

Reducing lameness in sheep



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Introduction

Lameness is a common health and welfare issue that has a negative impact on ewe fertility, lamb growth rates and longevity. It can cause considerable pain and discomfort to the affected sheep, while incurring financial loss to your business.

Producers who understand the condition and its many and varied causes can reduce the physical and financial effects of having lame animals on the farm.

You need to devise a strategy to suit your situation and employ various management tools to prevent and reduce its effect on your flock. It is important to correctly diagnose the cause of lameness and to only use antibiotics when necessary and effective.

This manual describes in detail the different diseases that can cause sheep to go lame. It outlines a five-point plan to tackle these diseases, including culling persistent offenders, quarantining all incomers and treating affected sheep appropriately.

The impact of lameness

The most common causes of lameness are the infectious bacterial diseases scald, footrot and Contagious Ovine Digital Dermatitis (CODD).

As a result of having a lameness problem in your flock, you can expect to incur added treatment costs from routine foot trimming, footbathing and increased use of antibiotics. You can also expect production to be negatively impacted due to lameness causing reduced fertility, lower growth rates and reduced longevity.

Seriously affected sheep are easy to spot because they hobble or ‘kneel’. However, even mild cases of footrot or contagious ovine digital dermatitis (CODD) are infectious, so early treatment is vital.

As well as financial losses through impaired performance, increased prevention and treatment cost, culling and so on, lameness also has implications for animal welfare.

In Great Britain, the level of lameness in flocks varies according to season and management. Farmers who have comprehensively managed lameness achieve levels as low as 2%.



Top tip

Identify the number of lame sheep within your flock now. This is the base level against which improvements can be measured. Establish a treatment and prevention strategy with your vet and set an achievable target.

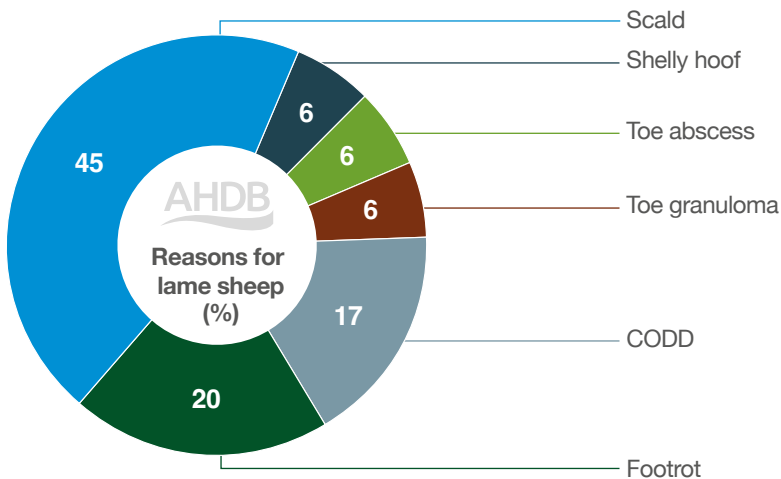


Figure 1. Reasons for lame sheep

The healthy foot

A normal foot has a hard wall of horn around two toes, each with a softer sole horn at the base.

In healthy sheep, the interdigital skin between the toes is pale pink and dry, with a layer of fine hairs. The sole horn is only 2–3 mm thick and is easily damaged by thorns or other sharp objects. The wall horn bears the sheep's weight, so a normal foot has wall horn that is usually proud of the sole. Sometimes, this wall horn curls over the sole horn. Although this may not cause the sheep harm, it became common practice to trim this horn away.

About 50% of farmers who were trimming have stopped this practice and, as a result, have seen fewer lame sheep.

Think 'foot check' rather than 'foot trim'

Research has shown that it is detrimental to trim feet of lame sheep with footrot or scald because it delays healing and increases the risk of footrot returning. Trimming equipment can carry infectious bacteria, which could spread disease in your flock.

Trimming may be needed where the hoof horn is deformed, but these sheep should be culled as soon as possible because they are likely to become lame again. If a diagnosis cannot be made without trimming, keep it to a minimum (see page 16 for best trimming practice).

Wall horn grows at the rate of about 5 mm per month and the length of sheep feet varies naturally over the seasons. Over the course of a year, growth often matches wear, so trimming is not necessary.

In a healthy foot, the horn of both sole and wall is intact without smell, heat, softness or separated horn. If a sheep is not lame and its feet look reasonable (see Figure 2), leave well alone.

