LIVERPOOL DRIVING BIT vs. CROSSUNDER BITLESS BRIDLE
A bitted and bitless driving experiment
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Clinical studies in the USA by Dr. Hilary Clayton have shown that a bitted horse at exercise will frequently swallow. Prof. Dr. Robert W. Cook has shown with his studies that a bit in a horse's mouth triggers an automatic chewing reflex, together with salivation. A horse is not able to breathe through its mouth like a dog can. When a horse is not eating, but is breathing deeply during exercise, the gullet should be closed and the windpipe fully open. Cook pointed out that the bit, just by triggering chewing and swallowing reflexes [*digestive system responses rather than respiratory system responses*] causes a conflict in the throat. Because the horse needs to breathe deeply and rhythmically at exercise [*breathing and striding should be synchronized, even at the trot*], it shouldn't have to keep shutting down its windpipe to swallow. Such conflict confuses the horse and wastes energy. It makes the work of breathing more 'expensive' in terms of energy cost but also less efficient.

Fig 1.Jos Bodewes, driving VIBORA, a 6-year-old Dutch Warmblood mare in a crossunder bitless bridle.

HYPOTHESIS

If we could allow the horse to exercise without a bit, it should be easier for him to breathe. The consequence should be less effort, thus a lower heart rate, as well as a more regular respiratory rhythm and perhaps a lower temperature.

METHOD

MenSport Magazine was curious enough to find out if this was so. Driver Jos Bodewes was willing to try a test with his well-trained driving/endurance horse. An experiment was designed to see whether we could find differences between driving with and without a bit.

In consultation with Jos and his wife Agnes, we identified a training course in the neighborhood of the riding hall in Onstwedde, from where so many endurance competitions have been started. Veterinarian, Tineke Fluit would record heart

rate, temperature and respiratory rate at the beginning and the end of each test. Photos were taken for MenSport by journalist/photographer and endurance rider, Ineke Westers, who was very interested in the results.

The morning is still cool with some veil clouds as we meet VIBORA, a 6 year old Dutch warmblood mare, sire GANGES, grandsire FABRICIUS. Vibora is a small mare with 'tuigpaard' blood. Jos and Agnes compete in category 2 endurance tests, at distances of 60 km. So we meet a very well trained horse. Jos attaches a cardiac monitor to the mare, with a wire connected to the meter on the carriage so he can see the values during driving. We agree on a training distance of 9.6 km with the riding hall as the start and finish of the route. The first kilometer will be done walking. Next, continue trotting till half a kilometer before the finish, so the route will be finished walking. Only the crossing of a few bridges on the way should be done walking, due to the risk of slipping. Vibora was allowed to choose her own speed, because that is the only way to be able to make a correct comparison with the bitless test. [*The phases of the exercise test are well delineated by the heart rate traces in Tables 2 & 3*]

Fig 2. From left to right, VIBORA, Madeleine Calkoen and Jos Bodewes

RESULTS

Before Vibora is harnessed with a bitted bridle [*a Liverpool driving bit, i.e., a curb bit*] and put to the carriage. Tineke Fluit takes the starting values. The temperature outside is 19 degrees. It took just short of an hour before the horse

and carriage returned to the riding hall. All figures are noted and Vibora is taken from the carriage.

Jos had asked whether his horse should be familiarized, a few days before the experiment, with the crossunder bitless driving noseband [*this is a version of the BitlessBridle, now marketed in Holland*], but we had reassured him there was no need. We put the noseband on and we find out that her lovely small head does not need the full size, but the cob size. Immediately, during a quick session of ground training, Vibora starts grazing with the bitless noseband. We allow her a brief rest from her first test, after which Jos put the harness on and takes up the reins to experience the feel of steering. Vibora walks in a very relaxed manner in front of him. I take over for a short lungeing session to show Jos how Vibora reacts at the trot [Fig 2].

Fig 3. The crossunder bitless bridle

Before Vibora is put to the carriage again all starting value figures are noted. The temperature outside has gone up more than four degrees and the sun is shining brightly.

Veterinarian, Tineke Fluit, warns that this higher temperature outside will certainly influence the values of Vibora now and at the finish later on. Jos takes a short tour over the field to sense Vibora's reactions in the new bridle. "It just feels the same as driving with a bit!" he shouts. Agnes comments, "She is trotting very relaxed." [Fig 3]

It is two o'clock in the afternoon and there is now a lot of traffic on the roads of the training route, just because the weather is so nice. We stay behind and have no idea what the heart rate will do. But, very curious, we meet them long before the finish to hear all about it. We can see there is quite a difference between the two rides with the difference being in favour of the crossunder bitless bridle.

