

## **THE PAIN-FREE HARNESS HORSE:**

### **Promoting performance by demoting the bit**

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#### ***Summary***

*New equipment is introduced for the harness horse that, it is predicted, will advance equine welfare, improve safety, and enhance performance. Reasons are given why the crossunder bitless bridle, in conjunction with a pair of bit bypass straps that demote the action of the bit, is a better way for drivers to communicate with the horse's head. The crossunder bitless bridle (CBB) with appropriately adjusted bypass straps is painless. A bit is painful and triggers a host of adverse and potentially dangerous behavioural reactions, all of which are likely to reduce performance. The CBB combo neither damages the sensitive tissues of the mouth, nor interferes with the horse's ability to breathe. As a result, many otherwise bit-induced diseases can be prevented and cured. Specifically, it is predicted that two particular scourges of harness horse racing can be prevented or significantly alleviated, respectively dorsal displacement of the soft palate (DDSP) and exercise-induced pulmonary hemorrhage (EIPH).*

*Measurement of equine performance and its correlation with any given variable is a notoriously difficult scientific experiment to design and has rarely been attempted. Nevertheless, it is reasonable to predict that - all other things being equal - a pain-free horse that can breathe freely and has a healthy pair of lungs will out-perform a horse handicapped by traditional equipment.*

*Adoption of the CBB combo eliminates the rationale for a number of bit accessories such as tongue-ties, dropped nosebands, poles and overchecks. The public image of racing will be improved by the use of a more humane method of communication and a predicted reduction of accidents.*

*In October 2011, the CBB combo was approved for harness horse racing by the Nordic countries, Sweden, Denmark, Finland and Norway. Thanks to this approval, a natural experiment will play out in Scandinavia over the coming years. Trainers themselves will evaluate race results as bitted horses compete against those that are not bedevilled by the bit.*

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## Introduction

*Custom puts to sleep the eye of judgment.*<sup>2</sup> A mouth iron for the horse has been customary for so long that we fail to see its inhumanity (26). But apart from this, it does not promote top performance. The bit is not only painful but also and, quite literally, a breathtaking device (4). A horse in pain and unable to breathe freely cannot give of its best. Conversely, a horse that is free of pain and able to breathe without hindrance is more likely to perform to its full potential (24).

But custom is so powerful a force that we submit without question to rules of racing that mandate the use of this prehistoric invention (14). The false mantra, “a bit controls a horse” is one of the most deeply embedded myths of the horse world. The reality is that the bit is the most common cause of complete loss of control. Adverse reactions to the bit are numerous, counter-productive and often dangerous. They cannot be dismissed as rare and insignificant side effects. There is a better way to communicate than this hand-to-mouth method (4, 8).

The horse’s mouth is a body cavity. When one or more metal rods are strapped into this highly sensitive cavity and placed under tension they become a source of acute and chronic pain. They frighten many a horse and make them nervous and spooky – an accident waiting to happen. Bit-induced accidents occur frequently in all disciplines (23). The many behavioural reactions to the bit that horses exhibit are normal evolutionary responses to pain, fear and panic. All such reactions reduce performance. The bit is also the source of much occupational disease. Two bit-induced diseases to which the harness horse is especially prone are dorsal displacement of the soft palate (7, 11, and 12) and bleeding from the lungs (1, 3, 5, 6, 16, and 27). There are many others (18). Collectively, counter-productive behaviour and diseases triggered by the bit are a serious cause of poor performance and catastrophic injury (8, 15, and 23). Summing up, the bit cannot be justified on the grounds of performance, control, or welfare. The bit is a handicap for the horse and a false friend to the horseman.

The good news is that, after 5000 years, a pain-free, more efficient and virtually bitless alternative is finally available (24). Unlike traditional bitless bridles (bosals, sidepulls and hackamores) the crossunder bitless bridle is painless, provides comprehensive communication and has no side effects. Since 1998, the crossunder bitless bridle (CBB) has been tried and tested by riders and drivers of all ages and experience; on horses of every age, level of training and temperament; under a wide variety of conditions worldwide; and in just about every discipline. As a result, it has earned an enviable reputation. For example, in the UK trials have shown that it is beneficial for the training of flat racers and steeplechasers (19), in Holland its benefits have been demonstrated for carriage driving (17, 20, and 21) and for bitless dressage. In Sweden, it has been successfully applied to the harness horse. The anatomical and physiological evidence in support of the CBB is compelling and the field testing evidence supports the basic science (4, 8, 14, 15, and 22).

