



Violetta Jackowski

The USEF rules specify what is and isn't acceptable in the show ring. Here we explain the whys and hows of bit science.

BITBYBIT

By Emily Esterson

From the rusty bits in museum showcases to the gleaming metal mouthpieces of the show ring, bits have remained relatively unchanged over their thousand-plus year history. Today, we have even more choices than ever thanks to a better understanding of the horse's mouth and how it interacts with the bit and the bridle. The *United States Equestrian Federation Rule Book* carries regulations about the proper bits for each discipline and breed division, and tack stores carry an astonishing array of options, many of which fall into the Federation's "legal" category.

Determining which bit is best for your horse, your particular style of riding within your discipline and making sure it is within the rules requires a mix of horsemanship and study. "There is no single answer to any question you ask about this subject," said Jay Shuttleworth, who makes bits for all the disciplines and has outfitted members of the United States Equestrian Team.

Although some of the science behind biting a horse is relatively new—we now have radiography to see inside the horse's mouth, and we understand more clearly how the mechanical actions of the bit interact with a horse's anatomy—the art of making and fitting bits is as old as our domestication of horses. The earliest bits were a rope around the jaw, a form of primitive hackamore. Early equestrians tried the metal nose ring they used for driving oxen, but found that didn't work well on more independent-minded equids. Metal bits came into existence around 1500 BC, according to archeological research. Over the years, the art of bit-making became more refined, but there have always been several basic families of bits. The Loriner (sometimes called a Lorimer, from the French) or bitmaker/saddlery craftsman in the 1800s made an astonishing variety of bits (curbs, snaffles, jointed, straight, metal, leather) and combinations thereof (such as the jointed Pelham). There were hard bits with wire and prongs straight out of nightmares, plus bits of leather and other unconventional materials. Even then, the importance of the uniqueness of the animal's mouth, with a bit fit correctly and used with educated hands, was well understood. In 1883, Benjamin Latchford wrote and published *The Loriner: Opinions and Observations on Bridle Bits and the Suitable Biting of Horses with Illustrations*, in which he wrote: "The horse's mouth and temper may be compared to a lock, so made that only one key will fit it...."

Individuality

Research supports Latchford's early wisdom. Dr. Hilary Clayton and colleagues at Michigan State University note the importance of the individual horse's anatomy in finding the proper bit for the best performance. In 2004, Clayton, Jane Manfredi and Diana Rosenstein completed *Radiographic Study of Bit Position within the Horse's Mouth*. They noted the assumption that a big horse has a big mouth is probably incorrect. In order to complete their study of the function of five different bits, they first had to determine whether the size of the horse's mouth correlated with the size of the overall horse. They found that mouth anatomy varies from horse to horse, but those variations weren't necessarily based on overall size. While the four basic parts of the horse's mouth are universal, the construct of individual horse's mouths can vary.



Dusty Perin (4)

Previous: An appropriate bit for your horse and your breed or discipline can make all the difference in the world on your horse's performance.

Above: The double bridle incorporates two bits, a bridoon and a curb. If used incorrectly, the horse might experience pain or discomfort. Therefore, the rider should be advanced enough in their skills to use this bridle effectively.

Below: Dee-ring French snaffle



factors. For example, he may have a deep jaw or a flat palate. He may have a thick tongue or muzzle.

The overall bridle also puts pressure on the horse's poll and nose. His front teeth, the incisors, should line up, meaning he has no overbite or underbite, and his molars should meet on the horizontal line as well. Some horses have wolf teeth, between the bars and the molars, with sharp points either already emerged from or just under the gum. Either way, wolf teeth with sharp tops can certainly cause a bitted horse discomfort. A veterinarian skilled in equine dentistry should remove wolf teeth. Malocclusions (misalignment of the jaw) can be corrected through filing and re-alignment, and slant or wedge mouth (where a horse's top or bottom teeth are slanted) can be repaired. As with humans, horses' mouths change over time. A young horse's mouth, and biting needs, may vary greatly from an older horse's, so changing bits depending on training, development, mouth condition and riders is a necessity.

