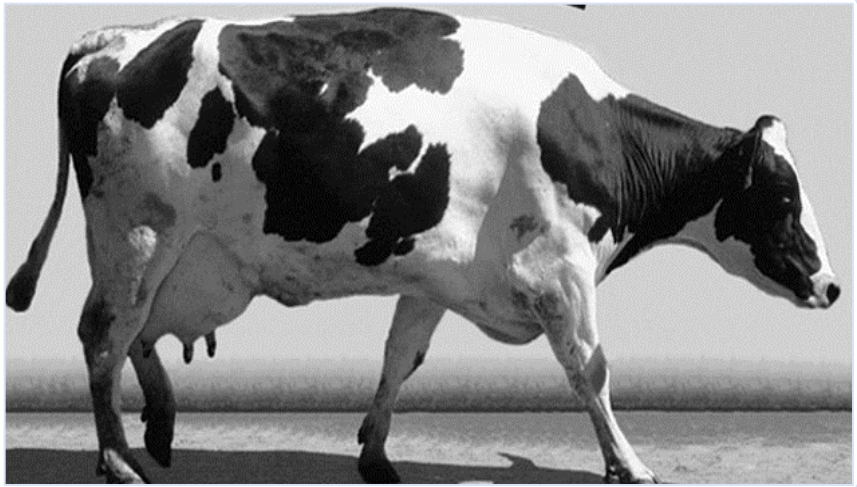
Theme 3: Animal Nutrition and Feeding

SCORING LOCOMOTION AND HOOF CONDITION (Level 2)

Topic	Training & information Content
3.1	Estimating feeding value of fodder & feed on dairy farms
3.2	Sampling feeds & forages/analysis interpretation
3.3	Estimating Dry Matter intake for various breeds/age categories of dairy cattle in the tropics
3.4	Reviewing feed intake, rumen fill, Body Condition Scoring (BCS)
3.5	Life weight estimation of cows
3.6	Rumen fermentation
3.7	Mineral & vitamin requirement, guidelines
3.8	Manure scoring and evaluation
3.9	Guidelines for ration calculations for various breeds, heifers, lactation stage (Rumen8)
3.10	Use of Rumen8 software for ration calculation
3.11	Optimization of ration with Rumen8
3.12	Feeding management guidelines
3.13	Feeding management of dry cows/close-up
3.14	Feeding systems
3.15	Metabolic disorders
3.16	Scoring locomotion and hoof condition
3.17	Mycotoxin in dairy cattle nutrition
3.18	Heat stress in dairy cattle nutrition
3.19	Monitoring feeding management, using KPIs (based on Rumen8)

1. You will learn about (learning objectives):

- ❑ How to score locomotion in cows.
- ❑ Hoof conditions in cows and prevention measures.
- ❑ Diseases that affect hoof and locomotion.



2. Introduction

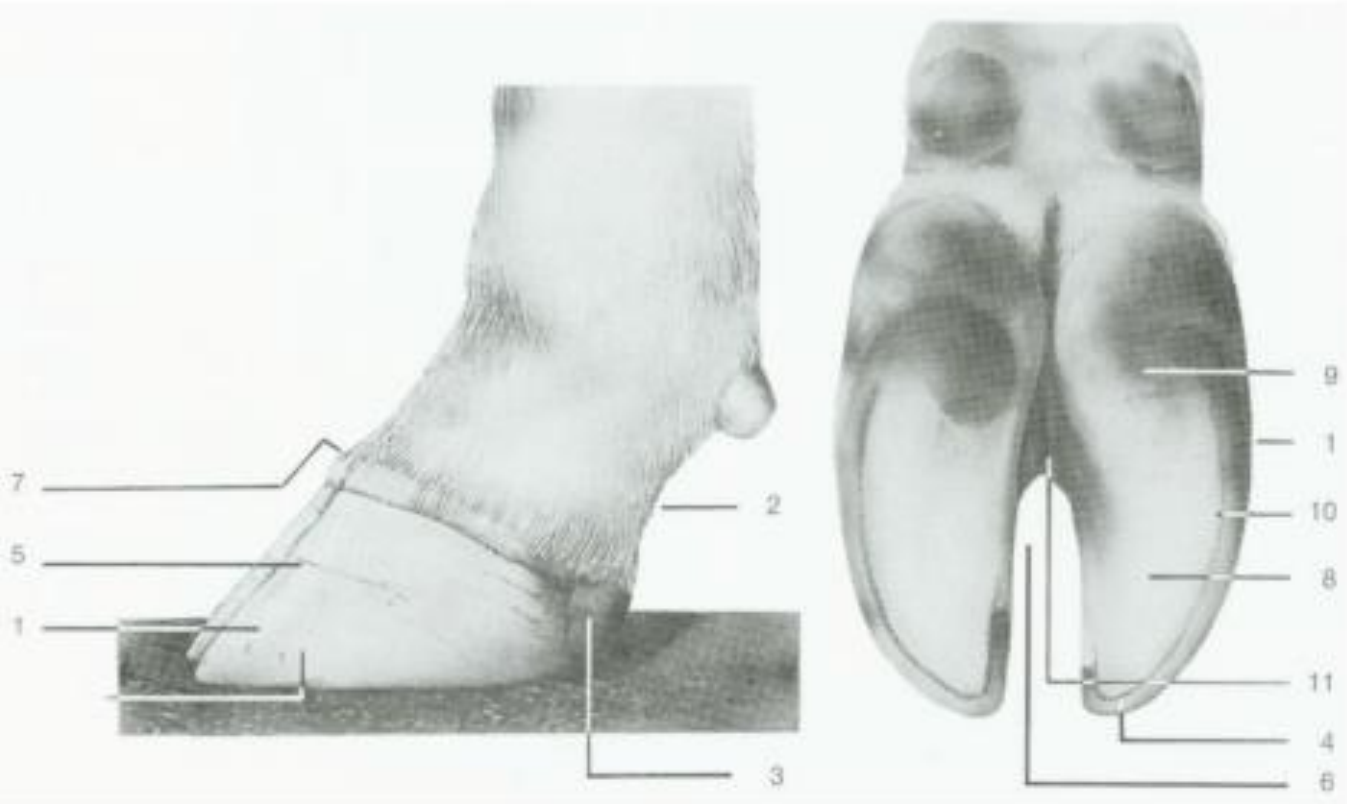
- The performance and production of a dairy cow is best if she is healthy and comfortable.
- A healthy cow feeds optimally and produces high quantities of milk while maintaining good fertility.
- An important feature of cows' health is their legs and feet. A dairy cow should be able to walk without any problems.

Cows walking in normally

2.1 Introduction Cont'd…

- A locomotion (or lameness) score provides a five point system for assessing the ease with which cows can walk over a level surface.
- The scores vary from normal to severely lame.
- The hoof score describes the degree of inflammation and infection of the hoof.
- The leg score is done to assess the stance of the hind legs.

