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PRELIMINARY STUDY OF JOINTED SNAFFLE BRIDLE vs. CROSSUNDER BITLESS BRIDLE: A Quantified Comparison of Behaviour in 4 Horses

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SUMMARY

The study tested the null hypothesis that if a horse is ridden in a snaffle bridle and then a crossunder bitless bridle there will be no change in its behaviour. It was predicted that there would be change and that behaviour would improve when bitless. Four horses, none of which had ever been ridden in a crossunder bitless bridle, were ridden through two, four-minute, exercise tests, first bitted then bitless. An independent judge marked the 27 phases of each test on a 10-point scale and her comments and scores were recorded on a video soundtrack (http://www.bitlessbridle.com/dbID/420.html).

The results refuted the null hypothesis and upheld the predictions. The average score, when bitted, was 37%. Through the first four minutes of being bitless, the average was 64%. A binomial probability distribution suggested that the results were significantly different from random effects. All four horses accepted the crossunder bitless bridle without hesitation.. Further studies are warranted and it is hoped that others will build on this new field of investigation. The authors are of the opinion that the bit can be a welfare and safety problem for both horse and horseman. Equestrian organizations that currently mandate use of the bit for competitions are urged to review their rules.

INTRODUCTION

The only previous study comparing the behavioural responses of horses when bitted or bitless used four unschooled two-year-olds (Quick and Warren-Smith, 2009). During a 10-day period of foundational training (bridling, long reining and riding), the two horses wearing a crossunder bitless bridle performed at least as well, if not better, than the two in jointed snaffle bridles.

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In 2008, an opportunity arose for the first author to carry out a more controlled experiment at a riding instructor's conference (the Certified Horsemanship Association's International Conference at the Kentucky Horse Park in Lexington KY, USA). The experiment tested the null hypothesis that if a horse is ridden in a bitted bridle, and then again in a crossunder bitless bridle, there will be no change in its behaviour. It was predicted that behaviour would change and that it would change for the better (Cook 1999, 2003, 2007a-c, 2008, 2009, Cook and Strasser, 2003, Mills unpublished observations). A secondary objective was to record how the horses reacted when first switched from a bitted bridle to a crossunder bitless bridle. The first author introduced the experiment and answered questions afterwards but otherwise took no part. The second author was not present at the event.

MATERIALS AND METHODS

Four riding school horses, none of which had ever been ridden in a crossunder bitless bridle, were provided for the experiment (Table 1). The same horses had been used for demonstrations throughout the day, ridden in bitted bridles. The experiment was scheduled as the last event of the afternoon.

The riders were four Certified Horsemanship Association riding instructors (Grade 3 or above), two of which had never previously ridden with a crossunder bitless bridle. Each rider was assigned to one horse, riding it first in a bitted bridle (jointed snaffle) and then, immediately after, in a crossunder bitless bridle (BitlessBridle) (Fig 1). All other potential variables were, as far as possible, unchanged.

Ref #	**NAME of HORSE**	**AGE (years)**	**COLOUR**	**BREED or TYPE**	**SEX**	**TIME OWNED**
1	DOC	12	Chestnut	Thoroughbred x	M (N)	3 years
2	RIO	7	Black	Paint	M (N)	4 years
3	CHIVAS	11	Chestnut	Appaloosa	M (N)	5 years
4	EMMY	12	Grey	Thoroughbred	F	5 months
Ref #	**HISTORY**					
1	A ‘rescue’ horse; nervous; cannot be clipped; head shy, especially around the ears; difficult to bridle					
2	Lives outside; good horse for a child; works in local shows; can jump an 8 foot spread					
3	A ‘rescue,’ retired event horse; in previous ownership was treated for EPM; still stiff through head & neck; rushes jumps but otherwise lazy					
4	May be a retired racehorse; very sensitive; ‘mareish’; needs light hands; tends to ‘rush,’ especially at the canter; stiff in lateral work					

Table 1. *Signalment of horses used in the study*

The exercise test comprised 27 timed phases. Each horse completed the test twice. The second test took place immediately after the first test. Each test took approximately four minutes, so every horse was judged for about eight minutes (Table 2). All testing took place in a covered arena, under consistent environmental conditions.

The tests were judged by a speaker at the conference,. The judge was a CHA Master Clinic Instructor, a Grade 4 Centered Riding Instructor, and a member of the American Judging Association with 25 years experience of judging dressage and other classes. She had used a crossunder bitless bridle occasionally when teaching at clinics but was not a committed user. Following standard protocol, she stationed herself at letter 'C' in the arena and scored each phase of the tests on a scale from zero to ten.

