Indian Veterinary Magazine
a monthly Magazine
of the people, by the people, for the people

Vol 2 Issue 1 Jan 2026, 41-45 ISSN:3108-1398

Lameness in Dairy Animals

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Abstract

Lameness is one of the most important health and welfare problems affecting dairy cattle worldwide and is a major cause of economic loss to farmers. More than 90% of lameness cases originate from foot and claw lesions, most commonly associated with laminitis syndrome and infectious conditions arising from unhygienic underfoot environments. Lame animals show reduced feed intake, poor body condition, lowered milk production, impaired fertility and increased treatment costs. High-producing, intensively managed herds are particularly vulnerable due to higher concentrate feeding, limited exercise, concrete flooring and increased herd size. This article highlights the major causes, diagnosis, common claw lesions, infectious foot diseases and practical management strategies for lameness in dairy animals. Special emphasis is given to nutritional management, regular claw trimming, footbath practices and farm hygiene as key preventive measures. Early detection through lameness scoring and timely intervention can significantly reduce the severity and duration of lameness. Adoption of simple, cost-effective management practices can greatly improve animal welfare, productivity and overall profitability of dairy farms.

INTRODUCTION

Lameness has been considered as the most important animal health and welfare issue nowadays. More than 90 % of lameness in cattle occurs due to foot lesions usually associated with laminitis syndrome and infectious agents from the underfoot slurry. Negative effect on fertility, loss of body condition and milk and cost of medication are some of the factors that are of great economic concern in lameness. Lame cows become less competitive for resources such as water, forages and concentrates. Usually intensively managed herds having high production status, have greater incidence of lameness probably due to greater confinement and increasing herd size.

CAUSES OF LAMENESS

- Nutrition: More concentrates and less fodder in ration
- Local factors such as season, inadequate exercise and concrete flooring.

- Animal factors like weight distribution, age, growth, genetics, body and foot conformation and behaviour
- Relaxin hormone released at the time of parturition may cause loosening of the suspensory apparatus and result in the rotation of third phalanx.
- Systemic diseases like Mastitis, Ketosis/Acetonemia, Metritis, Udder edema, RP etc.
- Trace minerals like Zinc, Copper, Manganese and Cobalt deficiency

DIAGNOSIS OF LAMENESS

1. Lameness scoring: Observe the cows walking on level concrete/firm and non-slippery surface in order to detect lameness. Observe the cow from each side, from front side as well as behind, when standing quietly and also on walking and also when cows turns first to left and then to the right.

Score 0: 'No gait abnormality visible at walk'

Score 1: 'Mild lameness with variation from normal gait symmetry at walk'

Score 2: 'Moderate lameness with moderate and consistent gait asymmetry'

Score 3: 'Severe lameness with marked gait asymmetry or severe symmetric abnormality'

Score 4: 'non-ambulatory or recumbent animals'

The Laminitis syndrome: Laminitis is cattle is a systemic disease with expression of signs in the claws and occurs in many identifiable forms, i.e. acute, subacute, chronic and subclinical forms. Acute laminitis is an uncommon disorder in cattle linked with accidental consumption of cereals or as clinical outcome of 'grain overload'. Cause of subacute laminitis seems to be any sudden dramatic but short-term change in nutrition causing digital blood vessels to dilate and produce an increase in the pressure inside the feet causing pain and discomfort. In subclinical laminitis, horn of claw capsule becomes softer over several weeks and therefore, lesions occur sometimes after the disorder was first affecting the animal. Continuous exposure of sole to slurry causes further softening of the claw making it prone to damage when the animal walks on hard surfaces. Dorsal wall flattens and becomes concave along the length due to rotation and sinking of pedal bone inside the claw in chronic laminitis.

2. Hoof/claw trimming: Claw trimming is important because it relieves the pain caused by an overgrown claw and improves wellbeing of the cow and has a positive effect on milk production and its reproductive efficiency. Trimming also simulates the production of new, healthy resilient horn. Newly exposed horn surfaces have greater friction factor and contributes to animal's sense of stability and wellbeing.

The first priority must be to unload the lateral hind claw and transfer weight to the medial

claw. The trimmer should know the mental picture of ideal model claw. The objectives of functional claw trimming are:

i. to establish balanced weight bearing between the two claws, which provides lateral stability
ii. to restore equal distribution of the load to the length of the claw, which provides longitudinal stability.

