

# Preventing Lameness For Profit

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Over the last decade many changes have unfolded on dairy farms across the country. Higher production expectancy, new genetics, unusual feeds, total confinement, concrete lots and other new technologies changed dairy cows' feet and how dairy farmers need to address hoof care. Maintaining good hoof health often requires a small investment, but a commitment to a well-managed hoof care program.

In the past, dairy producers have not viewed hoof care as an element to manage, like rations or breeding. They either trimmed show cows and heifers, or dealt with a lame cow when the problem did not go away in a short time. Because the dairy farm environment, the dairy cow and production practices have changed, dairy producers must now make a more conscious effort to manage hoof health.

I would like to take this opportunity to share how my experiences as a dairy herdsman, and more recently as a hoof trimmer, have taught me that regularly managing hoof health will prevent lameness and increase profit.

## Identifying Lameness

Lameness occurs from a wide variety of causes, most of them originating at calving time. We know calving is the most stressful time for cows and that is why most of the stresses or insults to the feet happen 30 days before calving to 60 days after. However, the lameness typically develops within three months after calving and lasts on average four to seven weeks. It also tends to reoccur.

We can group lameness causes into three general categories: mechanical-conformational defects, microbial agents and metabolic imbalances, or any combination of the three.

Mechanical causes of lameness deal with the shape of the foot and conformation of the animal, which determine how the hoof grows. Posty or sickle legs, low foot angle and shallow heels can cause the hoof to wear irregularly and become imbalanced, which can lead to sore feet. In addition, it is a well-known fact that with time, overgrown hooves cause lameness through sole ulcers, White Line disease and solar abscesses. Research has shown that the hoof normally grows about 3/16 of an inch per month and completely regenerates in approximately 14 months. Consequently, if you do not have hooves trimmed at least once a year, they can quickly overgrow.

Microbial-lameness causes come from the environment the cow lives in and affect the skin of the foot. If we do not have a clean and dry environment, diseases of the soft tissue or skin of the foot will develop, such as: Interdigital Phlegmon (acute foot rot), Interdigital Dermatitis (hoof rot) and Digital Dermatitis (foot warts).

Unlike mechanical and microbial causes of lameness, metabolic causes are more difficult to detect, treat and prevent. Metabolic imbalances cause laminitis, which is a complex, systemic syndrome that develops in many of the cow's organ systems and becomes apparent or releases in the foot. Laminitis is when the laminae or corium becomes inflamed or congested, which causes lameness.

To control and prevent lameness, dairy producers first need to manage hoof care by regularly trimming cows' and heifers' hooves. Then to correctly diagnose problems, dairy producers, veterinarians, nutritionists or anyone working closely with dairy cattle need a better knowledge of cow physiology and foot anatomy to easier understand and recognize lameness. And finally, we need to record trimmings, lameness incidences and corrective procedures for each cow.

### **Types Of Lameness**

Researchers have conducted some studies to learn which types of lameness are more prevalent on dairy farms and require more attention. A 1989 study (Collick et al. 1989) of 17 farms with lameness incidents of 17 percent found the types of lameness were:

- 47 % White Line disease, sole abscesses and foreign objects
- 31 % sole ulcers
- 22 % interdigital diseases like Interdigital Phlegmon (acute foot rot), Interdigital Dermatitis (hoof rot) or Interdigital Hyperplasia (corns).

This study took place before Digital Dermatitis (foot warts) affected the trial herds. A more recent study (Brizzi 1994) from Italy that included seven farms with 900 cows found the following types of lameness:

- 34 % Digital Dermatitis (foot warts)
- 26.5 % sole ulcers
- 22 % White Line disease
- 15.5 % foot rot and others

### **Lameness Diminishes Farm Profits**

Lameness is a pervasive, far-reaching problem that silently reduces profitably by deteriorating the cow's overall health through decreased mobility, feed intake, reproduction and production. Research has found that lameness can affect 4 to 55 percent of cows in individual herds annually. (Blowey 1993) This statistic helps us understand why 74 percent of culled cows have serious foot problems. (McDaniel 1994)

Lameness diminishes profit because it:

- requires extra management time
- increases concentrate feed costs due to less dry matter intake
- reduces milk and meat yields
- complicates heat detection and increases breeding costs
- extends calving intervals and generates fewer calves

- increases cull rates and leads to higher replacement costs

By just looking at reduced milk production, we can see how lameness sharply affects profit. Some studies suggest that lame cows experience 10 to 35 pounds of milk loss per day.