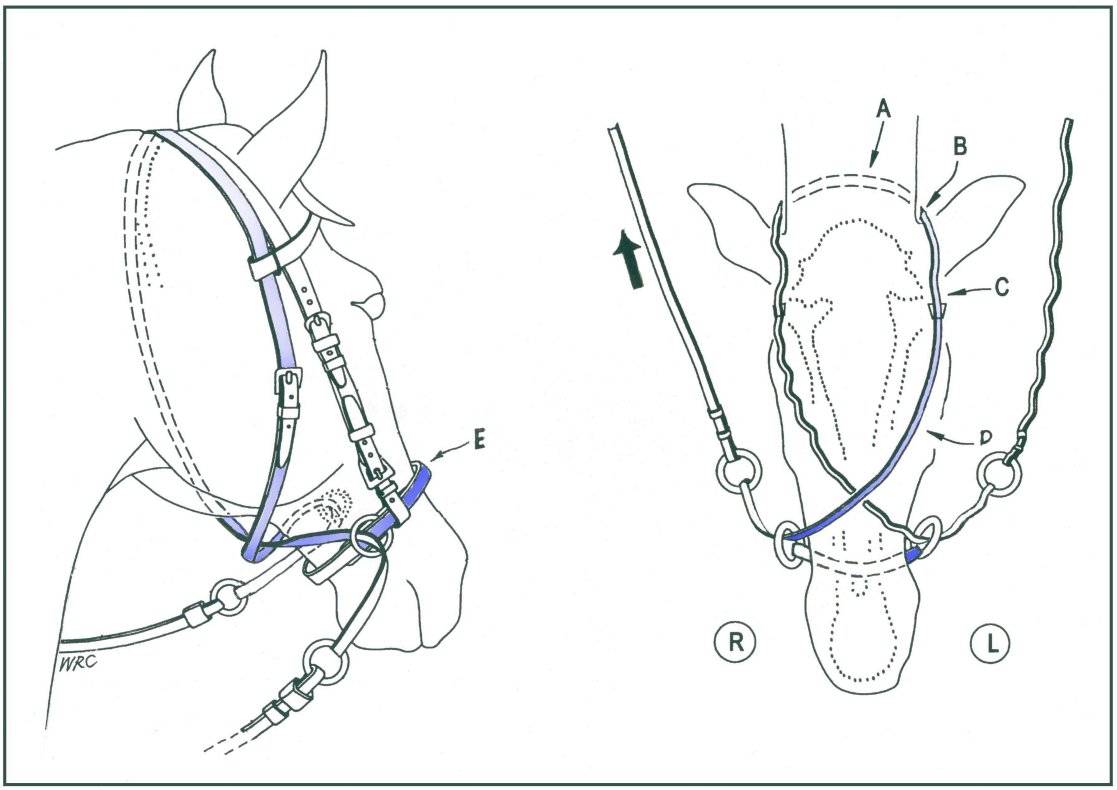

Fig 1. Crossunder bitless bridle*. Caudo-lateral and ventral views of the horse's head. For steering, pressure on the right rein (thick arrow) distributes painless pressure over the skin on the left half of the head (thin arrows A-E). For slowing or stopping, a bilateral and intermittent rein-aid hugs the whole of the head. At no point is skin pressure (indicated by gradation of colour) anything but gentle. It diminishes from E to A.*

Ref #:1 NAME of HORSE: DOC 12 year old, Thoroughbred cross, gelding. RIDER: Tiffany Ehnes DATE: 10/31/08.					
		BITTED		BITLESS	
PHASE	sec	Judge's notes	mark	Judge's notes	mark
Halt	10	rooted a bit and opened mouth	4	not above bit; more into contact	5
Walk	20	on forehand	5	mouth still	5
Halt	5	drifted into halt	4	much happier in mouth	6
Rein-back	5	inverted; above bit; opened mouth	3	much improved; horse kept back up	8
Walk	5	opening mouth	4	much improved; head bobbing a little	7
Working trot	10	fairly prompt; counter bent	4	more smoothly into trot	7
Shorten the trot	10	showed no real difference	3	saw a difference; responding to rein without resistance	7
Working trot	10	horse uncomfortable through mouth and head	4	showed a difference; much better balanced	7
Walk/Halt	5	reaching forward	4	much happier	8
Walk	5		4	was not as balanced	6
Working trot	10	on forehand; head extended; back inverted	3	more regular; a little more forward	6
Lengthen trot	10	more uncomfortable; raising head; head to one side	4	little more regular	6
Working trot	10	more comfortable	5		
Walk/Halt	5		4	ooh! That was nice!; nice square halt; very balanced	8
Walk & trot	5	counter bent; obviously uncomfortable	3	a little above the position he should have had	5
Working canter	10	counter bent and 'broke' (reverted to trot)	4	much improved; not counter bent	8
Shorten canter	10		4	actually staying on correct bend; mouth still	8
Working canter	10	moving head and neck quite a bit	4		
Trot/walk /halt	5	opened mouth	2	ooh!; nice smooth transition; very square; very nice	8
Halt	5	open mouth	2		8
Rein-back	5	above bit; obviously uncomfortable; open mouth	2	mouth absolutely still	8
Walk &	5	open mouth; counter	2	not quite as	7

trot		bent		balanced	
Working canter	10	tossing head	2	round!; going forward in contact; bent in correct direction	9
Lengthen canter	10	uneven contact because of head movement	3	nice lengthening, keeping same tempo	8
Working canter	10		3		6
Trot/walk /halt	5	still opened mouth; a bit better	4	very nice …wow, I'm impressed	9
Dismount	5	horse more comfortable	5		
TOTAL	**220**		**95**		**170**
AVERAGE			**3.5**		**7.08**
PERCENTAGE			**35**		**71**

