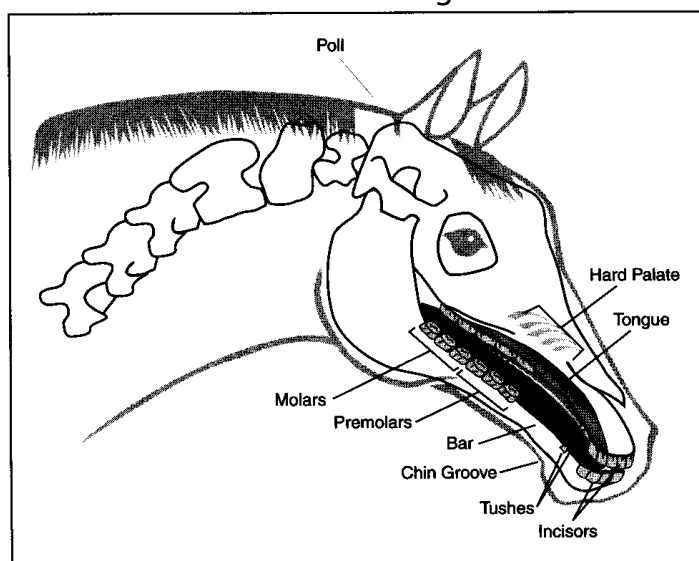


MOUTH ANATOMY and BIT DESIGN

The horse's mouth comprises the lips, jaw, teeth, bars, tongue and palate, and is one of the least understood parts of the horse's anatomy.

The inside of the horse's mouth is like a cavern, created by the jaws, walled with the teeth, roofed by the mouth and filled with the tongue.



Parts of the Head & Mouth

The Lips

The lips are covered by a thin layer of skin and are very sensitive.

The bit comes into contact with the lips in the corner of the mouth, and if not properly fitted, can pinch painfully and cause damage.

Check the corners of your horse's lips regularly for scars or sores indicating an ill-fitting bit.

The Teeth

Horses have 3 kinds of teeth:

the incisors at the front, used with the lips for cutting and pulling food into the mouth; the canine teeth (or tushes); and the cheek teeth, known as molars and premolars.

The cheek teeth are the most likely to require dental attention due to wear causing a painfully sharp edge. Biting problems associated with the teeth normally arise in connection with the front premolars and wolf teeth. Wolf teeth are small teeth that can appear directly in front of the premolars, one on either side but often angled and mis-aligned. They can be a problem because they are situated exactly where the bit will sit in the horse's mouth.

The Bars

The bars are the teeth-free space on the jaw where there are no teeth, between the premolars and the tushes.

The shape of the bars can vary – from v-shaped and sharp to broad and flat. The covering skin can also vary greatly in thickness. The shape and skin thickness will make a big difference to the sensitivity of the bars and the most suitable bit.

The Tongue

The tongue is a large, extremely strong muscle containing literally thousands of highly sensitive nerves. It is used primarily for eating, drinking & swallowing. Horses produce up to 38 litres of saliva a day (equal to 2 x office water cooler bottles!)

Horse's tongues can vary enormously in size and thickness. A very wide and fleshy tongue may be seen squishing out between the horse's teeth when the side of the upper lip is raised. It is important to assess the size and condition of the tongue, not least to establish how much room there is in the horse's mouth to accommodate any kind of bit. A very large tongue may greatly restrict the ability of the bit to touch, and therefore act on, the bars.

