

Theme 10: Hoof care

HOOF DISEASES AND HOOF CARE MANAGEMENT (Level 3)

Topic	Training & information Content
10.1	Hoof diseases and hoof care management
10.2	Five step protocol for hoof trimmers



1. You will learn about (learning objectives):

- ❑ Essential anatomy and physiology of a hoof.
- ❑ Hoof diseases:
 - Causes
 - Symptoms
 - Prevention and cure



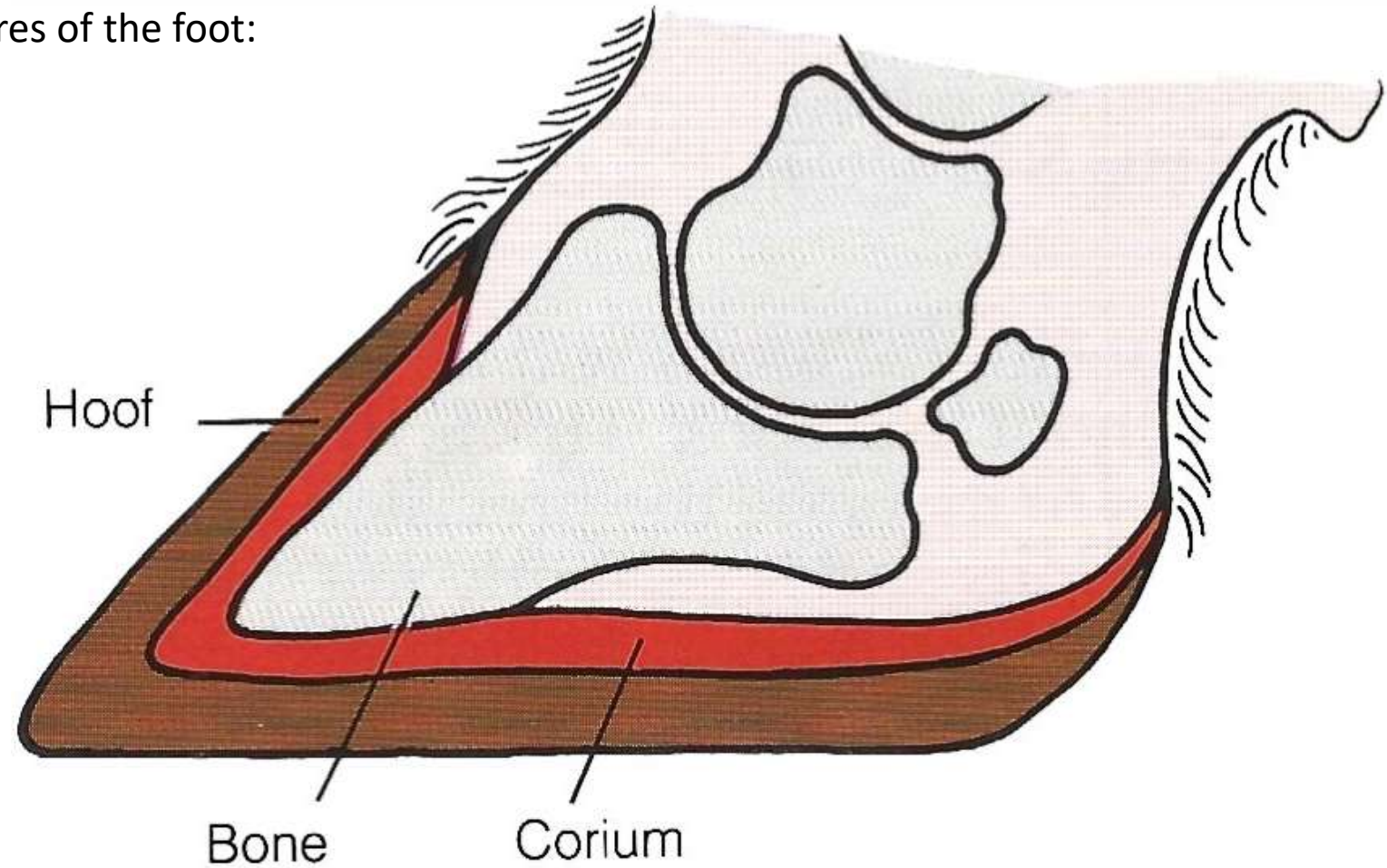
2. Introduction

- Hoof problems are severe problem in places with intensive (indoor) dairy farming, with high milk yield per cow.
- Cattle are kept on hard, often wet and dirty concrete floors, which increases the risk of spreading bacteria.
- Cattle will have high rations to fulfil their needs to produce a lot of milk, which will demand a lot of their metabolism.
- Now dairy farming is becoming less traditional, hoof problems will start to occur more often in Uganda.

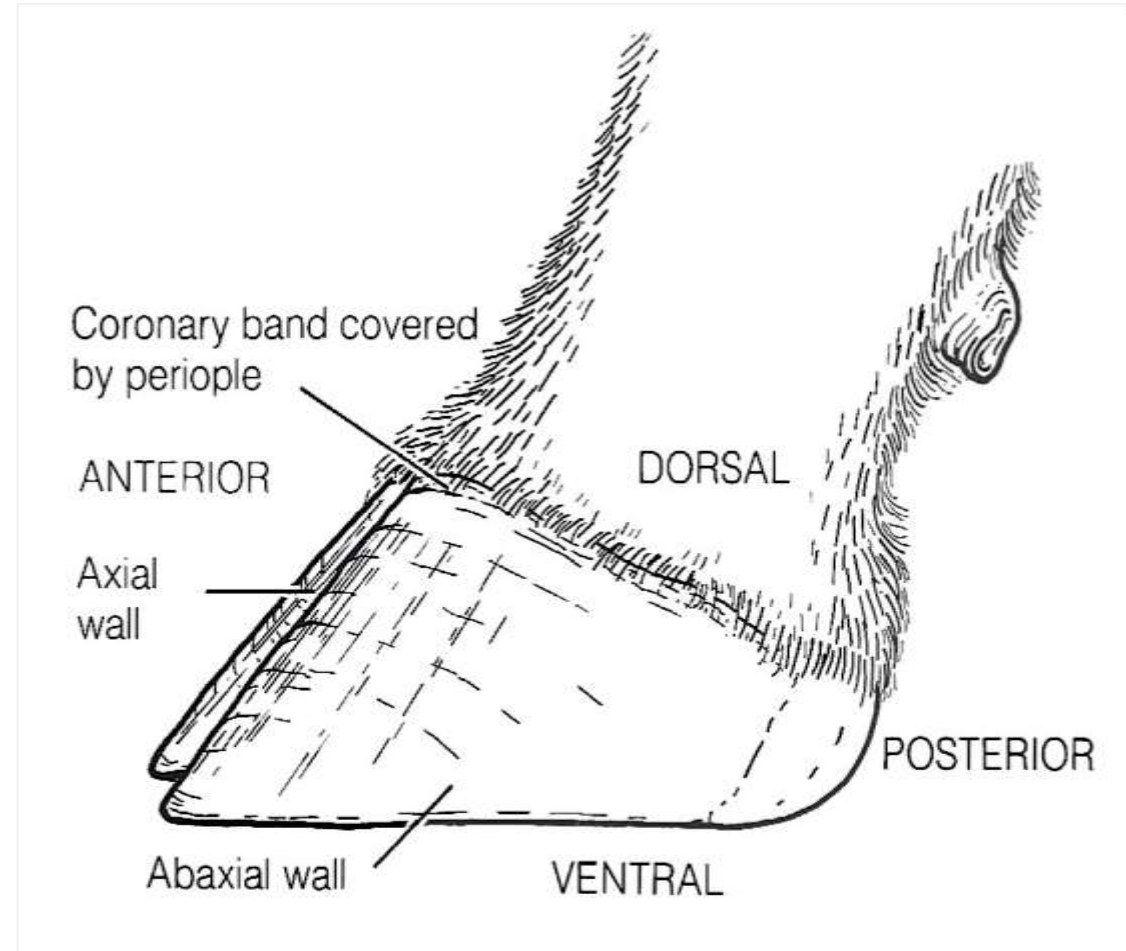
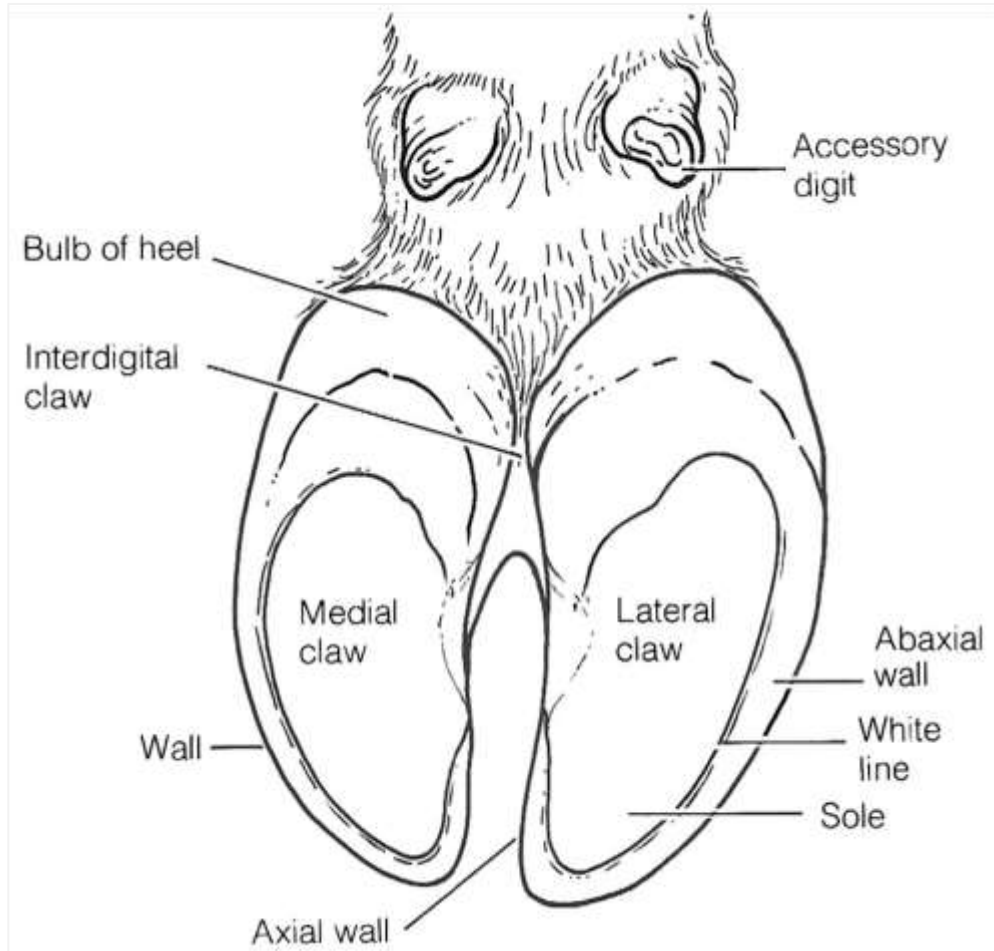


