

# How to Perform Oral Extraction of Equine Cheek Teeth

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Oral extraction of equine teeth is a useful technique that will allow veterinarians to remove affected teeth in standing animals, thereby avoiding the risks associated with general anesthesia and repulsion techniques. For these procedures to be performed successfully, practitioners must use proper equipment, select cases well, and allocate sufficient time for the procedure. Author's address: The University of Georgia, College of Veterinary Medicine, Dept. of Large Animal Medicine, Field Service Unit, Athens, GA 30602-7385. © 1999 AAEP.

## 1. Introduction

Within the past decade, there has been renewed interest in equine dentistry and various equine dental procedures.<sup>1</sup> One such procedure is oral extraction of diseased equine teeth. Although this procedure has distinct advantages over other methods used to remove diseased teeth, it also has its limitations. The purpose of this report is to acquaint equine practitioners with the tools and procedures and management of horses presented for oral cheek teeth extraction.

## 2. Indications

Indications for oral extraction of equine teeth include diseased, fractured, and loose teeth; retained deciduous incisors and premolars; and sinusitis caused by diseased teeth.<sup>2</sup> Advantages of the oral

extraction technique include avoidance of general anesthesia and its potential complications and better cosmetic results. These advantages are especially evident when multiple teeth are extracted.<sup>3</sup> Potential disadvantages associated with the procedure include the potential for fracturing the diseased tooth, inability to remove the affected tooth and laceration or bruising of the oral cavity. Loosening of adjacent teeth can occur with any extraction/repulsion method. Factors that must be taken into account before oral extraction is performed include the horse's age, tooth location and the amount and condition of exposed tooth crown.<sup>2</sup> Oral extraction in younger horses involves mainly removal of retained deciduous teeth (caps). Location of the tooth is a factor when a diseased tooth is located in the caudal part of the dental arcade because less space is available to perform the procedure. Teeth with little or no crown or teeth fractured longitudinally may have insufficient surface area available for contact with the molar forceps, thus making manipu-

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## NOTES

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lation and extraction of the tooth more difficult or impossible.

### 3. Methods

#### A. Masticatory Examination

Radiology is one of the most useful diagnostic aids for identifying and monitoring diseased cheek teeth.<sup>4-10</sup> All standard views (lateral, obliques and dorsal-ventral) should be taken to identify affected teeth. Satisfactory radiographs of the skull can be taken with a portable radiograph machine in most cases. To augment the radiographic procedures, the horse can be sedated and the head allowed to rest on a stable surface (portable stool or table) to reduce head motion.

To assist in identification of an affected tooth, it may be advantageous to insert a metal probe or inject contrast material into a draining tract and then obtain a radiograph of the area.<sup>11</sup> Indications for radiology include suspected eruption abnormalities, impacted premolars, fractures of teeth or the skull, draining tracts, painful areas in and around the mouth, abscesses, aberrant teeth, foreign objects, abnormal behavior (bitting, riding or head carriage problems) and missing, malaligned or supernumerary teeth.

Although scintigraphy (nuclear imaging) is not available in most practices, it is becoming more accessible and may allow detection of disease processes that otherwise might go undetected.<sup>12</sup> Although scintigraphic images have less resolution than radiographs, the specificity for identification of certain disease processes (e.g., early bone remodeling) is greater.<sup>11,12</sup>

#### B. Oral Extraction of Deciduous Cheek Teeth

Retained deciduous premolars (caps) are often detected after the owner notices abnormal eating habits, head carriage, facial swelling or blood in the mouth. The last finding may be caused by buccal or tongue lacerations from the root spicules of the deciduous tooth. A medium-sized (16-in) pair of molar forceps should be used to grasp the retained deciduous premolar and rotate it in a lateral-to-medial direction (buccal to lingual).<sup>13</sup> Minimal force should be used to extract the retained tooth. In some cases, the tooth caudal to the retained deciduous tooth might impede shedding of the deciduous tooth, and strong force will be needed to remove the deciduous tooth. Alternatively, the deciduous tooth may be displaced to one side and attached securely to the permanent tooth. This also requires application of more force than normal. When extracting a deciduous tooth, the occlusal surface should be rotated toward the buccal side of the mouth to keep the sharp points of the deciduous tooth from lacerating the cheek. Excessive force is rarely indicated; if it becomes necessary to use excessive force, the situation should be reevaluated.

