

Dental Conditions Affecting the Mature Performance Horse (5-15 Years)

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Mature performance horses make up the majority of horses in many equine practices. Many of these horses are just entering their early years in competition, but most are in the midst of their performance years and the horse owner or trainer always wants the horse to be able to perform to the best of its ability. Dental disorders can distract the horse during training and competition, but many horse owners and trainers are not aware of the oral and dental problems that can affect a horse during its competitive years. These problems are out of sight and, therefore, often out of mind. It is our job as the primary health care providers, to educate the horse-owning public about the importance of regular dental examination and proper dental maintenance.

One of the most important avenues of communication that the rider has with the horse is through contact with the mouth. The competition horse should receive a complete oral examination biannually. This exam must be performed using restraint that makes the procedure safe for the horse owner, the horse, the veterinarian, and veterinary assistant. Important instrumentation should include a full-mouth speculum, a bright headlight, and a dental mirror. Within six to ten months of their last dental maintenance, the majority of aged horses examined have developed dental-related conditions that could affect their performance. The most common problems identified are lacerations and ulcerations to the oral soft tissues. The interdental space, where the bit contacts the soft tissue, is a particularly important area to examine.

Malocclusions, such as rostral hooks and ramps on the 06s, should be evaluated and resolved. The soft tissue around the premolars should be examined carefully. In addition to a bit, nosebands, cavesons, hackamores and bosals can also pull the cheeks on to sharp enamel points and cheek tooth edges (Fig. 1). In particular, the premolars must not have sharp points or edges that the soft tissues can be pulled into. A small radius of tooth can be removed from the rostral aspect of the 06s, but care must be taken not to cause thermal damage to the pulp or to enter the rostral-most pulp chamber (no. 6) of these teeth. The pulp chambers are recognized by the darkly stained secondary dentine on the occlusal surface (Fig. 2). The first and last cheek teeth have six pulp horns and the middle cheek teeth each have five.

The cinguli (vertical reidges) on the buccal surface of the 06s and the rostro-buccal surface of the 07s can be smoothed to make wearing the bridle more comfortable. Large, chronic ulcers are commonly seen in this area due to pressure on the outside of the cheek from the bridle. Care must be taken not to expose the two buccal pulp chambers (nos 1 and 2) by removing too much tooth or to cause thermal damage to the sensitive pulp.



Figure 1. Large vertical ulcer at the rostral aspect of 107 caused by noseband of a bridle.

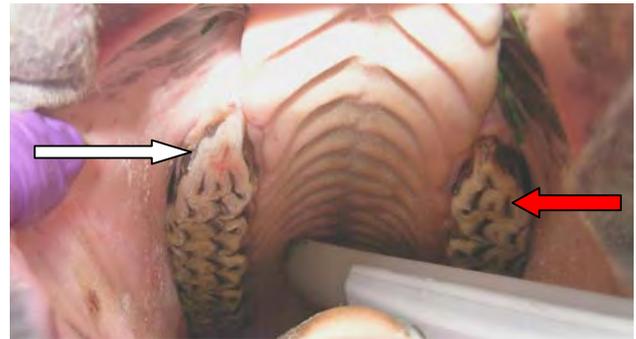


Figure 2. Aggressive bit seat causing damage to rostral pulp 106 (white arrow). Normal dark stained secondary dentine is present in the rostral pulp of 206 (red arrow).

So called ‘bit seats’ formed on the rostral aspect of the 06s are meant to create more comfort with the bit, but over aggressive reduction of these teeth can cause much discomfort (Fig. 2). The term, ‘bit seat’ is a misnomer, because a properly fitted bit should not contact the premolars. Many horses experience discomfort or sensitivity to the teeth after a ‘bit seat’ has been created, due to the large amount of sensitive dental tissue that was removed. Research has shown that after the sclerotic layer of dentine has been removed, sensitive odontoblastic projections are exposed and often damaged¹ and this can lead to pulpitis and pain. If the tooth is aggressively reduced, the pulp chamber may be inadvertently entered, leading to bacterial infection and often death of the tooth. Another reason for increased sensitivity is thermal damage to the pulp inflicted by aggressive reduction. Thermal damage can cause a pulpitis, and if the damage is severe, death of the pulp and so death of the tooth.

