History and Physical Examination Findings

A 4-year-old, 575-kg (1,265-lb) castrated male warmblood horse was evaluated because of mild dysphagia, a fractured left maxillary third molar tooth, and a left maxillary first molar tooth that had an abnormally large occlusal surface identified on oral examination by the referring veterinarian. General physical examination revealed a rectal temperature of 37.4°C (99.2°F); heart rate, respiratory rate, and results of a CBC and serum biochemical analysis (including fibrinogen concentration) were within respective reference ranges. The horse had a body condition score of 6 of 9 and was considered to be in excellent athletic condition in all other aspects. No neurologic or muscular abnormalities were detected. The patient was sedated by IV administration of detomidine (0.010 mg/kg [0.005 mg/lb]) and butorphanol (0.005 mg/kg [0.002 mg/lb]), and complete oral examination and dental charting were performed. Minor sharp enamel points were present on the buccal surface of the maxillary cheek teeth and lingual surface of the mandibular cheek teeth. The left maxillary dental quadrant had 7 cheek teeth evident with a presumed supernumerary third molar tooth positioned in the most distal part of the quadrant. The supernumerary tooth was rotated with the buccal surface positioned distally. There was a diastema between the first and second left molar teeth with food impacted in the interproximal space (Figure 1). The tooth in the normal left maxillary third molar tooth position had a complicated crown root fracture through pulp horns 1 and 2, with the buccal portion of the tooth displaced into the mucosa of the cheek, and exposure on the occlusal surface of pulp horns 3 and 4 detected with an explorer. The left maxillary first molar tooth had an abnormally large occlusal surface (approx 25% larger than that of the contralateral tooth, as measured from the buccal to lingual aspect) with an abnormal shape including the appearance of 4 infundibula and absence of the expected pulp horn arrangement. A series of radiographs (left 30° dorsal–right ventral oblique view of the right maxillary quadrant, right 30° dorsal–left ventral oblique radiographic view of the left maxillary quadrant, and dorsoventral radiographic view of the superimposed right and left maxillary and mandibular quadrants) was obtained (Figure 2).

Determine whether additional studies are required, or make your diagnosis, then turn the page→

This report was submitted by Travis J. Henry, DVM, and Alexandra C. Young, BVSc, from the William R. Pritchard Veterinary Medical Teaching Hospital, School of Veterinary Medicine, University of California-Davis, Davis, CA 95616. Address correspondence to Dr. Henry (thenry@ucdavis.edu).
No radiographic abnormalities of the teeth or bone of the right maxillary dental quadrant were observed (Figure 3). Radiography of the left maxillary quadrant revealed apices of 7 cheek teeth and confirmed the oral examination finding of a supernumerary left maxillary third molar tooth. This supernumerary tooth had a disverted apex, resulting in an oblique orientation of the occlusal surface. The fractured crown of the presumed left maxillary third molar tooth observed during oral examination was visible between the left maxillary second molar tooth and supernumerary left maxillary third molar tooth on the right 30° dorsal–left ventral oblique projection. This crown appeared discontiguous with the more distally located apex of the left maxillary third molar tooth on this projection. On the dorsoventral projection, the fragmented crown was deviated buccally, and a linear radiopacity, suspected to be a fragmented portion of the tooth, was observed to extend from its mesial margin. The left maxillary second molar tooth was impacted against the left maxillary first molar tooth. The large crown of the left maxillary first molar tooth seen on oral examination was also visible radiographically, with thickening and irregularity of its distal margin extending into the apical portion of the tooth. The abnormal tooth shape was also appreciable on the dorsoventral projection, with a large portion of the tooth extending buccally.

Computed tomographic evaluation of the dentition was recommended because of discrepancies between the oral and radiographic examinations, particularly in the region of the fractured crown of the presumed left maxillary third molar tooth, and to aid in surgical planning.

A catheter was placed in the left jugular vein, and the horse was premedicated with xylazine (0.5 mg/kg [0.23 mg/lb]) and butorphanol (0.005 mg/kg [0.002 mg/lb]) IV, followed by anesthetic induction with ketamine (2.0 mg/kg [0.91 mg/lb]) and midazolam (0.009 mg/kg [0.004 mg/lb]) IV. The horse was intubated nasally, and anesthesia was maintained with isoflurane in oxygen. The horse was placed in dorsal recumbency and contiguous 2.5-mm collimated, transverse CT images of the skull were obtained and processed with a bone algorithm (120 kV; 200 mA; 0.8-second rotation).2

The CT images revealed 3 supernumerary left maxillary molar teeth, with a total of 9 cheek teeth present in the left maxillary quadrant (Figure 4). There was concrescence of the cementum of the left maxillary first molar and supernumerary left maxillary first molar teeth at the clinical crown, with retention of separate reserve crowns and tooth roots. The left maxillary second molar tooth was impacted against the distal margin of the maxillary first molar and supernumerary first molar teeth and was rotated axially 90° so that its buccal surface was oriented distally. The presumed left maxillary third molar tooth seen on oral examination was identified by CT as a fractured supernumerary left maxillary second molar tooth, positioned buccal to the impacted left maxillary second molar tooth. The fractured supernumerary left maxillary second molar tooth was nonvital, as...
evidenced by failure of narrowing of the pulp horns (compared with those of adjacent teeth) and periapical changes consistent with external inflammatory root resorption (depicted by an overall shortening of the tooth structure at the apex). The actual left maxillary third molar tooth was also impacted, with the occlusal surface terminating approximately 1.5 cm below the alveolar margin. This tooth was rotated axially 45° with the buccal surface in a mesial orientation. The supernumerary left maxillary third molar tooth was located distal to the impacted unerupted third molar tooth and was rotated axially 90° with the buccal surface oriented distally.

