An Overview of Bits and Bitting

Dwight G. Bennett, DVM, PhD

Authors address: 2307 Tanglewood Drive, Fort Collins, CO 80523; E-mail: dwightbe@colostate.edu.

Take Home Message

To optimally fulfill the needs of our clients, we must be aware of their horse's occupation, become familiar with what actions are expected of it, and provide the kind of dental care required to help the horse perform most comfortably. To do this, we must understand the uses of various types of bits and bridles, be able to recognize oral problems related to bitting, and have the knowledge and ability to properly prepare the teeth according to the function of the individual horse.[1,2]

Introduction

How a horse's teeth should be floated depends on the horse's work, the individual horse and the type of bit used. Bitting requirements differ between horses used for western performance, English pleasure, polo, jumping, dressage, racing, and equitation (Figs. 1A-C).[2] The second premolars of a racing Thoroughbred, whose chin must extend to achieve maximum speed, require more rounding than those of a pleasure horse that performs with a nearly vertical head set. A barrel-racing horse in a gag bit requires a deeper bit seat than a cutting horse in a grazer curb bit.[2]

Figure 1A.

Figure 1B.

Figure 1C.

The head carriage when a horse is "on the bit" varies depending upon the function of the horse. Fig. 1A. The dressage or pleasure horse is ridden with a nearly vertical head set. Fig. 1B. The western performance horse must be given more control of his head for maneuverability. Fig. 1C. The racehorse must be able to extend his nose to achieve maximum speed.

A veterinarian should understand the action and purpose of bridles and bits, not only to provide optimal health care to horses' mouths but also to be able to address an owner's concerns about his horse's performance.

Proper Use of Bits and Bridles

Bits and bridles are for communication. They are not handles to stabilize the rider in the saddle or instruments for punishing the horse.[3,4] The accomplished rider uses his seat and legs before he uses his bit to communicate his wishes to his mount. Indeed, the most important factor in achieving soft, sensitive hands on the reins is to develop a good seat.[5]

As with most methods of training and communicating with the horse, the key to the proper use of bits and bridles is the principle of pressure and release.[2,3,5] A horse learns to seek a position of comfort to relieve the pressure applied by the bit in its mouth. Consequently, the rein pressure must be released the instant that the horse complies (or even tries to comply) with the request sent to it via the bit. If the pressure is not released, the horse has no way of knowing that its response was correct, and it becomes confused.[2,3,5]

Bits, bridles, and accessories can exert pressure on a horse's bars (the horseman's term for the mandibular interdental space), lips, tongue, hard palate, chin, nose, and poll. Of these, the tongue and the hard palate are the most sensitive and the most responsive to subtle rein pressure. Depending on the type of headgear used, however, commands sent to the horse via the bars, lips, chin, or nose can be more important than those transmitted via the tongue and palate.[2]

An important concept in bitting is signal, which is the time between when the rider begins to pull on the reins and the time the bit begins to exert pressure in the horse's mouth.[2,3] As a horse becomes schooled, it learns to recognize the initial increase in rein pressure and to respond before significant pressure is applied.[4]

Signs of Bitting Problems

Although laceration to the tongue is the most obvious injury associated with the improper use of bits (Figs. 2A and B), less spectacular injuries to the bars and other tissues are also signs of bitting problems.[2] Tissue trapped by a bit may bunch between the bit and the first lower cheek teeth, where it is pinched or cut.[1] The damaged area may then be irritated each time the bit moves. All types of headgear can press the lips and cheeks against points or premolar caps on the upper cheek teeth.[2]

Most bit-induced wounds are superficial, heal rapidly due to the extensive blood supply to the mouth and the antibacterial action of saliva, and seldom require treatment.[6,7] A severely lacerated tongue, however, often heals with a permanent defect, and trauma to the lower interdental space can penetrate to the mandible resulting in mandibular periostitis (Fig. 2C), which in severe cases, can lead to the formation of osseous sequestra.[8-12]

Figure 2A.

Figure 2B.

Figure 2C.

Fig 2A. Cut tongues are the most obvious injuries caused by the improper use of bits. Fig. 2B. Severe bit cuts often result in permanent defects in horses' tongues. Fig. 2C. A horse that reacts adversely to pressure on his mouth bars may be suffering from mandibular periostitis.

