

LAMENESS

Pathology description

Lameness is the third most important problem on many modern dairy farms after *mastitis* and reproductive failure. The considerable economic losses are attributable to the cost of treatment, decreased milk production, decreased reproductive performance and increased culling. The incidence of lameness has steadily increased over the past 20 years and on some farms over half of the animals become lame at least once each year. Lameness is a symptom related to several diseases; with multifactoriel origins. nutritional mismanagement, wet environment, abrasive or slippery floor surfaces, stall comfort and design and health events causing production of poor quality horn. We will focus on the 3 main infectious diseases responsible of lameness usually resulting from poor hygiene.

FOOTROT

- **Description**

Footrot has a worldwide distribution and is usually sporadic but may be endemic in intensive beef or dairy cattle production units. The incidence varies according to weather, season of year, grazing periods and housing system. On average, *footrot* accounts for ~15% of claw diseases.

- **Origin**

Injury to the interdigital skin provides a portal of entry for infection. Maceration of the skin by water, feces and urine may predispose to injuries. *Fusobacterium necrophorum* is considered to be the major cause of *footrot*. It can be isolated from feces, which may explain why control is difficult. Other organisms, such as *Staphylococcus aureus*, *Escherichia coli*, *Arcanobacterium* (*Actinomyces*) *pyogenes* and possibly *Bacteroides melaninogenicus*, can also be involved.

- **Symptoms**

Footrot is a subacute or acute necrotic infection originating from a lesion in the interdigital skin. Pain, severe lameness, fever, anorexia, loss of condition and reduced milk production are major signs of the disease.



Footrot with swelling, crack and ead tissue between the toes

Interdigital dermatitis

- **Description**

Interdigital *dermatitis* is a low-grade infection of the interdigital epidermis that causes a slow erosion of the skin with discomfort but no lameness unless the lesion becomes complicated. It is seen worldwide but is most prevalent under poor hygienic conditions in intensive dairy production. Morbidity is usually high in housed animals, particularly toward the end of the winter. When animals in such herds are examined, it is not unusual for 100% to have lesions of varying degrees of severity. The prevalence of heel horn erosion may increase in herds that have a high prevalence of interdigital *dermatitis*, suggesting a close relationship between the 2 diseases.

- **Origin**

Interdigital *dermatitis* is caused by a mixed bacterial infection, but *Dichelobacter nodosus* has been considered to be the most active component. The disease is most commonly seen when humidity is high, in temperate climates and under poor hygienic conditions, especially in housed dairy cattle. The source of the infection is the cow itself and the infection spreads from infected to non-infected animals through the environment. *Dnodosus* cannot survive >4 days on the ground but can persist in filth that is caked onto the claws.

- **Symptoms**

The bacteria invade the epidermis, but the organisms do not penetrate to the dermal layers. As the condition progresses, the border between the skin and soft heel horn disintegrates, producing lesions similar to ulcers or erosions. At this stage, the lesions cause discomfort.



DIGITAL DERMATITIS

- **Description**

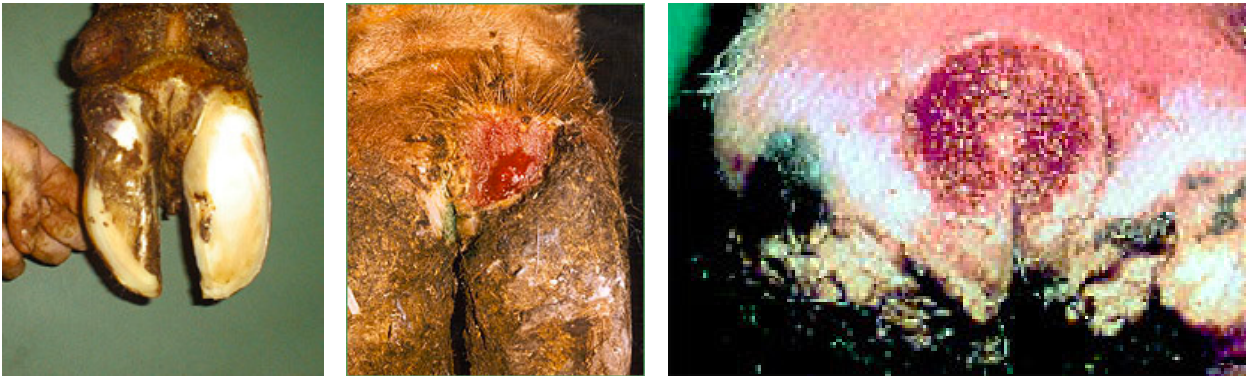
Digital *Dermatitis*, also called *Mortellaro* disease, is a highly contagious, erosive and proliferative infection of the epidermis proximal to the skin-horn junction in the flexor region of the interdigital space. Morbidity within a herd can be >90%. It can affect any breed or age group, although young animals with a poor immune response are most susceptible. It spreads rapidly from newly acquired animals, or it may be introduced by any mechanical vector, eg, boots or hoof trimming instruments. The prevalence is highest in the fall and winter and is lowest if the animals are pastured.