"Two things attracted my attention," Jos says, "First, the complete relaxation of Vibora. Her neck was so loose, that she looked to every side with ease. [*Subsequently, Madeleine described this feature as 'sight-seeing'! Jos had been accustomed to his mare having a stiff and fixed neck, so this eagerness on the part of the mare to look around was something to which he was unaccustomed. It kept him busy with the steering but, nevertheless, steering was still no problem*] And she had a lot to see, due to the busy traffic, so – though we finished the distance in a slightly shorter time in spite of these conditions, the difference was not significant and was not recorded. Secondly, it was obvious that Vibora adopted a more constant tempo, with a lot less variation than this morning, even though I had to hold her back more often, due to the traffic. I had the feeling that steering bitless gave more weight in my hands, but may be that is a question of habituation. Furthermore, I could see during the route that the heart rate was 10 to 15 beats lower per minute than this morning. And certainly this last section back to my horse truck showed me that, had I been in a competition, I would have had passed the vet-check easily and continued my route!" The heart rate dropped quickly after a few minutes of standing rest. It was noted that Vibora was sweating under her harness, but not on her body or neck [*as she had been in the morning when driven bitted, even though the ambient temperature was less*].

	AMBIENT	TIME	AT THE START			AT THE FINISH		
	TEMP.°C	hrs	Resp rate	Heart rate	Temp ° C	Resp rate	Heart rate	Temp° C
BITTED	19	11.3	28	31	37.6	28	72	38.6
BITLESS	23	13.45	no data	34	38.2	28	63	38.6

Table 1. Showing the lower heart rate at the finish of the bitless drive

BITTED: The starting values are nice and low before starting at 11.30 hrs. Breathing 28/min, heart rate 31/min and temperature 37.6 degrees. Starting with a full kilometer walking, with a heartbeat of 63, after which the trotting section starts. Distance, 9.6 km (Table 2). After just short of an hour's exercise, she returned with the following values: breathing 28, heartbeat 72 (after the final 500 m. at the walk) and temperature 38,6.

BITLESS: Starting values at 13.45 hrs. Heart rate now 34 and temperature 38.2. Both readings are higher than this morning. The breathing cannot be measured, as Vibora is too much distracted by her surroundings, so no recording was

possible.
Finishing for the second time, the heart rate after the 500m walk is 63, the temperature 38.6 and the breathing 28 (Table 3). Taking into consideration the higher ambient temperature, the higher starting values for heart rate and body temperature in the afternoon, and the busier traffic the bitless performance was superior. The heart rate dropped rapidly within a minute after finishing and even faster after that (Table 3).