Initial inflammation to the tooth may be manifested by excessive salivation after the procedure. Some horses may even become dysphagic and exhibit other signs of oral discomfort, such as stretching the neck and twisting of the head. Some clinicians claim that these signs of pulpitis are caused by pain from the temporomandibular joint. Often damage caused by these aggressive reductions is not evident for months to years after the initial insult. During subsequent dental visits, the individual affected teeth often exhibit extreme sensitivity when touched by a power instrument or float even when the horse is sedated. If these sensitive teeth are contacted by the bit, the same reaction may be noted.

Damage causing death of the tooth may not become evident until months to years later, when the tooth develops apical infection. Often, the damage is only obvious to the careful observer. Through normal attrition of the tooth’s occlusal surface, exposure of the open pulpal horns becomes evident. The normal, darkly stained, secondary dentine that fills the pulp chamber fails to be produced, causing a small void to appear on the occlusal surface. The defect in the occlusal surface will become packed with feed, eventually filling the

entire open pulp horns. The pulpal horn can be determined to be open by inserting a fine dental probe into it. Many affected teeth become infected and drain through the gingival margins or the open pulps into the mouth, preventing the infection from becoming evident externally. Sensitivity may also result when aggressive reduction decreases the occlusion on the 06's. When occlusive forces decrease, the periodontal attachments weaken, and the tooth can be more easily moved within the alveolus, causing pain during contact.

Many performance horses chew on the bit due to anxiety, nervousness, or boredom. The horse may displace the bit caudally with the tongue and bite the bit with the premolars. The horse may later allow the bit to slide forward and be squeezed out between the cheek teeth. Horses that chew on the bit usually do so with both the right and left arcades, but some may chew only on one side. Repeated occurrence of this habit wears the maxillary premolars (106, 206) into a dome as smooth as polished glass and wears the mandibular premolars (306, 406) at a smooth angle toward the gingival margin. If the occlusal surface wears faster than secondary dentine can be produced by the odontoblasts, the pulp chamber eventually becomes exposed on the occlusal surface. The exposure of the sensitive pulp may cause pain and allow infection of the sensitive structures of the tooth. Horses that chew on the bit also frequently have increased caries of the rostral infundibulum of the 106, 206 which can occasionally decay into the sensitive structures of the tooth.

Chewing on the bit can also cause the 06s to shift rostrally, causing a diastema to develop between the 06s and 07s on both the mandibular and maxillary arcades. The diastemata will collect feed and cause painful periodontal disease (Fig. 3). The 106 and 206 often shift slightly in a palatal direction. The 306 and 406 often shift buccally, and as the body tries to stabilize the teeth, a bony exostosis develops on the buccal aspect of the alveolus of each tooth. This constant wear caused by the bit also creates a sharp edge on the buccal and rostral aspects of these teeth, which can traumatize the soft tissues, necessitating more frequent dental maintenance. Changing to a bit with a roller or cricket can help stop bit chewing by giving the horse something to play with.² A Mullen type of mouthpiece can be harder for the horse to get between the premolars. Many horses cannot be stopped from chewing on the bit, and so, to prevent damage, these horses need to be ridden in a bitless bridle.



Figure 3. Dental mirror being used to diagnose a periodontal pocket on the lingual aspect of 306-7 due to a diastema.



Figure 4. Severe damage to the right bars of the mouth caused by inappropriate use of the bit.

During the initial examination, the interdental space between the incisors and premolars should be evaluated for the presence of erupted wolf teeth, impacted or blind wolf teeth, and for damage caused by the bit. Wolf teeth most often occur in the maxillae but occasionally, can also be in the mandible. Lower wolf teeth cause extreme discomfort with the bit, resulting in major training problems. Impacted wolf teeth are frequently undiagnosed because they are not visible and they may be found to cause performance problems in older horses. An impacted wolf tooth can sometimes only be found by careful palpation or radiographic examination. Impacted wolf teeth are positioned more rostrally than normal and can cause major problems in performance, because these teeth often interfere with the bit. Care should be taken to remove the entire wolf tooth, if possible, because a root that is left behind can act as a sequestrum and this chronic infection can cause much discomfort.

Palpation of the mandibular interdental spaces can also reveal painful periostitis caused by bit damage.³ Periostitis can also occur in the maxillary interdental spaces from over check and high ported bits, but it is much more common on the mandible. Any bit with excessive bar contact can cause bone damage if too much pressure is applied (Fig. 4). Curb bits with tight curb chains create a vice-like effect between the mouthpiece and the curb chain when pressure is applied to the bit. Biting rigs used to apply headsets and lunging a horse in side reins can cause excessive pressure and damage to the bars. The area rostral to the premolars should be palpated bilaterally before the horse is sedated, if possible, to check for a painful response.

