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# The importance of cow comfort

by DJ Tomlinson, MT Socha, JM DeFrain, TL Ward, Zinpro Performance Minerals, and J Tucker, Chemuniqué International

**Lameness reduces the overall profitability of a dairy operation. The effects of lameness can be subtle and have many levels of severity.**

Invariably, lameness is associated with pain, decreased dry matter intake, a loss of body condition, decreased milk production, increased reproductive failure and mastitis, often leading to expensive treatment or even culling. Factors affecting lameness and locomotion include nutrition, the environment, claw trimming and health events resulting in the production of poor quality horn. The identification and management of problem areas in an individual herd can be challenging.

When looking at the housing and management of dairy cows with regard to cow comfort, one has to consider flooring surfaces, the length of time standing, stall comfort and exercise. It is important that walking surfaces provide maximum traction with minimum chances for foot or claw injury. By grooving concrete surfaces, animal traction is improved and the potential for slips and falls is reduced. It is also recommended that soft, wet and manure laden surfaces are avoided, as claws become softer and are more prone to lameness due to penetration by foreign objects. Cows also alter their walking rate and step length, as well as angle, when on wet or slippery floors, which could cause abnormal wear and increased shearing forces on the white line area of the claw.

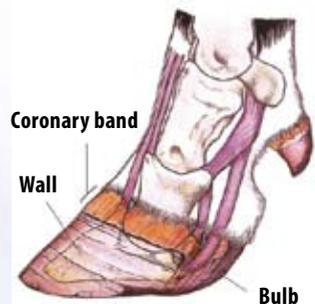
It is important to note that external stresses to the foot should be minimised during the critical period of calving and in early lactation.

Too much standing caused by the lack of comfortable places to lie or improperly sized milking facilities reportedly increases the incidence of lameness. Sand bedded stalls provide a more comfortable lying surface than sawdust or mattresses, and are also cleaner, cooler and more hygienic, while also improving footing on manure covered concrete. However, sand is not without risk, as it may lead to increased claw wear, resulting in thin soles and therefore it needs to be managed properly. Extended exposure to hard, unforgiving walking surfaces should also be avoided.

Cows and heifers should be adapted to new housing facilities/flooring before parturition, as this is usually a significant change from the dry period/rearing environment. Animals that are not adapted to new conditions are more susceptible to lameness.

There are also physiological changes that occur around calving, where the hypothesis is that the increase in the hormone relaxin (to help with expulsion of the calf) also increases the elasticity of the connective tissue suspending the pedal bone in the claw capsule, which could result in increased sole ulcers and white line lesions around calving.

Dairy managers should pay attention to all areas of cow comfort to minimise the incidence of lameness-causing factors and improve overall claw health to positively affect performance and profitability.



**Claw bones and tendons**

# Cows with healthy feet eat, milk and breed better

by DJ Tomlinson, PhD, MT Socha, PhD, research nutritionists, Zinpro Performance Minerals, and Jackie Tucker, Chemuniqué International

**There is much discussion about the relationship between nutrition and lameness with regard to the level of effective fibre, amount of grain, fermentation rates of grain, forage-to-grain ratios in the dairy cow ration and a subsequent acidosis-laminitis link. It is very evident that certain feeding regimes, diets, metabolic upsets and infectious diseases result in significant and prolonged drops in rumen pH, dramatically increasing the incidence of lameness.**

Key factors in the cascade of events are feeding management, moulds/mycotoxins (feed/forage quality), infectious disease and metabolic disorders, environment and genetics. Many of these variables lead to ruminal upsets, resulting in the death of gram negative bacteria and the production of endo-/exotoxins, resulting in a vaso-constriction/dilation response within the claw. This upset in blood and nutrient flow results in the production of a poor quality horn and, if severe enough, the death of laminar horn tissue and acute lameness.

An area of nutrition that is commonly overlooked, is the role of trace minerals in improving claw health, structural integrity and reducing the incidence of lameness.

Zinc improves claw integrity by speeding wound healing, increasing the rate of epithelial tissue repair and maintaining cellular integrity. It is also required for the synthesis and maturation of keratin. In a year-long study conducted at Illinois State University, cows fed complex zinc showed fewer cases of heel cracks, interdigital dermatitis and laminitis.

