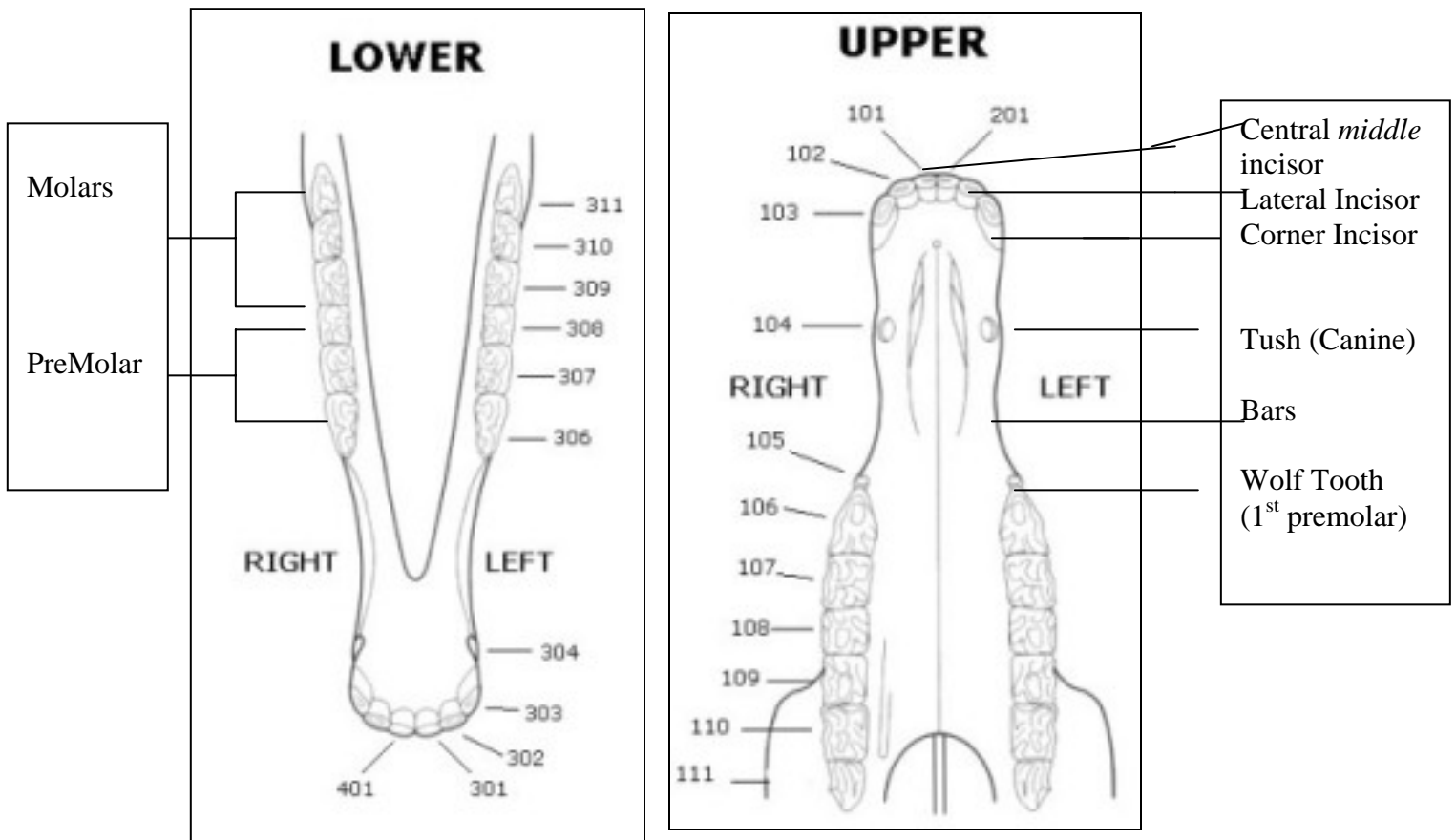


**Regional HA/H-B/C-3
Equine Teeth
January 16, 2007
Handout**

Anatomy of the Jaw



Adult horses usually have 36 (mares) 40 (males) teeth, but may have up to ---44 (4 wolf teeth)

- Six upper and lower premolars
- Six upper and lower molars
- Two wolf teeth, but may have up to 4
- Four canine teeth usually in stallions only
- Six upper and lower incisors (front teeth)

-Premolars and molars as a group are called cheek teeth or molars.