Acute trauma to the bars results in a soft edematous swelling and, if severe, bony sequestra. More chronic trauma results in a hard, bony type of exostosis, that is typically broad and thick if caused by repeated trauma to the surface of the bone. A small focal exostosis may form from a single incident of bone trauma. Radiographic examination

often fails to show dramatic changes to the bone, if damage is confined to the periosteum. Mandibular periostitis can cause the horse to avoid bit contact by flipping its head, carrying its head behind the vertical, carrying its head crooked or to one side, or rooting with its nose to get the rider to decrease contact. Mandibular periostitis can also cause the horse's tongue to protrude. To determine if bit damage is the cause of a performance problem, the horse can be ridden without a bit and observed for the same responses shown with the bit. Changing to a bit that has more tongue pressure and less bar pressure can help alleviate the irritation to the bone. An osseous sequestrum, periostitis, or a bony exostosis can be removed surgically with the horse standing and sedated after desensitizing the interdental space with a mental nerve block. The area should be allowed to heal for six to eight weeks before a bit is re-introduced. Using a bit with less bar contact is advisable to lessen the chance of recurrence.

Practitioners often associate sharp teeth in the front of the mouth with performance problems, but lacerations are also common in the caudal region of the mouth of performance horses. The bit takes up room in the horse's mouth, causing the horse to retract its tongue. For this reason, performance horses often have more lacerations on their tongue than horses that are not frequently ridden. Many performance horses are trained to carry their head in an unnatural position that can also change the position of the soft tissues in relation to the teeth. Soft tissues in the caudal region of the mouth are in close proximity to the teeth, and so sharp enamel points and dental edges can easily lacerate tissue (Fig. 5). Some horses let their tongue protrude from their mouth to avoid biting it while being ridden. Evaluating the caudal region of the mouth of horses exhibiting performance problems is just as important as evaluating the rostral oral region.

Early detection of malocclusions can prevent them from becoming major problems affecting performance. Minor hooks, ramps, and wave complexes are often evident in the early performance years (5 – 9 years), but if not addressed, become major problems in mid to late performance years (10 – 15 years). Early detection allows overgrowths to be corrected while they are still small. Reduction should be limited to only the overgrowths; the other normal occlusal surfaces should not be reduced. If the cheek teeth reduction is limited to just the overgrowths, incisor reduction should not be necessary, because the normal areas of the cheek teeth will still have good occlusion.

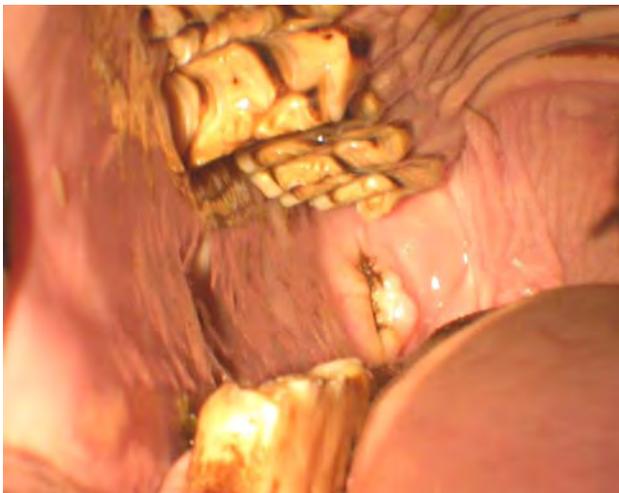


Figure 5. Large chronic ulcer in caudal region of mouth from hook on 111.



Figure 6. Severe periodontal pocketing of food caused by cheek teeth diastemata.

With large malocclusions involving many teeth, one must often choose the areas that are most compromised and take them out of occlusion, while maintaining occlusion on the more normal teeth. When reducing malocclusions, care must also be taken to maintain the proper cheek teeth table angle across the occlusal surface, in the buccal to lingual/palatal plane. Large malocclusions should also be reduced in stages over months to years, to avoid damaging the sensitive pulp of the teeth. Horses with regular dental maintenance often do not develop the wave mouth that we see so commonly in the old horse. Dental maintenance encourages the horse to chew with proper lateral excursion, which prevents many overgrowths from developing.