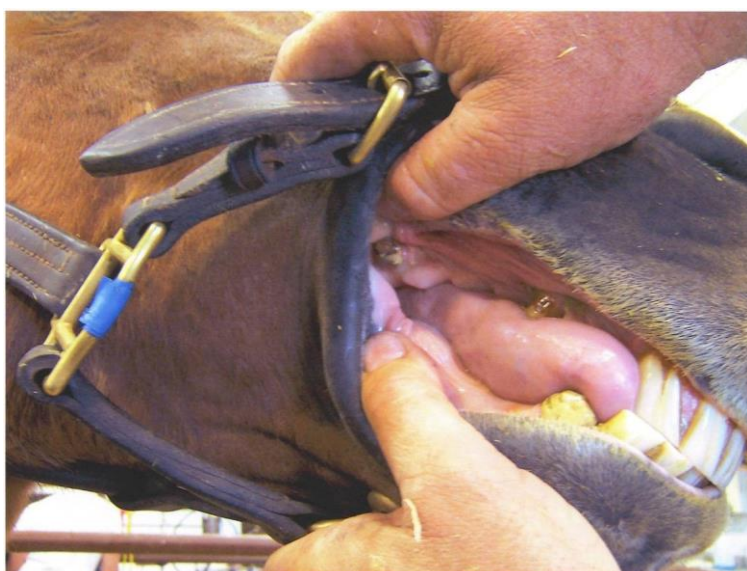
The Palate

The palate, or roof of the mouth, is covered with hard flesh and skin and is slightly curved upwards towards the horse's ears. The palate is a sensitive area and the height of the palate will also influence the amount of space there is inside the mouth for the bit.

The Curb and The Poll

Two other areas of the horse's head, the chin (and higher up on the back of the jaw) and the poll, are also important in the working of many bits. The chin/back of the jaw will receive pressure from a curb strap or chain into the curb groove or above. The poll, located at the 2nd vertebra at the top of the horse's neck will received downward pressure through the headpiece of the bridle. Pressure on the poll will release endorphins into the horse's system, which have a calming, pain controlling effect.

All horse's mouths are different and these differences should always be taken into account when deciding on the best bit for each individual horse.



However, whatever the individual variations, the tongue always takes up the vast majority of the mouth cavity, so any bit will depress and exert pressure on the tongue.

This X-Ray demonstrates the effect of the rein aid on the tongue.

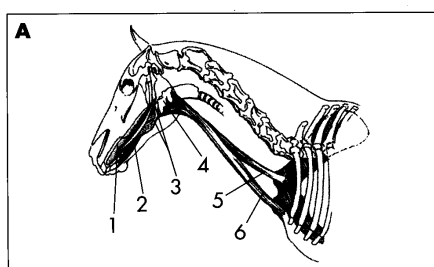
The horse here is facing to the right and the rider's hands are to the left and approximately 40° above the mouth. You can see the ridges on the palate and the how the rider is using this jointed snaffle to pull the tongue backwards into the bottom jaw.



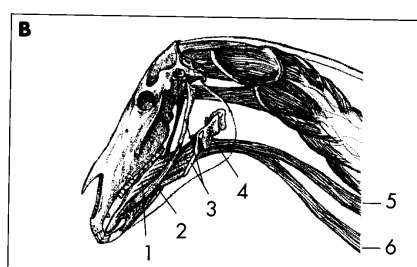
Physiology of the Mouth Related to Biting

Some of the tongue muscles connect to a small set of bones in the throat called the hyoid bones. Originating from the hyoid bones are two major neck muscles, one connecting with the sternum and one with the inside of the shoulder. Therefore, discomfort and tension in the tongue will lead to tension all the way down to the bottom of the neck. If the sternum muscles are tense, the horse cannot raise its back and use the circle of muscles that connect the poll to the tail and travel along the underside of the horse back up to the poll.

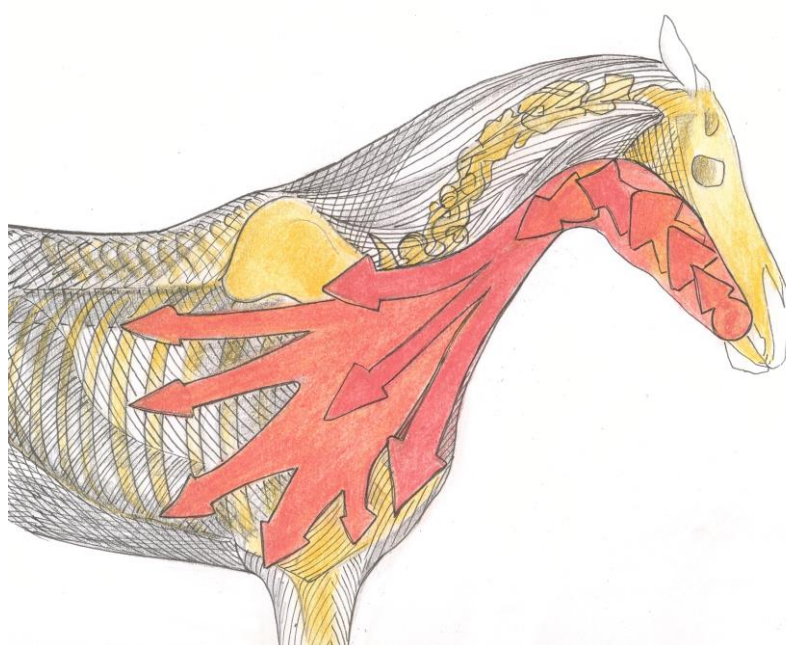
In addition, there are muscles connecting the hyoid bones to the temporo-mandibular joint (the TMJ, or jaw,) which is an important centre for nerves involved in balance and proprioception (part of the horse's coordination system.)



