Introduction

The words, “More diagnoses are missed through not looking rather than not knowing” certainly apply very well to the equine mouth. However, it is often for good reasons that many of us in the past have shied away from attempting to examine a horse’s mouth thoroughly. This lecture will attempt to summarise the correct technique, whilst highlighting some of the difficulties and how to overcome them. The need to examine a mouth is a very common part of equine practice, and the rewards for doing it well are present on many levels.

Why examine an equine mouth?

The most common reasons for an equine veterinarian to examine a horse’s mouth are:

1) Part of a performance float
2) Part of a pre-purchase exam
3) Part of a clinical examination in acute disease such as dysphagia, hypersalivation, anorexia, choke, fever of unknown origin, tetanus, sinusitis.
4) Part of investigating chronic diseases such as weight loss, chronic diarrhea, recurrent colic, recurring fertility problems in broodmares.

What anatomical parts are examined as part of an oral exam?

1. Rest of body – brief
2. External structures of the head and mouth – skin, muscles, eyes, nose, bones.
3. Lips and mucosa
4. Incisor teeth, periodontium and associated tests (EMC, AMO, RCM).
5. Canine teeth
6. Bars of mandible (inter-dental space where the bit rests when bridled)
7. Cheek teeth and periodontium
8. Cheeks, tongue, palate

The list above seems logical but is easier said than done, when it comes to checking all these structures in a live horse.

Limitations in achieving a thorough exam

The problem we have is that we are trying to achieve a very thorough exam, but have restrictions against us such as:

- Time – if the examination takes too long the horse becomes more intolerant, or may not tolerate it from the start
- behaviour of horses is quite variable and can be unpredictable – especially once you put the gag on,
- we are looking in through a small opening to a long dark cavity
- the horse’s tongue is very strong and mobile, and is often used to push instruments out of where we want them to go e.g. gag, mirror, probe
- sharp teeth which can cut our hands when palpating
- full mouth gag is necessary but can be dangerous to horse and operator
- grass hampers visualisation of teeth and gums
- biosecurity vs. bacteria, viruses e.g. strangles, Hendra, - risk to us and other horses
- Occupational Health and Safety (OH&S) – incidence of serious injury to horse vets is nearly 100% during their career.

Solutions to overcome these limitations:

- Good history taking – will aid you detecting and solving problems of the horse and rider
- Sedation – will make the horse more tolerant in accepting your manipulating their mouths, jaw, and examining inside their mouths.
- Use a gag which is strong and safe – to safely keep the mouth open.
- Flush the mouth – so you can feel and see the teeth and soft tissues.
- Use a light – some things you can feel but not see, and others you can see but not feel e.g. colour changes, gingivitis
- Use a probe – to clean out pockets etc
- Mirrors – to aid visualising into pockets and cavities and onto surfaces facing the dorsal, ventral or caudal. Use a disinfectant and detergent combination such as chlorhexidine scrub solution to prevent the mirror fogging up.
- Head rest – to counter act the “head droop” associated with most sedatives. Heads and necks can weight well over 20-30 kgs so it is not safe to expect anyone to hold them up – especially when they have a metal gag on the end of the muzzle!
- Stocks – to support any horse which becomes ataxic, and to stops them walking forwards or backwards when you are trying to examine them. Also keeps you, the owner and the horse safer than if not in stocks.
- Camera/scope – to enhance or record what you visualise.
- Radiology – to aid in further investigation of bony swellings and other problems such as periodontal disease.
- PPE – mask, gloves, glasses, disinfectants
- Organised, systemic approach – to minimise time wastage and inefficiency. Keep your equipment well organised and utilise fold up tables or benches.
- Float the teeth DURING the oral exam, in order to minimise time wastage, minimise the need to ‘top up’ the sedation, and reduce cuts to your hands.

Limitations to these solutions:

- Visibility and ambient light – if you are working out in direct sunlight, even a powerful light in the mouth will struggle to overcome your own eyes’ pupillary constriction – which allows less image detail reach your retina. Thus you need both a bright light and shade if possible.
- Cost of the sedation – can be a problem for practice owner and client if it is too high. Need to seek cost effective combinations of sedatives.
- Cost of equipment – need to invest in a minimal range of equipment to allow you to achieve good results and thus attract more work. Also to prevent your services gaining a reputation of being poor quality and “cheap” – will not attract good clientele and may even compromise your reputation in other areas
  Your equipment list can be categorised into:
  a) examination tools (gag, light, chin support, flushing syringe, mirror and probe),
  b) floating tools,
  c) extraction tools,
  d) storage (cases), organisation (fold up table), cleaning (disinfectants, bucket, brushes), safety and maintenance tools.
- Duration of sedation - it is preferable if you can do the examination AND treatment done before the sedation runs out, or sedation “top-ups” become necessary. One or two top-ups is acceptable, but heavy sedations lasting more than 1-2 hours can increase the risk of gut stasis, and so should be minimised if possible.
- Lack of facilities – throughout the world and across all types of socio-economic regions, there seems to be little appreciation by owners given to the safety of vets who work on horses. Even in the wealthy areas of Kentucky, USA, vets are expected to visit farms and preg test mares without the use of stocks. If you cannot convince most of your clients to build suitable stocks for you to work on their horses, portable stocks may aid in you staying safer and performing better quality work – where you can focus more on the job at hand and communicating with the owner – rather than fearing for the safety of you, your equipment, the horse or the owner.
- Water – for cleaning out the mouth to visualise and also to clean your gear and reduce fomite spread of infectious organisms.
- Temperament and behaviour of horse – can be extremely variable between horses and also in the same horse when exposed to different procedures e.g. putting a gag on a quiet old horse may induce a pain-induced forceful evasion technique once the gag is applied and opened e.g. pushing into or barging over the vet! This may well be why some dental practitioners recommend that old horses “don't need dental care, as they have no teeth!” What they really mean is the quiet old horse becomes a “monster” once the gag is opened!
- Market standards and education - your “call back rate” may not be good if you spend up to an 1 hour examining a mouth extremely thoroughly, and then take similar amount of time to float the teeth, and charge the appropriate hourly rate e.g. end up charging more than $300 for each horse for routine 6-12 monthly dental visits. The equine industry is very price sensitive and this practice may well result in you doing very little dentistry in your area. The key to success is good communication, education and let them know why they are getting what they pay for.
- Length of the sedation – the expectations of the owner depending on their education and previous experiences e.g. may be worried about
sedation if they've had previous bad experiences, may have been hit in head with a full mouth speculum

**Streamlining the oral exam during a performance float**

Your chosen process can increase or decrease your effectiveness and efficiency in maintaining high standards of oral exam technique during routine performance floats on horses.

The step by step process I find most time efficient, without compromising effectiveness is:

1) Before you touch the horse:
   - get a history and record on your dental chart – aids in the problem solving process and alerts you of the problems you're being employed to solve.
   - assess the attitude – helps you decide on type and amount of sedation
   - distant exam – aids your brain to think of the differential diagnoses for the patient and its problems e.g. if it has ill thrift, what conditions other than bad teeth could be contributing – such as parasites, chronic infection, malnutrition, low position in herd, stomach ulcers, heart, lung, kidney, liver disease.

2) Clinical exam - heart, respiration, skin tent, jugular pulse, temp?

3) 1st part of sedation – mixed in 1 syringe – using less potent sedatives e.g. acepromazine 10 mg, xylazine 100-150 mg (and possibly detomidine 2-3 mg) for anxious horses – which takes 5 minutes to work) to start working before the butorphanol (3-5 mg) is given in second part of sedation. Giving butorphanol in the first sedation results in many horses wanting to walk forward when being worked on.

4) Load the horse into stocks, or complete setting up your gear or adding details to dental chart if not using stocks.

5) 2\textsuperscript{nd} part of sedation – xylazine 100-250 mg mixed in 1 syringe with 3-5 mg of butorphanol.

6a) External oral exam – visualising and palpating the masseter muscles, TMJ region, temporal muscles, bones of the skull and mandible, lymph nodes, salivary glands, eyes and nostrils. This time and palpation also gives you and the horse some time to “bond and get to know” each others’ temperament before applying the gag etc. If it starts pushing you around at this stage, you’re in for a battle! If it is getting too sedated already, you need to speed up and start floating as soon as possible.

6b) Palpate for wolf teeth and the “bars” of the mandible. Wolf teeth are ideally removed in horses that are bitted, so their presence will lead to a discussion of whether the owner would like them removed by you at this visit. The bars of the mandible (dorsal border of the mandible in the space rostral to the first lower cheek teeth) are at risk of being traumatised by the bit when ridden by a heavy handed rider. So pain or small bony roughening or lumps here could be either new or old problems but must be discussed, as they can cause significant pain
to a ridden horse. It is also possible to get unerupted wolf teeth in this region, so an x-ray may be indicated.

7) Examine the labial mucosa and incisors. Are the incisors in good alignment? Are they in good health – the tooth and the periodontal structures supporting it? Does their wear pattern suggest that the horse has been chewing properly as evidenced by the quick tests of EMC (excursion to molar contact), AMO (angle of molar occlusion) and RCM (rostro-caudal movement)?

