How To Manipulate a Recumbent Horse (Entrapment, Clinical, or Technical Emergency Rescue Situations)

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1. Introduction

Recumbent horses are fractious, frustratingly difficult, and very dangerous to handle. Even dead horses represent a significant challenge to manipulate for staff safety due to their great weight and size.[1] Safe manipulation requires knowledge of anatomy and physiology to prevent injury when emplacing webbing or slings,[2] as well as proper personnel positioning (Table 1). The confined spaces that animals commonly are found (inside stalls, trailers, or entrapped in equipment or topography) require appropriate personal protective equipment such as helmets; and may require reaching, prying, and cutting tools (Fig. 1). Strategies and equipment to mitigate these situations in various recumbent positions (Table 2) are available but underutilized by responders; the effectiveness of proper response systems is further emphasized by appropriate procedures, equipment, training, and emergency drills.

Slides, drags, vertical lifts, and assists are basic to technical large animal emergency rescue—a specialty form of heavy rescue in the Fire and Rescue Services that is intimately tied to the veterinary practitioner's expertise and advice. Some poorer methods that well-intentioned "rescuers" have used in the past reflect our predatory human instincts to solve the problem—but have caused iatrogenic injury in the equine victim (traumatic amputations, lacerations, asphyxiation, corneal damage, myopathy, neurologic injury, etc.[3]). Ironically, horses do not instinctively understand how to help themselves, or have the capacity to understand that responders are there to help.

The use of the methods presented here represent viable options for the successful extrication and transport of horses[4] trapped during a disaster or emergency, or dead. Use of these equipment and procedures requires planning, coordination of resources, and personnel placement. For these reasons there is a need to coordinate the effort better to keep the victim, the practitioner, and their staff out of harm's way. Many animals, when manipulated out of the entrapment or enabled to roll to sternal, will rise and stand on their own; thus, facilitating self rescue is the best use of manipulations methods.

The purpose of this article is to suggest methods for response to horses that are recumbent due to being geriatric, debilitated, injured, or in daily

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Table 1. General Rules for Manipulation

1. Do not attach anything to the head, neck, or legs to pull on (only for guidance as in a halter). If you must use the legs (dorsally recumbent) then use webbing and padding to protect the delicate structures of the legs, but be very cautious of being inside the kill zone while attaching anything to legs or feet—Best Practice—approach from the dorsal side of the animal.
2. Use webbing with looped ends (instead of ropes) for any type of manipulation. The greater surface area and flat surface of the webbing will minimize injury to the skin and underlying structures. Or use padding to protect soft tissue structures.
3. Best Practice—use the pectoral and pelvic girdles as the attachment point for any manipulations. The muscle and bone structures here will protect the delicate soft structures (nerve, blood vessels, tendons, and ligaments) beneath.
4. Do not use the tail as an attachment point for any mechanical manipulations—only careful manual movement of the recumbent horse by no more than two people. It can be broken, injured, or traumatically amputated by application of excessive force.
5. Use a blindfold while horses are recumbent, to protect the downside eye and relax the animal. Ensure it is easily removable—blindfolds should be fastened so that it will fall off if the person handling the animal loses control of the animal. Panicked horses that get up and run loose with the blindfold still on will run in a straight line in fear until hitting a solid object or falls. The danger to people and the horse is palpable.
6. Whenever possible—allow the animal to self rescue—leave the legs free and the head and neck should have free movement so that the animal can balance and use their legs to assist themselves to get up and move out of the entrapment. A halter and lead rope are not intended for pulling the animal out—they are for guidance only.
7. Sedation and/or anaesthesia should be carefully evaluated by the practitioner based on the animal's medical status, time in situ, and potential for injury to a person or itself. Helmets should be worn when working with recumbent animals, especially by the animal handler.
8. Protection of the downside eye is assumed in all of the methods described herein—horses use their head and neck as a lever to rise and when struggling may cause serious injury to an unprotected eye.
9. Always treat even dead animals with respectful and professional methods—you never know who is watching or taking a video. Social media is ever present.

Fig. 1. Preparing a recumbent horse in a confined space of a stall for transportation on a Rescue Glide to definitive veterinary care. Attendants are approaching from the dorsal side of the animal, which is sedated, blindfolded, and hobbled for physical and chemical restraint. Photo by Washington State Animal Response Team with permission.

clinical situations or as part of a technical rescue response scenario, while presenting simple techniques for manipulation of recumbent horses, and will place emphasis on the use of simple tools, webbing, equipment, and proper positioning of personnel to achieve safer and more effective results when moving recumbent (live or dead) horses in various situations commonly encountered in the practitioners' daily work.

2. Materials and Methods

- Two pieces of 5-m (should this be 10-m?)-long, 10-cm-wide webbing or 2.5-cm-thick cotton rope (draft horses).
- Two pieces of 10-m-long, 10-cm-wide webbing or 2.5-cm-thick cotton rope (ponies and standard size horses).
- Cane or Boat Hook or Painters Pole for extension of the arm and guidance of webbing.
- Two pieces of 2-m-long, 10-cm-wide webbing with looped ends; one chest strap 1 m long; two prussick hitches 20 cm long, and overhead spreader bar for attachment to tractor/backhoe or chain hoist—or Hast Becker Sling System.

