Sociaal gedrag

Søndergaard et al., 2011: Lack of social contact is also one cause of development of abnormal behaviour in stabled horses (Nicol, 1999; Waters et al., 2002; Visser et al., 2008). The stereotypic behaviour 'weaving' is especially sensitive to the degree of social contact provided (Nicol, 1999) and the performance of this behaviour can be reduced by allowing stabled horses increased visual contact with neighbouring conspecifics, or by providing them with mirrors or images of other horses (Mills and Davenport, 2002; Mills and Riezebos, 2005; McAfee et al., 2002). Thus, even limited social contact may improve the welfare of stabled horses.
The present study shows that young female horses acquired an operant response to get access to social contact and that they are highly motivated for social contact. The finding that horses showed a similar and high motivation for all three types of social contact (full social contact, head contact and muzzle contact) with a familiar companion horse suggests that they perceived them to be of equally high value in a situation where the alternative is no physical social contact. Thus, horses should be given access to physical contact (minimum muzzle contact) in their home pens. The equal high value of the three types of social contact is in contrast to the study by Christensen et al. (2002) where horses that had been individually housed with muzzle contact to the neighbouring horse for several months showed a rebound of social behaviour when full contact was subsequently permitted. The discrepancy between these two studies may be that in the present study the horses had access to full social contact during several hours once weekly to avoid any adverse long term effects of limited social contact.

Mills & Clarke, 2002: There is evidence to suggest that social isolation is stressful for the horse (Mal *et al.*, 1991). This has adaptive value since social tendencies are an advantageous species-specific trait for the horse (Mills & Nankervis, 1999). Selection would then favour any mechanism, which motivates effort to establish social contact when isolated. In this case, we hypothesise that the horse housed in social isolation is in a chronic state of frustration, which might be alleviated by social contact. Interestingly, Cooper et al. (2000) found that weaving in horses was significantly reduced when they had access to a conspecific in an adjacent stable through a grilled 1 m2 portal. This effect has been replicated with the use of a similar sized mirror (Mills & Davenport, 2002) and in a longer term study, McAfee *et al.* (2002) found that this sort of mirror also reduced aggressive threatening behaviour over the stable door.
There is therefore a strong case for the provision of social or 'pseudo-social' housing. The one situation in which isolation can be beneficial is for the foaling mare, since even in the natural state the mare separates from the rest of the herd at this time (Tyler, 1972). Isolation at this time may also reduce the risk of problems with the development of the sequence of motor patterns that are required for successful suckling by the foal (Mills & Nankervis, 1999).

Cooper & McGreevy, 2002: In contrast both epidemiological and empirical studies of stereotypy have suggested that enhancing the horses' social environment actually reduced the incidence of stereotypy. For example, McGreevy *et al.* (1995a) found that stereotypy was less common on large yards where horses had visual contact with a large number of other horses. The low incidence of stereotypy in these yards may be related to a number of factors (*e.g.* increased yard activity compared with smaller yards) but within these yards increased visual contact with other horses was also a factor in lowering risk of stereotypy. In empirical studies, allowing close visual and tactile (thus olfactory, sniff/smell/nose at eachother) contact with the neighbouring horse (directly through a grill between stables, as opposed to when the horses happened to have their heads out of the stable

door) significantly reduced weaving and nodding relative to the conventional stable (Cooper et al., 2000). It may be inconvenient or impractical to socially house all horses, due to risk of infection, undesirable social interactions, or just the cost of maintaining an additional horse. A simple alternative may be the use of stable mirrors, which appear to have a similar effect to social contact in both short (Mills & Davenport, 2002) and long term (McAfee et al., 2002) studies. Whether horses with mirrors 'see' another horse or are merely distracted by the movement is not clear, but whatever the horses see, appears to reduce weaving.

Mills & Davenport, 2002: Weaving behaviour involves the repetitive lateral swaying of the head, neck, forequarters and sometimes hindquarters of the horse and is generally believed to be indicative of poor welfare. The behaviour of six known weavers was recorded three times a day for 5 days in each of three different stable designs. These were a conventional loose-box, a conventional loose-box with a 1 m2 acrylic mirror and a conventional loose-box in which there was a grilled 1 m2 side window separating the resident horse from a non-weaving conspecific in an adjacent stable. Weaving and other stereotypic behaviours were significantly higher in the unmodified stable and during the late afternoon observation period. There was no significant difference in the amount of stereotypic behaviour recorded in the two modified stables. Significant differences in the behaviour patterns and location of horses during the study suggest that activity engaging with either a visual image of a horse or a hay net is associated with a reduction in weaving and other repetitive activities in the stabled horse.

