

Lameness Control in Sheep

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Cause

Most outbreaks of lameness in sheep are caused by either interdigital dermatitis (scald) or footrot; footrot is responsible for 90 per cent of sheep lameness. Interdigital dermatitis and footrot are caused by the bacterium *Dichelobacter nodosus*. The UK's temperate climate provides an ideal environment for transmission of the bacterium that causes footrot. The important risk factors for foot lameness are damage to the interdigital skin by exposure to moisture and mechanical trauma, and transmission of *D. nodosus* from infected sheep. Other risk factors include movement of sheep onto the farm without effective quarantine and perimeter fences that are not stock-proof.



Fig 1 Many outbreaks of lameness in lambs are caused by interdigital dermatitis.

Interdigital dermatitis can cause severe temporary lameness which interferes with grazing. Prompt treatment ensures that there is no impact on growth rate but delayed treatment can cause failure to gain weight or even weight loss

Clinical signs

Interdigital dermatitis is the most common cause of lameness in lambs and occurs most commonly when underfoot conditions are wet often in late spring. At grass, the prevalence is much greater in lambs than in ewes, but interdigital dermatitis can become problematic in housed ewes, when straw bedding becomes wet and warm. The interdigital skin is red and swollen and covered by a thin layer of white exudate. There is no under-running of the hoof wall or sole.



Fig 2 Scald; the interdigital skin is swollen and covered by a thin layer of white exudate.

Diagnosis

The diagnosis is confirmed by inspecting the sheep's feet after removing any contamination.

Welfare implications

Interdigital dermatitis causes severe lameness which is a major welfare concern although sheep become sound 1-2 days after appropriate treatment.

Treatment

Individual cases of interdigital dermatitis can be treated topically using oxytetracycline aerosol sprays. When several animals are affected, treating all sheep in the group in a 10% zinc sulphate solution or 3% formalin in a footbath usually provides effective control. After footbathing sheep must stand in a dry area so that the formalin or zinc sulphate can dry on the feet - design of the handling facilities is essential. It is usually necessary to repeat the foot bathing at weekly or two weekly intervals throughout the risk period to prevent disease transmission and more lame sheep. No foot trimming is necessary for interdigital dermatitis.



Fig 3 These handling pens and footbath must be cleaned before further use.

Prevention and control

Footbathing is most successful in treating interdigital dermatitis in lambs and preventing footrot. There is no scientific evidence that any one type of footbath treatment formulation is more effective than another. At concentrations greater than 5%, formalin can cause severe irritation of the interdigital skin. The practice of regularly replenishing footbaths with a few splashes of concentrated formalin solution should be avoided.

Footrot

Footrot is an extremely painful disease and affected animals can lose weight rapidly. Sheep with footrot are very lame, remain recumbent for long periods and may not bear weight on the affected leg. When both forelimbs are affected, sheep walk on their knees. There is swelling and moistening of the interdigital skin with infection spreading to separate the horn tissue of the sole from the corium and extend up the wall in neglected cases. There is a characteristic foul-smelling discharge. Footrot is caused by the bacterium *Dichelobacter nodosus*.



Fig 4 Footrot has caused severe lameness in all three Blueface Leicester rams in this group.



Fig 5 Swollen knees caused by time spent grazing on his knees.

Economic impact

The prevalence (percentage of affected sheep on any day) is estimated to be 8-15 per cent in UK flocks. There is increasing evidence that a high prevalence of lameness (>2%) is indicative of failure to treat lame sheep appropriately (not quickly enough and using the wrong treatment). One flock study reported an annual loss of around £6 per lame sheep affected by footrot mainly the result of lost production not treatment costs.

Clinical Signs

Inflammation and superficial infection of the interdigital skin extends to under-run the sole and hoof horn of the inner hoof wall. Further separation and under-running of the hoof horn of the sole continues and may extend to the outer hoof wall. There is a characteristic smell of necrotic horn/exudate. The whole hoof capsule may be shed in severe cases. Chronic infection leads to grossly mis-shapen and overgrown hooves.



Fig 6 Early case of footrot with infection spreading under the horn tissue so that horn becomes

separated from the sole. This foot must not be trimmed.



Fig 7 Footrot where infection has spread under the horn tissue of the sole. The reddened corium has become exposed causing pain. This foot must not be trimmed.



Fig 8 Advanced case of footrot with infection under-running the sole and extending up the inner hoof wall to the coronary band. This hoof horn must not be trimmed.

In chronic cases, the hoof walls and toes become overgrown and mis-shapen, trapping dirt and inflammatory exudate between the inflamed, granulating soft tissues of the sole and overgrown horn.



Fig 9 The hoof walls and toes have become grossly overgrown and mis-shapen caused by prolonged lameness and ineffective treatment.



Fig 10 A neglected case of footrot with complete under-running of the sole and an overgrown and mis-shapen outer hoof wall. Excess flaps of horn can be trimmed about one week after antibiotic treatment when the foot will be much less inflamed and painful.