Rolling a Cast Horse

Horses commonly get "cast" in various positions in stalls (up against the wall), in depressions or ditches (in pastures and paddocks), and trapped where they cannot right themselves (fences or other obstacles) (Fig. 2). Since this often occurs to a horse that is not otherwise injured or sick, the animal is "fully charged" and capable of injuring a person easily. Geriatric or debilitated animals may need medical

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Table 2. Recumbency Definitions

Anterior: Occurs most often in animals involved in transportation incidents where the trailer goes nose down into a ditch, waterway, hole, or embankment and horses are not able to rise, where their heads are well below the rest of their bodies. Often the neck will be found at strange angles which impacts breathing, and the sheer weight of the abdominal contents pushes down on the lungs. A very rarely survivable scenario unless attended efficiently.
Posterior: Common in animals that fall into holes, ditches, or other obstacles where the rump is well below the rest of their body.
Dorsal: Befalls horses that fall or are thrust into a tight space and end up on their backs with their hooves pointed upward—this might be a water tank, feed bunk, ditch, horse trailer wreck, hole, or creek.
Lateral: Most common position for a "downed" animal due to various scenarios from geriatric inability to get up, to injured, to debilitated to technical rescue scenarios. The sheer weight of the animal contributes over time to compartment/crush syndromes, myopathies, neuropathies and requires that the animal be attended quickly—within 4 hours of being down for the best opportunity at recovery.
Sternal: The animal is laying on its ventral surface with legs either trapped in a downward position or folded and resting upon them. This is a preferred position for completing technical rescue scenarios at hand off to the veterinarian, and is considered the "recovery position" for downed equines.

attention immediately. There are conditions where the attending practitioner may not wish to roll the animal out of this position for medical reasons—in those cases one of the variations of the Forward Assist, Sideways Slide, or Backwards Drag should be selected.

There are three efficient configurations of correcting this cast entrapment position—SIMPLE ONE LEG, SIMPLE TWO LEG, and WEB ASSIST ROLL. In each case, pieces of 5-m-long, 10-cm-wide webbing or 2.5-cm-thick cotton rope may be used to roll the animal over the dorsum (use the longer webbing: 10 m for draft horses).

This procedure assumes that if the animals' leg(s) or head are entrapped that they are going to be corrected first, before attempting to solve the cast condition. It also assumes that before the animal is rolled in a confined space (trailer, stall, ditch) that people performing the procedure have a pre-defined escape route—as the animal comes over, it will often frantically attempt to stand. Affixing a halter with leadrope on the animal before rolling it and assigning one person as the animal handler will ensure better control of the horse when it gets up.

SIMPLE ONE LEG (Fig. 3)—This method allows F3
a limited number of people to be successful at rolling the horse out of the cast position, or can be used in confined spaces where there is minimal room for an escape route by people. Because the pelvis of the horse is fixed, attaching rope or webbing to the downside hind leg at the pastern, then rolling the animal over the dorsum at a 45° angle from over the shoulder will ensure that the rest of the horse easily rolls when pulled. The rope or webbing should be placed on the pastern from a safer position at the dorsum—using a cane or long

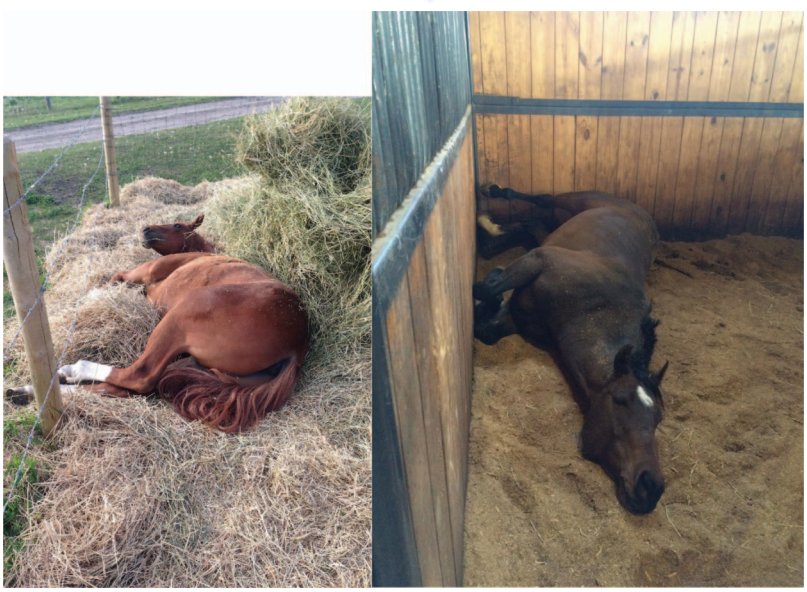

Fig. 2. Examples of cast horses: Left, Horse cast in the corner of a pasture with legs under a barbed wire fence and with a hay bale behind. Right, horse cast in stall. Left photo by Laura Stack, Right photo by Mattie Marohl with permission.

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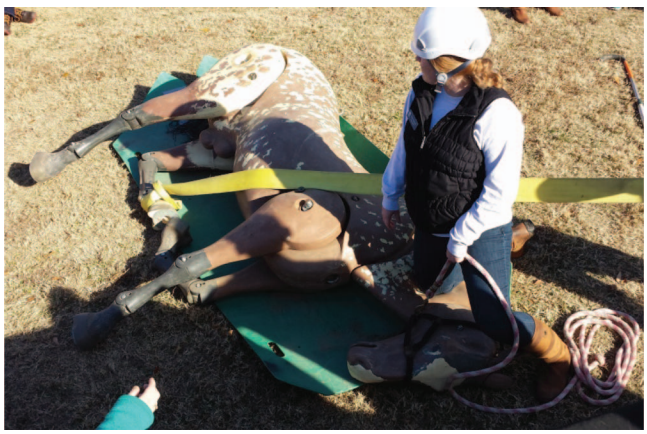

Fig. 3. Preparing for a Cast Horse Roll using a simple one webbing looped around the pastern of a mannequin for demonstration. The animal handler helps maintain the animal down until prepared to roll the horse, the webbing is placed at a 45° angle over the shoulder in preparation for pulling. Photo by permission.

pole to position it—which limits the chance of injury to the rescuer.

