

# A clinical trial comparing oxytetracycline, foot trimming and flunixin meglumine on time to recovery in sheep with footrot

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**ABSTRACT:** A randomized factorial clinical trial comparing treatments for footrot was run on 53 sheep. All received topical oxytetracycline, then sheep were given one or more of long-acting oxytetracycline, flunixin meglumine, no foot trimming, or foot trimming on day 1 or day 6 after treatment. The order of rate of recovery by 10 days was injectable antibiotic (90%), sprayed only (60%), injected and foot trimmed (50%), then foot trimmed and sprayed (25%). We hypothesise that intramuscular oxytetracycline penetrated the epidermis/dermis and killed *D. nodosus* allowing the foot to heal and conformation to return to normal, whilst foot trimming delayed healing.

Footrot in sheep is often treated by paring away the horn on the affected foot (foot trimming) and applying a topical spray. The most recent recommended treatment of footrot is to give injectable antibacterials to all sheep with footrot of

any severity and to apply a topical bactericide and then to trim the foot after five days, once inflammation has decreased. We ran a clinical trial using 53 10 month old ewe lambs to compare various treatments for acute footrot (defined as a separation of hoof horn with the characteristic grey scum and smell, lesions were a maximum of 14 days old) (Kaler *et al.*, 2010). Here we summarise the key findings from this trial.



Fig. 1: A case of footrot with separation in the medial regions of the digit.

To minimise the number of sheep in our study and to maximise the usefulness of the results we used a randomized factorial design. With this design, all sheep were treated with a 3.93% w/w oxytetracycline spray (Terramycin, Pfizer) as a baseline treatment (or positive control), then sheep were given one or more of the following treatments: parenteral administration of long-acting oxytetracycline (Terramycin, Pfizer 200 mg/ml) at a dose of 1 mL/10kg bodyweight by deep intramuscular injection with a maximum dose of 5 mL per site), flunixin meglumine (Finadyne, Intervet Schering Plough) at a dose of 2 ml/45 kg by intramuscular injection), no foot trimming, or foot trimming on Day 1 or Day 6 after diagnosis (see Table 1 for the number of sheep with each combination).

**Table 1: Number of sheep by treatment given in the clinical trial**

Treatment group	Parenteral antibacterials on day of diagnosis	Foot trimming on day of diagnosis	Foot trimming on day 6 after diagnosis	Non steroidal anti-inflammatory drug on day of diagnosis
1 (n=9)	9	0	0	0
2 (n=8)	8	0	0	8
3 (n=7)	7	7	0	0
4 (n=10)	10	0	10 *	0
5 (n=8)	0	8	0	0
6 (n=11)	0	0	11 *	0
Total (n=53)	34	15	21	8

\* Only sheep that were still lame were trimmed on Day 6. Thus, five lame sheep from Group 4 and seven lame sheep from Group 6 were trimmed, as 5 and 4 sheep from these groups, respectively, had recovered before day 6, adapted from Kaler *et al.*, 2010.

The 53 sheep were matched by locomotion score and maximum lesion severity and then randomly allocated to one of these six treatments by selecting a coloured ball from a bag. Sheep were diagnosed and treated by a team of two researchers. All foot trimming was done by the farmer who was blinded to treatment allocation. This farmer had been sheep farming for 15 years and did not trim feet severely. All sheep allocated to trimming were trimmed on Day 1 and only those sheep still lame on Day 6 after diagnosis and allocated to be trimmed were foot trimmed on Day 6. The experimental protocol was approved by the Home Office as a comparison of currently used methods to treat footrot and therefore ethically acceptable. The researchers and farmer also discussed the treatments and the farmer approved them for his sheep.

Sheep locomotion and foot lesions were scored on three occasions each week for up to 15 days. All sheep not returning to locomotion score 0 by 15 days were treated appropriately. The time to recovery from lameness and lesions was investigated.

