

# Recording Hoof Lesions by Zone

*Impact on the dairy*

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Supervisor Systems

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## **Recording Hoof Lesions by Zone Reduces Lameness in Dairy Cattle**

When hoof trimmer, Rick Trinko of Middleton, Wis., started seeing a large number of cows at one dairy with white line hemorrhages in zone 2, he knew something strange was happening. The typical site for a white line hemorrhage is zone 3, and it can indicate the early stages of white line disease. Cows at this farm never exhibited a problem like this in zone 2 before, so he needed to take a deeper look at why this part of the claw was affected. He suspected crowding issues were to blame and asked the farmer to observe how his cows were being pushed with the crowd gates into the milking parlor. Was too much pressure being placed on cows at the back of the holding pen? The answer ended up being “yes.”

If Trinko had dismissed this problem as white line hemorrhaging and paid no attention to the zone it was located in, more cows would have been damaged and the issue never resolved. Once the farmer educated his employees on the proper use of the crowd gate, the hemorrhages in zone 2 disappeared. Trinko’s proactive diagnosis helped prevent future injuries and a worsening of current symptoms.

### **Lameness: a growing problem**

Lameness has been cited as the number one animal welfare issue in the dairy industry. And it’s a costly one for the producer. Each year, hundreds of millions of dollars are lost to lameness. At least ninety percent of lameness in dairy cattle involves the foot. Most often it’s the rear feet, particularly the lateral claw. Digital dermatitis, sole hemorrhage, sole ulcer and white line disease lead the list of the most common problems observed.

The causes of foot ailments are many – ranging from nutrition, housing and management styles to the environment, genetic influences and disease. Major lameness factors include stall, floor, overcrowding and hygiene issues. Shortage of bedding, uncomfortable stall surfaces, not enough stalls and stalls that are too short, narrow, and have a poorly positioned head rail or brisket board discourage cows from lying down, thereby adding stress to their feet.

Coarse, broken, slippery or uneven surfaces are tough on hooves. Wet and dirty alleyways, stalls and holding areas stir up problems like digital dermatitis. Sporadic or improper claw trimming can also contribute to lameness problems. Nutritional factors such as limited access to feed, lack of effective fiber, feeding too much rumen fermentable carbohydrates, excessive amounts of protein, TMR sorting, inconsistent feeding times, inadequate trace mineral status, and an abrupt transition in nutrition and environment from dry to lactation period can all lead to foot discomfort.

What is the best way to alleviate this widespread lameness problem? Getting at the root cause of lameness begins with making an accurate diagnosis.

### **Zones created as a way to streamline communication**

First developed in the 1980s by Dr. Paul Greenough of the University of Saskatchewan’s Western College of Veterinary Medicine, the Hoof Atlas identification system is a standardized map of the hoof and illustrated guide to cattle claw lesions. After noticing an extreme deficiency in lameness coding throughout the United States, Dr. Jan Shearer, one of North America’s leading experts on dairy cattle hoof health, proposed foot care codes to improve upon Greenough’s original diagram.

“There is a tendency to over-generalize and refer to everything as a sole abscess,” notes Shearer. “But the term “abscess” is actually not very useful since the formation of an abscess is really a secondary condition that may occur subsequent to an ulcer, white line disease or a traumatic lesion of the sole such as a puncture. The nomenclature had to change because lesion names were so varied, and people had different names for the same type of lesion.”

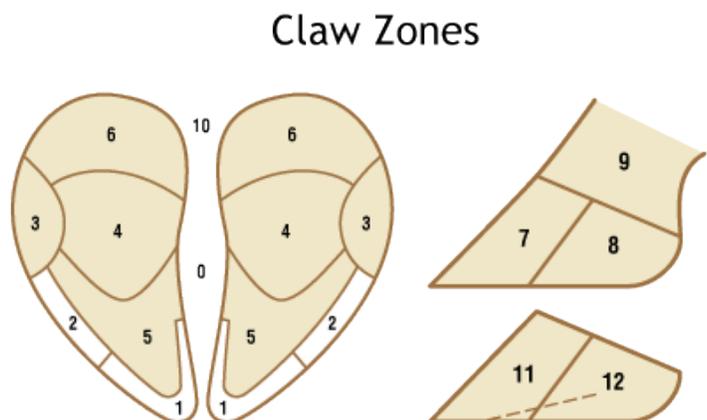
Professor and dairy extension veterinarian at the College of Veterinary Medicine at the University of Florida at the time, Dr. Shearer took the zone concept further in 2008 to capture info particularly at dairies where multicultural employees were involved with foot care. Shearer was working with multicultural, on-farm trimmers – some of whom were not familiar with lameness conditions or lameness terminology – to collect data to diagnose and correct foot problems. The zone scoring system, which divides the hoof into numbered zones, was very beneficial in this regard. If a trimmer gave him the number of the zone where the problem was occurring, Shearer could more than likely tell what kind of lesion it actually was.