McAfee et al., 2002: The provision of a mirror significantly reduced the incidence of both stereotypic weaving ($P < 0:001$) and nodding ($P < 0:05$) for the 5 weeks of treatment but did not affect the time the horses spent standing active, dozing or ingesting. The mirror may mimic visual contact with conspecifics (minimising the social isolation of the stable) and/or provide environmental distraction or additional visual stimuli, altering the horses' perception of the environment and their resultant responses to it. The use of mirrors in the stable appears to be a more effective treatment of weaving than many current popular treatments, including weaving bars.

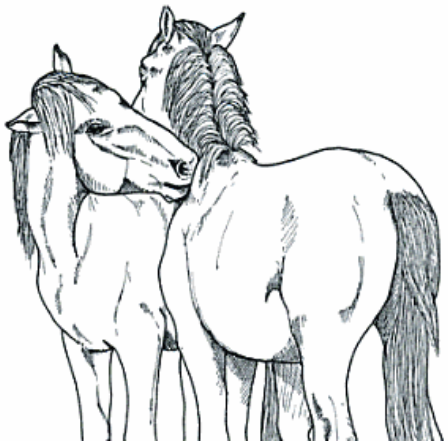
Mills & Riezebos, 2005: Whilst a static two-dimensional image of a horse's head has the potential to reduce these behaviours in the short term, this does not mean that their occurrence is triggered by social stimuli. The intensity of stereotypic head movement is associated with times of increased activity on the yard and anticipation of specific events, which may or may not be associated with increased social contact. It seems unlikely that the behaviours are a response to boredom. Further studies are warranted, which might investigate the specific role of a wider range of social stimuli.

Mills & Nankervis 1999: The evolutionary history of the horse reflects selection for a social species living in open plains where flight is the primary mechanism of escape from predation. It should not be surprising therefore, if there were to be an inherent aversion by the horse to the isolation and confinement associated with many housing systems.

Social investigation

Actions: Nose–nose contact, nose–body contact. Often, there is no direct skin contact, but the nostrils, which can be seen moving, are at a distance of 1–2 cm from the skin of the other horse.

Nose–nose sniffing takes place during greeting between two individuals, whether or not they are familiar with one another. Nose–elbow and nose–flank contact are typical for stallion encounters and courtship. These regions of the horse's body are tightly packed with sweat glands. Nose–genital contacts occur during courtship and stallion encounters. The function of these interactions certainly is olfactory information and transmission, but little is known about what information horses gather or transmit.



Feh, C. (2005), & Feh, C. (1988): **Social investigation**. Actions: Nose-nose contact, nose-body contact. Often, there is no direct skin contact, but the nostrils, which can be seen moving, are at a distance of 1-2 cm from the skin of the other horse. Nose-nose sniffing takes place during greeting between two individuals, whether or not they are familiar with one another.

Zharkikh & Andersen (2009): Some authors (Hoffman, 1985; Houpt & Boyd, 1994) designated simple sniffing of various parts of another horse's body in males (stallions) as communicative behaviour or as a greeting ritual, whereas a nose-nose interaction was designated as agonistic behaviour. Stomps were often observed during nose-nose interactions; yet, it did not indicate the agonistic nature of the behaviour sequence. As rivals did not intend to hit against each other, in this study a complete nose-nose interaction (as well as one without stomping) was believed to be a ritualized demonstration rather than an aggression per se. In the present study, nose-nose interactions were more often recorded between males from different subgroups, and thus the behaviour possibly has a function of the maintenance of the social hierarchy. Further investigation in this area would be desirable.

Wolski et al., 1980: Vision is used for individual recognition between horses along with odors and vocal characteristics. Olfactory behaviors were noted only when the mare and foal were in close proximity; the delays in location caused by masking olfactory cues imply they are important in mare-foal recognition.

Saslow, 2002: A very important distance sense in the equine 'umwelt': olfaction.
(however, olfactory discrimination and importance has not yet been tested in horses).

Hartmann et al. (2012) argue that the domestic environment should, whenever possible, offer horses the opportunity to socialize with other horses. This can best be achieved by keeping horses in groups. There may not be one best method that should be chosen in practice, because factors such as available space, feeding regime or individual horse characteristics must be taken into account. This review aims to give insight into whether or not some of the concerns related to keeping horses in groups are justified and to review scientifically based solutions that could be useful in practice to improve horse welfare and human safety. However, their review has revealed that, despite the ample work done in other species related to keeping animals in groups, there is insufficient scientific data on horses. This lack of knowledge may hinder objective decisions in practice that could optimize management and thereby ultimately improve and safeguard horse welfare and human safety.