3. Parts of a Cow's foot

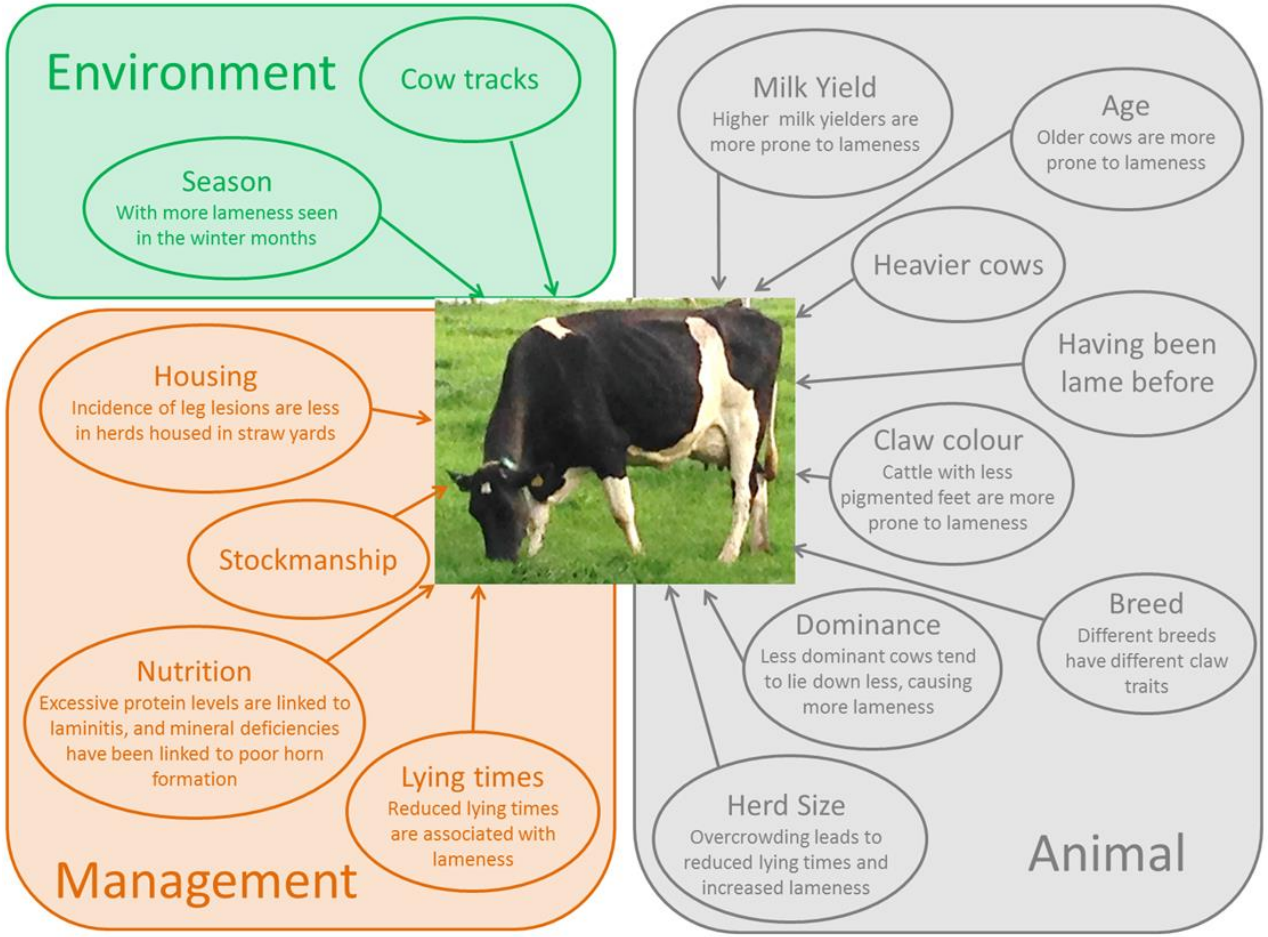


1. The horny wall of the claw
2. The pastern
3. The heel or bulb
4. The weight-bearing border of the wall
5. Growth rings
6. The interdigital space
7. The coronet
8. The sole; if the claw is healthy, the thickness is 5 -7 mm.

9. The soler part of the heel; the weight-bearing part of the heel.
10. The white line; the horny connection between the weight-bearing border and the sole.
11. The interdigital skin.

4. Lameness

- Lameness is a common problem in cows and can greatly affect their welfare and productivity.
- Lameness is not a (single) disease but a symptom associated with a range of different conditions.
- These can be environmental, management and animal factors/conditions.



5. Environmental factors affecting lameness

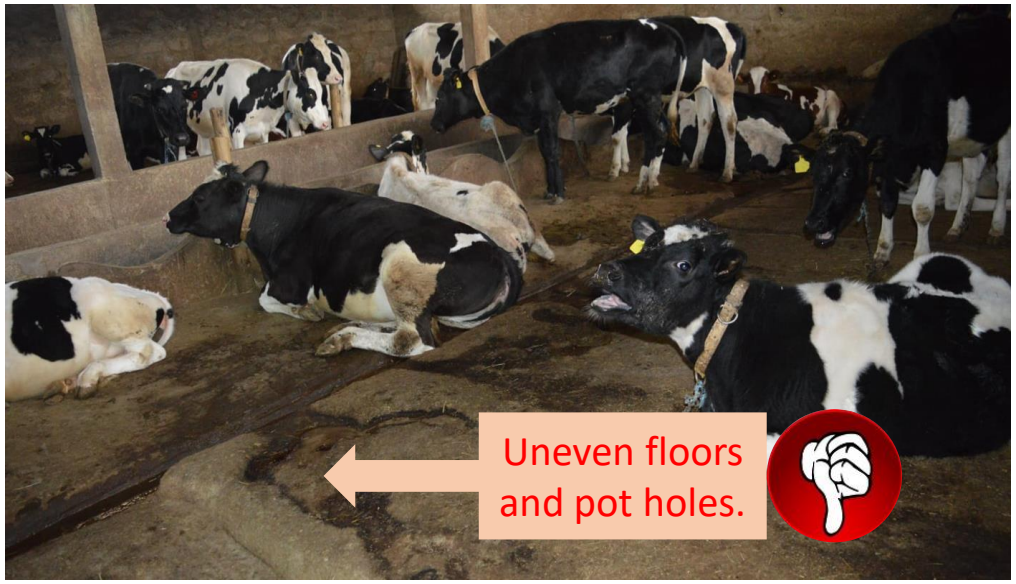
- One of the most important environmental factors is season, with lameness risks being greater in wet season than in dry season.
- Wet (weather) conditions in a cow barn are conducive for maintaining high bacterial levels.
- Lameness in grazing cattle tends to increase about three weeks after heavy rainfall.

Wet conditions in the fields

Wet conditions in the barns

6. Management and housing factors affecting lameness

- Manure management and prevention of prolonged contact between feet and slurry are important preventive measures in control of lameness.
- Overcrowding, especially of first calved heifers, leads to a reduction and frequency of resting time and increased number of lameness cases.