3. Anatomy of the foot

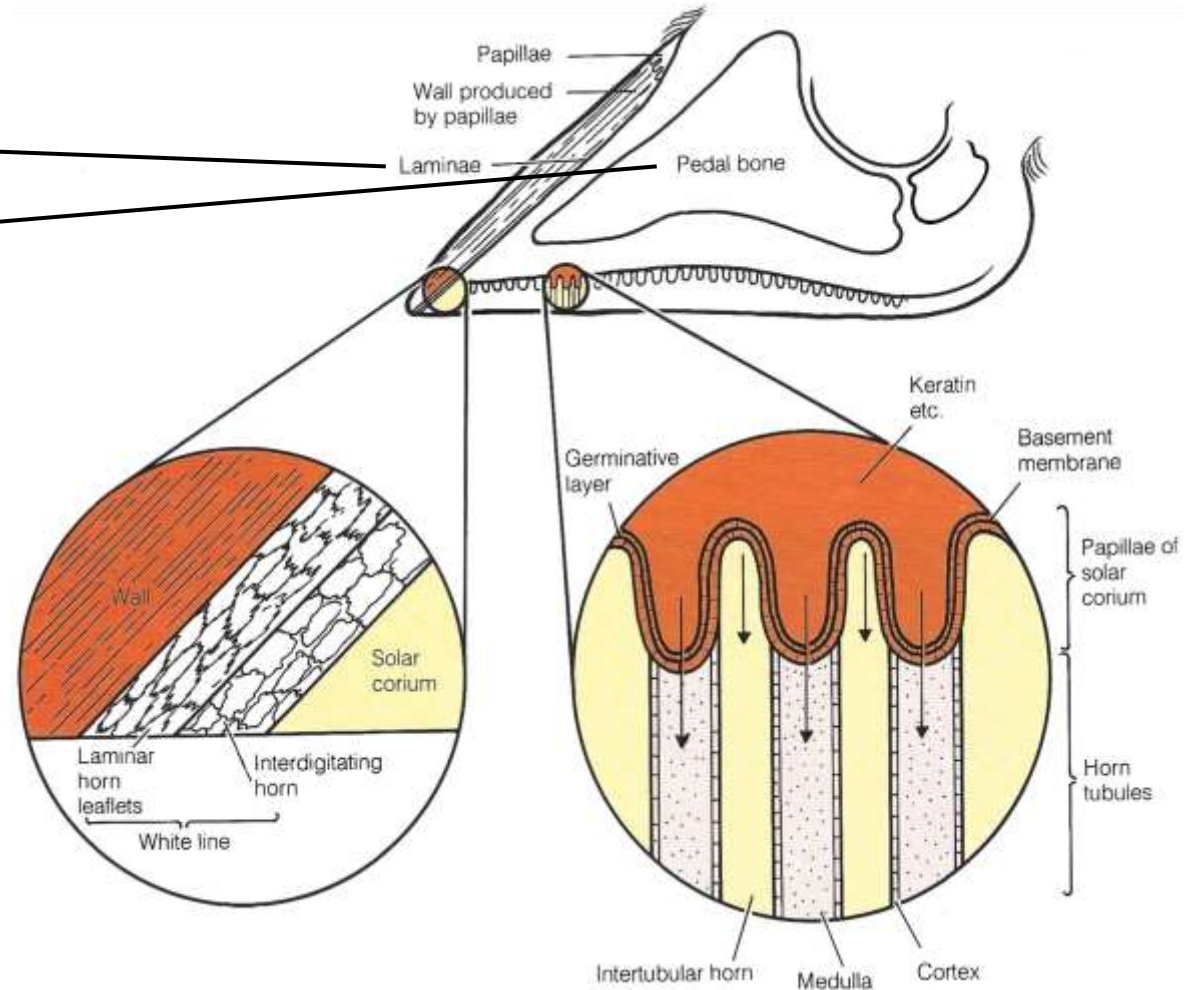
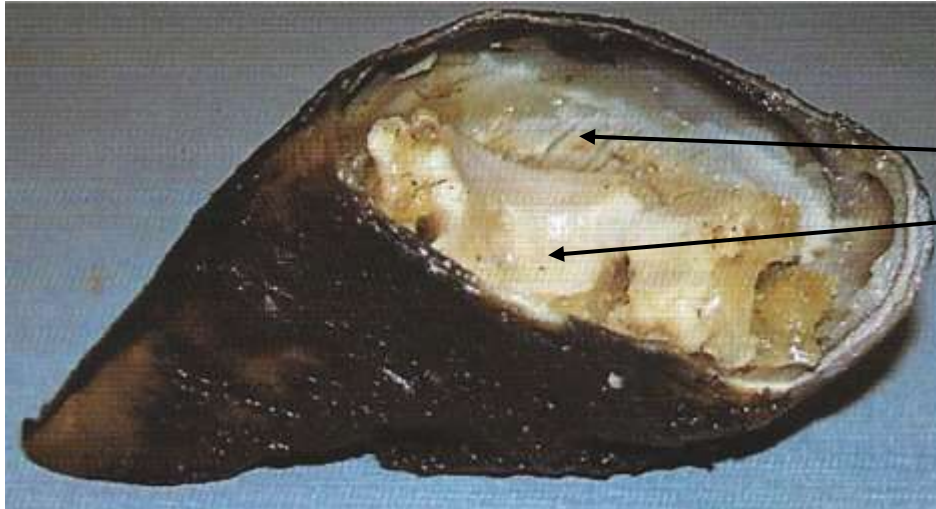
- The three basic structures of the foot:
 - i. Hoof
 - ii. Bone
 - iii. Corium



3.1 Anatomy of the foot Cont'd...



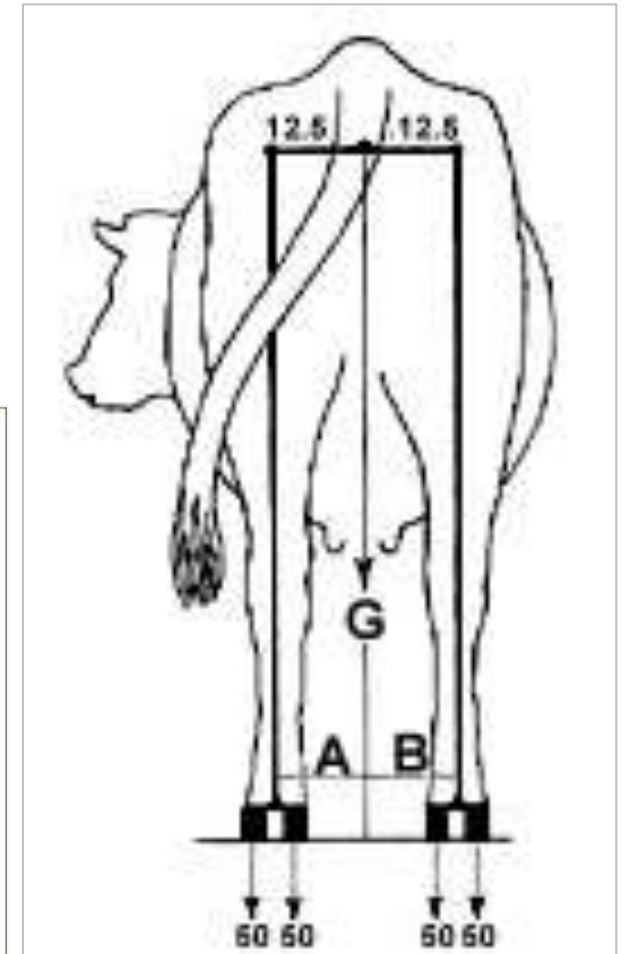
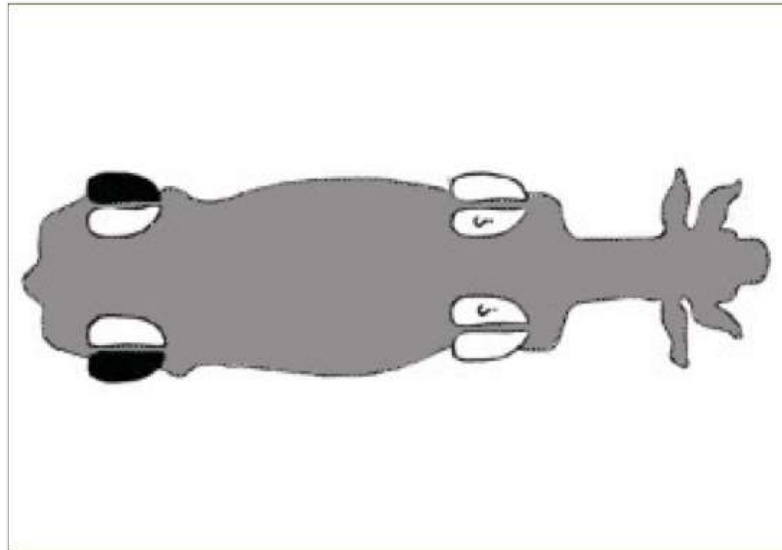
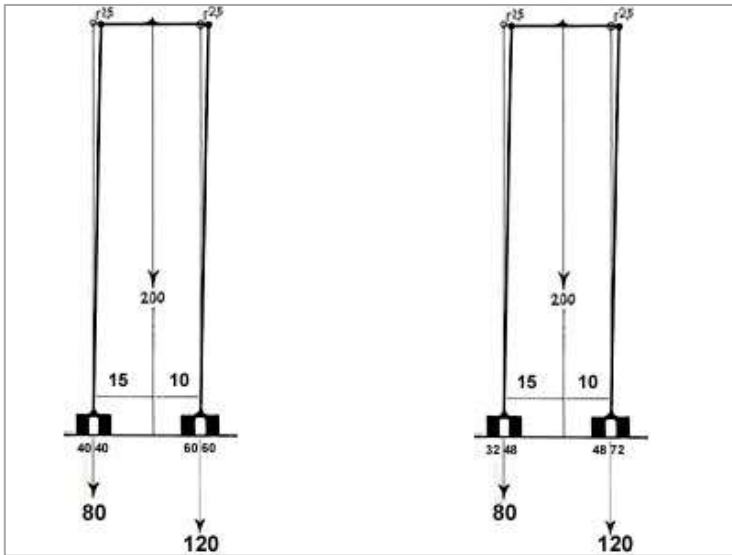
3.2 Anatomy of the foot Cont'd...



