

Nonseptic Pedal Osteitis: A Cause of Lameness and a Diagnosis?

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Pedal osteitis is a radiographic description of structural changes at the solar margin of the distal phalanx rather than a proven disease and cause of lameness. Little is known about the pathophysiologic mechanisms that cause the associated radiographic changes, and it is difficult to regard pedal osteitis as a primary disease. The radiographic changes leading to this descriptive designation have a variety of causes; thus, pedal osteitis is often an inappropriate definitive diagnosis by itself. This presentation describes the radiographic findings and causes and proposes more appropriate terminology. Authors' addresses: Dept. of Large Animal Medicine & Surgery, College of Veterinary Medicine, Texas A&M University, College Station, TX 77843 (Moyer and Walker); Dept. of Surgical and Radiological Sciences, College of Veterinary Medicine, University of California at Davis, CA 95616 (O'Brien). © 1999 AAEP.

1. Introduction

Pedal osteitis is defined as demineralization of the solar margin of the distal phalanx as a result of inflammation.¹ The term "*pedal osteitis*" has been utilized in the description of lame horses for many years,¹⁻⁸ but it remains a nebulous concept and problem for the equine practitioner and horse owner. The term itself is probably a misnomer and unfortunately is used to describe a variety of known insults that create radiographic changes in the distal phalanx. The term "osteitis" means inflammation of bone, and it is correct to term an infection of the distal phalanx as "septic pedal osteitis." It has not been documented that a true nonseptic *pedal osteitis* exists. A more likely scenario is that bone resorption and vascular channel changes take place as a result of neighboring hyperemia and/or focal pressure. The sources of hyperemia and/or pressure are

many and potentially could involve any insult that can occur to the feet. Yet this diagnosis continues to be utilized and has been a source of controversy with regard to prepurchase examinations, selection of treatment, and prognosis. It is also important to note that the radiographic changes tend to be permanent, and may represent a problem that occurred in the past and have limited relevancy to soundness. Therefore, it is important to the examining clinician to carefully evaluate the patient's history, the appearance of the foot (feet) and shoeing, and all evidence and potential sources of foot pain.^{1,2}

2. Description of Radiographic Changes

Focal or generalized demineralization of the solar margin of the distal phalanx and widening of the vascular channels result in radiographic loss of the normally smooth contour. Irregularities can occur

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on any portion of the solar margin. Such loss may be demonstrated with any view of the distal phalanx but is best on a properly exposed dorsal, 65 degree, proximal–palmarodistal oblique view. The shape of the distal phalanx is such that the solar margin has a rather sharp and thin edge; therefore, an overexposed radiograph makes visualization difficult. Perhaps the most common problem encountered is that of making only one dorsal 65 degree proximal–palmarodistal oblique radiograph for visualizing the navicular bone overexposing the solar margin of the distal phalanx. The lateral view may show remodeling of the toe of the distal phalanx (new bone growth or mineralization of the dermal laminae), or loss of opacity at the bearing surface creating a slight upward curvature. The palmar process (wings) of the distal phalanx may show discrete focal radiolucencies and/or new bone growth. It should also be noted that a large degree of variability in the radiographic appearance of the solar margin exists (border, and number and size of the vascular channels) in normal horses.⁴ Walker et al demonstrated diffuse new bone growth on the dorsal, distal aspect of the distal phalanx and bony solar margin loss in the toe region of historically and apparently normal mammoth donkeys.⁵

3. Causes

It appears that any associated focal/diffuse hyperemia and/or pressure creating phenomenon is capable of producing bony loss of the solar margin of the distal phalanx. Pool⁶ indicated that the histopathologic changes with regard to pedal osteitis are a solar variant of laminitis affecting epidermal and corial laminae of the distal wall and sole primarily in the toe and wing regions. Thus, the ultimate appearance is “laminitis-like” in origin. The list of known disorders creating such an appearance without bony sepsis includes the following^{1,2}:

- a. Laminitis may result in loss of bone at the distal phalangeal margin.
- b. Focal or generalized submural/solar infections without actual primary bony sepsis are common occurrences and may result in focal, marginal demineralization.
- c. Focal loss of the bony contour at the solar margin is a common sequella with type VI distal phalangeal fractures (solar margin fractures). It has also been suggested that such fractures may be a sequela to *pedal osteitis*.⁸
- d. Club-footed horses will often demonstrate focal loss of bone at the solar margin in the toe region.
- e. Keratomas can create focal loss of bone if they exist at the solar margin. (Usually the appearance of a keratoma created defect is more discrete and sharply marginated in appearance).
- f. Severe or chronic focal or generalized subsolar bruising.²
- g. Unknown origin in mammoth donkeys.⁵

4. Clinical Signs, Treatment, and Prognosis

Clinical signs vary with cause or causes, the degree of involvement, and whether or not the initiating insult is active. It is difficult if not impossible to know the origin and the duration of so-called *pedal osteitis*. Treatment and prognosis can only be determined by knowing the potential cause or causes. Radiographic observation of such lesions in apparently normal horses should obligate the examiner to a more detailed examination of the feet (hoof testers and other means) and, if possible, the accumulation of a detailed history. It is possible that the radiographic changes noted are the result of a problem that occurred years ago and may not have importance with regard to future athletic pursuits. However, it is important that this radiographic finding be recorded and reported. The finding should be discussed in view of the entire physical examination of the horse.

5. Summary and Suggestions

Due to the fact that the term *pedal osteitis* is a descriptive term rather than a definitive diagnosis, it seems appropriate that the term either disappear from the list of diseases experienced by horses or be modified to more accurately describe the problem. The inherent problem in using this term is that it implies the presence of a known disease, which indicates to the public some knowledge exists as to how best to deal with the problem as well as predict its future relevance. Since clearly this is not the case, the authors suggest that such changes be described in the future as “focal or generalized loss of solar bone margins and widening of the vascular channels as a result of a ‘known’ or ‘unknown’ cause.”

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