



## Digital Dermatitis: Successful Management

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Around the world, even in well-managed dairies, there's a good chance digital dermatitis (DD) is present. It is highly contagious, and if left unchecked, can cause painful ulcerations that often lead to lameness. Common practices for controlling DD have been limited to footbaths and topical treatment of severe lesions, with no clearly established guidelines

for optimal management. Many dairy producers might be surprised to learn that DD can be effectively controlled, but it requires a slightly more sophisticated and long-term approach than the current standard of care. This article explores the tools already available that can be used on a dairy to bring DD prevalence under control.

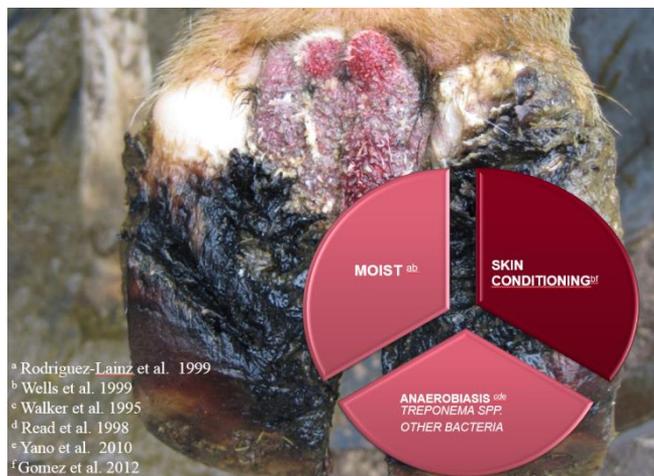


Figure 1. Digital dermatitis etiologic components.

The first step in controlling DD is to understand both the epidemiology, as well as changes in prevalence of the disease. Digital dermatitis is multifactorial, with a strong bacterial component, namely *Treponema* spp., which can exist in both active and

cystic (dormant) forms. In fact, DD causes changes in the shape and structure of an infected hoof before any lameness symptoms are observed, such as increased heel height, claw angle and heel horn erosion.

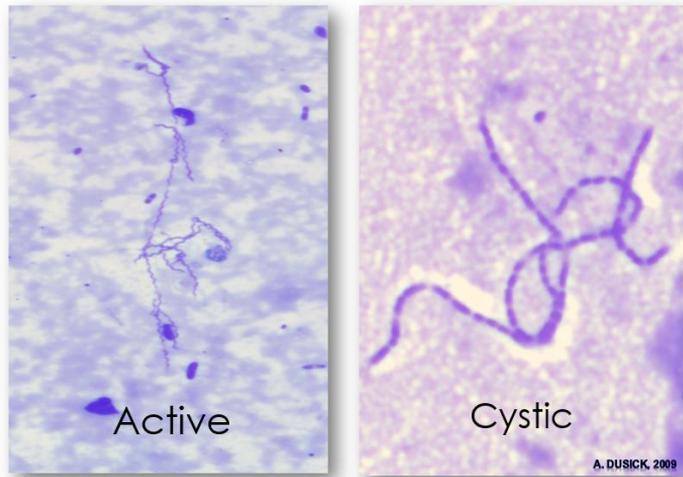


Figure 2. Active and cystic forms of *Treponema* spp.

Once the disease has infected the animal, it can persist as a problem throughout the animal's life. It is important, therefore, to focus on minimizing new infections and decreasing the duration of acute (ulcerative) M2 cases. In order to achieve this, we rely on a set of tools available called "FIGHTERS", which stands for:

- Footbath
- Infection Status
- Group of Animals
- Hygiene
- Trimming
- Early Topical Treatment
- Record Keeping
- Skin Quality - Skin Protection

Here's a breakdown of the FIGHTERS strategy (Figure 1) for controlling digital dermatitis.

### Footbath:

- The design of the footbath is of paramount importance to maximize the application of disinfectant solutions, decrease the amount of water used and minimize the amount of waste chemicals dumped into the environment (and save money!). Chemicals should always be used according to their labels. An ideal footbath is 3.0 to 3.7 meters long, 0.5 to 0.6 meters wide, with a 28 cm step-in curb and a 10 cm minimum solution depth. Sloped sides (70°) 1 meter high also help save solution and maintain adequate solution depth.
- The main objective of the footbath is to control early (subclinical) and chronic lesions, avoiding the progression of these lesions into acute (ulcerative) stages. Footbaths are not a substitute for individual treatment of acute lesions.
- The appropriate frequency of footbath applications should be determined based on infection rate, as well as foot and leg hygiene scores for



each individual farm.



Figure 3. Different footbath models showing solid sides, more than 3.5 meters in length and <60 cm in width.

### Infection Status:

- Assessing disease prevalence is the first step to quantifying the extent of the problem. The next step is evaluating infection status. Topical treatment applications need to be performed based on active

surveillance. Some tools such as “DD Pen Walks,” DD diagnosis in the parlor, or serologic identification of active DD cases can be used to directly evaluate DD status before lameness symptoms and chronic stages show in animals affected with the disease.