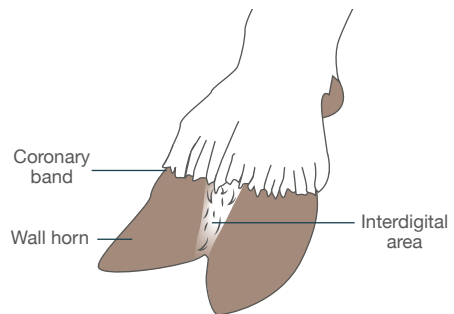
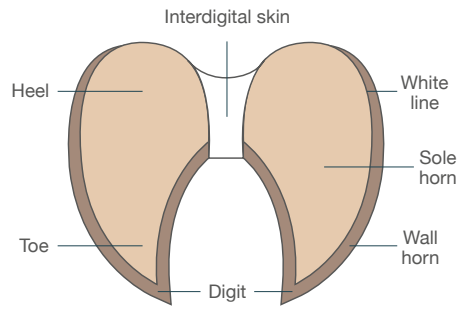
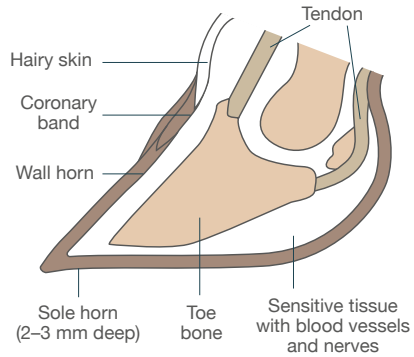


Figure 2. The healthy foot

Reduce on-farm bacterial challenge

To avoid spread on farm:

- Consider high traffic areas; for example, gateways and troughs, where bacteria can spread
- Consider handling facilities, equipment and hands – you can transfer bacteria from one foot to another when inspecting sheep

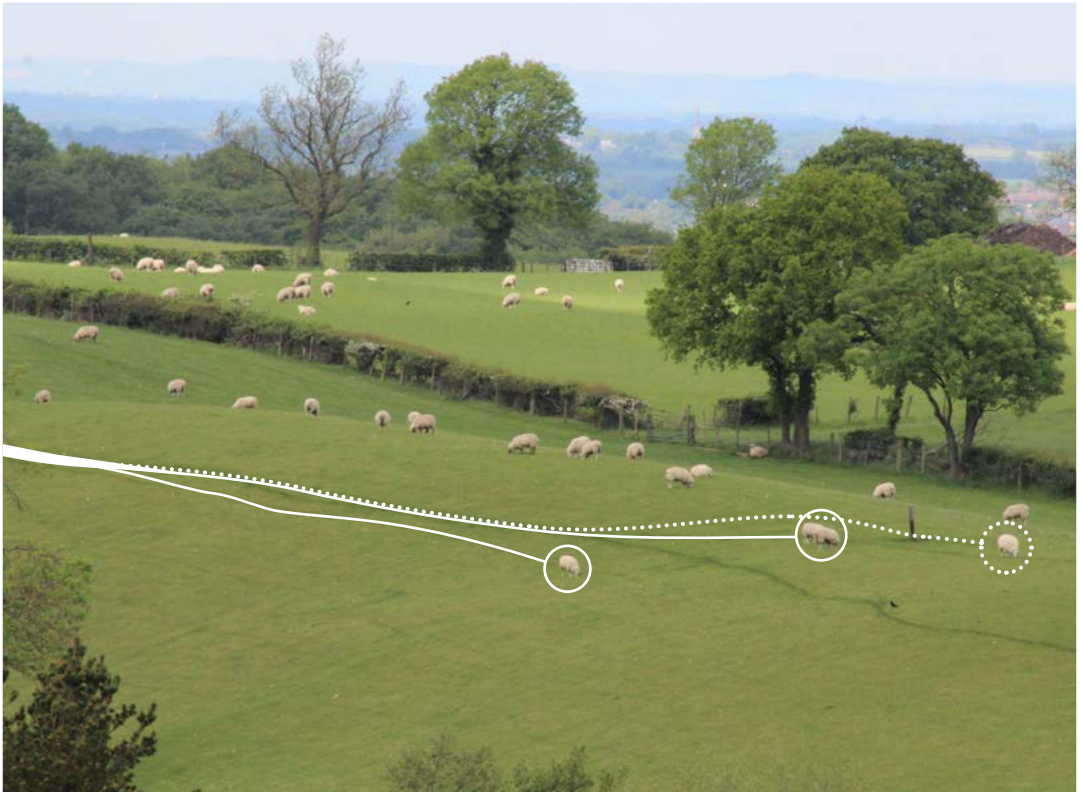
Every lame sheep is a primary source of infection. Isolate and promptly treat clinical cases. Cull persistently infected sheep.

There are six main causes of lameness in the GB sheep flock, which are described on the following pages.

Effective management of lameness depends on correct identification.

1. Scald
2. Footrot
3. CODD (Contagious ovine digital dermatitis)
4. Toe granuloma
5. Toe abscess
6. Shelly hoof

For more information, see the webinar **Reducing lameness – with consideration of appropriate antibiotic use**, available on the AHDB Beef & Lamb YouTube channel.