#### C. Extraction of Permanent Premolars and Molars

The gingiva on both the buccal and lingual sides of the cheek tooth to be extracted must be elevated to allow removal of the tooth with less force (Fig. 1). A dental pick is placed on one side of the affected tooth just below the gum line and slid slowly along the edge of the tooth. As the gingiva elevates from the tooth, the dental pick should be inserted to a greater depth. Caution must be exercised to avoid pushing the point of the dental pick through the gingiva. Next, a flat-sided dental pick can be used to elevate the gingiva further to the level of the adjacent bone. The process should be repeated on the opposite side of the tooth.

Molar spreaders are used to loosen the affected tooth in caudal-to-rostral and rostral-to-caudal directions (Fig. 2). The spreader is positioned on either the caudal or rostral interdental surface of the affected tooth. Initially the molar spreader will not close completely because of the tight interdental space. The molar spreader should be closed as much as possible without undue pressure on the instrument. Once the molar spreader is closed sufficiently, an elastic strap can be wrapped around the handles to maintain the spreader in this position. The strap also helps prevent fatigue of the practitioner's hands. The molar spreaders should be left in place for 1 to 3 minutes, released and moved to the opposite end of the tooth. The process is repeated several times until the molar spreader can be closed sufficiently in the interdental space to loosen the tooth. It appears that slow, steady pressure breaks down the periodontal ligament attachment more successfully than quick, forceful pressure.

Molar forceps are then used to loosen the tooth in the buccal to lingual direction (Fig. 3). The forceps should be placed on the crown of the affected tooth but not positioned deep enough to contact the bony part of the alveolus. Once the forceps are securely in place, a strap should be wrapped around the handles of the molar forceps in the same manner as used on the molar spreader. The molar forceps are moved slowly in a buccal-to-lingual direction to loosen the tooth further. This step should be done carefully to prevent fracturing the distal aspect of the tooth root. Again, slow, steady pressure in one direction is better than quick, forceful rotations. The handles of the molar forceps should not be torqued because this increases the chances of fracturing the tooth root or reserve crown. Fracturing of the tooth root or reserve tooth crown might terminate the procedure, depending on the fracture location and tooth attachment.

The hemorrhage that occurs as the tooth becomes loose facilitates breaking down of the periodontal ligament and subsequent extraction of the tooth. It is necessary to alternate the loosening process between the molar spreader and forceps to loosen the tooth within the alveolus. The entire process should take approximately 45 to 60 minutes, depending on tooth root length and the status of the affected tooth.

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Fig. 1. Dental pick elevating the gingiva away from the affected tooth.

Only after the affected tooth is sufficiently loose (the tooth will move freely within the bony alveolus and often make a squishing sound) should extraction be attempted.

The tooth is extracted using the molar forceps and a molar fulcrum (Fig. 4). The molar forceps should fit securely around the affected tooth to reduce the chance of fracturing the tooth crown. The molar fulcrum should be positioned as close to the head of the molar forceps as possible. This will provide the greatest amount of leverage and aid in the extraction process. Slow, steady pressure should be applied to the distal end of the molar forceps' handles with no rotation or torque. The tooth should move slowly out of the alveolus. If this does not occur, the tooth is not loose enough, and the molar forceps-spreader process should be repeated until the tooth can be extracted easily.

The use of molar cutters in oral extraction procedures is limited to cutting a tooth (most often in the caudal part of the arcade) that is partially extracted when there is inadequate room for continued extraction. Once the tooth has been cut, the molar ful-

crum and forceps are placed back on the remaining tooth, and the extraction process continued.