Lee et al., 2011: Rather than suggest that horses that are turned out alone need less time in the paddock, the results of this experiment show the benefit of exercising horses in groups, especially where the paddock groups are composed of socially compatible horses. What is the ecological need for exercise? To try the answer this question we measured the strength of preferences for three commodities and found that horses will not work as hard for the opportunity to exercise as for palatable food. The finding that horses do not prefer forced exercise is not surprising because moving at a gait faster than a walk is predator defense and, although it occurs in nature, it is a better indicator of poor than of good welfare.

Goodwin, 2002: As prey species, group living is an important survival strategy, as it increases the probability of detecting approaching predators, it also reduces the probability of any particular individual being caught and consumed. Domestic equids are, therefore, pre-adapted to forming associations with other species and to respond to the warning signals in the body language of other species (Goodwin, 1999).

Hall et al., 2008: The relative importance of the company of other horses was demonstrated in a study carried out by Schatzmann (1998). When given the option to select from (a) individual stall with hay and straw, (b) hay outside, (c) firm or soft ground surfaces, and (d) the company of others or not, the highest priority was always to be in the company of—or view contact with—other horses. The horses also showed a preference for being outside and eating grass, regardless of the weather conditions (Schatzmann, 1998).

Sweeting et al., 1985: During one-half of the observations, visual contact between the ponies was prevented by a solid partition between the stalls. The ponies spent significantly more time standing nonalert when the partition prevented visual contact (12 +/- 7%) than when visual contact could take place (6 +/- 3%, P less than.05). When fresh hay was supplied in the mornings, the ponies spent similar amounts of time eating whether visual contact was allowed or not, but in the afternoon significantly more time was spent feeding when visual contact was allowed (73 +/- 4%) than when it was not (60 +/- 7%). Less time was spent eating, in the absence of visual contact, despite the presence of auditory and olfactory contact. Apparently social facilitation is important in maintaining feeding behavior in ponies.

Henderson, 2007: The importance of social contact is evidenced by the negligible rate of stereotypies in mares used for urine collection to make estrogen supplements (Flannigan & Stookey, 2002).

Henderson, 2007: Although much of this behavioral repertoire is still intact, modern show horses differ in significant ways form their range-roaming ancestors – ways that may increase the risks of group turnout. For example, high-protein diets give show horses greater energy reserves, coupled with fewer opportunities for expression; both contribute to more explosive and volatile behavior when at liberty. Show horses wear steel shoes. There are also extrinsic factors in the show-horse environment that can disturb established hierarchies (arrivals and departures of new horses of a loose horse). Ultimately, although potentially psychologically beneficial, group turnout of show horses probably places them at increased risk for injury.

Henderson, 2007: Feral horses form pair-bonds with a particular herd member who is allowed within their personal space. When permitted, horses may often be seen nose-to-tail scratching the withers

and surrounding areas of their mate. The evolutionary purpose of this “allogrooming” was the removal of parasites, but perhaps it was more important for the cementing of pair-bonds that enhanced the stability of the harem (Budiansky, 1997; Feh, 2002). Thus, allowing a horse to form a relationship with “a turnout buddy” satisfies affiliation needs and may be more workable than larger groupings.

Søndergaard et al., 2011: The main reason for housing horses individually is to avoid fights and injuries. However, the risk of fights in group housing may be more related to competition for limited resources such as space and access to feed as suggested by Jørgensen et al. (2008).

VanDierendonck & Spruijt, 2012: Affiliative relationships are crucial for social cohesion of equine individuals in non-voluntary composed herds. Affiliative behaviour might be mechanistically explained by the fact that the execution of allogrooming or play is self-rewarding, by the production of endogenous opioids. Moreover, allogrooming and, to a lesser extent, play could be classified as an “ethological need”. This leads to the most plausible conclusion that performing affiliative social behaviour is indispensable to domestic horses. Domestic horses living in a complex social system safeguard their social position, and specific relations by means of interventions especially in affiliative interactions. This social relationships and interventions, induced by endogenous opioids, seem equines main coping mechanisms in large (domesticated) herds.

