

Causes, control and costs of lameness in sheep

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High levels of sheep lameness remain one of the great challenges facing the sheep industry, despite proven and effective control measures. It is the responsibility of the veterinarian to have a discussion of the causes, control and costs of sheep lameness with all sheep farmer clients

CAUSES OF LAMENESS

Wherever possible, the veterinarian should be given the opportunity to examine lame sheep and discuss the diagnosis with the farmer.

Table 1: The common causes of lameness in sheep (see also O'Leary 2014¹).

Diagnosis	Description	Effective treatments
Scald/strip	Moist, painful inflammation of skin between the digits. No lifting of hoof (Note that in adult sheep, scald is often early foot rot and probably should be treated as such).	Antibiotic sprays or footbaths sufficient in lambs.
Foot rot	Starts between digits but progresses to under-run hoof. Distinctive smell. Infected sheep will spread infection. Chronic cases have misshapen hooves.	Injectable antibiotics. Vaccination.
Contagious ovine digital dermatitis (CODD)	Very painful and invasive. Lesions start at top of hoof. Rapid spread to under-run hoof wall.	Injectable antibiotic and antibiotic spray together. Antibiotic footbaths.
Shelly hoof	Accumulation of debris at lower edge of foot which separates sole and wall along the white line. Often not associated with lameness.	Treatment only necessary if lame. Careful paring may be useful.
White line abscess	Following shelly hoof, infection tracks up white line and bursts out at the top of hoof.	Injectable antibiotics following application of a poultice.
Toe granuloma	Fleshy 'strawberry' lesion that grows at toe following over-trimming. Difficult to treat but easy to prevent - don't over-trim!	Injectable antibiotics if infected and pack with copper sulphate.

CONTROL OF LAMENESS

Control measures can be summarised within the five-point plan (Figure 1), which has been used successfully in the control of foot rot on a number of farms in the UK.²

1. Treat

It is essential that all lame sheep are caught and treated effectively, which will include use of an injectable antibiotic for all cases of foot rot or CODD.

2. Avoid spread

Both foot rot and CODD are infectious diseases which will spread between sheep at areas of high sheep traffic and as they are gathered. Footbaths can be helpful to reduce the spread of disease when sheep have been gathered

and it may be helpful to spread lime in gateways or around feed troughs.

3. Vaccinate

Use of vaccination has been shown to reduce levels of foot rot significantly by protecting individual sheep and lowering the level of challenge on the farm. Computer modelling shows that there is a cost-benefit to vaccination when levels of foot rot exceed 2% of the flock at any one time.

4. Cull

It is recommended that persistent offenders (sheep that are recurrently lame) should be culled. This means that records must be kept so that the same ewes are not retreated on multiple occasions. These ewes are not paying their way and are a constant source of infection to others.

5. Quarantine

All incoming sheep should be quarantined to avoid the introduction of a different, and perhaps more virulent, strain of foot rot or CODD. During quarantine their feet should be examined and they can be footbathed. Lame sheep should never be added to the flock.

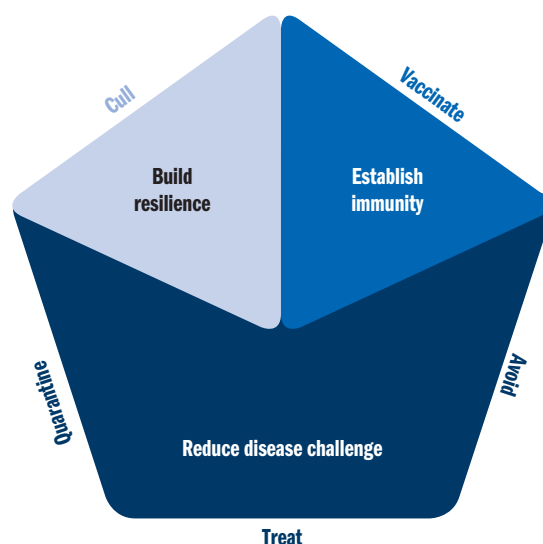


Figure 1: The five-point plan to control foot rot.