After the tooth has been removed, the alveolar socket should be packed initially with eprinprhine-soaked gauze sponges to control hemorrhaging. Once hemorrhaging is controlled, the alveolar socket is packed with a mixture of liquid methylmethacrylate and resin powder<sup>a</sup> or hydrophilic vinyl polysiloxane<sup>b</sup> impression material to fill the top one fourth of the socket and extend above the gingiva (Fig. 5). Deep packing the alveolus will cause the dental packing to be pushed out too soon by the granulation tissue, thereby creating a large pocket that may accumulate feed material (Fig. 6). The hardened material must not extend to the occlusal surface of the tooth, or it will be removed prematurely as the horse eats. Additionally, if the patch is not bridged between the adjacent teeth it will loosen before sufficient granulation tissue has formed and fall out (Fig. 7). Alternatively, roll gauze can be used to pack the alveolus. The gauze must be replaced daily for 7–10 days as the alveolus fills with granulation tissue.

Depending on the status of the diseased tooth and secondary infection of an overlying sinus (sinusitis), lavage of the sinus might be indicated before placement of the packing material. A Steinmann pin is used to make a hole into the bone overlying the affected sinus. A drip set is then connected to a 1-l bag, and the needle adaptor end is removed. The free end of the tubing is fenestrated for approximately 3 inches. The tubing is passed through the Steinmann pinhole just past the fenestrations into the sinus and secured to the horse's head. The rest of the tubing is then passed over the poll and down the horse's neck. The tubing can be taped to the horse's mane with the fluid bag located near the animal's withers. This allows the sinus to be irrigated using a 1-l bag, and the empty bag may be left attached to the drip set until the next treatment. The alveolus should be patched after the initial flushing. The infected sinuses should be flushed

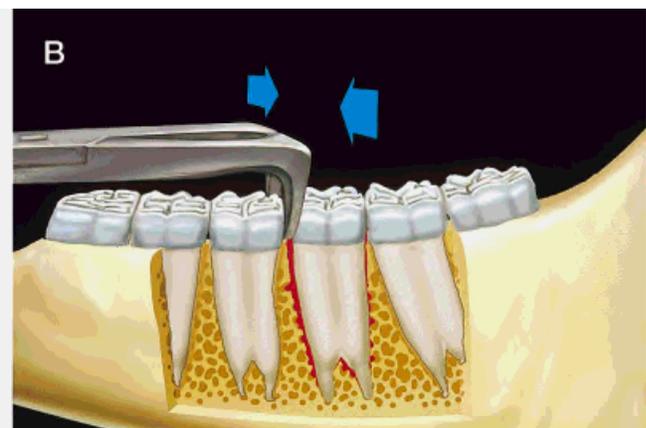


Fig. 2. Molar spreader used to loosen cheek teeth by wedging between two teeth. The instrument is moved repeatedly from the rostral to the caudal end of the tooth.

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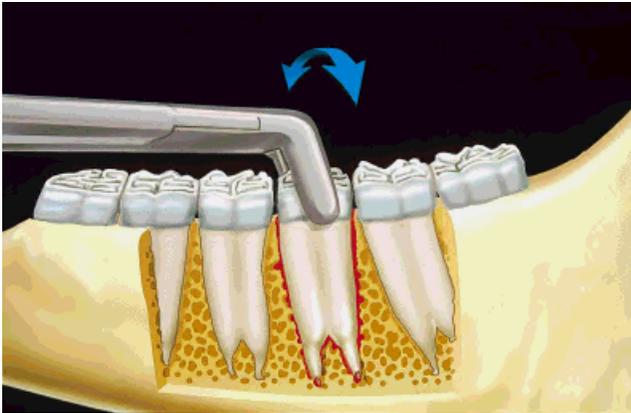


Fig. 3. Placement and movement (medial to lateral) of the molar forceps.

