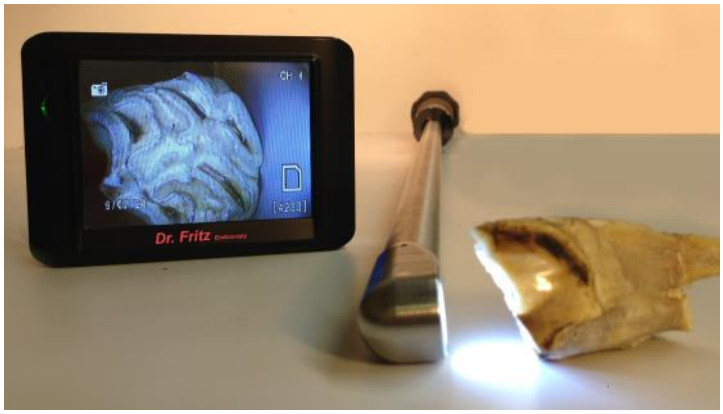
Equine Dental Endoscopy—is it worth it?

Dr. Ruedi Steiger DACVIM (Swissvet Veterinary Products)

The equine oral cavity, long and narrow, is notoriously challenging to access for dental procedures. For thorough examination and diagnosis, it has become customary to employ a full mouth speculum, cheek retractor, dental mirror, high-powered headlamp or speculum light, a stand or halter, as well as adequate sedation for the horse. Now there is conclusive evidence that another instrument is an exceptionally helpful diagnostic tool: the oral endoscope.

A flexible endoscope may be used for dental procedures, but is not ideal. It is vulnerable to damage, does not focus on close objects and, with its straight view, has a limited field of vision. The most appropriate instrument is a long rigid 90° endoscope. Only a small number of companies offer true equine dentalscopes, among them Dr. Fritz Endoscopy from Germany, with their 'dentalstick'. It consists of a waterproof scope equipped with LED lights and macro auto-focus with a 115° field of vision. The dentalstick stands out with high quality video and photographic images that can be viewed wired or wirelessly on a monitor or computer for processing and storage. The battery-powered



Pic1: A digital LED endoscope for equine dentistry with wireless data transfer to a hand held monitor. Without the need for an external light source or cables, this battery powered instrument is marvelous for field practice. (Dr. Fritz endoscopy Germany).

wireless option is compact and most convenient for field practice.

An endoscopic exam is always preceded by appropriate sedation and visual and manual examination of the oral cavity. In his book, *Equine Dentistry*, Dr. Jack Easley provides a step-by-step guide to intra-oral endoscopy:

"Start with examining the occlusal surfaces and buccal and lingual aspects of all teeth beginning with cheek tooth 106 and then advancing the endoscope caudally, inspecting each occlusal surface in turn, and noting any defects in the occlusal surface that may be of pathological significance. Any potential defects in the surface, particularly of the secondary dentin corresponding to the pulp horns or areas of infundibular cemental hypoplasia, are re-examined while inserting a fine occlusal probe or pick into the defect. The endoscope is then rotated and repositioned to examine the palatal mucosa and interdental spaces, noting any fibrous food entrapment and diastema….The endoscope is finally rotated to the buccal aspect of 106, and advanced caudally to identify diastema, displaced teeth and in particular, mucosal ulcers….deep periodontal pockets are thoroughly cleaned using a pick and water jet and then re-examined for the presence of inflamed or granulating tissue."

The same procedure is followed on the second arcade, and then on the mandibular arcades.

The primary and most compelling reason to include endoscopy in the dental examination is improved specificity of diagnosis. Consider a study conducted at Rossdales Equine Hospital in Newmarket, Suffolk in which a comparison was made between the number of abnormalities diagnosed by clinical versus endoscopic exam over a four month period. Dr. Goff concludes, remarkably: "The only abnormalities diagnosed more frequently with a clinical examination were dental overgrowths. Every other category of abnormality—including: soft tissue changes; dental fracture; infundibular caries; peripheral cemental caries; diastemata; and abnormalities of eruption—was diagnosed in higher numbers through endoscopic examination."