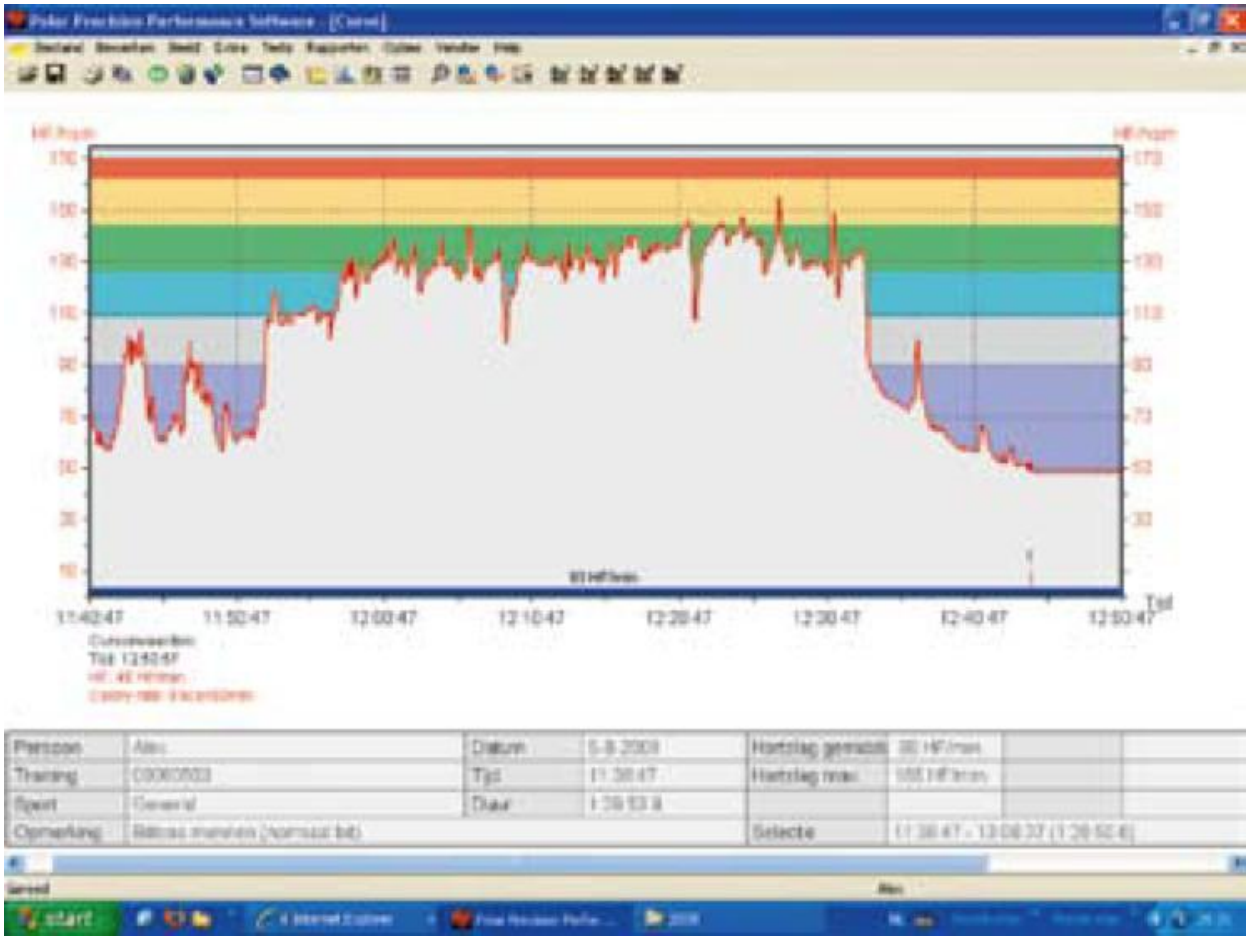

Table *2. Heart Rate Monitor Recording for the drive in a bitted bridle (Liverpool curb)*