- The horn grows from the corium.
- The corium is not flat but has papillae, which lay parallel of each other in so-called laminae.
- When laminae are infected, they want to swell.
- This is not possible inside the horn and therefore very painful.

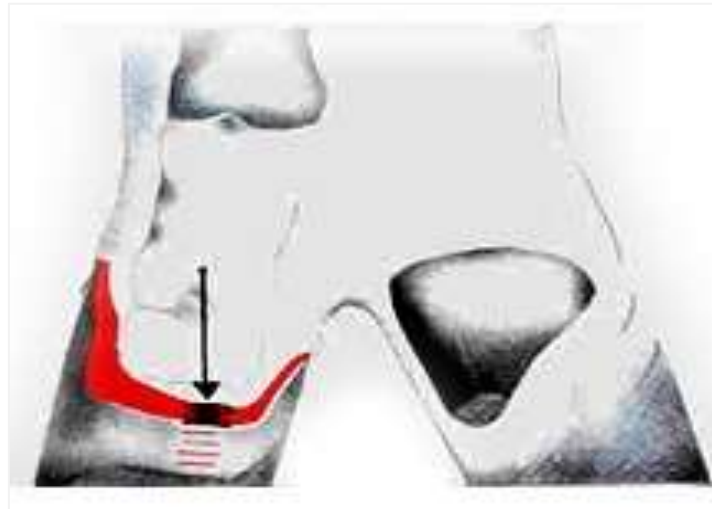
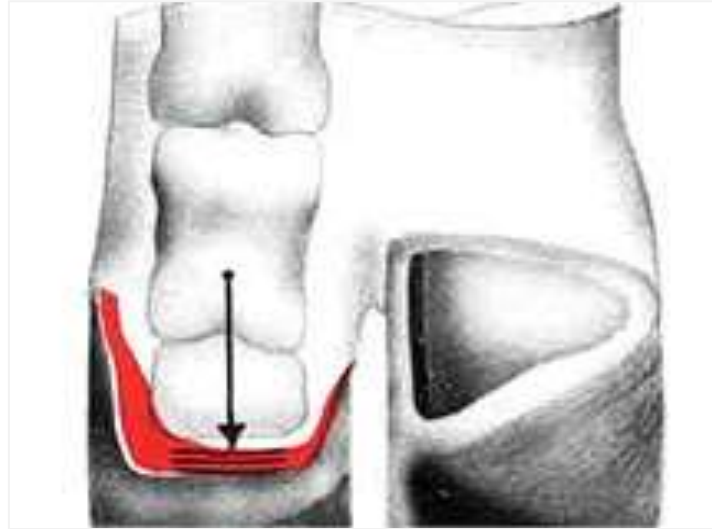
4. The Biomechanics

- In a normal situation, the weight is equally distributed over the 4 hoofs.
- When imbalanced, there is a difference between left and right.
- In an open system (extensive grazing) the pressure would be divided equally over the left and right claw, but in a closed system (zero grazing) there is disturbance.
- In practice the inner outside claw will be stressed the most.



4.1 The Biomechanics Cont'd...

- Due to growth of horn the pressure on the pedal bone can switch to a small area, which can give over pressure, and eventually can cause a sole ulcer.



5. Causes of hoof problems

- The causes of hoof problems can be divided in two categories;
 - i. Infectious
 - ii. Non-infectious
- **Infectious problems** are caused by bacteria and prevention and cure is based on hygiene, disinfection and antibiotic treatment.
- **Non-infectious problems** are caused by metabolic problems, which can have an infectious disease behind it like endometritis or mastitis.
- For both problems feeding a proper ration is of importance; because feeding is contributing factor in the causes of both categories.

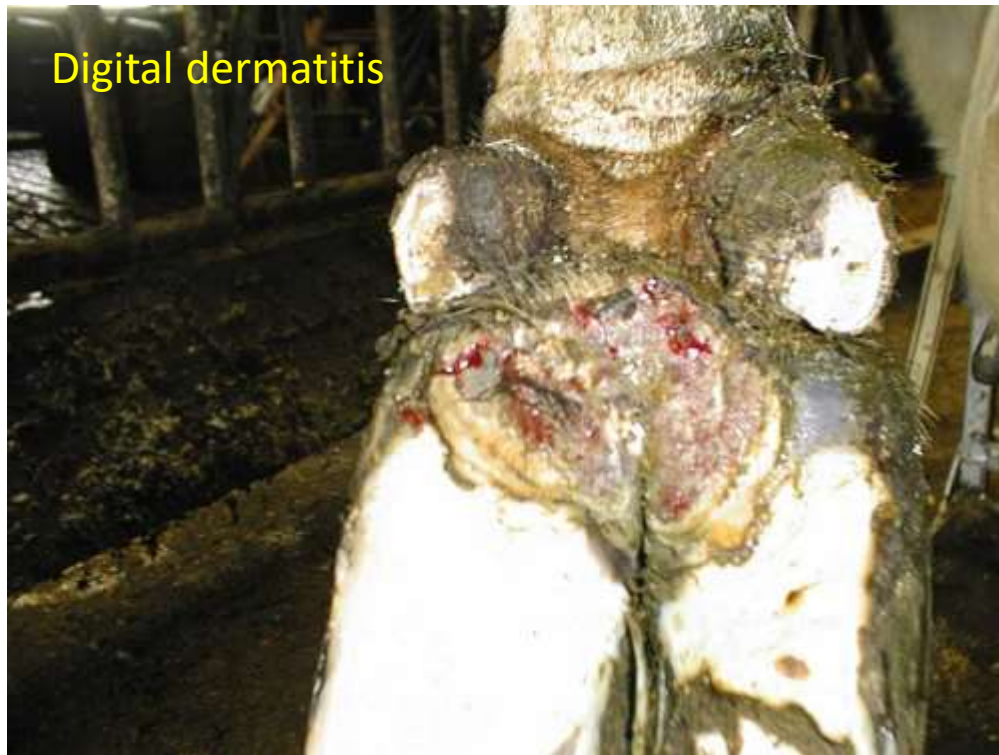


Muddy homestead

6. Infectious hoof problems

Three main sources of infectious hoof diseases are:

- i. Digital dermatitis
- ii. Interdigital phlegmon
- iii. Interdigital dermatitis



7. Interdigital dermatitis

- A - Stinking interdigital skin damage and superficial horn defects on the heel.
- B - More severe stinking interdigital skin damage and deep horn defects on the heel.
- C - Severe stinking interdigital skin damage with sole ulcer. Painful.



7.1 Interdigital dermatitis (foul in the foot)

- The infection is caused by the bacteria *Bacteroides nodosus* and *Fusobacterium necrophorum*.
- Occurs mostly on wet floors.
- It starts as a superficial stinking inflammation of the interdigital skin.
- Then damages of the horn in the heel with a lot of extra horn forms especially in the rear outside claw (this is a predisposition for getting Mortellaro disease).
- Initially the cow is not lame.
- Pedicure, disinfection and hygiene are possible solutions.

