

DAIRY VETERINARY NEWSLETTER

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How Effective - and Important - is Disinfection of Hoof Knives After Foot Trimming?

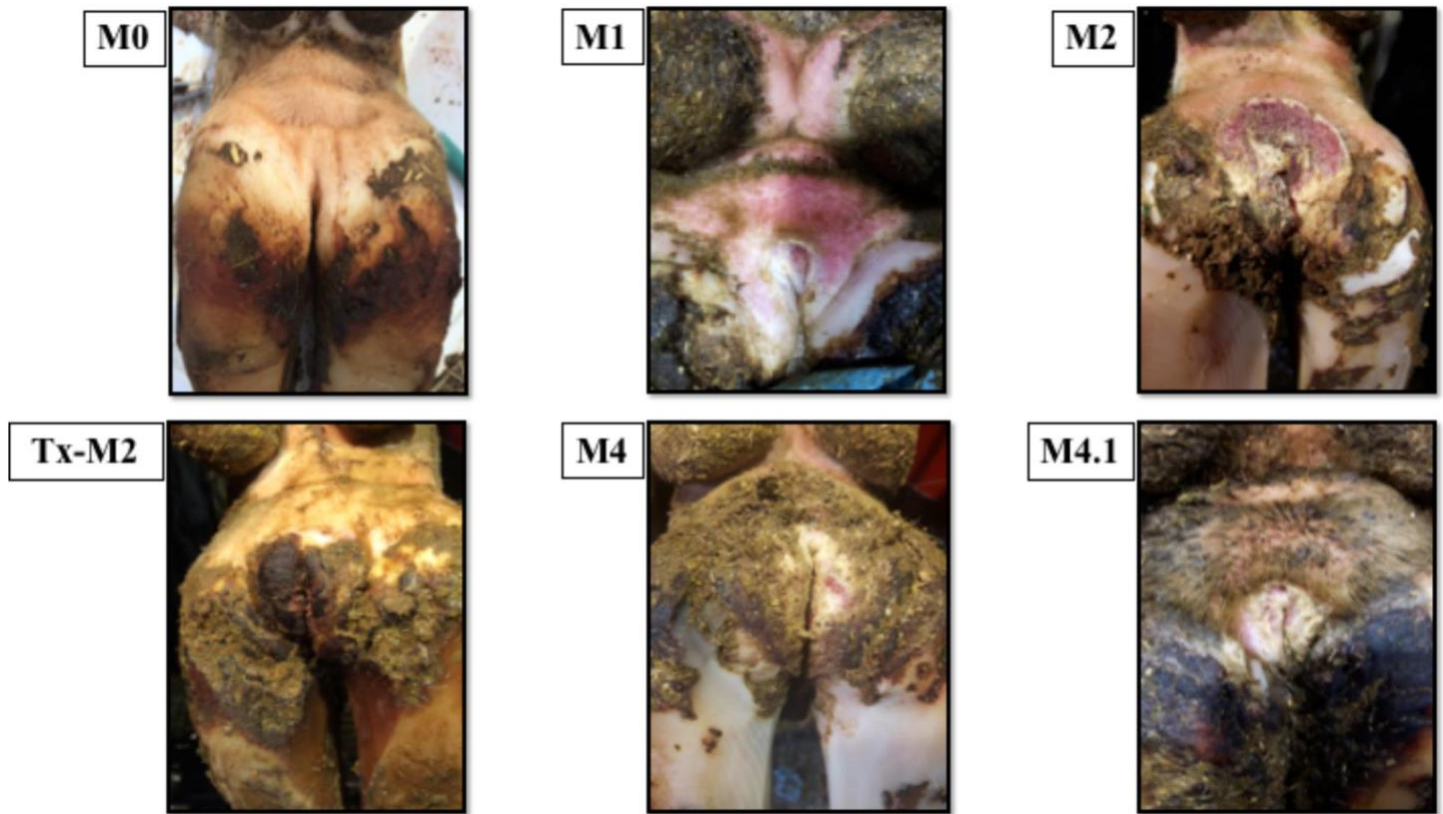
When I first graduated from veterinary school at Ohio State, the practice I joined in Indiana had a homemade portable foot trimming table. With input from the veterinarian who owned the practice, an engineer client had built it. It is still the best one I ever used; it was easy to tow behind either the small truck we used only for towing it or behind a much larger truck. It was rugged and the table operation motor was fantastic. It was the easiest to clean of any type of livestock or grooming chute I ever used. At first I really did not like foot trimming. During that first hot summer, it was the single activity I most perceived as, “I did not go to vet school to do this.” However, I learned a lot about foot trimming from our veterinary technician who was going back to college to pursue admission to vet school. (He was admitted and 6 years later graduated from Purdue.) Before long I grew to like foot trimming and I trimmed a lot of dairy cow feet and also show beef cow feet. It did not take long to realize that one could do a lot of good both in terms of prevention and therapy for bovines with a good foot trim. Sometimes one drains an abscess that was not even detected before the trim including by any noticeable lameness signs, or makes it noticeably easier for a cow to walk right away. Increased milk production often followed soon after a foot trim. During that time, and steadily through the years I was in practice and then my residency at Michigan State, the proliferation of professional foot trimmers and/or more dairy farms having their own foot trimming table accelerated. Today many dairies have either on-farm employees or outside foot trimmers do bovine hoof care. However, it is still useful for veterinarians to know about foot care. Especially for the remaining small dairies, including niche farms, operations with a large non-dairy income, and high genetics operations, they may need to do some foot trimming and hoof care. Conferring with professional foot trimmers is also needed. What about disinfection of hoof knives after foot trimming?

