

Fundamentals of Robotic Gynecologic Surgery (FRGS) Curriculum

Description

This course is based on the Fundamentals of Robotic Gynecologic Surgery (FRGS) curriculum. The psychomotor skills curriculum was developed through a consensus conference, which brought together subject matter experts from gynecologic societies, and surgical educators who agreed upon the critical skills, tasks, and most common errors that needed to be included in a comprehensive basic gynecologic curriculum. The result was a table that defined the skills/tasks/errors, the desired outcome measures, and the metrics that should be measured.

The measures deemed most important by the experts were incorporated into the curriculum.

The gynecologic robotic tasks have been developed on simulators for self-directed practice. Virtual reality platforms help accelerate learning curves for instrument manipulation, clutching, camera movements, use of thermal cautery devices, suturing, knot-tying, dissection and procedure-specific rehearsal.

The course provides a comprehensive educational package including:

1. Six Fundamentals of Robotic Surgery (FRS) tasks for a basic-skills practice:

- ◆ Ring Tower Transfer
- ◆ Knot Tying
- ◆ Railroad Track
- ◆ 4th Arm Cutting
- ◆ Puzzle Piece Dissection
- ◆ Vessel Energy Dissection

2. Four Hysterectomy tasks that should be completed as part of the Gynecologic curriculum:

- ◆ Ureter Identification and Dissection
- ◆ Bladder Flap Development
- ◆ Colpotomy Incisions
- ◆ Vaginal Cuff Closure

Objectives

- ◆ To practice basic robotic skills: camera navigation, clutching, wrist articulation, needle control, suturing, 4th arm use, fine dissection and energy application.
- ◆ To perform a thorough inspection of the abdomen and identify the course of the left and right ureters in the retroperitoneum.
- ◆ To practice blunt and sharp dissection needed to expose the ureter and avoid injury to it and the surrounding structures.
- ◆ To perform adequate bladder mobilization, maintaining the correct dissection plane within the vesico-uterine peritoneal fold, and reflecting the bladder to safely expose the anterior pubocervical fascia and upper vagina.
- ◆ To identify and circumferentially incise the cervico-vaginal margin without damaging the surrounding or underlying structures.
- ◆ To demonstrate the skills necessary to successfully place a suture through the full thickness of the vaginal cuff and perform running suturing to approximate the tissue.

Specialties

Gynecology

Target Audience

The psychomotor skills curriculum is designed to train and assess the proficiency of surgeons interested in performing gynecologic robotic surgery. The curriculum will ensure that only surgeons who are skilled and well trained in the basic skills of robotic surgery can perform such complex gynecologic procedures, making the patient the ultimate benefactor.

Assumptions

Familiarity with basic robotic surgery skills and basic gynecological procedures.

Suggested Time Length

Suitable for 2 day training courses or for distributed training.

Authors:

The Hysterectomy tasks cases were created by the Fundamentals of Robotic Surgery Curriculum, and in direct collaboration with:

Jeffrey S. Levy, MD, CEO, CaseNetwork. Board Member, Institute for Surgical Excellence. Assistant Professor, Department of Obstetrics and Gynecology, Drexel University Medical College, Philadelphia PA, USA.

Martin A. Martino, MD, FACOG, Associate Professor, Division of Gynecologic Oncology, Department of Obstetrics and Gynecology, University of South Florida. Medical Director, Minimally Invasive Robotic Surgery, Lehigh Valley Health Network, Allentown, Pennsylvania.

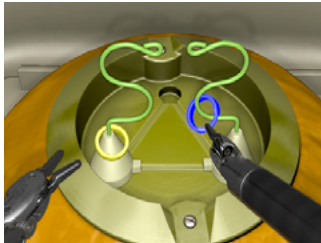
Nazema Y. Siddiqui, MD, MHSc, Assistant Professor, Division of Urogynecology & Reconstructive Surgery, Department of Obstetrics and Gynecology, Duke University Medical Center, Durham, North Carolina, USA.



Task Descriptions and Curriculum Steps

Part 1 - Fundamentals of Robotic Surgery (FRS) Tasks Review

Practice key components of the robotic hysterectomy procedure in a safe and reproducible VR environment. Each task focuses on one critical step of the procedure for optimal modular training: ureter identification and dissection, bladder flap development, colpotomy incisions and suturing of the vaginal cuff. Follow the optional step-by-step guidance and avoid complications and injuries to key structures. A comprehensive performance report is provided at the end of each task.



Task 1: Ring Tower Transfer

Task Description:

Remove a ring from the "S" tower, transfer to the other arm and place on a tower located on the side of the dome.

This task trains camera navigation, effective use of the camera clutch, and wristed instrument maneuvering for precise instrument tip positioning.