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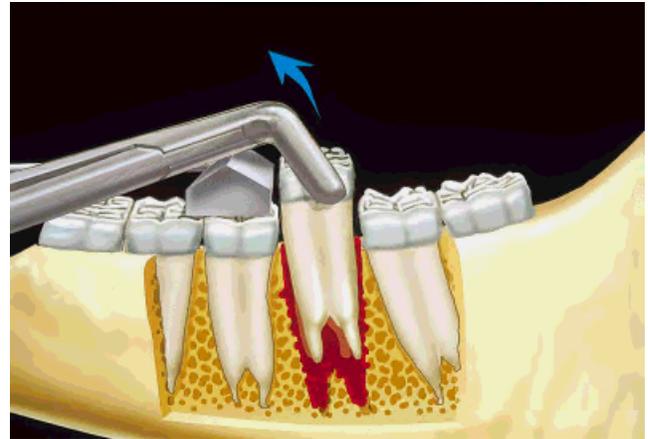


Fig. 4. Molar fulcrum placement and tooth extraction.

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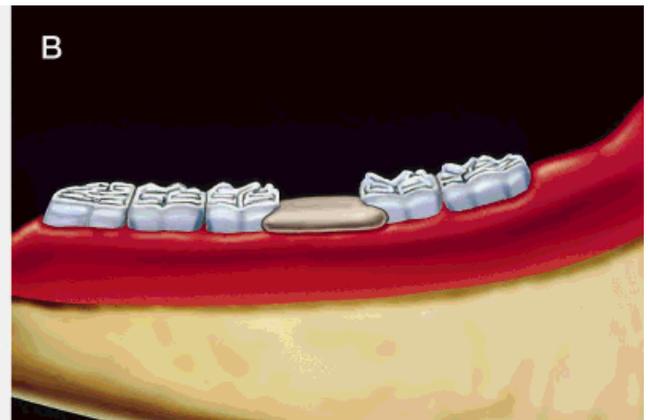


Fig. 5. Patched alveolus. Note how the patch is attached to the adjacent two teeth.

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Fig. 6. Packed alveolus. Deep packing will be pushed out by granulation tissue too soon. Subsequently, the alveolus will pack with feed material.

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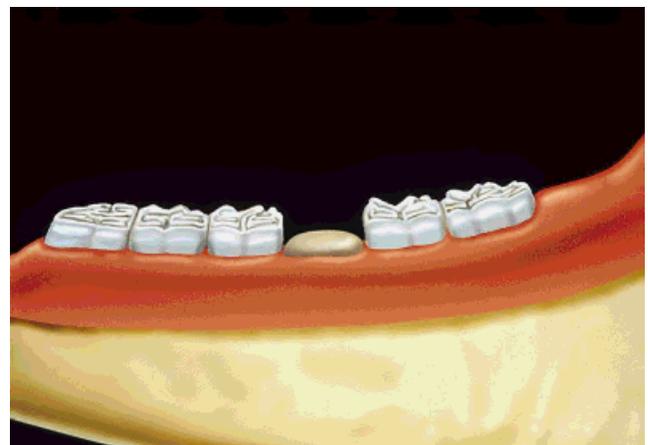


Fig. 7. Dental patch that is not connected to the adjacent teeth and subsequently has a greater chance of being displaced prematurely.

with saline, containing an appropriate antibiotic if desired, until the sinusitis is resolved.

#### D. Postoperative Care

Nonsteroidal anti-inflammatory drugs are indicated before and after removal of diseased teeth. Often these drugs are administered IV before the tooth is removed and then PO for a few days. Antimicrobial drugs also may be required, depending on the degree of disease present at the alveolus, the depth of the alveolus and the integrity of the adjacent soft tissues. If the diseased tooth or adjacent teeth have periodontal disease, if removal of the tooth will leave a deep alveolus or if the practitioner anticipates complications during the extraction procedure, antimicrobial treatment is indicated. Broad-spectrum antimicrobials (e.g., trimethoprim-sulfadiazine and metronidazole) provide adequate coverage in most cases.