Feh & Mazieres, 1993: It is commonly suggested that the principal function of allogrooming is to reduce social tension between group members, but direct evidence of the physiological consequences of grooming at particular sites is lacking. By filming allogrooming sequences in a herd of Camargue horses, *Equus caballus* , their preferred grooming site, which lies on the lower neck, was identified. Experimental imitation of grooming at this site reduced the heart rate of the recipient while grooming on a non-preferred area did not, in both adults and foals. This preferred site lies close to a major ganglion of the autonomic nervous system.

Visser et al., 2008: This study clearly shows that sudden isolated stabling is stressful to young and naïve horses, resulting in a high prevalence of stereotypies and abnormal behaviours. This study also provided some support for the notion that, in agreement with other species, social stress in horses may be associated with a blunted adrenocortical response to CRF challenge.

Lansade et al., 2012: Likewise, horses kept in individual stalls for several weeks acclimatized less readily to initial training for riding (Rivera et al., 2002), and in another study, horses housed individually for 3–8 months were more difficult to handle and train than horses housed in groups (Søndergaard and Ladewig, 2004). In horses, Rivera et al. (2002) explained that the unwanted behaviours observed in stalled horses during training could be due to a change in their relationship with humans (positive at first and more negative once training began).
We found that 11 days of isolation decreased emotional reactivity, as assessed by reactivity to separation, sound, suddenness and novelty, while learning performance improved, as evaluated by habituation to a novel object and by a forwards–backwards task. Our study shows for the first time that a short isolation period has a beneficial effect on emotional reactivity and learning abilities. In particular, isolation appears to make horses less fearful, thereby improving their ability to learn, which has relevance for horse training. However, further experiments are required to understand how isolation influences horses’ responses and learning abilities and to determine whether these

effects are long-term. It would also be interesting to extend these results to groups of horses of various ages, and to determine whether isolation is beneficial for other types of learning. However, maintaining horses in individual boxes for a long time is not recommended, because it can lead to restriction of the natural behavioural repertoire, to aggressive or stereotypic behaviour, and to impaired welfare (e.g. Christensen et al., 2002; Heleski et al., 2002; Kiley-Worthington, 1990). Thus, it is very important to establish the optimum duration of isolation needed to enhance subsequent training.

Flannigan & Stookey, 2002*:* 55 light and 55 draft late pregnancy mares housed in tie stalls. The majority of mares took the opportunity to interact with neighbouring mares (87.2% of light mares versus 89.1% of draft mares).

Kay & Hall, 2009: The current study investigated the effect of transporting horses alone, in company or with an acrylic safety mirror (measuring 81 cm x 61.5 cm) that provided surrogate companionship. The provision of surrogate companionship in the form of a mirror was found to be preferable to travel alone, but where possible a live companion is recommended.

Hays Grogan & McDonnell, 2005: With the goal of characterizing the type and degree of injuries and blemishes incurred by horses living under natural social conditions, all members of a semi-feral herd of ponies were inspected on 4 occasions over a period of 28 months. Two occasions were during breeding/foaling season and 2 during non–breeding/foaling season months. On each occasion, each animal was examined (N = 47–65) and all injuries or blemish marks were recorded. Based on the types and number of injuries or blemishes, an injury/blemish grade was assigned for each inspection, ranging from 1 for no blemishes to 6 for more than 1 open wound. Almost all injuries and blemishes recorded were extremely mild. Only 12 of the 213 inspections and 14 of the 858 total injuries and blemishes involved wounds affecting tissues other than hair and skin. Males had significantly greater mean injury/blemish grade than females ($P < .0001$). For all social categories and ages, the mean injury/blemish grade was significantly greater in the breeding/foaling season months than during the non–breeding/foaling season ($P < .0001$). All foals were blemish-free at the non–breeding/foaling season inspections (n = 24) and relatively blemish-free (9 of 14) at the breeding/foaling season inspections. The rump and the barrel areas were the most common site of injuries or blemishes, both as a percentage of the total injury count and as a percentage of inspections involving those areas. These findings are consistent with the seasonal and gender patterns of aggressive behavior seen in this herd. Compared with reports of truly feral horse populations, it appears that injuries are fewer and less severe in this semi-feral herd. In addition, there appear to be fewer leg injuries in this semi-feral herd than has been described for truly feral horse populations.