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<sup>2</sup> Michel de Montaigne (March 1st, 1580) “On Principle.”

The purpose of this article is to introduce the CBB to the harness horse industry in general (10, 11, and 17). The CBB acronym serves as a generic for 'crossunder bitless bridle' or the proprietary 'Dr.Cook BitlessBridle.™' A conflict of interest is declared.

### **A horse is not a wheelbarrow**

As a driver is more dependent on rein aids than a rider, it is necessary to dispel the almost reflex resistance that many drivers instantly have to the proposal that they would be safer if they eliminated the bit (10, 17, 20, and 21). To do without something that they have relied on all their life is scary. Intuitively, trainers may feel that drivers cannot possibly be safer, nor harness horses better off, without a bit. Riders are conservative and cautious about change but drivers even more so and for good reason. Driving accidents are more common than riding ones. But the root cause of this inequality stems directly from the driver's greater dependence on the bit, its crude action on sensitive tissues and the physics of the method.

Riders have short reins and a seat that is, at best, potentially unstable. Harness horse drivers, on the other hand, have the mechanical advantage (leverage) of long reins (with hand grips) and a seat that – though still unstable – provides greater 'purchase.' Because of the longer 'beam' and firmer 'stand,' a driver exerts a greater force on the horse's mouth than a rider. Archimedes' famous boast applies, "Give me a place to stand and a lever long enough and I will move the world." Drivers may feel that, given a place to sit, they can 'control' any horse. The assumption is flawed.

The rein and bit is a force-and-lever mechanical device that works on the principle of a second-class lever, like a wheelbarrow. The 'load' (the pressure of the bit) is situated between the fulcrum (the joint between horse's skull and the first vertebra of the neck) and the applied force (the horseman's hands). The longer rein and the driver's firm seat, applies a huge load and, therefore, more pain. This, in turn, triggers a greater sense of fear and panic by the horse and, accordingly, a greater frequency of driving accidents. Unlike a wheelbarrow, a horse is a sentient being.

Evasion of the bit by retraction of the tongue causes the root of the tongue to lift the soft palate and this, in turn, obstructs the airway in the throat (4, 8). The fact that a harness horse has more metal in its mouth than other racehorses (one or more driving bits and an overcheck bit) explains why dorsal displacement of the soft palate (DDSP) is more common in the harness horse (5, 6, 7, 11, 12, 18, and 27). Again, because of the mechanical advantage, a driver can flex a horse's head and neck with greater ease than a rider.<sup>3</sup> The more the poll is flexed the less oxygen the horse can obtain and the greater is the damage to its lungs from the increased vacuum pressure that develops when a horse breathes in (27). The combined effect of airway obstruction from soft palate elevation and poll flexion

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<sup>3</sup> One way in which a horse partially avoids having its head flexed and its air supply curtailed is to open its mouth. This allows the lever to act on the fulcrum of the temporo-mandibular joint before it acts on the poll but is also allows air to enter the mouth and throat, which elevates the palate. In the riding horse, crank nosebands prevent gaping mouths but add to the pain.

causes congestion of the lungs and bleeding, i.e. exercise-induced pulmonary hemorrhage (EIPH). Premature fatigue from asphyxia does nothing to improve a horse's performance (1, 3, 5, 8, 9, 12, 16, and 27).

EIPH is not a useful name for this problem. It provides neither an indication of its cause nor guidance on its prevention and cure. I recommend instead the name for a relatively rare problem in human medicine, negative pressure pulmonary edema (NPPE). An Internet search will reveal that NPPE in man is analogous to EIPH in the horse. It is caused by any obstruction of the upper airway (27). In man, pulmonary edema is accompanied by chest pain and a sense of drowning. For all we know, the horse may experience something similar.

In sum, the cost of bit usage in the driven horse is greater than in the ridden horse.

The CBB avoids these penalties (22, 24). Mild pressure is applied to relatively insensitive facial skin rather than the hypersensitive soft tissues of the mouth. The CBB's force is less because it is well-distributed, as opposed to the focussed pressure of a bit on lips, tongue and gums. Think of the impact of high-heeled shoes on a wooden floor. As a result, pain is avoided, horses can pay attention to a rein aid that does not hurt, so steering and brakes are more efficient.

