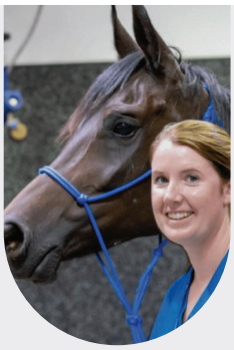
Long-term nursing care of the equine patient in a sling



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ABSTRACT The equine veterinary nurse plays a crucial role in the care and long-term management of the equine patient in a sling. In this article, we aim to provide a practical resource for equine nurses regarding the application and use of a sling in hospitalised horses, as well as tips on the nursing care and nutrition of these patients.

Keywords equine, horse, sling, veterinary, nursing

Introduction

Hospitalised patients with severe locomotive debilitation, such as those with fractures, myopathies, laminitis or neurological disorders, often progress to recumbent states or are required to rest for prolonged periods. These patients are difficult to manage and demand high staffing levels with intensive care (Ryan et al., 2020). Sling suspension of these patients can partially relieve pressure on horses' feet, in the case of laminitic patients, or allow for prolonged periods of rest for patients who are unable to lie down, such as certain fracture patients. In the authors' experience, horses managed correctly can be maintained in slings for up to 4–6 weeks. However, the duration of use usually depends on the horse's clinical condition and may be significantly shorter. In this article, we will discuss the use of slings in horses and the essential role the veterinary nurse plays in caring for the equine patient in a sling.

Choosing a sling

There are numerous commercially available equine slings on the market, such as the Large Animal Lift™, the Liftex™ sling, the PM Horse Swinglifter™, and the Anderson Sling Support Device™ (ASSD) (Madigan, 1993; Gardner, 2011). The Large Animal Lift™ (LAL) from Large Animal Lift Enterprises (http://www.largeanimallift.com) is a useful, lightweight sling, designed to lift a recumbent horse to standing in both hospital and rescue situations. However, it is not designed for long-term support (Pusterla & Madigan, 2006). The Liftex™ sling from Liftex Corp (https://www.liftex.com/animal-slings) can be tailor-made for different equine uses, in a variety of speciality webbing fabrics. The portable PM Horse Swinglifter™ unit from Michael Puhl (https://www.pmhuftechnik.saarland/home-english/pm-horse-swinglifter) is a practical sling choice for many hospitals as it is a portable unit with an inbuilt hoist that can be installed in any location, so a stall does not need a pre-installed hoist to accommodate a horse in a sling (Puhl, 2010). Finally, the ASSD from CDA Products (https://www.andersonsling.com/andersonsling) can provide long-term standing support to horses with musculoskeletal debilitation or recumbency (Pusterla & Madigan, 2006).

This sling consists of four components and an overhead rectangular base frame, which can support up to 2 tonnes of weight. It differs from other slings as it has a large rectangular base frame, which provides level and stable support for the horse's weight and movement, rather than a single point of suspension (**Figure 1**).

The four-piece unit includes an abdominal support sling with chest- and rear-support panels, which help evenly distribute the patient's weight safely through the frame (**Figure 1**). Additional leg supports can also help further reduce pressure on the horse's abdomen (Gardner, 2011). The latest models of the ASSD are colour- and number-coded for ease of application (**Figure 2**). In this article, we will refer to the use of the ASSD.

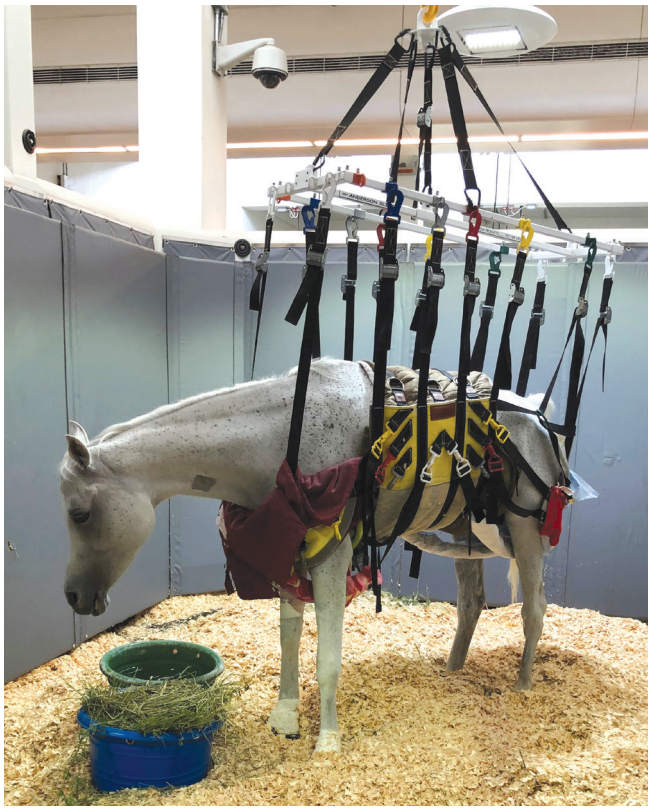

Figure 1. A four-piece unit can provide additional support and more even weight distribution.