WHAT TO DO IF THE CURRENT LAMENESS LEVELS ARE VERY HIGH?

Implementing the five-point plan can be intimidating if

there are already large numbers of lame sheep due to mixed infections of foot rot and CODD and a high level of challenge on a farm. In these circumstances it can be helpful to advise the farmer to divide out the lame sheep into a 'crock flock'. Practically, this involves watching the sheep carefully as they move slowly from one confined area to another as they mask lameness very effectively when gathered in pens. Once all the lame sheep are identified it is ideal for the farmers to get the vet in for diagnosis and possibly treatment of the whole lame group with an injectable antibiotic. If there is CODD in the flock then it may be helpful to use a longer-acting antibiotic such as the macrolide tilmicosin, or if using a long-acting injectable oxytetracycline then also always use a topical oxytetracycline spray alongside.

It is rarely appropriate or responsible to 'blanket-treat' a whole flock with antibiotics, though when faced with high levels of lameness it is very sensible to concentrate on the 'crocks' (clinically lame sheep) as described above so that levels are reduced in the early stages of control to manageable levels. Once lameness levels are under control, the five-point plan is a great way to keep them low.

THE COST OF LAMENESS

Lame sheep are costly to any farm business due to the costs of treatment, control and, most significantly, due to lower productivity (Figure 2).

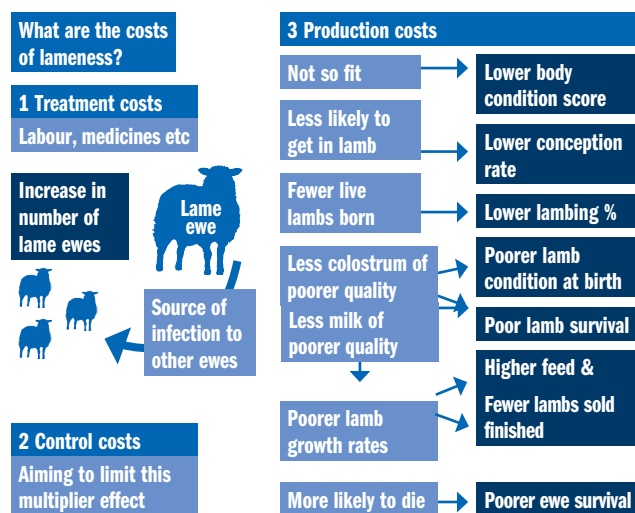


Figure 2: The costs of lameness.

The cost-benefit of different control measures can be compared using a computer model (Table 2) developed by the University of Reading (<http://www.fhpmmodels.reading.ac.uk>) which is available to download, free of charge, along with the software required to run it. There is a great benefit to a veterinarian running through this model with farmer clients and using their own figures to establish the cost-benefit of different control strategies.

For this article, the cost of loss of production was estimated via a number of veterinary and farmer workshops conducted by the author throughout the UK and Ireland from 2012 to 2014, at the International Sheep Veterinary Congress in New Zealand in 2013 and through consultation of the literature.³ In comparison to a sound ewe, it was estimated that a lame ewe would have a 15% reduction in conception rate, a 20% reduction in body

condition score, a 20% reduction in lambing percentage, a 3% reduction in ewe mortality, a 9% reduction in lamb mortality and that 20% more lambs, with lame mothers, would be sold store instead of fat.

Table 2: Costs of foot rot on a farm of 100 ewes. Figures calculated using the Reading University foot rot model (found at www.fhpmmodels.reading.ac.uk). (Assumptions: cull ewe=£60; fat lamb=£70; store lamb=£40; collection of fallen sheep=£12; scanning at 170%; 3% of foot rot ewes are culled; formalin costs £1 per litre; vaccine costs=£1 per dose; antibiotic costs=£1.30 per ewe. Assumes it takes one hour to footbath 100 sheep, four hours to vaccinate 100 sheep and half an hour to catch a lame ewe.)

