

Series of articles published in Reiterjournal (Baden-Württemberg) 2015, Part 1:

The Bit as a Means of Communication

The bit – a direct connection to the horse's brain

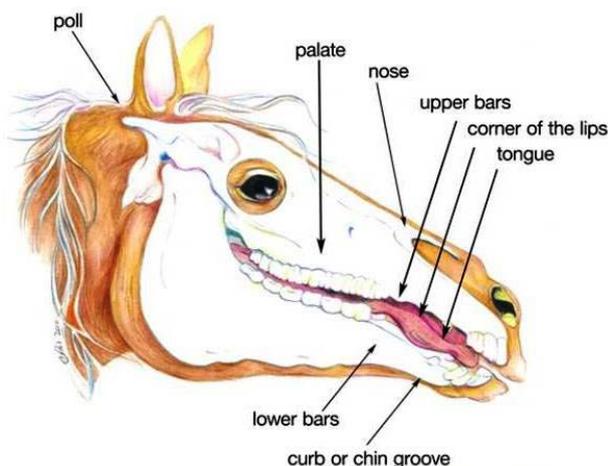
Bits have by now been in use for horse riding and carriage driving through more than 3000 years – but how many of the millions of users may ever have asked themselves how exactly this “piece of metal in the horse's mouth” is supposed to work?



Oxes and onagers (huge donkeys) had been used in Mesopotamia to pull carts and heavy goods already in the third millennium BC, but no horses, though they had been domesticated long since. The ancient king Zimri-Lim of Mari (nowadays Syria) received a letter around 1770 BC. in which he is advised “..to refer from riding horses in order to preserve his dignity, rather use a donkey or a mule if he insisted to ride at all” (carriage driving was obviously considered to be more appropriate). This would nowadays be an unexpected point of view. A closer look on the photo, which shows a mould crafted in Mesopotamia around 2000-1600 BC, reveals the reason: Before the bit was invented around 1500 BC, mounts and draught animals had been controlled by nose (lug) rings. Just try to imagine how your horse would react to that! Horses are flight animals by nature and resort to panic reactions if threatened – thus it is neither effective nor advisable to try to control them.

Fortunately, there must have been someone at that time who was fascinated by the horse's intelligence, ability to learn and eagerness to please. He understood the potential horses offer to communicate with them instead of trying to control them. By positioning a metal bit on the horse's tongue, located not too far from the brain, this early horseman invented a very effective means of communication.

Points of communication at the horse's head.



The area in the middle of the tongue, just in front of the molars where the bit is supposed to rest, is called “sweet spot” because it is touch receptive but not over sensitive. Here one of the head's many acupressure points is located. The distal area and the outer edges of the tongue are much more sensitive, whereas the rostral (inner) parts of the tongue are rather unreceptive. Further acupressure points, which react sensitive to touch, can be

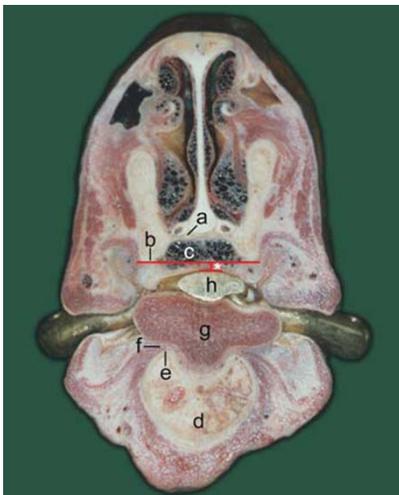
found e.g. at the poll, on the nose or in the chin groove (see fig. 2). Though every horse reacts individually, a highly differentiated communication between horse and rider can be established by addressing these receptive areas through bit and bridle.

Undisturbed communication

To ensure effective and successful communication, the horse must be able to focus upon the rein aids. Any sensation, which causes uncomfortable feelings, will distract the horse and spoil its focus. Thus neither the bit nor any part of the bridle should cause discomfort or hurt. The unfortunately rather common misconception to use a severe bit to try to enhance control can only lead to a Pyrrhus victory: If for example a showjumper is controlled by anticipating pain through the bit, it will jump reluctantly without using its back. If it no longer trusts the rider, the horse will start to refuse in difficult situations. Thus, our goal must be to optimize the communication, which defines what is required of all parts of the bit and bridle system.

The unobtrusive bit

The bit offers a direct contact to the sensitive mouth of the horse, which is expected to communicate signals on a high level of differentiation. The bit itself should rather not be noticed, thus the horse can focus on the interpretation of the rein signals. A perfect fit is mandatory. You may understand better what is meant if you compare it to shoes – you walk comfortably as long as you don't feel them – but as soon as there is only a single seam or edge which hurts or rubs, all your thoughts centre on the pain and live seems not worth living any more..(for more details, see Technical Information below). Just as shoes with cushioned soles offer much more comfort, a horse bit should be perfectly suited to the mouth anatomy.



The space between lower and upper bars and especially between tongue and upper palate is limited, as this cross-section of a horse's skull shows. Therefore, the mouthpiece must not be too thick. It should have exactly the necessary width, allowing loose rings to move freely, respectively fit snugly in case of fixed cheeks. What makes the choice of the perfect bit a real challenge, is that not only every horse's mouth anatomy is different, but also the individual touch sensitivity. We will learn more about that in the second article, in which the action of snaffle bits shall be discussed in detail.