You need to visualise both the labial and the occlusal surfaces of every incisor tooth to gain information of its health and viability. At the same time, visualise and palpate the surrounding gingival. It is not uncommon to find advanced periodontal disease affecting incisors, which is palpably painful – even in these sedated horses, and ongoing “home care” treatment may be necessary e.g. sweetened chlorhexidine solution.

8) Treat any OBVIOUS incisor malalignment, which is affecting mastication at this point – whilst the butorphanol is working at its peak (only last 10-15 minutes). Filing of incisors is less tolerated by horses compared to cheek teeth, so if you leave all the incisor work until after treating the cheek teeth, it may lead to you needing to administer more butorphanol later. Incisors should not be filed back more than 2-3 mms each 3 months, to avoid the risk of pulp exposure and overloading of molars, so incisor work is often quick and minor, but much easier when butorphanol is taking effect.

9) Apply the gag, open it, and rinse out mouth.

10) Quickly visualise inside the mouth, use mirror, then palpate

Then show the owner, but keep it simple!

Advise you will complete the exam after you have done the performance float, including the removal of sharp points, balancing the mouth and doing a “bit seat”.

No matter what further pathology is in each mouth, the minimum treatment you will do is a performance float, and any additional treatment will need to be discussed in regards to prognosis, cost etc. So it is best to get the performance float done whilst the sedation is still effective as possible.

11) Use mirror to examine and assess periodontal health, along with double checking of occlusal surfaces of teeth, especially the dentine covering pulp chambers.

**Streamlining the oral exam when examining sick horses.**

- May not be suitable to sedate – need horsemanship skills to work with horse at each step – “ask” the horse using signals e.g. to open mouth – press your finger against the horse’s palate.
- Need to practice gag application and opening on quiet, unsedated horses before working on client’s horses, as it requires more skill than when the horse is sedated.
- Assess incisors and use them to gather info but be aware of limitations of not being sedated. The unsedated horse willingly resists lateral excursion of the mandible, despite being able to chew normally. Thus these tests are almost useless in unsedated horses.
- If you are not putting a gag on, you can palpate the upper second premolars’ buccal edges to check for sharpness. If these are sharp, then the caudal molars will be even sharper.
• If you are not using a gag, you can still palpate upper PM2-4 (sometimes Molar 1 as well) teeth’s bucco-occlusal edge through cheeks rostral to the masseter muscle. Can often detect severe waves, missing teeth, hooks etc.
• Check Rostro Caudal Movement RCM through palpating the labial edges of the incisors whilst asking the horse to raise and lower its head. Beware of getting nipped though.
• Gag types in unsedated horses. Use of a plastic wedge speculum may be safer to the operator than a full mouth gag. However it does offer restricted palpation of the entire mouth as you can only palpate one side at a time.
• PPE – especially if respiratory or neurological signs and Hendra is on the differential list - maybe only do external or distant exam.

Streamlining the oral exam during pre-purchase examinations

• Need to explain the absolute need for sedation of the horse to achieve an accurate examination!
• Need written permission from buyer and vendor to sedate and perform a thorough and safe oral exam. Don’t do until rest of exam including blood collection is completed.
• Cannot accurately assess a mouth in an unsedated horse, so need to write this on pre-purchase exam chart!
• Need gag, light, flush, chin support, mirror, probe.

What if you fail to examine and detect problems in a horse's mouth:

Possible complications:
- Horse continues to suffer
- Horse’s ridden behavioural problems don’t improve.
- Litigation if it occurs during a pre-purchase exam.
- The next dental practitioner finds what you missed, and a bad reputation of your dental skills develops or continues.
- Your skills and knowledge fail to improve and keep up with advances in this field.
- You lose out on getting the work to treat the problem e.g. x-rays, extractions, medications, follow ups visits.

Unfortunately for the welfare of horses, failure to properly examine and effectively treat dental disease is extremely common.

With this scenario, the horse continues to:

a) Disguise the problems from its herd mates and predators (and owners)
   – through instinctive, “prey animal type” fear of being pushed down the pecking order and into the attention of predators.

b) Live with the problem and resiliently alter its mandible motion to avoid the painful pathology as best it can each time it chews.

c) Graze for more hours each day to try to ingest adequate calories to accommodate for its slower chewing speed.

Hopefully, equine veterinarians can continue to rapidly improve their oral exam techniques, detect and treat the pathologies which are so common in domesticated horses. In doing so, these vets can drastically reduce the incidence of painful pathology endured by many horses.