



EQUINE DYSTOCIA SIMULATOR

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> 1. EQUINE DYSTOCIA SIMULATOR

1.1 Care, Handling and Maintenance

This document has been created to describe the care and maintenance of the medium-fidelity VSI Equine Dystocia Simulator, to avoid misuse and damage, and to increase longevity of use. This document deals strictly with the equine model and its accessories. Handling of the VSI foal, which accompanies the horse, is dealt with in a separate document.

1.2 Horse Body

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 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 best cleaned with mild soap and water with a low-pressure washer, and never with harsh solvents or abrasive tools.



1.3 Birth Canal

A replica pelvis cast in resin and an inflatable 3 chambered bladder, which is fit between the pelvis and inside wall of the horse, create the birth canal of the horse. The pelvis and bladder may be removed for cleaning and to exchange or replace the perineum panel. The bladder is held in place merely by friction. The pelvic bone structure is seated in supports on the body wall of the horse and attached to a flat support via a single bolt through the pelvic floor. This bolt needs to be removed in order to remove the pelvic bone structure. The pressure of the bladder can be adjusted for the desired “feel” via the single valve on the corner, with the provided hand pump, and should be inflated only with a hand pump in order to control the inflation and avoid damage. Over-inflation may result in deformation of the pelvic structure.

1.4 Perineum Panel

The soft perineum panel has been designed with flexibility and durability in mind, with an oversized vulva or anal opening, depending on the style of model. This component will wear and possibly tear, but can be repaired with the provided silicone adhesive. Any tears should be repaired as soon as they are discovered. To repair the soft material, clean the damaged area thoroughly with isopropyl alcohol, apply the adhesive, set the tear, and avoid use for at least 12 hours. A good repair can be as strong as the original cast material. This panel is a replaceable part.

The flexible panel is attached to a rigid ring flange which fits inside the horse, locked in place with plastic turn-locks. To remove the flange with panel, first remove the pelvis. The pelvic bone structure is seated in supports on the body wall of the horse and attached to a flat support via a single bolt through the pelvic floor. This bolt needs to be removed in order to remove the pelvic bone structure. Lift the hook-bones from their mounts and the pelvis will be released. Now, the perineum panel can be released by turning the twist-locks to a free position, and by carefully tugging and flexing the rigid perineum mounting flange until it is free. The soft panel can now be separated from the rigid ring/flange by removing the plastic fasteners attaching the soft panel to the mounting ring.

The VSI equine reproductive tract panels each have dedicated rigid installment rings to which they are attached, meaning they can be exchanged within the horse model, dedicating the appropriate panel to a specific exercise. Water-based lubricant should always be used in conjunction with the VSI dystocia foal model or whenever the area is palpated. A small hole located near the equine's navel area will allow any excess lubricating fluid to drain. This drain may eventually become clogged as lubrication fluid dries, and should be checked periodically for clearance.



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1.5 Foal Support System

One large inflatable multi-chambered air bladder in the main body cavity of the horse provides the uterine support system for the VSI foal model. The bladder has one large lower chamber and two smaller side bolsters which are all inflated separately via valves at the cranial ends of the chambers. Also attached to these side bolsters is a vinyl flap which should be hung over the edge of the hatch opening to protect the VSI foal model from abrasion during loading or unloading. Once the VSI foal is loaded into position inside the body, these flaps can be folded inside the horse body and the hatch installed. The uterine air support chamber is held in place by friction only and can be easily removed for cleaning.

A small hand-pump is provided in order to adjust the inflation to the desired levels. Use only the small hand-pump to inflate the air bladders in order to control the inflation and avoid damage. If the bladder becomes damaged, it can be repaired with the vinyl repair kit or contact VSI.

A translucent vinyl bag represents a rudimentary uterus to contain the foal and the lubricant. This bag has a flange attached to the rigid ring of the perineum panel, via the same fasteners as the soft vulvar panel. This uterine bag has a dorsal opening to insert the foal and a Velcro closing. Grommets and short elastic cords with clips attach the vinyl bag dorsal to a central 'D'-ring on the body wall of the horse, and anterior to two 'D'-rings on the bulkhead. These clips keep the uterine bag from prolapsing during the extraction exercise. A moderate amount of water-based lubricant is required to assure free movement of the foal, during in-utero demonstration, pulling, and when inserting the foal inside the bag.



NOTE: Moderate amounts of a water-based lubricant should be applied to the soft perineum panel of the horse and to the foal, in order to avoid damage to any components. A diluted glycerin-based liquid soap will work as well or better than obstetrics lubricant, the operator should be suitably gloved as if performing tasks on a live animal.

1.6 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 counterclockwise 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.



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1.7 Foal Pulling

A modified Dr. Frank's Fetal Extractor and drop mat have been provided with the horse model. Padding has been added to the jack base to avoid damaging the surface paint and texture of the horse model. The puller should be used as it normally would be in a live animal to extract the VSI foal model. Use of any other form of extractors may cause damage to the surface of the horse model.

