Use of an Intraoral Camera for Identifying and Documenting Equine Oral Disease

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Intraoral disease is common in horses. The anatomical characteristics of the equine head severely limit the direct observation of premolar and molar dentition and surrounding soft tissue. A commercial intraoral camera manufactured for human dentistry facilitates the identification and documentation of equine intraoral anatomy, disease, and therapy. Authors' address: Equine Sports Medicine Laboratory, Dept. of Medicine & Surgery, Boren Veterinary Medical Teaching Hospital, Oklahoma State University, Stillwater, OK 74078-2041. © 1998 AAEP.

1. Introduction
Dental disorders are widespread and routine diseases encountered by the practicing equine veterinarian. A 1994 study documented oral pathology or dental disease in 80% of 500 abattoir heads from horses aged 6 months to 30 years.1 With the introduction of new lightweight oral speculums and improved pharmaceutical restraint2 in the standing horse, the examination of the oral cavity has been facilitated. However, because of the long and narrow anatomic configuration of the equine mouth relative to the size of the oral cleft (entrance to the oral cavity), the visualization of the intraoral soft-tissue structures and the dental arcades remains difficult.3 For example, periodontal disease and periodontal pockets are extremely difficult to visualize in live horses and yet were frequently documented in abattoir heads of horses aged 15 years or more; furthermore, their frequency of occurrence increased with age.3 We describe the use of an intraoral camera system that allows a detailed visual inspection and documentation of the oral cavity and dental arcades.

2. Materials and Methods
The intraoral camera system, currently used in human dentistry, consists of (1) a hand-held wand, (2) a linking cable, (3) a docking station containing the camera, and (4) a color viewing monitor. The wand is approximately 20 cm long and 0.9 cm wide, with the lens at the end of the wand and mounted perpendicular to the wand's long axis. A disposable, inexpensive plastic shield, which is easily replaced, protects the lens from abrasion. The other end of the wand is molded into a handgrip and has a conveniently located focus ring and buttons for image capture. The flexible cable is 178 cm long, 0.8 cm in diameter, and water impermeable. The docking station enclosing the camera, weighing less than 2 kg and measuring 7 cm × 23 cm × 35 cm, is connected to a display monitor for real-time visualization. The docking station can be simultaneously connected to a video recorder for image archival.
Selected images can be stored in the camera and later outputted to a color printer for hard-copy documentation.

Cases presented to the Boren Veterinary Medical Teaching Hospital at Oklahoma State University, Stillwater, Oklahoma, for dental disorders were examined in the Equine Sports Medicine Laboratory by using the intraoral camera system to complement conventional oral and radiographic examinations. The mouths of these horses were copiously flushed with water. Following intravenous restraint (detomidine HCl,\(^{b}\) given at 10 µg/kg and butorphanol tartrate,\(^{c}\) given at 10 µg/kg), a full-mouth speculum\(^{d}\) was placed within the mouth of the horses before the oral cavity was imaged. The initial examination consisted of a rostral to caudal view of the oral cavity that allowed the visualization of gross lingual or buccal displacement of cheek teeth and the identification of wave, step, or sheer mouths. The camera was then advanced into the oral cavity to view each of the lower and upper dental arcades individually. During this procedure, a detailed visualization of individual teeth and the associated soft-tissue structures was completed.

3. Results
Oral abnormalities that were visualized included the following: enamel points, lingual and buccal ulcerations, complete or partial remnants of retained deciduous teeth (dental caps), ramps, hooks, dental carries, patent infundibulum, periodontal disease, periodontal pockets, vaulted cheek teeth, and fractured cheek teeth. Abnormal wear patterns were also observed, including wave mouth, step mouth, and sheer mouth. Infusing contrast material through external draining tracts permitted the identification and precise localization of oral or dental fistulas. Following dental procedures, the camera allowed visualization of the efficacy of therapy, i.e., successful removal of enamel points following routine floating, lack of tooth fragments after extraction of partial or complete dental caps, and inspection of acrylic implants following tooth extraction or repulsion. Documentation of examinations, oral lesions, and efficacy of treatments was accomplished by using the intraoral camera’s image storage system, and hard copies of the images were included in the medical records and presented to owners of the horses.

4. Discussion
Use of the intraoral camera complements and enhances conventional equine oral examinations. The camera is easy to use, provides excellent visualization of the oral cavity, allows the identification of lesions, and documents lesions and their subsequent treatment. It provides detailed views of the occlusal, buccal, and lingual surfaces of cheek teeth and soft-tissue structures of the mouth that were previously unattainable. Additionally, this camera permits the identification of lesions (i.e., periodontal pockets and caudal buccal ulcerations) that were formerly difficult or unidentifiable by the use of routine methodology. Furthermore, the intraoral camera facilitates the documentation and re-evaluation of oral lesions. In our opinion, the visual component of this system enhances client satisfaction, appreciation, and understanding of oral disease and its treatment. The applicability of its use in the clinical environment makes it a practical tool for the equine veterinarian. The use of this intraoral camera system enables the practitioner to view, identify, and archive the normal and abnormal mouth in detail.

References and Footnotes
4. UltraCam II, UltraCam Intraoral Camera Systems, 1220 Champion Circle #100, Carrollton, TX 75006.