

# **BIT-INDUCED FEAR: A welfare problem & safety hazard for horse and rider**

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## **Part I: FROM HUMAN HAND TO HORSE'S HEAD**

### **Introduction**

In the last decade, a quiet revolution has taken place in equitation. The cross-under design of bitless bridle represents the first conceptual change in bridle design since the curb bit was introduced in the fourth century BC (Fig 1).<sup>2</sup> But unlike the curb bit, which was a step backwards in welfare and safety (as was the previous invention of the snaffle bit), the cross-under bitless bridle is a step forward. In terms of development, it can be thought of as a step forward from the neck strap. A neck strap is all that a master horseman needs and some don't even need that. But the average rider (and average horse) needs more signal than a neck strap can provide. They need something that will enable them to give comprehensive hand signals yet without inflicting the pain in the mouth that, in their hands, is an unavoidable (and dangerous) side-effect of the bit method of communication.



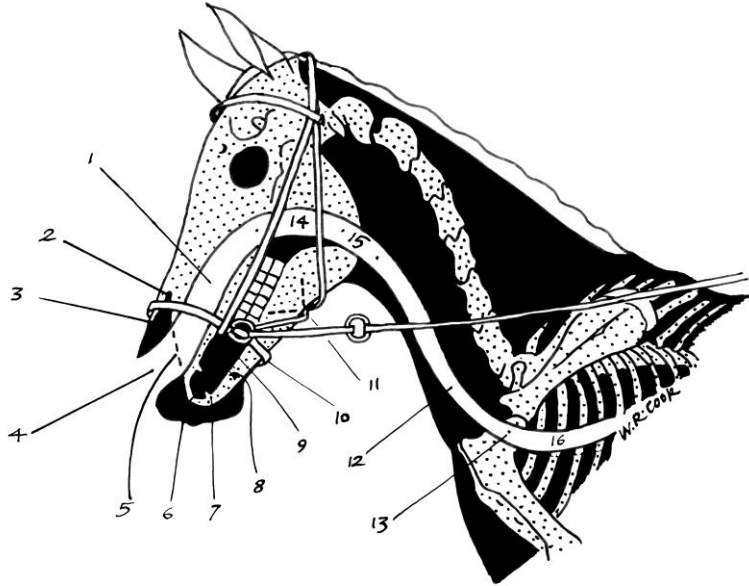
*Fig. 1. Showing how the noseband of the cross-under bitless bridle is fitted low on the head, yet without obstructing the nostrils. [Photo: Carole Iverson]*

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[www.bitlessbridle.com](http://www.bitlessbridle.com). Many cross-under bitless bridles are now on the world market but this article is based on  
evidence from *The Bitless Bridle*, first marketed in 1999



*Fig. 2. Showing how the anatomy of the muzzle region relates to the cross-under bitless bridle's noseband, which should lie on the peak of the premaxilla just below the premaxillary notch.*

*Key: black = soft tissue: stippled = bone*

*1= nasal airway: 2 = premaxillary notch: 3 = tip of premaxilla and point at which nasal cartilage commences: 4 = anterior nares: 5 = rostral edge of premaxilla: 6 = commissure of lips: 7 = lower canine tooth: 8 = mental foramen: 9 = bars of the mouth: 10 = chinstrap: 11 = cross-under strap: 12 = trachea: 13 = thoracic inlet lies just caudal to level of shoulder joint: 14 = nasopharynx: 15 = larynx: 16 lower airway*

The present article is the first part of a trilogy with three objectives.

- To introduce the literature on the cross-under bitless bridle method (Part I)
- To document the diseases caused by the bit method (Part II)
- To describe the negative behavioral signs attributable to the bit method, so that veterinarians can recognize their cause (Part III).

### **A review of the literature**

Since 1998, I have published a body of work comparing the merits of the bit method of communication and the cross-under bitless method. This includes two books, ten articles in scientific journals, and a further 17 in horsemen's journals.

In addition, independent authors have published a further 57 articles on the cross-under bitless method, in horsemen's journals around the world.<sup>3</sup>

Equestrians have underestimated the harmful effect of using one or more metal rods in a horse's mouth for what might be called the hand-to-mouth method of communication (Cook 1998a-b, 1999a-c, 2000, 2001a-b, 2002a-c, 2003, 2004, 2005 a-b, 2006, 2005/6, 2007, Cook & Peters 2001, Cook & Strasser 2003).<sup>4</sup> Though all horsemen and veterinarians are familiar with the phrase 'aversion to the bit,' if they were asked to compile a list of the problems that make up this syndrome they would probably list no more than half a dozen examples.

Yet, as a result of research over the last ten years, I now recognize over one hundred signs of aversion to the bit exhibited by the horse and at least 10 more signs of aversion to riding on the part of the rider that stem from these objections on the part of the horse. It has only been possible to recognize this alarming number of problems since the introduction of a bitless bridle that differs in concept from the traditional hackamores, bosals and sidepulls. The ease with which a horse can be switched, overnight, from its regular bit to the new cross-under bitless bridle has served to highlight many problems that had not previously been recognized as being caused by the bit. Essentially, this has constituted an unprecedented opportunity to conduct a large-scale controlled experiment.