Figure 2. Extra padding can dramatically reduce skin ulceration caused by sustained shear pressure.

Stall specifications

To support a horse in a sling, without a PM Horse Swinglifter™, the stall will require a weight-tested beam with a hoist installed, capable of loading up to 2 tonnes. The beam should be able to withstand the forces associated with a horse lunging or jumping while in the sling (Ishihara et al., 2006). The supporting beam should be at a height of at least 12 feet (3.66 m) (Ishihara et al., 2006). An electronic hoist control is preferable to a manual hoist, for more efficient control (Ishihara et al., 2006). The stall bedding should be at least 25 cm deep to provide ample foot support (Floyd & Taylor, 2017). Adequate overhead lighting should be in place for monitoring the patient and for positive mental stimulation (Floyd & Taylor, 2017) (**Figure 1**, previous page). It is important to maintain an appropriate ambient temperature for the horse, using fans or heat lamps as required (**Figure 3**). The use of fans helps to help maintain ventilation through the stall (Floyd & Taylor, 2017). Padded walls and floors can provide an additional safety measure, in case the patient struggles while in the sling (**Figure 1**, previous page). For patients receiving fluid therapy via an overhead hanger, the sling support frame should be anchored to wall rings to prevent it interfering with intravenous fluid lines.

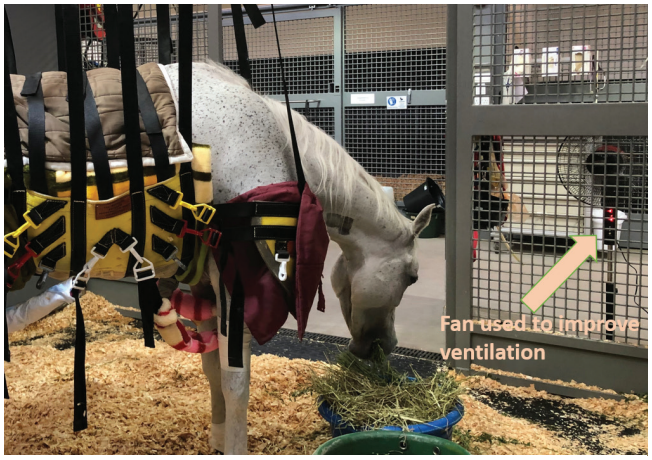

Figure 3. Maintain an appropriate ambient temperature for the horse using fans (indicated by arrow) or heat lamps.

Application of the sling

The use of a sling for the long-term management of a horse is largely dependent on the horse's temperament and tolerance of the sling (Furr, 2008). Fractious or intolerant patients can cause serious injury to themselves and personnel while being placed in the sling, and must be handled by experienced staff (Pusterla & Madigan, 2006). Sedation of the patient is advised, at least initially, until it settles and becomes accustomed to the noise of the hoist and the feeling of the sling (Hamm et al., 1995; LeBlanc, 1991; Taylor et al., 2005). Close monitoring is required in the first 12–24 hours, until the horse becomes comfortable with the sling (Bowman, 1995) Personnel should remain nearby in case the horse panics. Thereafter, CCTV allows continuous monitoring from a distance, for the ongoing safety of the horse (**Figure 1**, previous page).

Application of the ASSD on a standing horse (Ishihara et al., 2006)

1. If the patient is recumbent and calm, do not encourage or force it to stand until just before sling application. If applying the sling in the stall post-surgery, ensure the stall and sling are prepared prior to moving the horse from the recovery stall.
2. Prepare the sling outside the patient's stall by laying the pieces on the ground, straightening the straps and checking all buckles are secure.
3. Ensure all assistants understand the application process and assign roles to individuals.
4. To safely and efficiently apply the sling, a team of six assistants is optimum.
5. Apply the rectangular frame to the hoist before the application of the sling to the horse.
6. Raise the frame so the patient does not injure itself on it when standing.
7. Once the horse is standing, apply the body piece first.
8. The three centre straps should be securely fastened, over the horse's back, first.
9. The coloured buckles should be attached temporarily, across the horse's back, to their opposing twin buckle on the other side.
10. The chest panel and rear support are to be attached to the body piece, following the colour-coded buckle system.
11. The frame can then be lowered and all the overhead colour-coded buckles attached to the frame in a methodical and synchronised fashion on both sides.
12. Adjust all the straps to achieve even pressure.
13. Slowly raise the frame to apply gentle tension.
14. Further suspension can then be applied, slowly and gently, to avoid stressing the patient.