-Wolf teeth are small, vestigial teeth usually found just in front of the second

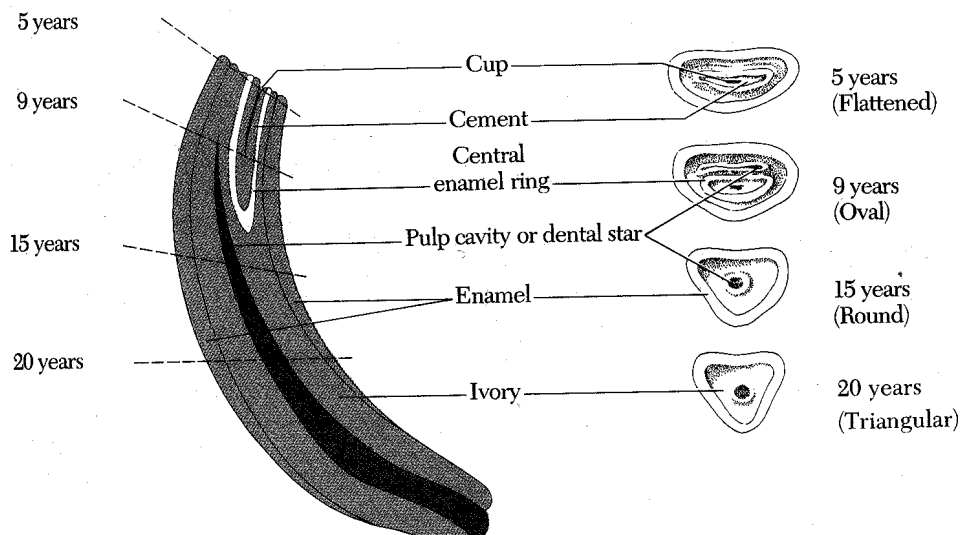
premolars; however, they are sometimes found in front of the lower second premolars. Wolf teeth are the first premolars. They are not functional as grinding teeth. They are usually removed from horses that use a bit, because they cause pain.

- Canine teeth erupt when the horse is 4 or 5 years old. Most mares do not usually have canine teeth. If canine teeth are present, they are very small and resemble wolf teeth. Canine teeth are usually one to 1.5 inches behind the corner incisor. The gap between the upper corner incisors and the canines is larger in the upper jaw than the lower jaw; therefore the tushes do not meet and therefore do not wear.
- Incisors are designed to bite off forage, after which the tongue moves forage back to the molars.
- The molars crush and grind forage into small pieces, usually 1/4 to 3/8 inches long, so digestion will be complete.

The forage gets only one trip through the mouth and it has to be minced adequately, otherwise absorption of nutrients is diminished.

Undulation is the natural, uniform wave in the chewing surface of the molars. Each molar has two waves. The undulations go from side to side of the tooth. This allows for better food grinding. They grind their food by sliding their teeth side to side. The horse opens its mouth slightly and moves the jaw to one side. As the mouth closes the chewing surfaces shear off or grind their food. They chew on one side of the mouth at a time. As the jaw returns to the resting position, the chewing surfaces separate. When the front teeth or incisors are in contact, there should be no contact between the upper and lower molars.

Horses chew in this manner because of the anatomy of their mouth. The upper molars are set wider apart than the lower molars. There is little overlap of the teeth surfaces. Therefore, chewing in the way that humans do, would have little effect on their food. This grinding motion causes the surface of the teeth wear at a 15 degree angle. The horse's teeth are much stronger than ours because of what they eat. Our teeth would not last 6 months on hay and grass diet as it would be like eating sandpaper all the time. The Dentin, Enamel and Cementum are the key components that give the horse's teeth their strength. They create the intricately layered, folded, multi-ridged and strong surface of the tooth.



