S500 Advanced Childbirth Simulator
Maternal and Fetal
Birthing Torso

INSTRUCTION MANUAL

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PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY PRIOR TO STARTING TRAINING EXERCISES ON YOUR NEW SIMULATOR.

HANDLE YOUR SIMULATOR IN THE SAME MANNER AS YOU WOULD HANDLE YOUR PATIENT – WITH CARE AND CONSIDERATION.

SHOULD YOU HAVE ANY QUESTIONS AFTER READING THIS INSTRUCTION MANUAL, CALL OR E-MAIL OUR CUSTOMER SERVICE DEPARTMENT.

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Section 1 – Please Read This First

Place the simulator on a flat surface. Remove the abdominal cover and inspect contents.

The S500 includes male and female fetuses having detachable umbilical cords and placenta; transparent and opaque abdominal covers; two spare vulva; four spare umbilical cords; two umbilical clamps; talcum power lubricant and a carrying bag.
Section 2 - Simulation Using the OB Birthing Torso

Preparation

Select a birthing fetus with placenta and cord, as well as one of the two abdominal covers. Note the anatomic landmarks, the removable vulval inserts, the removable end plate, and the bilateral Velcro strips used to attach the placenta.

Remove the end plate and attach the placenta. If the Velcro is attached in parallel, the placenta will be difficult to remove after birth and simulate a retained placenta. If the Velcro is attached at right angles, the placenta can be removed with modest cord traction. If the Velcro is not connected the placenta can be easily removed after delivery.
Now remove a few snaps attaching the vulval insert and note the bilateral ischial spines. If the fetal head is at the plane of the ischial spines, the head is said to be at Station 0. Labor usually begins at Station –5 or 5 centimeters above the plane of the ischial spine at which time the cervix is just beginning to dilate. Crowning occurs at Station +5 or 5 centimeters below the plane of the ischial spines when the fetal head is presenting.

Lubricate the inside of the vulval insert as well as the head and shoulder of the birthing fetus. Use either talcum powder or water-based silicone spray.
**Leopold Maneuvers**

To perform Leopold Maneuvers, remove the end plate and abdominal cover. Place a cushion or folded sheet within the birthing torso. Fold the legs of the birthing fetus as shown and insert the fetus as desired for the teaching exercise.

![Leopold Maneuvers](image)

**Place an elevating pillow and fetus in the simulator**

![Placement](image)

**Attach abdominal cover. The first maneuver is to determine which part of the fetus in the fundal area of the uterus. The head (breech) or the buttocks (vertex).**
The second maneuver is to determine the position of the spine: anterior, posterior, or perhaps transverse.

The third maneuver is to determine what is in the pelvis. Is it the fetal head or the buttocks.
The fourth maneuver is to determine what is the presenting part. The head or the buttock or perhaps an arm or leg.

Birthing Demonstrations

Start with deliveries that are seen frequently such as the one pictured below. Position the birthing fetus so that its head faces toward the left side of the simulator. This is the ROA or right occipital anterior. Note: any other position may be chosen such as perhaps the LOA position.

Placenta is in place and the fetus is in the ROA position. The instructor may elect to wrap the umbilical cord around the fetal neck so that the student may practice cord reduction.
The Instructor has selected a placental position high in the uterus. The transparent abdominal cover was used to facilitate viewing. The instructor is moving the fetus down the birth canal and the fetal head is at STA “0”. The placenta may also be placed near the outlet of the birth canal to demonstrate placenta previa.

The Instructor has replaced the transparent abdominal cover with the opaque cover and has (1) rotated the fetus toward a “nose down” position and (2) has moved the fetus further down the birth canal to a position approaching “crowning”.
The Instructor has moved the fetus past “crowning” and a student is controlling fetal descent. The Instructor has also begun to rotate the fetus so that the shoulders present along the axis of the vulva. Note the fontanelles. The “turtle sign” associated with shoulder dystocia may also be demonstrated and students encouraged to perform an episiotomy, use suprapubic pressure or perform posterior arm sweep in attempts to deliver the baby as quickly as possible.

A student applies slight downward pressure to facilitate birthing of the anterior shoulder. Note the fetus is rotated so that the shoulders align with the vulva.
A student simulates suctioning of the mouth then the nose.

A student maintains appropriate elevation of the fetus while clamping the umbilical cord. The clamps provided can be removed using a flat-bladed screwdriver.
Rather than cut the cord, the Instructor may elect to remove the cord from the fetus as shown above.

Student applies slight traction to the umbilical cord during a contraction in order to facilitate removal of the placenta.
Student has facilitated the removal of the placenta and will inspect it thoroughly for placental fragments that may still be lodged against the uterine wall.