Some years ago, I surveyed the written reports received from 605 riders who had switched from a bitted method to the new bitless method (Cook 2003). Since then, the survey work has continued and the questionnaire in Part III of this article is based on the updated findings. The comparison of behavior has been that between a painful and invasive method of communication (the bit), and a painless and non-invasive method (the cross-under bitless bridle).<sup>5</sup> As the behavior of their horses when bitted had been familiar to most riders for several years, and as the switch from bitted to bitless communication was literally overnight, the before-and-after behavior patterns were strikingly contrasted. Ten major findings that have emerged from this research are listed below:

- A bit (any bit) causes a horse pain, whether or not the rider is aware of the fact
- Pain and other pathophysiological problems generate behavioral reactions in the horse that are more common and more serious than previously supposed
- Manifestations of aversion to the bit can be classified under the six F's of fright, flight, fight, freeze, facial neuralgia and physiological confusion

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<sup>3</sup> A bibliography of articles that have been published about the new bridle is available online at [http://bitlessbridle.com/curriculum\\_vitae\\_2006.pdf](http://bitlessbridle.com/curriculum_vitae_2006.pdf)

<sup>4</sup> See Part III of this article for the full references, the texts for many of which are available online at [www.bitlessbridle.com](http://www.bitlessbridle.com).

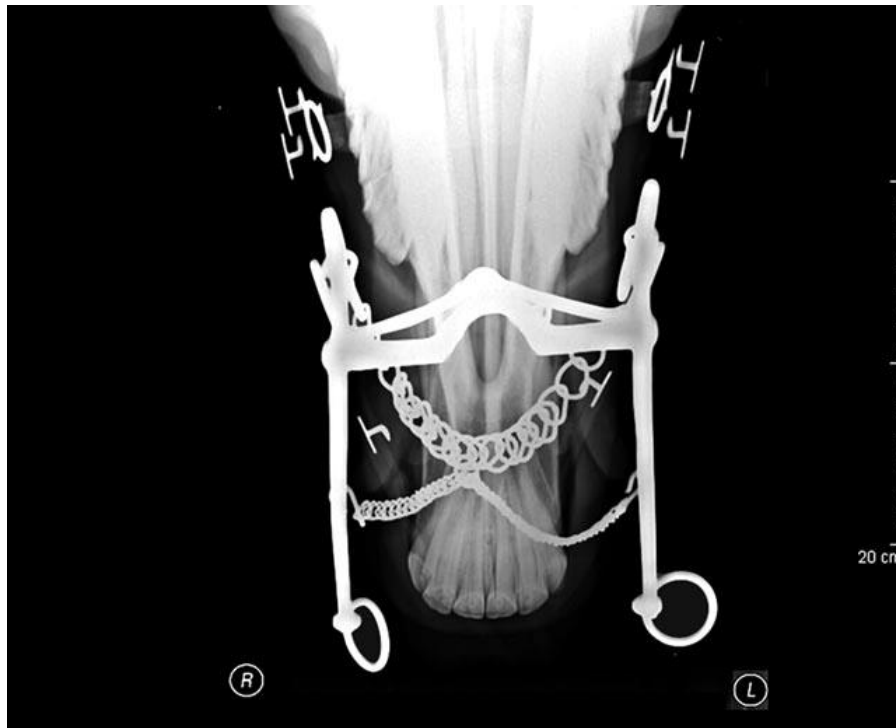
<sup>5</sup> The bit method is invasive in the sense that it involves inserting one or more foreign bodies into a body cavity

- All of the above, except the last, are subsets of fear and all six increase the likelihood of accidents to both horse and rider
- The bit is a common cause of asphyxia ('thickness of wind,' 'roaring,' and 'choking-up') and should routinely be considered as a differential diagnosis for recurrent laryngeal neuropathy
- The bit is a common cause of several diseases previously listed as idiopathic (e.g. the headshaking syndrome, dorsal displacement of the soft palate, epiglottal entrapment, scabbard trachea, and so-called exercise-induced pulmonary haemorrhage)
- The bit is a common proximate cause of poor action, stumbling, shortened stride and obstruction of the airway. It is a common ultimate cause of premature fatigue, 'breakdowns,' falls and limb bone fractures
- Removal of the bit and its replacement with the cross-under bitless bridle benefits not only those horses that riders recognize as 'hating the bit' but also those in which the rider has recognized no such aversion.
- The cross-under bitless bridle makes riding safer, simpler and more satisfying for the rider
- It enhances performance, reduces accidents and advances the welfare of the horse

### **Clinical anatomy & physiology of the horse's mouth**

Stone Age man, about five thousand years ago, deserves the credit for having first domesticated the horse. Unfortunately, Bronze Age man also made the understandable mistake of inventing the bit. The presence of what appeared to be a convenient gap between the teeth tempted early man to make use of it as a means of restraining this powerful beast.

