

**CASE REPORT**

For corresponding Satellite Article see pages 151-154

## Crib-biting and wind-sucking stereotypies in the horse

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### INTRODUCTION

A stereotypy is defined as a repeated, relatively invariable sequence of movements which has no obvious function (Broom and Johnson 1993). Perhaps the most easily recognisable stereotypies in the horse are crib-biting and wind-sucking. These stereotypies are the main focus of this article. Wind-sucking involves opening the mouth, contracting the pharyngeal musculature, flexing the neck muscles and swallowing or expelling air, usually making a characteristic noise. A crib-biting horse also makes the wind-sucking movements, but rests its upper incisors on some solid object, such as a door, post or manger. In some cases, the horse also holds the stable fitting or woodwork with both upper and lower incisors, thus gripping the object.

The pathology, possible causal factors and welfare implications of these stereotypies are discussed in detail in the accompanying satellite article (Broom and Kennedy 1993; p. 151).

### METHODS

Some of the data were collected during a research project at the Zoology Department of the University of Glasgow. This study (Study 1) was an attempt to discover factors of horse character and management which may be related to the development of stereotypies in the horse. Two busy riding schools and 4 private livery yards were visited. Details of the horse management regimen, the design of the looseboxes, the horse breed, and the staff's assessment of the horse's temperament were recorded. The horses were observed from 5-12 m distance for a 3-h period using continuous recording of a wide range of behaviours. The movements involved in any stereotypy were recorded in detail. For each type of stereotypy, the number of bouts and the time spent actually performing the stereotypy were recorded. In addition to the horses from Study 1, similar descriptions (by A.E.S.) of behaviour in other horses are included in the case histories presented below.

### RESULTS

Of the 49 horses observed during Study 1, 9 (18.4%) showed clearly recognisable stereotypies which in addition to crib-biting and wind-sucking included weaving, head-nodding, stable-licking, lip-licking and tongue-chewing. The 4 crib-biters came from the 20 horses at the 2 riding schools studied and there were no crib-biters amongst the 29 horses at the 4 private livery yards. The incidence of stereotypies among horses from the study is an underestimate because head staff at the stables described more horses as stereotypy performers than those identified as such during observation. Case histories of horses performing crib-biting and wind-sucking are presented here.

#### CASE 1

This was a 17-year-old Thoroughbred (mid-weight) mare at Stable A (riding school). She had a calm temperament and was initially trained for racing, then became a brood mare. She was moved to Stable A 1 year before study and was turned out once per week, with other horses, for 4-5 h. She was worked for 2 h/day in lessons at the weekend and for 1 h/day in a lesson during the week. The mare was fed 0.9 kg oats and 1.8 kg bran at 08:30 h and 17:30 h with hay *ad libitum*. The stable was very busy, with constant activity and 7 other horses could be seen across the yard and in adjacent looseboxes. There was a high degree of restriction of vision and movement in the small loosebox which had high iron bars to a height of 4 m. The mare showed crib-biting, in 7 bouts of 3-10 crib-bites which occurred over a 35-min period, i.e. the stereotypy was performed for 0.32% of the time observed. The activity was unlikely to be associated with anticipation of feeding time, because the period commenced 90 min before feeding time and ceased 55 min before feeding time.

When an anti-wind-sucking collar was used occasionally, it had no effect. When it was left on constantly and only removed at feeding time, the

stereotypy performance was reduced for a short while and then the collar lost its effectiveness.

#### CASE 2

This was a 15-year-old Thoroughbred (light-mid-weight) mare at Stable B (riding school). She had a calm temperament and had been purchased from a horse dealer 5 months before the study. She was turned out every weekday, with other horses, for 3 h but not at all at weekends. The mare was worked for 3-4 h/day in lessons at the weekend and for 2 h/day in lessons during the week. She was fed 0.9 kg barley or oats, 0.45 kg horse nuts, 0.9 kg coarse mix and 0.9 kg chaff at 08:45 and 17:30 h and hay at 08:30, 12:30 and 17.00 h. The stable was busy with periodic activity. The mare could see 3 other horses in the same enclosed building, but had little view of the yard outside. The loosebox was large, with no bars on the door.