Discussion of Normal Labor and Delivery

Overview

The S500 birthing torso offers the ability to demonstrate a variety of obstetric techniques including the following:

- Fetal palpation of the head, shoulders, backbone, knees and elbows
- Vaginal delivery
- Ritgen’s maneuver
- Shoulder dystocia
- Cesarean section delivery
- Complete, frank and footling breech positions
- Pinard’s maneuver
- Intrauterine manipulation
- Prolapse of umbilical cord
- Normal delivery of umbilical cord and placenta
- Placenta previa- total, partial, and marginal
- Palpation of fetal fontanelles
- Simulated suction of the nose and mouth
**Brief Overview of the Birthing Process**

The articulating fetus may be palpated while in the abdominal cavity. Place a cushion (not provided) within the abdominal cavity. To palpate the backbone, place the fetus face down on the cushion, snap the abdominal cover into place. Palpate the length of the backbone. To palpate the head and facial features, place the fetus face up on the abdominal cushion so that the presenting part (the portion of the fetus that descends first through the birth canal) is either the head (cephalic presentation), or in the breech position, or in the transverse position.

**Normal Labor and Delivery**

Labor is divided into three stages. The first stage begins with the onset of labor and ends when the cervix is completely dilated (expanded). The second stage begins with complete dilation and ends with the birth of the baby. The third stage begins with the expulsion of the baby and ends with the delivery of the placenta.

**Stage One**

The first stage is divided into latent, active and transitional phases. The latent phase begins with the onset of regular contractions. This cervix dilates to 3-4 cm and also effaces, thus thinning. The length of the latent phase varies greatly but is generally between 1.3-11.5 hours for a primipara (first time pregnant), and should generally not exceed twenty hours. For a multipara (pregnant more than once), the latent phase generally lasts from 1.0-9.7 hours and should not exceed 14 hours.

In the latent phase, uterine contractions increase in frequency, duration, and intensity. They may begin mildly, lasting 15-30 seconds at intervals of 15-30 minutes and progress to moderate contractions, lasting 30-40 seconds at intervals of 5-7 minutes.

During the active phase, the cervix dilates completely to 10 cm. (approximately 4 inches). Descent of the fetus into the birth canal accelerates and the cervix becomes completely effaced. Contractions become more frequent, usually every 2-3 minutes, are longer in duration, lasting about 60 seconds and increase in intensity. The length of the active phase of the first stage generally lasts between 1.0-8.2 hours for the primipara and 2.0-4.6 for the multipara. The rate of cervical dilation in the active phase is approximately 1.2 cm per hour in the primipara and 1.5 cm per hour in the multipara. However, when cervical dilation reaches 8-10 cm, the rate of dilation decreases and the rate of fetal descent increases.
Stage Two

The second stage of labor begins with the complete dilation of the cervix and ends with the delivery of the baby. This stage of labor usually takes no longer than an hour for the primipara, however it can last as long as three hours. In the multipara the second stage takes approximately 15 minutes, but can last up to a half hour. Generally, contractions are 60-90 seconds in duration at intervals of 2-3 minutes. The mother is encouraged to bear down with the beginning of each contraction so as to aid in the expulsion of the fetus.

Six movements of the fetus permit its birth:

1. descent
2. flexion
3. internal rotation
4. extension
5. external rotation
6. expulsion.

Descent of the fetus is achieved by the force of the uterine contractions, maternal pushing or “bearing down” and gravity (if the patient is upright). In the S500, lightly lubricating the fetal head and the inside of the vulval insert with talcum lubricant will ease the movement of the fetus through the cervix and vulva.

Flexion, the bending or flexing of the fetal head toward its chest, resulting in the smaller diameter of the presenting part (the part of the body that first appears in the cervix), occurs due to the resistance of the cervix, the pelvic walls and floor upon the presenting part of the fetus.

Internal rotation takes place as the fetal head meets the muscles of the pelvic floor. Generally, the head which enters the pelvis in the transverse (crosswise) position, turns so that the occiput (back of the head) is anterior to the symphysis pubis. Thus, the fetus rotates so that it is face down in the pelvis. Internal rotation may also take place so that the fetus is face up in the pelvis.

Extension occurs as the fetus nears the vaginal opening. As the head continues its descent, the caregiver’s right hand exerts upward pressure on the perineum and thus on the chin of the fetus, encouraging extension. This also prevents the fetal head from slipping backward between contractions. The left hand is applied to the occiput, providing the gentle pressure that discourages a too rapid extension of the head. The perineum begins to bulge and the head crowns. Crowning is the appearance of the largest diameter of the head in the opening of the vagina. An episiotomy may be performed at this time to prevent tearing of the perineum and to avoid massive stretching of the perineal tissues. As soon as the head has presented, the airway is cleared using a suction bulb. Insert an index finger to determine if the umbilical cord is around the neck of the
baby. If so, the cord can usually be slipped over the head or if the cord is too tight, it may be clamped and cut.

