

Short communication

A note on resting behaviour in horses kept on pasture: Rolling prior to getting up

M.N. Hansen, J. Estvan, J. Ladewig*

*The Royal Veterinary and Agricultural University, Department of Large Animal Sciences,
Grønnegårdsvej 8, 1870 Frederiksberg C, Denmark*

Accepted 18 April 2006

Available online 30 May 2006

Abstract

In previous studies on lying behaviour in horses kept in individual boxes we observed that most horses that had been lying down resting sometimes made a rolling behaviour prior to getting up. The rolling behaviour was seen in approximately 30% of the times the horses stood up. To analyse whether the behaviour was caused by individual housing in a box or whether it is a behaviour occurring also under free range conditions, we observed a group of 43 horses kept on pasture throughout the day and night. The horses were observed from 03:00 to 10:00 h over four consecutive mornings, at a time when lying behaviour was frequent. Of the 43 horses observed, the rising procedure was seen in 41 horses, and 25 of these horses (60.9%) performed the rolling behaviour at least once. A total of 135 rising episodes were observed, and 41 followed the performance of a rolling behaviour (30.4%). In contrast to the rolling behaviour seen indoors, the behaviour was more varied outdoors in that some horses rolled anywhere from 45 to 180°, some even repeatedly, whereas horses in a box only rolled 90° and back. In all cases when horses rolled 180° they rolled back to the original side before getting up. Also in contrast to previous observations, no horse was observed changing position during the roll. We conclude that the behaviour is a kind of comfort behaviour but that further studies are necessary to explain its function.

© 2006 Elsevier B.V. All rights reserved.

Keywords: Resting behaviour; Recumbency; Rolling behaviour; Rising behaviour; Horses; Comfort behaviour

1. Introduction

In two previous studies on horses kept in individual confinement in stables, we have observed that most of the horses made a rolling movement before getting up from a period of recumbency.

* Corresponding author. Tel.: +45 3528 3031; fax: +45 3528 3022.

E-mail address: JAL@kvl.dk (J. Ladewig).

None of the observed horses showed the rolling behaviour every time they got up. The behaviour was observed in approximately 30% of the times. In both studies we sometimes noticed that the horse changed position in the box while it was lying on its back. We therefore suggested that the behaviour enabled the horse to move away from the box wall or corner to get more space to get up (Pedersen et al., 2004). In the other study the behaviour was performed somewhat more frequently when horses were kept in a small box than in a large box, indicating the same function of the behaviour (Raabymagle and Ladewig, 2006). In both studies, however, the change in position was only seen occasionally, suggesting that the rolling behaviour also serves other functions.

Except for a brief note on horses rolling before getting up in Waring (2003, p. 153), this type of rolling behaviour to our knowledge has not been described in other studies. A logical next step, therefore, was to establish whether the behaviour is only performed during confinement or whether it is also shown by horses kept under free range conditions.

A change from standing to lying and vice versa in horses is an act that requires a certain amount of space. Firstly, the horse will often examine the ground before lying down by walking around or turning around. To lie down the horse flexes the front legs, pulls in the hind legs under the body and lowers its chest. When the chest is on the ground it is followed by the abdomen and the hind legs. The act of getting up proceeds approximately the other way around. From sternal recumbency the horse starts by stretching out the front legs in front of the chest, lifts the chest from the ground and then pulls the front legs in under the body while lifting up the chest. When the chest and abdomen are off the ground, the hind legs are stretched to raise the hind end. To shift weight from the back part to the front, the horse will stretch its head and neck out, a movement that requires extra space in front of the horse (Christensen, 2002).

Horses are polyphasic sleepers meaning that relatively short periods of sleep are followed by periods of activity (e.g. grazing). The duration of recumbency in horses varies from 11 to 20% per 24 h and lateral recumbency constitutes approximately 20% of the total recumbency time (Ruckebusch, 1972; Dallaire and Ruckebusch, 1974). Pedersen et al. (2004) found that horses stabled on wood shavings spend 6.6 ± 4.0 min in lateral recumbency and horses stabled on straw as much as 20.4 ± 8.4 min (Pedersen et al., 2004).