This horse's stereotypy consisted of a number of elements, usually repeated in the same sequence although some elements were omitted occasionally. Generally, she licked part of the loosebox woodwork, crib-bit this point, lowered her head to the horizontal position, wind sucked, lowered her head further, then repeated the sequence. Occasionally, when eating straw or hay, she lowered her head to the horizontal position, wind-sucked, and lowered her head further, between mouthfuls. The stereotypy was not interrupted by the entry of a staff member into the loosebox. There were 18 bouts of stereotypic behaviour, ranging from 10 sec to 16 min duration, i.e. 29.3% of the time observed. These were unlikely to be associated with anticipation of feeding time, because stereotypy performance was spread out over the entire observation period. No attempt was made to prevent stereotypy performance.

#### CASE 3

This was an 18-year-old cross-bred (mid-weight) pony gelding at Stable B (riding school). He was a nervous horse, purchased from a horse dealer and had been at Stable B for 6 years before the study. He was turned out with other horses for 3 h every weekday but not at all at weekends. The work involved 3 h/day in lessons at the weekend and 2 h/day in lessons during the week. The feeding regimen, stable activity, view of other horses and nature of the loosebox were the same as those for Case 2.

The pony showed crib-biting, in 62 bouts of 1-7 crib-bites, i.e. 1.4% of the time observed, evenly distributed throughout the period although the final bout was 4 min before a fresh haynet was given. After this he spent all his time eating hay. However, there was hay in the loose box when observation started, which he was eating, but this was punctuated with crib-biting sessions. No attempt was made to prevent stereotypy performance.

#### CASE 4

This was an 11-year-old Irish draught/Thoroughbred-cross (mid-heavy weight) hunter-type mare at Stable B (riding school). This horse is privately owned and her management regimen therefore differs from that of the other horses at Stable B. She was a nervous horse and was in a show-jumping yard before moving to Stable B 3 years before the study began. Her history before this is unknown although her owner suspects that she was poorly treated. The mare was turned out 3 times a week, alone because of her aggression to other horses, for 2 h. In summer she was moved away from Stable B for 1 month and turned out with other horses in a large field, with no aggression problems. The mare was ridden 4 times a week for 1 h by her owner, and fed 1.8 kg oats, 0.9 kg horse nuts, 1.8 kg coarse mix, 1.8 kg hay mix and 0.9 kg soaked sugar beet pulp at 08:00 and 17:00 h and hay *ad libitum*. The mare was stabled in a quiet part of yard where there was intermittent activity: 4 other horses could be seen if they had their heads over the loosebox doors. The loosebox was small and dark and totally enclosed apart from the door.

The mare exhibited crib-biting, concentrated around feeding times. On receiving her feed, she interrupted feeding every 2-3 sec to crib-bite. This intense stereotypy performance persisted for 30 min after feeding time and then stopped. During this period, she watched any activity in the yard, seemingly with great interest, and interrupted this watching to crib-bite. It was rare for this horse to crib-bite at times other than around feeding time. Her upper front incisors were very worn from crib-biting, presumably hindering the efficiency of her grazing, and, she also suffered frequent bouts of gas colic. Veterinary assistance had to be summoned 4 times during January and February of that year.

An anti-wind-sucking collar has been used in an attempt to prevent this horse crib-biting. Her owner reports that this helped in decreasing her performance of the stereotypy, particularly when the collar was fastened quite tightly, although it was not left as tight when her owner was not present. 'Cribbox', a bitter tasting substance, was also painted on the parts of the loosebox used for crib-biting, but the use of this substance had no effect on performance of the stereotypy.

