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# EQUINE PALPATION COLIC SIMULATOR

## Care, Handling, and Maintenance

### Horse Body

The primary base of the VSI Equine Simulator is a Quarter Horse model, constructed of epoxy resin and fiberglass, with dorsal access panel, a soft, flexible perineum panel, replica pelvic structure, soft natural tail, a soft ventral abdominocentesis plug and a representation of the aorta, spleen and kidney. The equine reproductive tract assembly and equine neck venipuncture components are dealt with in separate documents. This equine model has been entirely hand crafted which may result in minor inconsistencies between models form, fit, and finish. The material used to create the horse is fiberglass infused with an epoxy resin. This resin has been chosen for its durability and environmentally friendly characteristics, providing safety during its use and curing process. Although UV resistant, it is sensitive to high temperatures, and not intended to be exposed for long periods under hot sunlight where it may suffer deformation, most evident with the fit of the body hatch. Your model is intended for indoor use. Should your model deform under unusually high temperature conditions, the material can be brought back to its original shape. Achieving this is best handled through a direct communication with a VSI technician. Built-in guides and registers are meant to help in fitting the body hatch, but care should always be taken with its removal and replacement. The horse model is relatively durable and light-weight, is built to accept biological material, and is best cleaned with mild detergent and water with a low-pressure washer, and never with harsh solvents or abrasive tools.

### Perineum Panel

The soft perineum panel has an anal and vulvar opening for palpation as well as a vinyl rectal sleeve. Should these items tear or break down with use, they are repairable, replace-able items. Tears are best dealt with as soon as they are detected. The silicone adhesive provided can be used to repair the outer, soft silicone perineum panel (and/or uterus, in the VSI equine reproductive tract unit). Clean the damaged area thoroughly with isopropyl alcohol, apply the adhesive, and avoid use for at least 12 hours. A good repair can be as strong as the original cast material. The vinyl rectal sleeve may be repaired with the vinyl repair kit. These flexible panels are attached to a rigid perimeter frame which fits inside the horse, locked in place with plastic turn-locks. To remove the frame with the panel, first remove the pelvis. The pelvis is positioned by mounts at the hook-bones and through the pelvic floor with a single machine screw. Remove the screw and lift the hook-bones from their mounts and the pelvis will be released.

### Horse Tail

The tail of the horse consists of synthetic hair blended over a central cable core. The tail is attached to the horse body via a threaded rod, and may be removed by carefully, firmly gripping the internal steel core at the tail base, and turning counter-clockwise to unscrew the entire tail. If the tail becomes loosened during use, or needs to be reattached, it should be turned (clockwise) back into its mount until moderately tight and properly oriented. Do not over-tighten. Although the tail may aid instruction and may be wrapped or bound, it is primarily for appearance, rather than intended to perform as an actual horse tail.

### Belly Tap Function

The abdominocentesis/belly-tap plug is designed to be injected and aspirated with needles and tapped with a cannula. The flexible reservoir is intended to contain fluid for a tapping exercise. The entire plug is easily replaced/removed by loosening and removing the wing-nuts which fasten the clamping panel that secures the belly-plug in its opening. The plug can be completely removed from the opening and the clamping ring removed from the belly-plug. The soft plug is intended to be a replaceable item as it will endure a high, however limited, number of cuts and taps. To insert the plug in the dedicated opening, be sure it is oriented properly according to the keyed edge. Lubricating the contact surfaces with a small amount of petroleum jelly will help the plug seat properly and more easily.

### General

No parts should ever be cleaned with harsh solvents or abrasive tools. The horse model is painted with acrylic latex paints and coatings, and can be touched-up if chipping or other damage occurs through use. Many components can be easily replaced if they become damaged or faulty.

### Equine Uterus

The VSI equine uterus is attached to a dedicated perineum panel that fits into the VSI horse model. The uterus is suspended via magnets which are attached to the broad ligament. The magnets attach to small steel plates embedded in the body wall of the horse. These magnets may be repositioned within the area of the broad ligament, if the factory set positions are undesirable for an accurate biological representation. The magnets may be carefully removed from their supporting cups. Locate the access slot in the magnet's companion cup and with a small tool, carefully pry the magnet away from the cup, taking care to not damage the fabric of the broad ligament. Reposition the magnet in a desired location.

### Equine Ovaries

The multi-stage ovaries represented include a set of anestrus ovaries, normal clear ovaries, and a set of ovaries with follicles. These ovaries are interchangeable by carefully removing them from the uterus. The ovaries can be removed from uterus by simply pulling on the tubes that are attached to the ovaries until it releases from the end of the uterine horn. Always pull on the tube, not the ovary. A ligament is also attached to the ovaries and is trapped between the uterine broad ligament magnet and body wall. To release this ligament, gently pull the magnet to release it from the body wall, thereby releasing the ovary. To install the ovaries, simply push the tube into the ends of the uterine horn until approximately 1" or 2.5cm of tube is left exposed between end of uterine horn and ovary. Then reposition the ovary's ligament between the broad ligament magnet and body wall mounting plate in the desired position. The uterus incorporates a cervix and urethral orifice which is intended for palpation and illustrative purposes.