6.1 Management and housing factors affecting lameness Cont'd…

- Housing is also a significant factor. The overall incidence of lesions is lower in straw yards than in cubicles with concrete yards.
- Claw disorders are less frequent in herds in straw yards or pastures compared to those on slatted floors.
- Straw yards also reduce the exposure to bacteria causing digital dermatitis.
- Cubicle lying surface can affect lameness incidence.
    - Sand bedded cubicles are associated with less incidences of lameness.

Cows in sand bedded cubicles

7. Feeding practices affecting lameness

- Feeding errors and deficiencies of certain nutrients can be a key factor in foot problems.
- The risk period is from the last week before calving to the first weeks after calving (transition period). Heifers are particularly vulnerable.
- Shortage of vitamins (B7, A,D,E), minerals (copper and zinc) and trace elements (e.g., manganese) can lead to reduced hoof and horn quality.
- Laminitis is often associated with sub-acute rumen acidosis.
- Sudden changes from a low plane of energy pre-calving to high plane of energy after calving may predispose cows to lameness.

8. Animal factors affecting lameness

- Breed and genetic characteristics influences lameness:
  - Ayrshire and Jersey breeds have better claw score traits for certain foot conditions than other breeds such as Holstein Friesians.
  - Jerseys are smaller than other breeds and are therefore generally lighter cows.
  - Jerseys also they tend to have less lameness due to their harder feet/hoof.
- Heavier cows are more prone to clinical lameness.
- Age: very old cows and younger heifers are more prone to lameness.

8.1 Animal factors affecting lameness Cont'd…

- Low dominance-ranked cows spend less time lying down than high-ranking animals, hence higher risks of lameness.
- Many foot lesions are also related to the early post-calving period.
- At and around calving, cows are immunosuppressed (low resistance to diseases) and may have an increased standing time which may lead to foot lesions and lameness.

9. Weight bearing on hooves

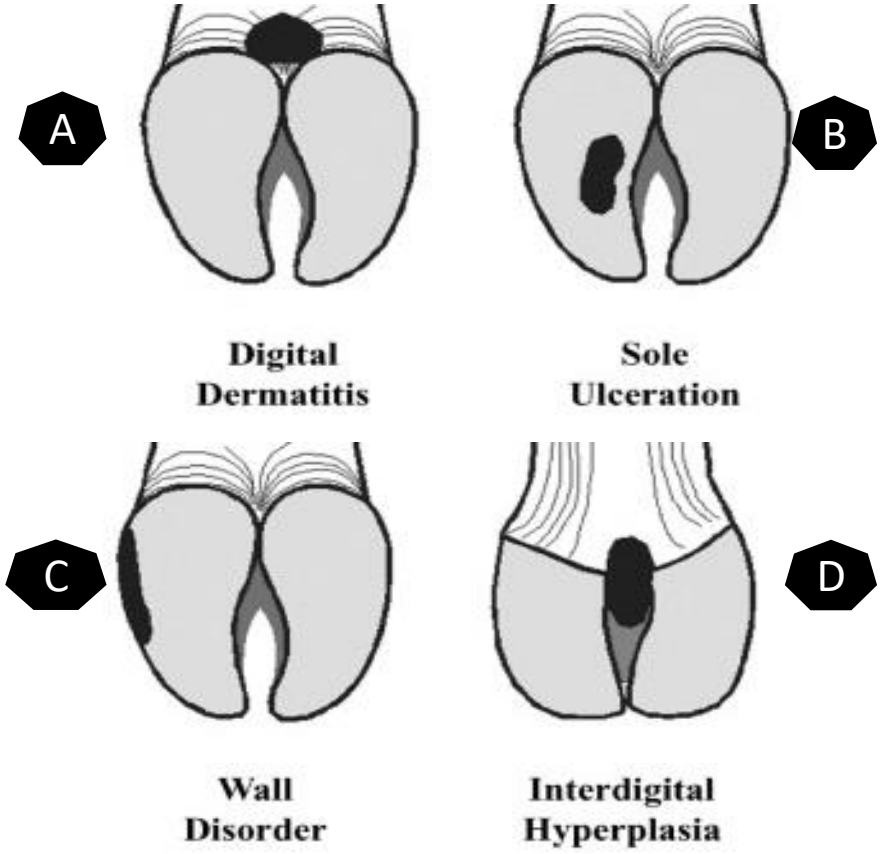
- Cow’s feet are made to bear their weight to ensure good mobility.
- The shape and condition of the hooves are important for healthy weight bearing.
- The weight should be equally distributed over the inner and outer hoof and should be on the weight bearing border of the hoof and the soler part of the heel and sole.

10. Other factors causing lameness

- After calving a cow with milk fever condition is not able to stand and walk. If treated early lameness can be avoided.
- Foot and mouth diseases cause ulcers on both the mouth and hooves of the cow.
- Injuries resulting to pelvic dislocation or broken bones can cause lameness.
- Injuries on the hooves such as cuts or sharp object (nails) in the hooves can also cause lameness.
- If a calf is born with disabilities it is considered lame.

11. Diseases associated with lameness

- Lameness can be caused by abnormal change on the hooves or feet; for example:
  i. Hard and soft feet
  ii. Foot rot
  iii. Heel erosions (C)
  iv. Laminitis
  v. Sole ulcers (B)
  vi. Digital dermatitis (A)
  vii. Interdigital dermatitis (D)
  viii. Hock and feet injuries



12. Hard and soft feet

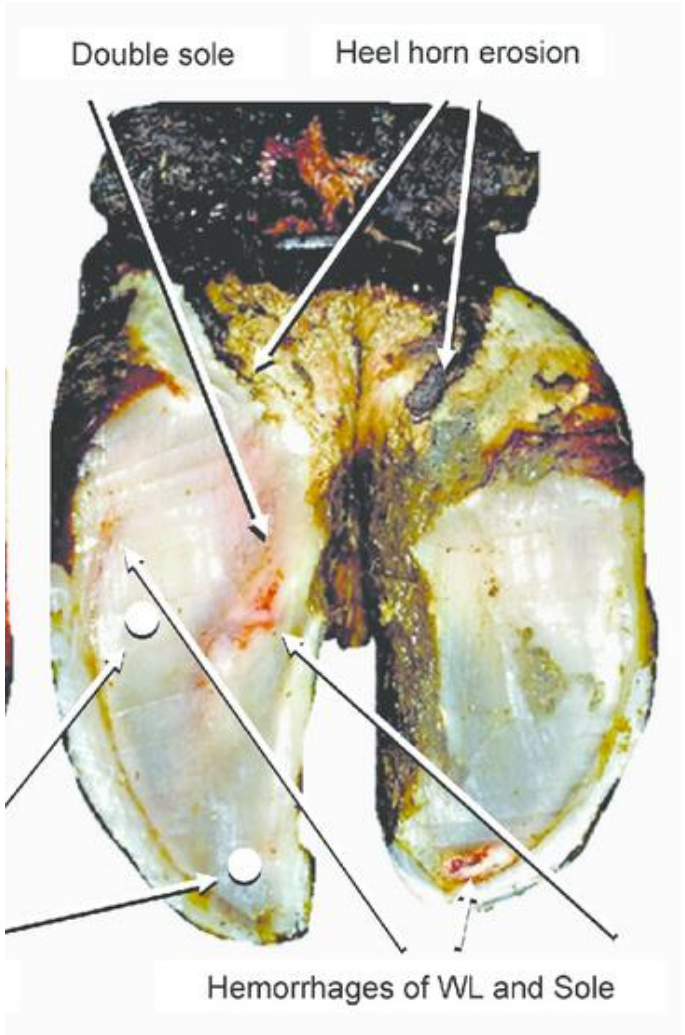
- Foot infections, abscesses or sole ulcers may stem from cracks that result when feet are too soft or hard.
- Excessively soft feet are more likely to occur in indoor intensive farming systems from standing in manure and urine.
- Hard feet usually occur in tie-stall barns, especially when kiln-dried shavings or sawdust are used for bedding.

