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Take Home Message—Oral endoscopy is a valuable additional examination technique for equines. However, oral endoscopic examination of the oral cavity cannot replace a thorough oral examination.

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I. INTRODUCTION

In the last decade oral endoscopic examination became an established diagnostic technique in equines. The examination technique and possible implementations have been described in literature and veterinary theses. Using an endoscope, the limited direct visualization of intraoral structures including the caudal cheek teeth can be compensated for and close-up visualization of the masticatory surfaces, the buccal and palatinal/lingual aspects of the cheek teeth rows and the gingival margins even of the most remote and narrow spaces is possible. Thus diagnoses which are usually difficult to obtain during conventional oral examination (i.e., small food impactions, valve-diastema formation between caudal mandibular molars, fissures on the occlusal surfaces, patent columns of secondary dentine (pulp positions) as well as pathological conditions of the oral cavity such as foreign bodies and parasitic objects.

Aim of the Presentation

To explain how to perform an endoscopic examination of the equine oral cavity

II. MATERIALS AND METHODS

Endoscopic Equipment

For equine oral endoscopy a 40-70 cm rigid endoscope with a 50-90° optic angle is recommended. A variety of endoscopes of an increasing number of providers, some explicitly designed for equine oral endoscopy, are available. A list of suppliers is provided at the end of the abstract.

A standard endoscopic unit usually comprises a cold light source, a light-transmitting cable, a color video chip camera and its control unit, the endoscope and a monitor for visualization. For stationary use in a clinic the equipment can be mounted on a roll container. For use in ambulatory practice however, the bulkiness of the gear is one of the main disadvantages. For this purpose some distributors have started to provide compact portable solutions for oral endoscopy.

Preparations

A thorough general and oral examination in the sedated animal including inspection and palpation of the structures of the oral cavity using a full mouth speculum has to be performed prior to any oral endoscopic examination.

The endoscope tip can either be heated in a bucket of hot water before it is inserted into the oral cavity or, alternatively, can be sponged with a swab drenched in 70% alcohol. Both techniques are helpful to prevent fogging of the endoscopic lenses.

Handling of the Endoscope

Best results are achieved when a bimanual technique is employed. A right-handed examiner should use the left hand to stabilize the endoscope inside the oral cavity while guiding the scope with his/her right hand. The left hand can also be used as a soft tissue retractor, pushing back the tongue or the cheeks to facilitate visualization especially of the mandibular cheek teeth structures. The right hand is responsible for the correct adjustment and focusing of the endoscope. In most systems it is possible to obtain stills or videos by pressing the respective buttons at the base of the endoscope or camera.

Examination Technique

To avoid missing relevant findings, the endoscopic examination of the cheek teeth should be conducted following a consistent routine.

The author prefers to examine the cheek teeth rows following the Triadan system. Starting at the upper right quadrant, the occlusal surfaces of each tooth are carefully checked for pathological changes like fractures, fissures, infundibular changes, changes of the occlusal enamel, primary and secondary dentine (pulp positions). The configurations of
the interdental spaces are examined for diastema formation, food impaction and dental alignment. Subsequently the buccal and lingual/palatinal aspects of the cheek tooth rows are carefully inspected. Dental fractures and peripheral (cemental) carious lesions can be identified. Feed entrapment, plaque formation, gingivitis and gingival retraction/periodontal pockets are signs of periodontal disease frequently encountered in conjunction with (valve) diastema formation. The presence of fistulous tracts at the mucogingival line is frequently a sign of an apical infection of the respective tooth.

The upper left, lower left and the lower right cheek teeth rows are then examined in similar fashion. Finally, the oral soft tissues (tongue, palate, buccal mucosa and gingiva) are assessed for pathological changes. All pathological findings should be documented in a dental chart.

### III. DISCUSSION

Oral endoscopic examination is a valuable diagnostic technique but cannot replace a thorough clinical examination of the oral cavity. Although endoscopy offers clear advantages in the diagnosis of subtle dental and interdental pathologic findings, some gross pathological conditions such as focal dental overgrowths, malalignment of teeth, irregularities of the angulation of the occlusal surfaces, supernumerary teeth or probrachygnathism can be readily diagnosed with direct angulation of the occlusal surfaces, supernumerary teeth or dental overgrowths, malalignment of teeth, irregularities of the angulation of the occlusal surfaces, supernumerary teeth or probrachygnathism can be readily diagnosed with direct visualization, the use of a dental mirror or palpation.  

In addition to the above mentioned advantages, oral endoscopy enables demonstration of pathologic conditions to the horse owner and education of students. Most systems allow capture of still images or video clips which can be added to the record and might later prove useful for follow up, for presentations or serve as forensic evidence in complicated cases. 

The steadily increasing number of portable endoscopic systems greatly simplifies the implementation of oral endoscopy as a routine diagnostic technique in ambulatory practice. However, financial considerations remain the major limiting factor for practicing veterinarians to obtain an oral endoscope.

### REFERENCES

5. Goff C. A study to determine the diagnostic advantages of oral endoscopy for the detection of dental pathology in the standing horse.

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