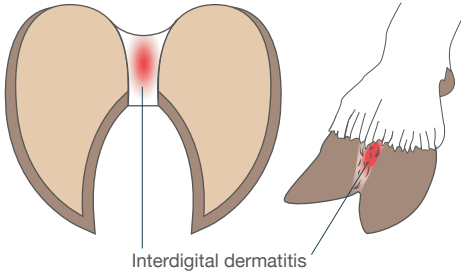


..... Lame ewe dropping *Dichelobacter* and *Treponemes* bacteria

—— Previously sound ewes picking up infection

Scald

Strip/interdigital dermatitis



Signs

Red/pink inflammation of skin between toes with white/grey pasty 'scum' on top. Can have a strong smell. Sheep can be very lame with only minor lesions. Scald is an early presentation of footrot.

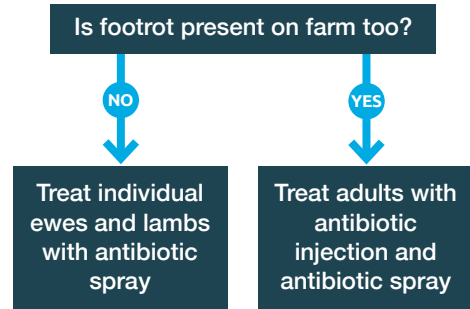
Cause

Scald is caused by the bacterium *Dichelobacter nodosus*, which also causes severe footrot. Infection occurs through skin damaged by:

- Abrasion; for example, harsh or rough pastures, thorns, thistles, hedge trimmings or stubble
- Prolonged exposure to moisture, causing softening of the skin

Scald is more likely to occur when sheep are at high stocking densities – including when ewes are with lambs. Transmission is more likely in areas where sheep gather; for example, at feed troughs, favoured areas of a field or in housing.

Treatment



Where incidence is high, foot-bath the group and move to pasture that has been sheep-free for two weeks, if this is possible.

Prevention

Farmers have found that controlling footrot in ewes reduces scald level in lambs.

If done properly, regular foot-bathing can help to prevent and control spring epidemics in lambs. Use a foot-bath as soon as lambs are large enough to go through it; this may help to minimise the number of lame sheep once the outbreak has started. Ensure feet are as clean as possible before foot-bathing. Use the correct concentration of chemicals and stand the sheep in the foot-bath for the correct length of time (see product label).

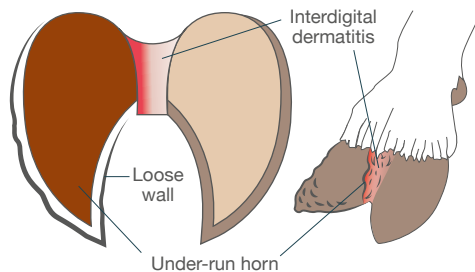
To be effective, sheep must stand on a clean, dry, hard area for 30 minutes after foot-bathing. Where possible, return the group to new pasture.

Avoid putting lambs on areas that are heavily contaminated with faeces.

Reducing the number and duration of handling events and improving underfoot conditions wherever possible can reduce the spread.

Apply suitable disinfectant around creep feeders, water troughs and gateways.

Footrot



Signs

A grey, oozing pus with a distinctive foul smell.

A separation of hoof horn, starting in the interdigital space. Once established, the sole horn and outer wall horn may be under-run.

Cause

Footrot, like scald, is caused by the bacterium *Dichelobacter nodosus*, which lives on sheep's feet. The bacteria are present on about 97% of farms.

Bacteria are found on pasture for most of the year, except in very dry conditions. Infection is most likely to spread during warm, moist conditions in spring and autumn, although wet summers and mild winters may create a year-round problem. Sheep with scald are the most infectious, contaminating pasture with bacteria. Footrot bacteria can survive on pasture for approximately 14 days.

Infection is particularly likely to spread in wet, soiled areas, such as handling

systems and gateways and in housed sheep where bedding is warm and stocking rates are high. It can spread from ewes to lambs during the summer months.

Treatment

When disease is seen, treat immediately.

- Give a long-acting antibiotic injection (discuss with the vet) for the correct weight of the animal. Do not under dose
- Apply antibiotic spray
- Do not foot-trim or foot-bath: these are not effective treatments
- Separate sheep where possible

Separation is very effective because it prevents sheep from continuing to spread bacteria onto the pasture, even after treatment.