F4 SIMPLE TWO LEG (Fig 4)—When more people are available to assist with rolling the animal, or where the rescuers have more room for an escape route, this method is useful. Attaching rope or webbing to the downside legs (front and rear) from a safe position at the dorsum—using a cane or long boat hook or painters pole to position it around the pasterns, then pulling both pieces of the webbing away from the animal toward the dorsal aspect so that it rolls over the dorsum will easily free the animal. (If there are sufficient personnel to assist, three or four legs may be used.) This is similar to the

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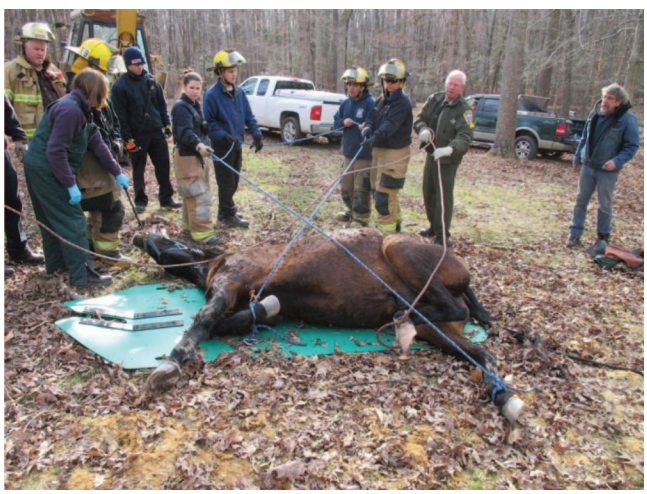

Fig. 4. Cast Horse Roll with two ropes attached to the downside legs in a crossed variation to give control. The 3rd leg is also bearing a rope since there are so many people available to assist with rolling the horse off of the L.A.R.G.E. Rescue Glide. Photo by Little Fork Fire Rescue with permission.

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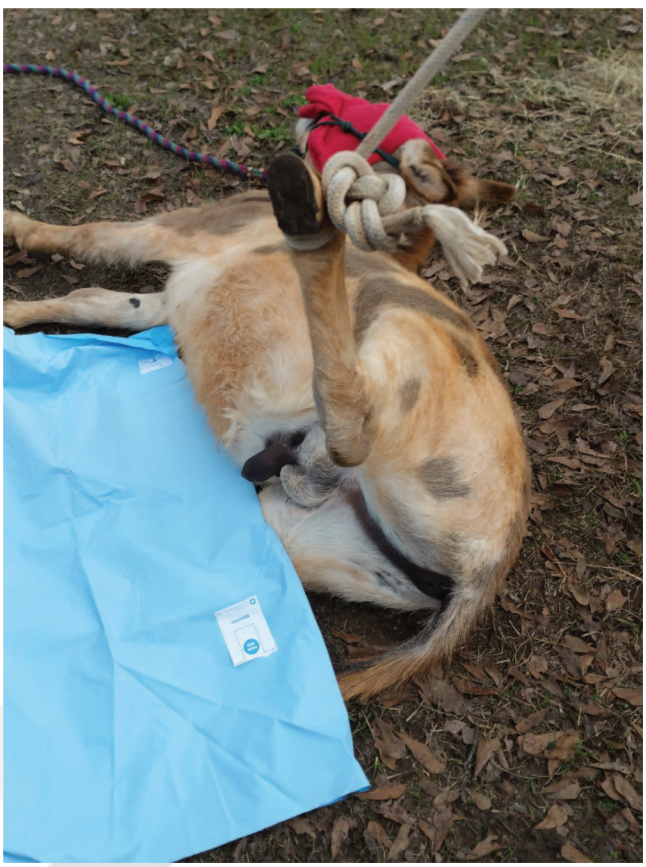

Fig. 5. A 1-in. cotton rope is used for tying off the hind leg for castration or other field surgical procedures and can be used in a girth hitch around the upper hind leg. A similar use can be applied to rolling a cast equine by attaching the rope to the downside rear leg. Photo by Dr Jennifer Proctor with permission.

girth hitch used by many practitioners to tie off a hind leg and prevent kicking during field surgical procedures (Fig. 5). F5

WEB ASSIST ROLL—This method may be useful in entrapment situations (especially slick mud) where it is easier to manipulate webbing under the downside legs, then pull the legs up and over to roll the entire animal onto better footing where it can stand. Use one piece of 10-m webbing under all four legs slightly above the hocks and carpus, and against the ground surface. Then the front portion of the strap is fed over the neck, while the back portion is fed over the buttocks of the horse. Working together, at least two persons pull from the dorsal area in a straight line and pull the animal over on its body axis.