13. Foot rot

- A smelly infection of the foot, which generally occurs high between the claws or toes is referred to as foot rot.
- It is an infection caused by bacteria. The organism may buildup in barns, exercise lots, mud-holes and pastures.
- If left untreated, the infection can progress into the joint space or tendon sheath producing permanent damage.

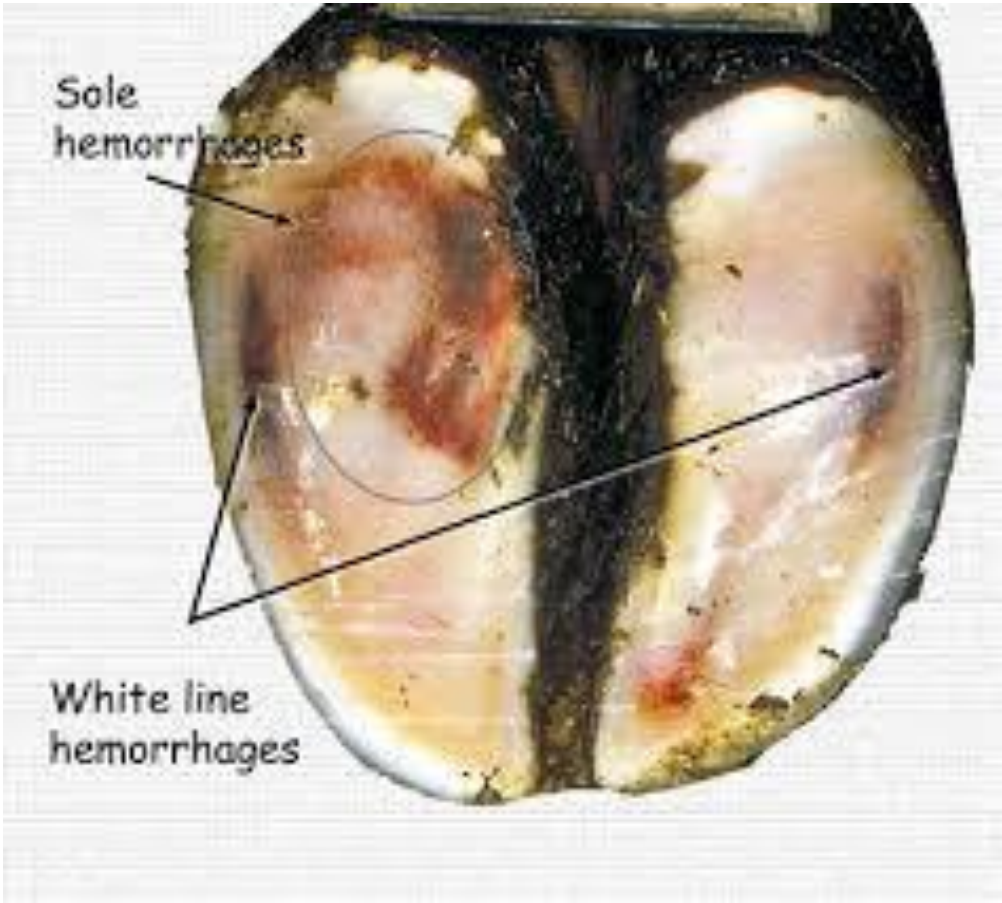
14. Heel erosions

- Heel erosions or under-run heels begin at the bulb of the heel. The horn can separate at the grooves to form a "flap."
- This condition is usually seen in confined cow in wet, dirty barns.
- Overgrown hooves shifts weight towards the heels exposing them to erosion, mostly in the hind claws.



15. Laminitis

- Founder or laminitis can result in long, overgrown and deformed feet or toes.
- Infections, abscesses or ulcers may occur when foreign materials enter places where the wall and sole have separated.
- The highest incidence of laminitis often occurs during the first 100 days postpartum.



16. Sole ulcers

- Sole ulcers are raw sores usually occurring on the inner side of the outside claw.
- Sole ulcers are usually associated with clinical manifestations of laminitis.
- However, there are other factors that can predispose cows to sole ulcers such as moisture and manure, excessive wear, and poor hoof trimming.

17. Digital dermatitis

- Other names include heel warts, hairy foot warts, strawberry foot disease, raspberry heel etc.
- Lesions look like raised, red and yellow patches and are usually located at the back of the foot above the heel.
- Lesions are painful and prone to bleeding when manipulated.
- May have raised long brown or grayish-black tufts of hair-like projections along the surface.
- They also have a hairy wart appearance.

