Proceedings of the 58th Annual Convention of the American Association of Equine Practitioners - AAEP -

December 1-5, 2012
Anaheim, CA, USA

Next Meeting:

Dec. 7-11, 2013 - Nashville, Tennessee, USA

Reprinted in the IVIS website with the permission of the AAEP
Considerations for Extraction: Perioperative Management and Case Selection for the Private Practitioner

Jennifer E. Rawlinson, DVM, Diplomate AVDC

1. Introduction
Pathology associated with equine teeth has been well documented by many research veterinarians and scientists from around the world.1–3 Dental fractures leading to significant crown loss and pulp exposure, apical infection, periodontal disease, dental malformation, supernumerary teeth, and maloccluded teeth are pathologies that could necessitate extraction of a tooth. Patient age and health, tooth positioning, severity of clinical signs, extent of pathology, and the owner's financial and nursing capabilities all play a role in determining if extraction is the best therapeutic option. Extraction of equine teeth, especially of those that are not already mobile, is a demanding task for both horse and veterinarian, and it should be undertaken with serious thought, preparation, and conviction. Extraction can be complicated and frustrating for experienced dental surgeons, and a practitioner should evaluate his or her ability to perform the necessary procedure (training, experience, instrumentation, etc). Before attempting any extraction, sedation, analgesia, visualization, equipment, environment and assistant help should be organized and ready. The veterinarian undertaking the extraction should also be able to deal with any complication that arises as a result of the procedure.

Determining whether and how a tooth must be extracted depends on a thorough exam. This starts with a good history, complete oral exam, and proper oral diagnostics. If you are unsure of your basic equine dental skills, start practicing, as it is the best way to develop a system that works. Adding an oral exam onto every physical exam is a great way to hone your skills, increase your recognition of normal and abnormal oral structures, educate your clients, and add appointments to the books. A large portion of routine oral exams reveals pathology unknown to the owner. Development of a treatment plan to address current pathology and future problems helps owners better understand the concept of proper equine dental care.

Radiographs are necessary to diagnose and locate the source of pathology for many cases that lead to extraction.4 The combination of extraoral and intraoral views and improved imaging systems has led to a renaissance in the practitioner's ability to diagnose pathology with this modality. With the appro-
priate instrumentation and adequate radiographic views, the majority of dental cases can be diagnosed with a complete oral examination and dental radiography. Once a treatment plan has been formulated, knowing which cases to take on is critical. If it looks like a difficult extraction and the owner is willing, referral to a specialist may be the best option.

2. Materials and Methods

The vast majority of extractions in the field will be in the deciduous premolar cap removal, wolf tooth extraction, and extraction of the geriatric, near-expired mobile teeth. The focus of this session will be the more difficult extraction cases that take longer than 15 to 30 minutes to perform.

Case Selection

There are many criteria to consider in case selection. All are important.

- History of past dental care.
- Systemic health.
- Ability of horse to stand still for extended period of time.
- Clinical signs associated with pathology.
- Patient age.
- Size of patient.
- Confidence in diagnosis.
- Number of teeth involved in primary pathology.
- Location of tooth.
- Condition of tooth and surrounding bone viewed on exam and radiographs.
- Sinus involvement.
- Owner involvement and financial means.
- Response of horse to sedation and oral exam.
- Postoperative care and environment.
- Available equipment and preparedness for extraction.
- Ability to perform reliable regional anesthesia.
- Availability of a reliable specialist in region.
- Anticipated duration of extraction.
- Ability of veterinarian and owner to respond to procedural complications.

Preoperative Management

If it has not already been done, a complete oral and physical exam is performed. Unless the extraction procedure will be brief (less than 15 minutes), I recommend addressing any enamel points, tooth overgrowth, or malocclusion before the extraction. Vaccine records are checked and a tetanus booster is administered if necessary. Depending on the procedure and history, preoperative antibiotics and pain medications are administered either orally or via catheter. Suitability for standing sedation, standing constant rate infusion (CRI) of sedative, and general anesthesia is considered. The vast majority of extraction cases can be performed standing with a CRI. Feed is withdrawn 4 to 6 hours before a standing procedure and 12 hours before a general anesthesia is given. If an extraction takes longer than 30 minutes, placement of a catheter and beginning a CRI will help both surgeon and patient tolerate the procedure better.

Before any extraction technique is started, the patient must be properly restrained and sedated with regional or local anesthesia of the extraction site. Preoperative radiographs to determine the condition of reserve crown, root, periodontal ligament, and regional bone are highly recommended for anything that will take you longer than 15 minutes to extract. Radiographs also help document the procedure. The oral cavity is rinsed and the extraction site and surrounding tissue is flushed with an antimicrobial solution to remove major debris and decrease bacterial populations. This produces a clean working site with decreased chance for residual feed and heavy bacterial contamination after extraction.