A horse with a sore mouth or an improperly fitting bit will often gape its mouth and pin its ears. It may nod its head excessively or toss its head. It may extend its neck (i.e., get ahead of the bit) or tuck its chin against its chest (i.e., get behind the bit).[2,5,8] Bitting problems are sometimes mistaken for lameness.[2]

The notion that a horse with a painful mouth is especially sensitive to bit cues is a common misconception. In fact, horses tend to "push into pain."[1,5] A vicious cycle can result from attempts to gain a so-called "hard-mouthed" horse's respect by changing to increasingly severe bits.[2,3] When you are consulted about a horse that has performance problems, you should always inquire about the type of bit used and carefully examine the tongue, lips, bars, palate, chin, and nose for subtle signs of injury. Even in the absence of an obvious injury, a change to a gentler bit, or to a bitless bridle, often leads to an improvement in a horse's performance.[6,7,10,11]

Mouthpieces

The mouthpiece of a bit may be solid or may have one or more joints. A mouthpiece composed of two or more pieces is referred to as a jointed or broken mouthpiece (Fig. 3A). The two halves of a simple, jointed mouthpiece are called the "cannons." The joint causes the bit to form a roof over the tongue, resulting in less pressure on the tongue and more pressure on the bars and lips. Some jointed mouthpieces have an extra link between the cannons, and as the length of the center link increases, the pressure on the tongue increases, and the pressure on the bars decreases.[2] Of course, the position of the horse's head, which varies depending on the horse's use, has a profound effect on a bit's action (Figs. 3A and C).[2,3]

Figure 3A.

Figure 3B.

Figure 3C.

Lateral radiographs of snaffle bits under rein pressure. Fig. 3A. Broken mouthpiece, poll flexed. Fig. B. Center linked mouthpiece, poll flexed. The extra link transfers pressure from the bars to the tongue. Fig. C. Broken mouthpiece, nose extended. The more a horse's nose is extended, the more likely that his lips will be pinched against his teeth and his tongue will be punished by the bit.

A solid mouthpiece may be straight, curved or ported. One of the most common misconceptions in bitting is that a low port makes a mouthpiece mild and that a high port makes it severe.[2,3] As a general rule, the higher the port, the less the chance of injuring the tongue, which is the most sensitive part of the horse's mouth. A high port is severe only when it contacts the horse's palate. The port must be at least 2 to 2 ½ inches high to contact the palate of most horses.[2,5] A straight, solid mouthpiece can be severe, if used improperly, because the tongue takes almost the full force of the pull. The mullen mouthpiece, with its gentle curve from one side to the other, still lies largely on the tongue and gives only a small margin of tongue relief.[2]

A mouthpiece's severity is inversely related to its diameter. The narrower the mouthpiece, the more severe the bit. The diameter of a mouthpiece is measured one inch medial to the attachment of the bit rings or shanks, because this is the portion of the mouthpiece that ordinarily contacts the bars of a horse's mouth. A standard mouthpiece is 3/8 inch in diameter. Most horse show associations prohibit a ¼ inch (or smaller) mouthpiece because a mouthpiece of this diameter is considered too severe.[2] Although a ½-inch mouthpiece is generally mild, some horses may be uncomfortable carrying such a thick mouthpiece.[11-13] Some horses, especially Thoroughbred types, have relatively narrow, sharp bars, which are easily damaged by pressure.[15] Such horses require thicker and/or softer mouthpieces than horses with thicker bars. Some horsemen cover their mouthpieces with latex in the early stages of training or use rubber- or leather-covered covered mouthpieces on very "soft-mouthed" horses to protect the bars and tongues.[6,16] Plastic and synthetic mouthpieces are gradually coming into greater acceptance.[17]

Snaffle Bits

Regardless of the bit they will ultimately perform with, most horses begin training in snaffle bits. A snaffle bit is any bit, whether it has a jointed or solid mouthpiece, in which the cheeks of the bridle and the reins attach to the same or adjacent rings on the bit.[2,3,5,18] The snaffle bit provides a direct line of pull from the rider's hands to the horse's mouth without mechanical advantage. Simultaneous tightening of the reins causes all types of snaffle bits to relocate caudally, to rotate on their long axis and to press on the tongue, bars, and lip corners.[14]