18. Interdigital dermatitis

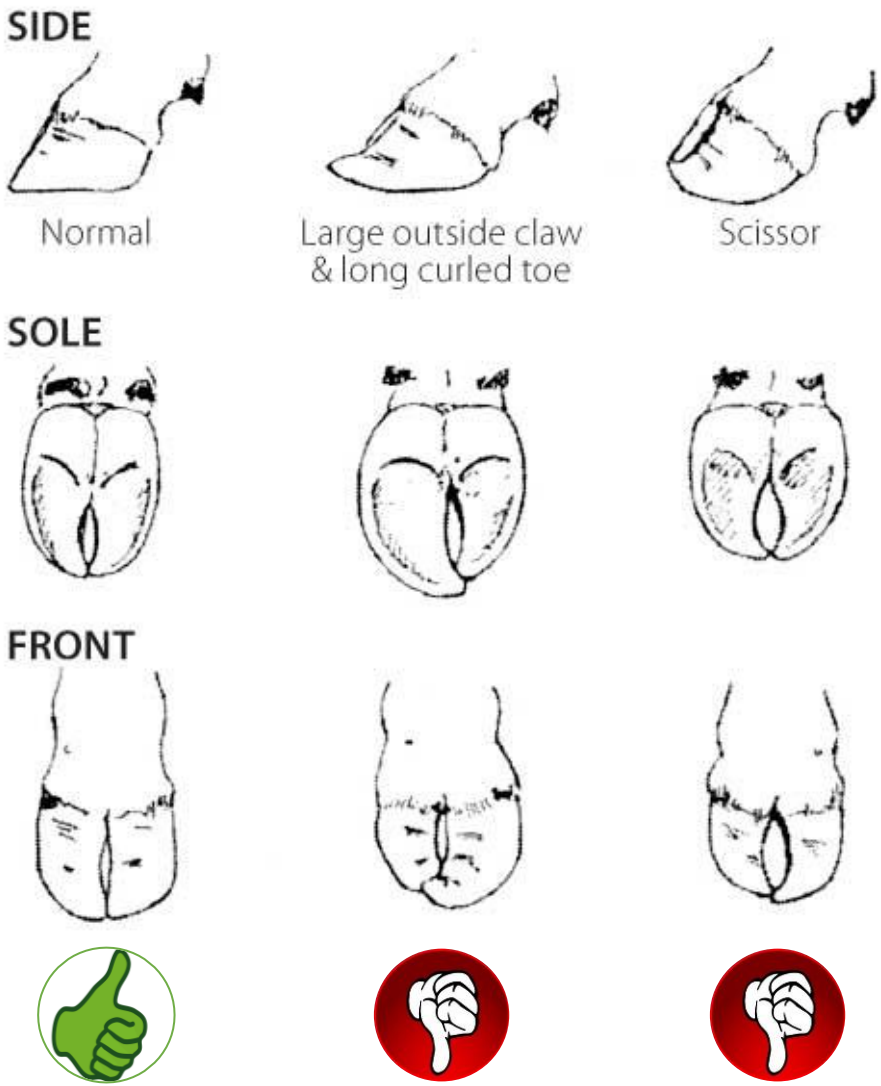
- Interdigital dermatitis is also called ‘slurry heel’ or ‘heelhorn erosion.’ It is a bacterial inflammation of the interdigital skin and the heel.
- The wet and smelly inflammation is characteristic of the initial stage of this disease.
- The inflammation may spread to the horn of the heel of the adjacent claws.

19. Hock and leg injuries

- The hock is a large, bony joint with little padding around it for protection.
- A cow's hocks may have hair loss, ulceration or open sores or swelling.
- Hair loss is the least severe form of hock injury, ulceration and swelling are more severe cases that eventually cause lameness.

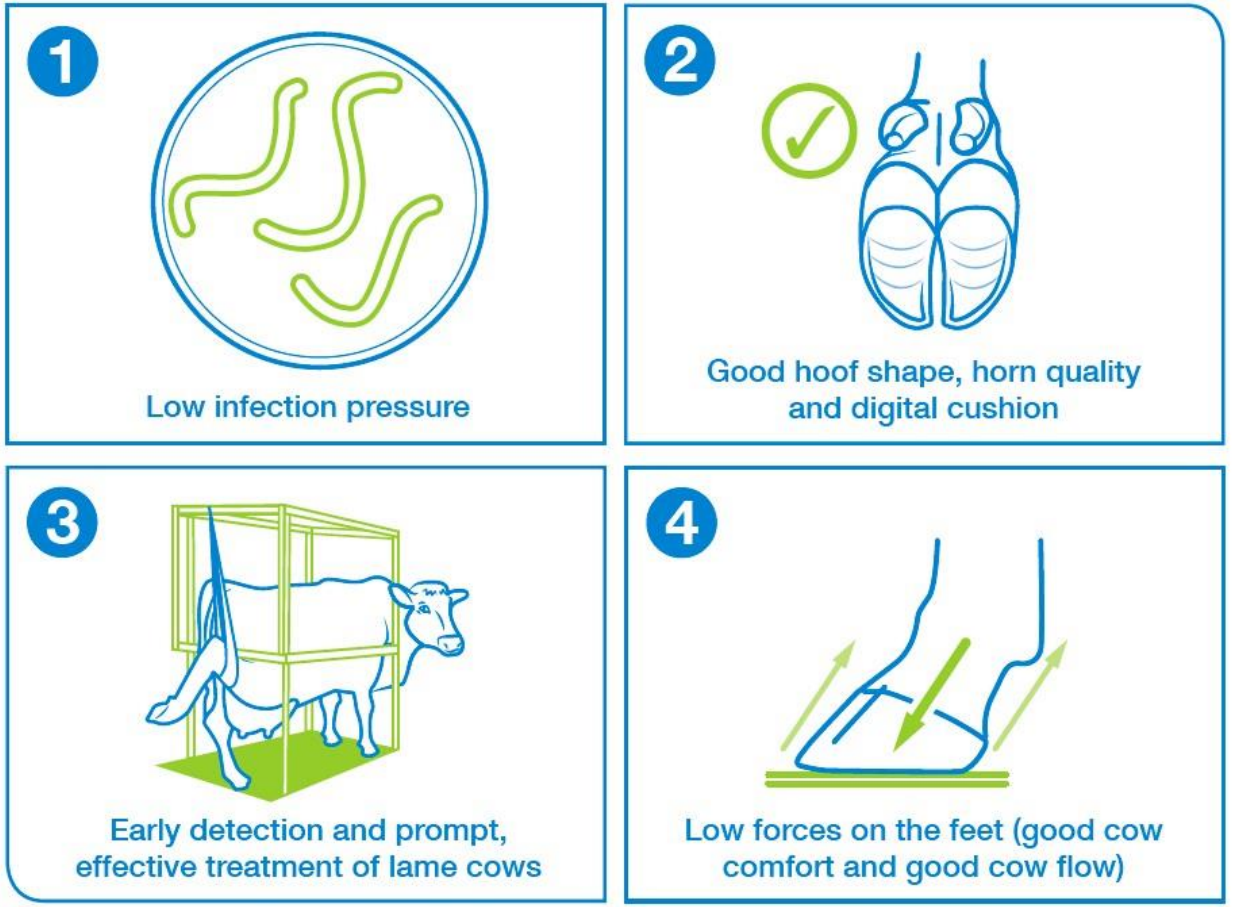
20. Hoof scoring

- Hooves should be taken care of and be as normal as possible.
- The diagram on the right shows normal hooves and the ones not acceptable which may cause lameness.
- There are several ways to take care and improve hooves in a farm.



21. Hoof and foot management

- Adopt the following as preventive measures to hoof and foot conditions.
  - Good feeding management
  - Hoof trimming (3)
  - Cow barn beddings and floors (4)
  - Footbaths and disinfectant (1)
  - General hygiene of the barn (1)
  - Breeding: Genetics to improve hoof condition(2)



22. Good feeding management to prevent hoof issues

- Feeding plays a big role in most of the hoof problems/conditions, for example laminitis.
- Sufficient fiber in the feed ration, correct fiber to concentration ratio, gradual change in rations are very important for maintaining healthy hooves.
- Management during transition period reduces the rapid change of ration before and after calving. Reduce drastic change of ration in all stages of cows.
- With a balanced ration and available feeds, cows eat enough in a short time and reduce standing times and increases resting time.