Early bits were probably made of plaited vines, rawhide, wood, horn and bone but metal was quickly adopted. Sadly, the bit method of communication has survived through the Bronze Age, the Iron Age, and into the age of stainless steel. The simple bar snaffle has been followed by the jointed snaffle and the curb-and-chain bit and an endless number of variations on these themes. As one bit has often been considered insufficient, two bits are frequently used, as in the double bridle (Fig. 3). Leverage bits (i.e. curb bits) logarithmically increase in the mouth whatever pressure the rider applies to the reins. The pressure is applied to soft tissue and bone (Fig 4).



*Fig. 3. A radiograph of a double bridle in situ serves to remind us of the basic inhumanity of the bit method of communication.*

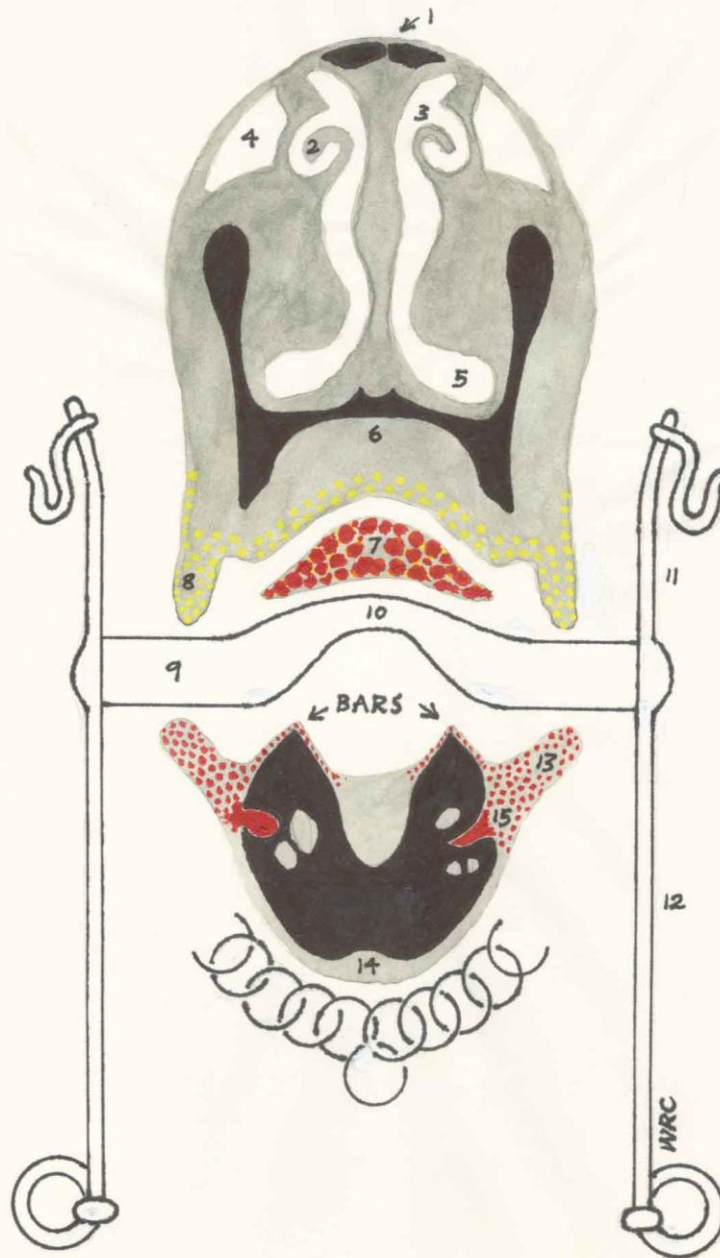


Fig. 4. A transverse section through a horse's head, level with the corner of the mouth, with a curb bit in position. The caudal section is viewed rostro-caudally.

*The diagram is drawn to scale and based on measurements taken from the skull of a larger than average horse, yet the bars of the mouth are only 29 mm (1 1/8<sup>th</sup> inch) apart. For illustrative purposes, the shank of the bit is shown at 90° to the line of the lips. In practice, it should never achieve more than a 45° angle but this discrepancy does not affect the principles of action discussed below.*

*The curb bit illustrated has a 10 cm (four-inch) mouthpiece, 12.5 mm (half-inch) diameter cannons, a mild port, and a two-to-one ratio between a 5 cm (two inch) cheek bar and a 10 cm (four inch) shank. As curb bits go, this is regarded as a mild curb. The mouth is illustrated in a slightly open position, with the lips just parted. In a double bridle, the bridoon bit would lie on the bars above the curb and between it and the first cheek tooth. For the sake of clarity, an air space is shown between the curb bit and the bars of the mouth but in use these would be in contact whenever the tongue is either behind or above the bit. Nevertheless, the bit does allow air into the mouth and so it is appropriate, though regrettable, to show air around the tongue and other places.*