Snaffle bits often are identified by the shape of their rings (Figs. 4A-G), e.g., O-ring, D-ring, half-cheeked, full-cheeked, and by how their cannons attach to the rings, e.g., loose-ring, fixed-ring, egg-butt. All ring shapes and attachments have their advantages and disadvantages. A loose-ring snaffle, in which O-shaped rings run through holes in the ends of the mouthpiece, affords the maximum signal because, when rein tension is increased, the rings rotate slightly before the bit engages.[2]

Figure 4A.

Figure 4B.

Figure 4C.

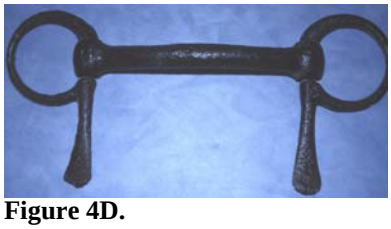


Figure 4D.

Figure 4E.

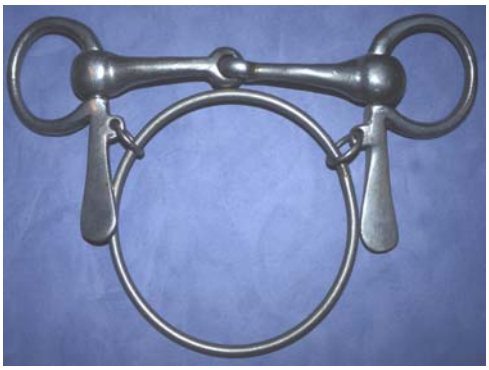
Figure 4F.

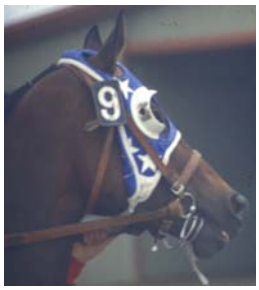
Examples of snaffle bits. Fig. 4A. O-ring with broken mouthpiece. Fig 4B. O-ring with center link. Fig. 4C. Half cheeked. Fig. 4D. Half cheeked with solid, curved (Mullen) mouthpiece. Fig 4E. Don Dodge with offset rings. Fig. 4F. Egg butt Fig. 4G. Full cheeked.

In egg-butt and D-ring snaffles, a metal cylinder connects the mouthpiece to the cheek rings, thus avoiding the pinching at the corners of the mouth sometimes caused by loose-ring snaffles. The well-defined corners of the D-ring snaffle (Figs. 5A and 5B) increase the pressure on the horse's cheeks, increasing the control over the horse but also increasing the chances that the horse's cheeks will be pressed against points on the upper premolars.[2]

Figure 5A.

Figure 5B.





Common racehorse bits. Fig. 5A. The D-ring snaffle provides maximal lateral control. Fig. 5B. The ring snaffle often is used on a horse that is difficult to hold off the pace.

Some snaffles have prongs or "cheeks" attached to the rings. "Full-cheek" snaffles have prongs both above and below the mouthpiece, and half-cheek snaffles have prongs below the mouthpiece. Like the D-ring or cylinder-type snaffles, the cheeks encourage the horse to turn in the desired direction by increasing the pressure on the corners of the mouth and the sides of the face. The cheeks also prevent the bit from being pulled through the mouth. Because their rings do not rotate, all cheeked, D-ring, and egg-butt snaffles bits provide less signal than loose-ringed snaffles.[2]

Leverage Bits

Leverage (or curb) bits (Figs. 6A – 6F) have bridle rings above the mouthpiece and rein rings below the mouthpiece. The ratio of the length of the shanks of the bit (i.e., the portion below the mouthpiece) to the cheeks of the bit determines the amount of mechanical advantage afforded to the rider. The severity of a bit increases as the ratio

increases.[2,5] For example, in a standard curb bit with 4½-inch shanks and 1½-inch cheeks (a 3:1 ratio), one pound of pressure on the reins translates into 3 pounds of pressure in the horse's mouth. When using a bit with 8-inch shanks and 2-inch cheeks, one pound of pull results in four pounds of pressure. Regardless of the ratio, however, the longer the shanks, the less the force on the reins required to exert a given pressure in the mouth.