Ritgen’s Maneuver may be performed by inserting hands into the vaginal opening of the simulator and assisting the movement of the fetus. The caregiver may assist as in an actual delivery and may perform an episiotomy on the replaceable vulval/perineal insert. Use of talcum powder lubricant will greatly facilitate this portion of the labor demonstration.

External rotation takes place when the head realigns with the fetal back and shoulders and is approximately perpendicular to the mother’s body. At this time, internal rotation of the shoulders may occur to ease movement of the body through the pelvis.

Expulsion occurs with the anterior shoulder first passing under the symphysis pubis and delivering, followed by the posterior shoulder delivering over the perineum. This may be aided by pulling the head downward gently thereby facilitating the delivery of the anterior shoulder. The posterior shoulder may be delivered with gentle upward traction. The body of the baby then delivers. Following expulsion, the umbilical cord is clamped in two places: one on the placental side and one approximately two centimeters from the newborn. The cord is then cut. The cut end of the umbilical cord is inspected to assure the presence of one umbilical vein and two arteries.

Expulsion can be demonstrated on the simulator by allowing the delivery caregiver to gently pull down and then up on the fetus to deliver both shoulders. Once the shoulders have been delivered, the motor stops and the rest of the baby is gently removed from the simulator’s pelvic cavity. After expulsion, the cord can be cut or detached. The presence of the umbilical vein and the arteries may be seen through the clear tubing covering the umbilical cord.

**Stage Three**

The third stage of delivery begins after the expulsion of the fetus. The uterus begins to contract and with this decrease in size, the placenta will begin to separate from the uterine wall. This separation occurs approximately 5-10 minutes after delivery and can be identified by four different indicators:

1. A fresh flow of blood from the vagina as a result of the placental separation
2. The fundus of the uterus rises in the abdomen
3. The uterus becomes spherical in shape
4. A longer length of umbilical cord is apparent outside of the vagina as the placenta moves toward the vagina

Once these signs have been observed, the mother may bear down to deliver the placenta. The caregiver may also aid in the delivery by applying gentle pressure to the fundus.
The placenta may deliver in different ways. The delivery of the placenta fetal side up is most common although delivery with the maternal side up is also not unusual. Delivery with the maternal side up may indicate incomplete delivery of all placental material. Regardless of delivery position, the placenta should be inspected to ascertain whether it is intact. If the placenta appears to be fragmented, it may be necessary to manually explore the uterus, remove placental fragments and inspect for serious internal bleeding.

The third stage may be simulated with the S500 by gently disengaging the placenta from the interior abdominal wall through the vulval opening. The placenta may then be pushed through the open vulva, or gently removed through the opening by means of the umbilical cord. Manual exploration of the uterus may also be demonstrated by inserting a hand up through the vaginal opening and into the pelvic cavity.

**Cesarean Delivery**

Cesarean birth is the delivery of the fetus through an abdominal and uterine incision. A Cesarean delivery, also called a C-section may be performed as a result of breech presentation, pre-term or dysfunctional labor, fetal distress, prolapsed umbilical cord, placenta previa, abruption placenta, or a variety of other abnormalities.

When performing a Cesarean section, an incision is made into the abdomen. A transverse incision is made across the lowest and narrowest portion of the abdomen, just below the pubic hair line. A vertical incision may also be used between the umbilicus and the symphysis pubis. A vertical incision called a paramedian, just off center, may also be used. The instructor can demonstrate a C-section by removing the metal snaps just above the pubic bone and birthing the baby between the stomach cover and the pubic bone.

**Prolapse of the Umbilical Cord**

Prolapse of the umbilical cord is a dangerous complication which involves the presence of the umbilical cord in the birth canal in front of the presenting part. This condition may occur as a result of breech presentation, transverse lies, a small fetus, an overly long cord, a placenta placed low in the uterus, or other abnormalities.

Fetal distress is common with prolapse. With every contraction, the umbilical cord is compressed between the mother’s pelvis and the presenting part. If the blood flow through the cord is interrupted, the baby may die. If a cord is observed in the birth canal ahead of the presenting part, gloved fingers should be inserted and the presenting part lifted off the cord to relieve pressure on the cord. This procedure must be maintained until the prolapse has been solved, either by a termination to the compression of the cord, or until delivery of the fetus by C-section.
**Placenta Previa**

Placenta previa is a condition in which the placenta is located in the lower half of the uterus, located near or covering the cervical os. There are three types of placenta previa: total, partial and marginal. Total placenta previa is when the placenta completely covers the cervical os. Partial placenta previa is when the cervical os is partially covered by the placenta. Marginal placenta previa is when the edge of the placenta extends to the internal os, where the uterus opens into the vaginal canal. With the dilation of the cervix, either in the third trimester before the onset of labor, or during labor, the placenta may disengage from the uterine wall, resulting in profuse bleeding. If a placenta previa is detected, delivery may be necessary by C-section.