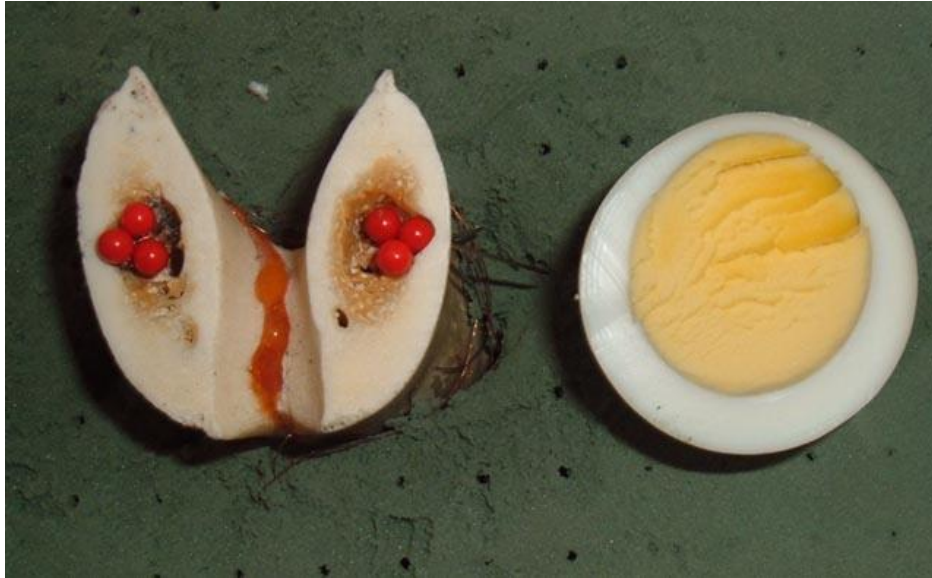
*The tip of the tongue is shown 'above the bit.' This is probably the least painful position for that delicate sense organ. A horse has two other options. The first is to leave it under the bit. As the tongue is wider than the bars, this will be more painful, for the tongue will be trapped between the bit and the knife-edges of bone that constitute the bars. The second is to withdraw the tongue so that its apex comes to lie 'behind the bit.' This avoids tongue pain but results in the same bone ache as when the tongue is 'over the bit.' In addition, the root of the tongue now elevates the soft palate and this, together with the ingress of air into the digestive part of the throat, obstructs the nasopharynx.*

*When the curb is centrally placed in the mouth, the port would prevent the cannons of the bit pressing directly down on the knife-edges of the bars. Instead, the cannons would tend to clamp and compress the jaw in a lateral-to-median direction. In so doing they would pinch the mental nerve rostral to the mental foramen (Fig 3). At any time when the curb is not symmetrically placed in the mouth, the cannon would act like a seesaw on one knife-edge bar.*

*A snaffle or a curb bit is a pressuring device that generates pain or the threat of pain by the application of metal on bone. The bone is thinly covered with gum but has no other 'cushion.' At the level of bit pressure the bone is roughly circular in cross-section with a pie-section missing that produces two knife-edges at 11 o'clock and 1 o'clock, the bars of the mouth. In a large horse, such as the one depicted here, the diameter of the section is 45 mm; the same diameter as a standard hen's egg when cut in half (Fig 4). The bone is also as fragile as the simile suggests and should be treated with the same respect.*

*Key: black = bone; gray = soft tissue; red = areas of high sensitivity supplied by terminal branches of the mandibular nerve; yellow = areas of high sensitivity supplied by terminal branches of the maxillary nerve*

1. peak of the nasal bone; 2. ventral turbinate bone; 3. entrance to the middle meatus; 4. nasal diverticulum; 5. ventral meatus; 6. hard palate; 7. apex of the tongue; 8. upper lip; 9. cannon; 10. port; 11. cheek bar; 12. shank; 13. lower lip; 14. 'chin groove'; 15. mental foramen



*Fig. 5. A transverse section of the mandible just caudal to the mental foramen, compared with a mid-section of a standard hen's egg. The rostral section is viewed caudo-rostrally. The red spheres represent the mental nerve. The 'bars' of the mouth may be described as flat when viewed laterally but in a transverse section they are seen as knife-edges.*

As the bit applies pressure to the dorsal edge of the mandible (the bars of the mouth) and the curb chain applies pressure to the ventral edge of the horizontal rami, the bone and soft tissues are being clamped between two pieces of steel. The bars of the mouth are two knife-edges of bone, covered with only a thin layer of gum and the mucosa of the mouth. 'Gum' consists of a layer of fibrous tissue, about 2 mm. thick, that is firmly attached to both the underlying bone and the transparently thin oral mucosa. It is, in reality, modified periosteum; therefore, any damage to gum is damage to bone.<sup>6</sup> The bars are never sufficiently padded with soft tissue to justify the horseman's description of being 'rounded and fleshy' (Fig. 2). At the bars, the bone of the jaw is not cushioned or in any way protected from the bit. Being covered only by the transparently thin oral mucosa, it is more exposed to injury than the human shin, which is at least covered by a layer of skin. The apex of the tongue may or may not provide some cushioning. As a horse frequently and deliberately retracts its tongue behind the bit (and in so doing obstructs its own breathing) the tongue cannot be looked upon as a

