

Terminology of Foot Diseases

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The terminology of foot disease is confusing, due not only to language difficulties, but to inadequate description of lesions and often to lack of knowledge of the aetiology. For this reason an international symposium meeting in Utrecht recently, drew up a list of the twelve main types of foot lesions seen in cattle (3). The terminology used is based on a description of the first stage of the individual lesions and ignores aetiology which is often found to be uncertain or disputed.

The adoption and use of a system such as this and the classification of colloquial terms within it should lead to a much better understanding within the veterinary profession and eliminate the tendency for authors to describe and classify the later stages or chronic forms of foot disease as separate conditions.

Pododermatitis traumatica for example refers to any mechanical damage to the hoof or underlying structures whether due to foreign body penetration, bruising or to excessive wear. The resulting damage may become septic or remain aseptic. Phlegmon interdigitales refers to a primary subcutaneous inflammation of the interdigital region and includes the conditions more commonly referred to as "interdigital necrobacillosis", "foul in the foot" and the condition commonly referred to as "footrot" in New Zealand.

Environmental factors play a major role in the aetiology of all the conditions described while genetic (excluding conformation) and nutritional factors seem to be of less importance.

The extent of the incidence of lameness and faulty hoof conformation among beef cattle in New Zealand is unknown. Commercial breeders seldom record this information and stud breeders are reluctant to discuss the problem as it relates to their herds. Most agree however that the problem is a significant one affecting all classes of beef cattle. Breed Societies are aware of the problem and most encourage their members to submit stock for inspection and approval by them prior to sale.

From enquiries made among a number of stud breeders it is suggested that the present wastage rate among young bulls due to foot abnormalities (mainly deformed claw) is about 5%. This represents over 1,000 animals annually if the assumption that the total bull population of approximately 62,500 is replaced every three years. Added to this figure are those animals that are culled at an older age because of foot problems which are again mainly hoof deformities. All of the twelve foot lesions listed are seen in beef cattle in N.Z. The possible exception is dermatitis interdigitalis contagiosa which has been shown to be associated with a *Bacteroides nodosus* infection the causative agent of foot rot in sheep. To the best of my knowledge no similar finding has been reported in N.Z. but this does not necessarily preclude its existence. The condition has been recognised and reported on in Australia and the U.K. and several other European countries.

Phlegmon interdigitales

This is a primary subcutaneous inflammation of the interdigital space. There is considerable swelling of the affected area and this is often most obvious at the plantar aspect of the interdigital space. A variety of organisms have been isolated from the lesion, but the one most frequently found is *Fusobacterium necrophorum*. Minor skin abrasions are thought to permit the entry of this and other pathogenic organisms. During its early stages the condition responds rapidly to systemic antibiotics. In neglected cases underlying structures may become involved and the treatment very much more difficult (7, 5, 9, 11).

Dermatitis interdigitalis contagiosa

This is a bacterial inflammation associated with a *B. nodosus* infection and confined primarily to the interdigital skin. During the acute stage there is usually a greyish coloured, foul smelling, serous exudate; the interdigital skin rapidly becomes eroded and separation of the horn particularly at the heel may follow. In Europe the disease seems to be associated with the housing of cattle during the winter months. The condition responds well to topical treatment with antibiotics and astringent agents. Systemic treatment has little or no effect. In neglected cases ulceration of hoof horn in other areas of the hoof and secondary bacterial infection of underlying tissues particularly at the plantar aspect of the interdigital space may follow (9, 8).

Dermatitis interdigitale

This is an acute or chronic inflammation of the plantar or dorsal aspects of the interdigital space usually considered to be associated with wet and muddy conditions. Affected animals are usually only slightly lame if at all and the condition will often heal spontaneously when they are moved to a drier area or turned out to pasture. Where treatment is necessary local application of astringent agents is usually satisfactory (5, 6).

Dermatitis digitale

This includes inflammatory lesions on any other part of the coronary area of the foot. Predisposing conditions are usually similar to those causing Dermatitis interdigitale and the treatment is similar (6).

Ungulysis

This refers to horn destruction of the weight bearing surface of the hoof. It is usually associated with poor housing where conditions are continually damp and unhygienic and the humidity is high. Animals suffering from deformed claw or Pododermatitis aseptica diffusa (Chronica) appear to be much more susceptible. Horn destruction is particularly severe in the region of the sole heel junction and the axial groove. Secondary bacterial infection of underlying tissues may follow if the sensitive laminae are exposed (6, 3).

Dermatitis verrucosa

This refers to the development of a tumor or tumor like growth at the plantar or dorsal aspect of the interdigital space. Treatment by surgery is usually successful (6, 11).

Hyperplasia interdigitalis

This term denotes a variable excess of epi- and hypodermal tissue occupying all or part of the interdigital space. The lesion can be secondary to repeated or chronic inflammatory lesions of the interdigital space or result from a ventral pouching of the interdigital skin which usually contains fat tissue. As this pouch gradually increases in size the skin thickens. Irritation by compression between the digits and contact with the ground and foreign bodies causes further thickening and eventually severe lameness. There may be an inherited predisposition to the latter form. Treatment by surgery is usually successful (2, 5).