Knubben et al., 2008: Reasons for performing study: Studies on the prevalence and predisposing factors of bite and kick injuries in horses have not been reported in a population-based data sample. Objectives: To investigate the prevalence of bite and kick injuries in horses and associated risk factors in a representative sample of horses in Switzerland.
Methods: A questionnaire on the incidence of disease and injury, which included the frequency of bite and kick injuries and their association with breed, housing, use and feeding regime, was sent to 2559 horse owners randomly selected throughout Switzerland.
Results: The data of 2912 horses with 897 disorders diagnosed by a veterinarian were analysed. There were 231 injuries, 50 (21.6%) caused by a bite or kick from another horse; this number corresponded to 5.6% of all diseases and injuries and concerned only 1.7% of all the horses

evaluated. Warmblood, Thoroughbred and Arabian horses had a 4.3 times higher risk of bite or kick injuries than horses of other breeds. Eighteen per cent of injuries were associated with a change in housing management and occurred regardless of whether horses were kept in groups permanently or sporadically.
Conclusions and potential relevance: A stable group hierarchy and a housing system that provides adequate space and is adapted to horse-specific behaviour are important factors in prevention and kick and bite injuries.
In conclusion, bite and kick injuries are greatly affected by housing management regimes. This is true for individual housing systems with temporary group housing but also for permanent group housing. Preventive measures include establishment of a consistent group of horses, large turn-out area and large enough barns or sheds with designs that provide individual feeding spaces and allow subdominant horses to avoid dominant herd mates. Sudden changes in housing and pasture management should be avoided, and differences in character and temperament between individual horses or horses of different breeds considered.

Jonge paarden

Heleski et al., 2002: Weaning foals marks a stressful event in horses' lives. Limited research exists regarding different housing methods post-weaning and the long-term implications on horse behavior and welfare. The purpose of this study was to monitor behavior and physiological stress markers in horses weaned individually in solid partition box stalls versus horses weaned in small groups and housed in paddocks. Both treatment groups underwent maternal deprivation stress, but the stalled weanlings had the additive effects of social isolation which prevented them from performing social behaviors. Quarter Horse weanlings from the Michigan State University, Merillat Equine Center, average age 4.5 months, were weaned in 13.4 m2 box stalls (n=6) or in groups of three in a 992 m2 paddock, which had very limited grazing forage and an open shelter available (n=6). Subjects were fed concentrate and hay to National Research Council recommendations. A time budget for 31 observed behaviors was developed. Behavioral observations were made 2 days per week, approximately 6 h per day, for the duration of the 56 days study. Instantaneous samples were recorded every 5 min on each observation day, with equal division between the two treatment groups (n=35 scans per horse per observation day). Focal data were recorded continuously between scans to provide a more detailed ethogram. On each observation day, fecal samples were collected to measure 11,17-dioxoandrostanes, an indicator of glucocorticoid metabolite concentration. Regarding the fecal 11,17-dioxoandrostanes, there was no discernible treatment difference either immediately post-weaning or at the conclusion of the 56 days study. Interestingly, all 12 weanlings showed a 4 week post-weaning increase in 11,17-dioxoandrostanes. The reason for this peak was unclear. Behavioral observations demonstrated a significantly different time budget in paddock-housed weanlings than in stall-housed weanlings ($P<0.0001$). Paddock-housed weanlings displayed a time budget more like a feral horse time budget, showing more time spent moving and less time spent lying. Paddock-housed weanlings, who had the option of selectively engaging in a broader range of behaviors, showed strong motivation to graze and be near conspecifics. Stalled weanlings spent significantly more time engaged in aberrant behaviors: licking or chewing the stall/shed wall, kicking at the stall/shed wall, pawing, and bucking/rearing bouts ($P<0.03$). Based on the variety of behaviors shown, the ability to engage in strongly preferred behaviors, and freedom from aberrant behavior, we conclude that the paddock-reared, group-housed weanlings had better welfare. However, there was insufficient evidence to conclude that the stalled weanlings had poor welfare.

Bourjade et al., 2008: We investigated the effects of the introduction of foreign adults on the behavior of young horses. First, we observed the behavior of 1- and 2-year-old domestic horses housed in same-age and same-sex groups (a standard housing system, but different from a natural situation). Then, two same-sex adults were introduced into each experimental group. Observations made before, during and after an introduction indicated that young horses reared in homogeneous groups of young had different behaviors compared to other domestic horses reared under more socially natural conditions. After the introduction of adults, young horses expressed new behaviors, preferential social associations emerged, positive social behavior increased and agonistic interactions decreased. These results have important implications both for understanding the influence that adults may have on the behavior of young horses, and in terms of husbandry, indicating the importance of keeping young horses with adults, although further studies are still necessary.