To simulate placenta previa with the S500, place the placenta in the desired position to simulate the condition, with the maternal side against the uterine wall or the cervical os. Then place the fetus within the uterine cavity with the presenting part closest to the placenta.

**Breech Birth**

Breech birth occurs when either the buttocks or lower extremities of the fetus are the presenting part. There are three types of breech birth: frank, complete and incomplete or footling. Frank breech occurs when the buttocks are the presenting part and the legs of the fetus are extended up toward the baby’s head. Complete breech occurs when the buttocks are the presenting part and the baby’s legs are flexed along the lower torso. Footling or incomplete breech occurs when one of both of the legs are the presenting part.

Breech presentation may be confirmed by fetal palpation or by palpation of breech presenting parts during a vaginal examination. During the third trimester, prior to the onset of labor, breech presentation may be solved by external cephalic version, in which the fetus is manually turned within the uterus by means of transabdominal manipulation.

There are many differences in labor between the breech presentation and the vertex presentation. With the descent, the posterior hip encounters the pelvic floor and internal rotation takes place, allowing the anterior hip to move beneath the pubic arch. The anterior hip then delivers, followed by the posterior hip, the legs and the feet. External rotation allows the shoulders to move into the maternal pelvic and internal rotation allows the shoulders to deliver. Downward traction allows the delivery of the anterior shoulder, with a finger inserted into the birth canal to free the arm. Upward traction allows the posterior shoulder to deliver and the posterior arm is freed in the same manner. After the delivery of the shoulders, the fetal head delivers in a flexed or heads up position.

Although it is possible for a vaginal delivery of breech presentations, once a breech presentation has been confirmed, a Cesarean is often performed to lower the risk of infant mortality due to cord prolapse or birth asphyxia.
To simulate breech presentations with the S500, remove the abdominal cover and place the fetal legs in either an extended position to simulate “footling” delivery or retract the legs for a “frank” delivery.

Use either talcum or silicone lubricant on the presenting parts as well as the inside of the vulval insert.

Fetus in breech position. A “footling” delivery is demonstrated using transparent abdominal cover.
Section 3 – Care of the Simulator

Treat the S500 with care, as you would your expectant mother!

After use, clean the simulator with a mild detergent or with soap and water. Remove all traces of any lubricant. Do not clean with harsh abrasives. Dry thoroughly.

* Store the simulator in a cool area in the packing carton provided.
* Do not stack or store heavy materials on top of the carton.
* Indelible marks made with ballpoint pens, ink or marker cannot be removed.
* Do not wrap the simulator in newsprint.
* Do not use povidone iodine on the simulator.
* Replacement parts are available from the manufacturer or from your Distributor.
Section 4 – References

1. Myles Textbook for Midwives. Edited by Bennett and Brown.
4. NOELLE™ Training Guide with basic and advanced interactive scenarios. Gaumard Scientific Company, Inc. Published 2003. (Instructor and Student Guides available.)

Section 5 – Limited Warranty

Gaumard® Scientific Company (Gaumard) warrants that if the accompanying product proves to be defective in material or workmanship within one (1) year from the date of the original purchase, Gaumard will, at Gaumard’s option, either repair or replace same without charge. This limited warranty may be enforced only by the first consumer user. All subsequent purchasers acquire the product “as is” without this limited warranty.

This warranty covers all defects in material or workmanship, except:

1. Damage resulting from accident, misuse, neglect, or from other than normal and ordinary use of the product.
2. Damage resulting from failure to clean or use the product in accordance with the instructions.
3. Damage resulting from repair or attempted repair by anyone other than Gaumard.

When repair is indicated, the user must:

1. Contact Gaumard and request service authorization.
2. At the customer’s expense, ship the product with a copy of the bill of sale to Gaumard.

Gaumard disclaims liability for incidental and consequential damages for breach of any express or implied warranty, including any implied warranty of merchantability with respect to this product. This writing constitutes the entire agreement of the parties with respect to the subject matter hereof, no waiver or amendment shall be valid unless in writing signed by Gaumard.
Section 6 – Technical Support

Contact us if you have any questions or if your system requires repair.

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Section 7 – Common Spare Parts List for the S500 Birthing Simulator

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