Pododermatitis aseptica diffusa

(a) Acuta

The acute form is described as a diffuse acute or subacute aseptic pododermatitis often associated with the overfeeding of concentrates. The pathogenesis is not well defined, but the pathological changes that have been observed include congestion and oedema of the corium particularly over the abaxial wall which becomes extremely sensitive to pressure during the acute phase.

(b) Chronica

The acute form may become chronic or the chronic form may develop without any previous evidence of the acute stage. Lameness is much less severe. Affected feet gradually become deformed because of the abnormal horn growth that follows the damage to the corium. Toes tend to elongate so that the hoof presents a wide flattened appearance. The position of the pedal bone is altered relative to the wall and sole causing increased pressure on the solar corium which in turn leads to defective horn. This increases the risk of solar penetration which may then be followed by secondary bacterial infection of the exposed laminae. The acute condition is usually treated with antihistamines or corticosteroids and the chronic form by hoof trimming when necessary (5, 6).

Pododermatitis circumscripta

This is a specific lesion usually located on or near the sole heel junction towards the axial border. The aetiology is not well defined, but it is generally accepted that the lesion is the result of abnormal horn growth due to increased pressure on the underlying solar corium. Factors that are thought to contribute to the occurrence of the

lesion are; the close proximity of the insertion of the deep digital flexor tendon, exostoses on the pedal bone, deformed or overgrown claws and limb conformation which may cause relative overweight on the affected claws. The lesion occurs more frequently on the medial claw of the front feet of bulls and on the lateral claws of the hind feet of cows (1, 4 & 11).

Pododermatitis traumatica

This refers to damage of the hoof horn and underlying structures caused by the penetration of foreign bodies, bruising or excessive wear. The resulting lesion may remain aseptic as in the case of some bruises, excess wear or small foreign bodies lodged in the hoof horn but not penetrating through to the sensitive laminae. A septic pododermatitis almost invariably follows penetration of the sensitive laminae. Microtrauma of the skin of the interdigital space may be involved in the aetiology of phlegmon interdigitales. **White line disease** should be considered under this heading because it is a combination of excessive wear and penetration of part of the weight bearing surface by small stones (2, 5 & 6).

Deformed Claw

This heading includes acquired and congenital abnormalities some of which are thought to be inherited. Horn growth and horn wear may be influenced by a number of factors related to breed, seasonal conditions, nutrition, stress factors such as "road work" or the lack of it, pregnancy and even udder size. There is also the inter-relationship between horn wear and conformation e.g. close hocks, straight hock and high pasterns (4, 2 & 6).

Fissura Ungulae

(a) Verticales

Vertical cracks are defined as a loss of continuity of the hoof horn usually on the dorso axial aspect of the hoof in the direction of horn growth. The condition may be associated with very dry conditions or to injury of the coronary band. Front feet are more commonly affected than back feet. Acute vertical cracks may be associated with severe pressure on the right bearing surface of the hoof or result from foreign body penetration. Acute vertical cracks may be seen on any aspect of the hoof wall.

(b) Transversalis

Transverse cracks are defined as a loss of continuity of hoof horn on a plane parallel to the coronary band. The lesion usually occurs on all four feet and when present has usually followed a severe metabolic upset or severe febrile disease (6).

Suggested Terminology

Synonyms or Colloquial Terminology

1. Phlegmon interdigitales (Primary Subcutaneous inflammation)
Fusobacterium necrophorum
2. Dermatitis interdigitalis contagiosa (Primary cutaneous inflammation) *Bacteroides nodosus*.
3. Dermatitis interdigitale
(usually plantar or dorsal interdigital areas).
4. Dermatitis digitale
(bulb and other coronary areas).

Interdigital necrobacillosis; Foul in the foot; Infectious pododermatitis; Footrot (NZ); cellulitis.

Footrot (UK, Europe & Aust.).

Interdigital eczema; scald.

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| 5. Ungulysis
(Hoofhorn destruction) | Chronic necrotic pododermatitis; Stable foot; Chronic Serofibrinous pododermatitis. |
| 6. Dermatitis verrucosa
(Tumor or tumor like growth at plantar or dorsal end of interdigital cleft) | Grease heel; papilloma, plantar dermatitis. |
| 7. Hyperplasia interdigitalis
(excess epi-and hypodermal tissue occupying the interdigital space usually dorsally) | Interdigital Fibroma; chronic Interdigital dermatitis; corn; interdigital cyst; vegetative interdigital dermatitis; Tylom. |
| 8. Pododermatitis aseptica diffusa
(a) Acuta
(b) Chronica | Diffuse Serofibrinous pododermatitis laminitis; Founder; Founder; Slipper foot. |
| 9. Pododermatitis circumscripta | Solar ulceration; prolapse of sole; bruised sole; specific solar contusion. |
| 10. Pododermatitis traumatica
(Damage to hoof horn or underlying tissues due to foreign bodies or excessive wear) | Includes "white line disease"; general or localised bruising; Foreign bodies; Aseptic pododermatitis; septic pododermatitis; foot abscess; suppurative laminitis. |
| 11. Deformed Claw | Beak claw; Corkscrew claw; Claw hypoplasia; scissor feet; stall claw, stable claw, overgrown claw, bilateral symmetrical overgrowth. |
| 12. Fissure Ungulae
(a) Verticales
(b) Transversalis | Sandcrack, vertical hoof wall fissure; Thimbling; Horizontal fissure of horn wall. |

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