

Canine Teeth in the Equine Patient - The Guide to Eruption, Extraction, Reduction and Other Things You Need to Know

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EQUINE CANINE TEETH Normal and Pathologic Conditions

Take Home Message

Equine Dentistry is an emerging specialty of equine practice. There exists no formal standard of practice for many of the commonly performed dental procedures in horses. This paper describes one area of the horse's mouth that requires more core knowledge, diligence and care than has been afforded to the horse in previous years by the general equine practitioner.

Introduction

Much discussion has taken place recently regarding equine periodontal disease and other diseases of the equine oral cavity. However, there exists one type of tooth in Equidae that enjoys little discussion while at the same time is regularly encountered in practice. There is much to know regarding this tooth and some of this information can be found in contemporary published literature such as Baker and Easley's *Equine Dentistry*, Wiggs and Lobprise's *Veterinary Dentistry*, *The Journal of Veterinary Dentistry* and Allen's *Manual of Equine Dentistry*. The objective of this paper is to give the reader one quick source for basic information concerning the eruption, extraction, manipulation of and problems relating to equine canine teeth.

The Canine Teeth

The canine teeth (004) are specialized for fighting in male Equidae. They erupt when the horse is four to six years old and may be the cause of considerable pain during eruption. They are the most brachydont-like teeth in the horse and are spade shaped with a convex bump on the lingual side. The conical dentin structure of the tooth is simple and covered with enamel unlike the incisors or cheek teeth which have infoldings of enamel and infundibula in the maxillary occlusal surfaces. Approximately 28% of females have rudimentary canine teeth which may be impacted ("blind"), unerupted, barely erupted or frequently mesially displaced¹ (Fig. 1). The deciduous canines do not usually erupt but sometimes can be palpated as soft tissue bumps on the bars of the mouth of juvenile horses. Those that erupt are replaced by a permanent canine. Perhaps it is because of the lack of a robust deciduous precursor that pain is common during eruption. The deciduous tooth in other types of teeth aids in the formation of an "eruption tunnel" for the active

eruption process of the permanent dentition. Without this tunnel, the erupting canine has to move coronally through the bone and soft tissue unaided.⁷ Painful eruption sites may be incised in a cruciate pattern after local infiltration of anesthetic to assist in this process.



Figure 1: Soft tissue mass over blind canine and female rudimentary canine. Photo by Lynn Caldwell, DVM.

The canines do not occlude and the mandibular pair is mesially situated to the maxillary pair similar to the position of the canines of small carnivores such as dogs and cats. The canine develops in the maxillary processes unlike the incisors, which develop in the incisive bone. It has been said that equine canine teeth do not continually erupt, however, it is my experience that they do continue to erupt to a small degree in young to middle-aged horses, eruption ceasing at the time of apical closure which occurs at approximately ten years of age.

Equine canine teeth are long and like an iceberg, only ten to twenty percent of their crown may be erupted. The apex is very long and deeply situated in the mandible and maxilla. In the dog, the canines extend to the mesial root of the second premolar.² The equine mandibular canine extends its apex 5 to 7 centimeters distally past the erupted crown of the tooth into the interdental space almost to the second premolar, making removal of this tooth a surgical procedure in most cases. The maxillary canines tend to have an “L” shape (Fig. 2).



Figure 2: Length of mandibular canines visible below approximate level of gingiva (red lines) and radiograph of canines showing “L” shape of maxillary pair. Note the level of the pulp chamber in the 104 in this 9 year old. Photo & radiographs by Lynn Caldwell, DVM.

The pulp cavity of the equine canine tooth is large, especially in young horses, with the pulp chamber lying within *five millimeters* of the terminal cusp of the tooth. An overzealous reduction of the crown in young animals is contraindicated due to the danger of direct or indirect pulp exposure. Unlike in the dog, where any loss of enamel crown of the canine tooth is a threat to tooth viability, equine canine teeth seem to be forgiving of crown reduction that exposes dentin. The apex of the canine tooth in a young horse is open (Fig. 3).



Figure 3: Open apex of 7 year old. Photos by Lynn Caldwell, DVM.

The crown of the equine canine tooth is frequently cut and buffed (“odontoplasty”) to “disarm” the male of the species. Odontoplasty of this tooth is also frequently performed to remove some of the obstruction in the interdental space where the bit lays and to prevent the severe calculus buildup that some canines develop (Fig. 4).

Additionally, reduction of the canines facilitates ease of routine full mouth “occlusal equilibration” (OE) and minimizes trauma to the dentist. Great debate exists as to how much canine to actually remove. Overzealous reduction of these teeth to the level of the gingiva may result in pulp exposure and necrosis or the development of “blind” canines. Reduction of crown to the gingiva should be considered a “crown amputation” and is contraindicated for reasons stated (Fig. 5).



Figure 4: Calculus on adult 404.



Figure 5. Canines that have had their crowns amputated to the gingival margin.
Photo by Lynn Caldwell, DVM.

