



Sheep lameness


Marion McMillan BVMS CertAVP MRCVS
SACCVS
Ayr

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Importance of lameness



- Lameness is one of the most important welfare issues in sheep industry
 - Causes pain and discomfort
 - Limits production
 - Thin ewes, more barren, fewer lambs
 - Increased metabolic disease
 - Reduced milk production and reduced lamb growth rate
 - Restricts financial viability of flocks
 - Treatment costs
 - Culling
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Costs of lameness



- University of Reading
 - Cost benefit computer model for footrot control methods
 - <http://www.fhpmmodels.reading.ac.uk/models.htm>

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How much Lameness is there?



- Farmers rate lameness as greatest concern within flock
 - Farmers weekly survey 2012
 - 39% of farmers claimed 3% to 5% of their flock were affected by lameness at any one time
 - 15% of farmers claimed 6% to 20% of their flock were affected by lameness at any one time
 - Postal survey by Royal Veterinary College 1997
 - 92% of 547 farms had lameness
 - Incidence was 6% to 11% on these farms

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Most common causes of lameness in sheep in the UK



- Interdigital dermatitis (“scald”)
 - now considered part of the footrot complex
- Footrot
 - (interdigital dermatitis and under-running footrot)
- Contagious ovine digital dermatitis
 - CODD
- All of above are contagious



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Interdigital dermatitis



- “Scald” – early stage of footrot
- Caused by *Dichelobacter nodosus*
 - *Fusobacterium necrophorum* now considered opportunist pathogen
- Skin between claws inflamed
 - lambs at grass
 - housed ewes
- Treatment
 - Antibiotic foot spray
 - Footbath
 - zinc sulphate
 - preferred
 - formalin



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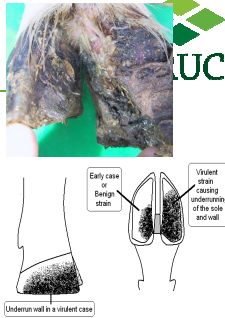
Treatment or disease spread?



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Footrot

- Later stage of footrot complex
 - *Dichelobacter nodosus*
 - Several serotypes
 - Virulence factors vary with serotype
 - Benign to virulent
 - Several serotypes may be present on one
 - No cross protection between serotypes
 - Found on feet and pasture
 - Survival 7-10 days on pasture and 6 weeks in affected horn clippings
 - Other bacteria (such as *F. necrophorum*) may augment effect of *D. nodosus*
- Separation of horn
 - Foul smell



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Footrot treatment

- Treat - LA antibiotics
- cull
- Foot bathing to control
 - zinc sulphate solution
 - stand on concrete
 - clean pasture
- Vaccination
- Do not foot trim



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Why do sheep get footrot?

- Environment conditions allow entry of causative bacteria
- Factors affecting prevalence may include:
 - Breed type, weather conditions, grazing management
- Low/moderate heritability
- It is possible to breed for resistance to footrot



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Footrot

- Under-running footrot and interdigital dermatitis (scald) are presentations of one disease – called footrot
 - Must be managed together
 - High bacterial (*D. nodosus*) load in scald cases
 - most infectious
 - Bacterial disease
 - Rapid treatment
 - Separation of affected sheep

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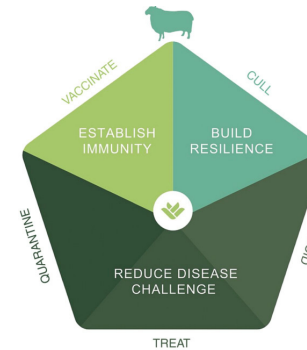
Lameness welfare and economic challenge



- Farm animal welfare Council 2011
 - Target reduce lameness to
 - < 5% by 2016
 - < 2% by 2021
- The five point plan to reduce lameness
 - Combination of
 - published research
 - practical experience of farmers who have reduced lameness in flocks
- cull, vaccinate, avoid, treat, quarantine

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The five point plan



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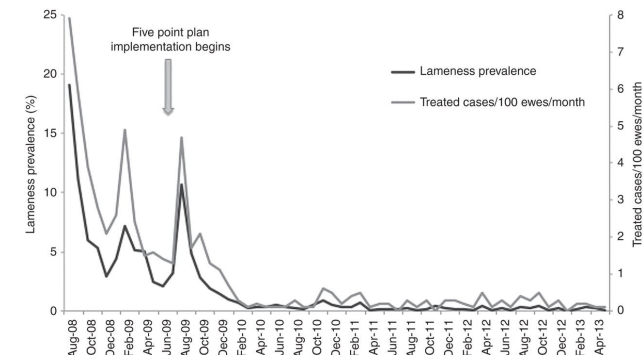
The five point plan



- Designed for footrot and scald
 - Also applicable for CODD
- Measures to
 - Build resilience
 - Reduce disease challenge
 - Establish immunity
- Practical experience on UK farm
 - Reduced lameness
 - Reduced lameness treatments

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Lameness prevalence and number of ewe treatments per 100 ewes per month, prior to and during the implementation period.