When placed directly behind the horse model, the mat creates a soft landing surface for the foal, should the foal be dropped during the extraction procedure. The mat should always be used when the potential exists to drop a foal during any procedure. The foal model should never be dropped on a hard surface.

1.8 Storage

The VSI equine unit should always be stored indoors under moderate temperature conditions. It is appropriate to store the foal model inside the horse, but only if the uterine air bladder of the foal support system are properly inflated. However, the foal should always be removed from the horse for transportation purposes, and carried in the carrying bag provided, or a similar container.

1.9 General

The main body of the horse model and its large components are best cleaned with a mild detergent and low pressure-washing system. 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 or repaired if they become damaged or faulty.

➤ 2. DYSTOCIA FOAL MODEL

2.1 Care, Handling and Maintenance

VSI has developed this dystocia foal model to aid in the instruction and demonstration of various dystocia positions and remedies. A great deal of research and testing has been involved in producing the most durable simulator with the greatest flexibility and most natural movement. However, in order to create a product that is a close biological mimic, VSI has employed a soft skin and articulated skeleton that require care and supervision in handling. The VSI dystocia foal model should be used only for table-top demonstration or with the compatible VSI dystocia horse model. In no instance should the foal model be used with any other manufacturer's simulators.

VSI provides warranty for any manufacturer defects, but can't provide protection against damage caused by misuse and unsupervised handling. The model is heavy, yet has a delicate nature and should be treated as such, similar to a real animal. Although a real foal may experience trauma and rough handling during its birth, it only needs to endure this procedure one time. Your foal may experience the birthing procedure several times a day. These simple instructions are intended to provide guidance and awareness that will help your VSI dystocia foal model last for years of use.

We always recommend the VSI foal model be used only with a VSI equine dystocia simulator model, or for table-top demonstration, and especially in conjunction with the VSI uterine bag, as other simulators may cause damage to the foal model. Loading the foal into the bag is a process greatly eased with the application of a moderate amount of lubricant.

Although the foal model has been designed for instruction on chaining legs and pulling with jacks, it is not intended to be unduly strained in pulling, or to be dropped on to surfaces from any height. Mishandling in this way or any other way can cause damage to the skin, hooves, and skeleton.



NOTE: When used with VSI horse model and uterine bag, moderate amounts of water-based lubricants should be used on the foal model, inside the uterine bag and on the perineum panel to help create a realistic, slippery surface, and to limit resistance and friction that may cause damage to the soft skins.

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The floor mat provided with the VSI dystocia horse model should always be employed when there is potential danger of dropping the foal. Otherwise, a padded surface should be used in the event the foal is unduly released and is dropped.

When demonstrating use of the head-snare, only the soft VSI support piece should be used, as other snares may cause damage. The foal model should never be carried by the tail or ears, as this may result in damage.

The skin of the VSI foal model is composed of silicone, which can be difficult to repair with any materials other than the adhesives provided by, or silicone adhesives recommended by VSI. When gluing tears, first thoroughly clean the damaged area with rubbing alcohol, never with harsh chemicals or solvents. Allow the glue to set and cure for at least 16 hours before use. Tears should be repaired as soon as they appear, in order to prevent further tearing and to close any openings that allow access to the body cavity.

For general cleaning, the entire foal model can be power washed or scrubbed with mild detergent and water and a soft cloth, but should not be immersed. If there are tears in the skin, care should be taken to avoid getting water inside the body. Repairs should be completed and cured before the model is given a general washing.

The foal model is best stored in the VSI dystocia horse model, supported by the air-support system, as long as the chambers of the support system are properly inflated. Otherwise, the foal is best kept in the provided storage bag. If the foal is stored in any other way, a padded surface and covering should be used. The soft skin, combined with the weight of the foal, can be permanently impressed by resting on a hard surface for long periods of time. The skin of the foal has a somewhat tacky nature which tends to attract dirt and other particles, therefore should be covered when not in use.

VSI continues research and development of techniques, design, and materials in an effort to improve all aspects our products, attempting to create the optimal educational and interactive tools. We invite feedback and suggestions in an ongoing collaborative effort between our manufacturing industry and our end-use clientele.

2.2 Warranty, Care, Use

VSI has invested significant time, energy, and resources into the design and development of this model. Real-world usage over an extended period has helped us determine its functionality, durability, and requirements. We have crafted pricing, purchasing, and warranty guidelines to best serve both VSI and our end-user clients, aiding in informed purchasing decisions.

The dystocia foal and horse model were designed with specific parameters in mind, based on available technology and consultation with professional collaborators, including veterinary educators and practitioners. While the models have been used beyond these parameters in terms of frequency, environment, supervision, and expectations, attempts to adjust the design to accommodate broader use have often pushed them beyond their intended limitations.