Structures of the tongue and neck: 1) tongue muscle (hyoglossus) 2) tongue muscle (styloglossus) 3) hyoid apparatus 4) larynx (cartilage) 5) omohyoideus muscle 6) sternohyoideus muscle.
(Drawing by Susan Harris)



Detailed structures of the tongue and neck: 1) tongue muscle (hyoglossus) 2) tongue muscle (styloglossus) 3) hyoid apparatus 4) larynx (cartilage) 5) omohyoideus muscle 6) sternohyoideus muscle.
(Drawing by Susan Harris)



Tension on the tongue will spread throughout the horse's body effecting his movement and his ability to do his best work

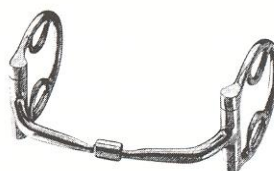
BIT STRUCTURE

Bits generally have 2 main parts, the cheeks and the mouthpiece.

The Cheeks

The cheeks can be varied in style, depending on the discipline, the needs of the rider and the aesthetic effect on the horse's head. They connect the bridle and reins with the mouthpiece, a key communication tool between horse and rider.

Shank cheeks give the rider leverage, allowing him to exert both backward and downward pressure in the mouth, downward pressure on the poll through the headpiece and downward and forward pressure against the jaw from the curb strap. The longer and straighter the shank, the quicker the action and greater the leverage, so the quality of the rider's hands must be taken into account when choosing shank length.



“Ring” cheek pieces, (eg. eggbutt and loose ring snaffles) give mainly direct action, ie. backward pressure on the mouth from the rider's hands.

Some ring cheeks (eg. Myler “hooked” eggbutt cheeks; Hanging Cheeks; or Full Cheeks used with keepers,) will allow some leverage action to tilt the mouthpiece downwards in the mouth, and some poll pressure to encourage the horse to come “onto the vertical”.

Mouthpieces

Mouthpieces are available in a wide variety of shapes, sizes, thicknesses and metals. Each design is meant to communicate in a certain way in a particular horse's mouth with a particular rider and so the choice of mouthpiece is relative to each horse and rider combination. The mouthpiece shape is very important because of the huge variation in mouth anatomy.

Mouthpieces generally come in two basic designs, solid and jointed. A solid mouthpiece consists of a non-folding bar attached to the cheeks and is used to exert direct pressure on the tongue, bars, lips and/or palate. The bar can be curved and since the advent of Myler's patented Independent Side Movement, may have a significant degree of rotational movement to make the rider's signals clearer to the horse.

Jointed mouthpieces consist of two or more pieces connected with a joint that allows the bit to fold in or collapse on itself. Besides acting on the tongue, bars, lips and/or palate, a jointed mouthpiece will also exert inward pressure, via a squeezing action on

the tongue, bars and lips, this collapsing action increasing in pressure as the rider pulls backwards on the reins.

Ported Mouthpieces

Mouthpieces with ports allow tongue room, which will be more comfortable for the horse and allow it to swallow. In the Western Riding tradition, correctly fitted ported bits are designed to use gentle, isolated applications of palate pressure to encourage the horse to flex at the poll. However, Western riders do not maintain a contact like their English counterparts, so none of the English style bits in the Myler range have ports which will touch a normal horse's palate, they are just designed to give tongue relief.