If you were to look inside a horse's mouth while he was wearing a bridle, as Drs. Clayton and Manfredi noted, you'd find a properly fitted bit centered between the bars of the mouth, resting along the edges of the tongue. The distance from the cheeks varies according to the bit, as does the tightness of the headstall. The old rules can all be debunked: the two-wrinkle rule, for example, which states that a bit is in the proper position in the mouth when the horse has a "two wrinkle" smile, just doesn't apply to some curb bits, nor some snaffles. It also may not be right for certain horses, depending on the shape and length of their heads.

Different amounts of rein pressure change the position of the bit in subtle but important ways. Pounds of pressure on a poor-fitting single-jointed snaffle or on a horse with a flat palate and shallow jaw, for example, can poke the joint of the bit into the roof, or palate of the horse's mouth, said Shuttleworth. Before embarking on creating a bit for a customer, both Shuttleworth and Darnell like to see a horse ridden and feel inside his mouth. Shuttleworth said that one of the biggest mistakes he sees in biting is the "one size fits all" attitude. For example, "If a horse is high-headed, it could be that the roof of his mouth is much flatter," he said. "There are low-headed horses though that also have flat palates. I try to build something with an action that solves that problem."

Like the rule about two wrinkles on the horse's lips, the assumption that skinny

equals harsh and fat equals soft is frequently misguided, Shuttleworth noted. For some horses, a skinnier bit may be more comfortable than a fat one, and vice versa. And any bit, skinny, fat, soft or hard, can be considered harsh in the wrong hands.

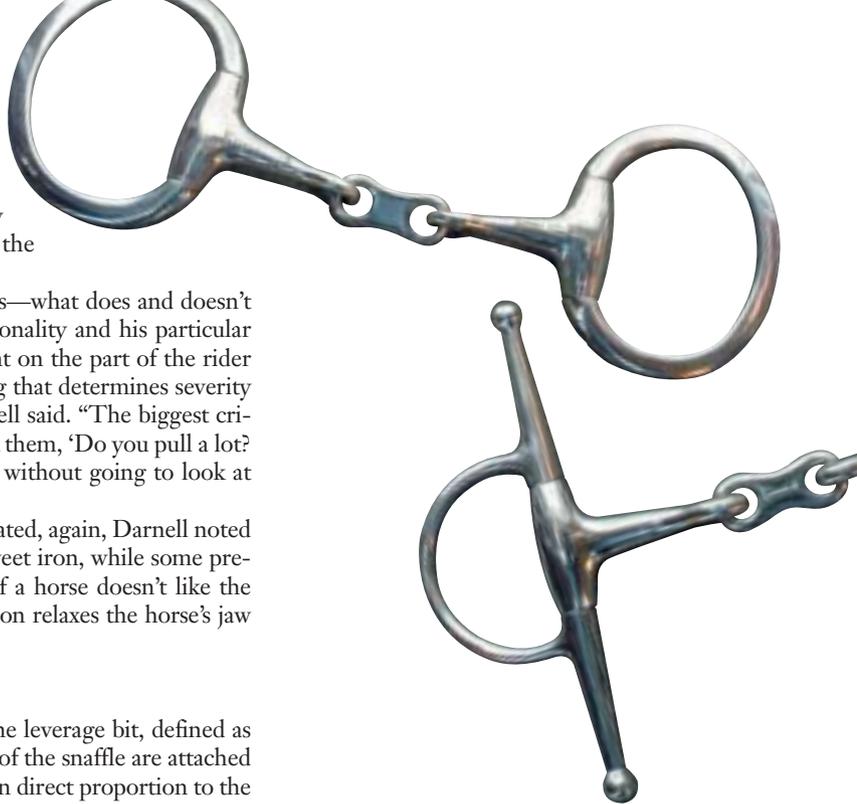
Riders choose bits for a variety of very subjective reasons—what does and doesn't suit horses, depending on the horse's comportment, his personality and his particular sensitivity level. Unfortunately, noted Darnell, self-assessment on the part of the rider is sometimes not part of the biting equation. "The only thing that determines severity of a bridle bit is the amount of pulling that gets done," Darnell said. "The biggest criterion for bridle bit is self-critique. If somebody calls and I ask them, 'Do you pull a lot? Do you jerk on the reins?' You're not going to get the truth without going to look at them ride."