I recommend reducing the canines in a *mature male horse* to about the level of the occlusal surface of the corner incisor or just below. Few horses are in danger of pulpal exposure at this level and should the canines be required for future orthodontic procedures such as fracture repair, they will be long enough to serve as anchor points if needed (Fig. 6). A fluoride dentinal sclerosing agent can be used to occlude exposed dentinal tubules^a and the operator should be prepared to perform a direct pulp cap if the pulp is accidentally exposed.^{3,4}

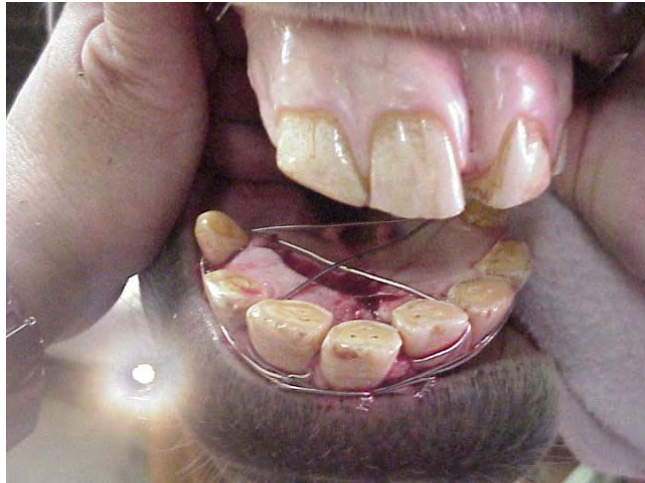


Figure 6: Example of canines used for fracture fixation. *Photo by Lynn Caldwell, DVM.*

Technique

The technique used for reduction (odontoplasty) of the equine canine tooth is pictorially illustrated in figures 7 through 11.



Figure 7: Normal adult male canine crown height. *Photo by Lynn Caldwell, DVM.*

The first cut is made to approximate the desired crown height using a diamond wheel^b (Figs. 8 and 9). Canine nippers, an instrument resembling small hoof nippers, used to be the most commonly used instrument for reducing the canine crown but the danger of causing crown fracture and pulpal exposure with this instrument was high and its use is no longer recommended.



Figure 8: Level of crown reduction is chosen and first cut is made with a diamond wheel. Care is taken to avoid overheating the tooth during the odontoplasty procedure. *Photo by Lynn Caldwell, DVM.*



Figure 9: Upper and lower canines cut to desired length with diamond wheel fitted with a vacuum system. Alternatively or additionally, a cooling stream of water may be run over the tooth during crown reduction. *Photo by Lynn Caldwell, DVM.*

After reducing the crown, the tooth is buffed with a diamond burr to smooth its edges (Figs. 10 and 11).



Figure 10: Cut canines buffed with diamond burr. *Photo by Lynn Caldwell, DVM.*



Figure 11: Mesial edge of canine tooth is the most difficult area to successfully smooth especially when the tooth is located close to the corner incisor. *Photo by Lynn Caldwell, DVM.*

Restoration and endodontic therapy of canines is occasionally required. Root canal obturation^{4,5} or vital pulpotomy (Fig. 12) may be necessary to avoid surgical extraction and to provide comfort for the horse.

Misplaced or malformed canine teeth often develop periodontal disease. Those that are affected by severe periodontal disease or develop deep periodontal pockets that endanger an adjacent tooth should be extracted (Fig. 13).



Figure 12: Vital pulpotomy of 104 and composite restoration for pulpal exposure.
Photo by Lynn Caldwell, DVM.



Figure 13. Mesially displaced and rotated mandibular canine with a deep periodontal pocket impinging on the 303. *Photo by Lynn Caldwell, DVM.*

Due to the great length of the unexposed crown of the canine, surgical extraction is necessary when the tooth must be removed⁶. Surgical extraction requires creation of a gingival flap and removal of buccal alveolar bone (Fig. 14). The surgical site is then closed primarily (Fig. 15).



Figure 14: Surgical canine extraction.
Photo by Lynn Caldwell, DVM.



Figure 15: (left) Canine extracted and (right) flap sutured in place with impression material protecting the suture line. *Photos by Lynn Caldwell, DVM.*

Cutting and buffing the canines is an integral part of the occlusal equilibration procedure for several reasons: 1) disarming the horse of his dental weapons, 2) prevention of entrapment of the tongue between the bit and the canine, 3) prevention of traumatization of canines especially in stall bound horses (Fig. 16) and 4) for safety reasons concerning the dentist.¹ Additional reasons to reduce canines include periodontal disease and calculus formation. Knowledge of dental anatomy is required to avoid unintentional pulp exposure and a familiarity with emergency endodontic procedures is recommended. During odontoplasty of the canine, care must be taken to avoid overheating the tooth during crown reduction so that the tooth does not suffer from pulpitis. Pulpitis may result in the tooth becoming non vital, necessitating that it be extracted or receive endodontic therapy. It is my opinion that the canine tooth in Equids is very resilient to crown manipulation especially if knowledge of the endodontic anatomy and respect for the physiology of the tooth is applied when performing odontoplastic procedures.



Figure 16: (left) Old crown fracture injury with (right) luxation. Tertiary dentin is visible covering the vital pulp. Radiographically, this tooth was viable and its periodontium healthy. Photos by Lynn Caldwell, DVM.



Figure 17: Appropriately cut and buffed canines. Photo by Lynn Caldwell, DVM.

Conclusion

Despite the fact that the equine canine tooth is a non occlusal tooth, its periodontic and endodontic health should be evaluated during routine dental procedures such as occlusal equilibration. Crown reduction should be performed to minimize its usefulness as a fighting weapon and to reduce its potential to interfere with the bit. Reduction of crown height of the canine also seems to reduce its tendency to become traumatized and accumulate calculus thereby maintaining better oral health by prevention of endodontic and periodontal disease.

References and Footnotes

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^a Colgate® Gel-Kam® Dentin Bloc® Colgate Oral Pharmaceuticals. Canton, MA 02021.

^b Diamond Cut-Off Blade in short GTU Handpiece unit. Carbide Products. 800-64-blade.