Introduction

Oral and dental diseases are common in horses as evidenced by results of incidence studies of dental disease carried out on abattoir specimens and live horses. Signs of dental disease are often not apparent to the owner until the disease is well advanced. Oral-dental examination is the most important aspect of equine dentistry and casual oral or dental examination as part of a complete physical examination is not sufficient to detect most oral or dental problems. Clinical signs of dental disease are often not specific and may be reflected in other body systems.

Although a comprehensive history and physical examination of every patient seen while performing routine dental work would be a valuable service to clients, this is not practical in most cases. However, one must establish the presence or history of medical problems that may have an impact on safe delivery of dental care. The minimal dental examination process must be thorough enough to detect dental abnormalities/disease in their early stages of development so corrective action can be taken to prevent progression of the pathological process to the point where correction is difficult if not impossible. The extent of the examination will increase depending upon the information obtained in the history and the findings of initial examination. The examination process must be performed in a routine fashion to ensure efficiency and quality. More information on: The Examination: Creating Satisfied Clients and Equine Dental Examination Checklist, can be found on the AAEP Website under the TOUCH program (AAEP.org/Touch).

A complete oral examination includes observing and feeling both oral hard and soft tissues for pathology. The hard tissues consist of teeth and osseous structures. The soft tissues consist of the lips, cheeks, tongue, palate, gingiva, oral mucosa, salivary glands and muscles of mastication. Variations and/or abnormalities detected at the time of initial examination must be documented. If no notation is made in the record, it can be assumed there were no abnormalities at the time of examination. When
routine becomes habit, the results are thorough and the time to complete the examination is reduced. A standard dental record form can be an invaluable aid in developing good examination habits. Computerized dental records make information more available for retrieval and case follow-up. A sample dental record can be downloaded from the AVDC web site under Equine Specialty Documents of from AAEP.org.

Equipment

Equipment utilized to properly examine the equine oral cavity is minimal, but certain items are necessary to perform a complete oral examination. The technique for restraint and size of equipment will vary for different ages and sizes of horses. Very large (1000 Kg+) draft breeds need restraint with more heavily constructed equipment than the typical (500 Kg) riding horse. At the other extreme, are the small (100 Kg) pony and miniature breeds which may require downsized equipment. Oral examination and dentistry on small horses may also be aided by walking the horse up on an elevated platform to view the oral cavity at a more comfortable height for the operator. Equipment needs include but are not limited to a halter with a large noseband and lead, a metal framed dental halter or headstand, mouth speculum, and a good light source. A good, very bright light source is necessary for proper oral examination and a clip-on speculum light or head lamp works well. Various types of cheek retractors allow better visualization in the buccal spaces. A long-handled, rigid shaft equine dental mirror is useful to visualize the interproximal spaces and occlusal surfaces of the cheek teeth. The strong, rigid handle can be used to retract the soft tissues and visualize hard-to-reach spaces in the oral cavity. Anti-fog treatment with a chemical cloth or wetting the mirror with chlorohexidine solution allows for a more consistent and unobstructed view. A laparoscope/boroscope with a 30 to 75 degree angled lens is helpful in examining the occlusal surface and between the caudal cheek teeth. A video or still digital camera can be attached to the scope to allow for more relaxed viewing. This method of visualization is an excellent tool for client education. Information on inexpensive equine oral scopes and camera systems are available in the 2015 AVDC Dental Forum notes or the proceedings of the 2017 AAEP Focus on Dentistry. (Pearce CJ, 2017)

A bucket with diluted disinfectant (chlorhexidine) solution to rinse the horse’s mouth, clean hands, and clean equipment are essential when evaluating the oral cavity. A 400 cc dose syringe with a blunt tip is useful to rinse the mouth before oral examination and during dental procedures. A high-pressure water irrigation unit can be used to eliminate debris from deep periodontal pockets. Irrigation will greatly aid in proper evaluation of pocket depth and tooth stability. Latex or nitrile gloves should be worn to protect the examiner’s hands and reduce cross contamination between horses.