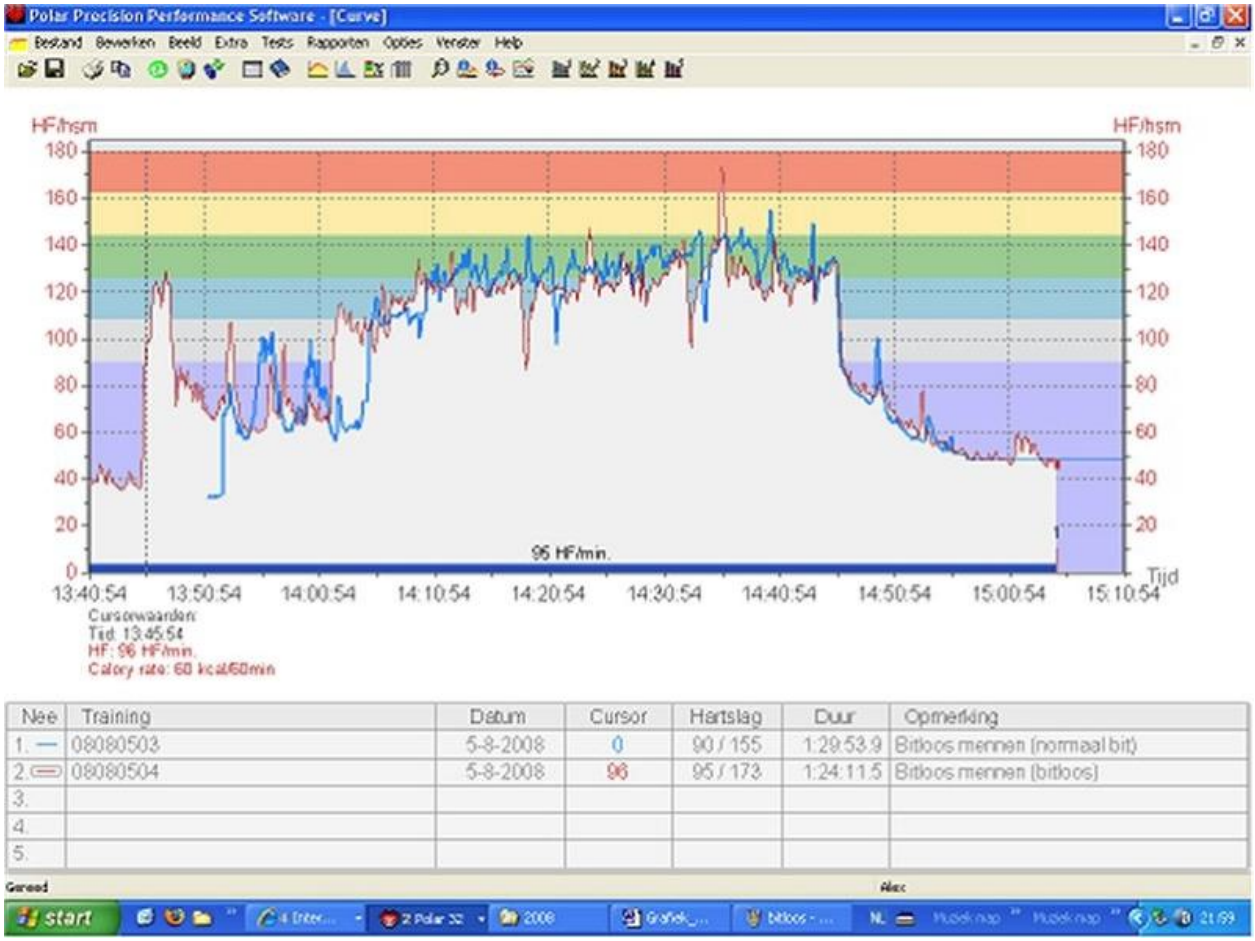

Table 3. Heart Rate Monitor Recording (red) for the drive in a crossunder bitless bridle. The heart rate for the bitted drive in the morning is shown in blue for the purpose of comparison.

DISCUSSION

“I think the result is very much in favour of the bitless performance”, Tineke concludes. “The horse has done two training routes, with conditions being a lot more demanding the second time, due to the higher ambient temperature and the greater traffic density. Her body temperature was already much higher to begin with at the second start this afternoon. Yet she returns after the test with a temperature the same as this morning’s value. So that is very, very positive. The same goes for her breathing. But most striking is the lower heart rate.”

Ineke Westers joins in: “I ride endurance myself and, as most endurance riders do, often bitless. I do that especially for my horses, so that they can eat and drink easier on the way and at the check points (to take care of the horses). But now I see that being bitless makes quite a difference to the heartbeat. That is for me a highly informative result.”

Jos explained, “I know exactly how fast I go at a certain heartbeat when bitted, i,e, about 11/12 km per hour for a heart rate of 130 to 140 a minute. I now know that at that same speed when bitless, the heart rate will be lower by about 10 to 15 beats a minute. If I was to let the horse perform bitless at a heart rate of 130 to 140 a minute, I feel sure that the speed will be faster on average by 1 to 2 km per hour. So much gain in speed over a long distance means a lot!” Jos concluded, “We will certainly test that in future!”

SUMMARY

In spite of the higher ambient temperature and the more crowded streets (children on bikes and many more cars), there was no difference in the body temperature or the respiratory rate after exercise between the bitted and bitless exercise test. This, in itself, was felt to indicate a real benefit of the bitless bridle. But also, the heart rate at the end of the route was lower when bitless. The 6-year-old Dutch Warmblood mare, in her first experience of the crossunder bitless bridle, performed well and exhibited no problems in adjusting to the new bridle. She was noticeably more relaxed in the neck and her cadence was more regular. Her heart rate when trotting and bitless was 10 to 15 beats/min lower than when bitted and this in spite of the fact that the busier traffic required the horse to be constantly held in, and the ambient temperature being higher.

Other changes for the better when bitless included much greater relaxation as judged by freedom of the neck, a better head position, (in the bit, she trots with her head ‘above the bit’), a quieter mouth, less tongue movement, less sweating, and a longer stride

APPENDIX

[*No mother would allow her child to run around the yard while eating an apple. Instinctively, she recognizes that the child should either eat or run, not both at the same time. A horse is no different. It cannot breathe deeply with something in its mouth, whether that something is food or a foreign body like a bit. In the wild, a running horse has a closed mouth, sealed lips, a relaxed and immobile tongue and jaw, and an empty and relatively dry oral cavity. A bit breaks the lip seal, opens the mouth, causes movement of tongue and jaw, triggers salivation and interferes with a horse’s ability to breathe. Quite apart from the pain it causes and the fear it elicits, the presence of a bit is incompatible with exercise. A cantering horse takes one stride for every breath. If respiration is cramped, so is locomotion. A bitted horse is a handicapped athlete*

The above driving experiment in Holland in May 2008 can now be compared with a ridden experiment that took place in the USA in October, 2008. A preliminary account of the experiment is posted on infohorse.com ... see “Jointed snaffle

bridle vs. Crossunder Bitless Bridle: A quantified comparison of behaviour in four horses.]