Over the last decade, the CBB has been successfully used for pleasure driving in many countries, particularly Holland (10, 20, and 21). In the U.S.A. all five horses owned by a carriage company in Beaufort, South Carolina have been bitless since 2005. Since 2009, many Amish drivers in the USA have recognized that bitless driving is safer. After many years of CBB driving, worldwide, CBB-related accidents have been conspicuous by their absence. I have not been notified of one accident attributable to use of the CBB. On the contrary, I have heard of a number of incidents in which, had the rider/driver been 'relying' on the bit, a serious accident may have occurred.

In the USA, where some harness horses are pacers and hobbles are allowed, if pacers stumble they can fall and horrendous pile-ups follow. In other disciplines it has been found that a common cause of stumbling is the bit. When the CBB combo is used for the harness horse, it will be interesting to see if stumbling becomes less frequent.

To counter the fear of the unknown as expressed by trainers who have not tried the CBB, here is a comment from Kerstin Kemlén, the pioneering harness horse trainer in Sweden, after she had used the CBB for over a year. *"Training is more fun. The horses move better and no longer are there situations where they become afraid and hard to handle."*

## Equipment.

Most harness racing jurisdictions currently mandate the presence of a bit. Nevertheless, as in Scandinavia, it may be possible to comply with the letter of the rule by combining a bit with a CBB in such a way as to minimize the bit's penalties. Trainers in the USA and Europe are encouraged to explore this possibility.

Figure 1 shows a harness horse equipped with a crossunder bitless bridle, a pair of bypass straps and a bit. Collectively this equipment will be referred to as a CBB combo. Figures 2, 3 and 4 illustrate the component parts.

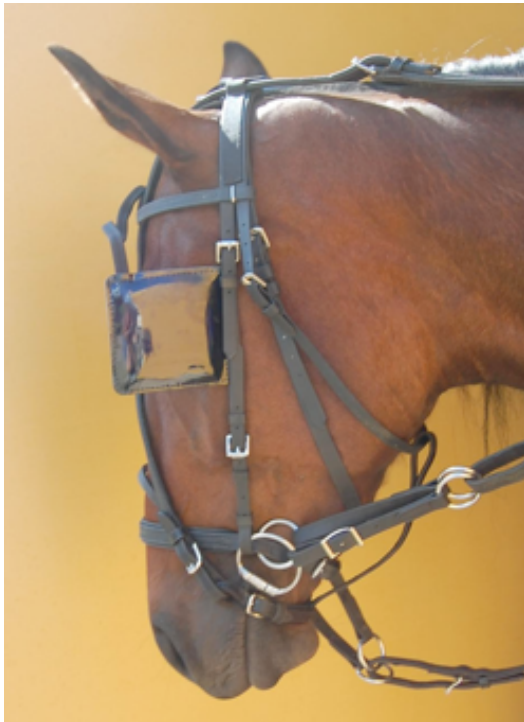
The CBB combo for the harness horse has blinders and a crown piece with tunnels to take an overcheck if required. My preference would be to avoid the use of an overcheck if possible. If one was really thought to be needed (?), it should be of a bitless variety.



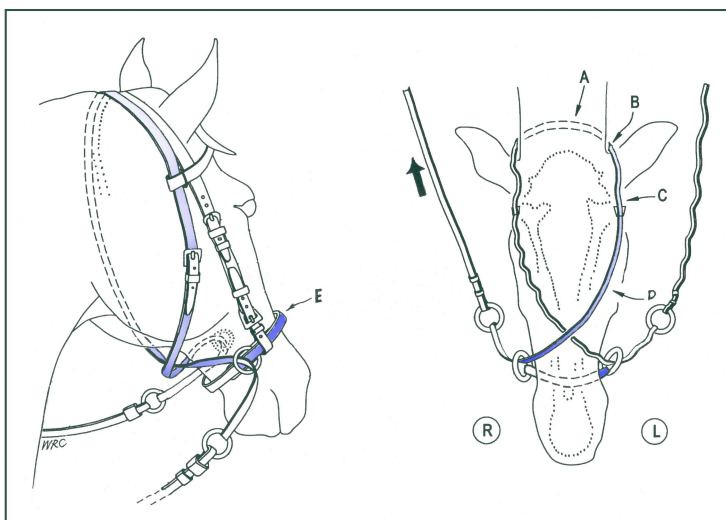
*Fig. 1a. The 'Dr. Cook Bitless Bridle™' together with bit bypass strap.<sup>4</sup> To avoid confusion, the right rein and its attachments have been deleted from the image. From the right hand side of the picture, the terminal loop of the rein can be seen passing through both 'O' rings. The slightly higher of the two, the one furthest from the camera, connects the rein to the crossunder strap of the bridle. As can be seen, tension is being applied to the crossunder strap, so the bridle in this configuration is bitless and the bit inactive. The lower 'O' ring, the one closest to the camera, connects the rein to the snaffle ring by means of the bit bypass strap. The length of the bypass strap is adjusted in this image so that tension on the rein applies no tension to the bit. If the bypass strap were shortened a hole at a time it would gradually bring the bit into partial action until, at its shortest, the bit would be 100% active and there would be no bitless action. When introducing the bridle, a trainer can choose to start with a bitted configuration and gradually transition to a bitless configuration. In this latter mode,*