Dental picks, probes, and forceps are available in various lengths and blade shapes. Sharp, fine picks are used to evaluate occlusal surfaces and scratch pulp horns. Long handled calibrated dental probes and right angle fine tipped forceps are helpful in cleaning and evaluating periodontal pockets.
The Dental Examination

A typical examination starts with a brief history while assessing the animal from a distance. The screening process should give the veterinarian a general idea of the type, thriftiness, general use, and overall physical condition of the horse. If any health concerns are noticed, TPR and other physical diagnostic and laboratory tests may be indicated before proceeding with sedation or dental procedures. The animal’s feed and water sources should be observed, noting the amount and type of feed being consumed. Attention should be directed to the horse’s manure to note how well feed is being processed and digested. The head is surveyed for shape, symmetry, and obvious abnormalities. The head should be palpated for irregularities or tender areas especially along the upper dental arcade and temporomandibular joint area. The lips are parted, incisors inspected and the age estimated. The oral mucous membranes, intermandibular space, and tongue are evaluated. Range of motion of the jaw is viewed and its grinding sound and vibration evaluated. Some useful information may be gained from evaluating incisor occlusion and separation during lateral jaw excursion. Sedation is often administered at this point in the exam to relax the horse.

The oral examination continues to the interdental space and adjacent structures. This area often reveals the performance horse’s biting history. The lip commissures, bars of the lower jaw, tongue, and palates are evaluated. In male horses over 4 years of age, canine teeth can be observed. The lower canines lay rostral to the upper canines making for a longer lower diastema. The upper canines erupt in the suture between the incisive and maxillary bones and usually break through the mucosa 2 to 8 months after the lowers. Young adult stallions and geldings between the ages of 4 and 6 years may have canine teeth in various stages of eruption. Eruption cysts or tenting of the mucosa with ulceration over these teeth can cause oral pain and biting problems. It bears repeating, long sharp canine teeth can be a danger to the examiner and care should be exercised to avoid injury when manually examining the mouth. These teeth should not be blunted as this can lead to long-term dental damage. About 25% of mares have one to four rudimentary canine teeth. Dental plaque or tartar accumulation around the lower canines leading to gingivitis is often seen in older horses.

The upper and lower interdental spaces should be observed and palpated. Firmly run a thumb over the mucosa, feeling for protuberances above or below the gum line and observe the horse's response to pressure. The lower bars should be checked for sharpness, bony irregularities, mucosal ulcers, or thickenings. The presence of lower first premolars can be detected in horses by palpating just rostral to the lower first cheek teeth. The upper diastema is palpated for bony abnormalities and upper first premolars. These caniniform teeth are referred to as ‘wolf teeth’ and erupt between 6 and 24 months of age. If present, they can be found along the edge of the maxillary and palatine bones from the palatal side of each upper PM 2 to 2 to 3cms rostral to this location. These teeth usually erupt through the oral
mucosa but can migrate under the mucosa and remain there as bumps. Unerupted wolf teeth, referred
to as ‘blind wolf teeth’, can cause oral discomfort and training problems in bitted horses. Wolf teeth
come in a vast array of shapes and sizes with the visible crown shape having no relation to the size or
shape of the root. The distance from the commissures of the lips to the rostral edge of the first cheek
teeth should be noted as this varies among horses. This distance will affect the ease with which one
works on the rostral teeth and may affect the comfortable position of the bit in a working horse.

The tongue should be checked for function and any anatomical abnormalities noted. Tongues are
frequently injured from harsh bits or neglected tongue ties. Calluses or ulcerations are the result of
chronic trauma from sharp teeth. Observe and palpate the hard palate. Lampas, or thickening of the
palatal mucosa just behind the upper incisors, is common in young horses erupting permanent dentition
and shedding deciduous teeth (caps). The hand can be introduced into the interdental space and a
thumb pressed on the hard palate to make the horse open its mouth. The oral soft tissues should be
observed with special attention paid to the palate, tongue, and buccal mucosa.