Clements R H , and Stoye S C Veterinary Record
2014;175:225

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Veterinary
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New / returning stock



- Risks
- Introduce footrot
- Introduce new type / strain of footrot
- Action
 - Buy footrot-free stock, but check feet anyway
 - Isolate – 3 weeks quarantine
 - Treat if any sign of footrot or scald
- Quarantine works!

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Affected sheep



- Separate affected sheep from non-affected
- Establish a crotch flock
- Treat and monitor



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Options for control of lameness



- Intervention as soon as possible
- Culling chronically affected animals
 - Poor response to treatment
- Quarantine “bought in” animals
 - Examine feet, treat and/or foot bathe as necessary
- Segregate lame sheep
- Consider vaccination
 - “footvax”

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Treatment of foot rot



- Paring away affected tissue
 - No longer recommended
 - May be associated with higher incidence of foot rot
- Injectable antibiotics for treatment
- Long acting oxytetracycline
 - One study showed 75% of sheep recovering from footrot 5 days after treatment

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Treatment of footrot – research



- Study on 53 lame sheep on commercial farm – 4 treatment regimes
 1. Antibiotic injection and topical antibiotic spray
 2. Topical antibiotic spray
 3. Antibiotic injection and topical antibiotic spray plus foot trimming
 4. Topical antibiotic spray plus foot trimming
- **Treatment regime 1 reduced lameness by 70% after 5 days of treatment**
 - Targeted effective treatment also reduces on-going disease transmission and would reduce long term use of antibiotics to treat lameness
- **Treatment regime 4 only reduced lameness by 10%**
 - This regime is the traditional way farmers treated footrot

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Footvax



- 10 strains of *Dichelobacter nodosus*
- Short duration of protection
- May need to re-vaccinate every 4-5 months
- Can cause temporary lameness
- Can cause large lumps at injection site
- Do not use within 6-8 weeks of shearing
- If footvax has been used do not treat sheep with 1% moxidectin injectable – sudden deaths have occurred

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Treatment of footrot – research



- Warwick study found that foot trimming could actually cause lameness
 - As trimming can result in the horn being removed too far
 - This exposes sensitive tissue which makes it painful for the sheep to walk and which is vulnerable to reinfection



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To trim or not to trim



- Bacteria transferred from diseased feet to healthy feet
- Overgrown feet which are not diseased will regrow within around 6 weeks
- Overgrown hooves will be worn down when painful foot condition is treated
- Prompt antibiotic treatment is key.

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But could you resist?

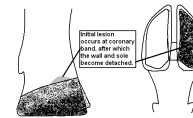


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Contagious ovine digital dermatitis (CODD)



- More severe than footrot
- Caused by spirochete, probably *Treponema* species
- Begins at coronary band
- Ulceration and separation of horn



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CODD



- Accurate diagnosis essential
- Treatment
 - antibiotic footbaths/sprays
 - Lincomycin/spectinomycin
 - tylosin
 - antibiotic injection
- Quarantine – 3 weeks
 - Foot bathing
 - foot inspections



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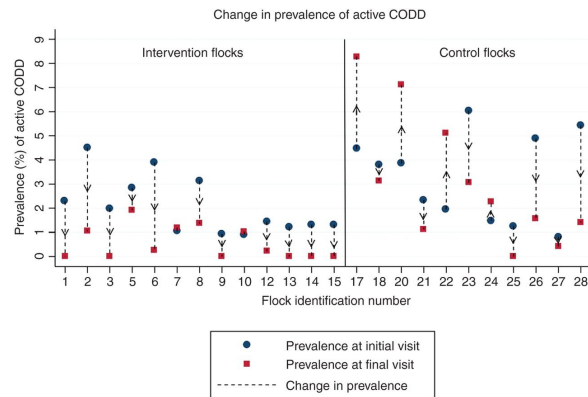
Whole flock treatment