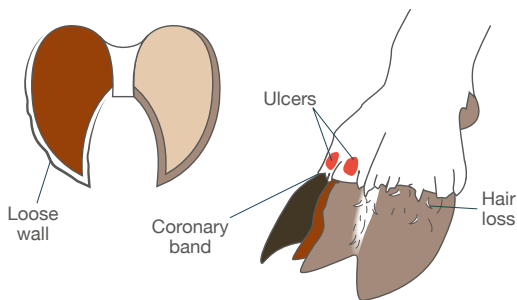
Prevention

Good flock management will reduce the risk of further epidemics. Do not select replacements from sheep with a history of lameness

Implement the five-point plan

1. Cull sheep that have had footrot more than twice.
2. Consider vaccination if lameness levels are high, as well as before high-risk periods, e.g. housing.
3. Treat even mildly lame sheep as soon as possible (including ewes in late pregnancy).
4. Avoid spreading infection – reduce the disease challenge by treating promptly and/or separating diseased animals.
5. Quarantine incoming sheep for at least 28 days. Physically inspect feet and foot-bath on arrival. Check feet again before mixing with flock.

CODD (Contagious ovine digital dermatitis)



Signs

Initially occurs at the top of the hoof (coronary band) and often results in severe lameness.

Infection starts as a small ulcerated area at the coronary band. The infection progresses to under-run the hoof horn capsule downwards towards the toe. The whole horn capsule may fall off.

There can be severe outbreaks of CODD in which up to 50% of a flock – both adults and lambs – may be affected in the first year. CODD infections may set lambs back for several weeks or months. The following year, outbreaks are usually less severe.

Mixed infections of both CODD and footrot are found on some farms.

Cause

While several bacteria can be isolated from infected hooves, it is considered that *Treponema* spp. are responsible for CODD. A risk factor for CODD is co-infection with footrot and therefore control of footrot should help reduce the risk of CODD on affected farms.

Treatment

It is essential to seek veterinary advice for the latest recommendations as soon as CODD is suspected. Treatment options include injectable long-acting antibiotics and antibiotic spray (may require repeat treatment).

Do not trim because there is risk of damage to underlying tissues and spread of infectious material on equipment/hands.

There is a strong link between footrot and CODD; therefore, it is recommended to implement the five-point plan to aid the control of CODD.

Prevention

The greatest risk is posed by purchased sheep, which may not appear lame but can be carriers.

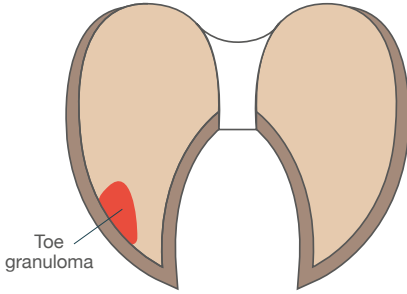
Carefully check the vendor's flock history and buy from flocks that are free from CODD.

Turn over and inspect the feet of all returning or bought-in sheep, because many sheep with early CODD lesions are not lame and can introduce disease.

Quarantine purchased and returning stock for at least 28 days. If possible, keep separate longer.

Hands, gloves and trimming knives become covered in the infectious agents during handling/trimming feet (hence trimming not advised). Clean hands and disinfect trimming tools between feet. Research has shown that 1% FAM30®, 2% Virkon® or 2% sodium hypochlorite are effective at preventing visible growth of treponemes following 20 seconds of contact.

Toe granuloma



Signs

The fleshy tissue, normally under the sole horn, grows out as a red pea-sized ball. This very sensitive tissue bleeds easily. Toe granulomas are more likely to occur on farms where footrot and CODD are also present.

The wall horn is often overgrown and sheep may not be able to bear weight.

Cause

Foot damage, especially that caused by excessive foot-trimming and foot-bathing, is the most common cause of toe granuloma. The fleshy 'strawberry' is a response to cutting into the sensitive tissue beneath the hoof horn.

It can also follow severe cases of footrot and CODD that have not been treated promptly.

Treatment

For the best treatment options, seek veterinary advice. Treatment can include removal of the granuloma by tying off with dental floss, bandaging the foot with copper sulphate, or surgical removal.

Use painkillers and antibiotics if there are signs of infection. Keep animals close to the farm to check regularly.

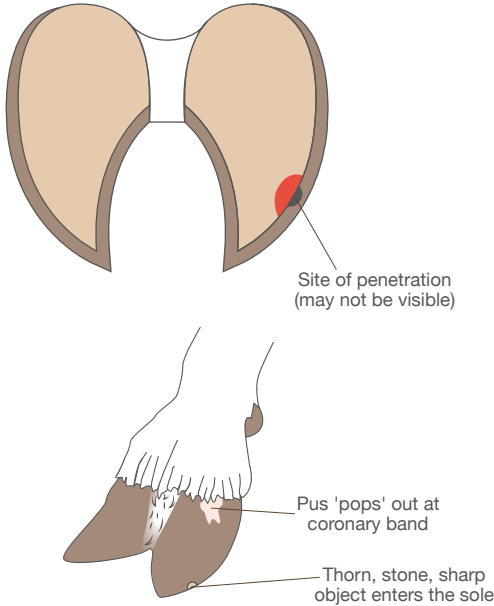
There is a risk of regrowth of the granuloma – consider culling these sheep.

