Equine Power Dentistry III

Keeping it safe and avoiding common mistakes

By Ruedi Steiger, D.V.M. Swissvet Veterinary Products
www.swissvet.com

Dr. Steiger using the Swissfloat for power dentistry

Teeth have been floated for centuries but it has only been for a decade that the work is routinely done with the help of power instruments. Most veterinarians today have changed their opinion about equine dentistry and see it as a great money maker for their practice — and many of them are very enthusiastic about floating teeth.

This third article on equine dentistry describes the potential risks of equine dentistry and explains how damage can be avoided.

The basic procedures of equine dentistry are easy to learn. It is important to float sharp points and reduce long teeth to make the horse comfortable. The equilibration is relatively safe when using hand instruments, because their poor efficacy limits the potential damage that can be done during floating.

With power instruments and enthusiastic users however, things look different. Today it is very easy to over float teeth and cause more harm than benefit to a horse's mouth. The quote: 'if a little is good, a lot is better'– is definitively NOT true for equine dentistry.

Pulp cavity damage

Other than being brittle, the hard tissues of the tooth (dentin, cementum and enamel) are not very delicate. Before the time of power instrument the reduction of large hooks or ramps was done with a molar chisel or a molar cutter. Both methods bear the risk to fracture teeth and today it is considered malpractice to use those old time instruments.

Having some risks eliminated, we are facing other potential problems with the modern instruments. Pathologies of the pulp, including infection and heat necrosis result in the loss of the tooth and over a period of months or years the tooth eventually needs to be extracted. It is very important to avoid heat stress or accidental opening of the pulp cavity during dentistry procedures.

Overheating

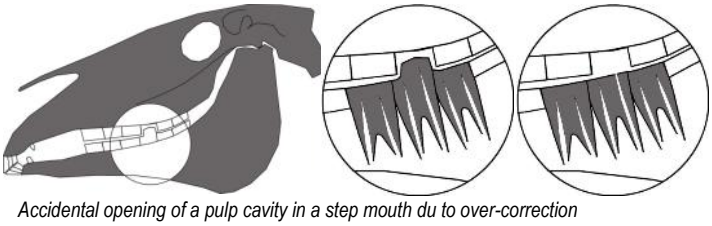
Heat damage is more common when using high speed instruments (ie Dremel cutting wheel) , when working on a large tooth surface, when applying a lot of pressure during floating and when floating on the same area for a prolonged period of time. Heat damage is very uncommon when using a coarse and sharp grinding disk such as a diamond chip disk of a rotary instrument like the Swissfloat for routine floating procedures.

There are no strict rules regarding heat stress during floating but using a gentle approach with little pressure and replacing dull disks is a good start. A single large tooth should be done in intervals and not at once. When alternated with other areas of the mouth, excessive heat production is nearly impossible, especially if the disk is regularly cleaned with water which keeps it cool and sharp. If any concern remains, the dentist may consider manually checking teeth for heat in regular intervals.

Accidental pulp cavity opening

Another avoidable mistake is the accidental opening of the pulp cavity due to overzealous floating. An open pulp cavity will get infected which results in the eventual loss of the tooth.

This is a particular concern in young animals with longer pulp cavities where the excessive reduction of teeth more easily opens the pulp cavity. Most commonly involved are the canines and the first cheek teeth (x06) during the 'bit seat' procedure. While canines often don't need much dental work at all, the formation of bit seats has to be done carefully and not excessively.



Accidental opening of a pulp cavity in a step mouth du to over-correction

Long overgrown teeth of a step mouth and rostral or caudal hooks need special attention as well. Equine teeth are hipsodont, ie they erupt continuously in order to replace the lost tooth material from grinding on each other during eating. Under physiologic conditions, the pulp cavity of an equine tooth is continuously filled with secondary dentin to prevent opening during normal attrition. However, the retraction of the pulp cavity and deposition of secondary dentin is a response to the pressure on the tooth during mastication. Hooks, ramps or steps lack the grinding pressure which is the reason for the overgrowth in the first place – and those teeth show an inferior filling of the pulp cavity.