The alveolus may not need to be packed in aged horses in which the alveolus is shallow. The alveolus from which the diseased tooth was extracted should be inspected and lavaged daily with warm water containing an antiseptic if possible. It is important that the alveolus be packed in younger horses with deep alveoli and in any horse in which a maxillary tooth with its root in the maxillary sinus has been removed. This is done to prevent introduction of foreign materials deep into the alveolus or into the sinus.

After the procedure, the horse should be observed routinely for abnormal eating habits, halitosis, sinusitis, oral or nasal discharges and fistulous tracts. If the health status of the surrounding bone or teeth is in question, it might be prudent to obtain radiographs of the area 4 to 6 weeks postoperatively to identify any sequestra that may have developed.

#### E. Complications

Any horse that undergoes extraction of a cheek tooth will require increased dental care regardless of the method used. It is imperative that the owners be informed of this before surgery and commit to having semiannual to annual masticatory examinations performed. If dental care is neglected, the horse will develop either step mouth or wave mouth in the affected arcade.

Potential postoperative complications include hemorrhaging, loosening of adjacent teeth, alveolitis, osteomyelitis, colic, sinusitis and myalgia of the masticatory muscles. Possible long-term postoperative complications are periodontitis of adjacent teeth, alveolitis and sinusitis. These can be avoided by careful planning, attention to detail and patience in most cases.

#### F. Cases

During the past 2 years, 12 horses had cheek teeth removed at the University of Georgia Large Animal Teaching Hospital or by its field service unit using

**Table 1. 12 Horses Presented over the Last 2 Years at The University of Georgia for 24 Diseased Cheek Teeth**

Horse	Horse Age (yr) <sup>a</sup>	Teeth	Disease
1	8	106	Periapical abscess
2	2.5	508	Impacted tooth
3	18	209	Sinus infection
5	25	109, 209	Periodontal
6	14	109, 209	Longitudinal split fracture parallel with mandible
7	25	107, 108, 109, 110, 207, 208, 209, 210	Severe periodontal disease
8	7	109	Fractured
9	30	108	Periodontal
10	9	111	Periapical abscess
11	22	207	Periodontal
12	12	109, 209	Periodontal
13	20	107, 207	Periodontal

<sup>a</sup>Average age, 16 yr.

the oral extraction techniques described here. Twenty-three diseased teeth were removed from these horses (Table 1). All horses were sedated with a combination of detomidine HCL<sup>c</sup> (10–20 µg/kg IV) and butorphanol tartrate<sup>d</sup> (0.01–0.02 mg/kg IV). The average age of these horses was 15.7 years (range 2.5–30 yr). Field service-treated horses were assigned 1 “hospital day” for each day a horse was examined. The cheek teeth were recorded according to the Modified Tridan System.<sup>14,15</sup> The average number of hospital days was 3.4 (range 1–17 d). These results are considerably lower than reported hospitalization median times of 22 days for maxillary teeth and 8 days for mandibular teeth.<sup>16</sup> No complications were encountered in these horses.

#### 4. Summary

Oral extraction of equine teeth is a useful technique that will allow veterinarians to remove affected teeth in standing animals, thereby avoiding the risks associated with general anesthesia and repulsion techniques. For these procedures to be performed successfully, practitioners must use proper equipment, select cases well and allocate sufficient time for the procedure.

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- <sup>a</sup>Techinovit®, Jorgensen Laboratories, Inc., Loveland, CO 80538.  
<sup>b</sup>PolySil®, SciCan, Inc., 2002 Smallman St., Pittsburgh, PA 15222.  
<sup>c</sup>Dormosedan®, Orion Corporation, Espoo, Finland.  
<sup>d</sup>Torbugesic®, Fort Dodge Animal Health, Fort Dodge, IA 50501.