Allocation of appropriate time for the procedure is important: add at least 1 hour to your projected surgery time, but try not to go beyond 4 hours of standing CRI per day unless the tooth is on the verge of removal.

Postoperative Management

The patient is allowed to recover in a climate-friendly, quiet environment. Postoperative radiographs are recommended for every extraction procedure to ensure that no dental fragments have been left behind and to provide documentation of the procedure and lack of adjacent hard tissue damage. If intraoral extraction was performed, packing material is placed in the extraction site for cheek teeth, and incisor and canine teeth extraction sites are managed appropriately. The oral cavity is thoroughly rinsed and the face cleaned. Antibiotics are recommended for the next 1 to 2 weeks unless the tooth was only mildly infected and the extraction procedure was minimally invasive. Pain is managed with nonsteroidal anti-inflammatory drugs, short-acting opioids, and regional blocks. Pain medication is determined individually for every patient. A bran mash or pellet mash is fed for the first 8 to 10 hours after surgery. After that time, hay, if appropriate, is reintroduced to the diet over the next 24 hours while monitoring fecal output. Extraction sites should be checked 1 week and 3 to 4 weeks after surgery. Solid packing material will need to be removed at the 3- to 4-week recheck exam.

All owners must understand the necessity for frequent oral exam and occlusal adjustment after a tooth is extracted. Rechecks are recommended every 6 months at a minimum. Consider having this reminder as part of a discharge statement that the owner signs and ask your office staff to send reminders.

3. Discussion

The fact that there are so many different approaches to the extraction of equine teeth highlights that no
one technique is appropriate for every case. I am never cavalier about recommending extraction because of the ever-present and very possible risk of complications and negative sequelae.5 The benefits must always outweigh the risks. When an extraction is necessary, the more techniques a practitioner develops, the more likely he or she will be successful. In all published studies to date, intraoral extraction of cheek teeth has provided the highest success rate and the lowest complication rate of any extraction technique; therefore, intraoral extraction of cheek teeth in the horse should always be considered before surgical extraction options.6

Identifying cases ideal for extraction in your practice requires a little introspection and solid diagnostic work. If you are wavering on a decision and the owner is up for a referral, send it to a specialist, and, if possible, attend the procedure at the referral institution. Then you will know for the next similar case whether you are confident tackling the extraction. Never start an extraction with minimal equipment, confidence, assistance, or time. Six criteria for case selection are the most critical: (1) Systemic health, (2) age, and (3) clinical signs determine whether the patient is an appropriate extraction candidate; (4) age, (5) confidence in diagnosis, and the (6) location and condition of the tooth and surrounding bone determine if it is appropriate for the primary care practitioner to extract the tooth. Systemically delicate patients may have higher physical and financial priorities to improve or maintain quality of life. Involved extractions are physically demanding for the horse and extended sedation may jeopardize organs that are in a delicate balance. Lack of overt clinical signs (fistula, nasal drainage, swelling, obvious discomfort, weight loss, etc) may delay the extraction of teeth with clinical crown fractures. We know that equine teeth can be very responsive to insult and in some cases able to "wall off" infection. Age not only indicates the ability of the horse to tolerate long procedures but also the size and anchorage of the tooth. If one lacks or doubts confidence in diagnosis, then a second opinion or conservative management with frequent rechecks is recommended. Finally, the location and condition of the surrounding bone and tooth will determine the level of expertise needed for extraction. Teeth that are ankylosed, roots with bulbous apices, and caudal molar teeth are notoriously hard to extract. Young teeth with severely eroded regional bone due to acute infection will require involvement of a specialist to minimize the risk of jaw fracture. Older teeth, premolars and rostral molars, roots with normal structure, and teeth with advanced loss of the periodontium are ideal for extraction by the primary care veterinarian.

If the oral exam and radiographs have not led you to a confident diagnosis, computed tomography (CT) is currently the best and most common advanced imaging modality for dental pathology. In the third edition of Equine Dentistry, Drs. Simhofer and Boehler have written a comprehensive review that details the technical principles of CT and the appearance of normal and abnormal dental tissue.7 The use of contrast, different algorithms, multi-planar views, and three-dimensional reconstruction all work together to provide the practitioner with a diagnosis and confidence in treatment planning. Usually, pathology resulting in distinct clinical signs will be clearly evident on CT. Newer machines are producing images with such detail that the veterinarian and radiologist have to be cautious of overinterpreting minor abnormalities and focus on major pathology. Very little literature has been published describing the newer high-detail, multi-planar images, and questions remain about normal versus abnormal findings in some cases. The minor findings become more of an issue in cases with vague clinical presentations (eg, discomfort with biting, plays with mouth, shakes head, carries head inappropriately) and a normal oral exam.

In summary, there are many extractions that an enthusiastic practitioner with a little extra dental knowledge can safely and successfully perform in the clinic or in the barn. The key is establishing good case selection criteria for the individual practitioner and attentive perioperative management.

References