Calving and the transition into the milking herd are the most stressful times for cows and make them most susceptible to damage from overgrowth, microbes living in the environment and laminitis. This susceptibility during stress periods causes lameness to strike just before the cow reaches her peak during the lactation. Considering one pound of milk increase during peak production adds 200 to 250 pounds of milk to the lactation total, lameness robs profits at the optimum time, around 80 to 100 days after calving.

Lameness can continue to reduce a cow's profitability during her productive years because injuries left untreated will lead to permanent, irreversible damage, even when they occur in young heifers. As a result, the hoof will not grow normally and will require more frequent trimming.

Lameness causes a snowball-effect as it keeps the cow from eating and producing milk as she should, from showing heats and breeding back for ideal calving intervals, and reaching her potential profitability. My experience has taught me that the taking the time to manage hoof care, plus a small investment in regular trimming, more than pays for itself by controlling lameness and increasing profits.

### **A Case Study From A Client**

Most dairy farmers cull cows for reasons related to the cow's ability to profitably produce high-quality milk. According to the USDA's National Animal Health Monitoring System (NAHMS), a 1996 dairy survey revealed that dairy producers cull cows for:

- 26.7 % reproductive problems
- 26.5 % udder/mastitis problems
- 22.4 % poor production
- 15.0 % lameness/injury
- 4.3% disease
- 4.1 % other
- 1.0 % aggressive/belligerent

A couple of years ago a dairy farmer called me with a large number of lameness problems and his cull rate was 40 percent. When I looked at the history of the cows that left the herd in the last year, there were some very interesting coincidences. His reasons for culling were exactly like the NAHMS survey.

Looking at cows that left the herd for low production, I found that the genetic pool used in this herd was above average. Springing heifers looked big and grown well. Some heifers would produce above average in early lactation, but would drop off around 50 to 70 days. These cows may have been lame and produced less because lame cows lie down more and eat and drink less. Milk production will drop when dry matter intake declines from eating less.

Lameness also affects reproduction, as I mentioned earlier. Lame cows rest more, are less active and less likely to show heats and sometimes do not even cycle. As a result, my client culled some cows for reproductive problems that lameness probably caused.

This client also culled for mastitis problems that lameness may have caused. Lame cows stay to the back of the group and enter the holding area in the milking parlor last. By the time they are milked, they have had all the standing they can take and lie down immediately after milking. There is a good chance that the teats' sphincter muscles do not completely close before the cows lie down, allowing bacteria to enter their udders. In addition, lame cows are not always the cleanest because they may lie down anywhere, even in the holding area or alley ways, to relieve their pain.

Results of the first hoof trimming visit where I trimmed all 80 cows:

	0-100 days	100-200 days	200-300 days	Dry Cows	<b>TOTAL</b>
<b>No Problem</b>	8	8	12	10	<b>38</b>
<b>Subclinical Laminitis</b>	6	6	4	2	<b>18</b>
<b>White Line disease, solar abscesses</b>	6	6	0	0	<b>12</b>
<b>Sole ulcers</b>	2	6	2	2	<b>12</b>
<b>TOTAL</b>	<b>22</b>	<b>26</b>	<b>18</b>	<b>14</b>	<b>80</b>

In addition, 26 cows had Digital Dermatitis (foot warts) on one or more feet.

