How to Properly Perform and Interpret an Endoscopic Examination of the Equine Oral Cavity

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1. Introduction
A detailed evaluation of the oral cavity can be quite a challenge for the examiner because of several restricting factors. Limited working space in the mouth because of the cheeks and the tongue along with the distance between the lips and caudal cheek teeth limit visual examination of all surfaces of the exposed crown of the tooth and oral soft tissues. Proper restraint with sedation, a full-mouth speculum, and the use of a head stand allow both the horse and the examiner to be in a comfortable position for the oral evaluation. Good illumination of the oral cavity with a headlamp or speculum light in combination with the use of rigid, heavy-duty, 45° mirrors improves visualization of the exposed surfaces of the teeth and oral soft tissue. Many dental abnormalities can be detected with the help of complete digital palpation of the mouth and the use of dental picks.

An even more detailed oral examination can be performed with the use of a rigid endoscope and camera system. Previously, work by Goff has shown that oral endoscopic evaluation allows for the detection of a higher number of dental abnormalities, excluding dental overgrowths. Endoscopic visual perception of abnormal dental wear patterns, such as crown overgrowths, lacks the sensitivity of digital palpation of the dental arcades. Endoscopic examination findings can be saved on a digital image capture device or recorded in real-time with a video recorder. These images can then be stored as a permanent part of the medical record or mailed electronically for consultation. Thus, the combination of direct visual exam, digital palpation of the mouth, and detailed endoscopic examination will maximize efficacy of a practitioner’s dental evaluation of the equine oral cavity.

Oral endoscopy provides both a magnified and a detailed view of the horse’s mouth. The inexperienced equine practitioner can find the interpretation of oral endoscopic findings to be challenging. Magnified anatomical structures and normal age-related dental changes are easily confused with pathological conditions. This video “tour” shows the various age-related changes in the oral cavities of several normal horses.

2. Materials and Methods

Equipment

- a rigid laparoscope with a 30–60° wide-angle lens
• digital video camera and 150-watt light source
• flexible light cable
• digital video camcorder
• still-image capture device
• flat-panel LCD viewing screen
• laptop computer to record and store video clips of the oral examination

The oral endoscopic examination is best performed with the viewing screen set facing forward at the level of the horse’s shoulder. This positioning allows the examiner to comfortably stand in front of the horse and view the screen. In cold and/or rainy weather, fog inside the mouth and moisture condensation on the scope optics can be a problem. These obstacles do not preclude being able to perform a detailed examination but may result in poor-quality recordings. Any endoscopic video camera and recording device can be used to record oral endoscopy. The author has found the above system to be both portable and easily transported in an ambulatory practice.

Study Group
Four horses owned by the author were sedated for an oral endoscopic exam; during the exam, the horses’ heads were placed on a head stand, and the four mouths were examined with a full-mouth speculum and head light. A complete oral endoscopic examination was performed and digitally recorded on video. The subjects of the study included an 18-mo-old filly with mixed dentition and newly erupted first molars, a 30-mo-old colt with recently shed second premolar caps and erupting permanent dentition, a 9-yr-old mare with permanent teeth, and a 24-yr-old stallion with aged permanent teeth.

3. Results
Horse #1: 18-mo-old Thoroughbred Filly
Upper wolf teeth, grass-pigmented oral gingiva, rugae of the hard palate, and a pigmented tongue are evident. This filly has a complete set of deciduous incisor teeth and pre-molar teeth. The infundibulae of the upper pre-molars are filled with cementum, and several vascular channels are present. The secondary dentin covering the pulp horns is darkly stained and easily distinguished from the primary dentin. The first upper and lower molars have recently erupted and are beginning to show occlusal wear. On the upper first molars (109 and 209), soft tissue still covers the caudal infundibulum, and the rostral infundibular cups are filled with chewed grass. The caudal aspect of the newly erupted last lower cheek teeth, the first molars (309 and 409), are tapered into a V shape. The organic pedicle and normal corrugated transverse ridges on the cheek teeth can be appreciated in detail.

Horse #2: 30-mo-old Quarter Horse Colt
This colt has mixed deciduous and permanent dentition. The central incisors are permanent, but the intermediate and corner incisors are still deciduous. The upper first pre-molars, also known as the wolf teeth, are present. The upper second pre-molar caps are present, and the permanent teeth are visible at the gingival margin. The lower permanent second deciduous pre-molars have erupted and are not completely in occlusal wear. The cementum that covers the occlusal surface at eruption can be seen at various stages of wear. The third and
fourth premolars are deciduous. The first and second molars have erupted. The infundibular cups are present in the most recently erupted upper molar teeth (110 and 210), and the contrast between the newly erupted teeth and the teeth in wear can be appreciated. The distal aspect of the last lower cheek tooth (310 and 410) is tapered. The oral opening for the parotid salivary duct can be seen buccal to the fourth pre-molars. The posterior dorsal of the tongue houses the prominent vallate papillae. Buccal mucosal erosions are adjacent to sharp enamel points on the upper caudal cheek teeth.

Horse #3: 9-yr-old Thoroughbred Mare (Dam of the 18-mo-old Filly)
The oral mucosa and exposed crown cementum is darkly stained with grass pigment. This mare has a full set of permanent dentition, which includes 12 incisors and 24 cheek teeth. She has no canine teeth or wolf teeth. For a mare this age, the incisors show normal wear. The infundibular cement lakes and vascular channels are seen in the upper cheek teeth (Fig. 1). The dark-stained secondary dentin filling the pulp horns can be appreciated on the surface of all of the cheek teeth (Fig. 2). The last lower cheek teeth (311 and 411) are tapered on the distal border (Fig. 3).

Horse #4: 24-yr-old American Saddlebred Stallion
This aged horse has a missing incisor tooth (401). The incisors show crown attrition and severe occlusal wear. The canine teeth are present, and the lower canines show decay and calculus buildup. The cheek teeth show signs of occlusal table attrition. Several upper cheek teeth have worn to the depth of the bottom of the infundibulum and have also become smooth on the occlusal surface. Feed can be detected in small diastema between teeth. The areas of secondary dentin on the occlusal surfaces of the dental arcades have become larger and coalesced in some teeth. These dental findings are a reflection of normal age-related architectural changes in the apical portions of the pulp chambers. Gingival recession is evident around the lingual aspect of the lower cheek teeth.

4. Discussion
An understanding of the normal changing anatomy of equine dentition with age is critical to the diagnosis and management of equine dental disease. Oral endoscopy allows for detailed examination of the exposed crowns of the cheek teeth and oral soft tissues. The equine practitioner using this technique can visualize and permanently document normal and abnormal dental anatomy in striking detail.

References and Footnotes

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