#### CASE 5

This 9-year-old Thoroughbred gelding at Stable C (polo yard) was very calm. He was initially trained as a racehorse, then sold on as a polo pony, being kept at a different yard for 2 polo seasons, before being sold to a beginner rider and moved to his present yard and regimen. In the winter he stayed out in a field with 2 other horses and was brought into a large barn and kept loose with his companions if the weather was bad. In summer he stayed out in the field with these 2 horses and some other horses

kept at the yard only during the polo season. He was put into pony lines when about to work. Pony lines are stalls, each accommodating 2 horses tied up to the bar at the front of the stall. When tethered in these, the horses could see each other and the considerable activity going on around them. The horse had no work at all during the winter. In summer, he worked 6 days per week. On polo match days he was ridden in two 7-min chukkas with 10-min warm-up sessions before them. On non-match days, he was ridden for 1 h per day.

The horses were fed in pony lines in the field. There was only one horse per stall during feeding, not tethered but shut in by a chain at the rear of the stall. As is common polo practice, they were not fed for 3 h before a polo match. During the summer the feed was 1.4 kg high-energy coarse mix or pony cubes and soaked sugar beet pulp morning and evening. Hay was provided if grazing was sparse. In the winter the pony received 0.7 kg high-energy coarse mix or pony cubes and soaked sugar beet pulp once per day. Hay was provided if the weather was cold, or the grazing covered by snow.

This horse crib-bit persistently when let out of the pony lines after feeding, or while in the pony lines if he finished his feed before the other horses. When let out of the pony lines after feeding he rooted around the feeding stalls, trying to find any feed the others had left behind, and then went to the feeding stall rails or the fence and started crib-biting continuing even if the staff attempted to distract him. This persistent, intense stereotypy continued for 20–30 min as he moved from rail to rail, crib-biting constantly. After this period, he moved away and started grazing or eating hay, and did not crib-bite again until the next feeding time. This horse also performed a tongue-chewing stereotypy at feeding times, and when wearing his bridle. Tongue-chewing was originally his only stereotypy, and crib-biting developed later.

An anti-wind-sucking strap was used in an attempt to prevent this horse crib-biting. This only decreased his crib-biting slightly, even when put on tight and left on constantly. As it had only minimal effect, the anti-wind-sucking strap was no longer used. Due to worries about other owners' horses copying the stereotypy and developing it themselves, a muzzle was occasionally put on him before feeding: this appeared to be effective because he could not rest his teeth on anything to crib-bite but it was not worn regularly.

#### CASE 6

This 12-year-old Thoroughbred gelding at Stable C (polo yard) was a calm horse and came from a polo yard with a more typical regimen than that at Stable C. There he was stabled all summer with no turnout, only leaving his loosebox to be exercised or play polo. He would not be fed for some hours before a polo match, and he would be fitted with a muzzle to prevent him eating bedding straw or hay during this time. Unlike Case 5, who only tongue chewed

before moving to the present yard, this horse was a crib-biter before moving to the current yard.

This horse's management regimen during the summer was the same as that of Case 5, except that during the winter months he was turned out in a paddock elsewhere. In summer he stayed out in the field with his companions. He was put into pony lines when about to work. The work and feeding regimens were the same as those for Case 5.

This horse crib-bit while in the pony lines before feeding, and when standing in the pony lines waiting to be ridden. When released from the lines, he performed a few crib-bites on the fence, and then went away to graze. He was seen standing crib-biting in the field at times other than around feeding times and so his stereotypy was not as exclusively associated with feeding as that of Case 5.

The use of a fairly tight anti-wind-sucking collar effectively prevented this horse crib-biting. However, when this was no longer used at the end of the polo season, he crib-bit as much as he did before it was put into use at the beginning of the season.

#### CASE 7

This 8-year-old Criollo cross gelding at Stable D (polo yard) had a very calm temperament. He came from Argentina as a 4-year-old, and joined Stable D, a large polo yard and riding school with about 90 horses.