The dystocia models are intended to demonstrate in-utero mal-presentation and subsequent manipulation to properly present the foal for extraction, under the guidance and supervision of qualified instructors. Extraction should be minimized to reduce strain and the risk of damage. When extracting the calf, it should be gently lowered to prevent damage, and a soft drop-mat should always be in place to cushion accidental drops.

These models are not intended for public demonstration unless all guidelines can be followed. They are heavy yet delicate and should be treated accordingly. Although a real foal may experience trauma and rough handling during its birth, it only needs to endure this procedure one time. Your foal may experience the birthing procedure several times a day. With proper care, clients have extracted the calf over 1000 times without major issues, but a single instance of mishandling can cause irreversible damage.

Detailed instructions on use, care, and maintenance are included with the models to ensure their longevity in educational environments, but common sense and good judgment are paramount.

VSI provides a 1-year warranty from the date of purchase for any manufacturer defects. This warranty does not cover damage caused by misuse, unsupervised handling, or defects that appear after the 1-year period. However, after the warranty period, the foal may still be repaired and refurbished by VSI for a fee plus applicable shipping charges.

We value the input, dedication, and collaboration of our educational partners in the continued development, improvement, and use of VSI simulation models. Practical models are essential to modern didactic systems, and we rely on the understanding and cooperation of professionals who utilize them in their programs.

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➤ 3. EQUINE NASOGASTRIC MODEL

3.1 Care, Operation, and Maintenance

Equine Nasogastric Model (1025593)

Components:

- Nasogastric equine head
- Nasogastric equine neck with skin cover
- Nasogastric stomach chamber
- Venipuncture fluid
- Venipuncture fluid reservoir
- Mane
- Extra veins

Equine Nasogastric Model with Stand (1025594)

Components:

- Nasogastric equine head
- Nasogastric equine neck with skin cover
- Nasogastric stomach chamber
- Venipuncture fluid
- Venipuncture fluid reservoir
- Mane
- Extra veins
- Adjustable rolling stand



3.2 Setting Up the Model

First, set up the adjustable rolling stand. Please see the adjustable rolling stand instruction manual. Once the stand is set up, this model requires the use of the stand adapter to attach the neck onto the stand properly. On the flat, wide section of the neck (proximal transverse plane), you'll find a female metal bracket into which the male fitting of the stand adapter will snugly slide. After securing the stand adapter to the neck, insert the adapter into the female receiver on the stand mount to firmly attach the neck to the stand.

With the neck securely mounted, you can proceed to fill the veins with venipuncture fluid and place the fleece hide. Refer to the specific instructions below for detailed guidance on filling the veins and securing the hide. After the hide is in place, attach the nasogastric head by inserting the steel bar at the back of the head into the female receiver on the exposed portion of the neck. The male bracket should slide easily into the corresponding female receiver, ensuring a snug fit with no visible gaps between the head and the neck.

Next, mount the stomach chamber onto the tower of the rolling stand. Align the opening of the chamber with the base of the neck, positioning it as close as possible to the ABS backer. There will be a small opening at the base of the neck for the nasogastric tube to pass through into the stomach chamber. If desired, the stomach chamber can be filled with liquid and scented as needed. The chamber is easy to clean by unscrewing the top and washing it with soapy water.

Once the adjustable rolling stand, nasogastric neck, nasogastric head, and stomach chamber are in place, the model is ready for use.

3.3 The Neck

The core neck structure of this model is constructed from flexible urethane foam, supported by an internal steel armature. The cranial plane features an exposed female bracket that serves as the receiver for the male bracket of the horse head. Additionally, an exposed female fitting on the transverse plane allows the model to be attached to either the adjustable stand or the equine body. When installing the model onto the stand, the stand adapter should be inserted into the back female receiver of the equine neck. The square tubing on the stand adapter slides into the corresponding larger square metal fitting on the stand, securing the attachment. For additional stability, tighten the hex-head set screw on the neck. Assembly and operation of the stand are covered in a separate document.

When attaching the equine head/neck assembly to the equine body, ensure that the hose coming from the neck to the reservoir is passed through the hole/tube located on the right front side of the body. The square tubing on the body should be carefully inserted into the corresponding larger square tubing on the neck model, taking care not to pinch the hose during installation. Once the neck is secured in place, the hose can be connected to the reservoir bag inside the body cavity. A "D" ring is located on the left side of the front interior bulkhead for hanging the reservoir bag.

The neck model features both intramuscular and venipuncture functionalities. The intramuscular feature includes large trapezoidal cutouts in the neck where urethane foam pads are inserted. These pads are designed to withstand hundreds of punctures and accept liquid from injections. Replacement pads (1025600) are available when they begin to show signs of wear from extensive use.