Glossary of Terms:

Cup (Infundibulum): The dark or dark-brown to black cement lined "crater" in the biting surface of each permanent incisor tooth that is worn away by the time a horse is 8 years old, leaving a flat mark called an enamel spot.

Crown: Part of tooth that shows above the gum line

Cement: the comparatively soft material that covers the outside of the tooth; connects the tooth to the jaw bone beneath the gums surface; and fills the inside of the incisor cups.

Enamel: the calcium rich substance that forms a thin layer over the incisor teeth and is complexly folded into the horse's molar teeth. This is the hardest tissue of the body.

Enamel Spot: the white enamel floor of a tooth cup that is left visible when the cup's cement has worn away.

Dentin: Bone like material (harder than bone) makes up the greater part of the tooth below the surface layer of enamel. Provides structural rigidity and $\frac{1}{2}$ tooth material.

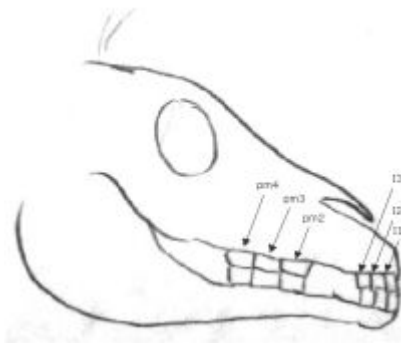
Dental Star: The brownish dentin exposed by wear that appears between the enamel spot and the front of each permanent incisor, starting with the central incisors about age 8. Initially a straight line across the tooth, the dental star curves with age, and eventually becomes round and dark brown on all incisors.

Pulp: the living tissue at the heart of the tooth, including the nerves and the blood vessels. As the pulp recedes over the years, it leaves behind stained dentin which steadily emerges as the dental star.

Aging the Horse by its teeth

Completely formed at an early age equine teeth erupt throughout the animal's lifetime as the grinding surfaces slowly wear away. In a young adult horse, about $\frac{1}{4}$ inch of a $4\frac{1}{2}$ to 5 inch cheek tooth is visible beyond the gum line, with the rest of the tooth stored in the dental socket. In a five year old with his recently completed "full mouth", the roots of the upper back molars reach almost to the eye socket. A horse's head weighs 7 lbs more at 4 than at 15 years because of his teeth. The permanent teeth grow at about $\frac{1}{8}$ th inch a year. This is usually enough to account for usual wear and allow the upper and lower incisors to maintain contact.

The horse, like most other mammals, has two sets of teeth during his life. They are born with them from expanded gradually. as milk, in pairs, and teeth.



one set of baby or deciduous teeth (or get the age of a few weeks/months); a new and set of permanent teeth will replace them There are 24 deciduous teeth (also known temporary, or baby teeth). These come out are pushed out later by the permanent

Deciduous teeth (baby teeth, milk teeth):

The full set of baby teeth in the horse counts 3 incisors and 3 cheek teeth in each jaw (a total of 24 teeth). The central incisor and the 3 cheek teeth (caps) are usually present at birth or right after, the middle incisor at 4-6 weeks and the corner one at 6-9 months.

Common ages for tooth eruption

Type of tooth	Number	Deciduous	Permanent
Incisor	First (central)	birth to 8 days	2.5 yrs
Incisor	Second (intermediate)	4.5-6 weeks	3.5-4 yrs
Incisor	Third (corner)	6-9 months	4.5-5 yrs
Canine		Absent	3.5-5 yrs, some around 6 yrs (if ever)
Premolar	First (wolf)	Absent	6 months to 3 years (if ever)
Premolar	Second	birth to 2 weeks	2-3 yrs
Premolar	Third	birth to 2 weeks	2.5-3 yrs
Premolar	Fourth	birth to 2 weeks	3-4 yrs
Molar	First	Absent	9-12 months
Molar	Second	Absent	2 yrs
Molar	Third	Absent	3-4 yrs

By age five, all permanent teeth have usually erupted. The horse is then said to have a "full" mouth. However, individual horses will vary, and some breeds and types of horses are known to have differing eruption timelines. These include: Shetland ponies: The middle and corner incisor (both deciduous and permanent) usually erupt later than the average horse. Draft horses and miniature horses: the permanent middle and corner incisors usually erupt later than average.