FORWARD ASSIST—allows the legs to be free so that the horse can use their muscular effort to move forward, usually to solid ground. There are THREE configurations of this method: SIMPLE/BASIC, CINCH/LARKSFOOT, and WIDENER/SWISS SEAT. In each case, the webbing that runs in front of the animal should be kept out of the way of the animal's

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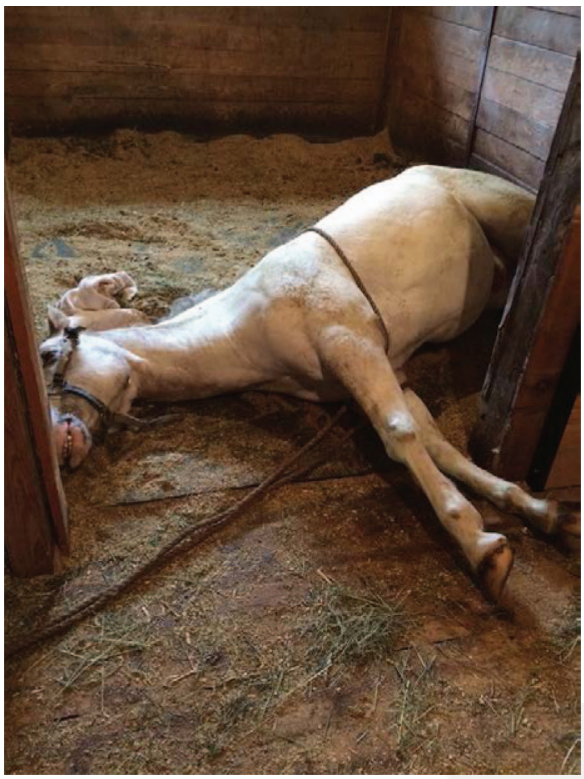

Fig. 6. Using a 10-m rope to remove a dead horse from a stall using a Forward Assist in the Simple configuration from a stall. The legs will be manipulated by use of tools or for a dead animal may be tied up to the body with rope or hay string to package the animal into a smaller size. Photo by Michelle Melaragno with permission.

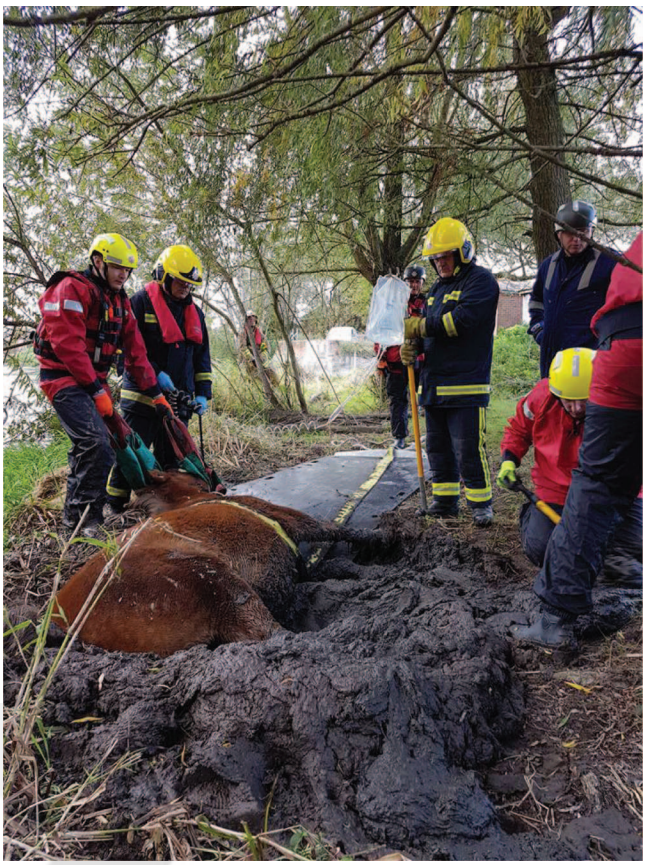

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Fig. 7. Simple configuration of the Forward Assist applied to a horse stuck in the mud, pulling it forward onto a Rescue Glide and demonstrating that it increases the surface area on the pectoral girdle of the animal. Photo by Hampshire Fire Rescue with permission.

hooves to minimize entanglement during the extrication. The permission assumes that rescuers have assigned an animal handler, who has attached an emergency rope halter or typical halter to the animal for guidance and control. It is crucial that no one pulls on the animals' head during the rescue, or else the animal will fight the assistance effort using opposition reflex. Once the animal begins to move forward it will often use its muscular power to move forward so egress routes should be cleared before asking the animal to move forward.

F6 SIMPLE/BASIC FORWARD ASSIST (Fig. 6)—This configuration of the forward assist is the simplest to attach and remove, and the easiest to learn to use; however, it is also most subject to slipping and is not appropriate for vertical lift from posterior recumbency (out of manholes, etc., where only the forequarters and head are within reach.) A 10-m piece of webbing is laid over the animal's withers at the halfway point, then each end of the webbing is wrapped under the chest at the sternum and pulled anteriorly between the legs, then attached with a carabiner to a long rope for manual pulling.

CINCH/LARKSFOOT FORWARD ASSIST—This configuration of the forward assist literally cinches down around the animal's chest, minimizing the chance of slippage. It is commonly used to tie an animal off in its current position (on top of a bridge or trestle for example) so that it cannot fall further into trouble. It is also recommended for vertical lifts from posterior recumbency (when a simple vertical lift with simple web slings is not possible, or when the equipment is not available.) One 10-m piece of webbing with loops at each end is wrapped around the animals' chest at the withers, then one end of the webbing is fed through the loop at the other end, fed anteriorly between the front legs, then attached with a carabiner to a long rope for manual pulling (Fig. 7). F7

For horses trapped in posterior recumbency (wells, manholes, etc.) the loop of webbing coming from between the front legs may be attached to an overhead lifting point to perform a vertical lift. We are aware of five occasions of live rescues using this method that were very effective. However, we prefer that the rescuer should use the Widener/Swiss Seat method described below because it doubles the surface area and ensures the horse's pectoral girdle is locked in and cannot fall out.