The venipuncture feature includes two cavities in the jugular groove region. These cavities house thick, soft silicone rubber open-sided tubes that act as backing for the jugular vein, preventing punctures to the durable silicone skin of the model. The jugular vein is represented by a replaceable latex tube that 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 is wrapped over the hose and connector to tightly clamp the hose and prevent leaks.

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Similarly, at the cranial plane of the neck, the latex hose is attached to a reduced connector with a plastic barbed fitting. A short piece of clear vinyl tubing is connected to the barbed fitting and is sealed at the cranial end with a push-type air relief/bleeder valve. The caudal end of the vein is connected via the one-way valve/connector to clear vinyl tubing, which joins with a barbed 'T' fitting to a single line from the reservoir.

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

The reservoir also features a pump that can pressurize the reservoir to fill the veins. Only apply enough pressure to overcome gravity and simulate natural venous pressure, as excessive pressure may cause the veins to leak. When not in use, release the pressure by depressing the release button on the pump. The reservoir hangs from a magnetic hook, which can be positioned as desired on the stand.

3.4 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 available as a replacement part. 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.

Although tap water may be used to represent blood in the model, a one-liter container of simulated blood concentrate is provided. This can be mixed with water at a maximum ratio 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 as a replacement item.

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 can be 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 into 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 once the veins are full. If fluid does not begin to fill 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.

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 should be stripped from or rolled off the connectors at both ends.

3.5 The skin cover

A tailored, stretchable cloth represents the skin cover. 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 intramuscular injection pads.

The skin cover 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 installing the skin cover, it is best to start with a proper orientation and pull the covering over the neck (horse head removed),—similar to putting on a pullover sweater. The cloth material can be massaged into 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 light and oxidation, and can be partially protected from these elements if the skin cover is kept in place even when the model is not in use. The rubber covering of the neck core may exhibit yellowing over time.



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➤ 4. ADJUSTABLE STAND

4.1 The Head

The head is constructed from rubber-coated, flexible foam with an internal metal armature and an exposed square-tubing bracket. This male bracket easily slides into the corresponding female receiver in the neck structure. The head features an open mouth, allowing for the application of a bridle. Proper head placement also helps to secure the cloth hide covering to the neck. To access the bleeder valves for filling the veins or to remove the cloth hide covering from the neck, the head must be detached.

Both nostrils provide access for passing a nasogastric tube. While lubrication is not required, it can be used if desired. Depending on the tube's orientation, it may enter the upper nasal passage or the trachea. In either case, the tube will encounter a dead stop and will need to be readjusted.

As the tube travels down, it will pass through an entryway into the esophagus. A visible bulge at the base of the neck will indicate the tube's passage through this area before it enters the stomach chamber.

4.2 The Stand

The dedicated stand is adjustable for height, head angle (forward and back), and can be rotated 90 degrees to one side.

Follow the steps below to assemble the stand:

Prepare the Base:

- Start by placing the base on a flat, sturdy surface with the wheel side facing down.
- Remove the top bolt and wingnut to reveal the opening in the base where the tower will be attached. Ensure the lower bolt and wingnut remain securely in place, as the tower will rest on them.

Attach the Stand Tower:

- Insert the stand tower into the central metal hole of the base, letting it rest on the lower bolt.
- Use the second bolt to securely fasten the stand tower to the base by passing it through the designated holes.

Handle Installation:

- Now that the tower is in place, remove the bolt and wingnut from the handle.
- Slide the handle onto the top of the tower through the single square hole in the handle.

Adjust the Handle Height:

- Lower the handle to your preferred height and lock it in place using the removed bolt and wingnut.
- To adjust the handle's height or tilt the model, simply remove the wingnut and bolt, make the necessary adjustments, and then secure them back in the desired positions.

Final Checks:

- Before placing your model on the stand, ensure all bolts are tightened securely, the wheels have been locked, and the stand adapter has been attached to the model.

To adjust the tilt of the model's head, use the single bolt and wingnut to lock the head in your desired height position. The head has a square bracket that fits into a corresponding tube on the adjustment assembly. Once in place, you can adjust the tilt using the hand crank. To rotate the head 90 degrees to the right, remove the locking pin and rotate the head carefully.

When in use, the front and rear wheel locks should be engaged (depressed downwards) to prevent movement of the stand.

All of the stand components are either painted, powder-coated, galvanized, plated, or made of plastic and are resistant to moisture. However the stand should always be stored indoors and kept dry to prevent unnecessary corrosion.

To ensure seamless integration with the adjustable rolling stand, simply slide the provided adapter into the crank mount. Once securely in place, slide the horse neck onto the adapter, and your model will be ready for immediate use.

Should you encounter any challenges during this process, please don't hesitate to reach out to us. Our team is here to assist you and troubleshoot any issues you may encounter, ensuring a smooth and successful experience.



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