



E-ROUNDS

APPLIED RESEARCH FOR TODAY'S EQUINE COMPANION

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Equine Odontoclastic Tooth Resorption and Hypercementosis (EOTRH)

Case Summary

A 21-year-old male castrated Holsteiner presented for increasing discomfort and regional inflammation associated with his incisors. He was diagnosed with Equine Odontoclastic Tooth Resorption and Hypercementosis (EOTRH), and all incisors were extracted to alleviate pain and infection/inflammation associated with this disease.

Signalment and History

A 21-year-old male castrated Holsteiner presented to the Dentistry and Oral Surgery Service for increasing discomfort associated with the incisors. The owner first noted inflammation around the maxillary incisors roughly three years prior. Over time, the owner described that the redness of the gums increased and the gum tissue seemed to be lost from many of the incisors. Roughly six months prior, the right maxillary lateral incisor fractured, and the referring veterinarian removed the remainder of the tooth. The owner believes the condition is painful as the horse has become increasingly head shy for biting, and has no interest in the carrot and apple treats she used to provide from him. Recently, he had also been eating hay slower than normal. Other than the oral condition, the horse had been healthy.

Physical and Oral Examination

Physical exam was within normal limits. Prior to sedation for oral exam, the horse was given a small amount of hay to observe eating and prehension. It was quickly noted that the horse would grasp the hay with his lips and work the feed around the edge of the incisors and into the "bar" region of the mouth. Once the feed was in the mouth, the horse masticated normally. The incisors were not used for prehension in any manner, and the horse made a tremendous effort to avoid contact of the incisive tissue with the hay.

The patient was sedated with Detomidine and Butorphanol for oral examination. Extraoral-facial examination was normal and there was no enlargement of regional lymph nodes. The horse resisted manipulation of the lips but with repeated slow and gentle retraction a thorough examination of the incisive region was performed. Severe gingival recession associated with dental enlargement and calculus deposition was noted. The gingiva was inflamed and there were multiple fistulas draining purulent material along both the maxillary and mandibular gingiva. The right maxillary third incisor was missing, and many incisors were displaced from their normal location (Figs. 1-6). After evaluation of the incisor and canine region, a

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At Colorado State University, equine veterinary care is delivered through the collaboration of three nationally recognized equine service centers:

- Colorado State University Orthopaedic Research Center
- Colorado State University Bud & Jo Adams Equine Reproduction Laboratory
- Colorado State University James L. Voss Veterinary Teaching Hospital Equine Service

Equine treatment capabilities at CSU are at the forefront of equine veterinary medicine through the shared expertise of these organizations.

Questions about this case should be sent to:

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Fig. 1: Central maxillary view of pathology



Fig. 2: Left maxilla



Fig. 3: Right maxilla



Fig. 4: Central mandibular view of pathology



Fig. 5: Left mandible



Fig. 6: Right mandible

mouth speculum was placed to evaluate the remainder of the oral cavity. The horse was extremely sensitive to placement of the mouth speculum and was re-sedated heavily prior to opening the speculum. Caudal mouth examination revealed 2-mm enamel points on most maxillary and mandibular premolars and molars. Stage 1 infundibular caries were noted within the first and second maxillary molar teeth bilateral. All other teeth were within normal limits for the age of the horse.

Diagnostic Testing

Intraoral incisor and canine radiographs were obtained. Bisecting angle DV/VD and left and right obliques were taken to evaluate the teeth with minimal superimposition (Figs. 7-12). Severe internal and external tooth resorption was present on all incisors. The left mandibular canine tooth had sub-gingival moderate resorption on the mesial aspect. There were regions of mild to moderate peripheral dental thickening associated with all incisors.

Severe horizontal and vertical bone loss was noted on all incisors and regions of reactive osteitis and apical radiolucency were particularly severe surrounding the maxillary central and right second incisors.

A complete blood count and chemistry were within normal limits.