*a horse still has a foreign body in its mouth but, as a bit, it is disarmed. Note that the snaffle is hung directly from the cheek piece of the bridle. In this way, the noseband is at the recommended height for 'bitless' use (i.e., lower than its traditional placement but without obstructing the nostrils), yet the bit still hangs in the mouth at a traditional height. Unlike the riding bridle, the driving bridle has a throat latch and blinders. But cheek pieces are interchangeable so that an 'open' bridle (without blinders) is also possible (Photo courtesy Kerstin Kemlén).*

<sup>4</sup> Manufacturer's address: BitlessBridle Inc. Wrightsville, PA, USA [www.bitlessbridle.com](http://www.bitlessbridle.com)



*Fig. 1b. Showing the CBB combo with a bitless overcheck. Tension on the left rein is being transmitted to one crossunder strap of the CBB and to the snaffle. No tension is being applied to the right rein. (Photo courtesy of Kerstin Kemlén)*



*Fig.2. Diagrams to illustrate the mode of action of the CBB (blinders and other accessories not shown). The diagram on the right is a view from below. For steering, brief pressure on one rein (thick arrow) nudges the opposite half of the head, across the nose in particular (E) but also with diminishing pressure from D to B, and with least pressure at the poll (A). At no point is the pressure great and, such as it is, the pressure is well-distributed, as indicated by the depth of the blue tone. Unlike the effect of a bit, that*

*tends to twist a horse's head, the head stays upright and the turn is more natural and physiologically correct. More effective steering is one of the first benefits that users notice, a feature of special interest to drivers of the harness horse. For slowing and stopping, intermittent or alternate pressure on both reins hugs the whole of the head.*

## Fitting the CBB combo

The process can be described in three stages:

Stage 1: Apply the CBB in the usual way, following the recommendations for fitting (22). Briefly, the bottom edge of the noseband should be about one and a half inches (3.7cms) from the corner of the horse's mouth.<sup>5</sup> The chin strap, when cinched up, should permit one flat finger between it and the bottom edge of the jawbone. Adjust the length of the crossunder strap so that its 'O' ring is about 4 inches (10cms) away from the 'O' ring on the noseband (22).

Stage 2. There are two options.

- i) Take a bit-hanger (essentially, an adjustable long strap for suspending a bit from the poll) with a snaffle and thread one end through the loops of the CBB browband. Adjust the length of the bit hanger so that the bit causes no wrinkling of the lips at the corner of the mouth. This option may be necessary if you are using a driving bit with a small ring.

or

- ii) Attach a snaffle with snaffle ring of the correct large size directly to the cheek piece of the CBB noseband (Fig 1).

Stage 3. Take a bit bypass strap and fix its Conway buckle end to the snaffle ring (Figs 1 & 3). Place its 'O' ring alongside the 'O' ring at the end of the crossunder strap (Figs 1 & 4) and unite both 'O' rings to the rein. Repeat on the other side. Adjust the length of both bypass straps in whatever way you choose, depending on the stage of the horse's transition from bit to bitless. . If the straps are sufficiently short, rein tension will activate the bit but not the CBB. If the straps are sufficiently long, rein tension will activate the CBB but not the bit. Intermediate lengths will provide, as wished, a predominant action of either the bit or the CBB. Obviously, to reap the full benefits of the CBB combo, the less bit pressure the better. Many drivers do what riders have been doing successfully for a decade, which is to switch the horse directly from bit to bitless and skip the transition phase. It has been demonstrated that horses take to the CBB on day one (25); it is only we humans that hesitate.