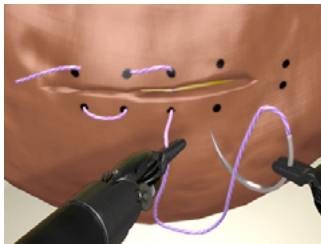


Task 2: Knot Tying

Task Description:

Tie a surgeon's knot to approximate the two eyelets of the "I" towers so that they touch each other. Back up the knot with a square knot (two throws).

This task trains successful suture placement and square knot tying.

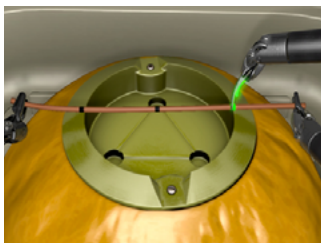


Task 3: Railroad Track

Task Description:

Perform horizontal mattress suture through the target points to approximate the tissue. Anchor the needle by passing through the final two target points twice.

This task trains precise needle control and suturing during robotic surgery.



Task 4: 4th Arm Cutting

Task Description:

Pick up and pull the elastic band taut with 2nd and 4th arms, then use 1st arm to cut the band at the first mark on the right end of band. Repeat until band is cut at all marks and put all pieces in the cap.

This task trains switching back and forth between a primary instrument and the 4th arm in a coordinated fashion.

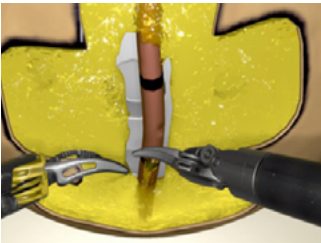


Task 5: Puzzle Piece Dissection

Task Description:

Cut out the puzzle piece shape within the designated line without incising the underlying tissue.

This task trains precise fine dissection so that the skin is incised on the marked lines while not injuring or tearing the underlying tissue.



Task 6: Vessel Energy Dissection

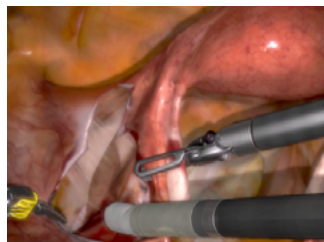
Task Description:

Dissect through the fat layer to expose the vessel, cauterize the vessel and cut the vessel.

This task trains for the correct use of the pedals for electrocoagulation and accurately cutting between the sealed points.

Part 2 - Fundamentals of Robotic Gynecologic Surgery (FRGS) Tasks

Practice key components of the robotic hysterectomy procedure in a safe and reproducible VR environment. Each task focuses on one critical step of the procedure for optimal modular training: ureter identification and dissection, bladder flap development, colpotomy incisions and suturing of the vaginal cuff. Follow the optional step-by-step guidance and avoid complications and injuries to key structures. A comprehensive performance report is provided at the end of each task.



Ureter Identification and Dissection

Task Description:

Bluntly and sharply dissect the ureter at the pelvic brim, near the infundibulopelvic ligament and where it courses under the uterine artery. Demonstrate understanding of pelvic anatomy.

This task teaches the blunt and sharp dissection needed to expose the ureter and avoid injury to it and surrounding structures.



Bladder Flap Development

Task Description:

Incise the anterior peritoneal reflection overlying the upper bladder and lower uterine segment. Retract the bladder flap upwards and safely mobilize the bladder inferiorly with sharp and blunt dissection.

This task trains precise dissection while moving the bladder out of the way in preparation for excision of the cervix from the upper vaginal fornices.

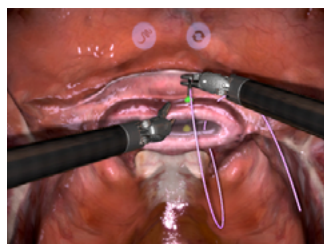


Colpotomy Incisions

Task Description:

Create an anterior and posterior colpotomy by cutting through the vagina to the cup in the vagina. Safely incise around the entire cervix into the upper vaginal fornices in order to free the cervix and attached uterus.

This task provides training on correct pedal usage for electrocoagulation and accurate cutting.

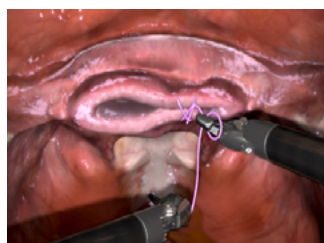


Guided vaginal cuff closure with knot tying

Task Description:

Demonstrate the skills necessary to successfully place a suture through the full thickness of the vaginal cuff. Properly secure the corners of the vaginal cuff and successfully tie square knots in the vaginal cuff.

This task trains precise needle control, suturing and knot tying during robotic surgery.



Freehand vaginal cuff closure with knot tying

Task Description:

Without guidance, demonstrate the skills necessary to successfully place a suture through the full thickness of the vaginal cuff. Properly secure the corners of the vaginal cuff and successfully tie square knots in the vaginal cuff.

This task trains precise needle control, suturing and knot tying during robotic surgery.