When it comes to the materials from which a bit is fabricated, again, Darnell noted that it's very subjective. Some horses really like the taste of sweet iron, while some prefer copper, alloys (mixtures), stainless steel or even rubber. If a horse doesn't like the taste of a bit, he won't chew or salivate. The action of salivation relaxes the horse's jaw and allows him to be softer and more relaxed in his mouth.

Anatomy of a Snaffle Bit

There are two basic families of bits: the snaffle bit and the leverage bit, defined as such by their action in relation to the reins. Because the rings of the snaffle are attached directly to the reins, the snaffle bit's pressure on the mouth is in direct proportion to the pounds of pressure on the reins, so a pound of pull equals a pound of pressure on the bars of the mouth, whether the bit is straight or jointed. Single or double-jointed bits may be snaffles, but beware of the terminology here; the bit families are defined by the rein action—leverage vs. direct—rather than the mouthpiece style. A leverage bit can have a jointed middle like a regular snaffle bit. And a snaffle can have a port, which are usually more common for leverage bits.

Allowable snaffles in USEF competitions can be fitted with Dee-rings, full-cheeks and loose rings. They can be single-jointed, mullen-mouthed (straight, no joints) or double-jointed, such as the Dr. Bristol or the French snaffle. Double-jointed bits have a



Top: Eggbutt French snaffle

Above: Full-cheek French snaffle

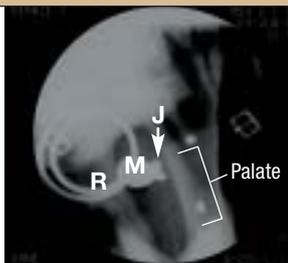
Affects of Bits on the Mouth

Top row: Lateral-view radiograph of a horse's head facing to the right. The horse is wearing a single-jointed, loose-ring snaffle. The parts of the bit are labeled R (rings), M (mouthpiece), and J (joint). The arms of the mouthpiece hang down toward the incisors. The joint protrudes towards the horse's palate (roof of the mouth). With rein tension, the mouthpiece presses on the tongue and the joint moves away from the palate.

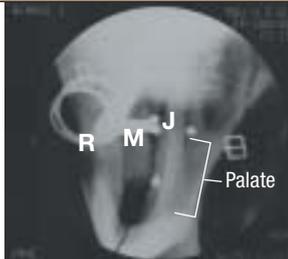
Middle row: Lateral-view radiograph of a horse's head with a Baucher bit in place. The mouthpiece is higher on the horse's tongue than with the snaffle. The joint is near the palate, and this bit is harder for the horse to move in his mouth to relieve pressure on sensitive structures.

Bottom row: Lateral-view radiograph of a horse's head with a KK Ultra bit. The L labels the link in the bit. The smooth surface of the link of this bit is next to the palate, but farther from the palate than the joints of the other two bits. With rein pressure, the entire mouthpiece moves away from the palate as the tongue is compressed. Many horses perform well in this type of bit.

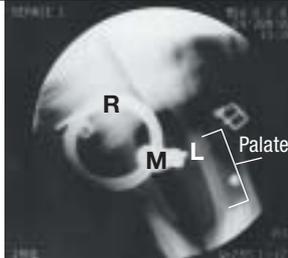
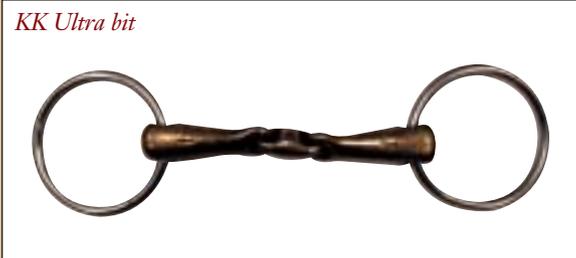
Single-jointed, loose-ring snaffle



Baucher bit



KK Ultra bit



Courtesy Dr. Hilary Clayton (6)