According to Dr. R.J. Esslemont of England (1993) who looked at the cost of lameness, he estimated that the average economic loss per cow, per incident was:

Sole ulcers	\$627.00
White Line disease and sole abscesses	\$257.00
Foot rot and foot warts	\$80.00

He did not calculate the economic loss for Subclinical Laminitis, a metabolic cause of lameness, because it is so difficult to determine its economic impact. I do not know of any studies that have been done yet to calculate the loss from Subclinical Laminitis.

On my first visit, my client's economic loss from lameness was:

12 cows with sole ulcers	@ \$627.00	\$7,524.00
12 cows with White Line disease and sole abscesses	@ \$257.00	\$3,084.00
<u>26 cows with foot warts</u>	<u>@ \$80</u>	<u>\$2,080.00</u>

TOTAL ECONOMIC LOSS

\$12,688.00

Because there was a severe problem in this herd and lameness does reoccur, this was the economic loss for one period of lameness, not the total for the year. After calculating the economic loss for all lameness incidents during the year, the total profit loss would be greater than \$12,688.00. Furthermore, I did not calculate losses from Subclinical Laminitis, which would significantly add to the economic loss.

There were several factors causing lameness in this herd and almost all were management related. With just a few management changes, like regular maintenance trimming, ration changes, paying closer attention to transitions and calving, and bringing springing heifers off pasture and into the dry lot two months before calving, we minimized lameness. We also started trimming older, chronically lame cows every two months. The herd's cull rate dropped to less than 15 percent and metabolic and mechanical related lameness incidents declined to one cow per month. Today this farm is much more profitable.

### **What Can We Do To Combat Hoof Problems?**

The best way to prevent hoof problems is to keep cows healthy by using good general-management practices. Quickly and properly diagnosing and treating health problems is your best defense to ward off lameness. Besides this, dairy producers can implement three practices to manage hoof health to control mechanical, metabolic and microbial lameness. They are:

- regular maintenance trimming
- reduce stress factors
- practice good hygiene

### **Regular Maintenance Trimming**

The easiest and most economical way to prevent lameness is regular maintenance trimming. With today's confinement conditions and concrete facilities, dairy cows experience minimal and irregular hoof wear. As a result, we must accept that it is necessary to trim each cow at least twice a year.

The objective of hoof trimming is to restore the hoof to its normal shape and correct balance. It is ideal to trim cows during the early dry period. Since most of the insults, or stresses that make the cow vulnerable to lameness, occur four weeks before to four weeks after calving, it is important to have a correctly balanced hoof during this stressful period. Then a second trim is usually necessary at mid-lactation, around 120 to 150 days fresh. Cows with a history of problems may need re-balancing every two months, particularly their hind feet.

Even with the best preventative maintenance, occasional hoof problems can occur; therefore, we need to properly diagnose and deal with them immediately. Therapeutic trimming procedures or blocking are necessary aids to help lame cows recover.

Some research studies have identified the effects of hoof trimming on lameness. One study found that cows with trimmed feet walked better, fewer cows developed lameness and there were fewer incidences of solar problems. (McDaniel & Wilk 1990)

	<b>Trimmed</b>	<b>Not Trimmed</b>
<b>Locomotion Score *</b>	1.52	1.83
<b>Number of lame cows</b>	10	15
<b>Cases of Clinical Lameness</b>	23	54
<b>Weeks Lame from clinical cases</b>	2.3	3.43
<b>Solar problems</b>	17	45

\* Higher scores indicate more lameness

I also recommend that dairy producers evaluate replacement heifers to determine if they need trimming and include them in the regular maintenance trimming program if necessary. I have found that producers often neglect heifers, which can be risky. If their hooves are out of balance and you do not treat an insult, it can cause permanent, irreversible damage. Remember how those show animals seemed to last forever in the milking herd? I believe that is because from a calf on they were trimmed at least once a year to get them ready for the show. This serves as an excellent reason to include heifers in a regular maintenance trimming program.

