Barefoot Hoof Care May Improve Heel and Foot Health

Written by Toni Rizzo

Members of the hoof care industry within different schools of thought have recently been debating the merits of shod versus shoeless hoof care approaches. Debra R. Taylor, DVM, MS, Auburn University College of Veterinary Medicine, Auburn, Alabama, USA, presented the current evidence for the "barefoot" approach to hoof care.

Traditional metal shoes provide traction, protection and support, and enhanced biomechanics. They require no work for the rider and stay on better. In a horse with injury or weakness, shoes provide protection while healing and immediately make the foot more comfortable and functional. However, barefoot proponents are concerned that metal shoes can lead to more dysfunction or atrophy and that those adjacent tissues might be overworked or adversely affected. Most believe that confinement in softly bedded stalls is the main obstacle inhibiting hoof development.

Barefoot proponents are trying to achieve a structural change in the hoof to increase soundness, functionality, and foot "ableness." According to Dr. Taylor, anecdotal reports support the concept that the foot can undergo internal structural change, but scientific evidence is lacking. This concept of "smart" tissues proposes that tissues react to stresses and strains by becoming stronger under an increased load. Most horses need foot protection while the foot is adapting and when working on unfamiliar terrain. Hoof care providers who focus on barefoot hoof development and rehabilitation do not leave horses barefoot unless they are comfortable. Most apply some type of nonmetal hoof protection, such as hoof boots, while horses adapt to going barefoot.

According to the smart tissue theory, the horse hoof responds to direct stimuli, such as trimming, shoeing, or padding, and to indirect stimuli, such as change of stress or strain on the tissue [Thomason JJ. In: Floyd AE, Mansmann RA, eds. *Equine Podiatry* 2004]. Sensory perception of the stimulus leads to cellular and tissue responses, resulting in comfort, reduced lameness, and anatomic change. These theories were supported in a study of 7 Arabian horses trimmed by the barefoot method every 6 weeks and followed for 16 months [Clayton HM et al. *Aust Vet J* 2011]. The heels were gradually lowered to allow the frog and bars to contact the ground, and the hoof wall was beveled. Minimal sole material was removed, leveling to the live sole plane and allowing the sole to develop a sickle-shaped callus. This treatment resulted in palmar/plantar migration of the heels with increased support length of the heel from 11.20 ± 1.23 cm to 11.59 ± 0.56 cm, increased heel angle from 35.65° ± 7.07° to 44.28° ± 5.07°, and increased average solar plane angle of P3 from 3.70° ± 2.29° to 7.38° ± 2.06°.

The Clayton study supports the claim of barefoot proponents that heel health is essential for overall foot health. Dr. Taylor hypothesized that they may be right and that it is impossible to build long-term soundness in the hoof if all or part of the heel is missing. It may not be realistic to expect other tissues to compensate for the weak heel forever. Currently, most research dollars are spent on molecular studies of laminitis, with limited funding spent on biomechanics of shoeing and understanding normal foot function or physical therapy systems for hoof tissues.

Dermatology Pearls: Mites, Follicular Cysts, and Diagnostic Techniques

Written by Toni Rizzo

James O. Noxon, DVM, Iowa State University, Ames, Iowa, USA, discussed the diagnosis and treatment of 2 dermatology conditions that occur in dogs and cats—mite infestations and interdigital follicular cysts. He also described techniques for performing skin biopsies and bacterial culture.

DEMODEX DIAGNOSIS AND TREATMENT

Several species of *Demodex* occur on dogs and cats. The classical demodectic mange of dogs is caused by the follicular mite *Demodex canis*. The features, diagnosis, and treatment of conditions caused by *D. canis* and other *Demodex* species are described in Table 1.

INTERDIGITAL FOLLICULAR CYSTS

Interdigital follicular cysts develop in traumatized hair follicles, causing swelling of the follicular ostia. The most common cause of follicular cysts is excessive weight on the feet and conformational changes. The affected follicles occur on the ventral surface of the feet in the palmar (most common) and plantar regions. Trauma causes the follicles to dilate and fill with keratinocytes. The follicles rupture and drain dorsally, most often between P4 and P5, releasing their contents into the surrounding dermis and provoking an inflammatory reaction.

Close examination of the ventral foot reveals lichenification and comedones, from which keratinaceous debris can be expressed. The presence of follicular cysts can be confirmed by skin biopsy and histopathologic

Table 1. Characteristics, Diagnosis, and Treatment of *Demodex* Conditions

Description	Diagnosis	Treatment
D canis		
Classical demodectic mange Follicular mite Present in moderate to high numbers Causes immunosuppression Secondary infections common, especially pyoderma	Skin scrapings Trichogram	Oral ivermectin Oral milbemycin oxime Topical amitraz rinses Topical insecticide rinses
D injai		
Follicular mite Present in low numbers Causes pruritus, erythema or greasiness, mostly over dorsal thoracic region	Trichogram best Skin scrapings May need multiple tests	Oral ivermectin Oral milbemycin oxime Topical amitraz rinses Topical insecticide rinses
D cornei		
Short-bodied mite associated with *D canis* (morphologic variant of *D canis*)	Skin scrapings Trichogram	Oral ivermectin Oral milbemycin oxime Topical amitraz rinses Topical insecticide rinses
D cati		
Rare follicular mite of cats Present in low numbers Causes nonpruritic, symmetrical alopecia or alopecia with crusts and scales	Trichogram most reliable Skin scrapings May need multiple trichograms and scrapes when suspected	Oral ivermectin Oral milbemycin oxime Topical amitraz rinses Topical insecticide rinses
D gatoi		
Small mites on skin surface or superficial dermis in cats Causes moderate to severe pruritus, with self-induced hair loss (often symmetrical) Contagious to other cats	Skin scrapings, 10× microscope objective for examination due to small size	2% lime sulfur rinses (3–6 total) most effective Imidacloprid + moxidectin every 1–2 wk effective in some cases

examination. Cytologic examination may help identify active infection or ongoing furunculosis, such as eosinophilic to pyogranulomatous inflammation. Even though staphylococci are usually found, bacterial culture should be performed to guide antibiotic selection. The lesion should be packed with mupirocin and antibiotics given for 3 to 4 weeks. Two negative cultures may indicate presence of a sterile pyogranuloma.

Laser ablation is the treatment of choice for follicular cysts, but it is a complex procedure that requires training to perform properly. The cyst may also be treated with surgical debridement. Other therapies include immunomodulating agents, shampoo therapy and residual topical rinses, and topical benzoyl peroxide shampoo or gels for early or mild lesions. Glucocorticoids are indicated for some allergic conditions and sterile pyogranulomas. Fusion podoplasty is successful in some cases. Finally, counseling the owners about weight control is critical for ensuring that the problem does not recur.

SKIN BIOPSY AND BACTERIAL CULTURE

The key to obtaining an adequate biopsy is to take a sample of any abnormal skin areas. Although histopathologic examination may not always provide a definitive diagnosis, it can help with the differential diagnosis. According to Dr. Noxon, local anesthesia is adequate for most skin biopsies, "depending on the demeanor of the patient." General anesthesia is recommended for biopsy of the pinnae, foot pads or distal extremities, nasal planum or facial region, and periocular skin.

Indications for culture include recurring pyoderma, failure to respond to standard therapy, and unexpected cytology results. The sample should be taken from a pustule, intact lesion, under the crust of an epidermal collarette, or tissue biopsy. The lesion should not be scrubbed before sampling. Draining tracts should not be directly sampled. Sterile technique should be used, avoiding contamination from skin or hair near the lesion. The collected material should be placed in a sterile culture container and sealed for shipping to the laboratory.