Prevention

Avoid trimming feet unless absolutely necessary and do not trim into the sensitive tissues that bleed.

Always treat other conditions, such as footrot and CODD appropriately and as soon as possible.

Toe abscess



Signs

Pus may ooze from the coronary band and at the boundary between horn and skin. Can have a strong smell.

Affected hooves may be hot to the touch and painful before pus becomes visible.

Sheep will be very lame.

Cause

Puncture of the hoof, or separation of the white line, can lead to infection and abscess formation in the foot.

Treatment

Drain abscess and reduce pressure by paring just the sole, as necessary.

Treat immediately with antibiotic injection and spray.

Prevention

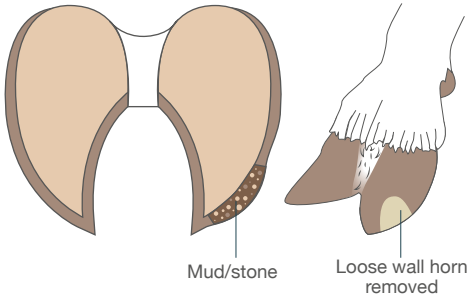
Keep stock away from areas that could cause foot damage; for example, hedge trimmings and thistles, wherever possible.

The white line is where the wall horn joins the sole horn. It is made up of a different type of horn, which is particularly prone to separation. Two diseases may be seen when this separation occurs: toe abscess and shelly hoof.

A toe abscess occurs when infection gets into the white line – for example, with a stone or thorn – and an abscess then develops under the wall or sole horn.

In shelly hoof, the wall horn comes away from the sole horn and the foot integrity is lost, but sheep are rarely lame.

Shelly hoof



Signs

The wall and toe horn separate to form a pocket. Sheep may not appear lame unless walking on impacted soil or hard ground. Shelly hoof will expose affected animals to secondary diseases.

Cause

The cause of shelly hoof has not been identified. However, associations with damage from rough or wet ground, stony standings or nutritional imbalance have been suggested. It is more common at low stocking densities, in flocks with high levels of scald and footrot and where formalin foot-baths are used.

Double check that it is shelly hoof and not footrot.

Treatment

If lame, remove the loose horn flap, remove stones/thorns and treat as white line disease.



Prevention

There is no proven method of prevention.

Check that the mineral/vitamin balance in diet is correct and adjust accordingly.

Avoid walking sheep on stony or irregular ground.

Other causes of lameness

From time to time, certain other conditions occur in a flock. Such conditions may, or may not, cause a lame gait.

- Misshapen hoof
- Overgrown hoof
- Joint ill in lambs
- Post-dipping lameness
- Erysipelas arthritis

Always seek veterinary advice to be sure of a diagnosis and correct treatment.