Bourjade et al., 2009: **Background:** Adults play an important role in regulating the social behaviour of young individuals. However, a few pioneer studies suggest that, more than the mere presence of adults, their proportions in social groups affect the social development of young. Here, we hypothesized that aggression rates and social cohesion were correlated to adult-young ratios. Our biological model was naturally-formed groups of Przewalski horses, Equus f. przewalskii, varying in composition.
Methodology/Principal Findings: We investigated the social interactions and spatial relationships of 12 one- and two-year old Przewalski horses belonging to five families with adult-young ratios (AYR) ranging from 0.67 to 1.33. We found striking variations of aggression rates and spatial relationships related to the adult-young ratio: the lower this ratio, the more the young were aggressive, the more young and adults segregated and the tighter the young bonded to other young.
Conclusion/Significance: This is the first study demonstrating a correlation between adult-young ratios and aggression rates and social cohesion of young individuals in a naturalistic setting. The increase of aggression and the emergence of social segregation in groups with lower proportions of adults could reflect a related decrease of the influence of adults as regulators of the behaviour of young. This social regulation has both theoretical and practical implications for understanding the modalities of the influence of adults during ontogeny and for recommending optimal settings, as for instance, for schooling or animal group management.

Hengsten
Briefer Freymond et al., 2013: Horses are often kept in individual stables, rather than in outdoor groups, despite such housing system fulfilling many of their welfare needs, such as the access to social partners. Keeping domestic stallions in outdoor groups would mimic bachelor bands that are found in the wild. Unfortunately, the high level of aggression that unfamiliar stallions display when they first encounter each other discourages owners from keeping them in groups. However, this level of aggression is likely to be particularly important only during group integration, when the dominance hierarchy is being established, whereas relatively low aggression rates have been observed among stable feral bachelor bands. We investigated the possibility of housing breeding stallions owned by the Swiss National Stud in groups on a large pasture (5 stallions in 2009 and 8 stallions in 2010). We studied the pattern of agonistic, ritual and affiliative interactions after group integration (17-23 days), and the factors influencing these interactions (time after group integration, dominance rank, age or experience of group housing). We found that stallions displayed generally more ritual than agonistic and than affiliative interactions. The frequency of agonistic and ritual interactions decreased quickly within the first three to four days. The frequency of affiliative interactions increased slowly with time before decreasing after 9-14 days. A stable hierarchy could

be measured after 2-3 months. The highest-ranking males had less ritual interactions than the lowest-ranking. Males had also less agonistic, ritual and affiliative interactions if they had already been housed in a group the previous year. Therefore, we found that breeding stallions could be housed together on a large pasture, because the frequency of agonistic interactions decreased quickly and remained at a minimal level from the fourth day following group integration. This housing system could potentially increase horse welfare and reduce labour associated with horse management.

Ingólfsdóttir & Sigurjónsdóttir, 2008: This study shows that higher ranking horses can have more access to provided hay in large pastures and can be better sheltered from the wind and precipitation than lower ranking individuals. Hence, the dominant horses gained weight while the subordinates lost weight in the groups where body condition of horses was estimated in the beginning and in the end of the observation period. Horse owners can diminish this effect by carefully considering what the best composition of groups is and how to distribute fodder/hay in the pasture.

Erber et al., 2013: For initial training, horses are often transferred from group housing to individual boxes, which is a potential stressor. In this study, salivary cortisol concentrations, locomotion activity, and heart rate (HR) were analyzed and the HR variability (HRV) variables standard deviation of beat-to-beat interval (SDRR) and root mean square of successive RR differences (RMSSD) were calculated in 3-year-old mares (n = 8). Mares were transferred abruptly from a group stable with access to a paddock to individual boxes without a paddock and were studied from 4 days before to 5 days after changing the stable. Mares underwent routine equestrian training for young horses. On the days before mares were moved to individual boxes, cortisol concentrations showed a diurnal rhythm with values approximately 0.6 ng/ml in the morning and a decrease throughout the day. When horses were moved to individual boxes, cortisol concentrations increased to 1.8 $\pm$ 0.2 ng/ml within 30 minutes and did not return to baseline values within 6 hours (0.7 $\pm$ 0.1 ng/ml, $P < .05$ over time). On the following days, a diurnal rhythm was re-established but at a higher level than before the change of stable. Locomotion activity was higher when mares had access to a paddock than when kept in individual boxes. Heart rate increased for approximately 60 minutes when mares were separated from their group. In conclusion, separating young horses from their group and individual stabling are perceived as stressful.

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