The split in the interdigital skin is typical



The swelling of the coronary band forces the claws apart

8. Digital dermatitis (Mortellaro disease)

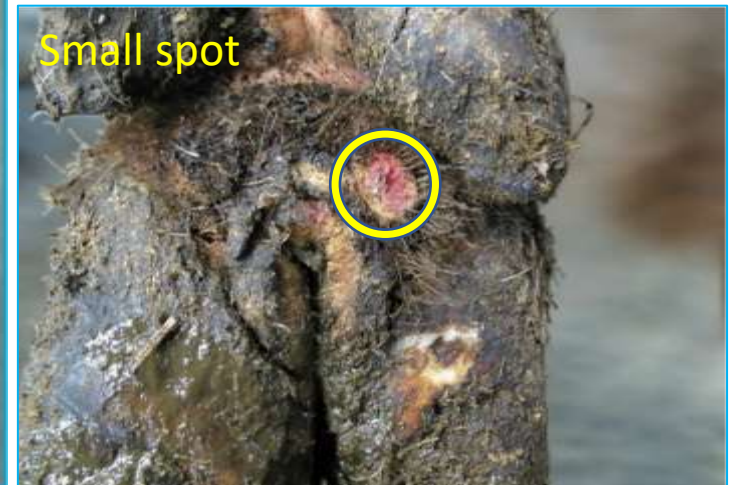
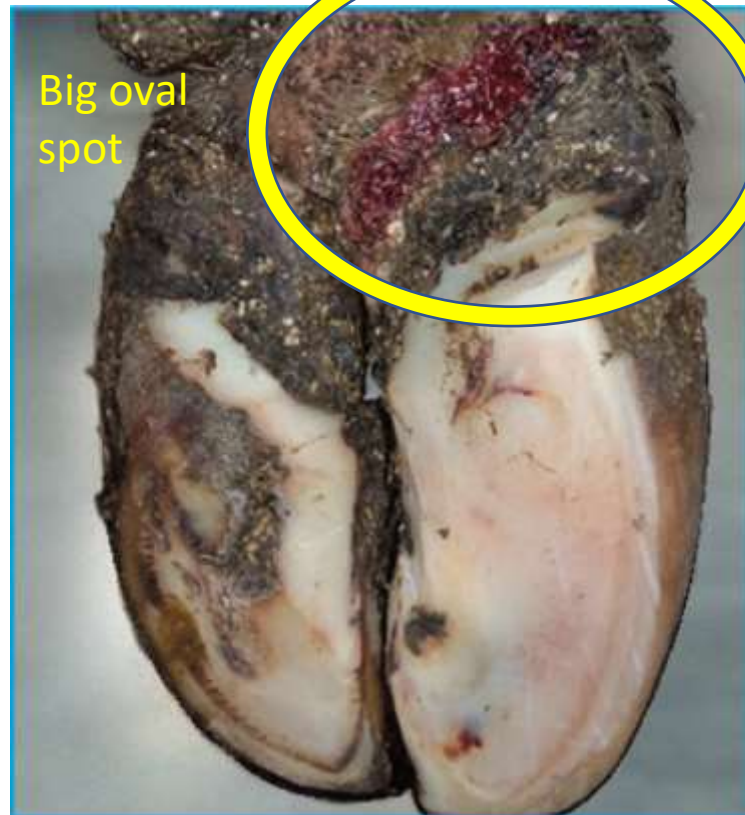
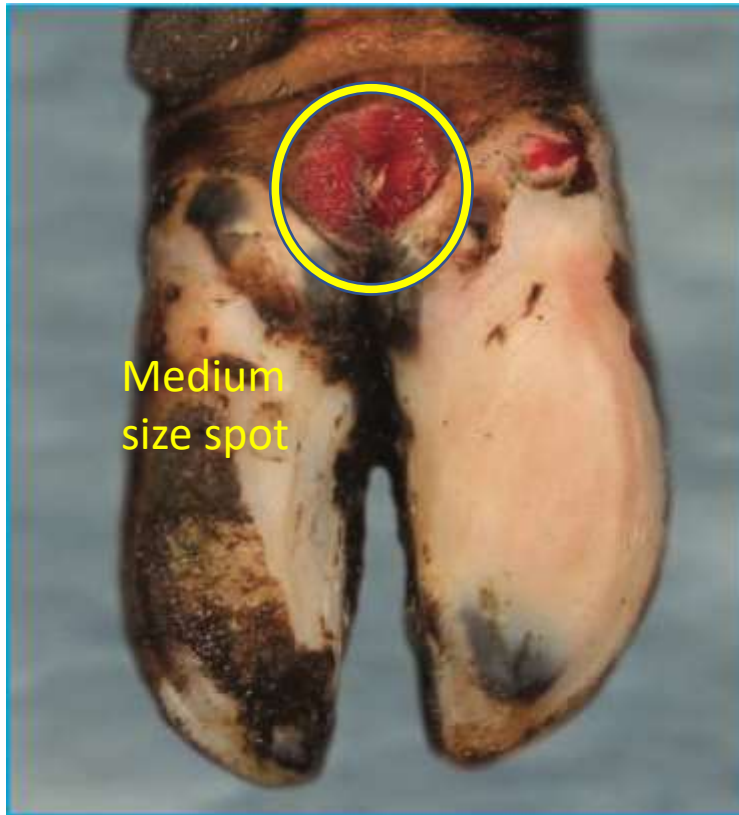
- Digital dermatitis or Mortellaro disease (first found in the seventies in Italy), is a highly contagious infectious disease.
- It is caused by a Treponema bacteria.
- The bacteria is present in manure.
- The bacteria enters deep into the corium and is therefore difficult to tackle.
- It is very painful for the cow.
- The skin around the claw is affected which is shown by a 'strawberry' like spot.
- Due to the damages caused, it can go together with interdigital dermatitis.
- Dry floors, pasture, disinfection and trimming can reduce the problem.



Moist and exudative area with matted hair

8.1 Digital dermatitis (Mortellaro disease) Cont'd...

- The picture below shows the typical 'strawberry' formed skin lesion, which is not always so clear.



8.2 Digital dermatitis (Mortellaro disease) Cont'd...



Mortellaro disease and associated under-run heel



Mortellaro disease with papilliform changes

8.3 Digital dermatitis (Mortellaro disease) Cont'd...



Mortellaro disease before trimming to reveal diphtheric material



Mortellaro disease after trimming reveals raw and red granuloma tissue, which is painful for the cow

9. Non-infectious hoof problems

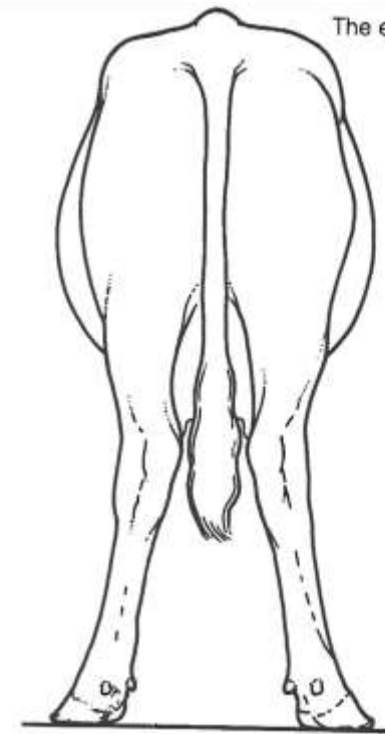
- The main cause of non infectious hoof diseases is laminitis.



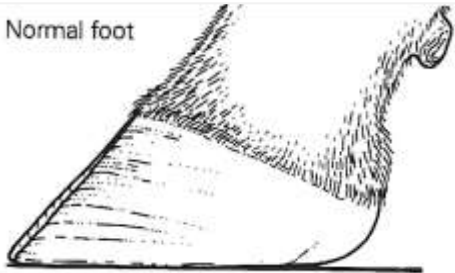
Normal stance



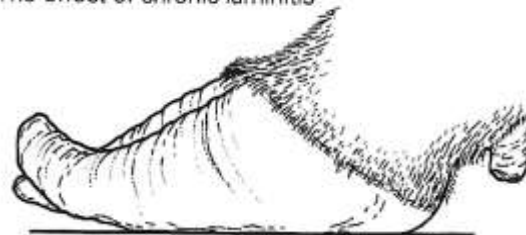
The effect of laminitis



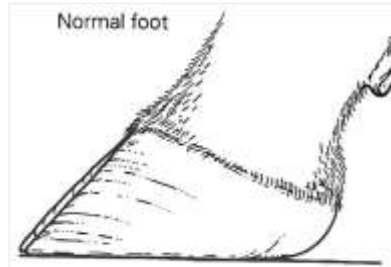
Normal foot



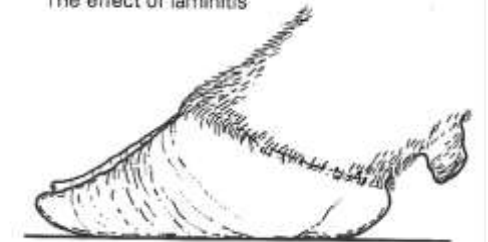
The effect of chronic laminitis



Normal foot



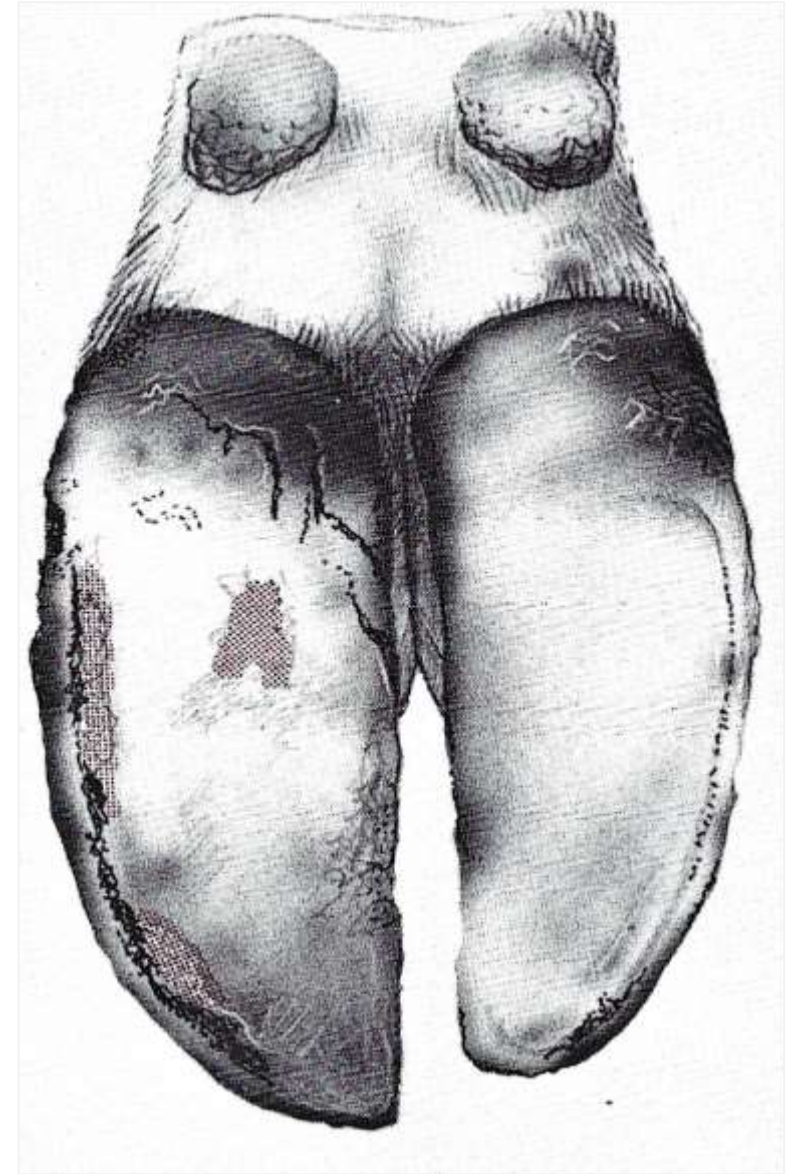
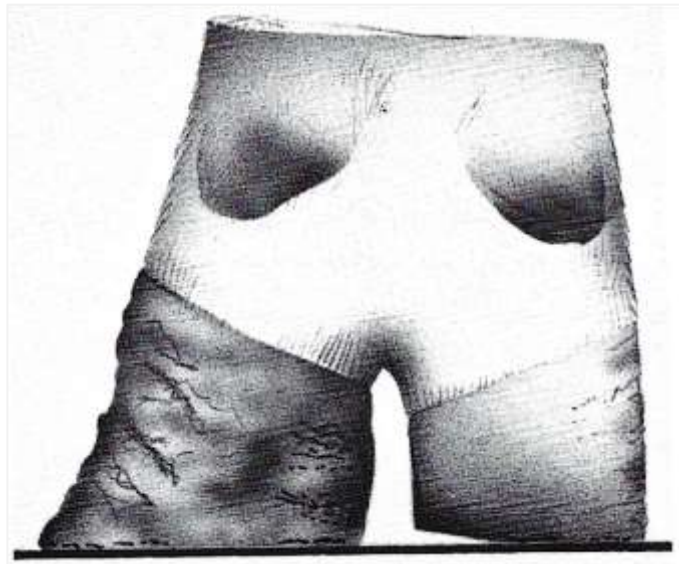
The effect of laminitis