2. Materials and methods

The study was done at Søborggaard Horse Centre in the northern part of Sealand (Denmark) in June 2005. To collect as much data as possible, observations were made by two observers working together. The observers were sitting next to a car at a distance of approximately 50 m from the horses, at a location where people often were walking and driving by. The presence of the observers did not appear to influence the behaviour of the horses.

2.1. Animals

We observed 43 horses and ponies of different breeds and different ages in the study. The horses were partly riding school horses and partly privately owned horses. Approximately two-thirds of them were mares and one-third were geldings. All horses were marked for individual recognition with different coloured tape attached to their mane. The marking was done just before the observation period.

2.2. Pasture

The horses were kept on a pasture for 24 h a day only interrupted by riding sessions lasting 1–2 h in the early afternoon. The horses had been kept on the pasture for several months and were therefore familiar with

the environment. The pasture was approximately 13 acres and the ground consisted of areas with different properties. One area was swampy and covered with tall grass, another was covered with short dense grass, and a third area consisted mostly of bare ground. A fourth area was next to a jumping court and was covered with cut grass. In this area water was available. The horses preferred to lie on the cut grass or on the bare ground.

2.3. Observations

The observations were made from 03:00 to 10:00 h over a period of four consecutive days. The time the horses lied down and the time they got up was registered. For every rising event we noted if the rolling behaviour was performed and how it was performed.

3. Results and discussion

In total the rising procedure was seen in 41 of the 43 horses. Twenty-five of these horses (60.9%) performed the rolling behaviour at least once before getting up. A total of 135 rising episodes were observed during the 4-day period. Of these, the rolling behaviour was observed in 41 instances (30.4%). In 23 horses the rolling behaviour was observed three or more times (Fig. 1). One horse was observed to get up seven times without performing the behaviour.

There was no evidence that the period of time the horses spent recumbent had any effect on the occurrence of the rolling behaviour. For instance, one horse was observed rolling before getting up after having been recumbent for only 12 min. Another horse did not roll before getting up after 1 h and 28 min recumbency.

In no case was a horse observed rubbing its back as can be seen when the roll serves a grooming purpose. It is thus reasonably clear that the rolling behaviour after a period of recumbency does not serve a purpose of skin or fur care.

3.1. Rolling behaviour in the pasture

The rolling behaviour in the pasture differed in several ways from the rolling behaviour observed under confinement (Pedersen et al., 2004; Raabymagle and Ladewig, 2006). Most horses went from sternal recumbency to the rolling behaviour, as under confinement, but the roll could be more or less pronounced (Fig. 2, Table 1). Some horses rolled once to their back with all four legs up in the air (90°), others made this movement several times. Other horses rolled all the

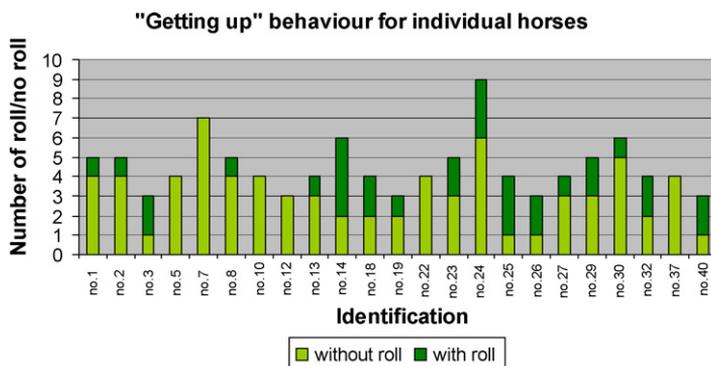


Fig. 1. Rolling behaviour in horses that were observed getting up three or more times.

