperplasia (fibroma)

- **Cause**

Hereditary component, overweight, splayed digits, inflammation of the skin.

- **Clinical signs**

A fold of fibrous tissue hanging down from the interdigital space. As the lesion increases in size it becomes vulnerable to trauma and ulceration, resulting in lameness.

- **Treatment**

If the animal is not lame, treat the underlying cause.

However, in lame animals, surgical removal is indicated (local anaesthetic technique, grasp with forceps, incise around, excise some of the interdigital fat pad; dress the wound and leave to heal by granulation; and immobilise the digits).

Cryosurgery can be used to freeze and remove the lesion under local anaesthesia if the procedure is available.

Necrotic toe

- **Cause**

This is linked to digital dermatitis with the probable infection due to spirochetes.

- **Clinical signs**

The sole at the toe degenerates – becoming necrotic, malodorous and sometimes pus-filled. Affected animals are usually very lame and walk on their heels, or toe-touch to avoid bearing weight on the area.

- **Treatment**

The necrotic damaged tissue needs to be removed, either by gentle paring or by toe amputation under local anaesthesia. If the pedal bone is affected, the diseased portion should be removed

where possible; otherwise this would be an indication for digit amputation.

Slurry heel

- **Cause**

Cause may be subclinical laminitis, slurry erosion, *D nodosus*.

- **Clinical signs**

Progressive destruction of the heel horn, starting on the axial surfaces of the heel bulbs. It begins as discrete craters, which coalesce over time, becoming darker and eroded. It causes little discomfort until affected by weight bearing, and can predispose to sole ulcer.

- **Differential diagnosis**

Under-running of the heel.

- **Treatment**

Foot trimming, heel balance and topical oxytetracycline spray.

- **Prevention**

Formalin foot baths and foot trimming can be used.

Infection affecting the synovial structures

The infection or trauma that affects these structures results in severe lameness, which is often impossible to treat successfully and is a common indicator for digit amputation or casualty slaughter. Knowledge of the anatomy in the digit is useful when dealing with lesions, so more aggressive treatments can be used when deeper structures are at risk of becoming affected.

Three synovial structures are in close contact in the digit:

- plantar pouch of pedal joint;
- navicular bursa; and
- sheath of digital flexor tendon.

Pedal joint infection

- **Cause**

This is a common complication of diseases that affect the distal region of the digits – for example, sandcrack, white line disease (WLD) and foul.

- **Clinical signs**

It is a very painful and stressful condition. The destruction of bone and tendon is progressive.

- **Signs**

The animal becomes markedly lame. The tissues above the coronary band are swollen, pink and tender (particularly on the front of the foot). An x-ray would reveal that the joint appears more separated and pedal bone texture is lost, proliferating periosteitis of the distal phalanges.

- **Treatment**

Surgery is required to release the trapped infection – either by removing the diseased joint or by providing a means of excellent drainage. Some options are:

- digit amputation;
- arthrodesis by direct ablation of the joint;
- arthrodesis by resecting the deep digital flexor tendon and removing navicular bone; or
- casualty slaughter.

Septic tenosynovitis

This is a complication of septic pedal arthritis, sole ulcer or a retroarticular abscess secondary to WLD.

- **Signs**

A soft, fluctuating swelling extending 10cm above the fetlock and filling the grooves on either side of the flexor tendon. Swelling does not usually occur between the coronary band and the fetlock because of close contact (unless retroarticular abscess is also present).

- **Diagnosis**

Sample from the sheath immediately proximal to plantar/palmar ligament of the fetlock 2cm from the midline. Probe the sole ulcer site and feel for probe.

- **Treatment**

Drainage is as for septic arthritis or reticular abscess. Care should be taken when excising anything from the sheath too high, due to the location of the nerves and blood vessels.

Pedal bone fracture

- **Clinical signs**

Cows often stand with their legs crossed. Lameness is variable and depends on the position of fracture. True (traumatic) fracture is across the posterior third of the bone and involves the joint. Pathophysiological fracture involves the anterior mass of pedal bone and results in detachment of the bone apex.