Fig. 7: DV bisecting angle maxillary radiograph



Fig. 8: Right maxillary oblique radiograph



Fig. 9: Left maxillary oblique radiograph

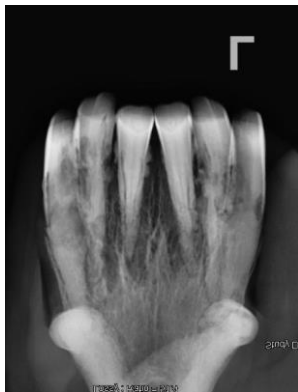


Fig. 10: VD bisecting angle mandibular radiograph

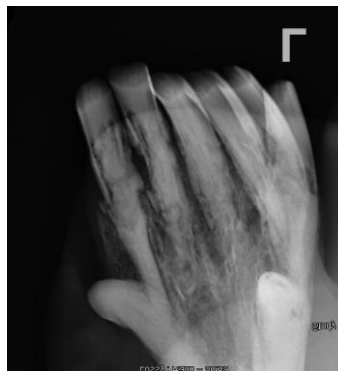


Fig. 11: Right mandibular oblique radiograph

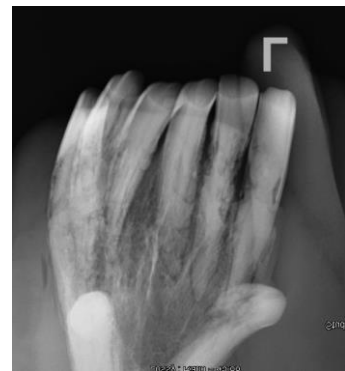


Fig. 12: Left mandibular oblique radiograph

Diagnosis and Treatment Plan

A diagnosis of severe EOTRH was reached. It was recommended that all incisors be extracted to alleviate the obvious pain, infection, and inflammation the horse was experiencing. It was decided to leave the left mandibular canine tooth, as the resorptive lesion was subgingival and not infected. The owners were instructed to monitor this tooth for future signs of deterioration.

Treatment

The horse was kept overnight for surgery the following day. A catheter was placed and a constant rate infusion of Detomidine and Morphine was initiated the following morning. Right and left maxillary and mental nerve blocks were placed, and the mucosa encircling the incisors was locally perfused with bupivacaine. A surgical approach via a mucogingival flap was used to extract all incisors. Due to the severe resorption associated with the incisors, regional bone was removed with a water irrigated, high-speed drill to allow for dental elevation without tooth fracture. Teeth were removed with a dental elevator and extraction forceps (Fig. 13). After tooth extraction, the remaining bone was completely debrided, flushed and smoothed with a combination of rongeurs and the drill. The mucogingival flaps were released of tension, and the surgical sites were closed with absorbable suture in a



Fig. 13: All extracted teeth

simple-interrupted pattern (Figs. 14-16). Postoperative radiographs were acquired prior to closure of the surgical sites to ensure all dental material was extracted (Figs. 17 and 18).

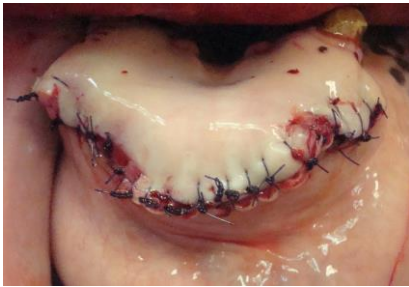


Fig. 14: Mandibular surgical site sutured



Fig. 15: Maxillary surgical site sutured



Fig. 16: Lateral view of surgical sites



Fig. 17: Maxillary postoperative radiograph



Fig. 18: Mandibular postoperative radiograph

Postoperatively, the horse was fed a combination of a senior pelleted mash and soaked hay. Postoperative pain management relied solely on the phenylbutazone, and the horse was monitored closely for signs of discomfort. Four hours post-operatively, the horse was eating well and continued to eat ravenously throughout the remainder of the hospital stay. Trimethoprim-sulfa and phenylbutazone was prescribed for seven days and the horse was sent home the day following surgery. The owner was instructed to flush the surgical site twice a day gently with warm water.

Recheck Examination

Over the next two weeks, the horse was managed by the referring veterinarian due to the long distance to the farm. The referring veterinarian reported a small 3-cm region of dehiscence that occurred on the right mandible, but all other surgical margins healed by primary intention. The owner reported that the horse's energy was increased and he continued to eat ravenously to the point where he started to gain a little too much weight. She had even seen him using his lips to graze in the pasture. One month after the surgical procedure, he returned to trail riding and accepted the bit without incident. The owner reported that his overall demeanor was brighter and he was more focused and responsive during rides.

Three months later, he returned for recheck oral examination and evaluation of the left mandibular canine tooth. The owner reported no problems and a much happier horse. Oral examination revealed completely healed mucosa over the surgical sites (Fig. 19). The left mandibular canine tooth had not changed radiographically, and there were no supragingival lesions associated with this tooth. Annual rechecks were recommended to monitor the remaining canine teeth for signs of disease in the future.



Fig. 19: Healed oral cavity at recheck exam

Discussion

EORTH is a newly recognized pathology affecting both the incisors and canine teeth of the horses typically greater than 15 years of age.ⁱ EORTH is characterized by internal and external resorption of dental structure sometimes associated with excessive production of cementum on the exterior of the tooth. As the disease progresses, the pulp, periodontal ligament, and alveolar bone become inflamed and infected, leading to reduced structural support for the teeth, degradation of gingiva, increased incisor angle, fistula formation, tooth fracture, and pain. It has been reported that periodontal inflammation might be an initiating trigger for tooth resorption.¹ Depending on the animal and individual tooth reaction, the balance between resorption and cemental deposition can vary resulting in the variety of resorption/hypercementosis seen sometimes in one mouth.ⁱⁱ Though a singular etiological theory has not been proven for EOTRH, it is clear that chronic inflammation is involved.