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<sup>6</sup> As bone relies on its periosteum for its nutrition, damage to the gum (periostitis) can result in sections of the bone dying and forming sequestra. These pieces of dead bone, some as long as 3.0 cm, now have to be sloughed away from the surrounding tissue or be surgically removed.



protection for the bone.<sup>7</sup> When the bit presses on the bars, the pounds per square inch pressure (psi) being concentrated on their knife-edges must be immense.<sup>8</sup> Not surprisingly, this pressure causes intense pain. It also frequently damages the bone and causes the growth of even more painful bone spurs (Fig 5).

### **Bit-induced pathophysiology of the horse's mouth**

The horseman's belief that, over time, a horse's mouth can become so scarred by the bit that the nerves are numbed and the mouth becomes 'dead' to sensation is false. Horses that pull and have a 'hard' mouth are simply doing what they can to defend themselves from the bit. In desperation, they have four options. First, they can grip the bit between the second premolars ("getting the bit between their teeth"). Secondly, they can raise and stretch their head and neck in such a way that the bit comes to lie against and polishes the front edge of the second premolars in the lower jaw, rather than on the more sensitive bars ("getting above the bit"). Thirdly, they can trap the bit under their tongue and to some extent immobilize it ("getting their tongue over the bit"). Fourthly, they can try to evade the bit by over-bending at the poll ("getting behind the bit"). None of these options are entirely the answer from the horse's point of view, as they still experience pain. But they should not be blamed for trying to reduce the agony.

My survey of 65 jawbones from horses five years old or older in osteology collections at four Natural History Museums in the USA (Cook 2002a) has shown that bone spurs were present in 49 (75%). As some of the 65 horses were feral horses and had been bit-free all their lives (the feral horses had no bone spurs) the real incidence of the problem in the bitted horses was actually greater than 75%. No bone spurs were found in a survey of 35 adult zebra skulls. Readers can readily imagine how excruciatingly painful it must be for a horse with bone spurs on the bars of its mouth to be 'controlled' by a steel bit. No wonder that they toss their heads, open their mouths and 'evade the bit' in endless different ways.

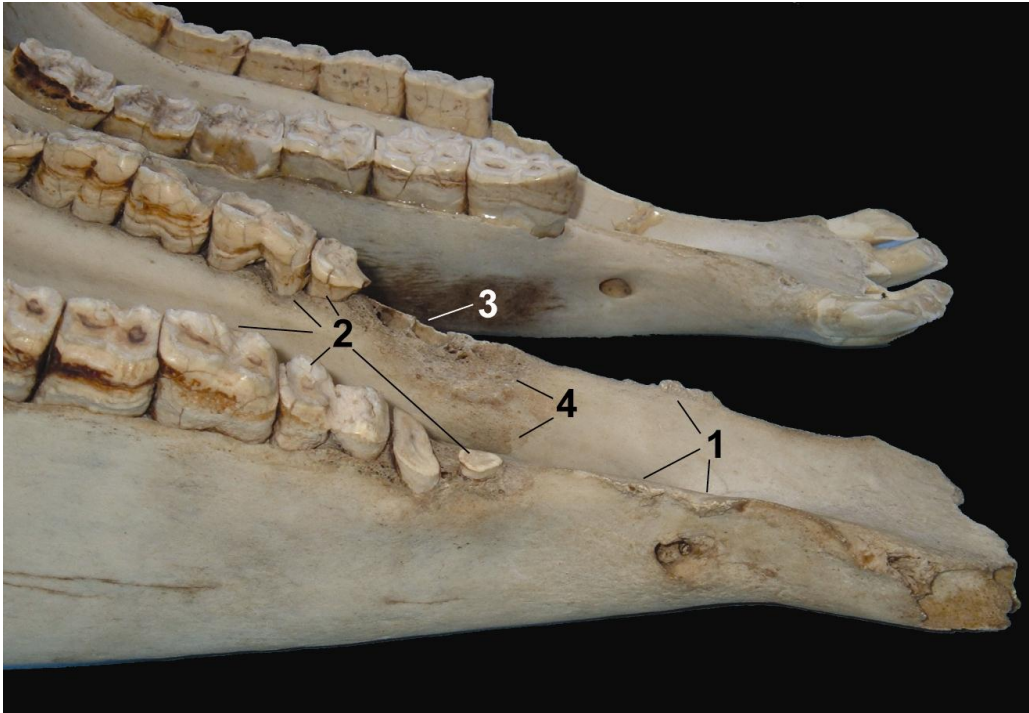
Sadly, instead of treating a problem by removing its cause (the bit), which is the only valid approach to treatment, the standard approach to these evasions is to employ a variety of supplementary devices aimed at suppressing the symptoms. These devices are designed to prevent a horse from doing those things that it would never think of doing if it did not have a bit in its mouth in the first instance.