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Note: A variation of this method has been used to lift cattle, elk, moose, and other bovids by using the 10-m piece of webbing with loops at each end, wrapped around the animal's chest at the withers and one end of the webbing fed through the loop at the top of the withers, then attached with a carabiner to an overhead crane for a vertical lift. The authors are not aware of any successful live rescues of horses using this method, but it represents a consideration in situations where there may not be any other option as an attachment point.

WIDENER/SWISS SEAT FORWARD ASSIST—This configuration of the forward assist cinches around the animal's entire forequarters and pectoral girdle, effectively doubling the surface area of the webbing on the animal's skin, therefore reducing the chance of injury from pressure used to pull the animal out of its entrapment. It also cinches down onto the chest, minimizing slippage. Highly recommended for posterior recumbency vertical lifts, this configuration is slightly more difficult to envelope around the animal, and does take more time to remove. However, it does not come off the animal if properly emplaced (Fig. 8). F8

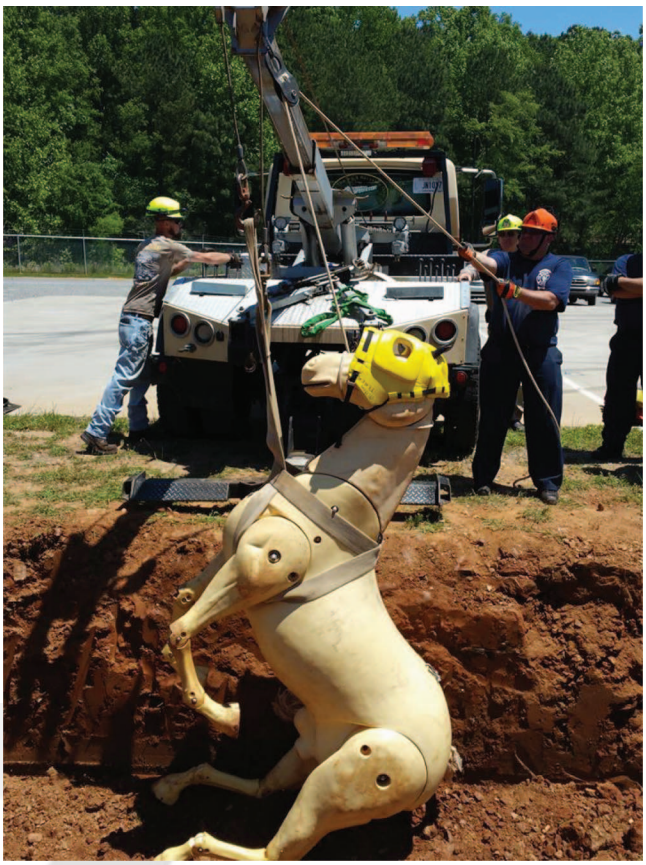

Fig. 8. Horse in simulated posterior recumbency for training.—webbing has been placed in the Widener/Swiss Seat configuration around the chest and pectoral girdle to double the surface area and provide better support to the vertical lift. Note: the head MUST BE SUPPORTED with an overhead attachment point or it will fall to the side and injure the animal. Photo by Battalion Chief Darrell Mitchell with permission.

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One 10-m piece of webbing is held at the animal's chest below the thoracic inlet at the halfway point, then each end of the webbing is wrapped over the withers, around each side of the animal, down then under the chest at the sternum, then pulled anteriorly between the front legs; lastly, it is fed up through the existing webbing at the thoracic inlet; then both looped ends attached with a carabiner to a long rope for manual pulling.

SIDEWAYS SLIDE—this drag method is useful for minimizing the animal's instinct to struggle by adding pressure to the chest and abdomen while moving the animal up or to the side (trench, surface ice, ditch, flat ground, mud, etc.). There are two configurations of this method: SIMPLE/BASIC and HAMPSHIRE SLIP. Both require two pieces of 5-m-long, 10-cm-wide webbing (10 m length for draft horses). In both cases it is preferred that the head be controlled by the animal handler to reduce possible injury to the eye or facial paralysis. The weight of the animals' body is used to the advantage of the rescuers to keep it recumbent, and increases the surface area of the animal on the unstable ground surface (mud, etc.) while being moved to safe ground.

SIMPLE/BASIC (Fig. 9)—This configuration can be used to pull the animal sideways along the ground or on the surface of mud, or upward in a modified vertical lift from surface ice, ditch/trench or pool; or to roll and maneuver the animal into ~~a~~ different positions on the ground (example: for placement onto a Rescue Glide). Two pieces of 3-m webbing are separately flossed under the animal into position (front position) around the abdomen directly behind the front legs, and (back position) around the abdomen directly in front of the back legs. F9

HAMPSHIRE SLIP (Fig. 10)—This configuration can be used to pull the animal sideways without causing it to roll or struggle out of position. This method has been used in serious mud entrapment scenarios to move a floundering horse over 200 m to safe solid ground. Two pieces of 3-m webbing are separately flossed under the animal into position (front position) around the abdomen directly behind the front legs, then the top portion of the strap is fed between the front legs, under the neck of the animal, and then back to the rescuers at the dorsal aspect of the animal; and (back position) around the abdomen directly in front of the back legs then fed between the back legs, under the tail, and back to the rescuers at the dorsal aspect of the animal. F10

BACKWARD DRAG (Fig. 11)—for removing an animal that is recumbent in a trailer or other entrapment where the only access is to the rear end/posterior of the animal (horse trailer, culvert, etc.) There is only one configuration of this method—a 10-m piece of webbing is encircled around the animal's pelvis with the center of the webbing at the dorsum above the spine at the loin. The pieces of webbing with loops on the end are fed toward the F11