EORTH is a painful disease. The most common initial sign of incisor pain reported by owners is a reduced ability in grasping apples and carrots. Many horses over time will eventually become completely disinterested in accepting these treats. Other signs of pain associated with EOTRH include sensitivity to biting, head shaking, ptyalism, resistance to turning during work, shyness about the head, periodic inappetence, weight loss, and decreased use of incisors for grasping and grazing. Some horses become incredibly adept at grasping feed with the lips, sliding it past the incisors and moving it into the mouth through the “bar” region. Watching how an EORTH horse eats hay prior to an oral exam is a good way to gauge the animal’s discomfort and stage of disease. Some highly trained horses or horses in earlier stages of the disease can show no apparent signs of discomfort, and patients with primarily hypercementosis and very little to no resorption also seem to remain comfortable. Oral exam can be quite challenging because patients are resistant to manipulation of the lips and pressure on affected teeth. Placement and opening of an oral speculum can elicit alert and possibly dangerous behavior even under heavy sedation. Oral exam findings can include enlarged mandibular lymph nodes, decreased incisor angle not appropriate for age, prominent juga, loss of dental papillae, gingival and mucogingival fistulas, severe regional inflammation, purulent drainage, calculus and feed accumulation, missing teeth, hyperplastic gingiva, gingival recession, bulbous enlargement of dental structures, tooth mobility, and supragingival regions of dental resorption. Resorptive lesions in older horses can be found under excessive tartar deposition on the mandibular (more common) and maxillary canine teeth. Exposing these lesions after removal of tartar will cause discomfort for the horse and the practitioner should be prepared to address the problem either through extraction under primary care or referral to a dental or surgical specialist.

EOTRH necessitates intraoral radiographs of both the incisors and canines to properly formulate a treatment plan. Radiographic findings typically include loss of the periodontal ligament space, disruption of alveolar and regional cancellous bone, osteomyelitis, and tooth fracture. Cases involving only hypercementosis can usually be monitored via annual oral exam and radiographs as these horses usually remain comfortable for a long period of time. Patients with mild subgingival resorption and no regional osteitis or alveolitis can be monitored with oral exam and radiographs as the pace of disease progression varies between teeth and individuals. It is not uncommon to see on radiographs a variety of disease stages ranging from normal to severe throughout the incisors and canines. Once supragingival lesions, alveolitis, osteomyelitis, tooth fractures, and extensive resorption of the reserve crown and root are detectable on radiographs, extraction is recommended. Moderate to severe cases of EOTRH require staged or complete extraction of the affected incisor and canine teeth to alleviate infection and pain caused by this disease. Incisor extraction can be accomplished in two ways depending on the nature and severity of the pathology associated with the tooth/teeth. Singular incisor extraction can be accomplished simply in mild to moderately affected teeth by elevation and avulsion.ⁱⁱⁱ In cases of multiple incisor and canine tooth extraction with severe EOTRH, a surgical approach is necessary to allow for complete removal of dental material, visualization of tooth and diseased structures, debridement, and closure. In addition, a surgical approach increases the surgeon’s ability to deal with complicated extractions where reserve crowns and roots have fractured due to initial trauma and resorption.

A complete oral exam and all necessary occlusal adjustments should be performed before extraction so the oral speculum will not need to be placed on the surgical site postoperatively. Regional and local anesthesia of the extraction site is necessary to alleviate pain and ensure a successful procedure. EORTH is exquisitely painful for the horse, and without regional and local anesthesia, a standing procedure utilizing a constant rate infusion of a sedative will not be possible. Owners should be warned that full incisor extraction may lead to a slight protrusion of the tongue especially when animals are at rest. Horses without incisor teeth have a high quality of life and most

maintain their ability to graze on soft, fresh pasture. It should be emphasized to the owner though that a balanced, pelleted ration should be the main stay of the patient's diet to ensure adequate nutrition.

Finally, mucogingival flaps in horses are notorious for dehiscence especially on the mandible. The reason behind this is not exactly known, but time devoted to mastication, disruption of circulation during surgery, labial and frenulum attachments, gravity, and tongue action have all been thought to contribute to dehiscence. In the author's experience, dehiscence if present usually occurs between days 5–10, when granulation tissue, partial primary closure, and wound contraction have already started to occur at the surgical margin. Sutures involved with the dehiscence are removed, and the owner is instructed to flush the wound twice daily with an antimicrobial rinse until complete healing has occurred by second intention (usually 2 to 5 weeks).

Take Home Message

EOTRH is a painful disease that can be readily diagnosed with an oral examination and intraoral radiographs. Horses with severe disease require surgical extraction of all incisors to alleviate pain, infection, and inflammation. Postoperatively, these horses do very well usually with improved appetite and performance.

This case was submitted by Dr. Jennifer Rawlinson, DVM, DAVDC, DAVDC Eq.

ⁱ Staszuk C., Bienert A., Simhofer H., et al. Equine odontoclastic tooth resorption and hypercementosis. *Vet J* 2008; 178: 372-79.

ⁱⁱ Schatzle M., Tanner S.D., Bosshardt D.D., et al. Progressive, generalized, apical idiopathic root resorption and hypercementosis. *J Periodontology* 2005; 76: 2002-2011.

ⁱⁱⁱ Tremaine W., Schumacher J. Exodontia. In: Easley J. Dixon P, Schumacher J ed. *Equine dentistry 3rd ed.* London: Saunders Elsevier, 2011;321-322.