Figure 6A.

Figure 6B.

Figure 6C.

Figure 6D.

Figure 6E.

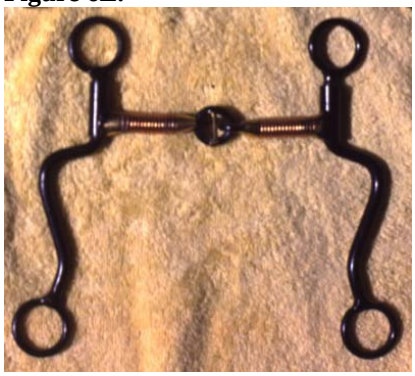


Figure 6F.

Examples of curb bits. Fig. 6A. Standard curb bit. Fig. 6B. Cathedral bit with high spoon that contacts the palate. Fig. 6C. Myler bit with independently rotating shanks. Fig 6D. Loose cheeks, broken mouthpiece. Fig 6E. Loose cheeks, lifesaver-shaped link in mouthpiece. Fig 6F. Correction bit.

Although the severity of a curb bit increases as the length of the shank increases, this severity is partially offset by the fact that the signal provided to the horse increases as well.[2] A long-shanked bit must rotate more than a shorter-shanked bit before it exerts significant pressure in the horse's mouth.

To exert their leverage, curb bits depend on a curb chain or strap that passes beneath the horse's chin groove and attaches to the rings on the cheeks of the bit. The bit rotates in the horse's mouth until the curb strap stops (i.e., curbs) the rotation and the leverage

Figure 7A.

Figure 7B.

Figure 7C.

The snugness of the curb strap ultimately determines the function of the bit. Fig. 7A. A tight curb strap prevents the bit from rotating and decreases the signal. Fig. 7B. A loose curb strap allows the bit to rotate and increases the signal. Fig. 7C. In the absence of the curb strap, the leverage is lost.

action of the bit takes effect. Leverage bits exert pressure primarily on the chin groove, the tongue, and the bars (Figs. 7A-7C).[2,3,5]

Typically, the more moving parts within a leverage bit, the more signal it will provide to the horse.[2,3] For example, a loose-jawed bit, one that attaches to the mouthpiece via hinges or swivels, will allows a certain degree of rotation before the bit engages. Adding a freely rotating rein ring to the loose jaw increases the signal, and adding a broken mouthpiece increases it even more.[5] The down side of a broken mouthpiece in a curb bit is that it increases the potential severity.[2] A "correction" bit, in which there are joints on each side of the port where it joins the bars, is capable of exerting tremendous bar and tongue pressure.

The angle between the shanks (Figs. 8A and 8B) and the cheeks affects the speed of communication. The straighter the line, the less signal the bit provides. The mouthpiece of the so-called “grazer bit,” which has swept back shanks, tends to rotate less than the mouthpiece of a bit with straighter shanks and provides more signal to the horse.[2]

Figure 8A.

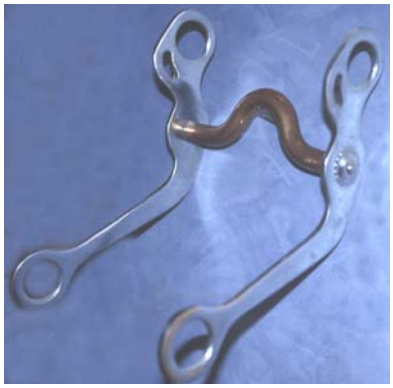


Figure 8B.

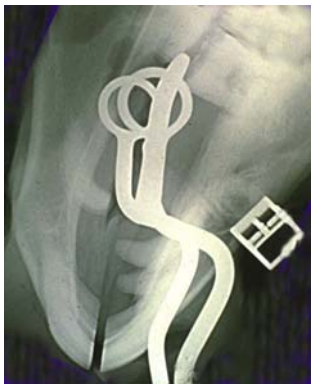
Fig. 8A. Swept backed shanks on a curb bit allow the cutting horse to extend his nose, thus increasing his maneuverability. Fig. 8B. Straight shanks on a curb bit encourage the dressage horse to maintain a vertical head set.

