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Investigation and management of equine cheek teeth apical infections

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Apical infection is a more accurate term to use in equids than “tooth root infection” as these infections often develop in young horses prior to any true root development, but they can also occur in older cheek teeth with well developed roots. These infections are usually an extension of pulpar disease through the apical foramen into the peri-apical (apical) periodontal tissues. Apical infections of incisor or canine teeth are rare in horses, but apical infections of cheek teeth are relatively common. Cheek teeth (CT) apical infections are particularly clinically significant in horses because of the length of the reserve crowns of affected cheek teeth, that usually have intact periodontal membranes that does not allow the exudate to readily discharge into the oral cavity. Consequently the infections usually spread around the apex, causing clinical changes to the alveoli and supporting bones.

Clinical signs
The clinical signs caused by CT apical infections depend on the site and age of the infected tooth, and the duration and the extent of the infection. When the rostral 2-3 maxillary CT are infected, rostral maxillary swellings and sinus tracts occur in most horses, with sinus tracts developing into the nasal cavity (causing nasal discharge) less commonly occurring. Maxillary sinusitis (with purulent nasal discharge) is the main sequel when the caudal 3-4 maxillary cheek teeth are infected. Mandibular swellings and external sinus tracts commonly occur with mandibular cheek teeth infections in younger horses. With older teeth, an apical infection may fully drain via the periodontal membranes into the oral cavity and such case may just have halitosis as their only clinical sign.

With apical infection and death of the pulp, no more sub-occlusal secondary dentine can be deposited and therefore with time, the existing sub-occlusal secondary dentine becomes worn away. Consequently, the occlusal pulpar exposure present in apically infected cheek teeth is almost certainly a sequel to pulpar damage. The most commonly recognized cause of equine CT apical infection is anachoretic infection, i.e. blood or lymphatic borne bacterial infection. Vertical impactions and hyperaemia of the developing apex can result in large eruption cysts in younger horses (“3 and 4 year old bumps”) that in turn may predispose to anachoretic infections and this may explain the high prevalence of CT apical infections in younger horses.

Dental fractures are the second most common cause (20%) of apical cheek teeth infection and these fractures include gross, usually sagittal (so called “idiopathic) fractures and occasionally also hairline (fissure) fractures that communicate between the pulp and tooth periphery. Clinically significant fissure fractures usually have dark staining (by bacterial or food pigments) on cut sections of extracted teeth. However, these fissure fractures are not clinically obvious on the clinical crown, unless the operator uses an oral endoscope or dental mirror and has been trained to recognize them. Not all idiopathic fractures (e.g. lateral slab fractures through the lateral pulp horns) cause apical infections as some such pulps can manage to seal off the exposed pulp laying down a layer of tertiary dentine to prevent infection spreading down the pulp horn.
Extension of infundibular caries to adjacent pulps is a specific disorder of maxillary cheek teeth only, that can cause apical infections. Infundibular cemental hypoplasia (especially of the 09s) with subsequent food impaction in the cemental defect predisposes to the development of infundibular cemental caries. This caries may cause apical infections; either by weakening the tooth resulting in midline sagittal fractures; or by extension of the caries through the infundibular enamel into dentine and then pulp.

Apical infections can also occur secondary to developmental dental disorders (polyodontia, dental dysplasia, hypoplasia, diastemata and displacements), usually by an apical extension of deep periodontal disease. As noted, focal tracts of periodontal disease can also be secondary to apical infections, especially in older cheek teeth where exudate from the infected apex drains into the oral cavity via periodontal tracts – and thus avoids disease of the supporting bones (e.g. facial swellings or sinusitis).

Diagnosis of apical infection largely depends on clinical examination of the suspect tooth and radiography and may often be difficult. Scintigraphy and computed tomography are useful techniques in such cases. Treatment of apical infection is usually by dental extraction, but some early cases may respond to prolonged antibiotic therapy. Oral extraction of infected teeth under standing sedation is the technique of choice, avoiding the costs and risks of general anaesthesia and having less post-operative complications than repulsion or Buccotomy.

Treatment
Extraction of the long crowned (hypsdont) equine CT is a major surgical procedure with many possible immediate and delayed sequel and consequently, this procedure should never be undertaken lightly. The traditional method for extracting equine CT has been by repulsion of the diseased tooth under general anaesthesia. This procedure carries all of the inherent expense and risks of general anaesthesia in the horse and additionally is associated with a high level of postoperative complications. Complications most commonly occur following repulsion of apical infected CT from younger horses because much damage occurs to the alveolar and supporting mandibular or maxillary bones during the repulsion. Some studies have shown that more than 50% of cases of equine dental repulsion will require a second surgery, usually to curette dental fragments or alveolar sequestrae from non-healing alveoli.

Oral extraction of teeth has the great advantage of being performed in the standing horse and thus removes the expense and risk of general anaesthesia. Additionally it does not require surgery of the supporting bones and consequently, post-operative complications are relatively rare. The current availability of safe and effective sedatives and analgesics has been a major reason for the revival of the oral extraction technique, because the instrumentation has remained unchanged for almost a century.

If an external sinus tract is present, the bone at base of the tract can be gently curetted and will usually spontaneously heal within the few days. If extensive bony changes are present deep in the sinus tract, it may be advisable to seal off the oral aspect of the alveolus with dental wax and to irrigate the sinus tract with dilute iodine for couple of days.