Fig 11 Neglected case of footrot - this must not happen. Antibiotic treatment - injection and topical spray are essential. Only large loose flaps of horn should be removed with sharp hoof shears after an interval of about one week or so.



Fig 12 Hooves become overgrown because the sheep does not walk on that leg. Grossly over-grown feet (see above) suggest an extended interval to correct treatment.

Diagnosis

Moderately to severely lame sheep must be examined that day. Diagnosis of footrot is based upon the characteristic appearance of lesions although it may prove difficult to differentiate from contagious ovine digital dermatitis (CODD) in some cases and veterinary examination is essential. Sampling for bacteriology is rarely undertaken in the field because of cost.

Treatment

Foot-bathing is not an appropriate treatment for sheep with footrot although, if used correctly, it may limit the spread of the disease during its early stages.

The best current treatment for footrot is an injection of long acting oxytetracycline injected intramuscularly at a dose rate of 10 mg/kg, together with removal of any debris from the interdigital space and use of an antibacterial spray. Most sheep recover from lameness within a few days, a few may take up to 10 days and lesions heal over a similar period. Affected sheep must be isolated with other sheep undergoing similar treatment. Some veterinary practitioners report a much better response using tilmicosin compared to oxytetracycline when treating advanced lesions of footrot however there are concerns about the routine use of macrolide drugs in farm animals.

Paring the hoof horn in cases of footrot exposing the corium delays healing and is not recommended. Overzealous paring and exposure of the sensitive corium in combination with frequent formalin footbath treatments may result in the generation of toe fibromas.



Fig 13 Toe fibroma caused by excessive paring and exposure of the corium.



Fig 14 Toe fibromas can be very difficult to treat.

Foot paring may be undertaken when the sheep is no longer lame and the foot is grossly overgrown. The grossly overgrown horn should be trimmed with sharp foot shears after about one week when the footrot lesion is much less inflamed. Only grossly

overgrown flaps of horn that could trap dirt should be removed. It must be recognised that the foot has become overgrown because the sheep has not been bearing weight on that foot.

Prevention and control

Foot trimming

Foot trimming has no role in the treatment of footrot nor should it be considered as a preventive method when planning control programmes. Foot paring must not be undertaken when the corium is exposed and bleeding. However, where the cause of lameness is not obvious, and the corium is not exposed, careful paring of overgrown horn may be necessary to check for the presence of white line disease and an abscess.



Fig 15 Foot trimming has no role in the treatment of footrot nor should it be considered as a preventive method. Excessive trimming of the wall in this case causes most of the weight to be carried by sole which is not normal.

Footbathing sheep before housing and after gathering, where facilities are excellent and the standing is hard can kill off bacteria on the surface of the foot and reduce transmission of infection. Footbathing is most likely to be successful to prevent footrot.

Trimming excess horn whilst leaving a weight bearing wall is best done once the sheep is no longer lame; trimming should not be viewed as part of the initial treatment for footrot. If a chronically lame sheep does not respond to remedial treatment, it should be culled.

All purchased stock must be quarantined for one month and examined for footrot before introduction

into the main flock. Footbathing could be undertaken during this quarantine period as directed by the farmer's veterinary surgeon.

Vaccination

Prior infection does not confer any appreciable immunity to footrot. There are few reported flock trials of footrot vaccines in the UK upon which to base informed opinion. It is recommended that all sheep are vaccinated thereby limiting future environmental contamination and challenge. A single dose of vaccine is given which can be boosted four to six weeks later if significant levels of disease still remain in the flock. Subsequent doses should be administered according to prevailing conditions or in anticipation of climatic conditions which favour disease.

Potential disadvantages associated with vaccination include; cost (£1.50 per dose), short duration (booster vaccinations required every six months or before the anticipated challenge period), and occasional severe localised reaction at the injection site.

Whole flock metaphylactic injection

Where the prevalence of lameness is very high, whole flock metaphylactic injection has produced excellent results for the control of footrot and CODD in carefully selected flocks with secure perimeter fences and good biosecurity. Farmers should consult their veterinary practitioner for advice on whole group/flock antibiotic injection as this practice has been questioned by the most recent RUMA guidelines.

RUMA guidelines are that "Fluoroquinolones, 3rd and 4th generation cephalosporins and long acting macrolides have an important place in the therapeutic armoury for serious diseases of both animals and humans. The use of these classes in both human and veterinary medicine has produced particular debate and the following guidelines for use should be followed. Fluoroquinolones, 3rd and 4th generation cephalosporins and long acting macrolides should only be used therapeutically not for prophylaxis".

Genetics

Selecting sheep that are more resistant to footrot is desirable and possible. Estimates from many countries indicate that resistance to footrot in ewes is heritable at 10 - 20%. Currently selecting replacements from ewes that have not had footrot,

especially in a group where there have been ewes with footrot will help to reduce susceptibility to these conditions.

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