The Hoof Atlas identification system simplified communication among hoof trimmers, producers, veterinarians, nutritionists and researchers – placing everyone on the same page and talking the same language when referring to hoof problems. To assist in accurate and consistent lesion identification, Zinpro Performance Minerals and the International Lameness Committee – a panel of cattle feet experts from around the world – developed a poster of the 14 currently recognized foot disorders. The poster includes photos and descriptions and indicates which zones are affected by each type of lesion.

### Claw zones help standardize information captured in lameness records

The hoof is divided into 12 zones. Zones 1 through 6 are found on the weight-bearing part of the claw, while zone 0 represents the interdigital skin and zone 10 the interdigital cleft (a common site for hairy heel warts). Zones 7 and 8 represent the outside hoof wall, while zones 11 and 12 denote the axial or inside wall. The dashed line specifies the white line on the axial side of the claw capsule or wall. Zone 9 is used to identify lesions of the foot skin above the coronet.

“Zones add precision to your diagnosis,” says Shearer, who is now professor and extension veterinarian at the College of Veterinary Medicine at Iowa State University. “Zone identification is especially helpful for people who don’t know specific lesion names or for multicultural persons who may not be familiar with terms in English. Since ulcers can occur in zones 4, 5 or 6 and white line disease may show up in zones 1, 2 or 3, it’s helpful to designate the zone as well as the lesion type in order to fine-tune your diagnosis.”



Hoof lesions commonly occur in zones 0, 3, 4 and 10. A lesion in zone 0 may indicate foot rot or digital dermatitis, whereas lesions appearing in zone 10 are most likely digital dermatitis – a highly contagious, erosive infection usually affecting the skin on the bulbs of the heel but can also be found between the digits or in the area of the coronary band. These lesions are believed

to be in part related to poor hygiene and result in significant lameness. Lesions occurring in zone 3 represent white line disease. Both digital dermatitis and white line disease are major causes of lameness frequently complicated by abscess formation, which can result in serious lameness.

Zone 4 is the typical site for sole ulcers. A sole ulcer is a painful, non-infectious hoof lesion and one of the most common causes of lameness in dairy cattle. "Sole ulcers are often traced to feeding problems or issues related to cow comfort or conditions that predispose to excessive standing," notes Shearer. "If you're seeing a lot of them, you need to ask yourself: are cows resting enough? Are the stalls designed appropriately? Is there adequate bedding?"

Lesions can even tell you what kind of floors the cows are standing and walking on. If you didn't know the zone, you could never diagnose to this extent. "Zones act like a GPS system for hoof health," says Canadian hoof trimmer, Vic Daniel, of Vic's Custom Clips. "They show you exactly where problems are located and provide accountability of why a cow cannot walk normally. It's like a forensic audit for a dairy herd's foot health."

When capturing lameness data, Shearer believes the zone concept provides extremely useful information. "Registering claw zones gives us primarily what we need to know and whether or not further action needs to be taken."

"We're visualists," says Daniel about hoof trimmers. "Show us a picture, and we get it." Serving as director-at-large for the Hoof Trimmers Association and Speaker of Ontario Hoof Trimmers Guild and having more than 30 years of trimming experience under his belt, Daniel goes on to say, "The use of zones makes trimmers more confident in their work and provides tighter evaluations of our observations. Loose terms such as ulcer, hemorrhage, etc. just don't cut it anymore. Zones are also great for communicating minute problems, such as an axial fissure."

### **Lesion recording by zone helps determine root causes**

When Daniel saw sole ulcers cropping up in zone four on the front feet at one dairy, he was alarmed as this lesion is predominantly found in hind feet only. In the slatted floor barn, he discovered dried feed piled in a convex formation on slats three and four from the feed bunk front. This sharp haylage was compressing animals' feet, causing the corium to fail. "Lesion identification by zone helps you spot factors that could be influencing that specific zone," notes Daniel, "whether they are management, feed-related or something else."