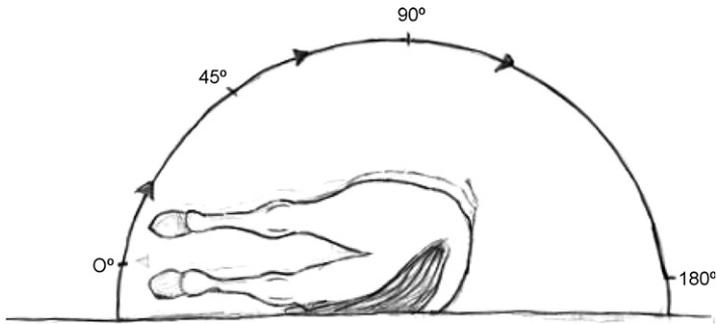


Fig. 2. Possible movements during rolling behaviour in the pasture.

way over to the other side (180°) once or several times but always rolled back to the original side again before rising. Some horses only rolled approximately 45° . A few horses went from sternal recumbency to a lateral position before rising with no rolling movement (0°) (Table 1).

In no case was a horse observed changing position while it was rolling, as had been observed in the stable. Obviously, the function of the roll on pasture is not to move away from a wall to get more space for the rising procedure. Furthermore, in no case did we see a horse lying on one side roll 180° and get up from the other side. If a horse rolled over to the other side, one or more times, it always rolled back again to the original side. Along with the fact that they never moved during the roll, we believe that rolling in the pasture has nothing to do with too little space.

In several cases it happened that a lying horse was disturbed by another horse or something else. In these cases the disturbed horse would get up without performing the rolling behaviour. The disturbance seemed to inhibit the rolling behaviour.

3.2. Comfort behaviour

It appears that the rolling behaviour is some kind of comfort behaviour. Stretching is a sign of well-being and possibly rolling is a variant of stretching. Rolling could be a way for the horses to decrease stiffness and thereby gain well-being and satisfaction because, like stretching, it is performed after sleeping and resting. Stretching is assumed to be a feedback from stiffness and the phenomenon is seen in response to a period of asymmetry in position just like when the horses have been resting in sternal recumbency (Fraser, 1989).

Since rolling behaviour prior to getting up apparently has only been observed in horses that at some point in their life have been kept in individual confinement it is possible that the behaviour has been learned under stable conditions. To elucidate this possibility, observations on horses that

Table 1
The degree and frequency of rolling behaviour observed

Degrees rolled	Times rolled	Frequency of rising episodes
0–45	One time	7
45–90	One time	14
	Two or more times	5
90–180	One time	2
	Two or more times	6

have only been kept in loose housing, possibly observations on feral and wild horses, need to be made.

4. Conclusion

The rolling behaviour performed just prior to getting up was seen in 30.4% of the 135 rising events observed, and 60.9% of the horses observed performed the behaviour. This result which is in agreement with earlier observation made in a stable, suggests that the behaviour is somewhat important to the horses. Our best explanation for the function of the rolling behaviour is that it is a type of comfort behaviour.

References

- Christensen, J.W., 2002. Hestens adfærd. In: Søndergaard, E., Clausen, E., Christensen, J.W., Schougaard, H. (Eds.), *Opstaldning og Hold af Heste. DJF-Rapport. Nr. 39 – Husdyrbrug. Danmarks jordbrugsforskning, Tjele, Denmark*, pp. 15–31.
- Dallaire, A., Ruckebusch, Y., 1974. Sleep and wakefulness in the housed pony under different dietary conditions. *Can. J. Comp. Med.* 38, 65–71.
- Fraser, A.F., 1989. Pandiculation: the comparative phenomenon of systematic stretching. *Appl. Anim. Behav. Sci.* 23, 263–267.
- Pedersen, G.R., Søndergaard, E., Ladewig, J., 2004. The influence of bedding on the time horses spend recumbent. *J. Equine Vet. Sci.* 24, 153–158.
- Raabymagle, P., Ladewig, J., 2006. Lying behaviour in horses in relation to box size. *J. Equine Vet. Sci.* 26, 11–17.
- Ruckebusch, Y., 1972. The relevance of drowsiness in the circadian cycle of farm animals. *Anim. Behav.* 20, 637–643.
- Waring, G.H., 2003. *Horse Behavior*, second ed. William Andrew Publ., New York, p. 153.