Claw Lesions associated with Subclinical laminitis (SCL)

- Heel erosions
- Sole haemorrhages and ulcers
- Sole avulsions
- Toe haemorrhage/ulcer
- Under run/ double sole
- White line disease (White line haemorrhages and White line fissures)
- Overgrown sole
- Overgrown hooves
- Corkscrew hooves
- Vertical fissures (sand cracks)
- Horizontal grooves/fissures

Infectious lesions

Interdigital Hyperplasia: It develops as a firm, tumour like mass in the interdigital space. Larger lesions may become excoriated, sore and infected. Treatment is surgical. Cryosurgery is also another option.

Foot rot: Foot rot is an acute or subacute necrotising inflammation of the interdigital skin that leads to cellulitis in the digital region. Severe pain and lameness, fever, anorexia, loss of condition and reduced milk production are major signs of the disease. Fusobacterium necrophorum is the major cause and hind digits are more commonly affected. A typical foul odour is characteristic of foot rot. Provision of formalin (4%) footbath for three days regularly every fortnightly is very effective for prevention and control.

Interdigital dermatitis: It is a low-grade infection of the interdigital epidermis that causes a slow erosion of the skin causing discomfort to the animal. Formalin footbath 4 % every fortnightly can also be used successfully. Sometimes animals can be confined in a 5 % copper sulphate footbath for one hour twice daily for three days to get instant relief.

Digital dermatitis: It is very rare in crossbred cattle and buffaloes in India. It is a chronic erosive and proliferative infection of the epidermis proximal to the skin/horn junction in the flexor region of the interdigital space. Lesions are most usually confined to area formed by a

triangle between the accessory digits (dew claws) and the cleft between bulbs of the heels at the posterior end of the interdigital cleft. Problem in the herd can be controlled by using a footbath and by improving hygiene.

MANAGEMENT

Lameness is a herd problem and needs to be checked regularly by following certain management practices. Three fundamental management practices to address lameness in dairy animals are:

Balanced nutrition: Feed the animal a well-balanced ration with an appropriate energy and protein ratio. Always give concentrates to the animal according to its milk yield. Fulfil one-third of the dry matter intake of the animal from the fodders/roughages. Roughages induce rumination and cause more saliva production which is required to neutralise excess of acids in the rumen. Add mineral mixture to the ration regularly because it was observed that deficiency of trace minerals like zinc, copper, manganese and cobalt leads to poor hoof horn synthesis. Biotin has been observed to improve the horn quality by strengthening the intercellular cementing material between keratinocytes.

Regular Claw trimming: Claw trimming should be a regular part of the hoof health programme in cattle and should be done every six months.

Regular footbaths: Formalin footbath (4%) has been found very effective in controlling foot lesions especially infectious skin lesions. Footbaths should be 3 m long, 1 m wide and 15 cm high. Concrete footbaths are best and cheaper. Formalin (39-40 %) should be preferred for foot bathing as a 4 per cent solution [120 litres of water + 5 litres of formalin] in the footbath. Animals should be given footbath on 1st, 2nd and 3rd day of every fortnight. Feet of the animals should be washed properly before introducing the animal into footbath. After foot bathing, animals should be kept for at least half an hour on clean pucca (concrete) floor. In case there are few animals, formalin spray (40 ml per litre of water) can be used on 1st, 2nd and 3rd day of every fortnight.

Management tips: Ensure proper drainage and excellent underfoot conditions. Ensure that the width of the stall should not be less than 1.2 m and length should be 2.5-2.8 m depending upon stature of the cow. Do not make abrupt feed changes. Provide a transition ration 2-3 weeks before calving and gradually increase concentrate during first 6 weeks of lactation. Never give more than 4 kg of concentrate at a time. Rations should have a minimum of 21 % NDF from forage. Supplement dietary buffers in early lactation, e.g. sodium bicarbonate at 1 % of the total ration DM. On those farms (with high-yielding animals), where lameness is a major problem, Biotin 2 per cent @ 1 gm/animal/day and/ or Zinc sulphate @ 4 gm/animal/day should

be added in the ration in addition to the regular mineral mixture.

CONCLUSION

Lameness is a common but largely preventable problem in dairy animals that significantly affects productivity and welfare. Most cases arise from poor nutrition, inadequate hoof care and unhygienic housing conditions. Regular claw trimming, balanced feeding with adequate minerals and biotin, proper footbath practices and good farm hygiene are essential for prevention and control. Early detection and timely veterinary intervention can greatly reduce economic losses and improve the health and longevity of dairy animals.