Copper is necessary for the formation of crosslinks of connective tissue in the claw. Pre-partum transfer of maternal copper to the developing foetus takes place, therefore copper can be at its lowest in late gestation and early lactation, which could reduce the formation of properly developed connective tissue in the claw, resulting in greater elasticity, which will predispose cows to increased lameness in early lactation.

Manganese plays an important role in cartilage and collagen formation, as well as bone growth and thus helps minimise feet problems by maintaining proper leg formation and production of quality horn. Supplementation in late gestation should be considered, as manganese status in the cow is lowest at this time.

Florida research indicates that replacing inorganic forms of zinc, manganese, copper and cobalt with those from Zinpro Performance Minerals, beginning in the dry period and continuing through lactation, reduced the incidence and severity of claw disorders. The overall incidence of claw disease, for example, decreased by 30,8% as early as 75 days postpartum, with a further reduction of 43,5% by 250 days in milk.

Lameness is an issue of extreme importance in every dairy and dairy producers who take an aggressive approach to foot management can attest to the fact that cows with healthy, pain free feet, eat better, milk better and breed better.

**Talk to your nutritionist or feed sales representative about the inclusion of Zinpro performance minerals in the diets of your dairy cattle.**



# Locomotion Scoring of Dairy Cattle



Available From:



[www.zinpro.com](http://www.zinpro.com)

## 1 NORMAL

Description: Stands and walks normally with a level back. Makes long confident strides.



Back Posture Standing: Flat



Back Posture Walking: Flat

## 2 MILDLY LAME

Description: Stands with flat back, but arches when walks. Gait is slightly abnormal.



Back Posture Standing: Flat



Back Posture Walking: Arched

## 3 MODERATELY LAME

Description: Stands and walks with an arched back and short strides with one or more legs. Slight sinking of dew-claws in limb opposite to the affected limb may be evident.



Back Posture Standing: Arched



Back Posture Walking: Arched

## 4 LAME

Description: Arched back standing and walking. Favouring one or more limbs but can still bear some weight on them. Sinking of the dew-claws is evident in the limb opposite to the affected limb.



Back Posture Standing: Arched



Back Posture Walking: Arched

## 5 SEVERELY LAME

Description: Pronounced arching of back. Reluctant to move, with almost complete weight transfer off the affected limb.



Back Posture Standing: Arched



Back Posture Walking: Arched

# Identifying dairy cow lameness

**As reported in our previous articles, lameness is a costly disease and reducing its incidence has direct ties to improvements in dairy performance and overall profitability. So how do we identify lame cows?**

## **Locomotion scoring**

“The first step in reducing lameness is to determine its incidence and severity on the dairy,” notes Dr Mike Socha, dairy research specialist with Zinpro Performance Minerals, adding: “Many dairy producers today are using locomotion scoring to help find lame cows.”

In this system, cows are scored from 1 to 5, based upon observation of the cow standing and walking, with special emphasis on the cow’s back posture.

The arched back, without the appearance of favouring a limb, has been recognised for some time as an indicator of cows experiencing discomfort in their feet, as cows arch their back to alter weight distribution. In addition, research shows that of the behaviours exhibited by cows with claw lesions, spinal curvature had the highest numerical correlation to the presence of claw lesions.

Cows that score a 2 or higher should be examined by a hoof trimmer. Promptly examining and treating cows that show mild discomfort is important to prevent cows from developing more serious lesions and therefore a reduction in productivity. A poster showing locomotion scores 1 to 5 is a tool every dairyman should have displayed.

## **Claw lesion identification**

In order to determine the best course of action to reduce lameness on the dairy, claw lesions must be accurately identified and recorded. Several systems are used to record claw lesions, ranging from simply recording the cow identification and treatment, to systems in which an extensive list of information, like lesion and location, is recorded. However, the most important point is to have accurate information and to use it to implement a lameness reduction programme.

The International Lameness Committee recently produced a poster showing the most common claw lesions in dairy cattle and how to correctly identify them.

Once lesions have been recorded, data should be analysed to determine what lesions are most prevalent and to determine if there is any seasonality or stage of lactation effect. To help with record interpretation and treatment, lesions should be classified as infectious or non-infectious lesions. The appropriate corrective and preventative actions to reduce lameness will be based upon whether the pain is caused by infectious or non-infectious lesions.