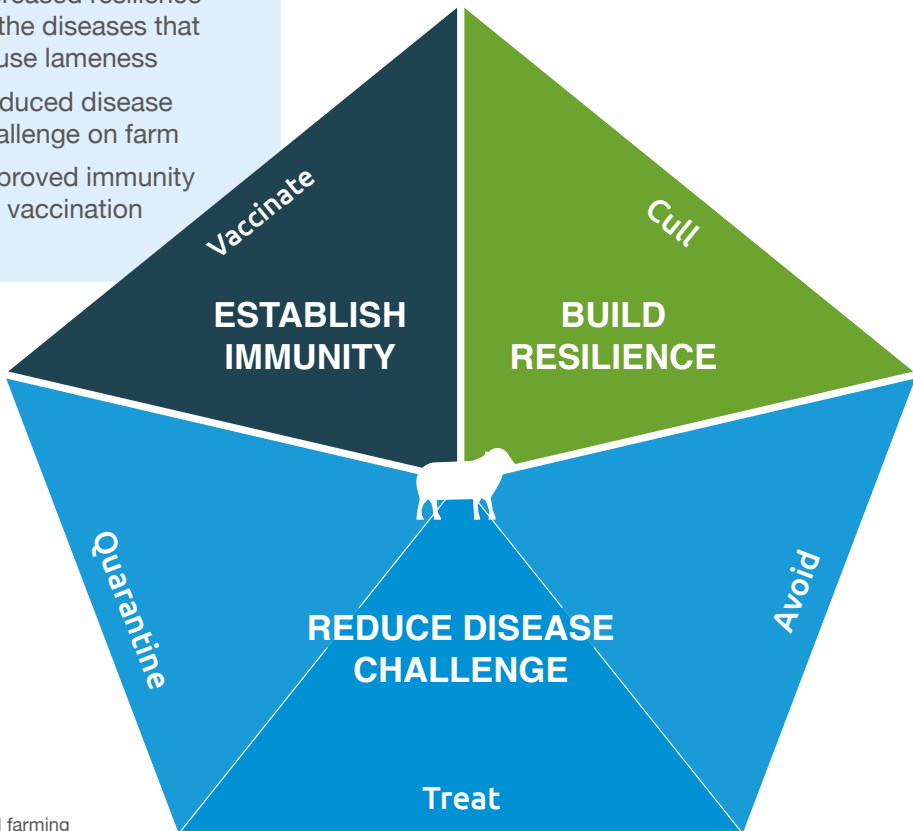
Five-point plan

The important challenge for lameness in sheep flocks is to reduce the number of new clinical cases of lameness requiring antibiotic treatment. This can be achieved through use of the five-point plan. The five-point management plan provides a clear strategy to control lameness on farm and is recommended where footrot, scald and/or CODD have been diagnosed as the cause of lameness.

By implementing all five points in the plan together, farmers can tackle the disease from all angles and give their flock the best chance of avoiding lameness problems.

These actions should result in three outcomes for the flock:

- Increased resilience to the diseases that cause lameness
- Reduced disease challenge on farm
- Improved immunity via vaccination



1. Cull – build resilience

Lame ewes spread disease to other ewes and lambs.

Sheep that have suffered severe or repeated bouts of lameness can develop chronically infected and misshapen feet. These animals act as a constant source of infection, making other control measures ineffective. They should be removed from the flock.

It can be difficult to cull ewes that are apparently productive. However, culling hard in the first year will boost overall resilience levels in the flock and reduce the amount of disease that is spread.

Identify repeat offenders, use cull tags or electronic identification (EID). Be tough – two strikes in one season and then cull.

2. Quarantine – reduce disease challenge

When purchasing ewes, rams or replacements, ensure their health status is known. Even the finest pen of animals might bring new infection to the farm that could threaten existing stock. A sound biosecurity programme can minimise the risk.

Any sheep brought onto the holding that has – at any time – been in contact with other sheep on farm must be quarantined (even if returning from a show) to prevent the introduction of different strains of footrot and CODD. Any brought-in sheep must be considered as being at risk and should be quarantined for a minimum of 28 days. The sheep should be foot-bathed, in either 10% zinc sulphate or 3% formalin, every 5 days on three occasions. Check every sheep to look for early signs of footrot or CODD. Treat clinical cases quickly. If you suspect CODD, contact your vet for specific treatment advice.

Do not accept stock that are lame or that have chronically misshapen feet.

Ideally purchase all replacements from an individual flock and transport directly from origin to the new premises. Ideally, visit potential purchases and inspect their feet. This prevents other diseases from being picked up. Ensure the transport vehicle is properly cleansed and disinfected. Avoid sharing transport vehicles and mixing stock from different sources. Where possible, move sheep in the farm's own transport vehicles.

When treating lame sheep in the flock, whenever possible segregate out the lame animals to prevent spread between the sheep. Keep them separate until fully recovered.

Only buy from sources that take a proactive approach to tackling lameness. Decide on a quarantine procedure with the vet – and stick to it.

3. Treat – reduce disease challenge

Disease spreads quickly, so treat even mildly lame sheep as soon as possible. Rapid treatment helps to stop the cycle of infection.

- Catch – within three days of becoming lame
- Inspect – clean away dirt but do not trim hoof horn
- Diagnose – identify correct cause. Seek advice from the vet if not sure
- Treat – see decision tree (on page 19) for treatment options



- Mark – affected limb and record tag number
- Cull – repeat offenders or run lame sheep in a separate group

Look for all cases of lameness, not just the worst cases. Act quickly to treat.

When treating animals, ensure the right antibiotic is given for the disease and the correct dose. Discuss this with the vet.

Antibiotic injections

The correct dose of long-acting antibiotic is the most efficient treatment for scald in adults, footrot, CODD and toe abscesses.

Typically, long-acting intramuscular oxytetracycline or amoxicillin can be used against footrot. For CODD, long-acting intramuscular amoxicillin is advised.

For most oxytetracycline-based products, no more than 5 ml should be given at any one site.

These injections can provide cure rates of 70–90%, so some sheep will require repeat injections.

Give the correct dose, the correct route and the correct length of treatment. Failure to strictly follow this will severely affect an animal's chances of recovery and may cause antibiotic resistance on your farm. Do not underdose an animal – always give the correct dose for their weight.

If these products are not effective, there could be several reasons for this. Contact the vet for further advice.

Foot sprays

An oxytetracycline-based aerosol will aid treatment by killing surface bacteria. This will also reduce the spread of footrot to other sheep in the flock. Spray all four feet because there will be increased numbers of bacteria on the healthy feet as well as the diseased feet.



Top tip

Make sure the area to be sprayed is clean. Spray for at least five seconds, or until lesion is adequately covered. Let the sprayed area dry before releasing the sheep.