A two-and-a-half-year study at the University of Florida involving two large dairies revealed a widespread thin sole toe ulcer problem caused by excessive wear. The most prominent lesion was in zone 5 at the junction of zones 1 and 2. The lesion could best be described as a break or separation of the sole away from the white line adjacent to zones 1 and 2. It's often mistaken by trimmers and vets as white line disease occurring in zones 1 or 2, but closer examination shows thinning that leads to a break or separation in the sole (zone 5). Heat stress management practices exacerbate the problem in the southeastern U.S. since cattle are exposed to large amounts of water in the form of sprays or misting droplets. This softens the claw horn and causes it to wear even faster.

"When claw horn is constantly exposed to high moisture conditions, the sole starts to look spongy, like how a person's nails look after washing dishes," explains Dr. Blaine Ellison, a Florida veterinarian and nutritionist with vast hoof trimming experience. It is soft and flexible to finger pressure and cows may appear as though walking on egg shells. For a heifer, it's an even

bigger problem. She's still growing and can't replace sole material fast enough to make up for what she's losing. Ellison has found that heifers will actually leave behind a chunk of their sole when they plant one or more feet and then pivot and turn because of reluctance to enter the milking parlor. When cows' feet are wet and soft, an increased rate of wear is to be expected. "Defining it as white line, which is viewed as nutrition-related, will never solve this problem," says Ellison. This study illustrates the value in knowing precisely where in the sole the lesion is located.

One solution is to install rubber in the exit lanes of the parlor, at the feed bunk and passageways between housing and parlor to alleviate stress on feet. "Rubberization of the parlor helps every animal every day," confirms Ellison. "It doesn't matter how much biotin or zinc or name your favorite hoof product you throw at her if cows are on concrete too much. Hydration makes hoof material softer and less resistant to environmental abrasion. The result is an ouchy animal – one who doesn't want to eat, show heat, etc. We put cows in all kinds of situations they weren't meant to be in – cows did not evolve to walk on concrete. Cow comfort has to be priority #1."

Zones tell a story about what is happening in an animal's life. When Daniel saw severity level 2 and 3 sole hemorrhages in zone 6 and sole ulcers in zone 4 on one farm, he knew cows were perching because their stalls were not built right. Perching occurs when a cow cannot fit completely in her stall, forcing her to stand with her back feet on the concrete alley or in the gutter rather than lying down. "Just recording this as a sole hemorrhage wouldn't reflect the real problem of perching," says Daniel.

Zones can also be used to provide a distinct profile of the problems trimmers encounter. For example, when Daniel finds white line in zones 1, 2 and 3 and a sole hemorrhage in zone 4, he knows he's dealing with a fresh two-year-old on concrete in a free stall barn. "Or if it's a tie stall barn, I may see white line in zones 1, 2 and 3, a sole ulcer in zone 4 and sole hemorrhage in zone 5. Now I know I have a fresh two-year-old with not enough bedding and too hard of rubber mats. You see these problems with two-year-olds because their feet are soft and have never been trimmed."

### **Zone scoring aids in treatment and prevention**

Knowing exactly where a lesion is located helps the farmer in providing appropriate follow-up treatments and removes guesswork on both sides – for trimmer and producer. "For example, let's say you have a case of digital dermatitis," says Daniel. "The farmer undoes the wrap four days later and sees no lesion by the heel. He thinks the trimmer made a mistake because the cow is still limping, but the lesion was actually in the center of the foot in zone 0. This shows how zone scoring helps prevent assumptions from happening; it protects the trimmer."

Using zones offers proper evaluation of the treatment for all parties involved – from trimmer to farmer to vet. Recording lesions by type and location enables producers to implement a more targeted treatment plan and gives them the ability to track over time which lesions are most prevalent in their herd. It can even lead to making new management decisions, such as putting down rubber to ease the strain caused by concrete.

Ellison believes vets and nutritionists should spend time with the trimmer to see where problems are located so they can help with the remedy. "They need to figure out what complications their current strategies are causing and make changes to correct them. Nutrition is very important to hoof health; therefore, nutritionists are handcuffed to it in a number of ways." When Ellison

found heifers that were exhibiting white line disease in zone 3, he knew nutrition was a factor. He started looking at feet and found the first lesions in short-bred heifers. It turned out there was a change in the ration at this stage that was causing laminitis, but someone had misdiagnosed it as a fresh-animal sole problem. The injuries had actually been caused much earlier. Ellison helped fix the ration heifers were receiving between breeding and gestation to put a stop to this lameness problem.