### Group of Animals:

- The rearing period is a crucial factor in herd prevalence of this disease. Success of the milking herd DD prevention program will be determined by the quality of DD prevention during the rearing period. A recent research study we conducted at the University of Wisconsin (under the direction of Dr. Dorte Dopfer),

USA, showed that ~67% of the heifers that were initially infected with DD during the rearing period experienced a case of DD during first lactation. However, animals kept disease-free (during the rearing period) only experienced a case of DD during first lactation in 13% of the cases. In addition, reproductive, production and lameness performance during the



first lactation was significantly affected by the occurrence of DD during the rearing period.

- Precise identification of high-risk groups of animals can be achieved

by evaluating the DD incidence and prevalence by days-in-milk or by lactation group. This is required in order to maximize the resources and efficiency of control programs during the rearing period and in adult cows.



Figure 4. Digital dermatitis lesion in a 7 month-old Holstein heifer.

### Hygiene:

- Digital dermatitis infection is associated with poor hygiene. The correlation between dirty environments and higher DD prevalence is widely accepted. However, even in fairly clean barns, special attention needs to be made to critical points where disease transmission can happen, even if animals are exposed to problematic spots for very short periods of time. Some examples are when animals 1) walk through footbaths full of manure during periods when footbaths are not actively used, 2) are confined to small spaces to facilitate pen cleaning activities, 3) are exposed to manure piles dragged across alleys by scrapers or, (4) walk through unhygienic surfaces located around water troughs.

### Trimming:

- Appropriate trimming can help prevent and treat DD infections. Routine trimming of feet allows for close examination, in addition to early identification and treatment of DD infections. Prevention can be achieved by removal of loose horn at the heels, wide trimming of the axial space of the lateral toe and treatment of DD lesions found during trimming (such as necrosis of the toe).
- Comprehensive trimming/foot examination programs should always take into consideration non-lactating cows, such as replacement heifers and dry cows.



### **Early Topical Treatment:**

- Bacterial colonization of the deeper epidermal layers of skin is observed at very early stages of the disease. Over time, skin proliferation can increase as the animal reacts to the disease. Therefore, deep colonization and thickened skin, the natural disease progression, compromise treatment success and are exacerbated when lesion treatment is delayed. Consequences of delayed treatment include increased lesion recurrence, proliferation of skin and transmission of DD to healthy animals. Only programs that include active surveillance to detect and topically treat new cases of the disease as early as possible will achieve long-term success. A farm goal of 0% presence of skin proliferation in M2 lesions at treatment can be established to recognize and monitor early treatment.
- The objective of early topical treatment is to reduce infectious period duration of DD lesions and increase cure rates. The only solution to reduce the number of active DD lesions is topical treatment. A one to three week follow up of the initial DD lesion treatment must be included in the treatment protocol. Although research efforts are being made to find non-antibiotic topical treatments, Oxytetracycline (OTC) is still an effective option to treat M2 DD cases. However, working along with your veterinarian is advised when using OTC products.

### **Record Keeping:**

- The increasingly common use of on-farm management software

allows for recording health events, including lameness and hoof lesions aimed at organizing future tasks (e.g., monthly number of calvings, animal movements, etc.). These records can help determine severity and prevalence of DD infections in different groups of animals, and thus the intensity of DD control programs in specific groups of animals can be modified accordingly.

### **Skin Quality – Skin Protection:**

- Digital dermatitis develops from multiple risk factors as a result of a weakening of the skin barrier, due to mechanical irritation and wet conditions. Improving skin integrity and/or enhancing immune response in the presence of bacteria (including *Treponema* species) that cause the disease will help provide a barrier of protection against the disease. One way to enhance disease resistance is to provide cattle with an adequate supply of effective trace minerals, which have been shown to play a critical role in wound healing, as well as maintaining the health and integrity of skin.
- Research has shown supplementing pre-calving heifers with complexed trace minerals helps improve skin recovery from subclinical DD infection and maximize the resources needed by the immune system to fight infections. An obvious advantage is the possibility of decreasing DD prevalence by more than 50% even when the use of footbaths and topical treatment is limited or in cattle that are not easily handled on a regular basis such as pastured cattle and beef cattle in large feedlots.



ACTION	TOOLS	OBJECTIVE
<b><u>FootBath</u></b>	Dimensions, Chemicals	Decrease Chronics/Subclinical going to Acute DD
<b>Infection Status</b>	Elisa, Visual Inspection (Chute, Parlor), DD Pen Walks	Early Detection; Monitor Cure
<b>Group of Animals</b>	Tailored Interventions Periods Of High Risk Heifers	Maximize Work Efficiency and DD Control Success
<b>Hygiene</b>	Focus On Critical Control Points	Decrease Risk of Transmission
<b>Trimming</b>	Professional Trimming	Prevention And Cure
<b><u>Early Topical Treatment</u></b>	Topical (Wrap) Treatment of M2 DD	Maximize Clinical Cure – Minimize Skin Proliferation
<b>Record Keeping</b>	Commercial Software	Monitor and Adapt Management
<b>Skin Quality – Skin Protection</b>	Complexed Trace Minerals	Maximize Skin Integrity- Skin Protection

Figure 1: Summary of FIGHTERS against Digital Dermatitis

**References and further questions:** Available at [agomez@zinpro.com](mailto:agomez@zinpro.com)