Caries of Peripheral Cementum

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The formation of enamel, dentine and cementum involves the initial secretion of an organic matrix by ameloblasts, odontoblasts and cementoblasts respectively. This matrix is subsequently 'loaded' with mineral - principally calcium hydroxyapatite (Ten Cate 1998). When peripheral cementum is still lying sub-gingivally (alveolar crown or gingival crown) (Mitchell 2004), it is nourished by the periodontium. Following its eruption as clinical crown, this vascular supply is lost, and peripheral cementum may then be considered to be an inert tissue (Mitchell 2004). This makes peripheral cementum prone to irreparable damage through physical trauma (including abrasion, attrition and fracture) and caries.

Caries is defined as a disease of the calcified dental tissues resulting from the action of microorganisms on carbohydrates within the oral cavity, and is characterised by both demineralisation of the inorganic part, and subsequent destruction of the organic part of the tooth (Shafer et al. 1983). It is a complex and dynamic physiochemical process involving the movements of ions across the dental-oral cavity interface, as well as many biological processes between bacteria and host defense mechanisms (Soames & Southam 1993). The generally accepted aetiology of caries has remained largely unchanged since first postulated by Miller (1891). Miller's acidogenic theory proposed that acid, resulting from the fermentation of dietary carbohydrates by oral bacteria, leads to progressive decalcification of tooth substance with subsequent destruction of the organic matrix.

Baker (1979) demonstrated the presence of plaque on equine teeth using a disclosing dye, and showed the principle areas of plaque formation to be at the gingival margin and interdental space in normal teeth, and occlusally in unopposed teeth. There has been little work since on the possible role of plaque in equine dental pathology. In his thesis, Baker states "the most common (equine dental) pathological conditions were periodontal disease and caries of cementum" Early studies reported incidences of **infundibular caries** to be as high as 79-100% in certain ages of equine populations (Baker 1970; Honma et al. 1962).

To date, the pathological significance of peripheral cemental caries in many horses is unknown (Dacre 2004). Peripheral cemental caries most commonly affects the caudal cheek teeth (Fig 1). Because of the difficulty in closely examining the caudal cheek teeth, this disorder can readily be missed in these teeth. By weakening and removing occlusal cementum that contributes considerably to equine cheek teeth clinical crown structure (notably mandibular cheek teeth) (Mitchell 2004), it may increase the rate of occlusal wear, or even to the development of diastema or periodontal disease. Removal of peripheral cementum also makes proud areas of brittle enamel on the occlusal surface more prone to fracture.

Figure 1: Peripheral cemental caries of the buccal aspect of 309-311, with gingivitis of affected areas. A wide diastema is also present between 310-311, with a deep interproximal periodontal pocket. The occlusal angle of these teeth is high, possibly due reduced mastication of the left jaw caused by periodontal pain.

This presentation will outline some clinical cases of peripheral cemental caries, both in individual horses and in groups of horses and will demonstrate the main pathological features of this disorder. The possible aetiology of this ever more frequently recognised pathological condition will also be considered, including intercurrent dental disorders causing restricted oral food movement and even food stagnation, and dietary considerations such as feeding diets with a high readily fermentable carbohydrate content or low pH feedstuffs.

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