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Are hoof disorders dermatological not orthopaedic challenges?

Derek C Knottenbelt
Philip Leverhulme Equine Hospital, University of Liverpool, Leahurst, Neston, Wirral UK CH64 7TE knotty@liv.ac.uk

The hoof and its components can be regarded as special appendages of the skin; it is easy to view the 'foot' as an "orthopaedic" structure but it is much more related to the skin than to the bones. The complexity of the foot and its relationship to "lameness" has meant that many of the conditions that are characteristic of the hoof capsule, the frog and the coronary band have been belittled and remain largely misunderstood.

Various conditions caused by environment, injury, neglect or poor farriery practices may cause changes to the wall, sole, frog and/or coronary band tissues. These changes may also be related to physical, infectious, neoplastic or genetic factors. It is difficult to categorize the various conditions as they often co-exist and many have a common aetiology. The hoof capsule and solar tissues can reflect metabolic changes and changes occurring within the foot itself or can reflect metabolic and nutritional changes in the horse itself. It is therefore important even in the normal clinical examination to examine the foot closely.

The foot should always be examined methodically after careful (attentive) cleaning and preparing the hoof itself. It is helpful to pay great attention to the process of cleaning since in some cases there are significant changes that can be removed prior to examination. The sole should be palpated using digital pressure and hoof testers, starting at the toe and working laterally and medially. Pressure can be applied to the frog and across the heels from frog to wall. Squeezing gently across the heels (medial and lateral) from the back of the foot applies pressure to the plantar/palmar structures. The wall should be palpated carefully and its temperature assessed in comparison with the contra-lateral limb. Gentle tapping with a small round hammer is a good test of wall pain, particularly over shoe nails which might be causing problems. Evidence of bruising, haemorrhage or abnormal tissues (both in appearance and texture) in the sole wall or frog should be noted. The white line should be carefully examined for breadth, normality of horn tubules and bruising/haemorrhage.

It is important to examine the ergots and chestnuts whenever a hoof capsule pathology is identified. In some important conditions e.g. pemphigus foliaceus and eosinophilic epitheliotropic disease these are also commonly affected. These structures may also provide a reliable, safe option for diagnostic specimens and biopsy in particular.

From a diagnostic perspective hoof and coronary band disease are major challenges since little research has been carried out and few treatments have been properly tested. The hoof wall is hard to sample and treatments are always going to be slow and very difficult by virtue of the nature of the tissues. Even biopsy of the coronary band carries risks of a permanent hoof wall deficit and so there is general reluctance to get involved. This means that treatments become empirical and often irrational.

The "dermatologic" foot disorders can be divided anatomically (see figure 1). Within those categories infections are common and non-infectious diseases include traumatic injuries, immune mediated disorders and tumours (see Figure 1).
Nutritional toxicity can cause serious problems with the production of horn; the best example is selenium toxicity. This can arise in special circumstances where seleniferous plants are a major part of pastures or more commonly as result of irrational use of dietary supplements. The effects are devastating and the mane and tail hair is also affected whilst the body hair coat is much affected. There may be a devastating slipping and sloughing of some or all of the hooves. Lesser toxicity produces abnormal hoof growth with prominent rings and evidence of laminitis.

The quality of the hoof wall varies and many genetic lines have poor hoof or solar structure and thickness. This is often not appreciated but since the conditions are heritable and genetic, they cannot usually be cured – management is the best that can be hoped for. This might involve the use of “glue-on” shoes, protective boots and even reconstructive farriery or surgery or both.

Figure 1: The various structures that comprise the hoof have different disorders and different causes but there are some common features and some common diseases. Most of the conditions shown above are genuine dermatologic problems and many have similar conditions affecting other areas of skin and so diagnostic and therapeutic lessons can be learnt from those.
Coronary Band Dystrophy particularly (but by no means exclusively) affects the heavy breeds of horses; the genetic basis mean that treatment is palliative and long term. The ergots and chestnuts can also be affected and a diagnosis can usually be made clinically. Biopsy is difficult and the pathology is by no means pathognomonic (Menzies-Gow et al., 2002). New treatments include retinoids such as tazarotene.

Inflammation of the coronary band - "coronitis" - is a common clinical presentation. The immune-mediated coronitis complex is common and a source of continued frustration to veterinarians. Autoimmune coronary band pathology can exist on its own or with ergot and chestnut changes or perhaps more commonly, as part of a generalised pemphigus condition. Biopsy which can be collected more safely from over the heel bulbs can be helpful but pathognomonic changes (acanthocytes and clefting etc.) are not obvious. Systemic steroids can bring an improvement and can often hold the disease in remission.

Necrotising pododermatitis (Canker and Thrush) are well recognised clinical conditions that are encountered with some regularity on equine practice. Their diagnosis usually presents little difficulty but the treatment is another matter entirely. Thrush is a particular form of hoof necrosis that is largely restricted to the clefts and central sulcus of the frog and is most commonly associated with poor management practices. Canker is a chronic, debilitating hyperplastic, exudative pododermatitis mainly of draft horses affecting the hoof wall, sole or frog of one or more feet. Thrush is easily managed but canker is far more of a problem.

Tumours of the hoof wall and the other structures are relatively common. Several benign tumours occur including the well-recognised keratoma, solar fibroma and the sub-dermal coronary fibroma or larger breeds and of course the sarcoi.d. Management and prognosis follow basic principles of cutaneous tumours. Treatment is similar but complicated by the nature of the hoof wall itself. Far too little research has been dedicated to study of the foot as a dermatologic structure. There are still some very common and many less common affections that have no answers either in terms of pathogenesis or treatment. The hoof and sole as a clinical region has probably fallen into a crevasse between the farriers and the orthopaedic clinicians.

FURTHER READING:
Knottenbelt DC; 2009 Pascoe's Principles and Practice of Equine Dermatology. Saunders, Oxford
Scott DW & Millar WT 2003 Equine Dermatology. Saunders Philadelphia
Stashak TS & Theoret C 2009 Equine Wound Management. Wiley Blackwell;