He was not turned out at all for 8 months of the year (summer and part of the winter), only leaving the loosebox to work. He was turned out in a field with other horses for the remaining 4 months. The horse was used both for polo matches and in riding lessons. The stable was busy with constant activity. The loosebox was small and dark, 3 m<sup>2</sup> in area. This horse performed the crib-biting stereotypy very intensely indeed, crib-biting constantly throughout the day.

There was no attempt to prevent this horse crib-biting at Stable D. At the age of about 7 years, he was moved to a local riding school. In an attempt to stop his crib-biting, an anti-wind-sucking collar was fitted. However, the huge muscles he had built up in his neck due to the intensity of his stereotypy broke two of these collars. Then a plastic drainpipe was suspended on a bar above his loosebox door, which he could not crib-bite on because it spun on a central pivot when he tried to rest his teeth on it. This was quite effective in reducing the time spent crib-biting. After spending one winter at the local riding school he was moved to a farm livery stable. A few days after arriving, he developed colic and died. Because there was no *post mortem*, it is unknown whether the colic had any relationship to the crib biting.

#### CASE 8

This 7-year-old Thoroughbred/Irish draught cross (mid weight) hunter-type mare at Stable E (breeder/dealer's yard) was slightly nervous in temperament. She had been bred at

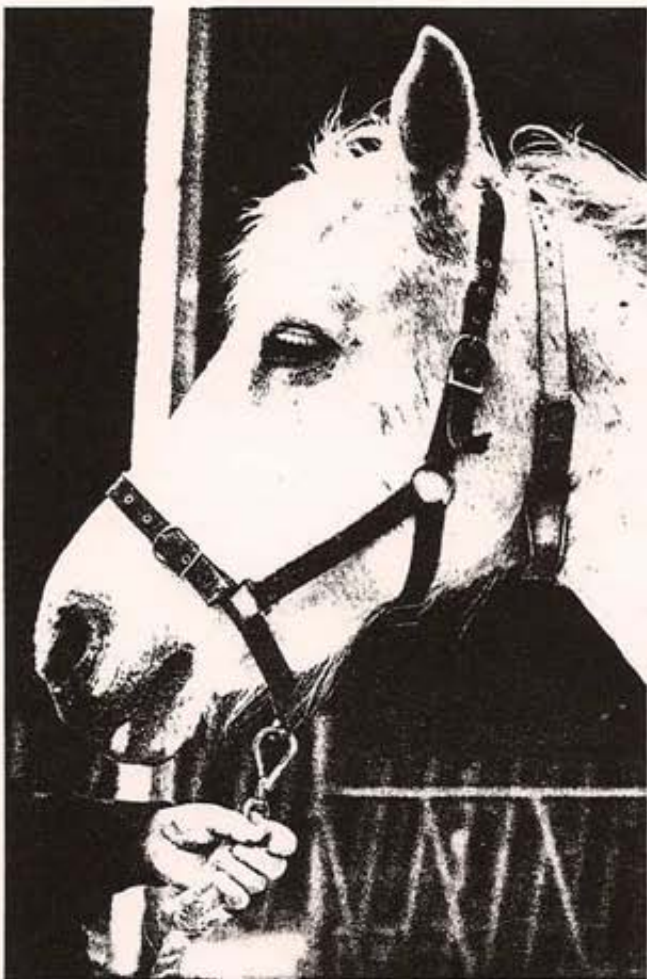


Fig 1: A conventional anti-wind sucking collar in place (photograph by A. E. Schwabe).

Stable E. In the summer she stayed out in a field with other horses, and in winter she was brought indoors with no turnout at all. She was given no work and fed a home-mixed feed ration at a variable time in the morning and at a variable time after dark; hay was available *ad libitum*.

The stable had occasional busy periods, and other horses were visible down the passageway. The loosebox was large (4 m<sup>2</sup>) with low, 1.5 m high walls. This yard was converted from cattle accommodation. There was no view outside from the loosebox.