Pelhams

Pelhams have two reins, the top rein activates direct pressure on the mouth like a snaffle, and the bottom rein utilises leverage pressure with a curb chain and gives a little poll pressure.



Kimblewick (American name "Kimberwick")

This bit has a D-shaped cheek with a curb chain for increased leverage and a small purchase (the ring to which the headpiece is attached) to give poll pressure. The cheek has different options for positioning the rein. If the upper slot is used, the bit will have a direct action, if the lower rein slot is used, it results in leverage and curb pressure through the curb chain.

Gags

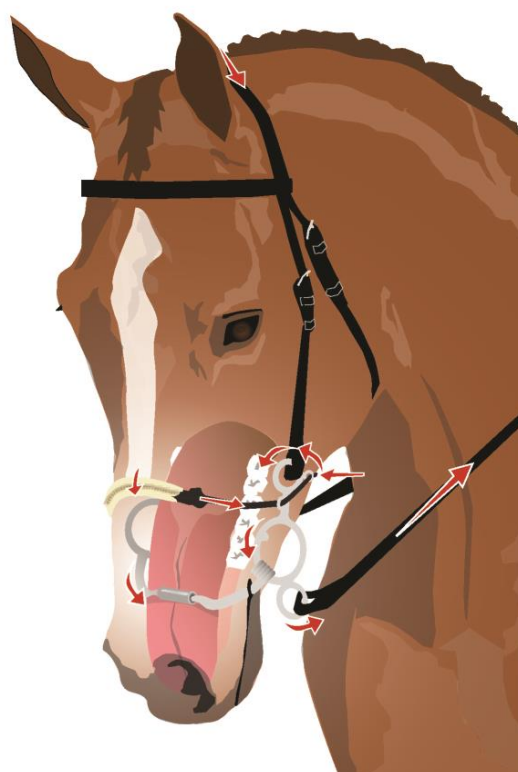
Gags exert backward and downward pressure to the mouth, before downward pressure is applied to the poll. Some gags work via a sliding pulley system, connecting the reins directly to the headstall through the cheek, thereby also pulling the bit up in the mouth. Others utilise a sliding shank on a cheek ring.

Hackamores

A bitless bridle, the hackamore uses the same principles as a leverage bit but works off the nose rather than the horse's mouth. As well as acting on the nose, curb and poll, a hackamore should be fitted so as to restrict the horse's breathing when pressure is applied by the rider. For this reason it is not a good option for a style of riding where a constant rein contact is applied.

Combination Bits

Various designs of combination bit are available. The definition normally encompasses a bit with features of both shank and ring style bits, sometimes also with hackamore action. Arguably, this can include Pelhams, Kimblewicks and Gags. The Myler Combination Bit, however, is a hybrid of the bit and the hackamore, combining mouthpiece, shank, ring cheek, curb and noseband to utilise the pressure areas of the nose, curb, poll and mouth. Because the pressure exerted by the rider is dispersed between the various points, the Myler Combination Bit offers an extremely humane communication tool.



Mouthpiece Thickness

Whilst a thin mouthpiece will exert relatively more concentrated pressure over its smaller area, a thick mouthpiece is not necessarily kinder for the horse because of limited capacity in the mouth.

Mouthpiece Metals

Mouthpieces can be made of various metals, rubber, and even plastics. Whilst rubber and plastic are obviously softer and less cold, they can catch and drag a dry lip and need to be replaced more often than metal. Stainless steel, whilst being strong, comparatively cheap and smart, has little taste and can dry some horse's mouths. Copper encourages salivation which aids a soft mouth, but copper is expensive and soft and so an alloy of copper, Sweet Iron, is often used as it combines the advantages of copper with none of the disadvantages.

Most English style Myler Bit mouthpieces are made of stainless steel, but there are small strips of copper inserted at each corner to encourage salivation. Exceptions are the Loose Ring Comfort Snaffles and the Combination Bit mouthpieces, which are all made from Sweet Iron (these also have the copper inserts).

Curb Chains

Myler Snaffle bits are unusual in being able to take a curb chain, attached with J-hooks or quick-release hooks to the small holes at the top of the cheeks. Snaffle curb chains lie far higher up the horse's jaw than the curb chain found on a Pelham or Kimblewick.