23. Cow barn floors

- Smooth floors are too slippery and the cows can slide and get injured.
- Too rough floors causes hoof erosions and can injure the cow.
- Averagely rough floors, with well drained slopes are good for the cows.

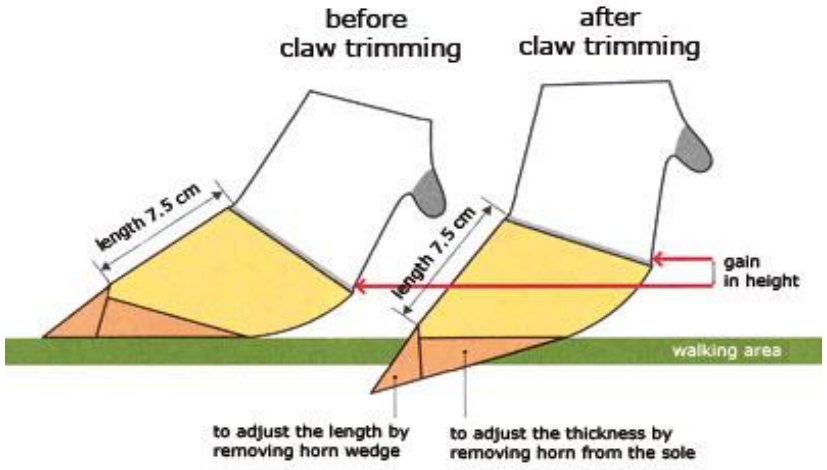
Too rough floor with poor drainage of slurry

24. Cow barn beddings

- The laying area should be soft and doesn’t injure the cow’s hocks while lying down.
- Too hard and rough resting area such as concrete floor is highly discouraged due to the degree of injuries on the cow.
- Cows prefer laying areas that mimic the natural pastures. This condition minimizes standing time and reduces pressure on the hooves.
- Different material can be used to make the laying areas more comfortable and avoid injuries. e.g. sand, straws.

25. Hoof trimming

- Routine hoof trimming and conformation of the foot consistently improves the shape of the foot.
- It is however not always associated with an improvement in locomotion score.
- If cows are driven along stony tracks just after their feet have been trimmed, there is a risk of more lameness.
- If feet are trimmed when the cow is dried off, she will usually stay in one place and the risk of injury while walking is less.

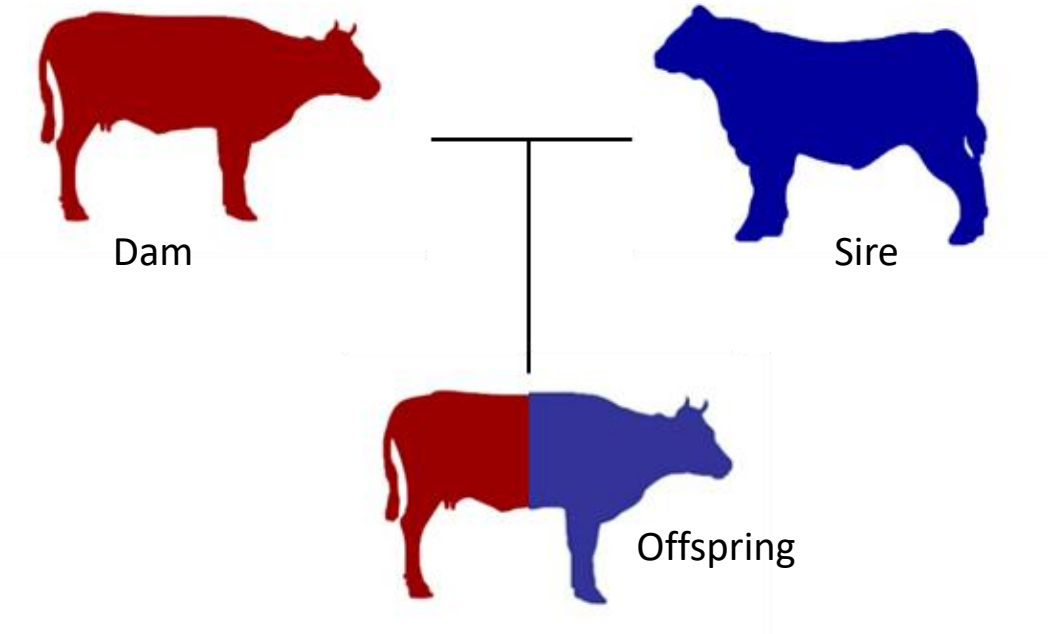


26. Footbaths and disinfectants

- A footbath is only effective if cows actually walk through it.
- You do not need to actively wash your cows' feet. Rather, they just need to walk through the disinfectant solution.
- The best place for a footbath is after the exit of the milking parlour.
- Depending on the number of cows a footbath can be used for about 2-3 days.

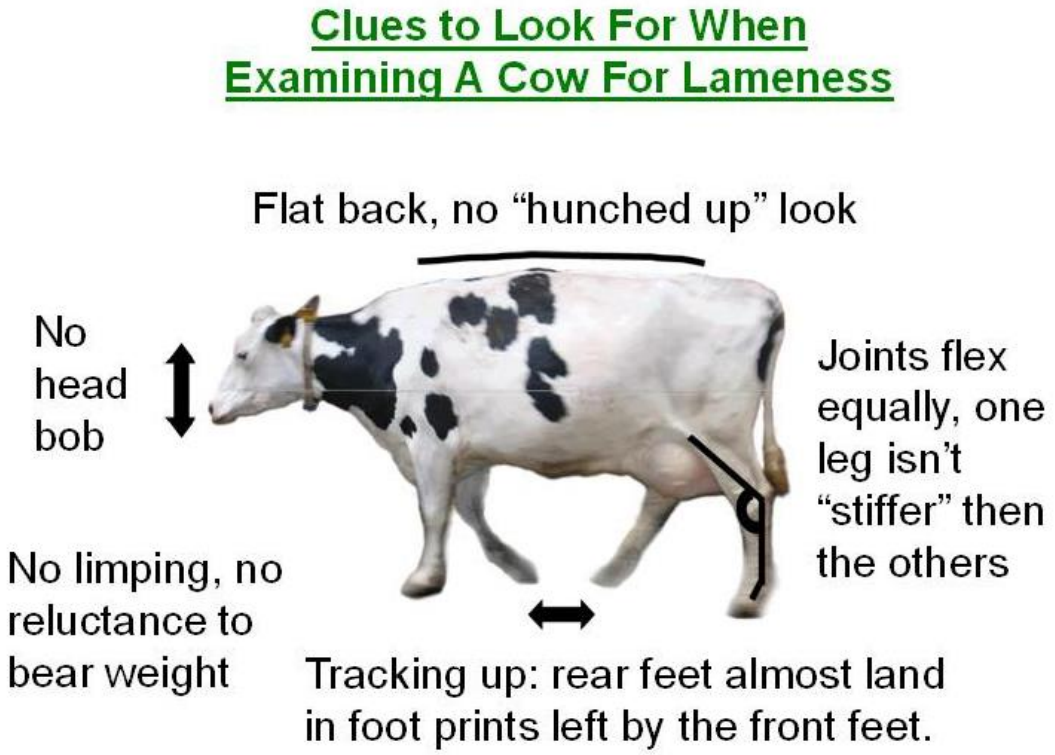
27. Breeding against poor feet and hooves conditions

- Breeding: In order to reduce susceptibility to foot diseases, adequate selection for specific traits is done.
- These traits must be heritable and must have a correlation with the occurrence of foot disorders.
- It is recommended to use semen of proven sires that are known for improving the quality of feet and legs, and foot angle.