Inspect the oral cavity visually and palpate from the labial edges of the incisor teeth, caudal to the
buccal recesses distal to the last molar. Subtle details of the examination process are extremely
important. The easiest and safest way to thoroughly evaluate the oral cavity is by using a full mouth
speculum. Mild sedation is required in most horses to the speculum and perform a thorough oral
examination. The exposed crown height and crown health of the incisors should be assessed before the
speculum is placed on the incisor arcades. Horses with short exposed crowns or damaged teeth may
require a flat or padded incisor plate. To place the McPherson-type speculum in the mouth, the
examiner stands to the left side of the horse. With the left hand holding the mouthpiece and the right
hand holding the poll strap, the mouthpiece is introduced between the incisors in the same manner as a
bit. The left thumb and forefinger are used to open the mouth and guide the mouthpiece into place
between the incisors while the right hand applies steady tension to the halter strap from behind the
horse’s poll. When the speculum is properly positioned, the left hand is maneuvered to the halter’s
buckle to adjust the strap length until the speculum strap is snug. The mouthpiece is adjusted from the
front to square it with the incisors. A final check is made to ensure that the teeth and incisor plates are
free of tongue, lips, and examiner’s digits so they are not pinched when opening the speculum. It is
important to adjust the noseband and chin strap to allow a stable yet comfortable fit on the horse. The
jaws of the speculum are opened one notch at a time alternating each side until the jaws are opened
two to three notches. If the horse resists its mouth being opened with the speculum in place, the
temporomandibular joints and bony structures of the jaw should be carefully evaluated before excessive
force is placed on the jaw. At this point, the oral cavity is ready for visualization and palpation. Use a
head support stand or metal frame dental halter to elevate the head of a sedated horse to a
comfortable height for good visualization and palpation.

To examine the oral cavity, good illumination is critical. Several powerful lights are available. Some of
these attach to the incisor plates of a speculum allowing unobstructed viewing of the mouth. A
headlight provides good illumination while allowing both hands to be free for instrumentation inside the
mouth. A blade retractor fitted with an illuminator will aid in the evaluation of the buccal recesses. A
basket or long blade retractor will help keep the tongue and buccal mucosa pulled away from the teeth
for good visual access to the last few cheek teeth. Dental mirrors with a long, ridged shaft are useful for visualizing the occlusal surfaces of the cheek teeth. A flexible fiberoptiscope, rigid laparoscope, or intraoral camera can prove useful in obtaining a close-up and detailed view of the caudal recesses of the mouth and documenting examination findings.

The teeth should be evaluated for conformation, position, and number. Common premolar findings include hooks, ramps, erupting teeth, or loose caps or cap slivers. In the center of the molar table, one may observe long teeth, wave mouth, cupped out or decayed infundibula, missing teeth, split, fracture or misplaced crowns. The caudal dental arcades should be inspected and buccal ulcers, sharp enamel points or hooks, supernumerary or missing teeth, or ramped dental arcades should be noted. Enamel points that normally form on the buccal and lingual enamel folds or cingula usually do not protrude beyond the level of occlusal surface of the cheek teeth. The acute angle between the vertical edge of the tooth and the occlusal surface can cause sharp enamel points to look and feel quite prominent.

Inspect the mesial and distal dental margins for abnormal tooth contact or feed packed into diastemata or gingival pockets. A dental probe with a long shaft can be used to probe the four corners of the cheek teeth to detect and clean out periodontal pockets. A calibrated periodontal probe can be used to measure gingival pocket depth, which ranges from 0.5mm to 7mm for normal teeth. It has been shown that gingival pocket depth measurements are significantly increased with periodontal disease. Defects in the secondary dentin covering the pulp horns have been found on the occlusal surfaces of some periapically infected teeth. These defects can be detected by scraping the secondary dentine-covered occlusal surfaces of suspect teeth, with a fine dental pick.