This horse crib-bit, and also performed a stereotypy consisting of 'biting' air rather than directing this biting at an object. She did not swallow air when performing this stereotypy. Stereotypies were performed when she was kept indoors and also when living outdoors. Crib-biting was particularly intense before and after feeding time, but was also performed throughout the day. Each crib-biting bout consisted of 2-3 crib-bites. Stereotypies were more frequent when there was activity in the yard involving other horses, for example, when they were led past the loosebox or being removed. No attempt was made to prevent stereotypy performance.

#### CASE 9

This was a 4-year-old Thoroughbred mare at Stable E (breeder/dealer's yard). She was of slightly nervous temperament and other management details were the same as for Case 8. This horse shared her loosebox with Case 10; other horses were visible down the passageway.

The loosebox was large (8 m<sup>2</sup>) with low, 1.5 m high walls. There was no view outside from the loosebox. Crib-biting and wind-sucking were performed when the mare was indoors or outdoors. Crib-biting was particularly intense before and after feeding time, but was also performed throughout the day. Each crib-biting bout consisted of 2-3 crib-bites. Stereotypies were more frequent when there was activity in the yard involving other horses, for example, when they were led past the loosebox or being removed.

No attempt was made to prevent stereotypy performance.

#### CASE 10

This was a 3-year-old Thoroughbred gelding at Stable E (breeder/dealer's yard). He was calm and had been bred at Stable E. Management details were the same as for Case 9.

The horse exhibited crib-biting only when kept indoors. Crib-biting was particularly intense before and after feeding time, but was also performed throughout the day. Each crib-biting bout consisted of 2-3 crib-bites and was more frequent when there was activity in the yard involving other horses. No attempt was made to prevent stereotypy performance.

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### CONTROL OF CRIB-BITING AND WIND-SUCKING STEREOTYPIES

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The most common method of attempting to control crib-biting and wind-sucking in the case histories above, and probably generally, is the anti-wind-sucking collar (Fig 1). This consists of a leather strap placed around the upper part of the neck, with a thick, specially shaped piece of leather which sits between the jaws at the throat, designed to place uncomfortable pressure on the pharyngeal area and on the muscles used in wind-sucking if the horse attempts to perform the stereotypy. In one variation of this collar, steel points are pushed into the horse's neck muscles if the horse attempts to wind-suck. This collar is also used in attempts to control crib-biting because similar neck musculature movements are involved. The extent to which it prevents the movements depends on the character and strength of the individual horse, how tightly it is applied and whether it is worn constantly. In no case reported did it abolish the stereotypy completely in the long term. Such collars must always be uncomfortable for the horse, especially if applied tightly.