Charting the Dental Change: (see algorithm for aging horses by their teeth)

1. The cement lined enamel cup wears away first on the incisors: - lower central incisor - 6 yrs, lower lateral incisor 7 years, lower corner incisor - 8 years. Because the cups on the upper incisors are deeper they take longer to disappear - upper central incisor 9 years, lateral upper incisor 10 years, upper corner incisor 11 years.
2. After the back edge of the cup disappears around age 15, the surface of each incisor is marked by a small round enamel spot.
3. Yellow-brown dental stars appear between the ages of 8 and 10 as the upper portion of the tooth is worn away. They start out as dark lines in the center of the tooth, then change to more star like ovals at age 13 and become round at about age 15. In elderly horses, the tooth's surface is worn smooth and patternless.
4. As the horse ages the shape of the incisor changes from narrow (front to back) or flattened (5 years), to oval (9 years) to roundish (15 years) to triangular (longer front to back rather than side to side) (20 years).
5. The profile of the upper and lower incisors changes from nearly upright in the young horse to a forward slant in the elderly.
6. The hook - appears on the outer edge of each upper corner incisor at approximately age 7, disappear at age 8 and reappear again at age 11.
7. Galvayne's Groove (name after the horseman who made his living by aging horses at sales in the 1880's - developed the aging system by the teeth): A yellow brown line that appears at the upper gum line of the upper corner incisor at the age of 10, $\frac{1}{2}$ way down tooth at age 15, to the bottom of the tooth by age 20; gone from the top half of the tooth by age 25 and gone by 30. (Many horses run out of teeth by 30)

Judging age by Galvayne's system is at best an educated guess as various factors influence the pattern of wear on a horse's teeth including:

- Genetics e.g.: Arab teeth wear more slowly than standard bred and they more slowly than Draft horses
- Type of forage: - grass in sandy soil wears teeth faster than grass in less sandy soil
- Grazers have to cut forage and pull with their incisors; a horse feed hay does not need to do this
- Feeding from a hay rack rather than the ground - provides less wear and tear on the incisors and slows the forward slant
- Horses with malocclusion (e.g.: parrot-mouthed) show abnormal wear and dentistry to correct such abnormalities may grind away the usual markings
- Mineral deficiencies (especially calcium and phosphorus)
- Cribbing or running their teeth along the stall bars

Abnormal Teeth Architecture:

Most dental problems occur early in the horse's life. Oral deformities may be congenital (there from birth) or may develop as the permanent teeth erupt from age 1 to 5 years. If the permanent teeth do not erupt normally or the baby premolar teeth (caps) remain in the mouth, the resulting irregularities or crowding can cause misalignment of the permanent teeth.

Parrot mouth: Upper incisors protrude beyond lower - In mild cases the incisors are only slightly separated - in severe cases upper jaw can extend 2 ½ inches beyond lower jaw.



Sow Mouth: the lower jaw protrudes beyond the upper.

Wry Mouth: the upper or lower jaw twists to one side or the other. May also affect air flow on one side of the nostrils

Cribbing or wood chewing: can cause the lower corner incisors to wear and the upper to grow longer as they grow "unopposed" - and give the appearance of a frown. Or they can cause uneven wear and an offset bite with the upper and lower Incisors being completely offset. These vices also wear down the incisors at an earlier age.