### **Reduce Stress Factors**

Keeping cows comfortable and stress-free is vital to enhance productivity and prevent lameness, because stress makes cows susceptible to mechanical, metabolic and microbial causes of lameness. Properly balanced rations and high quality feed are essential for high-producing cows. Sudden ration changes are a major cause of metabolic-related lameness. Consult with a reputable nutritionist to manage your milking, dry and transition rations.

Animals need a smooth transition period into the milking herd. Heifers coming off pasture need 30 to 60 days before freshening to adjust to the milking herd's concrete housing. It is also important to remember that first-calf heifers entering the milking herd have difficulty socializing, which can cause stress. Likewise, overcrowding in early lactation reduces resting time for animals that are not up to speed. Good cow comfort, clean water and good ventilation will help maintain healthy cows.

Implementing regular hoof maintenance trimming and reducing all stress factors to a minimum are the first steps in a successful lameness prevention program. The third point, which may be even more important, is hygiene.

### **Practice Good Hygiene**

I strongly urge dairy producers to make every attempt to keep hooves as clean and dry as possible. I cannot emphasize this point enough. We have to manage the microbial causes of lameness as we manage mastitis, by controlling the sources and causes of infection. Even if you

have the happiest, most stress-free cows with properly balance hooves, wet and dirty conditions will negate your other efforts and cause lameness.

Producers should work hard to eliminate mud and stale, standing water because these are the sources for reinfection. Time and time again I have observed lame cows standing in puddles of dirty water and/or manure. Perhaps doing this soothes their pain, but it only promotes more lameness by allowing microbes that live in the filth to contaminate the skin of the foot.

I recommend dairy producers scrape lots, clean the alley ways and empty the gutters before letting cows out of the stalls. In some cases it may even be necessary to manually wash the caked-on manure off the hooves. While these measures may seem meticulous and time-consuming, keeping cows' feet clean and dry is the best method to prevent the microbial causes of lameness, like hoof rot, foot rot and foot warts. Digital Dermatitis (foot warts) is the most persistent microbial cause of lameness.

### **Control And Treat Digital Dermatitis (foot warts)**

Studies have found that up to 90 percent of cows with lameness have Digital Dermatitis or foot warts present. This is a disease of modern dairy husbandry. I believe we will never eliminate Digital Dermatitis, but we can manage to control it. We still do not understand what the etiology of foot warts is, but researchers at the University of California, Davis have successfully reproduced foot warts in a controlled lab setting. They found that foot warts are anaerobic and will thrive in moist conditions, which reinforces the need to keep the cows' environment clean and dry.

Digital Dermatitis seems to have entered the dairy industry for the long haul. Once a herd has become infected, it may not be possible to cure the cows of foot warts. However, through practicing good hygiene, regular maintenance trimming and reducing stress, you can keep outbreaks to a minimum. If Digital Dermatitis has not infected a herd, the best way to prevent infection is to properly introduce purchased animals. (see below)

Dairy producers can successfully treat foot warts to significantly improve cows' health and production potential. On a 100-cow dairy with a 90 percent infection rate of Digital Dermatitis (foot warts), milk production rose eight pounds per cow per day (68 lbs. to 76 lbs.) after successful herd treatment. I have found four ways to control and treat Digital Dermatitis: maintenance foot baths, treatment foot baths, spray-on topical treatment and individual bandage treatment. The key to achieving fast and successful treatment is to identify the warts in the early stage.

### **Maintenance Foot Baths**

Maintenance foot baths condition and strengthen the soft tissue of the hooves, making the foot less susceptible to invasive organisms. If we can control Interdigital Dermatitis (hoof rot) with a maintenance foot bath, it can also help reduce the occurrence of other hoof diseases, such as foot warts. Preventative products that work for foot baths are solutions of mild soap, Hoofpro+,

copper sulfate, zinc sulfate and rock salt. Consult with your University Extension agent or veterinarian for solution recipes and how to properly use a foot bath.