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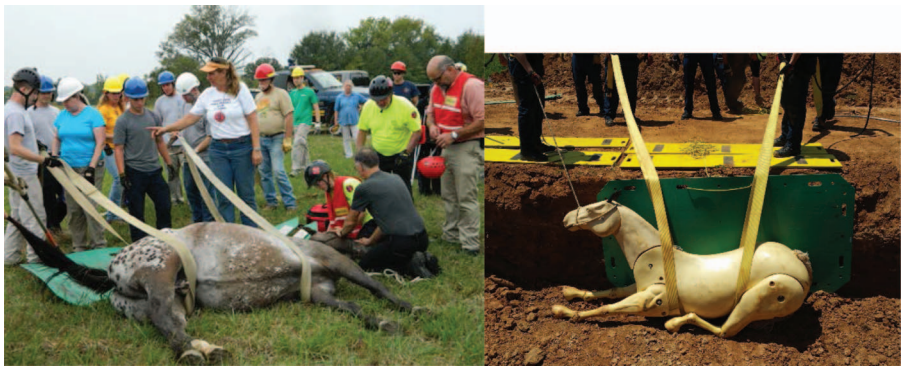

Fig. 9. The sideways slide or drag is used to move animals on flat ground onto a sked. Here the sedated live animal is being pulled onto the L.A.R.G.E. Rescue Glide sked for attachment and packaging. Right, the mannequin is doing to be pulled out of the ditch with a sideways drag using the green Rescue Glide for edge protection. Photos by permission.

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abdomen, then are pushed between the back legs to a carabiner, which can be attached to a manual pulling system. This can often be easily effected by the use of extension poles or canes to move the legs without harming a rescuer. It is preferred that the head be controlled by the animal handler to reduce possible injury to the eye or facial paralysis.

VERTICAL LIFT is the last option because it usually involves heavy equipment and greater coordination and expense. When considering situations that require this method, ensure there is an alternate plan if the animal cannot stand on its own after lifting (Anderson Sling[a] for long-term support, recumbent transport, or euthanasia).

Sedation is almost always required, and close coordination between the operator of the equipment and the animal handler. Vertical lifting has been well covered in the veterinary literature for a large variety of simple to complicated slinging equipment[a,b,c] and methods[5,6] of horses but one that is most commonly used by emergency responders and veterinarians in technical rescue scenarios is the Simple Vertical Lift Web Sling (Figs. 12 and 13; a commercial version available is the Becker Sling[d]). Use of 2-m webbing directly behind the front legs supported with a chest strap across at the thoracic inlet to keep it in place, and another 2 m directly in front of the hind legs ensures the animal cannot escape. These webbings are connected to the spreader bar overhead with the prussick attachments, then the spreader bar is connected to the tractor/backhoe or chain hoist for lifting.

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Benefits of Simple Vertical Lift Web Slings include equipment that is simple to employ, cheap to acquire, and the practical use of the Simple Vertical Lift systems has been shown in numerous situations. The technique makes the animal feel trapped and usually causes the horse to sulk or hang quietly during the lifting procedure due to the physical sedative effect, minimizing risk to itself and others.

A concern with implementing the Vertical Lift Sling is that personnel must be trained in its use to maximize safety when working around a trapped or recumbent frightened animal to prevent being kicked or crushed. Initial sedation or light anesthesia of the animal is essential to allow the animal to be placed in the sling and to prevent it from struggling and injuring itself or the rescuers.

Lastly, vertical lift systems visually appear to place significant pressure on the abdominal area of the animal; however, abdominal, thoracic, and pulmonary perfusions have not been observed to be significantly impaired in rescued animals lifted in this manner for 2–12 min (>20-min lifts in training scenarios with demonstration animals over 200 training evolutions). Pregnant mares have been successfully lifted using this technique. Contact pressure is minimized when using wider straps for the lift because they increase the surface area of the contact points on the animal. When used in con-

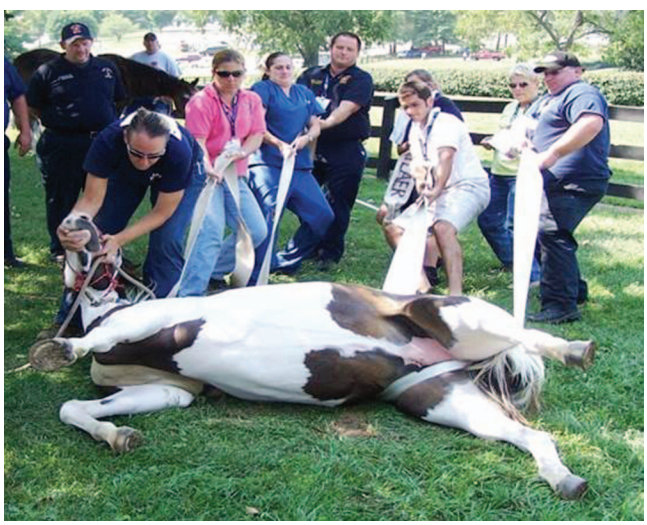

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Fig. 10. The Hampshire Slip is used to move an animal sideways without any chance of rolling. Additionally when the animal stands up it allows the webbing to fall away freely. Webbing is placed under the pectoral and pelvic girdles, and through the legs. Working together, the two teams can pull and rotate the animal around obstacles. Photo by Tori Miller with permission.