### Treatment and Outcome

Extractions were recommended as the treatment modality of choice for the supernumerary teeth in the most distal location as visualized in the oral cavity. This included the nonvital and fractured supernumerary left maxillary second molar tooth (initially thought to be the left maxillary third molar tooth) and the supernumerary left maxillary third molar tooth. With the horse under general anesthesia for imaging and because of the extensive nature of the extraction process, it was decided to perform the surgical treatment under general anesthesia. The horse was moved to a surgical suite, and a left maxillary nerve block was performed with 15 mL of 2% mepivacaine solution after aseptic preparation.\(^1\)\(^,\)\(^2\) The teeth were extracted orally with a nonsurgical technique. Postoperative radiographs were obtained for evaluation of the vacated alveoli. Vacated alveoli were packed with dental base plate wax, and flunixin meglumine (1.0 mg/kg [0.5 mg/lb]) was administered IV. The horse recovered from anesthesia uneventfully. Trimethoprim-sulfamethoxazole (30.0 mg/kg [13.6 mg/lb], PO, q 12 h) was administered for 14 days. Phenylbutazone (3.0 mg/kg [1.4 mg/lb], PO, q 12 h) was administered twice daily for the first 10 days postoperatively.
h) was administered for 7 days. No complications were noted after surgery, and the horse masticated normally. Two weeks after surgery, the extraction sites were healing as expected. The horse returned to performance at 30 days after surgery, and the extraction sites had healed as expected. Follow-up examination was recommended in 6 months or sooner if problems with mastication were noted.

**Comments**

A 4-year-old horse would be expected to have 3 permanent incisors, 3 or 4 premolar teeth, and 3 molar teeth, with the third molar tooth erupting but not fully in wear, in each dental quadrant; a canine tooth may or may not be present. The horse of this report had 4 left maxillary molar teeth observed clinically in the oral cavity and radiographically. In contrast, CT imaging clearly revealed 6 left maxillary molar teeth; this included 3 expected teeth and 3 supernumerary teeth. The oral examination and radiographs alone did not reveal the full extent of the anatomic abnormalities at initial evaluation. Additional radiographic projections, such as intraoral radiographic views obtained with a bisecting angle technique and an extraoral right 30° ventral–left dorsal oblique radiographic projection, also did not provide sufficient additional information owing to superimposition. The information gained from CT imaging was considered to be the most valuable and important for identification of the additional teeth and for treatment planning.

Teeth in addition to those indicated by the normal dental formula are considered supernumerary teeth. The nomenclature of supernumerary cheek teeth relies on identification of the extra teeth in the quadrant, which are then named on the basis of their position relative to the normally positioned teeth in the same quadrant.3,4 The prevalence of supernumerary teeth in horses has been reported as < 3%.3,5 These teeth can be found in any region of the equine dentition but are most often found at the caudal regions of the quadrants, particularly distal to the third molar teeth.6,7,8

Supernumerary cheek teeth in the horse often go undiagnosed when the horse is masticating normally and full oral examination has not been performed.3 When secondary sinusitis is absent or only mild periodontal disease is present, the supernumerary teeth can often be addressed in a conservative manner.3 Conservative approaches would include frequent occlusal adjustments and periodontal treatment of the quadrants affected by the supernumerary teeth. Horses having pathological conditions attributable to supernumerary teeth such as sinusitis, advanced periodontal disease, and apical infection of related teeth are treated with dental extraction.3,5,8,9

The horse of this report had mild dysphagia that prompted an oral examination by the referring veterinarian. Because the supernumerary left maxillary second molar tooth (initially thought to be the left maxillary third molar tooth) had a complicated crown fracture and was nonvital, extraction was indicated. The CT examination revealed that the left maxillary third molar tooth was impacted and thus was undetected during visual examination of the oral cavity. The supernumerary left maxillary third molar tooth was extracted to reduce the risk of periodontal disease from the abnormal relationship in the interproximal space and the malocclusion that would be present from this tooth not opposing a mandibular tooth.3 The impacted left maxillary third molar tooth was also expected to erupt once the supernumerary left maxillary second and third molar teeth were extracted, providing space for the third molar to enter the oral cavity. Recheck examination and imaging results of the left maxillary second molar and third molar teeth will indicate whether extraction will be necessary.

Tooth concrescence is defined as 2 teeth that are joined by the cementum.10 In this horse, the first molar and supernumerary first molar teeth were joined by the cementum at the clinical crown, and tooth structures were separate at the apex. As the clinical crown is worn away by mastication, we expect that a potential space will be created between the crowns in a mesial-to-distal direction. Food may potentially become impacted in such a space, and periodontal disease may ensue; careful monitoring and follow-up examinations are therefore indicated.

**References**