All of the simulated uterine parts are fabricated in soft materials which should be handled delicately to avoid damage. They can be cleaned with mild detergent and water and can be repaired should they become damaged. The equine uterus should be stored either installed in the simulator. Avoid folding the uterus during storage as this can create permanent creases.

### Removing the Equine Perineum Panel Assembly

The Perineum Panel Assembly consists of the equine uterus, the perineum panel featuring anal and vulvar openings, and the rigid plastic flange holds them in place. First, detach the uterine broad ligament by releasing the magnets from their mounts on the body walls. Now the perineum panel can be released by turning the twist-locks to a free position and by carefully pulling and flexing the rigid perineum flange until it is free. The soft panel can now be separated from the rigid flange by removing the plastic fasteners attaching the soft panel to the flange. The VSI equine reproductive tract panels each have dedicated rigid installment flanges to which they are attached, meaning they can be exchanged inside the horse model. Water-based lubricant should always be used when performing a palpation exercise via the perineum panel, *and the operator should be suitably gloved as if performing tasks on a live animal.*

### GI Tract

The VSI equine GI tract large intestine model consists of 5 components; left and right ventral colon, left and right dorsal colon, and cecum, assembled to form the complete large intestine with representative membranes. Each component is separately partitioned to allow inflation of individual sections.

This unit is fabricated in natural latex rubber, which is relatively durable, but must still be handled with care. Keep the model away from sharp or abrasive objects and surfaces. **Do not over-inflate.** Over-inflation may cause ruptures, damage, and deformities. Use only the hand-pump provided to inflate to a pillow-like firmness.

Avoid rough handling and stressful manipulation of the model; treat it as if it were a real equine colon.

VSI GI tract simulators also include a short piece of small intestine model. This should also be carefully inflated, and is intended to represent a condition of inflated intestine blocking the palpation area directly anterior to the pelvic opening. The small intestine model is held in place in the VSI horse model by being looped and stuffed into the oval opening of the black plastic mount. The mount is laid into the contoured area anterior-ventral to the pelvic bones.

### Please note:

Latex rubbers are sensitive to **ultra-violet light**, therefore the model should always be kept out of direct sunlight. **Petroleum products** such as Vaseline will also break down latex; when handling the model ensure your hands are free of such products.

Clean the model with mild soap and water. Never use harsh chemicals or solvents on the latex surface. Store partially inflated, sprinkled with talcum powder.

Should the model become torn, it can be quickly repaired with the provided latex repair kit. Rubber cement, contact cement, or latex may also be used.

### Spleen and Kidney

The GI tract representation also includes a spleen, left kidney and the reno-splenic ligament as palpation landmarks and to help demonstrate specific colic conditions. These components can be attached and adjusted into their proper anatomical positions via magnets embedded in each of the organs and the body wall of the horse. They can be cleaned with mild soap and warm water.

*Please contact Veterinary Simulator Industries Ltd. for specific repair instructions or any concerns or inquiries.*

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# EQUINE NECK VENIPUNCTURE IM INJECTION MODEL

## Care, Operation, and Maintenance

### The Neck

The core neck structure of this model is constructed of a flexible urethane foam supported by an internal steel armature. An exposed bracket on the cranial plane acts as the receiver for the male bracket of the horse head. An exposed male fitting on the transverse plane allows the model to be fit to the adjustable stand or onto the equine body. Square tubing on the neck model slides into corresponding larger square tubing (from the top down) on the adjustable stand. The fitting can be further stabilized by tightening the hex-head set screw. The assembly and operation of the stand is dealt with in another document.

When installing the equine head/neck assembly onto the equine body, the hose coming from the neck to the reservoir should be passed through the tube located on the right side front of the body. Square tubing on the neck model slides into corresponding larger square tubing (from the top down) on the body. Care must be taken not to pinch the hose while installing the neck on the body. Once the neck is in place the hose can be connected to the reservoir bag inside the body cavity. There is a "D" ring located on left side of front interior bulkhead for hanging the reservoir bag.

A cavity in the jugular groove region receives a thick, soft silicone rubber open-sided tube which acts as a backing for the jugular vein.

The jugular vein is represented by a replaceable, latex tubing which, in turn, fits into the tubular cavity of the silicone backing. The latex hose is connected at the caudal transverse plane of the neck to a fluid reservoir via a one-way valve/connector. A small latex band stripped over the hose and the connector clamps the hose tightly to prevent leaks. The same is true at the cranial plane of the neck, where the latex hose is attached to a reduced connector that has a plastic barbed fitting. A short piece of clear vinyl tubing is attached to the barbed fitting and is closed at the cranial end with a push-type air relief/bleeder valve. The caudal end of the vein is reduced via the one-way valve/connector to clear vinyl tubing which is joined with a barbed 'T' fitting to a single line from the reservoir.