- **Treatment**

– **True fracture.** Sudden, severe lameness – often of the forelimb medial claw. Confine, immobilise the digit in position of extreme flexion relative to the other digit. Block sound claw. Wire apex of affected claw into block (trim apex to level of block) for four weeks. Prognosis is excellent.

– **Pathophysiological fracture.** Pain when hoof testers are used. No obvious sole lesion, but the animal is recumbent for prolonged periods. Unknown cause, but possibly ischaemic necrosis, allowing fracture along the arch where the digital artery passes into the axial aspect of bone.

Use intravenous regional anaesthesia. Remove the horn to expose the white line, then expose the dermis that will be necrotic overlying the necrotic bone. Black fluid often drains. If it bleeds excessively, rediagnose, amputate apex of the claw with shears or wire (taking care to avoid the joint). Remove the bone fragment, dress for a few days and then glue over the surface. Block sound claw.

Bruising of the sole

Bruises (purple) are of traumatic origin, while haemorrhages have metabolic and traumatic components. It is not possible to differentiate a pure bruise from a laminitic haemorrhage unless a history of trauma is known.

- **Clinical signs**

Blue/purple discolouration, the sole is softened and hoof testers give pain. A history of rough

surfaces, excessive wear and recent overzealous trimming.

- **Treatment**

A soft bed (the pressure encourages growth), and the fragmented sole will need block.

- **Prevention**

Ensure good walking surfaces, particularly after trimming.

Foreign body with abscess

Foreign bodies that do not penetrate the sole will result in pain when weight bearing. If the sole is thick, the condition will be less painful, but the foreign body will work its way through the sole to the corium.

Foreign bodies that penetrate the sole will result in a localised abscess. Abscesses under the front half of the sole are very painful – the heel involves less pain.

- **Treatment**

Remove the foreign body and explore the cavity. Drain, flush and bandage if necessary.

- **Prevention**

Ensure good walking surfaces for the animal are free from stones and flint. Provide good building and track maintenance.

White line abscess

Occurs from external infection penetrating from the outside (pus usually black) or internal pressure following collapse of the pedal bone support system, tearing the white line apart and producing inflammatory debris (cream pus). Most abscesses are in the posterior outer wall of lateral hind claw.

- **Treatment**

Explore the tract, remove pus and remove the wall over the tract.

Sandcracks

Vertical fissures run down the abaxial border of the dorsal surface of the wall. The majority are on the outside front claw. Lameness occurs if it then becomes infected.

- **Cause**

The causes may include poor conformation and weight gain. When the horizontal groove or fissure defect reaches the middle of the claw, the dorsal surface bends round defect.

- **Treatment**

None, unless required – if the animal is lame it suggests infection or pedal involvement. Remove all detached horn, and clean and dress with pressure bandage. Cosmetically, you may need to wire or glue support on to the crack to prevent further splaying. Trim the axial side at the crack of the apex right back (this prevents both sides bearing weight to reduce splaying), smooth the edges, wire or glue and leave for eight to 12 months.

- **Control**

Control with forage and pasture management.

Horizontal fissures

Hardship grooves run parallel to the hairline. Grooves, fissures, broken toes and ridges can be a good indicator of periods of stress, sudden changes in nutrition or severe febrile disease. A groove indicates roughly when the causal insult occurred.

Lesions should not be common in a group of dairy heifers, but may be so in a group of beef calves weaned, castrated, dehorned and sold at the end of autumn. The groove can be so deep it completely penetrates the whole wall (horizontal fissure) with a buckled claw that is bent around the groove to make the dorsal wall concave. The stages are: groove – fissure – thimble – broken toe.

The groove is an indication of temporary short-term stress. Fissures growing out to the apex resemble thimbles, and as this breaks off it leaves a square toe. During the act of breaking off, it is attached only by shreds of dermis/sensitive tissue and is very painful. Once broken, the cow is broken toed.

The mechanical strength of the claw capsule is influenced by changes, shape and condition.

- **Treatment**

Thimbles must be removed under sedation with the animal bearing weight on that toe.

- **Control**

Identify insult and the management and nutritional routine.

- In part two I will cover disorders associated with subclinical laminitis syndrome in cattle.