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<sup>5</sup> A distance equivalent to the terminal section of an adult thumb





*Fig.3. Clockwise from top left, the CBB cheek piece, crossunder strap, bit bypass strap and, in this particular case, a riding snaffle. The red arrow indicates the point of attachment of the rein.*



*Fig. 4. A close-up view of the point of attachment of the crossunder strap and bit bypass strap to the rein (represented by the red arrow)*

The choice of snaffle will depend on how much drivers wishes to rely on the bit for communication compared with the CBB. When first introducing the CBB combo, drivers may wish to use the same snaffle that they have always used and leave the CBB inactive. Later, when intending to use the bit less and rely more on the CBB, this same snaffle might still be appropriate. When drivers choose to use the CBB only, it makes sense to choose the smallest and lightest of bits. The bridoon from a double bridle may be a good choice.



If a small bit is chosen, the lips will stay closed and little or no air will enter the mouth once the horse has been bridled. The horse will keep its mouth closed and a gaping jaw will be avoided. At rest, a horse may still 'play' with the bit a little but, at exercise, tongue movement will be insignificant and airway obstruction caused by an active bit will be markedly reduced or avoided. The penalties of being bitted in this way will be nothing like as draconian as they are with an active bit. All the most serious disadvantages and risks associated with an active bit will be avoided. The CBB combo is safer than a traditional bit, more humane and fosters improved performance.

### **First trials**

Test drive the CBB combo as you would with any new equipment. To gain confidence, long lining is always an option. Most drivers use a quiet training track for their maiden voyage but, if available, a small paddock or covered school works well. For those who have never used the CBB before and are not convinced that they can control a horse without a bit, the bypass straps can be adjusted for the first outings so that the bit is fully in use and the CBB inactive. At subsequent outings (as the driver gains confidence), the straps can be lengthened a hole at a time, so that the bit becomes progressively less active as the CBB takes more and more responsibility.

For training, the horse can be jogged for most days of the week in the CBB alone, without using the bypass straps. The bit and bypass straps are only needed at intervals, just to accustom horse and driver to the presence of the mandated bit on race days. In the early days, a few trainers may choose to train predominantly with the CBB and revert to the bit for racing. Such horses will still enter the race with some benefits. Their mouths will not be sore (13) and their lungs will be in better shape for not having been stressed during the fast work of training. Another important benefit may also 'carry-over' - an improved attitude to racing and more 'heart.'

### **Indications**

As a veterinarian, the first indications that come to my mind tend to be those that focus on the bridle's merit as a piece of equipment compatible with the anatomy and physiology of the horse, the contribution it can make to eliminating pain, solving behavioural problems, and in treating and preventing disease. But as a pragmatist, I am not blind me to the realities of racing, the objective of which is to win races. So, before getting into the specifics, one indication that has to be listed is ... to improve performance and enable an athlete to reach its full potential. In a word – to run faster.

Putting aside rules of racing, the CBB combo is indicated for every harness horse, at whatever age and stage of training. It is especially useful in the schooling of young horses, as a horse learns more quickly when not in pain and the development of resistance to the bit is avoided. In the mature and fully-trained horse, the CBB combo is not just indicated for those horses that are thought to have an aversion to the bit. The bit causes so many problems, most of which are currently unrecognized by most trainers, that improved performance can be anticipated in every bitted horse (9, 18, 23, 25, 26).

Behavioural problems are common in all disciplines and harness racing is no exception. As a breed the Standardbred is remarkably tolerant but it is not insensitive. In one of the few experiments to have been attempted to measure behaviour, four riding school horses that had never previously been ridden in the CBB, were ridden through two identical 4-minute exercise tests, first in a bitted bridle and then immediately afterwards in a CBB (25). On average, the riders improved their scores by 75% in the first four minutes of riding bitless. The average score when bitted was 37 - when bitless 64.

The CBB is especially indicated as the solution for horses with sore mouths (13) and many other problems (18, 23). Soft tissue injuries to the mouth are easily recognized but bit injuries to the bars of the mouth and the lower molar cheek teeth are largely overlooked. A survey of horse skulls in U.S. museum collections revealed that 88% of domesticated horse jaws had either bit-induced bone spurs on the bars of the mouth or bit-induced erosion of the first cheek teeth (26). Most had both. Feral jaws exhibited no such lesions.