The sling can also be applied to the recumbent patient. However, this requires the horse to be rolled into dorsal recumbency to pass straps through the underside (Ishihara et al., 2006). This is dangerous in a non-anaesthetised patient, requiring the limbs to be tied and

the head well restrained to prevent injury to the animal or personnel (Taylor et al., 2005). Alternatively, where the option exists, the LAL is safer and more efficient for an unanaesthetised recumbent horse, as the straps can be more easily passed beneath the animal. Once in a standing position, this can be exchanged for the ASSD if available, which can then be applied over the LAL (Pusterla & Madigan, 2006). The horse may need to be lowered again to facilitate the changing of the support frame between slings. Once the correct frame is in place, the horse can be attached to the frame (Pusterla & Madigan 2006). The frame of the sling can be further stabilised by attaching it to supporting wall rings using long ropes to reduce excessive motion, particularly if the patient struggles while becoming familiar with the noise and feel of the sling.

Operation of the hoist

The sling is best operated by an electronic hoist for smoothness and swiftness (Ishihara et al., 2006). The hoist should not support more than 25% of the horse's body weight for extended periods of time, to avoid complications associated with excessive pressure (Furr, 2008). However, more recently, the use of a computer-integrated weight compensation system in combination with an ASSD showed that horses began to show complications (such as avoidance behaviours and respiratory distress) at >20% weight compensation (Montgomery et al., 2019), indicating that slings should not support more than 20% of the horse's body weight. In the absence of an electronic weigh scale incorporated into the hoist, a spring-loaded scale could be incorporated into the hoist to estimate the percentage of body weight supported. Failing this, the hoist height must be subjectively estimated.

The hoist should be held at a height whereby the horse is weight bearing on all four limbs, while also being lightly supported by the sling. This means the horse is still able to move around in the sling but, if wishing to rest, the animal can relax into the sling and allow it to take more body weight for brief periods. Slings are most beneficial to horses that can partially support themselves, or those requiring prolonged periods of rest (Furr, 2008). The patient should be encouraged to sit back into the sling and can also be facilitated to lie down by carefully lowering the hoist at the appropriate time. For horses that put their full weight into the sling, bales of shavings or hay can be used as a head rest. If the horse's temperament allows, the hoist can be used to elevate the horse further for short periods of time, to facilitate foot care or procedures such as bandage or cast changes, where the horse would need to lift its feet.

A common complication associated with the use of a sling on equine patients is that a horse can panic and struggle before becoming accustomed to the sling. It is advisable to have a competent handler at the horse's head at all times during this period. Depending on the horse's temperament and restrictions, it can then be cross-tied or allowed loose in the sling in the stall.

Skin care

Shear pressure or friction occurs when a bone or underlying tissue moves in one direction and the skin moves in a different direction (Davies, 2018). Thick padding, such as a saddle pad or numnah, placed along the dorsal midline and beneath the straps of the abdominal support section, can dramatically reduce skin ulceration caused by sustained shear pressure, which is unavoidable when maintaining a horse in sling long-term (**Figure 2**, previous page). Extra padding should also be applied to the coarse material of the sling's chest panel, rear panel and leg straps, to minimise skin abrasions in areas of thin or sensitive skin (**Figure 1,** page 35). Ensure the choice of material is soft and breathable to discourage excessive sweating, such as natural sheepskin or cotton-fleece blankets (Anders et al., 2010). Natural sheep-fleece girth covers are useful for covering the straps of the sling. Fleece-lined headcollars also help to minimise the occurrence of abrasions on the head when cross-tied. The patient's skin should always be kept clean and dry, in order to minimise skin maceration, which can, in turn, promote decubitus ulceration (Anders et al., 2010).

The rear panel and straps are at risk of becoming urine soaked, due to incontinence or an inability to posture correctly to urinate, particularly in mares. Prolonged urine contact with the skin alters the skin's pH, leading to contact dermatitis and, in turn, skin ulceration (Anders et al., 2010). Long-term urinary catheterisation of mares is not recommended, as it can lead to ascending urinary tract infections (Hollis, 2008). Silver sulphadiazine or zinc-based barrier creams, talcum powder and incontinence pads can be used to reduce contact of urine with the skin (**Figure 4**).

