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Satisfy the Movement Needs of Horses in Husbandry Systems with Close-by Paddocks

Horse husbandry systems with close-by paddocks are considered a very animal-friendly housing form, since the animals constantly have an opportunity for movement. Within the framework of a doctoral thesis, a study was conducted at the former Institute of Production Engineering and Building Research of the FAL in Brunswick, to see if the close-by paddocks themselves provide adequate movement potential for the horses. Here the influence of additional movement and space offers on the movement activity and stress of the horses was considered, too. The duration of movement per horse and day was between 62 and 248 minutes and the stress exposure was less in the variants with additional movement opportunities.

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Keywords

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The majority of horses kept in Germany spend most of their time in a stable. The most common form of housing is single box husbandry. But the single box provides only limited or no social contact to other horses, few opportunities to retreat into privacy and few choices in regard to location. Free movement is limited and activity is possible only with feed and litter [1]. The incorporation of a permanently accessible paddock, permitting a stay outside, social contact and minimum of movement is an improvement of this form of husbandry [2].

Housing systems with directly close-by paddocks are becoming increasingly popular, both for single and group housed horses. The group paddock housing is considered to be the form of husbandry which best addresses the fundamental change in horse use from regularly used working animal to mainly irregularly used recreation partners [3].

Many horse owners are nonetheless of the opinion that the movement needs of the horses are covered in a paddock husbandry systems since they have adequate space available to them.

Since it is now known that under natural conditions horses spend 12 to 16 hours moving around [2], it is appropriate to study how far these movement needs are actually covered for horses in open yard housing systems. Here it is also of interest which additional movement opportunities lead to an increase in movement activity, and in what way this could cause an increase in the stress exposure of the horses.

Materials and methods

During the study, experiments were conducted with 24 warmblood mares (Hanoverians) from 1.5 to 3.5 years of age in single and group yard husbandry systems. The experiments were conducted in the test stable of the former FAL Braunschweig for 14 months. Six horses each served as one test group. In each group, five variants, each of three week duration were conducted. The group husbandry was supplemented by three different additional movement opportunities (2 hours pasture/day, 2 hours non-grassy pasture

land/day, 1 hour free range horse walker/day). In the single open yard husbandry, and in one experiment variant in the group husbandry, the horses had no additional movement outside of the stable housing system. While horses in the single husbandry system were kept in 12 m² single boxes, each horse had permanent access to its own paddock (45 m²). The group husbandry system experiment was itself marked by the spatial division of the function areas (lying, eating, drinking, movement) and the close-by paddock was 270 m². In an additional test phase, an expansion of the permanently accessible paddock to a total of 540 m² was available.

In order to study the movement behaviour of the mares, pedometers were attached to a hind leg of each horse. Based on the pedometer data, the time each horse spent moving or sleeping each day could be monitored. Here an ALT pedometer was used (ALT is the acronym for activity, lying, temperature). The movement impulses on the hind leg of the horse were measured, whereby per second a maximum of two impulses can be registered. Based on this preset value, a conversion of the movement activity into minutes per day was possible. In addition an analysis of videos of the horses was undertaken, where the horses' activity was monitored 24 hours a day and evaluated by computer (Software Interact). Furthermore the stress exposure of the horses was evaluated. For this purpose, nightly measurements of the heart frequency variability (Polar Equine Transmitter S810, Parameter HF and SD2) were taken and the concentration of cortisol metabolites in the faeces was analysed.

Results and reasoning

The evaluation of the pedometer data showed that an additional two hours of free movement by the horse group on a pasture led to a significant increase of the average movement activity (149.6 min/day), as did one hour of movement in a horse walker (173.0 min/day). An non-grassy pasture land did not, in contrast, motivate the horses to more movement (131.6 min/day), but rather

sometimes led to a reduction in movement activity. In the group paddock husbandry without additional movement opportunities, the movement activity was also low (125.8 min/day) and the horses showed the least movement activity in the single open yard husbandry without additional movement (102.3 min/day).