10. Laminitis

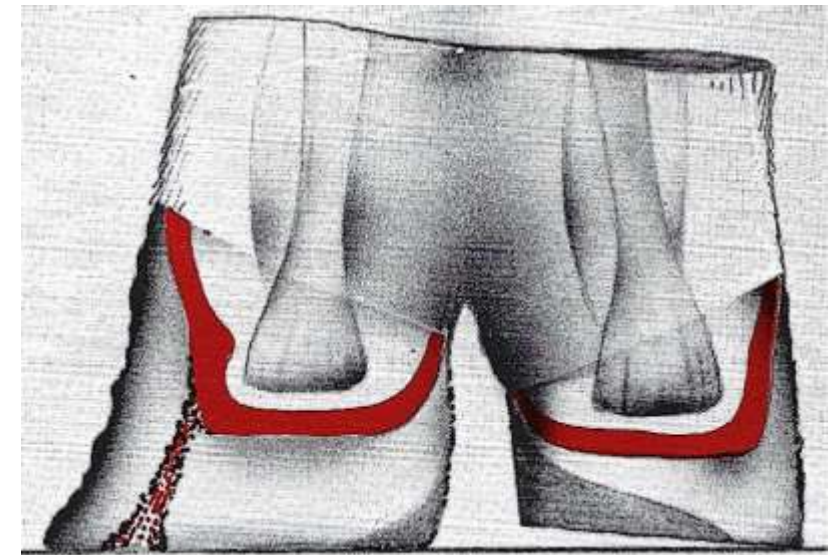
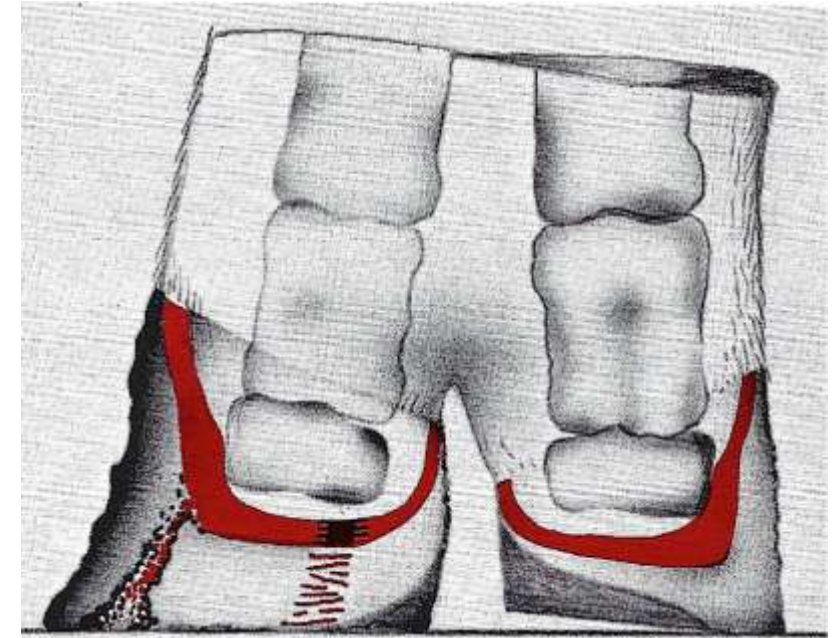
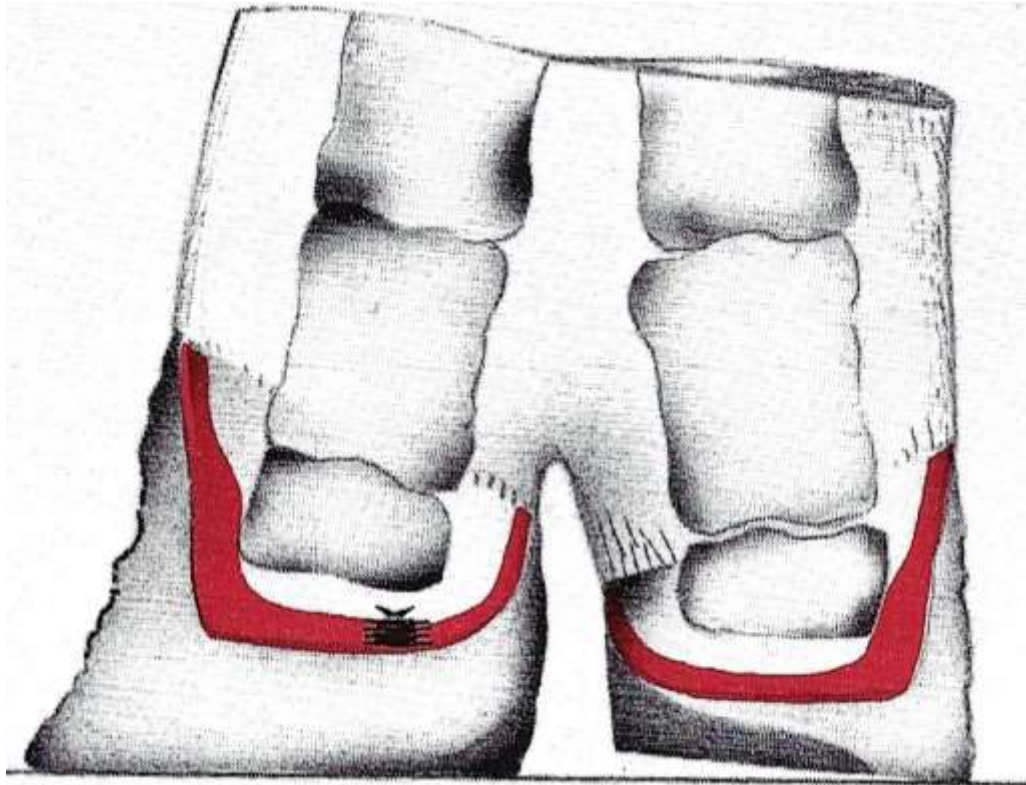
Symptoms

- The back outside claw is clearly too high (similar to digital dermatitis).
- The sole is often coloured due to bleedings.
- Front claw is bent in.
- Growth ring pattern changes.
- Toe tip comes up.
- It affects full sole.



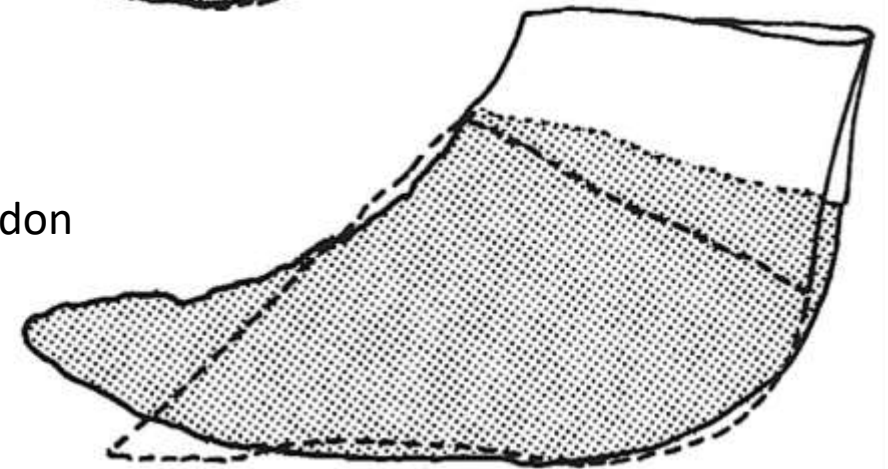
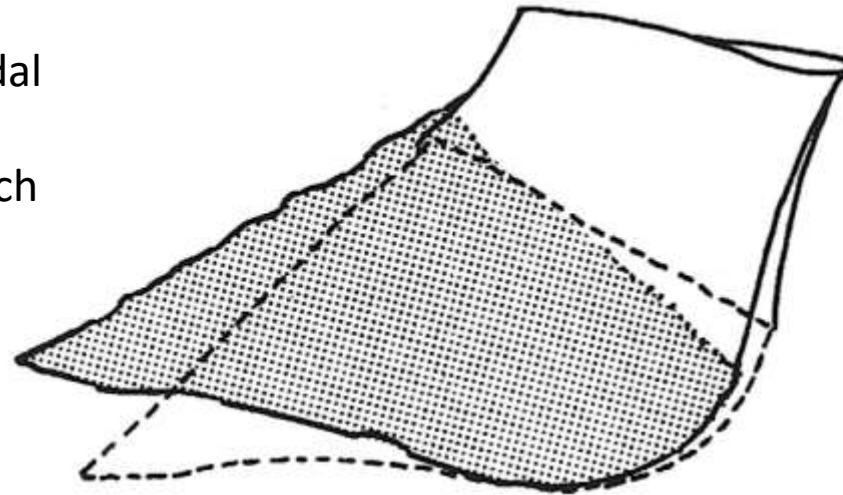
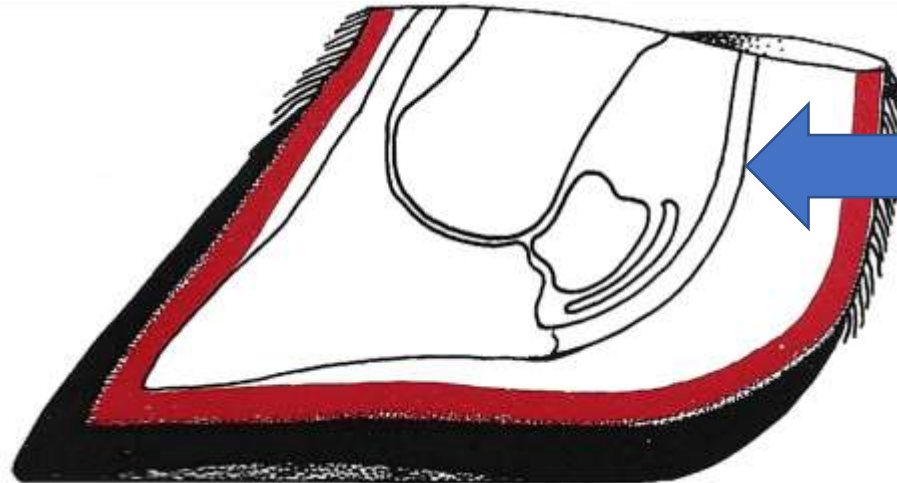
11. Biomechanics and Laminitis

- The pictures show how by growth of horn and change of pressure sole ulcers and white line defects can develop.