It is no problem for power instruments like the Swissfloat shown below, to reduce a long hook or step to the level of the adjacent teeth, a procedure that was nearly impossible with hand floats. However, if reduced at once the pulp of a long overgrown tooth might be accidently opened and it is recommended to perform the reduction in these cases in several sessions over several months or years.

Accidental opening of a pulp cavity after wedge reduction in a cadaver head

Correction of an asymmetrical mouth

Asymmetries are most easily seen in incisor teeth and some dentists are tempted to use the power of their instruments to change them into perfectly aligned teeth.

However, it has to be remembered that over time cheek teeth as well as the anatomy of the mandible and maxilla adjust to severe incisor asymmetries. In addition, it is possible that incisor malalignment is caused by an irregular anatomy of the skull or cheek teeth pathology. Unless there is a reason such as an old incisor fracture the necessity for a corrective procedure needs to be assessed very carefully.

In any case, the equilibration of the cheek teeth should have the first priority and

sudden equilibration of severely asymmetrical teeth should be avoided. In mild cases there might actually be no need for incisor correction after cheek teeth equilibration, and the softer incisors should adjust automatically. Severe cheek teeth asymmetries need correction but this has to be done very carefully and maybe only after consulting with an equine dentistry specialist.

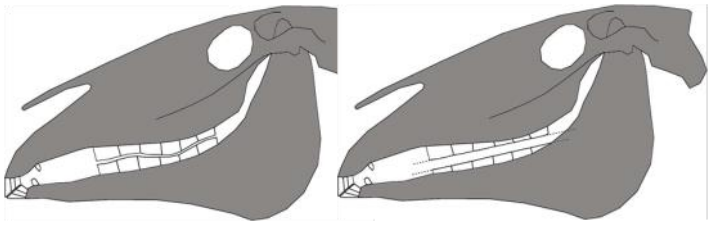
This requires several sessions to treat

If correction is needed for incisor or cheek teeth asymmetries, the adjustment has to be done in several sessions over a period of several months or even years and not at once in order to avoid stress and pain at the temporo-mandibular joint.

Overfloating a wave mouth

Wave formation of the cheek teeth arcades is a common finding in horses. In these cases the occlusal surface of the cheek teeth is waved in various degrees and usually the left and the right side are involved.

The condition has an unlikable look but it is questionable how much the condition is associated with clinical signs. Mild forms are usually without any clinical signs and should not require treatment. Severe waves restrict the rostro-caudal movement of the jaw when horses are collected during riding, which results in poor performance and should be addressed. In addition, the peak of the wave causes severe pressure stress on the teeth of the opposite trough area.



Over-correction of a wave mouth prevents the horse from eating properly (right)

It is important to reduce waves restrictively and give the arcades time to recover and fill in the trough. The peak of the wave has to be flattened to reduce stress on the trough areas, but the reduction has be done carefully and in multiple sessions with little removal each time.

It is certain, that the over-enthusiastic use of power instrument, where both arcades are completely flattened, will result in problems. Because of the excessive removal of tooth material the molars are no longer in contact and horses with severe cheek tooth reduction have problems with mastication.

Over floating an old mouth

Old horses are a challenge for the equine dentist. Irregular wear, periodontal disease and neglected or poor dental care often result in a mouth with waves, and loose or missing teeth on one side and hooks and sharp points on the other side. The picture below shows an example of an old horse with a long overgrown tooth in the lower arcade (double arrow) resulting in a severe soft tissue damage in the area of the upper missing tooth (single arrow).