Rules Regarding Western Bits

2. A standard Western bit is defined as having a shank with a maximum length overall of 8 1/2". The mouthpiece will consist of a metal bar 5/16" to 3/4" in diameter as measured one inch in from the shank. The bars may be inlaid but must be smooth or latex wrapped. Nothing may protrude below the mouthpiece (bar), such as extensions, prongs or rivets designed to intimidate the horse. Rollers attached to the center of the bit are acceptable, and may extend below the bar. Jointed mouthpieces are acceptable and may consist of two or three pieces and may have one or two joints. A three-piece mouthpiece may include a connecting ring of 1 1/4" or less in diameter or a connecting flat bar of 3/8" to 3/4" (measured top to bottom with a maximum length of 2"), which lies flat in the mouth, or a roller or port as described herein. The port must be no higher than 3 1/2" maximum with roller(s) and covers acceptable. Jointed mouthpieces, half-breeds and spade bits are standard. Slip or gag bits, rigid donut mouthpieces and flat polo mouthpieces are prohibited. Roping bits with both reins connected to a single ring at center of cross bar shall not

be used. Reins must be attached to each shank. Any rein design or other device which increases the effective length and thereby the leverage of the shank of a standard western bit is prohibited. Anything that alters the intended use of equipment as provided for in the description of appointments for a given class is considered to be an artificial appliance.

3. Standard snaffle bits are permitted in any class on a junior horse five years old and under. A standard snaffle bit is defined as a center-jointed single-rounded, unwrapped smooth mouthpiece of 5/16" to 3/4" diameter metal as measured from ring to 1" in from the ring with a gradual decrease to the center of the snaffle. The rings may be from 2" to 4" outside diameter of either the loose type, eggbutt, dee or center mounted without cheeks. If a curb strap is used it must be attached below the reins.

4. Hackamores are permitted in any class on a junior horse five years old and under. A hackamore includes a bosal rounded in shape and constructed of flexible braided rawhide or leather and

must have a flexible nonmetallic core attached to a suitable headstall with maximum diameter of 3/4" at the cheek. Attached reins may be of hair, rope or leather. No other material of any kind is to be used in conjunction with a bosal, i.e., steel, metal or chains (Exception: smooth plastic electrical tape is acceptable).

5. Horses shall not be shown with artificial appliances that would tend to alter their performance. Curb chains and leather chin straps may be used but must be flat and at least 1/2" in width and lie flat against the jaws of the horse. No wire, rawhide, metal or other substance can be used in conjunction with or as part of the leather chin strap, or curb chains. Rounded, rolled, braided or rawhide curb straps are prohibited. A light lip strap is permissible. Hackamore bits, bosals, cavesson-type nosebands, martingales and tie-downs are prohibited. A judge does not have the authority to add or to remove any of the standard equipment as specified above.

■ USEF Rule Book, WS105



rounded or flat link between the two main pieces of the bit and in general tend to have a softer, rounder action than single-jointed bits. Bridoons, which have smaller rings, are also acceptable, particularly in concert with a leverage bit in a double bridle. That's the general overview. But in each division and discipline, there are some slight variations.

When a rider applies pressure to the reins, the single-jointed snaffle, for example, bends around the tongue at an angle of varying degrees, depending on the bit. The arms of the mouthpiece apply pressure to the bars of the mouth and on the tongue. According to Clayton and Manfredi's study, the single-jointed snaffle creates a small surface protruding toward the palate. The bit mouthpiece moved closer to the horse's molars than other types of bits tested. The study notes that single-jointed snaffles have a reputation for a "nutcracker" effect, where the joints bend, trapping the tongue and poking the roof of the horse's mouth. However, Clayton and Manfredi noted that the flexibility of the tongue more than compensates for that pointed part of the bit. In addition, both Clayton's study and Darnell's experience proved that single-jointed snaffles rarely cause the reputed "nutcracker" problem, because the space in the lower jaw is usually fairly deep under the tongue, and that allows a good deal of space for the bit.

The double-jointed snaffles and ported snaffles with curved mouthpieces, on the other hand, created a smoother surface in the horse's mouth. In addition, the single-jointed bits moved more closely to the premolars when rein pressure was applied, while curved and double-jointed bits remained more firmly in position.

There are dozens of variations on snaffle bits—from the material and style of the mouthpiece to the way the bit is attached to the bridle and the reins. From twisted wire single links to fixed O-rings (taking its name from the shape of the ring attached to the bridle), the way the bridle attaches to the bit also affects the action of the bit. For example, a fixed ring bit, Darnell said, pulls on the ring and the opposite side of the face. A loose ring, where the rings slide through the mouthpiece, puts pressure on a smaller area of the face.