12. Tip toe and Laminitis

- When the deep tendon breaks the tip of pedal will go upwards.
- This is the reason for the Ali Baba shoes which you see in cattle with chronicle laminitis.



Deep tendon

13. What happens in the hoof when a cow has Laminitis?

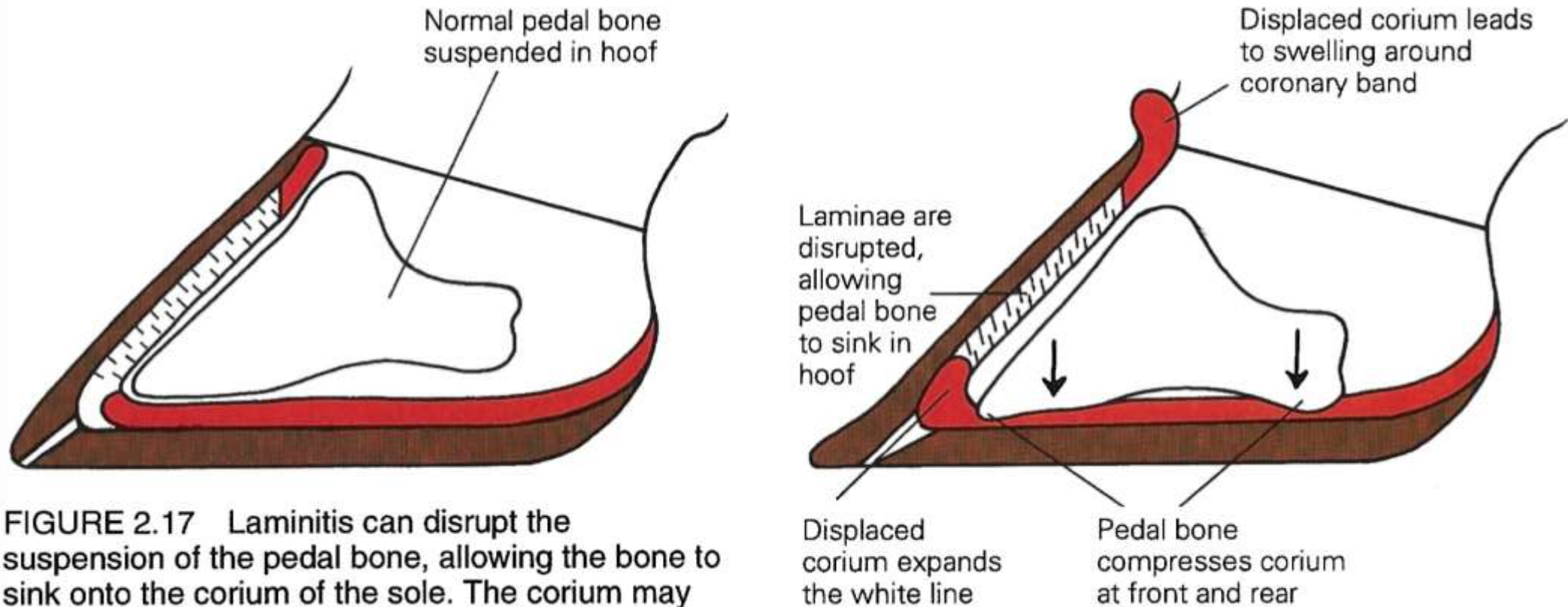
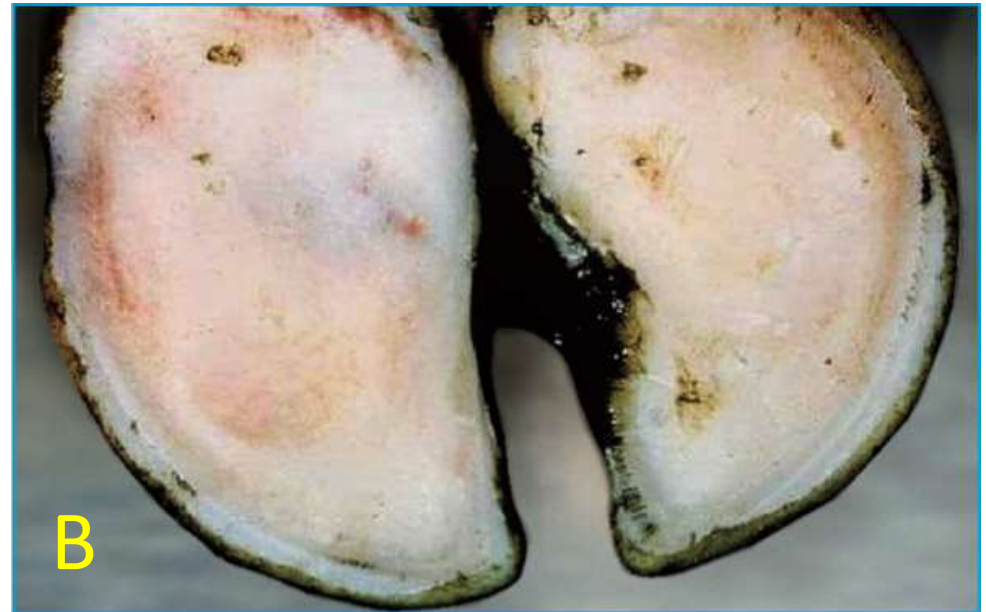


FIGURE 2.17 Laminitis can disrupt the suspension of the pedal bone, allowing the bone to sink onto the corium of the sole. The corium may then become displaced laterally, leading to an enlarged white line, or upwards, producing swelling above the coronary band. (Dr P. Ossent)

14. Laminitis and sole bleeds

- A - Big bleeding with release of sole from the corium.
- B - Yellow coloured sole with small bleeds.
- C - Bleeds in nearly half of the sole.



15. Laminitis and white line defects

- A - Small defects in the white line.
- B - White line inflammation or release.
- C - (White line) wall ulcer.



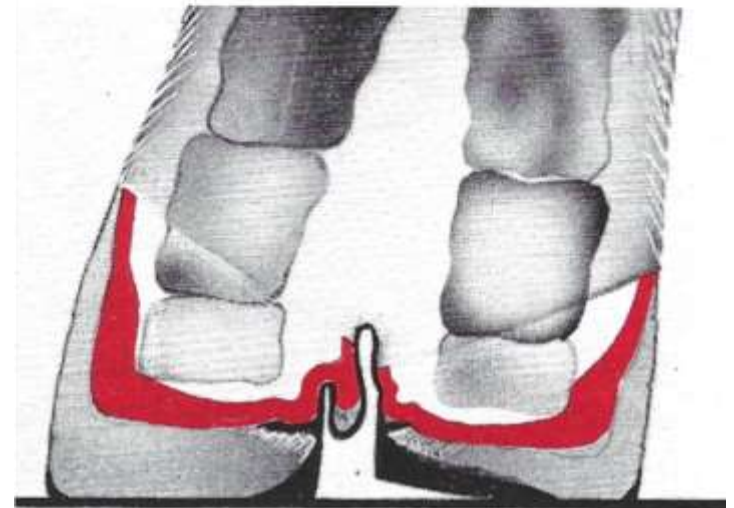
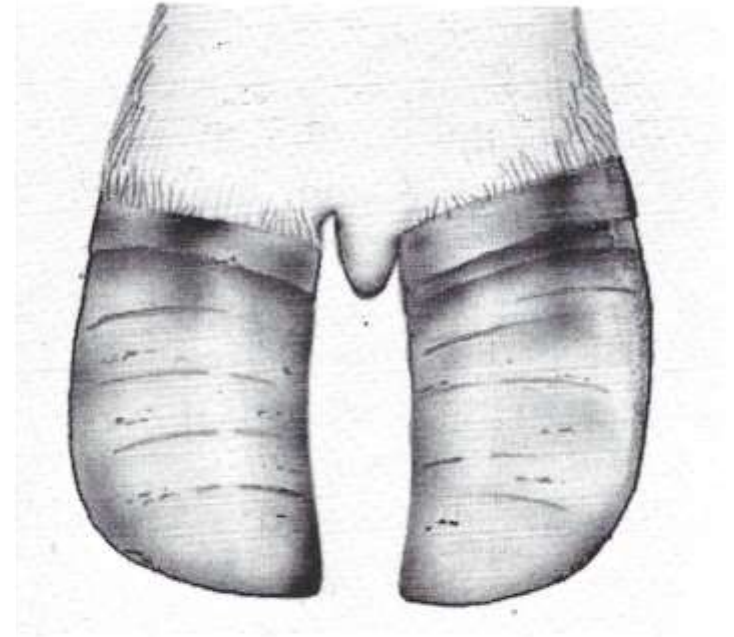
16. Laminitis and sole ulcers

- A - Bruising on typical spot.
- B - Heavily bruising on typical spot.
- C - Ulcer with prolapse.