How were the veterinarians' diagnostic powers radically

Pic 2: Endoscopic examination of fracture lines in a maxillary cheek tooth (Dr. Fritz endoscopy Germany).

improved by the use of an oral endoscope? Exploration, visualization, magnification, and recording. More effective exploration, above all, of the caudal oral cavity, is possible with an endoscope. Certain abnormalities that are difficult to identify during visual examination, such as soft tissue

Pic3: Endoscopically controlled exploration of a maxillary cheek tooth infundibulum using a dental probe with 3mm marks (L); closer view of cariotic lesions within the infundibulum (R).

lesions or infundibular cemental hypoplasia, open pulp horns, and periodontal disease, are rendered accessible by the intra-oral endoscope. Magnification and angled viewing expose buccal or lingual ulcerations that may otherwise go unseen. And the ability to record images for further study

Abnormality	Diagnostic Method	
	Clinical	Endoscopic
Soft Tissue changes	25	34
Dental Overgrowths	194	44
Dental Fracture	12	21
Infundibular Caries	21	63
Peripheral Cemental Caries	31	72
Diastemata	39	60
Abnormalities of Eruption	14	17

Table 1: Of all horses examined, the total numbers of teeth showing abnormalities detected by each diagnostic method are shown. Dr. C. Geoff (AAEP 2006)

and second opinions is invaluable. In her thesis, Dr. Deike Schacht from Germany determined that endoscopic examination of the occlusal surface of the cheek teeth and surrounding structures is only surpassed by a postmortem examination— which is precisely what we are trying to avoid.

The ability to make a complete and detailed diagnosis is the most compelling reason to include endoscopy in a dental examination. However, there are quite a few secondary benefits worth noting, especially in light of the initial capital outlay for an endoscopic system.

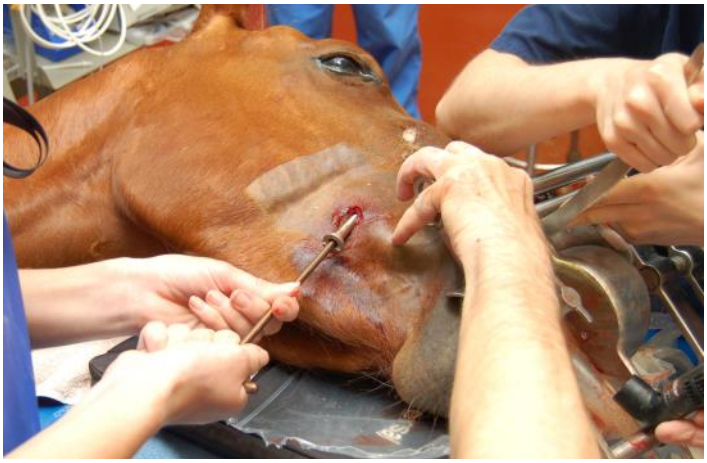
Equine dentists have begun to use a guided endoscopic intra-oral approach for many procedures. In cases of periapical cheek tooth infections, for example, an endoscope is a valuable tool to assist the diagnosis of the correct tooth to be extracted. Furthermore, it helps during certain cheek tooth extraction procedures, such as Dr. Stoll's minimally invasive technique via buccotomy and screw extraction. A dentalscope also proves useful during removal of cheek tooth fragments. The interdental space can be explored more thoroughly with an endoscope, and associated pathologies such as periodontal disease diagnosed and treated more effectively. The same is true for infundibular disease of maxillary cheek teeth (see picture 2).

Examinations are very engaging with live feed on a monitor and usually greatly appreciated. Video or still picture documentation facilitates communication with owners, technicians, and students. Involving owners or trainers in the examination of their horses improves relationships, sets one apart from often poorly equipped lay dentists, and helps attracting new clients.

While conventional photography of lesions often show unsatisfactory results due to inadequate lighting or badly focused images, they are easily done with a digital endoscope. These digital images are easily stored and used in the patient record, sent to colleagues for a second opinion, and recalled for re-assessment of treatment outcomes

Furthermore, assuming a reasonable additional charge, perhaps $50, the client is endowed with concrete visual information, accurate diagnosis, and an impromptu education—allowing your endoscopy set to turn a profit after a reasonable time period.

For further reading: **Equine Dentistry.** *Jack Easley, Padraic Dixon, Jim Schumacher.* Saunders Elsevier 2011.



Pic 4: Buccotomy approach for minimally invasive cheek tooth extraction (L); endoscopic control to ensure proper screw placement for tooth extraction (R).