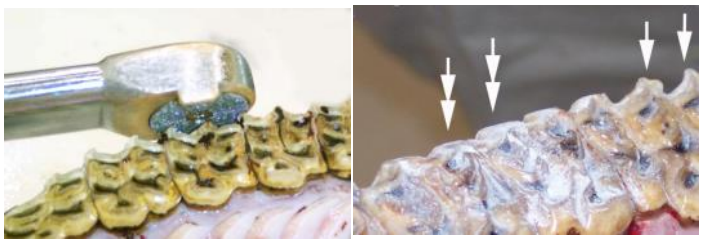
Missing teeth and mucosal damage

In most of these cases it is impossible to achieve perfect equilibration and the goal of the treatment is to make the horse as comfortable as possible. The use of a rotary power instrument such as the Swissfloat is imperative, since many of the half loose teeth are impossible to float with a manual instrument and in a reciprocating motion.

However power instruments have to be used very carefully without removing too much tooth material. Old horses don't have many teeth left to chew with and excessive dental work only results in gaps between the arcades making it even harder to do the job. The treatment is focused on smoothening any sharp points, and to carefully reduce ramps and hooks – and not to make the mistake to remove too much tooth material.

Preserving the grinding surface

The different hardness of enamel and dentin results in the irregular biting surface of the cheek teeth despite constant grinding. The irregular surface is needed for proper eating of the coarse diet of a horse. It is very important to leave as much of the irregular grinding surface as possible and to reduce sharp points from the outside (vestibular) side of upper cheek teeth, and from the inside (lingual) side of lower cheek teeth.



Correct floating with the Swissfloat, preserving as much grinding surface as possible

Ideally the instrument is positioned in a 45 degree angle to smoothen the sharp points only. The example here shows an upper arcade with sharp enamel points (single arrow) before, and after floating (double arrows). The biting surface of these teeth has been well protected.

Proper way

Usually it is fine to check and float once a year if there are no lesions that demand a more frequent treatment. However young and old horses, unless they show a perfect mouth, benefit from more frequent visits.

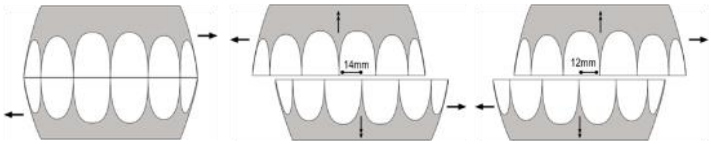
It has been stated several times in this article that overfloating is one of the biggest mistakes made in equine dentistry. As little tooth as possible and as much as needed should be the motto for routine dentistry. Severe cases require floating in intervals of several month until the appropriate level of equilibration has been achieved and the progress has to be monitored carefully in the medical record.

It is impossible to ad on what has been removed, and a more conservative approach is safer for the horse. It could be considered offer a free re-visit within two weeks after floating a horse, if the client is not happy with the result. This is rarely needed but it allows to be more conservative in difficult cases, and it doesn't leave the impression of a failure at the second visit, since the point to be careful and restrictive with the power instruments had been made at the beginning.

EMC

The EMC procedure (excursion to molar contact) is a very simple procedure that helps to determine how much tooth material should be removed and whether the work is done.

At rest the cheek teeth of a horse are not in contact, but the incisor teeth are. When moving the jaw to the side, the cheek teeth eventually reach contact and, due to their angulations, slide on top of each other resulting in a separation of the incisor teeth. The distance of the incisor excursion to each side until the molars reach contact is measured. The distance should be around 12-14mm and equally to each side. Once in contact the further lateral movement and incisor separation should be easy and without locking of the jaws.



If the distances to the left and right are not the same or if the lateral EMC procedure is not smooth, the mouth should be examined carefully to find the reason for these findings. After dental equilibration the EMC procedure should be repeated to monitor the progress.

An EMC that is too small or too large can be corrected with molar and incisor reduction respectively, but these procedures have to be done carefully and should be done by an dentistry specialist.

Modern dentistry instruments are powerful, but they are designed to make the veterinarians live easy not to harm horses. Or in simple words, the key for a good dental work: less is more.