In addition to the perfect fit, the material of the mouthpiece should be agreeable to the horse's mouth. Which qualities would you ask of a material, that is supposed to adapt unobtrusively to soft and warm tissue? Only metal can be shaped precisely, is durable enough and maintains a smooth surface, but to be unobtrusive to the horse it should also feel "warm", lightweight and "soft" when coming in contact to the teeth. Referring to metal, this means asking for a high thermal conductivity and shock absorbing quality.

Stainless steel, cheap, durable and thus one of the most popular bit materials, does not fulfil these requirements: It is always feeling cold due to its low thermal conductivity, is quite heavy and rather "clanky" (imagine hitting your teeth accidentally with a steel spoon). Furthermore,

it usually contains chrome as an anti-corrosive, which is not exactly healthy. In Argentan (“German Silver”), another traditional mouthpiece material, Nickel, known to induce allergic reactions, is used for that purpose.

If you do not like the thought of metal ions accumulating in your horse, the material to choose for the mouthpiece should be biologically inactive. “Sweet Iron” is the contrary of this, its sweet taste is achieved by emitting iron ions (a process usually referred to as “rusting”). Above that, recent research has proven that a pronounced taste is more liable to distract the horse than to help focussing on the rider’s aids. In contrast to a popular belief, the horse does not actually need to “chew” on the bit to keep a consistent contact. A relaxed neck and lower bar allows the parotid gland to produce enough saliva to keep the bit smooth and gliding.

The action of the bridle

The main function of the bridle is to hold the bit. Additionally, seeing apart from the Western One Ear bridle, the straps of most bridles transmit rein tension to the communication points. The curb chain of a Weymouth or pelham not only acts as a physical stoppage to limit the angle of the shanks, but also transfers a signal to the acupuncture point in the chin groove. “Lever bits” act to apply an additional pressure to the poll (though much less than generally suspected, we will discuss this later in this article series).



A recent example of an exceptionally clever function is the Horshware Micklem Bridle (picture), which transmits rein signals to the nose. This is the same contact point, which bitless bridles like Hackamore and Bosal (which are supposed to be milder than the use of a bit) exploit instead of the tongue. The traditional nosebands (e.g. flash, dropped or grackle) are not directly connected to the bit, but exert a certain pressure just by being properly fitted, which increases when the horse opens its mouth. Accounting for the horse’s sensitivity in these areas, we should always make sure that they are treated carefully and any pressure (whether intended or casual) is attenuated by using wide and/or cushioned leather pieces and adjust them properly (a too slack noseband can irritate by giving “random” signals to the horse). Special care has to be taken when fitting a dropped noseband, assuring that it will not prevent the bit rings from sliding freely, squash the lips or constrict breathing. It should never be used to forcibly prevent the horse from opening its mouth, if it tries to do that. Always remember that our goal is to communicate with the horse, and feeling comfortable is a prerequisite to understanding and cooperation. A responsible horse person will always try to find the reason behind his equine partner’s problem, instead of just fighting the symptoms!

Technical Information:

“Straight from the horse’s mouth”

Are you pondering how exactly a certain mouthpiece may feel on your horse’s tongue? A very important aspect is that the position of the bit is depending on whether there is rein contact or not:

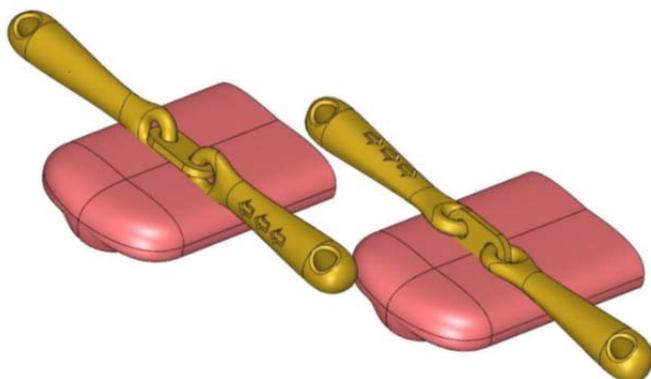


As soon as there is a tension applied to the rein, the mouthpiece rotates by approximately 45° into its “working position”. It is displaced in the direction of the corner of the lips and the soft tissue of the tongue is compressed.



Let us look for example at a traditional mouthpiece with a flat lozenge (Dr. Bristol Bit or French link):

It looks quite harmless, and does not seem to take up much room between tongue and palate. However, which pressure does it exert in “working position”?



The CAD reconstruction of the Dr. Bristol bit in action (left) reveals how the loops of the cannons press into the tongue, thus concentrating the rein force on a rather small area. The French link (right picture, lozenge tilted by 90°), transmits the force to the narrow edge of the lozenge, which is pressing into the tongue if the rein is taken.



Another unfortunately much too popular bit (due to the nice colour options, or because it is supposed to taste of apples?) is a single jointed rubber mouthpiece with a very primitive metal joint.

This type of bit can exert a severe “nutcracker action”, as you will easily imagine if you look at these x-ray pictures:



As long as the rein is slack (left picture), the joint tends to prick into the upper palate. As soon as there is enough rein tension, the cannons will be squeezing the sides of the tongue to the lower bars. In the pictures, a bit with an appropriate width has been used, but experiments have proved that you can even observe both effects at the same time if the mouthpiece is wide enough...

Not only the female readers will have experienced how just one pinching seam or squeezed-in toe can spoil the fun of even the most glorious pair of shoes...Consequently it is not uncommon that these types of bits are reported “to have worked very effectively in the beginning, until the horse started to resent the bit, and is now refusing completely “