The oral cavity should be palpated feeling the buccal, occlusal, and lingual surfaces of all four arcades. The gingival margins of the cheek teeth should be uniform with no feed or forage packed between them. The crown height should be the same on the mesial and distal aspects of each tooth. The crown height should be longer on the buccal aspect of the upper and the lingual aspects of the lowers. This reflects the normal slope of the molar arcade. Any deviation or asymmetry in molar table height or angle should be noted. Each exposed tooth crown should be grasped between the thumb and forefinger and checked for stability noting any movement. The occlusal surfaces of the arcades should be palpated noting any defects or asymmetry in the occlusal crown surface. Keep in mind that fractured teeth crowns occur in 1-4% of horses examined in clinical practice. Any crown defect in one arcade will usually be reflected in a wear abnormality or defect in the opposite occlusal arcade.

Ancillary Diagnostic Tests
If the initial dental examination findings reveal signs of dental disease, other diagnostic techniques can be employed to make a more definitive diagnosis. A more thorough oral examination can be carried out on a sedated and restrained or anesthetized horse. Endoscopic examination of the nasal passages, larynx, and oral cavity is often indicated. Skull radiographs (plain and contrast film studies) give added information about dental, osseous, and sinus structures. Radiographic examination of the equine skull can add valuable information to physical examination, oral examination, and endoscopic findings. Most equine practitioners have access to portable radiographic equipment making this a routine part of the complete workup of any case with suspected dental pathology. Often, radiography is indicated before major dental corrections can be safely undertaken.

Standing skull films with the mouth open, provide the veterinarian with a more complete assessment of the occlusal pattern of the dental arcade. In many cases, dental disease cannot be diagnosed without radiographs.

Other imaging modalities such as ultrasonography, computerized tomography (CT), nuclear scintigraphy, MRI, or fluoroscopy may reveal a more accurate picture of some dental pathologies.

**Dental Records, Charting and Treatment Planning**

The horse’s signalment, use and management should be recorded. Pertinent history must be noted with special emphasis on digestive system or performance problems. The horse’s general body condition should be recorded and a numbered body score assigned. The results of the masticatory system examination should be recorded and problems listed in order of significance. A plan for treatment of each problem should be outlined based on the results of history, clinical findings, and oral examination before proceeding with any dental work. This problem-orientated approach is important because the owner and/or trainer should be informed of any abnormalities, given a plan for treatment, and an estimate of the cost before any corrective procedure is carried out. An owner consent statement is
often included in record forms and can minimize problems should a legal claim be filed against the veterinarian or a bill come in dispute for collection.

Charting is the process of recording the state of health or disease of the teeth and the oral cavity. To properly chart the mouth, the dental formula and anatomical locations in the mouth must be standardized to make documentation consistent (sample charts on AAEP.com). Use of standard abbreviations for dental terms to describe anatomical boundaries, pathology, diagnostics, and therapeutic procedures has made communication possible between colleagues in both the veterinary and human dental professions (ACVD.org for standard abbreviations and terms).

The American Veterinary Dental College Nomenclature and Classification Committee has endorsed the use of the Triadan tooth numbering system. Numbering is based on a fully phenotypic dentition made up of 44 teeth. This three-digit system uses the first digit to designate the quadrant and arch location and whether the dentition is deciduous (primary) or permanent (adult). The quadrant implies the right or left side of the individual. The arch denotes maxillary or mandibular. The numbering sequences are upper right, upper left, lower left, and lower right. The permanent (adult) dentition utilizes numbers 1 to 4, and the deciduous (primary) dentition uses numbers 5 to 8. In each quadrant, the first or central incisor is always 01, with incisors numbered 01 to 03, the canines, whether present or not, take up the 04 position in the formula. The premolars are numbered 05 to 08 and the molars are numbered 09 to 11.

The Triadan system of equine dental nomenclature for permanent teeth. To identify deciduous teeth, 4 is added to the first number.
Summary

With proper restraining techniques and specific equipment, a thorough dental examination can be performed with minimal stress and risk to the horse and examining veterinarian. A dental record system is important in documenting findings and monitoring case follow-up.

References and Suggested Reading