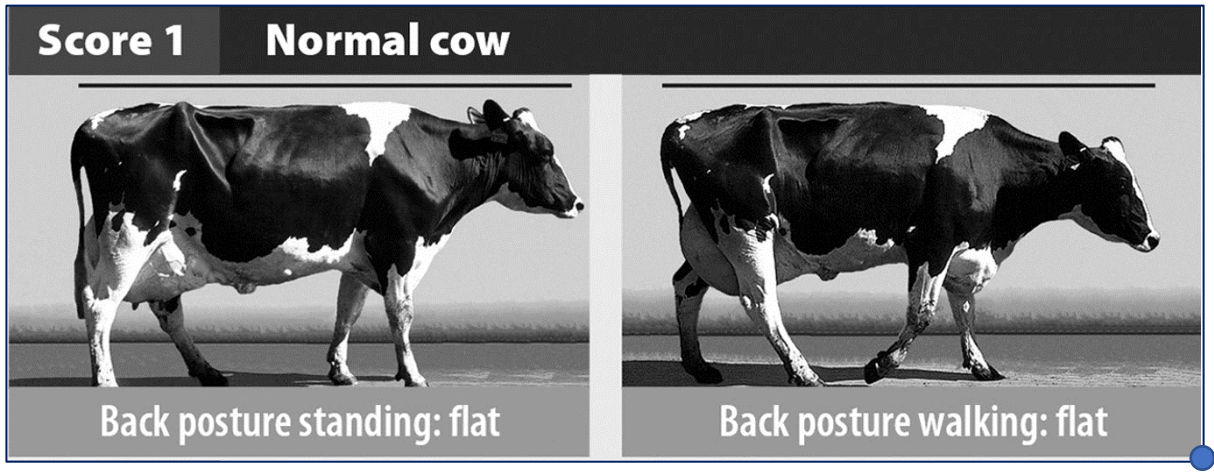


28. Locomotion scoring

- Lameness is an increasing problem in both grazing and housed cows, and can often lead to serious economic implications.
- Locomotion scoring from 1 to 5 (increase in lameness) provides a quick measure of the cow's ability to walk normally.
- Locomotion score is guided/based on observations of back posture, head and limb position and behavior when walking.



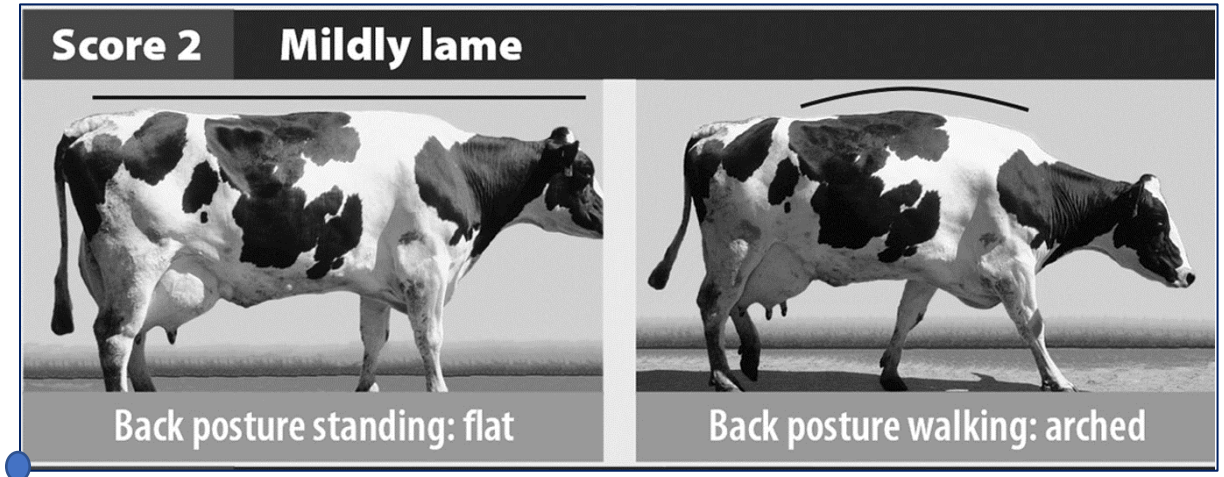
28.1 Locomotion score 1 and 2



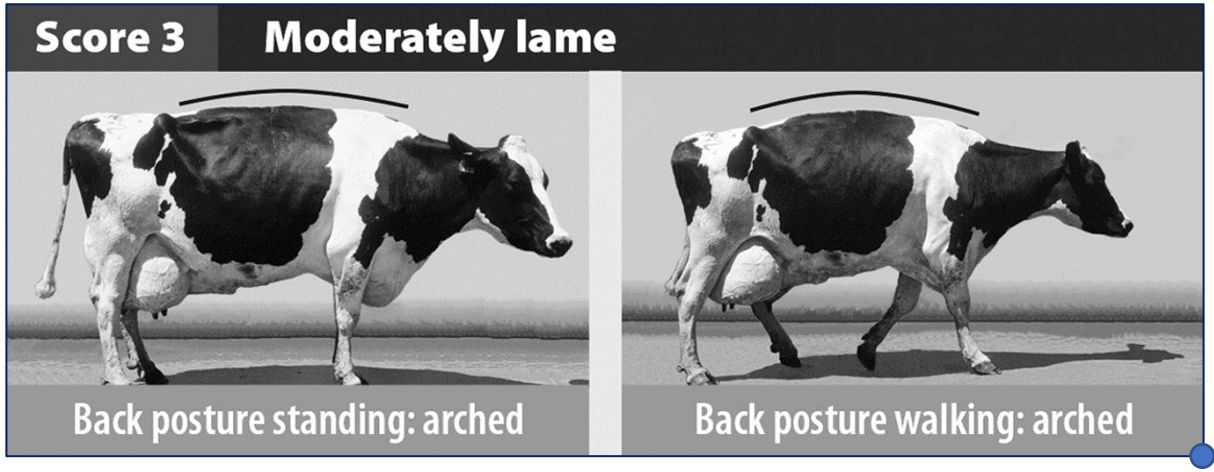
This is normal locomotion. It is characterized by;

- Smooth and fluid movement.
- Cow stands and walks with a level back. All legs bear weight evenly. Joints flex freely.
- Head carriage remains steady as the animal moves. Gait is normal.
- Cows feed intake and milk production levels are not affected.