Figure 9A.

Figure 9B.

Figure 9C.

Figure 9D.



***Lateral radiographs of curb bits. Fig. 9A. No rein pressure. Fig. 9B. Rotation under rein pressure. Fig. 9C. Rein pressure on a bit with loose cheeks and a broken mouthpiece can force the mouthpiece against the palate. 9D. A bit with a high port or spoon can contact the palate and a lateral pull of the reins can force the bit against the cheek teeth.**

Gag Bits

The reins and cheekpieces of the headstall of the basic gag bridle are one continuous unit.[2,3,5,20] When the reins are pulled, the mouthpiece slides upward in the horse's mouth and transfers some of the pressure from the tongue and bars to the lips and poll. A gag bit, when used properly, provides a rider more control than a standard snaffle without proportionally providing more punishment to the horse's tongue and bars (Figs. 10A – 10C).[2]

Figure 10A.

Figure 10B.

Figure 10C.

Three types of gag bits. Fig. 10A. Gag snaffle with half-O-rings. Fig. 10B. Basic gag bit, in this example with a link in the mouthpiece. Fig. 10C. Gag with full rings allowing for attachment of snaffle rein.

Figure 11A.

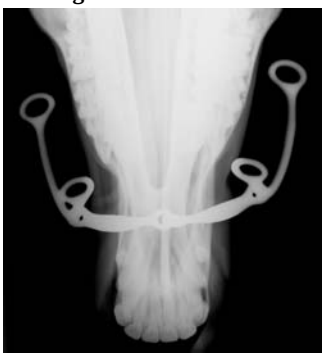


Figure 11B.

Figure 11C.

Figure 11D.

*** Radiographs of gag bits. Fig. 11A. VD with no rein pressure. Fig 11.B. VD under rein pressure. Fig. 11C. Lateral with no rein pressure. Fig. 11D. Lateral under rein pressure.**

It might be thought that the gag functions to lower the head because tension on the reins places pressure on the poll. But, because the horse's mouth is much more sensitive to pressure than is its poll, the net effect of the gag bit, used with no auxiliary aids, is to accentuate the basic head-raising action of a snaffle bit.[2]

Full Bridles

The full bridle or double bridle has both a snaffle and a curb bit (Figs. 12A-12C), each with its own separate set of cheek pieces and reins. The snaffle bit is placed above and behind the curb bit.[15,19]

Figure 12A.

Figure 12B.

Figure 12C.

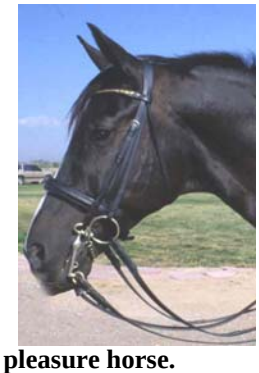


Fig. 12A. The snaffle and curb bits on a full bridle. Fig. 12B. Full bridle on English pleasure horse. Fig. 12C. Full bridle on dressage horse.

The double bridle with its combination of bits is an extremely sensitive instrument capable of placing the head with greater finesse than is possible with any other bridle in current use. However, the rider needs a considerable amount of skill for this bridle to be effective and humane. Using the double bridle when the horse is not sufficiently schooled or when the rider is not sufficiently skilled can damage the horse's psyche as well as its mouth.

It is often stated that with the double bridle the rider uses the snaffle bit to raise the head and turn the horse and the curb bit to lower the head and stop the horse. When the double bridle is used properly, however, nearly all commands for moving, stopping, and head position, are given via the snaffle. The role of the curb is basically a passive one of promoting poll flexion, collection, and balance.[19] Excessive tension on the curb rein is the most common cause of problems that accompany the use of the full bridle.[2]

Figure 13A.

Figure 13B.

Figure 12C.