Where possible, allow treated sheep to stand on dry ground for a minimum of 30 minutes before returning to pasture.

Foot-trimming

Do not trim sound feet; horn will break away naturally. Do not trim for cosmetic reasons.

Trimming is only required to remove pockets of horn when the length of the horn causes sheep to be unable to walk. Ewes that are grazed at pasture for most of the year will naturally wear the horn away.

If trimming is required:

- Leave a wall edge 2–3 mm proud of the sole
- Only trim away loose horn that may allow mud to become impacted on the foot
- Do not trim to blood
- Collect and dispose of trimmed hoof
- Disinfect clippers and clean hands between feet – use sharp instruments and replace them regularly

Before disinfection, clean hands and foot-trimmers in soapy water to remove visible dirt. Research has shown that disinfecting blades in 1% FAM30®, 2% Virkon® or 2% sodium hypochlorite for 20 seconds is effective. For more information, see the hygiene and disinfection protocol ***Reducing the spread of digital dermatitis by disinfection of hoof trimming equipment***, available at ahdb.org.uk/knowledge-library/reducing-the-spread-of-digital-dermatitis-by-disinfection-of-hoof-trimming-equipment

Foot-baths

Foot-bathing can help to treat and prevent scald in lambs, but is not effective for treating footrot or CODD. Always foot-bath sheep after routine gathering to prevent the spread of disease.

It is important to:

- Plan foot-bathing
- Check equipment is in good order and the sheep's feet are clean
- Use solutions at concentrations and stand-in time recommended by the manufacturers
- Stand sheep on a clean, dry and hard area for a minimum of 30 minutes after foot-bathing
- Turn sheep onto a clean, dry field (one that has ideally been sheep-free for at least two weeks) afterwards



4. Avoid – reduce disease challenge

Avoid spreading infection during handling, gathering and when the sheep are out in the field. Bacteria spread easily in wet, soiled handling areas and in muddy fields.

Improve under-foot conditions in poached areas or where there is heavy traffic. Spread gravel, woodchips or lime.

Upgrade and clean up permanent handling areas and tracks, or consider mobile handling systems.

Think carefully every time sheep are handled or moved. Does handling make the problem worse? What can be done to improve the management system?

Handling systems

Good handling systems are important to prevent and manage lameness. The aim should be to avoid damage to feet by using hard ground without stones. Portable handling systems offer the advantage of not gathering all sheep in the same place, which avoids exposing the whole flock to one contaminated area.

Wherever sheep are gathered, minimise the amount of time they are standing in collecting areas. Foot-bath afterwards, observing product recommendations.



Breeding – increases resilience

- Do not breed or buy replacements from sheep that have had scald or footrot
- Susceptibility to footrot can be inherited, so consider genetic indicators for resistance, when available

Grazing management

- Aim to minimise the build-up of bacteria by rotating stock or maintaining low stocking densities. Footrot bacteria live on pasture for approximately 14 days
- After whole-flock foot-bathing, move the animals to a field that has, ideally, been sheep-free for at least two weeks
- Keep a ‘spare’ field to separate treated lame sheep

- Place water troughs in well-drained areas and avoid spillage
- Move feed troughs, creep feeders and forage racks regularly to avoid poaching and faecal contamination
- Avoid excessive use of gateways. Consider using a suitable disinfectant product in heavily used areas

Housing management

Warm, damp housing provides ideal conditions for bacteria to thrive.

At housing

- When bringing the flock in, sheep with footrot, scald or CODD should be treated and housed in a separate pen
- Foot-bath remaining sound sheep and house away from lame sheep

During the housed period

- Ensure dry bedding throughout the housing period – especially around feed and water points
- Immediately move any sheep with scald, footrot or CODD to a separate pen and treat promptly
- Consider using a suitable disinfectant product around troughs and feed barriers



5. Vaccinate – establish immunity

There is a licensed vaccine available, which can be used to treat and prevent footrot. For best results, complete a whole-flock vaccination programme (including rams).

Time the vaccination to coincide with high-risk times on the farm.

Vaccination protocols can differ depending on the challenge: discuss with the vet. The vaccine is protective for 4–6 months and can be given annually, but biannual vaccination may give the best results. It offers partial protection against footrot and on average, reduces the chances of a sheep becoming lame by 20%. For a flock with 5% lameness, vaccination would reduce this to 4%.

Read the product data sheet very carefully before using the vaccine.

Wear gloves when vaccinating and use a safety vaccinator to avoid self-injection because the vaccine is hazardous to humans.

Sheep that have, or will be given footrot vaccine, should not receive 1% moxidectin. Discuss in more detail with the vet.

Decide with the vet if and when to vaccinate. Common times are at housing or after shearing.