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Fig. 11. The backward drag is placed carefully around the loin of the pelvic girdle and between the legs to remove a horse backward from a trailer or tight spot. It may be flossed under the animal easily by lifting the back leg with a cane or boat hook. Right, it is easy to see that the webbing goes around the hip and through the back legs. Photos courtesy of Dr Keith Stafford.

junction with appropriate lifting equipment Simple Vertical Lift Slings can provide a suitable means of short-term vertical lift of large animals.

RESCUE GLIDE SYSTEMS—Horses are notoriously difficult to move or transport when sternally or laterally recumbent. Their tendency ~~is~~ to thrash in an attempt to stand can lead to further injury. There is little information in the literature providing viable solutions to this problem. Attempts by early practitioners to use low-wheeled tables, tarps, or simple plywood for this purpose were impractical or unprofessional in the field, at shows, in the clinic, and on racetracks.[7]

The L.A.R.G.E. Rescue Glide[e], Resquip Glide Mat System[f], CDA Products Rescue Glide[g], and LARRCO Rescue Glide[h] all provide practical means of moving a recumbent, nonambulatory horse. They are skeds that have been modified from the human version by increasing the length to 2 m or 2.5 m and by using a recycled polypropylene polymer plastic that does not crack or break under heavy use. Horses with serious injuries, displaying severe debilitation, or neurological symptoms can be easily relocated from a stall, removed from public view at an event/race/show, or even drawn along a wilderness trail to a horse

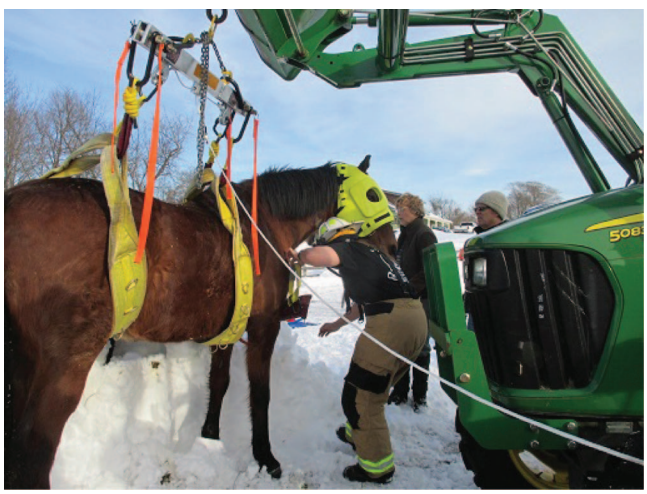

Fig. 12. Using a Becker Sling to lift a horse from a snow bank in January 2016. Here the fireman is first removing the chest strap in preparation for removal of the sling system from the overhead by pulling the orange webbing. The horse is wearing a head protector as well. Photo by Little Fork Fire Rescue, Virginia, with permission.

Fig. 13. Here students practice a vertical lift using the Becker Simple Web Sling and a crane. The mannequin is simulated to be sedated for this procedure to minimize struggling and possible injury to itself and handlers. The most dangerous times are at lift off and set down of the animal—when a live animal can get leverage and launch itself forward. Photo by permission.

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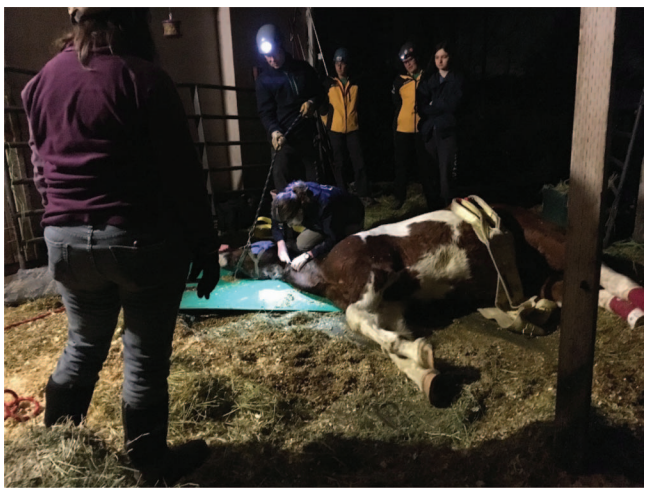

AQ: 6 Fig. 14. Down horse in a barn being sedated by a veterinarian before attachment to the Rescue Glide for transport to veterinary care in an equine ambulance. Working as a team to keep people in safe positions is the goal of large-animal rescue. Photo courtesy Washington State Animal Response Team with permission.

ambulance for transport to definitive veterinary care (Fig. 14). These skeds have specialty access points, rachet or webbing tie-down anchor straps, and metal attachment points for loading into an equine ambulance. A horse must usually be sedated during transport on these skeds to prevent further injury to itself or personnel. Use of Rescue Glide systems in both medical emergencies and technical rescues of trapped animals has been extremely successful for transport of horses with severe tendon lacerations, neurologic injuries or diseases, broken pelvises and extremities, or shock, to veterinary facilities.

F14

3. Results

Collecting the actual number of recumbence events is impossible because it is such a common part of clinical practice, and prevents documentation of the success rate of using these methods. A literature search revealed a small pool of information about methods of moving horses that are recumbent, and an inconsequential amount of research into physiologic responses to these methods. Collection of anecdotal information on recumbent horses by the permission has revealed that numerous incidents occur; however, the reporting subject often does not have access to or receive the details that are most important to disaster scientists, technical rescue researchers, or veterinary epidemiologists. Manipulation methods training is not currently a part of the student curriculum of veterinary schools or veterinary technician programs, but could be extremely helpful to reduce injuries to employees and students assisting with horses in these situations, particularly to reduce work-related exposure to injuries. (These techniques work equally well on bovine, caprine, porcine, llamoid, and large exotics with minor modifications for behavior and anatomy.)