Figure 4. Shows positioning of incontinence pads, and positioning of food and water within easy reach.

All pads and blankets require frequent attention, repositioning and immediate change once wet (Falloon et al., 2018). The use of fans to improve ventilation can help reduce sweating induced by the sling and extra padding (**Figure 3**, previous page). Frequent application of talcum powder can absorb moisture from the skin.

Depending on the horse's comfort levels, the rear panel often takes more weight than the chest panel, particularly in laminitic patients, which frequently stand in a saw-horse position or sit into the sling in a dog-sitting position. Immobility is a leading cause of decubitus ulceration as the patient is unable to relieve pressure on painful areas (Anders et al., 2010). To avoid this problem, depending on the horse's temperament and clinical condition, it may be possible to remove the horse completely from the sling for a few hours during the day. Alternatively, it may be possible to remove the rear panel, under supervision, to allow the skin to aerate and dry. Daily grooming will help maintain skin hygiene and integrity, while providing positive mental stimulation for the patient (Ryan et al., 2020).

Nutrition

The horse in a sling should be maintained on a high plane of nutrition in order to avoid excessive weight loss (Floyd & Taylor, 2017). However, over time, disuse muscle atrophy will occur regardless of the patient's nutritional status, due to lack of exercise. Food and water should be offered hourly to the patient and positioned for ease of access (**Figure 4**), for example, at shoulder height if necessary (Floyd & Taylor, 2017).

Where indicated, a forage-based diet should be supplemented with a feedstuff low in non-structural carbohydrates, to minimise the onset or progression of laminitis. Further supplementation with an omega-3-rich oil will increase calorie intake (Harris, 2017).

Weight loss in recumbent or debilitated patients has been shown to greatly increase the risk of decubitus ulcer formation (Anders et al., 2010). Anorexic horses should be encouraged regularly to eat and drink as much as possible, using treats such as apples and carrots, or warming the food to a warm mash to improve palatability (Ryan et al., 2020). For horses that are unwilling to drink, the provision of a 'water buffet' of sweet-, electrolyte- and non-flavoured water, as well as placing chopped apples in the water, can help to encourage water intake (Dunkell, 2008; McKenzie, 2008). Food and water intake should be carefully measured and recorded on the patient's chart to facilitate monitoring.

Further nursing care

As with all intensive-care patients, it is important to carefully monitor and record the patient's clinical parameters and progress several times daily (Floyd & Taylor, 2017). Monitoring charts, such as the Colorado Pain Scale (Blossom et al., 2007), can be used to subjectively record the patient's demeanour and attitude while in the sling (Ryan et al., 2020).

Reduced locomotion results in decreased intestinal motility, which can result in impaction and colic (Floyd & Taylor 2017). Faeces and urine should be monitored for consistency and quantity (Ryan et al., 2020). Nasogastric fluid therapy may be required in patients that have inadequate fluid intake (Dunkell, 2008).

Other indicators that the horse is not tolerating the sling well include signs of respiratory distress such as increased repiratory rate, nostril flare and abdominal effort (Furr, 2008; Montgomery et al., 2019).

Casts, bandages and foot supports should be checked regularly and monitored closely for signs of damage, slippage, strike-through, swelling or foul smells. Lower limb oedema caused by reduced mobility can be minimised by the application of supportive stable bandages (Floyd & Taylor, 2017). Iodine tincture should be used to maintain hoof integrity and hygiene (Floyd & Taylor, 2017).

Positive mental stimulation for these patients, such as physical contact, grooming, good lighting, stable toys, food and salt licks, can improve their outcome and quality of life (Ryan et al., 2020). Application of fly spray is also beneficial to avoid fly annoyance to the patient (Ryan et al., 2020).

Conclusion

Nursing an equine patient in a sling can be both physically and emotionally demanding for the horse-owner, patient and caregivers alike. It requires highly intensive 24-hour care. The equine nurse plays a crucial role in the veterinary care of the equine patient in a sling.

Successful management of an equine patient in a sling depends largely on the animal's tolerance of the sling – both physically (in terms of the incidence of complications such as the development of pressure sores) and mentally (in terms of the patient's general behaviour and attitude towards the sling).

Several ethical considerations factor into decisions on maintaining an equine patient in a sling for a prolonged period of time – primarily the long-term prognosis and the primary underlying condition for which the horse is being treated. Attentive nursing care will have a significant positive impact on the outcome of these cases, and on the patient's quality of life.

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