Managing individual lame sheep

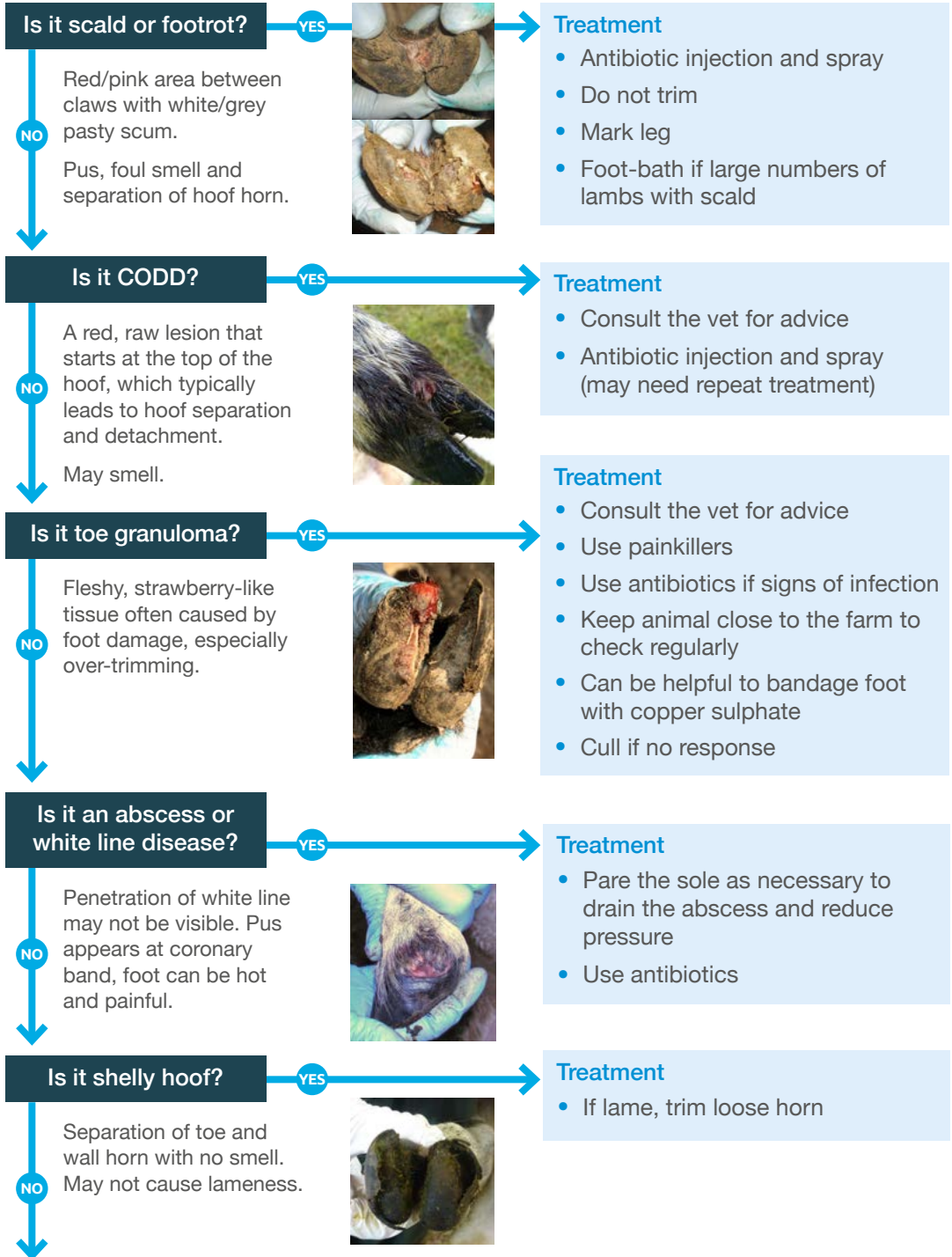
- Catch lame sheep within three days and examine legs and feet
- Check legs carefully for swelling, heat or pain
- Check feet for smell of footrot or scald, early CODD and heat

Issue	Trim yes/no
Infected with footrot	No
CODD	No
Shelly hoof	Yes
Overgrown	Only if walking is impeded

Where lesions are not obvious:

- Check for thorns, mud, skin damage between toes or granulomas. Ideally treat without hoof-trimming
- Check for lesions. If diagnosis is not possible, carefully trim away the horn. Do not cause bleeding
- Feel for heat in the joints or feet – this indicates infection. A foot abscess may need careful paring of the hoof horn to drain pus. Always give an antibiotic injection and spray foot after treatment

Decision tree for lameness



For other causes of lameness, consult the vet for advice on treatment

Further information

Other publications from AHDB

- Worm control in sheep
- Improving lamb survival
- Liver fluke control in grazing livestock
- Parasite control guide
- Sheep diseases directory

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