17. Tyloma

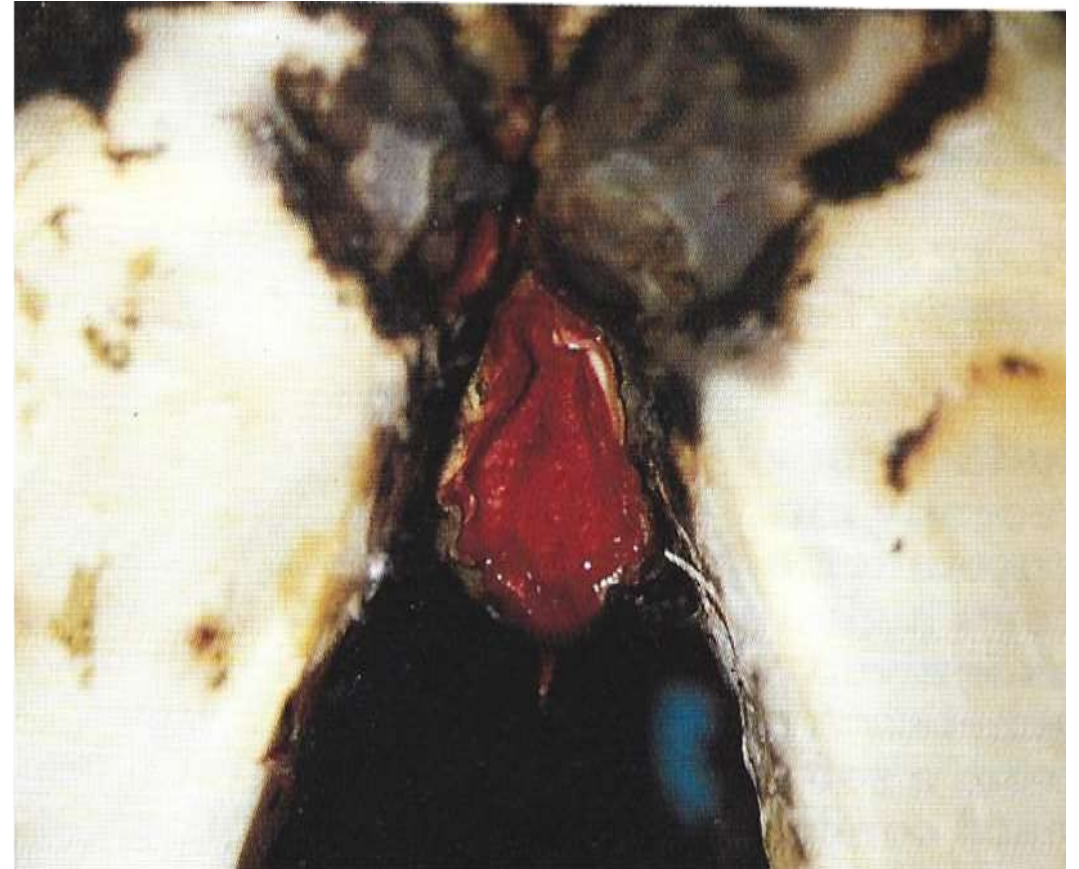
- Tyloma is also known as Interdigital skin hyperplasia.
- Is exhibited by overgrowth of skin between the claws.
- Caused by chronic irritation, (inter) digital dermatitis, and possibly foreign bodies.
- Has a high hereditary component.
- It is more seen in Herefords and big beef cattle (bulls).
- Also occurs in certain families within a breed.
- Develops most on the inside of the outside rear claw.



17.1 Tyloma Cont'd...



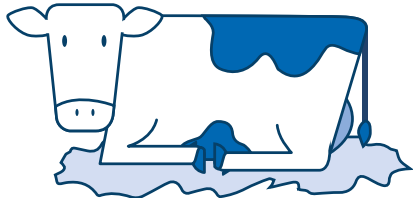
Interdigital skin hyperplasia together with interdigital dermatitis



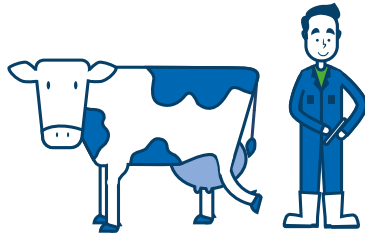
Large interdigital skin hyperplasia. This may require amputation.

18. How to handle hoof problems

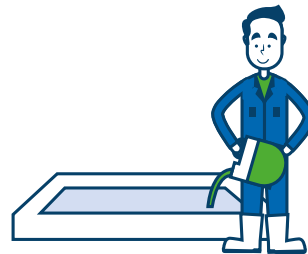
- The Dutch Animal Health Service recommends seven items to take care about:



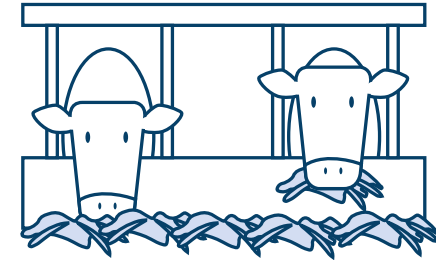
1. Floors and cubicles



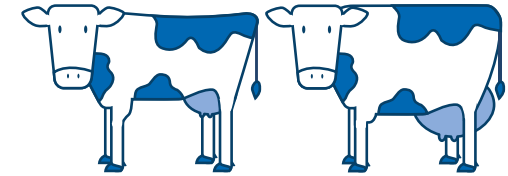
2. Hoof checks



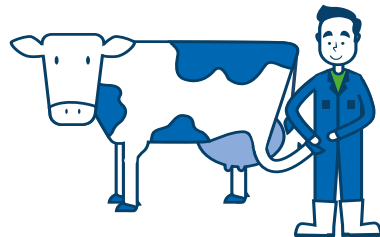
4. Disinfection



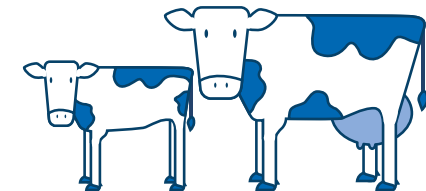
5. Ration



6. Body Condition Score



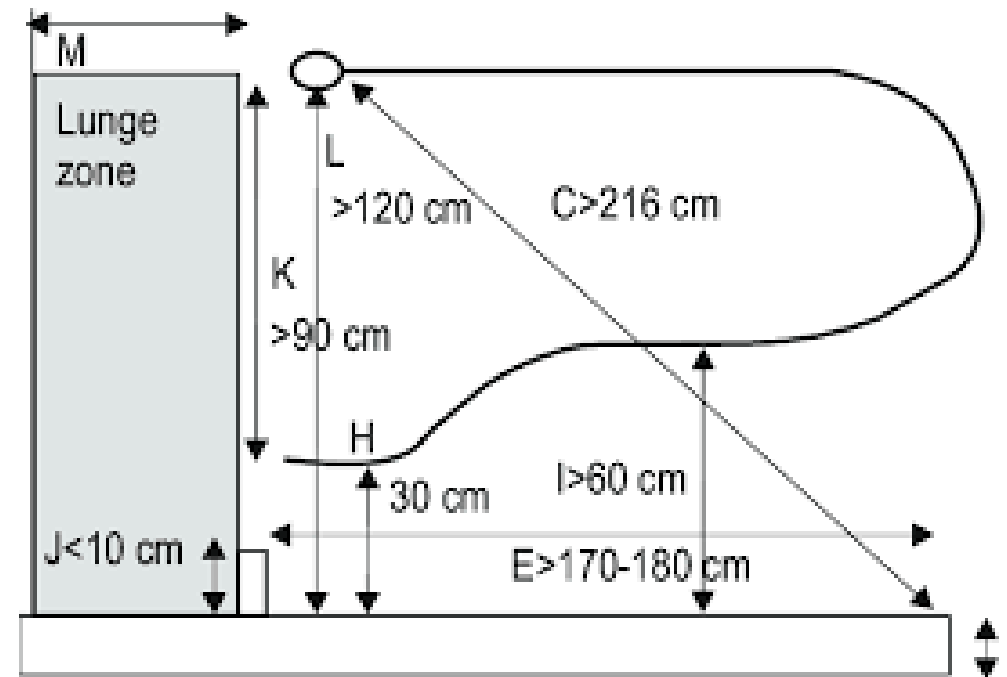
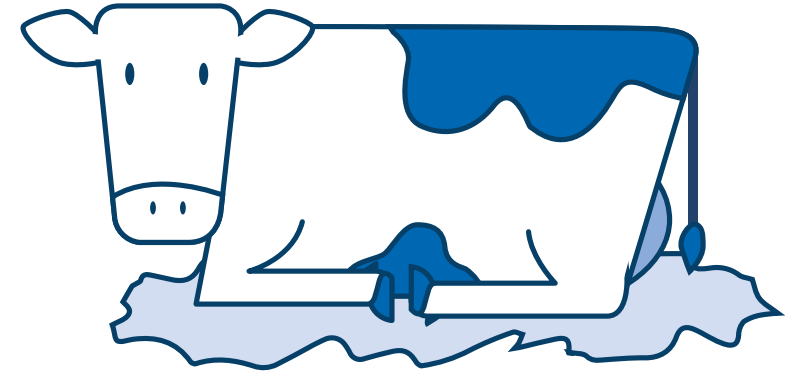
3. Treatment of lame cows



7. Breeding and culling

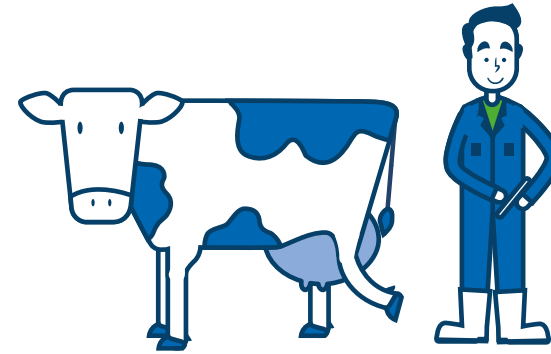
19. Floors and Cubicles

- Assure a dry clean floor with comfortable cubicles.
- Pasture is often the best remedy for hoof problems.
- Cubicles should have the right size.
- Take care of daily dry bedding, a 5cm straw layer or have 5 cm rubber matress.
- Clean the walking area at least twice a day.
- Prevent overcrowding.