Leverage Bits

In the second family of bits, the reins are indirectly attached to the bit via a shank or a series of adjacent rings on each side of the bit. In the early days of riding, noted Darnell, shanks were 18 inches long or even longer, for good reason. War horses during the Crusades, for example, measured 18 hands plus. The warriors, however, were only on average about 5'6". The leverage that a small man on a tall, powerful horse needed was quite a bit more than even working cowboys need today (when in fact, the ratio of man-to-horse has reversed in many cases).

With leverage bits, the reins are attached to the bit rings at the end of a shank or in the case of some elevator bits seen in the English arena, one of several rings. The bridle is attached to the upper rings on the bit. When a rider uses the reins, the amount of pressure on the bit is magnified by the degree of the total length and angle of the shank. To calculate the ratio, measure the space between the bit and the bridle ring (the cheeks) divided by the length of the bit to the rein ring (the shanks). That ratio is the pounds of pressure applied versus the pounds of pressure the horse feels.

"The greater the ratio, the more leverage the rider has to control the horse," Darnell said. So, studies show, in a standard curb with 4 1/2-inch shanks and 1 1/2-inch cheeks, there is three pounds of pressure in the horse's mouth for every one pound applied by the rider.

The Rules on Western Bits

In general, the USEF allows bits in five categories. The criteria for those categories is much the same for all divisions and disciplines—the bits have to be humane, they have to provide the same level of action as any other bit in the category (a level playing field, in other words) and they should be traditional or at least conventional.

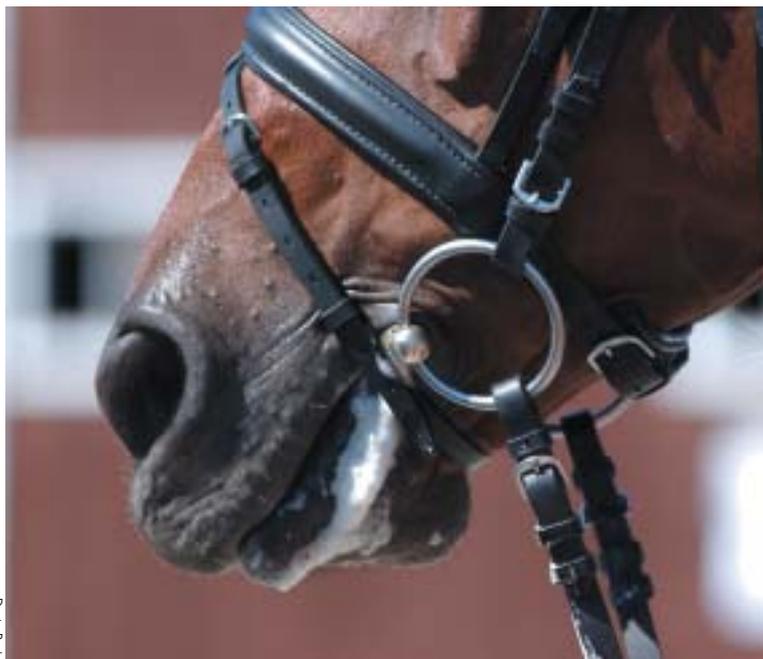
"In the Western committee, we get frequent requests to change the rules," said Ron Rhodes, USEF board member and author of *A Guide to Western Equipment*, published by USEF. "It's as simple as this: I sit down at my dining room table, [I look at the] rule from the open Western division. I ask these questions: Is the bit shank a maximum of 8 1/2-inches long? Is the bit more than 3/8-inch? Is it too skinny, making it too severe? I check those criteria off. If it meets all those configurations, we'll allow it. Unless they made it to be anodized pink, which is simply not traditional."

Indeed, history plays a big role in determining the acceptability of bits. Darnell noted that traditional bits were created by people who depended on their horses for their lives. In general, horsemen of the past knew as much—if not more—than we do about how to make horses happy and comfortable in a bit, which is why tradition and history play such a strong role in determining today's Western competition rules.

The words "unconventional" and "nontraditional" appear frequently in the USEF rules. Rhodes explains that a pink bit, for example, while stylish, would not be considered "traditional" in the Western bit lexicon.

"If you look at the current style," Darnell said, "I have a lot requests for engraved bits and so forth, and none of that is traditional in any sense of the form. But that's where the market is going. It's a nightmare to see what people come up with, and it boils down to a sales approach. If you go back through the museums, you're going to find since the early 1700s there has been very little deviation to the bits of today. We use and make the same things, only we have better materials, more machinery and more technology."