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<sup>7</sup> Place a pencil in your mouth and note how you immediately retract your tongue and use its tip to incessantly 'play' with the pencil. Now discover how difficult it is to drink or eat. Try not to slobber.

<sup>8</sup> The actual pressure has yet to be measured but let us take a hypothetical example. Suppose that a rider applies 5 lbs. of pressure to the curb rein, a figure that is not uncommon according to work done by Dr. Hilary Clayton at Michigan University. Let us assume that the curb bit has a shank of a length that multiplies this pressure by three. Accordingly, 15 lbs. of pressure will be distributed over a surface area of about 1/5<sup>th</sup> of a square inch of bone. This would translate to a pressure of 75 psi. Imagine what the psi might be if a horse spooks and a rider momentarily snatches at the reins to regain balance. The rider's full weight and momentum banging against the bars of the mouth must generate a tremendous force.

Hence the use of crank nosebands, in doomed attempts to close the mouth, or the use of dropped nosebands, flash and grackle nosebands. Similarly, in the hope of limiting if not preventing head tossing, standing and running martingales are employed. To discourage evasion of the bit by tongue movement, racehorses have their tongues tied to their lower jaws with either rigid or elastic straps. Predictably, none of these measures are effective cures for the problem. They are not even effective in suppressing the symptoms.



*Fig.6 The mandible in the foreground exhibits extensive bit-induced damage to the bars of the mouth and the first three cheek teeth. Compare this diseased bone with the healthy mandible in the background.*

- 1 Bone spurs on both bars of the mouth, immediately above the mental foramen.*
- 2 Severe erosion of the first three cheek teeth on both sides of the jaw.*
- 3 Entire loss of the whole of the first cheek tooth on the left side, together with the rostral half of the second cheek tooth on the same side*
- 4 Periostitis of the alveolus of the first cheek tooth on the left side, indicating that loss of this tooth occurred during the life of the horse and was not a post-mortem artifact.*

Further indictment of the bit method of communication will be found in Parts II and III of this article. For the present, it suffices to note that the antiquity of a

method is no assurance of its true fitness of purpose. The bit method's primary fault is that, except in the hands of a master horseman with an unshakably independent seat, the bit causes pain (Cook & Strasser 2003). 'Good hands' depends on having little or no pressure on the bit. As the horse's mouth is one of the most sensitive parts of its anatomy, even the slightest pressure (the weight of the bit and the attached reins) can cause intense pain (Fig 4).<sup>9</sup> Think of the pain of badly fitting dentures or the irritation from a particle of food that lodges in your mouth.



*Fig. 7. Inevitably, this looks like a cartoon horse but it has a serious message. This is an attempt at showing what a horse might look like if one apportions scale and color to represent the relative investment of its sensory anatomy. The red areas represent those areas that are most generously supplied with sensory nerves. In such a representation the muzzle and mouth become the largest parts because these are the most 'touchy/feely' areas. The horse depends on its muzzle to feel its way around the world.*

The horse exhibits this pain through the five F's of fright, flight, fight, freeze and facial neuralgia (the headshaking syndrome). Apart from these being the underlying cause of many accidents to horse and rider, the bit also causes physiological confusion as it interferes with both breathing and striding (Cook 1999a, 1999b, 2000). Shortage of breath is a cause of premature fatigue and, once again, fatigue is a potent source of accidents. Fatigue causes falls, and falls can be fatal to man and horse. Finally, fatigue is a common cause of poor performance.

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<sup>9</sup> The guiding principle for good saddle fit is that no pressure should be applied to bony prominences such as the withers and spine. The saddle should not even *touch* these areas. Instead, pressure should be well and evenly distributed over the fleshy part of the back, i.e. the muscles. Sadly, until the last eight years, the same guiding principles have not been applied to the bridle. The principle behind all bits, hackamores, bosals and sidepulls directly contravenes this 'no pain' guideline. Pressure is deliberately placed on bone and is, therefore, painful. The cross-under bitless bridle, on the other hand, follows the guiding principles for saddles and indeed saddlery in general, that it should be incapable of causing pain. The new bridle can only apply a rather trivial pressure and what pressure is applied is distributed around the whole of the head, much of it on fleshy areas such as the cheeks and poll.

## **A classification of the different methods of communication on the basis of their action**

The snaffle bit method provides communication primarily with the mouth (lips, tongue, gums and jawbone). An appropriate name for the method would be the **oral cavity rod** method. Supplementary action is also possible. Depending on the horse's head position and the angle at which the reins are held, the snaffle also acts as a **lip retractor** and will often stretch the lips to twice their normal length. If used in conjunction with an auxiliary aid (such as a drop, flash or grackle noseband) there will also be a vice action on nasal bone and mandible if the horse is still trying to open its mouth. Jointed snaffles and, to a lesser extent, French link snaffles have a nutcracker action on the side of the bars as well as the top. Three-ring 'snaffles' are really leverage bits, not snaffles, and designed to exert slight or severe pressure on the poll, depending on their adjustment.