- Back posture - flat or arch.
- Ability to move freely is not diminished. Cow is mildly lame.
- Cow stands with level back, but arches when walks. All legs bear weight.
- Joints slightly stiff. Head hangs lower and further from her body. Gait is slightly abnormal.
- Cow reduces feed intake by at least 1% of the average feeds it normally consumes per day. The milk production may not be affected.

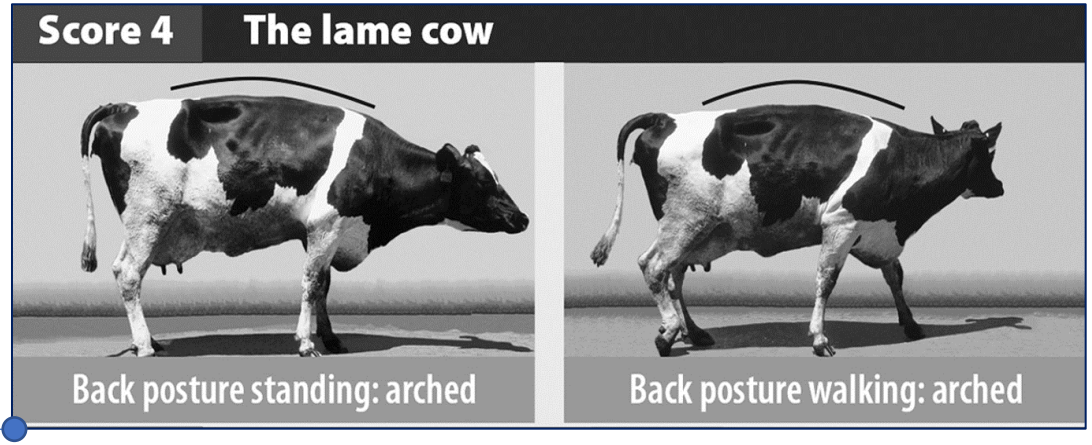


28.2 Locomotion score 3 and 4



- Back posture - Arch.
- Capable of locomotion but ability to move is compromised. Moderately lame.
- Stands and walks with arched back. Slight limp and short strides in one or more legs.
- Joint shows signs of stiffness but does not impede freedom of movement. Head carriage remains steady.
- Feed intake reduces by at least 3% of the average feeds it normally consumes per day. Milk production declines by 5%.

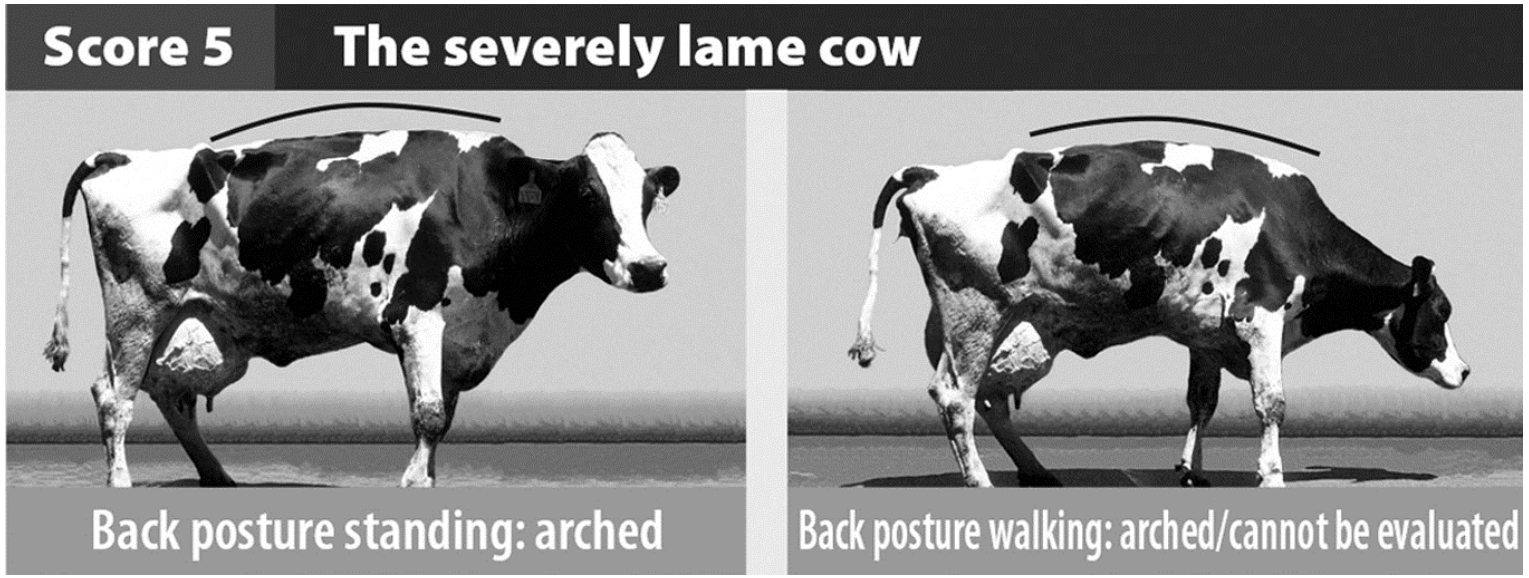
- Arched back is always evident and gait is one deliberate step at a time.
- Reluctant to bear weight on at least one limp leg but still uses that limb in locomotion.
- Strides are hesitant and deliberate and joints are stiff.
- Head bobs slightly as animal moves in accordance with sore hoof making contact with the ground.
- Feed intake reduces by at least 7% of the average feeds it normally consumes per day. Milk production declines by 17%.



28.3 Locomotion score 5

Characterized by;

- Extreme arched back when standing and walking. Inability to bear weight on one or more legs.
- Obvious joint stiffness characterized by lack of joint flexion with very hesitant and deliberate strides.
- One or more strides obviously shortened. Head obviously bobs as affected hoof makes contact with the ground.
- Score 5 feed intake reduces by at least 16% of the average feeds it normally consumes per day. Milk production declines by 36%.



29. Take home message/Summary

The general guidelines for proper foot care are:

1. Maintain a hygienic environment with dry surfaces, comfortable floors and areas as well as proper drainage to avoid dirty environment.
2. Pay special attention to areas around water troughs and waiting areas not to become pools of mud during the rainy season.
3. Feed sufficient good quality roughage and avoid sudden changes in the daily ration.
4. Hoof trimming should be done on a regular basis, preferably at least twice a year.
5. Use footbaths regularly for preventative hoof care and individual cow treatment of lame cows as required.
6. Select proven sires that improve legs and feet.

- END -