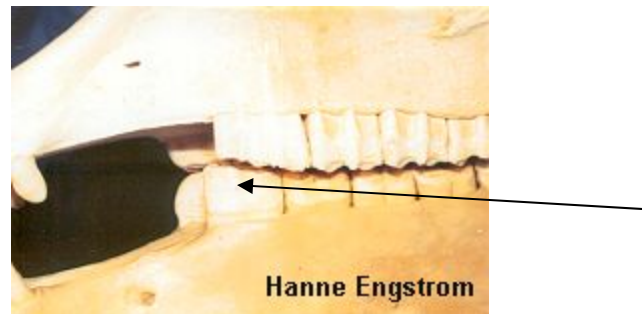


Abnormal Wear Patterns:

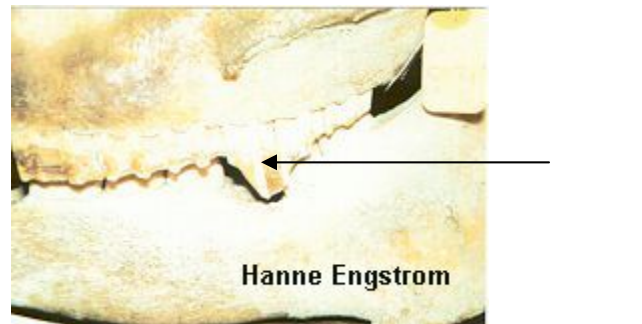
Wave Mouth: 2 or more teeth in the molar arcade are high, creating a series of ascending and descending grinding surfaces in a wavelike pattern. This can be the end point of other neglected malocclusions such as ramps, missing teeth or hooks. Failure to properly shed baby teeth (retained caps) can start the process and wave mouth can begin as early as 6 years.



Ramps: are typically premolars with a surface that slopes like a ski jump. Ramps may occur when the upper front baby premolar is retained, preventing normal growth of the permanent premolar. Ramps can cut the cheek or tongue when the horse is bitten.



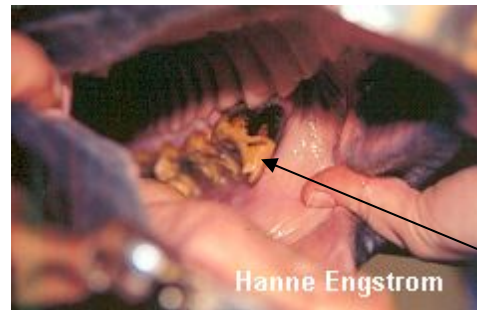
Step Mouth: A stepped molar has grown unopposed and this unworn so that it juts above the rest of the molars. A gap in the opposite molar initiates the abnormality, and the overgrown tooth can seriously inhibit the chewing motion of the horse. This can be corrected by filing the tooth to the level of the other teeth.



Shear Mouth: This occurs when the grinding surfaces of the cheek teeth are severely sloped on each individual tooth (so the inner side of the teeth is much higher or lower than the outer side of the teeth). This may result in an angle at 60-75 degrees, opposed to the normal 15 degree angle seen on most horses. Again, the chewing motion is severely affected.



Hooks: sharp points on a tooth; usually develop on the outside of teeth in the upper jaw, the inside of teeth in the lower jaw from the normal chewing motion. They also commonly occur on the front of the first upper premolar, or last lower molar when an overbite or under bite causes an imperfect meeting of the top and bottom arcades. Front hooks are commonly caused when the upper first cheek tooth sticks out in front of the lower first cheek tooth and the unopposed front of the upper tooth gets no wear. As it gets longer and thicker and forces the lower jaw rearward and the back cheek teeth become out of contact.

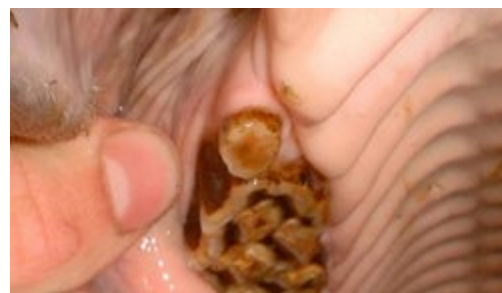


Hook formation on the upper premolar

Other dental problems:

A wolf tooth, located just in front of the premolars.

Other common problems include abscessed, loose, infected, or cracked teeth, retained deciduous teeth, and plaque build up. Wolf teeth may also cause problems, and are many times removed, as are retained caps.