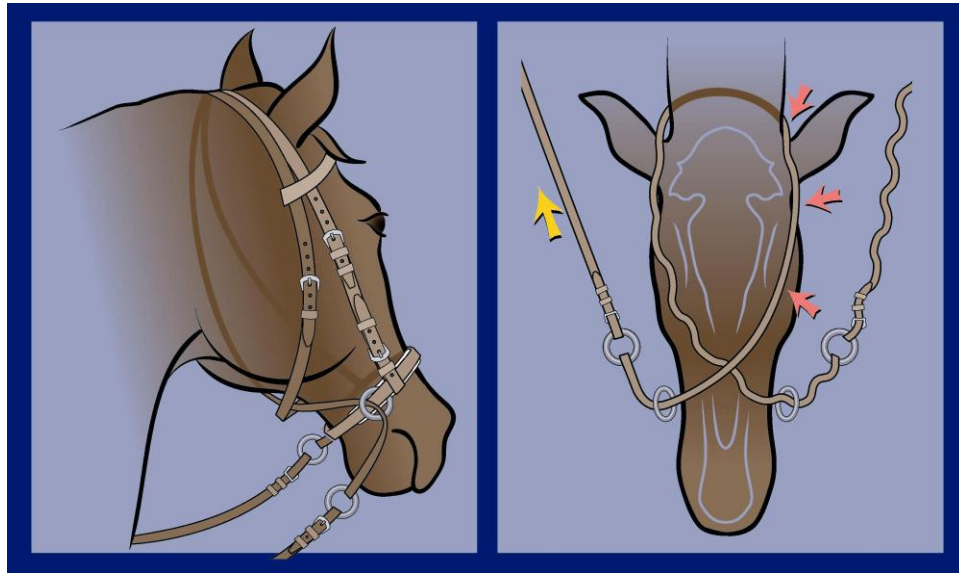
A double bridle is made up of a thin (therefore severe) snaffle known as a bridoon and a curb bit, which has a leverage action and also applies pressure on the chin and poll. The port of the curb is designed to relieve pressure on the tongue and to actually encourage bar pressure. For the purposes of description it could be referred to as the **mandibular vice** method, as – except in the hands of a master - it squeezes the mandible between two pieces of steel, the mouthpiece of the curb and the curb chain.

The Western curb is a leverage bit that is used without any accompanying snaffle. It has a long shank and a spade extension of the mouthpiece designed to apply pressure to the hard palate. It is normally introduced after the horse has been fully trained to respond to a bosal, the curb bit being regarded as the finishing touch for a horse that is already well schooled. When used by a master it is not used, in that the rein is slack at all times. The rein is only used for neck reining, as the curb bit is not suitable for steering. If used by any other than a master it is a painful device because of the huge leverage advantages it offers the rider, coupled with the severe pain that can be inflicted on the hard palate (**oral cavity rod, plus mandibular vice, plus palatine prod**). A spade bit is sometimes used, inappropriately, in the hope of preventing a horse from getting its tongue over the bit.

The mechanical hackamore has a leverage action and applies pressure on the bridge of the nose, the mandible and the poll. For descriptive purposes it could be called a transverse axis head vice, as it squeezes a rostral section of the head between a steel noseband and a chain in the chin groove.

The English hackamores and the sidepulls rely primarily on nose pressure only. They could be called the **nasal hoop** method.

The cross-under bitless bridle, communicates by slight and painless pressure. This pressure, such as it is, is well distributed around the whole of the head. The greatest pressure, such as it is, is applied by a soft strap across the bridge of the nose, with less pressure on the ramus of the mandible and the cheek, and least pressure on the poll (Fig. 2).



*Fig.8. The cross-under bitless bridle. The diagram on the right is a ventral view of the head, showing how traction on the right rein (yellow arrow) nudges the entire left side of the head for steering to the right. The red arrows indicate only some of the areas that are nudged, for pressure is also applied to the poll, the bridge of the nose and under the jaw. Intermittent pressure on both reins for signaling 'slow' or 'stop' hugs the whole of the head.,*

Its action can best be described as a **head hug** method (Table I). The bridle distributes mild pressure over a large area of relatively insensitive tissue, whereas all the other bitted methods apply severe pressure on a small area of extremely sensitive tissue. Furthermore, with the head hug method whatever pressure is applied at the level of the rider's hands is dampened before it is applied to the tissues of the head. Contrast this with the leverage methods in which whatever pressure is applied to the reins is not only focused on a small area of sensitive tissue in the mouth but is actually magnified three or four times before application. The cross-under feature of the head hug method means that, even when a horse spooks and a rider instinctively hangs on the reins to regain balance, the amount of pressure is never capable of causing pain. This means that whatever caused the horse to spook in the first instance is not automatically followed by a sudden pain. The result is that the horse recovers from the spook more readily and does not have a further incentive to bolt. Furthermore, the next time it sees the same monster, it will not associate it with a sudden pain in its mouth. The spook will be less likely to escalate and the apprehension that results from anticipation of pain will not develop.