Much knowledge of how horses may be manipulated, and suggestions for better response procedures, come from a combination of knowledgeable veterinarians, horsewomen/men, actual accounts and photos/videos, and reports from professional emergency responders (fire/rescue, mounted police, animal control and sheriff's officers) that have responded to these incidents. For example, when pressure is applied on the chest and abdomen of a horse, it causes a physiological response that minimizes effort to struggle, resulting in a lessened ability of the animal to get up, especially if the head is managed well by the animal handler. This physical sedative effect has been utilized by farriers, veterinarians, and horsemen throughout history to cause horses to become quiescent for various procedures.

During the last 25 years much of the research and development of these procedures and methods has been documented by colleagues in large-animal and technical emergency rescue, not within the veterinary community. The authors' experiences providing student training in Technical Large Animal Emergency Rescue with practitioners, veterinary technicians, fire/rescue professionals, animal control, and law enforcement officers have demonstrated that many people are assumed to know—but actually do not know—how to help a recumbent horse in an emergency situation without putting themselves or the animal at risk. Fallacies related to recumbent animal response and poor understanding of correct methodologies in the general equine industry have grown out of the lack of scientific rigor available.

4. Discussion

Recumbent horses are very dangerous to manipulate. Injuries sustained by practitioners, their staff and clients (well-intentioned rescuers) on scene can have debilitating long-term effects on health, safety, and wellness of people. Slides, drags, vertical lifts, and assists are basic to technical large-animal emergency rescue—a specialty form of heavy rescue in the Fire and Rescue Services that is intimately tied to the veterinary practitioner's expertise and advice. Past use of methods such as pulling on the head, tail, or feet without relieving pressure points reflect our predatory human instincts to solve the problem—but have caused iatrogenic injury in the equine victim (traumatic amputations, lacerations, asphyxiation, corneal damage, myopathy, neurologic injury, etc.). When emplacing webbing or slings, extensions of the arm should be used, and before pulling proper personnel positioning should be considered to get the correct angle to effect rescue.

Many animals, when manipulated out of the entrapment or enabled to roll to sternal will rise and stand on their own; thus, facilitating self rescue is the best use of manipulations methods (Fig. 15). F15/AQ:3 It prevents the practitioner from having to use more complicated slings or methods to effect extrication or rescue. Horses in emergency or clinical recumbence scenarios may have special medical concerns

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Fig. 15. A horse cast in a ditch is assisted to self rescue by a trained team of fire department personnel by use of a piece of looped end webbing to assist this geriatric horse to rise more easily. In the left photo, the horse is pulled slightly out of the ditch, in the right photo they provide support to get her to sternal position and rise. Photos courtesy Katherine Davis with permission.

such as severe injuries, stress, hyper- or hypothermia, dehydration, shock, and exhaustion. Coordination between the veterinarian and the response team is important to increase the efficiency of treatment on scene, facilitate the extrication and allow veterinary medical attention to be administered. The increased chance of shock when combining sedation with rescues is because the veterinarian may not be notified or physically able to arrive to treat the animal until several hours after the incident occurred.

Some animals in recumbency will need to be aggressively treated or euthanized based on the extent of their internal or external injuries—this is where the crucial involvement and advice of the attending veterinarian is mandatory. The use of sedation should be carefully evaluated when recumbence scenarios occur in wet or muddy environments, because the sedated horse could drown or cause physiologic thermal maintenance issues.

Large animals when recumbent represent a challenge to extricate from the numerous and common entrapments that they occur in. However, procedures used to safely and simply remove the animal from the situation emphasize use the simpler use of webbing, extension/reach tools for emplacement of webbing or slings, helmet for the handler and operational personnel, a halter for guidance and control by the animal handler, and coordination of personnel to pull or manipulate the animal. By successfully manipulating the body of the horse the responders can encourage the animal to self rescue where possible, and minimize iatrogenic injury to the animal victim. The suggested methods provide a more professional, safe, and efficient response to horses that are recumbent due to being geriatric, debilitated, injured, or in daily clinical situations or as part of a technical rescue response scenario. With emphasis on the use of simple tools, appropriate protective equipment for personnel (i.e., helmets), looped-end webbing, equipment, and proper positioning of personnel, the practitioner and their staff can achieve safer and more effective results when moving recumbent (live or dead) horses in various situations commonly encountered in the practitioner's daily work.

Acknowledgments

Declaration of Ethics

The Authors declare that they have adhered to the Principles of Veterinary Medical Ethics of the AVMA.

Conflict of Interest

The Authors declare no conflicts of interest. AQ: 4

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[a]Anderson Sling, CDA Products, Porter Valley, CA 95469.
[b]Large Animal Lift, CDA Products, Porter Valley, CA 95469.
[c]Liftex Sling, Liftex, Inc., 443 Ivyland Road, Warminster, PA 18974.
[d]Becker Vertical Lift Sling System, Hast, Inc., Floyd, VA 24091.
[e]L.A.R.G.E. Rescue Glide (modified), Ben McCracken, B & M Plastics, Greenville, SC 29607.
[f]Glide Mat System, Resquip, Ltd., Leighton, Welshpool, Powys SY21 8HH, United Kingdom.
[g]Rescue Glide, CDA Products, Porter Valley, CA 95469.
[h]LARRCO Products, Large Animal Rescue Resource Corp., 926 N. Liberty St., Winston-Salem NC 27101.

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