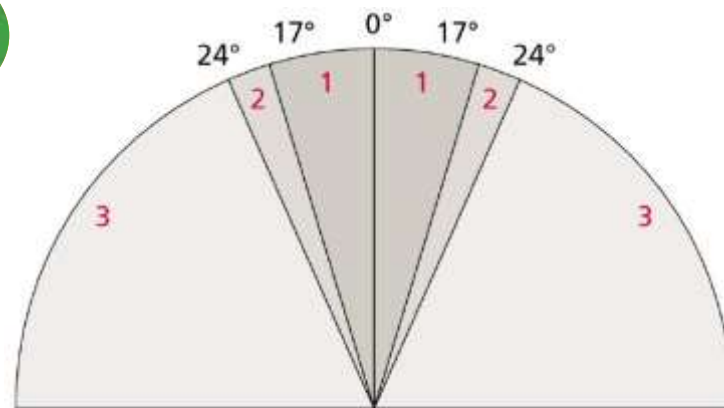


20. Hoof checks

- Check the hoofs (by taking them up);
 - At the start of the dry period,
 - Two to three month after calving,
 - And cattle who need extra attention, because of lameness.
- This is a recommendation for cattle in zero grazing circumstances.
- While checking you can do a functional pedicure (See five steps protocol for hoof trimming).



- A first indication can be a claw score. ✓
- Cattle with score 2 or 3 should be trimmed.



Meten van de klauwscore



Claw score

20.1 Locomotion score

- An alternative for getting an impression for hoof health of the herd is by doing a locomotion score.
- Cattle with score 2 are already in need for a trim.
- When doing it regularly and by recording it, you get insight in hoof health of your cattle.



Score 1

- Cow stands and walks normal.
- Long confident strides.



20.2 Locomotion score Cont'd...

Score 2

- Mildly lame.
- Stands with flat back
- Arches when walks
- Slightly abnormal gait.



Score 3

- Moderately lame.
- Stands and walks with arched back.
- Short strides.



20.3 Locomotion score Cont'd...

Score 4

- Lamé.
- Arched back standing and walking.
- Favours certain legs.



Score 5

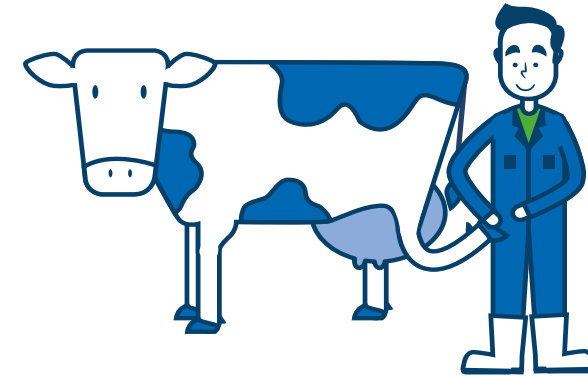
- Severely lame.
- Constant arched back.
- Great difficulty moving.



21. Treatment of lame cattle

- Treat lame cattle as soon as possible.
- Majority of lameness are hoof related, so hoof trimming is the first step.
 - Functional trimming first.
 - Therapeutic trimming when necessary.
- When an infectious diseases is present you can use an antibiotic spray after trimming.
- Seven (7) days later you can then treat with a disinfectant, preferably by spraying.

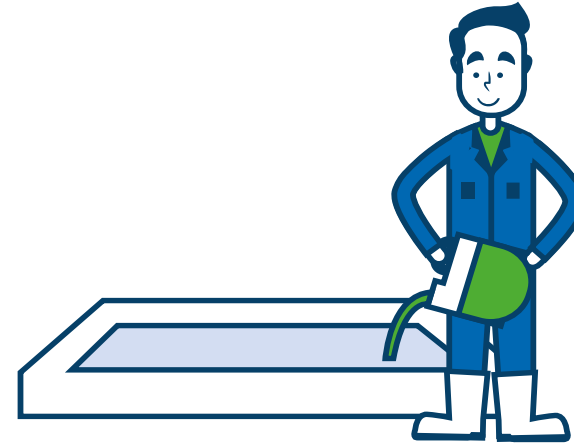
Cattle with a severe acute laminitis need veterinary attention.



Therapeutic treatment

22. Disinfection

- When there are problems with infectious claw diseases (phlegmone, digital and interdigital dermatitis), disinfection can help.
- Traditionally this is done with footbaths filled with biocides (formalin, antibiotics, CuSO_4). From environmental perspective, this is nowadays not justifiable anymore. Only quaternary ammonium compounds are environmentally safe.
- In Uganda every farmer has a sprayer. This can be a good alternative. Prerequisite is concrete (not muddy, crush) floor.
- Use quaternary ammonium compounds. Probably other disinfectants as iodine will also work.

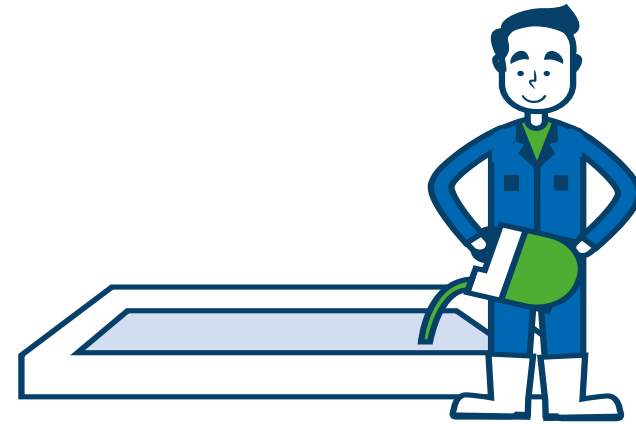


Farmer spraying hoofs

22.1 Disinfection Cont'd...

Protocol for digital dermatitis;

- Spray all cows with symptoms once daily for three days in a row.
- Repeat this after ten days.

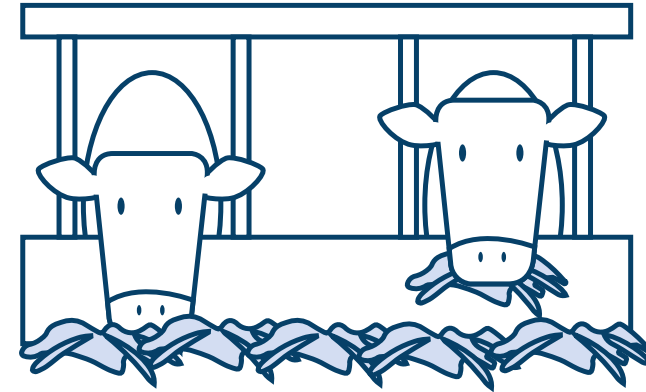


Mortellaro disease



23. Ration

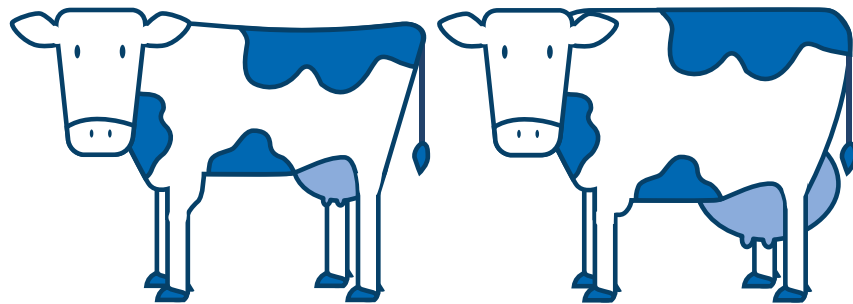
- A good ration is is very important for horn growth.
- As you all know parturition has effect by counting the rings off the horns to see the number of calving the cow had.
- This has to do with changes in feeding and (hormone driven) metabolism around giving birth. Especially the provision of Zinc, Manganese and biotin are of interest.
- Often, the problem is not lack of these minerals and vitamin, but disturbances in the rumen (acidosis) which decrease the absorption of these substances.



Interruption in horn growth

24. Body condition score (BCS)

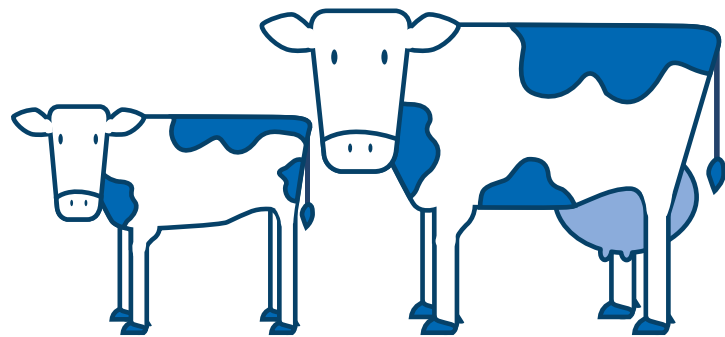
- Skinny cattle with a BCS > 2.5 can develop claw problems. The fat cushion in the claw gets thin then. (Lame cows will get skinny because they eat less).
- A condition score of 3-3.5 before calving is recommended.
- 8% of all lameness can be prevented by reducing the loss of BCS to 0.5 point.
- Cows with BCS < 2.5 at the start of the dry period have 4 times more chance to develop lameness.



BCS 2.75

25. Breeding and culling

- Tyloma is 60% hereditary and not connected with dermatitis.
- So keeping calves born by cattle with tyloma have the risk to develop tyloma as well.
- Cattle with chronic digital dermatitis are continuously spreading the contagious bacteria, so culling can be an option.



Tyloma

26. Summary/Take home messages

1. Infectious diseases of the foot first will damage the skin closely adjacent to the horn of the hoof and then cause damage in the deeper tissues and the horn.
2. Non-infectious diseases of the foot will develop from the inside of the claw and slowly show signs on the outside (hoof bleeds, sole ulcers, white line defects).
3. When checking the herd this difference is mostly not clear.
4. Symptoms of laminitis give opportunities for infections from the outside while infections in general are contributing to the development of laminitis.
5. So, hoof diseases are multi-factoral diseases and treatment and prevention have to tackle all factors (causes).
6. With infectious diseases, hygiene and disinfection have to be emphasized.
7. With laminitis, the emphasis will be on general management and feeding.
8. When a herd has foot problems, trimming is a key factor in prevention as well as in treatment.



Under-run or double sole