<b>METHOD</b>	<b>BRIDLE</b>	<b>ACTION</b> (Distribution of pressure)	<b>FREEDOM FROM PAIN</b>	<b>STOPPING</b>	<b>STEERING</b>
<b>BITS</b>	Snaffle	Oral cavity rod + lip retractor	1	1	1
	Snaffle + auxiliary noseband	Oral cavity rod + lip retractor + nasal/mandibular vice	1	1	1
	Double Bridle (curb and bridoon)	Oral cavity rod + lip retractor + mandibular vice + poll pressure	1	1	1
	Western curb with curb chain & spade or spoon	Oral cavity rod + mandibular vice + palatine prod	1	1	1
	Gag bits	Oral cavity rod + longitudinal axis head vice (corner of lips to poll)	1	1	1
<b>BITLESS</b>	Mechanical hackamore	Transverse axis head vice (nasal bone to mandible)	2	2	1
	Western Hackamore (bosal, latigo, fiador, & mecate)	Transverse axis head vice (nasal bone to mandible)	3	2	1
	Sidepulls (with metal or rope noseband) and rope halters	Nasal hoop. Note that a metal noseband or thin cord noseband is more severe than a strap	2 or 3	2	3
	English hackamore (strap noseband), webbing halter	Nasal hoop	4	2	3
	Cross-under bitless bridle	Head hug	4	4	4

*Table 1: A comparative classification of the modes of action of the different designs of bridle with a subjective grading of each method's efficiency on a four*

*point scale, where 4 is the most favorable score. Note that all but one design is capable of inflicting pain*

In sum, all the designs except the cross-under bitless bridle are pain-based designs. To communicate by dependence on pain is to run a high risk that the signal could trigger quite the opposite response from the one intended. Horses run from pain, so a painful stop signal might well initiate bolting. On the other hand, reflect that a horse is perfectly capable of registering and responding to the touch of a fly on its head. This should remind us that a painful signal is not needed for successful communication and a signal that stimulates touch receptors without stimulating pain receptors is both sufficient and safer as a means of rider/horse communication. Bits are over-kill and, quite literally, weapons of horse destruction. A polite touch is more likely to be complied with than a painful prod and far less likely to be misunderstood. In Part III of this trilogy I will list the hundred or more negative side-effects that painful signals promote.

### **Criteria for an acceptable method of communication**

The five indispensable requirements are that it should be:

- Humane
- Effective as a form of communication
- Compatible with the physiology of the exercising horse
- Free of undesirable side-effects
- As safe as possible for horse and rider.

The bit method of communication is unacceptable on all five criteria. It might be considered humane in the hands of a master horseman who has learned to avoid its use. But even master horsemen are not born with good hands and so horses will undergo years of pain before a budding master achieves years of discretion. In the hands of an average horseman, a bit is painful. In the hands of a novice, a bit is cruel. Cruelty is defined as the infliction of avoidable pain. Now that a painless method of communication is available, the bit method has to be re-classified as cruel (Cook et al 2006).

A further preference for any form of communication is not an absolute requirement but it adds to the merit of the method. This is the applicability of the method for all types, temperaments, ages and uses of the horse, together with all types, temperaments, ages and skills of the rider. Though the bit method has long been used for all disciplines and on all types of horse, it has to be said that the bit lends itself far too easily to abuse, both intentionally and unintentionally. It

cannot, therefore, be recommended for universal application (see Part II: Table I).<sup>10</sup>

Quite apart from the evidence now accumulated that the bit causes pain, the effectiveness of the bit method from the rider's point of view can be shown to be questionable, simply by noting the multiplicity of bit designs that are on the market. The situation is no different from a comparable situation in medicine. Whenever there is a multiplicity of treatments for any one disease or problem it is generally true to say that none of them are entirely satisfactory. Unsurprisingly, the bit method is ineffective in preventing the many instances of bolting, bucking and rearing. When it is recognized that the bit is a common cause of all three of these problems it becomes apparent that it is illogical to expect such problems to be cured by continuing to use the same method and simply changing the design of the bit. When riders tend to own, on average, about 11 different bits this tells us something important about the efficacy of the method. By way of contrast (and if readers will excuse the atrocious pun), another name for the cross-under bitless bridle would be 'the bridle sweet.'

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<sup>10</sup> The problems caused by the bit and the principles of communication discussed in this article are based on my ten year's experience of the cross-under bitless bridle for riding. I believe that the same principles apply also to driving. Bitless driving is as yet in its infancy but the feedback to date certainly supports this belief.