Signs of possible dental problems

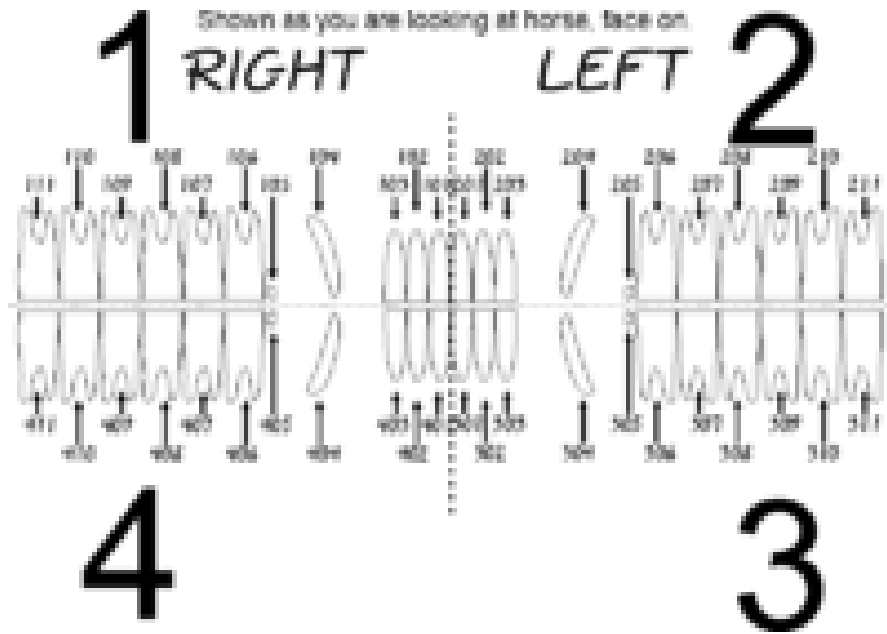
- Reluctance to eat, does not finish food, or eats slowly
- Dull coat, weight loss, and loss of condition
- Quidding (horse drops partially chewed food while chewing), or chewing with the mouth open
- Turning of head to the side while chewing
- Excessive salivation while eating, blood in saliva
- Foul smell from mouth or nose
- Draining of abscess from the jaw
- Discharge from one nostril
- Undigested feed in manure
- Colic
- Excessive salivation
- Facial swelling

Additionally, many problems under saddle can be tooth-related, such as:

- head tossing
- difficulty in picking up the canter or in performing flying changes
- tilting of the head while riding or difficulty in bending
- refusal to collect
- bucking
- difficulty in getting the horse "on-the-bit" (especially if the horse tends to go behind the bit)
- gaping the mouth

For many performance-related problems, it is often best to check the teeth to rule out that factor.

Prevention of dental problems



Many veterinarians will use a Triadan chart to record the animal's dental problems for future reference.

To help prevent dental problems, it is recommended to get a horse's teeth checked by a veterinarian or equine dentist every 6 months. However, regular checks may be needed more often for individuals, especially if the horse is very young or very old. Additionally, the horse's teeth should be checked if it is having major performance problems or showing any of the above symptoms of a dental problem.

Many horses require floating (or rasping) of teeth once every 12 months, although this, too, is variable and dependant on the individual horse. Floating involves a veterinarian or equine dentist wearing down the surface of the teeth, usually to remove sharp points or to balance out the mouth. However, the veterinarian or equine dentist must be careful not to take off too much of the surface, or there will not be enough roughened area on the tooth to allow it to properly tear apart food. Additionally, too much work on a tooth can cause thermal (heat) damage (which could lead to having to extract the tooth), or expose the sensitive interior tooth.

The only way to prevent problems is to have your veterinarian sedate your horse, fit him with a speculum to hold the mouth open and use a light source such as a flashlight to completely exam (see and palpate) your horse's mouth every year.

Never Look A Gift Horse in the Mouth! - WRONG!

You should look every horse in the mouth if you expect to take proper care of him!