A September 2020 paper by A. Gillespie et al. in BMC Veterinary Research addresses this question; the study was done near Liverpool in the UK. Bovine digital dermatitis (BDD) associated with *Treponema* spp. was the focus of the experiments. (I learned years ago that one of the first names for BDD was “Mortellaro”. However, I did not remember until I read this paper that the first 1974 published description of the disease was co-authored by Dr. Mortellaro of Italy.) The spirochetes found in BDD lesions are comprised of three “phylogroups” (their names read like species): *Treponema medium/vincentii-like*, *Treponema phagedenis* and *Treponema pedis*.

The foot lesions are often characterized using a 5 point scale: small, focal active lesion (M1), larger active ulcerative stage (M2), healing stage (M3), chronic hyperkeratotic scabs (M4), from which state they can ‘reactivate’ with small focal active lesions superimposed (M4.1). In the images on the next page, there is also shown a category M0 which is normal without any BDD lesions. There are multiple sets of images available online, and they are not completely similar in appearance or severity to each other. Most clinical scales of disease severity include some subjectivity, and these are no exception.

Cow-to-cow transmission of the treponemes has been attributed for more than 45 years to the environment. However, “treponemes have not been isolated in culture or detected by PCR from farm environments”, say the

authors, citing a 2012 paper by Evans et al. (This is not unique to BDD. Many cattle disease agents clearly associated with specific environmental conditions and materials are difficult to isolate from such sources including feces, water, slurries, etc.)



The spread of BDD from Italy to other parts of Europe and then North America and much of the world has increasingly been attributed to foot trimming equipment that travels from farm to farm. It is estimated that as many as 97% of dairy herds are infected with BDD. The paper states, “- - across the last 50 years, use of external foot-trimmers operating high throughput systems, where large numbers of cows are trimmed in succession, has increased. Previous work detected BDD-associated treponemes on hoof knives using PCR, raising concerns that these tools, which are moved quickly and frequently from foot-to-foot, may act as a fomite for BDD-associated treponemes and could be having an impact on case numbers - -“.

In the study, 133 cases of BDD were enrolled: M1 (n = 1), M2 (n = 11), M3 (n = 10), M4 (n = 101) M4.1 (n = 10). There was no attempt to enroll equal or nearly equal cow numbers by severity; the study population was all of the BDD cases seen “during routine foot-trimming” on 3 commercial dairy farms during the study period.

During foot-trimming, no blade contact was made with the BDD lesion for 22 cases, while the blade contacted the lesion “to remove crusting from lesions prior to the application of topical treatment (Terramycin Aerosol Spray®)” for the remaining 111 cases.