The reservoir is a vinyl bag with a built-in connector for the single feed-line. This connector contains an automatic shut-off valve, allowing the single feed-line to be disconnected without spillage or emptying the reservoir.

The reservoir also has a pump that can pressurize the reservoir to allow the veins to fill. Only pump enough to overcome gravity and create a natural venous pressure. Too much pressure can cause the veins to leak. When not in use the pressure should be released by depressing the release button on the pump. The reservoir hangs from a hook that inserts and bolts on the adjustable stand in any of the adjustment holes.

### The Veins

The jugular veins are represented by 50 cm (20 in.) lengths of thin-walled latex tubing. This tubing requires replacement when it has endured enough punctures to start causing leaks and weeping. This material is of a very specific dimension and is a replacement part available from VSI Ltd. The latex composition of the veins is UV sensitive, and any replacement veins should be protected from UV and stored in a cool, dry environment.

The veins are backed by thick silicone inserts that absorb punctures from needles that breach the medial vein wall. Although these thick, silicone backing inserts are replaceable, they will withstand hundreds of punctures before requiring maintenance. They are mechanically held in place and they are easily removed by simply stripping them out by hand.

To fill the veins with fluid, first fill the reservoir bag with the desired liquid and hang it on the provided hook at the top of the stand's main strut. Connect all lines, with the veins inserted in the jugular grooves. The tubing of the veins and the respective connecting tubes will air lock. With the horse head removed, open the relief/bleeder valves at the cranial end of the vein by pressing the ends of the valves and holding the valves open. If the hide covering is rolled forward at the transverse plane, the veins can be seen filling. Release the valves to stop the flow when the veins are full. If fluid does not start filling the veins when the relief valves have been opened, gently squeeze the reservoir bag, forcing liquid to flow through the lines to help start the siphoning action.

If the veins need to be drained, the latex tubing representing the vein can be removed from the connectors at either end, as the one-way valve/connector will impede draining. To remove or replace the veins, the hide covering needs to be removed and the latex tubing stripped from or rolled off the connectors at both ends.

Although tap water may be used to represent blood in the model, one liter container of simulated blood concentrate has been provided by VSI. This can be mixed with mixed to a maximum of 1 part concentrate to 3 parts water for use in the model. The contents of this simulated blood will mitigate leakage from needle punctures in the veins, especially if the vein is being occluded. This simulated concentrate is available from VSI as a replacement item.

If the veins need to be drained, the latex tubing representing the vein can be removed from the connectors at either end, as the one-way valve/connector will impede draining. To remove or replace the veins, the hide covering needs to be removed and the latex tubing stripped from or rolled off the connectors at both ends.

### The Hide

A tailored, stretchable cloth represents the hide covering. The hide is oriented with Velcro patches running along the growth-line of the mane. The mane is a separate strip of hair material with Velcro strips to attach appropriately to the hide. The hide must be removed in order to insert and replace the veins or the intra-muscular injection pads.

The hide covering is best applied with the neck in place on the adjustable stand, with all of the components assembled, veins filled, and horse head removed. When adding the hide covering, it is best to start with a proper orientation, and pull the covering over the neck (horse head removed), as one would a pull-over sweater. The cloth material can be massaged into a close conformity and, when properly dressed, will have very little bridging or tenting in crucial areas. When using the neck on the equine body, the hide should be installed prior to installing the head/neck assembly onto the body.

The rubber and foam composition of the neck is sensitive to UV and oxidization, and can be partially protected from these elements if the hide covering is kept in place even when the model is not in use. The rubber covering of the neck core may yellow over time.

### The Head

The head is constructed of a rubber-coated flexible foam and contains a metal armature with an exposed square-tubing bracket. This male bracket slips into the corresponding female receiver of the neck structure. The head features an open mouth for applying a bridal and also plays a role in helping secure the cloth hide covering to the neck. The head must be removed to activate the bleeder valves to fill the veins, and to remove the cloth hide covering.

### Intramuscular Injection

Large, trapezoid-shaped rubber-lined cavities in both sides of the neck create receivers for right and left intra-muscular injection pads. The pads are absorbent foam with a rubber skin and will accommodate training IM injection with fluid. The foam will absorb the fluid, and can then be dried out and cleaned when if they become saturated. These are replaceable parts that will withstand hundreds of injections before breaking down.

### General

Parts can be hand washed with mild soap and water. The foam construction of the neck will absorb water and other fluids, so care should be taken to not saturate the model with liquid. No parts should ever be cleaned with harsh solvents or abrasive tools. Many components can be easily replaced if they become damaged or faulty.

*Please contact Veterinary Simulator Industries Ltd. for specific repair instructions or any concerns or inquiries.*

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