- **Origin**

Deep in the epidermis of erosive/reactive lesions, 2 types of *spirochetes* can be demonstrated. One is a long, spiral, filamentous organism $12 \times 0.3 \mu\text{m}$ and the other is a shorter, thicker spirochete $5-6 \times 0.1 \mu\text{m}$. However, it is thought that there is a multifactorial etiology with multiple organisms involved. *Dichelobacter nodosus* is likely to be implicated. Strong circumstantial evidence suggests that a virus plays a part in the pathogenesis of the disease, but to date, none has been isolated.

- **Symptoms**

Two main types of lesions are seen, one is erosive/reactive, the other is proliferative or wart-like. Both forms cause varying degrees of discomfort and may give rise to severe lameness. Sometimes, one particular form predominates in one area, but both forms can be seen in the same animal. The 2 forms likely represent different stages of the disease process. Some of the variation may be due to concurrent interdigital *dermatitis*.



Cost

- Decrease milk production.
- Reproduction consequence.
- Extra replacement costs.
- Treatment costs.

Vectors

- **Environment**
Contaminated litter, the germs can be found in the feces.
- **Material**
Mechanical vectors, e.g. boots or hoof trimming instruments.
- **Animal**
Newly acquired animals.

→ MAIN VECTOR: contaminated litter

Preventive action

- **Good hygiene**
On farm level, especially the bedding and the walk area.
- **Claw trimming**
Under normal circumstances, horn growth keeps pace with wear and the growth/wear rate at the heel is greater than it is at the toe. Horn that is dry tends to be extremely resistant to wear and may grow longer than normal. The claws of cattle maintained in straw yards tend to become overgrown. Conversely, the claws of cattle maintained in extremely wet conditions are softer than normal and more prone to wear. If the animals are housed on concrete surfaces the lateral hindclaw tends to wear less than the medial. In many countries, claw trimming is performed by a professional claw trimmer rather than a veterinarian. In these cases, collaboration is recommended in which the role of each party is clearly defined, eg, the claw trimmer would keep extensive records for epidemiologic investigation by the veterinarian.
- **Footbath**
Using a footbath is not a substitute for either good hygiene or claw trimming. Permanent, concrete foot baths may measure 3 meters in length and be a least 0,9 meter wide and 20 cm deep. Ideally, 2 baths should be built in sequence. The first bath would contain a foot-washing solution, the second would be medicated. Both should have drainage pipes. Portable baths constructed from fiberglass are available (dimensions must be at minimum 2 meter per 0,75 meter per 20 cm). A hoof mat, consisting of a sheet of foam plastic encased in a perforated plastic cover, is also available. The foam is soaked in medication that squirts up between the claws when the cow walks on the mat.

Controlling action

Herd measures like footbaths, hoof mats, foaming systems are also essential to control the extension of the disease. It has been reported that if claws are correctly trimmed at least once each year, longevity of the herd may be extended by 1 year. Individual treatment, including disinfecting and healing processes may be useful. Antibiotic treatment if necessary must be implemented under the advice of your veterinarian.

Advised protocols

For every possible vector, a hygiene protocol must be implemented. See the specific purpose protocol :



GENERAL
HYGIENE



PERSONNAL
HYGIENE



HOOF
HYGIENE

Source: *The Merck Veterinary manual, 10th edition*