Detection of *Treponema* spp. used a nested PCR that was referenced to an earlier study by some of the same authors, but had no statistics regarding validity/accuracy. Culture of cotton swabs of knife blades used Oral Treponeme Enrichment Broth and Fetal Calf Serum.

Treatments used to clean hoof knives by immersion for 20 seconds were: water (n = 47), 2% Virkon® (oxone, sodium dodecylbenzenesulfonate, sulfamic acid) (n = 45), 2% sodium hypochlorite (n = 21) and 1:100 FAM30® (Foot and Mouth 30 iodophor containing iodine, sulfuric acid, phosphoric acid) (n = 20). It was not

explained why the treatments were so unevenly distributed among the cases. Again, this was not a planned experiment, but an observational study even though the trial design was not described. Nevertheless, it would have been preferable to have the treatments assigned more evenly among the cases.

Results of the hoof knife disinfection

Of the hoof knives that did not contact BDD lesions, 6/22 (27%) tested PCR positive for *Treponema* spp. BDD phylogroups when tested pre-trimming, “suggesting some hoof knife blades were contaminated prior to trimming, including some that had not been previously used for hoof trimming that day.” However, none of the pre-trimming knife blades had *Treponema* spp. that could be cultured, “indicating a low [prevalence] of living organisms when sampled.” Actually based on these numbers, it suggested no living treponemes. Similarly, of the hoof knives that did contact BDD, 16/111 (14%) tested PCR positive for BDD phylogroups pre-trimming, but again no living treponemes could be cultured.

After trimming, the non-contact knives had 12/22 (55%) PCR positive for BDD phylogroups. Following disinfection, PCR BDD-positive results were: water 4/9 (44%), Virkon 6/13 (46%), only “sterilizing” 2 knives of the 22 that did not contact lesions. (Note that two of the disinfectants were not used on any of these knives. What proportion of the PCR positives could be cultured was not reported. Given the other results, it might be expected to be none.)

All 111 knives with blades that did contact lesions were PCR positive for *Treponema* spp. BDD phylogroups after trimming. In contrast, BDD phylogroup culture detected viable BDD treponemes on 64/111 (55%) hoof knife blades after trimming. Thus a biologically important proportion of more than half of the knives had living treponemes on the blades.

Following disinfection with any of the 4 treatments (38 water, 32 Virkon, 21 sodium hypochlorite, 20 1:100 FAM30), none of the 111 knives had positive culture results for BDD treponemes.

Severity/stage grades of the BDD lesions were not significantly associated with whether treponemes were isolated; this was largely because most stages had small numbers compared to the 101 M4 cases. However, there were treponemes isolated from a substantial proportion of all stages of BDD lesions except none were cultured from the single foot with an M1 lesion.

DNA of BDD pathogens was commonly found on hoof knives before - including those not used since at least one day previously - and after foot trimming, and live infectious organisms were found by culture on over half of the hoof knives. Following disinfection including with water, no living BDD pathogens were found.

Conclusion

The authors stated, “[Causative] treponemes present in BDD lesions are readily transferrable to hoof trimming blades and can be viable and transmissible. Importantly, it [was also] shown that even brief disinfection of the blades [in field conditions was] very efficient in eliminating viable treponemes from blades and presumably blocking at least this route of BDD transmission.”

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More Event Cancellations or Modifications

National Mastitis Council Meeting Moves to Virtual Format, Dates May Change Also

The NMC meeting “*previously scheduled for Jan. 25-28, 2021*” has been changed to virtual format, and the dates may change also. “Tentatively, NMC’s main presentations will be offered the week of Jan. 25, with short courses potentially being offered the week of Jan. 18, 2021.” The revised schedule is due during November 2020.

Possible June 2021 UVMA Canyonlands Conference Cancelled

At the recent UVMA board meeting, the above decision was made in light of the continuing pandemic. The new goal is to get back on track as we have for many years with even-numbered year conferences beginning during summer 2022.

If you know of other planned veterinary conferences or CE events that have been cancelled or had a change in schedule and/or format, please let me know.

I wish our readers as good a Holiday Season as possible, and most of us can probably agree that we hope for a better 2021. Please let us know your comments and suggestions for future topics. I can be reached at (435) 760-3731 (Cell), or David.Wilson@usu.edu.



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