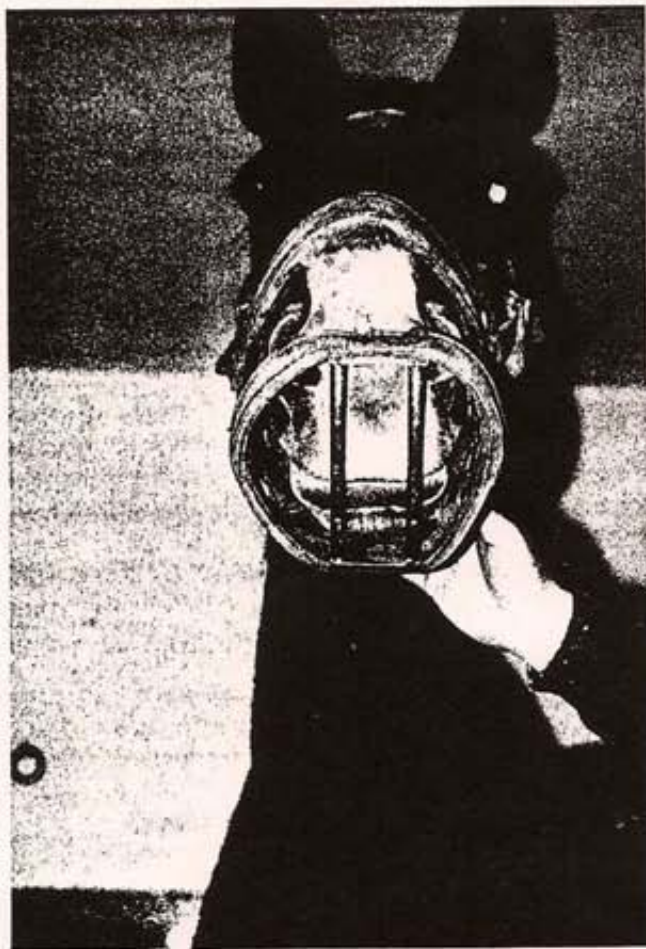


Fig 2: A bar-muzzle in place (photograph by P. D. Rossdale).

A second method of crib-biting control relies on coating the surfaces on which the teeth are rested with an unpleasant tasting substance, for example 'Cribbox', or Stockholm tar. This seldom reduces the frequency of crib-biting for long and does not eliminate the behaviour.

A third method of controlling crib-biting is the bar muzzle (Fig 2). This prevents the biting movements whilst still allowing the tongue and lips to be extended. The biting is completely prevented but wind-sucking movements can still occur. Again, the pressure of the muzzle may cause some discomfort and frustration to the horse.

The most effective reduction in stereotypy performance discussed in the case reports appeared to be the drainpipe suspended on a bar over the stable door, thus preventing the horse gripping the door. Other methods of preventing a horse gripping an object in order to crib-bite include covering stable fittings with metal, and removal of fittings at mouth height from the loosebox. These methods do not affect wind-suckers.

Surgical techniques have been developed in an attempt to control crib-biting and wind-sucking. One of these is myotomy of the ventral neck muscles to prevent retraction of the hyoid and larynx and depression of the tongue,

movements used in stereotypy performance (Forsell 1926). A second technique is to cut the ventral branch of the spinal accessory nerve (9th cranial) (Firth 1980) and a third is partial myectomy of the sternocephalicus, sternothyrohyoideus and omohyoideus together with the neurectomy (Hamm 1977; Frauenfelder 1981; Greet 1982). For wind-suckers, a further technique is buccostomy to prevent air swallowing (Karlander *et al.* 1965). Such operations reduce or prevent the movements in some horses but have no effect on others. Pain and discomfort will be associated with the surgery and the consequent inability to carry out certain movements may cause severe frustration.

Another method of attempted control of stereotypies is that of aversion therapy. In this behavioural therapy attempts are made to stop the horse from performing the stereotypy, by associating stereotypy performance with an unpleasant stimulus, such as an electric shock. The horse is given an electric shock or other unpleasant stimulus initially every time the stereotypy is performed and later during intermittent, random sessions of training, until the stereotypy ceases or is attenuated. The treatment is aversive by design, and horses may not reduce their stereotypy performance.

The methods described above which attempt to reduce the occurrence of crib-biting and wind-sucking result directly in poorer horse welfare, sometimes very poor welfare, and they do not lead to permanent improvement even if the welfare of the horse is ignored (Sambraus 1985; Houpt 1986; Fraser and Broom 1990). An opioid antagonist has been used to treat crib-biting (Dixon *et al.* 1992). However, this is unlikely to affect the behaviour for long and does not solve the horse's problem.

The most ethically sound method of treating stereotypies is by attempting to identify and treat the underlying factors contributing to the development of stereotypic behaviours, such as inadequacies of the housing and management regime the horse experiences. For example, we could attempt to improve husbandry techniques and housing conditions by allowing more social contact and longer turnout to graze. This approach is discussed in detail in the accompanying satellite article (p. 151).

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