*** Radiographs of bits on full bridles. Fig. 13A. Ventral Dorsal. Fig. 13B. Lateral without rein pressure. Fig. 13C. Lateral under rein pressure. The double bridle puts a lot of hardware in the horse's mouth, and the chances of injury are arguably doubled as compared to bridles with a single bit.**

Pelhams

A Pelham bit, really just a curb bit with an extra set of rings at the level of the mouthpiece, is designed to gain the advantages of a double bridle using a single mouthpiece (Fig. 14). Tension on the rein attached to the lower ring gives the effect of a curb bit and tension on the rein attached to the ring at the level of the mouthpiece gives the effect of a snaffle bit.

Figure 14

Fig. 14. Examples of Pelham bits. A Pelham bit can have any combination of mouthpiece, cheeks and shanks as long as there are rein rings both at the level of the mouthpiece and at the ends of the shanks. The bit on the lower left is a Kimberwicke, which is used with a single rein.

A Pelham bit can have any combination of types of mouthpieces, cheeks, and shanks found on standard curb bits. One type of pelham, the Kimberwicke, uses only one rein with the hand position, or rein setting, determining whether the bit functions as a snaffle or as a curb.

The Pelham does not work well in a horse with an exceptionally long interdental space because it is essentially impossible to have the curb chain in the chin groove while simultaneously maintaining the mouthpiece in its proper position against the lip corners.

The curb chain, under such circumstances, tends to pull backwards until it is beneath the branches of the mandible, and pressure on these is quite painful to the horse and may result in severe bruising. The use of a lip strap can help to counteract this disadvantage.[2]

In a horse with short jaws and a relatively small interdental space, the single mouthpiece of the Pelham may fit better than the double mouthpiece of the full bridle. Certainly some horses perform better in a Pelham bit than in any other.

Figure 15A.

Figure 15B.

Figure 15C.

Figure 15D.

Fig. 15A. Pelham bit on a pleasure horse. Fig 15B. Pelham bit on a polo horse. Fig 15C. Pelham bit with leather "roundings" which connect the snaffle and curb rein rings. The roundings allow the bit to be controlled with a single rein, but the dual action of the bit is lost. Fig 15D. Kimberwicke with rein set to lower level in Uxeter cheeks.

Fitting the Bit

The size, shape and degree of sensitivity of a horse's mouth should be considered when selecting and fitting bits and bridles.[5,12] As a rule, the mouthpiece should not project more than ½ inch or less than ¼ inch beyond the corners of the lips on either side.[2] A

mouthpiece that is too short pinches the corners of the lips against the cheek teeth. One that is too long, can shift sideways, putting the port or joint out of position, making the bit ineffective and possibly painful.

The ideal position for the bit in the bar space varies from horse to horse and bit to bit. A popular rule-of-thumb for adjusting snaffles is to adjust the bit so that the commissures of the horse's lips are pulled into one or two wrinkles. The problem with such a fit is that releasing the pressure on the reins gives the horse no relief at the corners of its mouth.[2,3,5] A better method is to position the bit so that it is relatively loose in the mouth and then, when the horse learns to pick it up and carry it, to adjust the headstall to fix the bit at the position the horse has determined it be most comfortable.[2,3]

Figure 16A.

Figure 16B.

Figure 16C.

Fig. 16A*. Bridles are often adjusted so that bit causes one or two wrinkles at the commissures of the lips. Fig. 16B. A better method is to first hang the bit relatively loosely until the horse learns to pick it up and carry it and then adjust the headstall accordingly. Fig 16C. Bridle adjusted so tight that it gives the horse no chance for relief.

An old horse may have less space for a bit in his mouth, because as a horse ages, its incisors slope further forward, and the exposed crowns of the cheek teeth shorten by wear causing the palate to sink closer to the tongue. A bit that was comfortable to a horse when it was five years old may no longer be comfortable when the horse is twenty years old.

One must consider more than the external dimensions of a horse's head and its age in choosing an appropriate bit. Recent research has shown that the size and shape of a horse's oral cavity often correlate poorly with the size and shape of its head, age, or sex.[12] There is no substitute for careful manual and digital examination of a horse's mouth when selecting and properly fitting a bit. Periodic re-examination is indicated because wearing of the teeth, or even dental procedures, can change the shape of the oral cavity.[12]

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