## RESULTS

### Injectable antibiotics

Sheep that received parenterally administered oxytetracycline and were not foot trimmed recovered fastest. The explanation for this rapid response to treatment might be that the intramuscular injection of oxytetracycline penetrated deep into the epidermis/dermis where *D. nodosus* (the cause of footrot) can be present. The results suggest that a single parenteral administration of 20 mg/kg oxytetracycline was very effective at minimising the length of time that sheep were lame because 75% of sheep given this treatment recovered within five days. Thus treating all sheep that are lame with footrot with an injection of oxytetra cycline at this dose could not only improve the health and welfare of the sheep but could also minimise the effects of chronic lameness on loss of body condition and reduced productivity, such as lambs born and lamb growth rate.

### Foot trimming

Sheep that were trimmed on Day 1 or Day 6 without receiving parenteral antibiotics recovered significantly more slowly from both lameness and lesions than sheep foot trimmed and given an injection of antibiotic. These in turn recovered more slowly than those which were just given an injection without trimming. There was no difference in the time to recovery whether lame sheep were foot trimmed on the day of diagnosis or 6 days later.

Quite remarkably, sheep that were not foot trimmed and did not receive parenteral antibacterials, but only an oxytetracycline spray (as were all sheep in this study) recovered more quickly than those foot trimmed and given topical spray suggesting that foot trimming cannot be recommended as a 'second best' treatment where farmers do not wish to use

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**Fig. 2:** A mild case of footrot, note the 'sticky' interdigital hair and erosion at the medial coronary band.

injectable antibacterials but rather it is detrimental to recovery from lameness and lesions.

### Flunixin

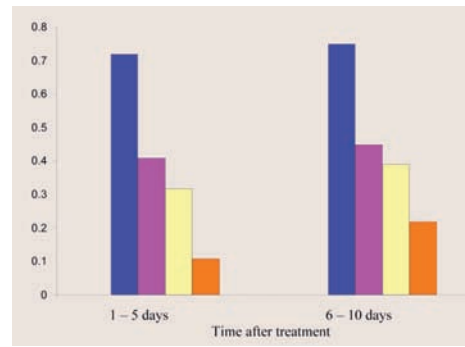
The use of flunixin did not change the time to recovery from lameness significantly, possibly because only eight sheep received NSAIDs or because they were given for only one day. A previous study suggested that after three days administration of flunixin meglumine responses to noxious mechanical stimulation given to sheep with footrot were comparable to healthy sheep. NSAIDs do produce analgesia for up to 24 hours and so one injection might help ewes to continue to feed and allow their lambs to feed; it certainly should not be discounted because of the results from the current study.

### Limitations

This was one trial on one farm with one age group, studying acute (not chronic) footrot, the advantages of this are that the comparison between treatments were unlikely to be affected by farm, age of sheep, duration of disease. The disadvantage is how generalisable these results are to other farms and sheep. No non-lame sheep were foot trimmed in this study and it is only possible to hypothesize on the impact of routine foot trimming from other studies where trimming was positively correlated to lameness. Foot trimming might cause damage to the



**Fig. 3:** Severe footrot with separation of the hoof horn from the sensitive tissue, inflamed interdigital space and the characteristic sticky look to the foot with little bleeding.



**Fig. 4:** Percent recovery from footrot 1 - 5 and 6 - 10 days after treatment by: Parenteral antibacterials with no foot trimming (blue bars), parenteral antibacterials with foot trimming (yellow bars), foot trimming with no parenteral antibacterials (orange bars) or positive control - antibiotic spray (pink bars), adapted from Kaler et al., 2010.

foot and spread or increase susceptibility to *D. nodosus* or it might be indirectly causal if farmers trim rather than treat lame sheep.

### Clinical importance

Untreated sheep with footrot can remain lame for many months. If parenteral antibacterials and topical spray were used in all sheep at the stage where footrot was acute and foot trimming on Day 1 or on Day 6 after diagnosis was stopped then over 1 million sheep each year lame with footrot in the UK would recover more rapidly with benefits to productivity and welfare.

### ACKNOWLEDGMENTS

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