### **Treatment Foot Baths**

Success varies when using a treatment foot bath exclusively to treat Digital Dermatitis (foot warts). Only farms that practice excellent hygiene will have satisfying results. Treatment products are Tetracycline, Oxytetracycline, Lincomycin, Lincomycin-Spectanmycin and Hoofpro+. When you plan to use antibiotics other than how the label directs, get your veterinarian's consent and directions. Using any of the products mentioned above in a foot bath is an off-label use.

An important point we must consider when using a treatment foot bath is that the amount of exposure to the solution is critical. Feet must be clean to effectively expose lesions to the solution. Change the bath every 80 to 150 cows and continue using the treatment bath until you achieve your desired results. It is critical to carefully handle the treatment foot bath to avoid antibiotic residue. Antibiotics are more effective when used sparingly.

### **Topical Treatments**

Topical treatments are solutions made with the products used in a treatment foot bath, but are applied with a garden-type pump sprayer. You can spray hooves either in the milking parlor or in the self-lock stanchions of the freestall barn. This is the second most successful treatment and the most cost-effective way to deal with Digital Dermatitis (foot warts), even though it is more labor intensive than a foot bath. Remember to carefully use antibiotics, particularly in the milking parlor, and when using antibiotics for off-label use, consult with a veterinarian.

For improved results, I have found it works best to treat all feet of all the cows once a day, for five to seven consecutive days, because not every cow with warts will appear lame. Then continue spraying every day only the cows with visible lesions. Because foot warts reoccur, I have observed producers successfully control warts by treating the entire herd every four to six weeks.

### **Individual Bandage Treatment**

If foot baths and topical treatments fail to control foot warts, you will need to treat cows individually. This is a very labor-intensive and expensive method, but it is 99 percent successful. After carefully cleaning the affected area, apply a treatment-soaked gauze to the lesions and secure it by loosely bandaging the infected foot. Try not to make the lesion bleed as blood dilutes the treatment solution. Remove the bandage after 24 to 36 hours. I do not recommend removing any tissue in any way or form because it takes a long time for the tissue to heal. Before the area can heal from having the tissue removed, it becomes reinfected and additional complications may develop.

### **Vaccinating For Digital Dermatitis (foot warts)**

Because of the nature of this disease, I question vaccinating for Digital Dermatitis (foot warts). Dairy producers primarily use vaccines to prevent viral diseases, and so far field trials have not generated any positive results for vaccinating for foot warts, to my knowledge. Perhaps after more research, scientists will be able to develop an effective vaccine to prevent Digital Dermatitis, but for the time being, topically treating the disease is more successful.

### **Properly Introduce Purchased Animals**

Research does not know, if when we bring purchased animals into a herd, if we introduce different strains of bacteria and the cows must develop immunity, or if the new cows introduce the same bacteria, but the herd and the purchased cows do not share the same level of immunity. This is why dairy producers should quarantine purchased animals for up to 30 days. During this period dairy producers should observe animals and promptly treat active lesions.

### **Conclusion**

To conclude, dairy farmers, veterinarians and hoof trimmers need to realize that the economic loss from lameness can be astronomical. Finally, recent studies have shown just how pervasive lameness is because it affects so many aspects of the cow's health, which significantly diminishes profitability. The most successful way to prevent lameness from robbing dairy producers' profits is to faithfully perform good management practices.

All management practices must better accommodate today's housing conditions, new technologies and the harder-working dairy cow. We can successfully manage hoof health and prevent lameness with a minimal investment and by incorporating hoof care into our regular management practices. We also must incorporate scientific knowledge into preventative and therapeutic trimming techniques, which can reduce clinically lame cows suffering from mechanical damage to less than 2 percent of the herd per month.

There is no shotgun or needle approach to solve lameness. Dairy producers must look at hoof care as an investment in the future and not as an expense of producing milk or meat. The economic rewards are large when you keep cows healthy, comfortable and free from lameness. Besides preventing lameness to increase profits, dairy producers earn a living from working with animals, and therefore, have an obligation to their cows' welfare.

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