Control strategy	Cost per ewe in the flock due to treatment/control measures	Cost per ewe in the flock due to production losses	Total cost per ewe in the flock
10% lameness due to foot rot. No treatment or control undertaken.	0	£14.16	£14.16
10% lameness due to foot rot. Farmer footbaths in formalin once a fortnight throughout year.	£2.89	£11.57	£14.46
10% lameness due to foot rot. Farmer vaccinates against foot rot twice a year.	£2.60	£6.31	£8.91
10% lameness due to foot rot. Farmer promptly catches and treats lame ewes with antibiotic and vaccinates twice a year.	£3.09	£2.65	£5.74
3% lameness due to foot rot. Farmer promptly catches and treats lame ewes with antibiotic and vaccinates twice a year.	£2.91	£1.07	£3.98

TRIMMING

Foot trimming was long recognised as an appropriate management technique for sheep until considerable research suggested that routine trimming can increase levels of lameness.⁴ More recently, it was shown that even trimming the hooves of lame sheep may lengthen the time it takes for them to heal.⁵

Recent studies of lame adult ewes on commercial farms in Gloucestershire, Northumberland and Yorkshire, UK, have been funded by the retailer J Sainsbury's and the English levy board, EBLEX. These studies compared the effects of trimming some randomly selected lame ewes compared to not trimming others and have provided answers to farmers who questioned what sheep feet would look like in the months following lameness.

Results from these studies suggest it is often not necessary to trim misshapen claws though lame sheep should be treated quickly and effectively with an injectable antibiotic to clear up any infection. Sheep feet become overgrown and out of shape when they are infected with either foot rot or CODD. They may be more likely to become infected if they are damaged, but not necessarily if they are overgrown. It is very important to promptly treat any infection but not necessarily to trim the foot (Figures 3-7).

On May 16, 2014 (Figure 3), both feet were infected with foot rot and the ewe was severely lame. She was treated



Figure 3: May 16, 2014.

with injectable and topical oxytetracycline but not trimmed. On June 6 (Figure 4) she was walking much better; she was not trimmed and no further treatment was given. On July 4 (Figure 5), August 1 (Figure 6) and September 15 (Figure 7), she was completely sound and her hooves developed back to a good shape despite no trimming at any stage. This ewe was at grass all summer and had not walked on hard surfaces. Trimming sheep feet does not necessarily keep them tidy as healthy sheep hooves can grow a couple of inches in a year – and perhaps even more when there has been



Figure 4: June 6, 2014.

some insult, such as an infection or after they have been trimmed. Even careful trimming does not mean that the foot will still be a neat shape after six weeks and it may cause excessive (Figure 8) or even irregular growth. It is not recommended to carry out routine foot trimming of sound ewes.

On some farms it has been shown that trimming infected feet delays their recovery. Careful trimming should only be considered in cases of shelly hoof, if the hoof shape is encouraging debris to accumulate or if the hoof is so overgrown that its shape is itself causing lameness. In this



Figure 5: July 4, 2014.



Figure 6: August 1, 2014.



Figure 7: September 15, 2014.

case, cautious trimming, well clear of any sensitive tissue, will probably not cause further harm though it could be considered as a 'cosmetic' trim, not necessarily beneficial.

CONCLUSION

Lame sheep represent a significant welfare and financial cost to the sheep industry despite proven and effective control measures. Some shepherds tolerate too many lame sheep, so on these farms there is a high weight of challenge facing both ewes and lambs and causing yet more lameness and significant costs. However, on other farms, there are shepherds who have embraced the control measures so that they consistently have low numbers of lame ewes which means that every one that is lame can be treated within a timely manner. The control of lameness offers veterinarians a great opportunity to engage with their sheep farmer clients: from initial diagnosis to suitable advice on the use of appropriate antibiotics and the place for vaccination.

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Figure 8: This photo indicates how quickly hooves will become overgrown. Only six weeks before this photo was taken, this foot had been carefully trimmed.

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