“A cow’s feet are like reading a book; it’s difficult to get the whole story from reading a single chapter,” points out Dr. Jeff DeFrain, research nutritionist at Zinpro Corporation. “You have to take into account factors such as season, days in milk, parity and repeat events before interpreting foot health data on each dairy. I would prefer to have two to three months of solid hoof data as well as locomotion scores of representative groups of cows when conducting a full dairy lameness audit. Capturing zone info improves the accuracy of lesion diagnosis which gets us closer to determining the root cause of lameness on the dairy.”

### **Hoof Supervisor: a simple solution for recording consistent hoof lesion data**

Hoof Supervisor, developed in part by Dr. Jan Shearer, is a chute-side computer system that makes it quick and easy for hoof trimmers to record lameness information on individual cows. Using the Dairy Claw Lesion Identification system agreed upon by the International Lameness Committee, lame events are recorded by lesion name and zone location in one, easy-to-use product. It also tracks lesion severity level on a scale of one to three.

Hoof Supervisor captures data in one simple step. You can identify the foot, claw and location of the lesion in a single tap of the rugged touch-screen. It shows the weight-bearing surfaces of a cow’s four hooves as they appear to the trimmer. The trimmer then chooses which hoof has the lesion. This action enlarges that particular image to display the numbered claw zones. Tapping the zone where the lesion occurs makes the zone turn red. Hoof Supervisor also offers options to record lesions of the hoof wall (zones 7, 8, 11 and 12), anterior interdigital cleft (zone 11), and foot skin above the coronet (zone 9).

“The big benefit of this product is that you can pinpoint exactly where the problem is, like the zone 1-2 junction,” says Ellison. “That’s why Hoof Supervisor is instrumental in distinguishing problems like a thin sole toe ulcer.”

This simple data collection software is much preferred over manure-stained, handwritten notes and provides valuable history on every cow that enters the chute. At the end of the day, trimmers can create a pie graph depicting the allocation of problems and what zones are affected. “Farmers really like this,” says Trinko, an instructor at Dairyland Hoof Care Institute who also travels abroad to train and consult on hoof care. “It shows you what’s going on at the herd level.” If a cow requires immediate attention, the report will communicate this too.

The convenient record-keeping system helps trimmers collect, report and analyze their work in an efficient manner. It’s teaching trimmers more about different types of lesions and providing greater understanding about lameness on a herd-by-herd and region-by-region basis. With Hoof Supervisor, no cows are lost in the system. You have a record of what’s going on, making it impossible to ignore the problems. The trimmer, producer, nutritionist and vet can see what the herd’s predominant hoof problems are and determine a corrective course of action to improve hoof health.

Because he uses Hoof Supervisor, it takes Daniel just three hours to evaluate his entire

business and all the herds he works on. “You start seeing patterns develop after using the system for nine to ten months. “I’ve been using it for four years, and I would never go backwards now. I need to know the ramifications, need to understand what I’m treating. Some trimmers say, ‘I don’t need to do all of that recording.’ But farmers should demand a return on investment from their trimmers. It allows a farm to protect their money.” Hoof trimmers are finding the younger generation of farmers really likes to see this kind of data. They crave answers and results. And that’s exactly what Hoof Supervisor provides.

DeFrain believes the industry needs to be more specific about lameness. “There are a lot of dairies who aren’t recording data, and that’s a problem,” he says. “You can’t just say, ‘I have lame cows.’ Instead, for example, you need to tell us, ‘I have a problem with sole ulcers.’ Then we can help them.”

In Canada, they’re working to tackle the lameness problem through a program called the Alberta Dairy Hoof Health Project. This large endeavor involves recording hoof health information on thousands and thousands of cows, and they’re using Hoof Supervisor to capture and record the data. The goal is to uncover the most common causes of lameness and advance hoof health through specific research efforts.