Another indication for the CBB combo is for those horses with breathing problems of one sort or another, especially for horses that flip their palates (DDSP). It cannot cure partial paralysis of the voice box ('Roaring') but by improving the airway in other respects it can help to alleviate its effects. Epiglottal entrapment, in my experience, is predominantly a bit-induced problem, so the CBB combo should prevent this problem from occurring.

Again, in my experience, the Headshaking Syndrome is predominantly bit-induced (2, 4, and 8). Bit usage triggers, I believe, the same intense facial pain that in human medicine is known as *tic douloureux* or trigeminal neuralgia. In man, these sporadic but severe and repetitive attacks of facial pain are described as extreme sudden flashes of stabbing or burning pain, like an electric shock. Fortunately, most headshakers respond to removal of the bit.

Sore shins occur in young horses that are heavy on the forehand from leaning on the bit. The CBB combo would help by improving their balance.

In another article I have tabulated over 200 bit-induced behavioural problems (23) and 40 different bit-induced diseases (18).<sup>6</sup>

To summarize, a healthy racehorse is more likely to be successful than an unhealthy racehorse or one distracted by painful equipment that interferes with their ability to breathe.

## **Contraindications**

In a decade of use, no contraindications for the CBB have been found.

Those who have never used the CBB will often maintain, with some vehemence, that the CBB may work fine on a well-trained, compliant sort of horse but could not possibly work on a keen horse that takes a strong hold or a horse that bolts. Nothing could be further from the truth (10, 17). If such a person would only try the CBB, they would find that pullers, bolters and even horses considered dangerous are the very ones that show the most dramatic improvement when the bit is removed.

Though it is not a contraindication based on equine physiology or human safety, the only hindrance to bitless equitation is an administrative one. Ironically, two of the disciplines which mandate use of the bit are the fastest and the slowest, respectively racing and dressage. The 2011 approval of the CBB combo for harness racing in Scandinavia offers hope that, in time, other racing jurisdictions will follow suit. In 2009, the Royal Dutch Equine Federation gave a lead in dressage by approving bitless bridles for the first two levels.

## **Public relations**

The predominant economic rationale for racing is as a vehicle for gambling. The countries in which racing thrives best are those in which the public are still interested in this form of gambling. It may be no coincidence that racing is in the doldrums in North America because this is the only region of the world in which race-day medication is permitted. Perhaps, as has been suggested, there is a correlation between race-day medication and racetrack accidents. Undoubtedly the perception of racing by the public in the USA has been affected

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<sup>6</sup> We need a word equivalent to 'lame' or 'crippled' for leg problems to describe a horse with bit problems. I considered "throttled" but this would not include all the negative behavior. I propose '*snaffled*,' as in "*My horse is snaffled*" or "*I have a snaffled horse*" or, as I contend, "*Every bitted horse is snaffled. Some only have 25 'snaffles,' others have 50.*"

by two problems. Firstly, a stream of high-profile accidents in an age when concern for animal welfare is on the rise. Secondly, the perception by the gambling public that race-day medication destroys the integrity of the sport (27).

Anything that can be done to reverse this trend will be helpful to North American racing. The adoption of a pain-free method of control, a reduction in accidents and the elimination of race-day medication would do much to improve the public image of racing.

### **Technical support**

Use of the CBB combo for harness racing is still in its early days. As was the situation when the CBB was first introduced for riding, it is to be expected that users may have supplementary questions and some need for guidance. Questions and feedback are welcomed.

Contact information for myself is available as a footnote on page one. Contact information for Kerstin Kemlén is as follows:

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### **Afterword (November 19<sup>th</sup>, 2011):**

In October, 2011, the CBB combo was approved for racing in all the Nordic countries, i.e. Sweden, Denmark, Finland and Norway. The first horse to race in the CBB combo raced in Sweden. The colt FRITIOF PIRATEN, trained by Susanne Richter, has now used this bridle to run six times in the major Swedish Trotting League. It has been placed on four of these occasions.

### **Acknowledgments**

The 2011 approval of the CBB combo in Scandinavia, for which I thank Swedish Trotting and the Nordic committee, was achieved following a two-year collaboration with Kerstin Kemlén, an experienced trainer of harness horses in Sweden. I am grateful to Kemlén for the confidence she has always had in the CBB and her courage in pioneering and promoting its use for the harness horse.

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