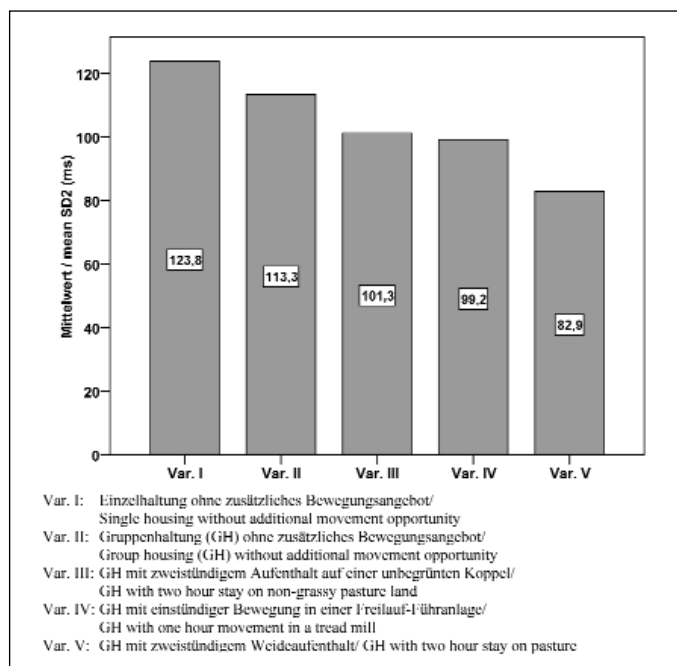
An enlargement of the paddock adjacent to the stable in the group husbandry system had no influence on an increase on the movement behaviour of the horses.

On the basis of the video tapings the impact of the additional movement opportunities on the movement time of the animals in the stable husbandry system was analysed. Here was no significant influence of the additional movement outside the housing system to the rest of locomotion noted.

The analysis of the increased stress parameters showed the least stress in the variants of group husbandry with a two hour pasture visit as well as a one hour movement period in an free range horse walker. *Figure 1* shows the stress exposure in dependence on the study variants based on the SD2 value (heart frequency variability), which increases with increased stress exposures. The studies show an increase in stress exposure in the group husbandry with two hours outdoors on a non-grassy pasture land with no feed offering as well as in the variant of group husbandry without additional movement opportunity. Thereby it was a higher stress exposure in the variant without additional movement opportunity in comparison to the variant with two hours outdoors. It was striking that the reverse held true in a scant 30 percent of the horses. The higher stress exposure of these horses during the variant with additional movement on a non grassed pasture land can most probably be explained by the lack of occupation for the horses on the area without vegetation.

Thus the non-grassy moving area is not a suitable alternative to increase the wellbeing of horses in group husbandry. In contrast, for horses in single housing, this could serve as a balance. If they could go out onto the non-grassy pasture land, they could at least make social contacts and experience comfort behaviour (perhaps wallowing). Further studies would be required to prove this. Most of the horses studied had the highest stress exposure in the single husbandry without additional movement. A comparison of the group and single housing with regard to the heart frequency variability did however show, that a total of 70% of the horses felt less stress while held in a group. However there were some horses (30%), which showed reduced stress levels in the single box husbandry, whereas the animal herd ranking seemed to play a decisive role here.

Fig. 1: Measuring stress exposure in different husbandry variants



For this reason, further research would be of interest. It should be studied whether for some horses other possible housing forms, such as for example a smaller group size or paired housing would be more suitable, and up to which group size common horse keeping is possible.

The concentration of the faecal cortisol metabolites reflects the stress exposure of the previous day since the metabolism of cortisol requires about 24 hours in a horse. For this reason, an excrement sample was collected from the test horses on the day of their arrival in order to compare the stress exposure during the experiment variants with the stress in the farm of origin. These excremental analyses showed that the mares had lower stress exposure in their farms of origin than during the entire testing period. Before the beginning of the experiment, the horses were kept all day at pasture or in a large one room free yard stable with many hours of movement outdoors. They had relatively little contact to humans at this time and spent much time outdoors. During the experiment, in contrast, the horses had daily contact to humans, were fed at automats and spent a maximum of two hours a day outside of the stable system, which of course is not in accordance with the natural conditions of a horse. The determination of faecal cortisol metabolite concentrations thus confirms the positive impact of horse-keeping as close to nature as possible.

Conclusion

In general it can be established that paddock husbandry systems indeed provide a certain incentive to movement, but with a maximum of four hours movement per day, the daily activity was much less than for example in the case of wild horses or year-round pasture keeping. Thus, if no alternative movement incentives and possibilities are offered, the paddock husbandry system doesn't satisfy

the movement needs of the horses despite separate functional areas and a large outside paddock.

Here additional movement is not only necessary to keep the horses' musculoskeletal system and bodily functions healthy, but also to increase the well being and mental balance of the horses.

Literature

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