In the near future, all dairy farms in Canada may be required to prove details about treatments applied to animals and can be subject to a farm audit. Daniel says Hoof Supervisor and the use of zones will comply with these audits. “If I find severe digital dermatitis in zone 10 and give the cow four to five grams of tetracycline and a wrap to treat, Hoof Supervisor records how much meds I used and on which animal. I have knowledge on my side. It protects me and provides due diligence for both trimmer and producer. By using zones, you know exactly where the medication was applied and it’s standardized to that treatment profile.”

### **Addressing lameness at the very earliest stages**

Zones help you pinpoint problems and their locations sooner. “You can do this without zones too, but it’s more difficult,” admits Trinko. “You don’t remember where the problem was the next time you see that animal. Picking zones is a simple concept that enables you to record objective data.” When you document lesions by zone, you can see patterns developing and hopefully save a cow before it’s too late. For those animals whose problems are severe, you can at least provide humane euthanasia while she can still walk.

If a cow has ulcers on multiple parts of the same claw, this triggers a sign that she is likely on her way out. Damage to both claws indicates she should be on the cull list. Daniel says, “When I see a consistent problem in the same zone on the same animal over a one- to two-year period, I recommend my clients do not breed her back.”

### **Zone lesion scoring establishes timeline for trimming**

Farmers cannot be put in a box when it comes to their trimming schedule. “That’s the number one failure,” says Daniel. “Each farm and its cows are unique. Using a system like Hoof Supervisor helps set benchmarks for the herd and targets appropriate timeframes for how often cows should be trimmed: 120 days, 150 days, 180 days, 250 days, once a year. The proper schedule can ultimately save the farmer money.”

Prompt and effective treatment of lesions is critical. “Don’t wait until you have sore cows,” recommends Daniel. “You need to trim *before* that happens.” The acceptable herd lameness rate is ten percent. If you’re at this level, then you’re at the right time period between trims. If the

percent of cows being treated for lesions is higher than this, trimming sessions should be scheduled more frequently.

Waiting too long between trims can provoke all kinds of problems. Daniel says if he trims 100 cows and sees five sole ulcers and twenty sole hemorrhages, it's a good day. But if the farmer decides to wait five months until the next trim and ends up late by six to eight weeks – sole hemorrhages start spreading and you have combined hemorrhages and sole ulcers. This is an example of waiting too long and then having to pay the price. "A cow is a walking time bomb on her feet," says Daniel. "If you don't take care of them, eventually she's gonna blow up!"

Daniel once took on a 60-cow herd with "foot problems galore." Ninety-four percent of the cows had lesions occurring in zone 6 (sole hemorrhage of 2 and 3 severity level) and zone 10 (digital dermatitis). During the second trim session at this same herd, only 55 percent of cows had lesions. The problems in zone 6 started disappearing. Cows had been perching so they adjusted the head rail. "We then went eight extra weeks until the next trimming, and the number of cows with lesions soared back up to 92 percent. Digital dermatitis in zone 10 was through the roof, and we had triple the amount of corns in zone 0 and double the amount of dermatitis. I told the farmer I need to come back in 120 days!"

### **Zones benefit trimmer, producer and all industry partners**

Lameness problems arise when the communication strategy is too simplistic, when there's too much guesswork going on. Zones encourage education on the part of the farmer. Many farms consider trimming merely an expense, but it's actually an investment. Daniel estimates that a farmer gets \$3 back for every \$1 they spend on hoof work when their lameness rate is at ten percent. If a herd was being trimmed four times during a two-year timeframe and can now justify three times, that's a 25 percent savings. Zone scoring can even inform a farmer about the kind of job his or her trimmer is doing. If you see a lot of thin toes (affecting zone 5), he could be trimming too much off the toes. Problems in zones 3 and 4 could indicate he might not be balancing the claws right, which could cause a hemorrhage.

"Zones put everyone on the same page, resulting in better communication," says Trinko. "I can actually show the farmer, etc. the precise location of the problem. If I just say ulcer, it doesn't tell anyone where it's located. Sole, heel and toe ulcers are completely different – they're located in different spots and caused by different things. If a person breaks their leg, you have to know specifically where it's broken. Is it the knee? Upper leg? Lower leg? It's the same with hoof problems."

Zone scoring ensures all industry partners are working towards the same goal. "It gets everyone involved in deciphering hoof problems as a team," says Shearer. From the trimmer to the producer to the veterinarian and nutritionist, working together to uncover which zones are affected and why is the only way to solve the lameness problem. As Vic Daniel puts it, "Without zones, you're pretty much setting yourself up for failure."

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