Bits for all Western divisions, no matter the breed, are broadly governed by the open Western division guidelines (see sidebar). In addition, any attachment, or method of attaching the reins that changes the action of the bit is prohibited. That includes roping bits with reins attached to a single ring at the center of a crossbar or rein devices that increase "the effective length and thereby the leverage of the shank of a standard western bit" are prohibited.



Above: Foam coming from the mouth may alarm the non-horse person, but it is actually a welcome sight. Foam indicates that a horse is relaxed and working with the bit.

Top: Kimberwick curb, with a ported mouthpiece

Opposite: Kimberwick snaffle



Top: With a Western curb bit, when the rider places contact on the reins, pressure occurs in the mouth, on the jaw through the curb chain or strap, and over the poll.

Above: Sweet iron is a common material used in Western bits. Some horses enjoy the taste of sweet iron and will accept this type of bit more readily than the typical stainless steel bit. This bit has a mixture of sweet iron and copper with stainless steel.

In addition to the action of the bit itself, leverage bits usually have curb chains. Because the bit and the curb chain are directly related, there are standard, allowable curb chains and straps. They have to lay flat against the horse's jaw and be at least a 1/2-inch wide.

In the Western division, snaffle bits are considered appropriate for younger horses—those five years and under. In the English disciplines, snaffle bits are nearly always appropriate, with the exception of international-level dressage where the horse is required to wear a double bridle.

Bits and Training

Indeed, the horse's training plays a role in the USEF Rules Committee's decisions to allow or disallow bits at certain junctures in the overall competition scale. On the English side, bits come in four basic categories: snaffles, pelhams, kimberwicks and gags. Bitless bridles, such as hackamores (for show jumpers) are also allowed. The same basic rules apply to the English as to the Western divisions: the bit must be humane, traditional and not give the competitor an unfair advantage. Like the Western rules, dressage and other English discipline rules state that the bits must be smooth with a solid surface.

In the dressage divisions, any wire, twists or rollers are prohibited for the simple fact that they add an extra layer of severity to the bit that may give a rider an advantage. According to Chrystine Tauber, Secretary of the USEF FEI-level jumper and "R" hunter judge, as well as an accomplished trainer and competitor, for hunters, there's no on-site inspection of bits. "You don't always know what's inside in the

mouth," she explained. "It could be a Dee snaffle on the outside, but not a plain snaffle on the inside. If there is something unusual in the horse's mouth, therefore something in the performance is going to show up. The horse may not be so good in the mouth, so they won't ribbon in the class. [The non-conventional bit problem] usually takes care of itself."

To explain further, Tauber said that because hunters are judged on their softness and responsiveness, any unconventional bit in the show ring means the horse may not be as quiet and as obedient as he should be. Therefore, the pair is likely to be penalized for their lack of training rather than the bit in their mouth. Nonetheless, there is a phrase in the *USEF Rule Book* that notes, "Unconventional bits may be penalized at the discretion of the judge." Tauber said this could be put into play when the rider is very obviously

using a strong bit abusively in the ring. "If [the bit] is starting to severely cut the mouth, a steward is going to discuss it with the rider."

In the dressage court, bridles and bits can have more leverage as the horse and rider team becomes increasingly expert. The assumption here is that the rider, in order to be able to compete successfully at this level of competition, will have educated hands and be able to ride the horse safely in a double bridle. While bits are checked in dressage competitions, there is a similar "self policing" element to a competitor's bit choice. A dressage horse who "needs" a harsh bit will likely score low on submission—an important line on the scorecard. And, as with Western leverage bits, curb straps come with their own sets of rules: they have to be metal, leather or some combination, a lip strap or covered with leather or rubber. No protrusions are allowed.

While tradition still rules both bit design and the USEF, Tauber noted that overall, bits have improved in the past few years. Now, there are more bits that are created to conform to the horse's mouth and are quite pleasant for him to wear. Nonetheless, the right bit on any horse requires a careful self assessment, a good look and feel around your horse's mouth and a knowledge of how a bit functions. As Shuttleworth said, "There is a difference with every bit and every horse with every person who's using it." ■

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