Table 2. Exercise test and score sheet. *The judge's comments and scores are shown for Horse #1. Similar score sheets were compiled for the other three horses. For a glossary of dressage terms see* http://www.bitlessbridle.com/CookGlossary.pdf
[Reader's forbearance requested for the imprecise formatting of an original Excel spread sheet]

A scribe recorded the judge's comments and scores and the judge wore a lapel microphone so that these were also added to the soundtrack of a videotape (viewable at http://www.bitlessbridle.com/cat/Video.html) .

A timekeeper called out the different phases of the test.

RESULTS

None of the riders experienced any communication problems as a result of switching their horse to an unfamiliar bridle. On the contrary, their scores indicated that communication was enhanced.

Descriptive assessment

The behaviour (performance) of all four horses markedly improved when bitless. The average score when bitted was 3.7 and, when bitless, 6.4. In four minutes, the scores changed from a category of 'fairly bad' to 'satisfactory.' Percentage improvement in scores from bitted to bitless ranged from approximately 45% to 109%, with an average of approximately 75% (Table 3).

Ref #	BITTED	BITLESS	% improvement
1	3.38	7.08	109.47
2	4.04	6.37	57.67
3	3.04	5.96	96.05
4	4.30	6.26	45.58
AVERAGE	**3.69**	**6.42**	**75.19**

Table 3*. The average scores for the 27 phases of each test as judged on a scale of ten. For horse #1, marks were not awarded for three phases of the second test, so its average is based on 24 phases (see Table 2).*

Statistical analysis

A binomial probability distribution was used to calculate the significance of the results for each horse. This used the recorded data to calculate the probability of one bridle being better than the other, accounting for the proportion of observations where there was no difference in behaviour. Given that there were matched data from 105 phases, with a difference between the two types of bridle used on 101 occasions, the probability of there being a directional difference expressed is 101/105 (~0.9619). If the difference between the two bridles was random, then the probability of an improvement being recorded in relation to one bridle over another for any given task is 0.5. Thus the working probability for one bridle being shown as superior to the other in this test is (101/105)*0.5 = 0.4810. In this study one horse showed an improved performance in 24 out of the 27 phases, one in 26/27 and one 27/27. Horse #1 showed an improvement in 23/24 (Table 2). The probability of any horse showing improvement in at least 24 out of 27 or 23/24 phases is less than 0.0001 in each case. This suggests the improvement is not due to random error.

Conclusion

The null hypothesis was refuted and predictions upheld.

DISCUSSION

While the binomial probability distribution provides strong evidence to suggest that the results are not random, this calculation assumes that the tests are independent and that performance in the second test is not affected by performance in the first test. It is not known for certain that this assumption holds, though - for the reasons given below - the authors believe this is unlikely. The strength of the finding provides sufficient evidence to warrant further investigation in a larger sample size, accommodating for potential experimental limitations and allowing for a more robust statistical analysis.

The possibility of an order effect (due to all horses receiving the bitless bridle second) deserves consideration. That improved behaviour could be attributed to the horses being better warmed-up for the second test can be refuted on the grounds that these horses had been in work throughout the day and were fully warmed-up at the time of the first test. That improved behaviour could be attributed to the greater familiarity of the horses with the test on the second occasion and not to the change of bridle is considered unlikely, given both the short latency and the magnitude of the improvement. In addition, such an explanation is not consistent with the sustained improvement that occurs with long-term usage of the crossunder bitless bridle observed by the authors in other contexts. Fatigue as an explanation for improved behaviour might also be considered but, in man, fatigue increases the frequency of error in sport performance and it seems unlikely that horses are any different. The videotape showed that, when bitless, all 4 horses were more willing and alert than when bitted, so this too is inconsistent with a fatigue factor.

While there are some weaknesses in the objectivity of the methodology, for example the absence of 'blinding' by judge and rider, these are balanced to some extent by the presence of witnesses and the availability of a videotape recording. It is hoped that other researchers will build on this preliminary study, improve its design and conduct some of its many permutations.

A recent review of tack-induced riding accidents lists over 200 negative behavioural responses and 40 different diseases caused by the bit (Cook, 2009). Yet current competition rules for dressage, show hunter , hunter jumper classes and racing mandate the use of a bit. Applying the precautionary principle, there is strong evidence to suggest that an amendment of these rules is necessary. For the sake of both equine and human welfare a crossunder bitless option is recommended..

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Declaration of Interests

Dr. Cook is the Chairman of BitlessBridle Inc. Dr. Mills has no business, financial or other association with BitlessBridle Inc. or any other equestrian company which may have special interest in the work described.

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