## **Why is there a need for these posters?**

- The knowledge and understanding of the cause, treatment and prevention of lameness has expanded dramatically.
- The posters represent a global consensus for lameness identification – by adopting consistent terminology throughout the world, both the prevalence and economic impact of various lesions will be easier to track and assess.
- Accurately identifying a specific type of lesion is critical for treatment and prevention plans; generic lesion terms are not beneficial. In the past, it was typical for several different types of claw lesions (white line, sole ulcer or sole haemorrhage) to generically be identified as laminitis. In order to accurately identify the cause of the lesion and determine the proper corrective action plan, it is critical to be more specific and consistent.

## Who developed the poster?

The dairy claw lesion identification poster was developed through a combined effort of Zinpro Corp and the International Lameness Committee, a collaboration of researchers, veterinarians, academia and hoof trimming professionals from around the world.

### Key features:

- **Ease of use:** a practical, user-friendly visual guide to help accurately identify lame cows/claw lesions; includes photos and common signs.
- **Global application:** uses a consistent, single-letter abbreviation for each lesion.
- **Cross-reference ID:** provides the ability to cross reference lesion type with the particular claw zone(s) where each lesion occurs, resulting in more accurate lesion identification. Each particular type of lesion has a limited number of causes, therefore accurate lesion identification helps to increase the understanding behind the lesion's true cause so that an effective correction plan can be implemented.
- **Separate categories:** lesions organised into infectious and non-infectious categories. Effective claw lesion management starts by evaluating which category (infectious or non-infectious) is most prevalent on a particular dairy. Corrective action plans must be appropriate for the category of lesion. For example, using a footbath programme to treat and prevent non-infectious lesions will not remedy the problem.

### FirstStep™

Until now, there has not been an objective, methodical system to assess the many factors that contribute to lameness. With the FirstStep™ lameness assessment and prevention programme, it all changes. The programme was developed in a combined effort of the University of Wisconsin's lameness expert, Dr Nigel Cook and Zinpro Corporation. FirstStep™ provides the dairy industry's first ever comprehensive assessment of overall lameness risk factors.

Data is gathered from up to 20 different assessment models, which the programme then uses to help identify factors that increase the risk of cows becoming lame. FirstStep™ also provides a comprehensive resource library for dairy operations, including videos, articles and other visual resource tools. These will help to educate dairy personnel about lameness, its causes and effects, and possible treatment options.

No matter how many different scenarios exist on a dairy operation, FirstStep™ can be tailored to best fit each situation or type of dairy (pasture or confinement based). The prevention of lameness begins with the assessment of contributing factors. The 20 assessors include some of the key factors to identify the cause of lameness: locomotion scoring, hoof trimming, hygiene and foot baths, claw lesion identification, environment, nutrition and cow management.

Once all the data has been captured, FirstStep™ offers recommendations on possible treatments to remedy the situation in a simple, easy to understand, but comprehensive report. Zinpro Corporation and Chemuniqué International, together with industry commitment and education on lameness related issues are providing the first step towards ensuring that the animals in today's food and fibre industry will provide a positive return on investment for producers into the future.

For more information on any of the lameness tools or copies of the posters, please contact Chemuniqué on 011 789 2414 or [nutri@chemunIQUE.co.za](mailto:nutri@chemunIQUE.co.za).

# DAIRY CLAW LESION Identification

## Non-Infectious



### WHITE LINE LESION (WL)

Also called: White Line Separation, White Line Disease

Zones Affected: 1, 2, 3

Common signs:

- It is mild cases, a void occurs in the junction between the sole and the wall
- In severe cases, abscesses form, generally at the heel-toe-wall junction (zone 2)



### SOLE ULCER (LU)

Also called: Hemorrhagic Contusion, Burnt Horn (Ulcer)

Zones Affected: 4

Common signs:

- Sole sore (horn erosion defect) occurring at sole heel junction on inner side of outside hind claw
- Often occurs in both outside hind claws (when present)



### SOLE HEMORRHAGE (SH)

Also called: Torn Hoofing

Zones Affected: 4, 5, 6

Common signs:

- Slight to significant red (or blue) coloration of the sole
- Not to be confused with natural black pigmentation of claw horn



### TOE ULCER (TU)

Also called: Toe Abscess, Abscess Abscess

Zones Affected: 7

Common signs:

- Black mark, blood stain and/or rupture in white line or sole at the toe
- Caused by rotation of pedal bone within the claw growing tissue on the sole or thin sole



### CORKSCREW CLAW (CC)

Zones Affected: 7

Common signs:

- Rapid irregular growth of the claw with rotation
- Spine displaced inward and rear
- Causes difficulty walking



### HORIZONTAL FISSURE OR HARDSHIP GROOVE (HG)

Also called: Hardship Hoof Injure, Hoofy Hoofing, Transverse

Zones Affected: 7, 8

Common signs:

- Claw wall parallel to the hair-line cracks and eventually breaks off
- Caused by nutritional or metabolic stress



### VERTICAL FISSURE (V)

Also called: Sandcrack, Flare, Ungular Longitudinal

Zones Affected: 3, 4

Common signs:

- Vertical split in front or side of claw
- Occurs primarily on outside front claws
- Often the most painful cause of lameness



### AXIAL FISSURE (A)

Also called: Axial Hoof Injure

Zones Affected: 11, 12

Common signs:

- Deep groove on anterior surface of claw wall parallel to front claw surface
- Swelling may indicate lesion present
- May lead to severe lameness



### INTERDIGITAL HYPERPLASIA (KH)

Also called: Corn, Interdigital Penetration, Interdigital Growth

Zones Affected: 10

Common signs:

- Rapid growth of skin and/or tissue between the digits, forming a firm mass
- Secondary infection likely with severe digital pain



### THIN SOLE (Z)

Zones Affected: 4, 5

Common signs:

- Sole is thin and flexible when pressure is applied
- Caused by insufficient length of toe, excessive wear or over-trimming
- Minimum claw length of 2 inches (7.5 cm) does not apply to heifers or animals that weigh less than 800 to 900 lb

## Infectious



### DIGITAL DERMATITIS (D)

Also called: Merry Heat (Hot), Moxiburn Disease

Zones Affected: 9, 10

Common signs:

- Raw, bright red or black circular growth above the hoof bulb, with edges forming a white squamous ring or hard, thin, hairy, wart-like growths or sores
- Affected cattle are reluctant to walk on any lone



### HEEL EROSION (E)

Zones Affected: 6

Common signs:

- Severe erosion of heel in irregular pit-like depressions or "V" shaped grooves causing lameness
- Instability of the claw due to loss or damaged horn resulting in uneven weight bearing
- Heel becomes sore as erosion progresses



### INTERDIGITAL DERMATITIS (I)

Also called: Slicked Feet Hot, Slick

Zones Affected: 8, 10

Common signs:

- Discharge and destruction of skin between the claws
- Both have effects leading to cessation of the cornium and ulceration



### FOOT ROT, FOUL OR PHEGMON (F)

Also called: Interdigital Phlegmon, Interdigital Necrotic Onychia

Zones Affected: 10

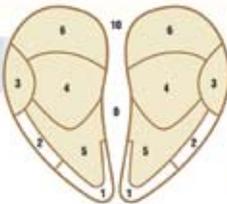
Common signs:

- Swelling of the entire foot (especially including the toe claws)
- Separation of digits, infection produces a noticeable foul odor
- Animals will likely have a fever

### LESION ABBREVIATIONS

- C = Corkscrew Claw
- D = Digital Dermatitis
- E = Heel Erosion
- F = Foot Rot, Foul or Phlegmon
- H = Horizontal Fissure or Hardship Groove
- I = Interdigital Dermatitis
- K = Interdigital Hyperplasia
- T = Toe Ulcer
- V = Sole Ulcer
- WL = Vertical Fissure
- WH = White Line Lesion
- X = Axial Fissure
- Z = Thin Sole

## Claw Zones



ABAXIAL (DORSAL) VIEW



AXIAL (MEDIAL) VIEW



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www.chemurpro.com



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# Food for FEET.™



Nobody understands better than Zinpro, the relationship between healthy hooves, lameness, welfare, reproduction, longevity and overall productivity.

In addition to our research-proven patented performance minerals, such as Availa®4, we work closely with universities and experts around the globe to learn more about hoof health and lameness in cattle. This vital research has resulted in break-through, world first programs like FirstStep®. The FirstStep program drives a comprehensive and methodical investigation of a herd lameness problem and delivers an action-plan to reduce the problem.

Like to know more? Visit [Zinpro.com](http://Zinpro.com)  
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