Rostral to caudal movement of the mandible occurs when the horse raises and lowers its head. Large malocclusions, such as rostral and caudal cheek teeth hooks and ramps, wave complexes, stepped teeth, and abnormally enlarged transverse ridges limit this natural movement. When the rider asks a horse with a malocclusion to change head position or to travel in a different frame, the malocclusion may restrict movement of the mandible, making the change in head position difficult or painful. Often, a horse with a malocclusion must open its mouth to allow the mandible to move rostral-caudally. A tight noseband on the bridle may prohibit the horse from opening its mouth, and prevent the normal rostral to caudal slide. The inability of the horse to comfortably change its head position can lead to performance problems. Freedom of rostral to caudal movement can be evaluated in the sedated horse by measuring the change in position of the upper and lower incisors in relation to each other as the head position is changed. When the jaws are centric, the upper and lower cheek teeth should have little contact with each other, and the majority of the occlusion should be at the incisors. The alignment of the cheek teeth can be evaluated with the mouth closed, using a cheek retractor and a bright light.

Periodontal disease can cause extreme discomfort to performance horses (Fig. 6). It can also cause weight-loss due to dysphagia, systemic diseases through septicemia, apical tooth infection, and premature tooth loss. This problem is often overlooked if the oral

examination is performed without using a full-mouth speculum, a bright light, and a dental mirror (Fig. 3). Due to the chance of systemic involvement, horses with periodontal disease should receive antibiotic administration prior to treatment for periodontal disease. The most common cause of periodontal disease in the horse is mechanical packing of feed at the interproximal spaces that occur due to malocclusions and overgrowths forcing two teeth apart. Early correction of the offending malocclusion or overgrowth often greatly reduces or eliminates the periodontal disease.⁴ Horses with chronic periodontal disease may require more aggressive treatment, and the condition may not be entirely correctable.

Young horses can develop severe periodontal disease caused by crowded or rotated teeth associated with diastemata or open interproximal spaces that collect feed. These abnormalities can cause extreme discomfort for the horse and are very difficult to correct. Radiographs, including open-mouth and intraoral projections, are very helpful in evaluating the integrity of the structures surrounding the tooth and the position of the teeth in relation to each other (Fig. 7).^{5,6} Long-stemmed feed material can be cleaned out manually with long forceps. Most horses find this procedure very painful and actively resist, even when heavily sedated. Regional nerve blocks can greatly facilitate cleaning these painful pockets. The depth of the pocket should be evaluated using a periodontal probe and a dental mirror.

Impacted debris and calculus can be cleaned out of the pocket using air abrasion and a sodium bicarbonate solution administered at 125 –150 psi. The Equine Dental System by P.E.D.I. offers the advantage of having a prophylaxis/air abrasion unit, which utilizes high pressure lavage (100-200 psi) with sodium bicarbonate/chlorhexidine solution to clean and disinfect.^a A biodegradable antibiotic gel, such as doxycycline gel,^b can then be applied to the pocket, and a thin layer of soft plastic impression material can be used over the antibiotic gel to protect it from abrasive feed materials. The pocket should be re-evaluated within two weeks to assess the degree of healing. If a diastema is caused by displaced teeth, the corners of the affected teeth can be trimmed using a small, 1/8 inch-diameter water-cooled burr.



Figure 7. Intraoral radiograph of an apically infected 109 caused by periodontal disease.

A valve-type diastema (i.e., a diastema where the occlusal space is smaller than the space at the gum line) can be widened at the occlusal surface, to help facilitate movement of feed through the diastema as the horse eats.⁷ The rostral and more especially the caudal pulp chambers of a cheek tooth are in close proximity to the interproximal space and consequently, care must be taken not to cause direct or thermal damage to the sensitive pulp.⁸ Periodontal disease in the old performance horse is more common than in the young performance horse and is often associated with poor dental care. An overgrowth often forces a space between two teeth, and feed may pack into this space, setting up an environment suitable for periodontal disease. Initial treatment to resolve the periodontal pocket is similar to the treatment described for the young horse, and the most important aspect of treatment, for both young and old horses, is to reduce overgrowths and correct malocclusions.

Thorough and regular dental examination allows early detection of dental abnormalities in the performance horse. Correction of these abnormalities can greatly enhance performance and the longevity of the teeth in these horses. Owners and trainers must be educated about how these abnormalities can affect performance and about the benefits of proper dental maintenance.

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