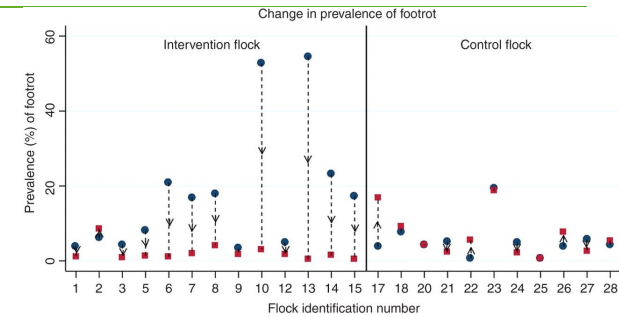
- Treat all sheep with tilmicosin or gamithromycin
- **Yes or no????**
 - The magic bullet for footrot eradication??

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Whole flock treatment?



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- Initially appears attractive
- BUT



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- Initially appears attractive
- BUT
- No flock eradicated footrot
- 6/13 flocks had eradicated CODD at 1 year post treatment
- Expensive
- **Macrolides are critically important for humans with antimicrobial resistant organisms**



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Other common causes of lameness in sheep



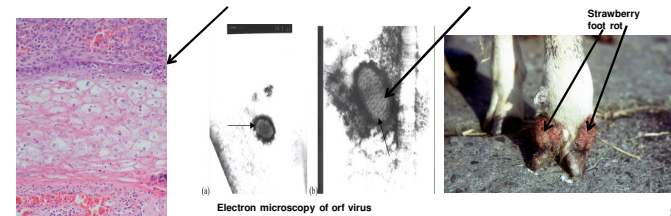
- Strawberry foot rot
- Shelly hoof
- Toe granuloma
- Foot abscesses – toe or heel
 - one-off infections involving a single digit
- Arthritis in young lambs

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Strawberry footrot



- Due to a pox virus (care handling as zoonosis)
 - Frequently bacterial superinfection with *Dermatophilus congolensis*
- Seen in outbreaks of orf
- Diagnosis by histopathology, PCR or electron microscopy



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Shelly hoof (white line disease)



- White line between sole and wall of hoof
- Non-infectious cause of lameness
- cause not known
- Separation of wall of hoof from underlying tissues
- Does not usually cause lameness unless soil impaction in space (which may lead to abscessation)

Treat by paring horn to release soil/abscess

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Shelly hoof (white line disease)



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Toe granuloma



- Thought to be due to excessive foot trimming
- Highly vascularised fibrous tissue
- Treatment may be unrewarding – consider culling



Toe granuloma

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Toe granuloma



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Chronic lameness



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Arthritis in young lambs



- Arthritis – inflammation of joints
- Seen in lambs under 4 weeks of age
- Bacterial infection from contaminated environment
- *Streptococcus dysgalactiae*
- Initially joints (particularly knee and hock joints) hot and painful
 - Later distended with pus
- Treatment with antibiotics



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The nasties!!



- Foot-and-mouth disease (FMD)
- Bluetongue



- Notifiable disease

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Foot and mouth disease



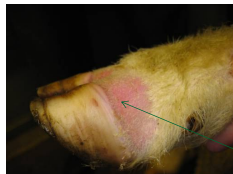
- May be mild or subclinical
- Direct, fomite or aerosol spread
- Sudden severe lameness
- Vesicles on the hoof at the coronary band, in the interdigital cleft and at the heel bulb
- FMD lameness is exacerbated by foot rot
- Oral lesions such as vesicles or ulcers less common
 - dental pad

FMD. Ulceration at coronary band



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Bluetongue virus



- In addition to more significant clinical signs such as salivation and swelling of the lips, mouth and face there are feet lesions:
 - Acute inflammation of coronary band
 - More chronic inflammation of coronary band
- Spread by midges
- Several serotypes
 - BTV8 in Europe in 2006-2008
 - In central France 2015-16
- Bluetongue also affects cattle

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- If a chronically lame sheep does not respond to remedial treatment it should be culled and not left to suffer.
- As such animals cannot be transported in a way which avoids further suffering, they should be slaughtered on the farm



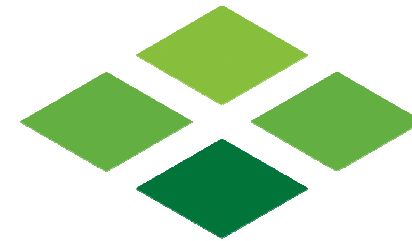
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Transportation



- Sheep that can bear weight on all four
- feet but are slightly lame should not be
- consigned to market or on any journey
- which is likely to exacerbate the injury,
- however slight.

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