A Novel Pelvic Surgical Simulation Model

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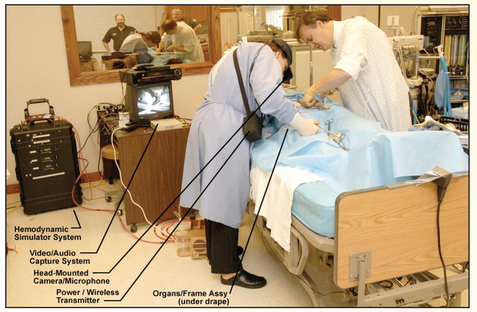
INTRODUCTION

Pelvic surgery can be very challenging to accurately and safely teach. Procedures take place in a small and deep cavity, which can be difficult for learners to accurately view and understand the correct steps in surgical technique.

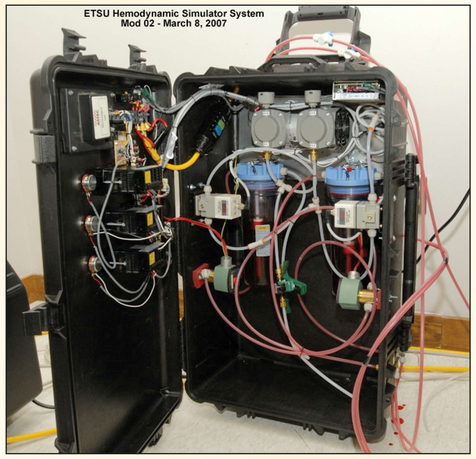
The anatomy in the female pelvis is also very intricate and complex, making dissection very complex to novice surgeons with limited experience. Even to the expert gynecologic surgeon, pelvic surgery can be complicated. For this reason, attempting to teach pelvic surgeries to students and residents can be dangerous using living patients. Our purpose in creating a novel high-fidelity pelvic surgical simulator was to make this process safe, teachable and reproducible, with the ability for teachers to easily monitor and critique students.



METHODS

At ETSU, we currently have several simulator models which we employ in a variety of training scenarios and simulations. Not only have we adapted industry models for our educational needs, but we are at the forefront of inventing our own unique models for more intensive training.

A multidisciplinary team of obstetrics and gynecology faculty, physicians, engineers, and simulation experts has devised a high-fidelity abdominal/pelvic model, specifically for obstetrics and gynecology surgical simulations. This novel model fits into our established patient simulator, representing a realistic pelvis.



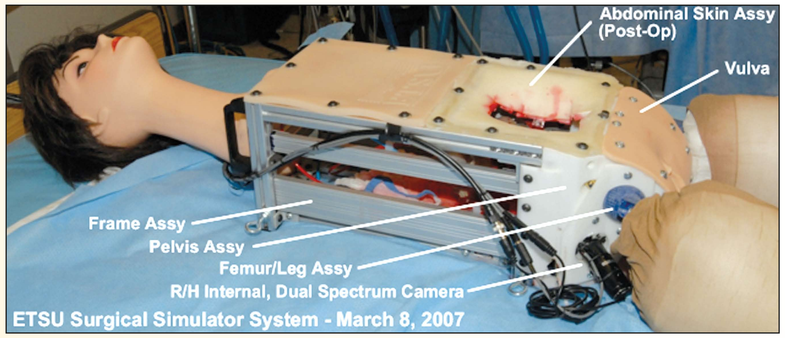
Included are all the female anatomic organs, layers of the abdominal wall, an anatomically correct hemodynamic circulatory simulator system which can be adjusted to flow at different rates and pressures, and an internal video system using infrared LEDs and dual spectrum cameras to monitor and record learners performing procedures in real-time. These features are unique and integral to our simulator system.

RESULTS

By developing a simulation that has realistic anatomy, including gynecologic organs, a hemodynamic circulatory simulator system with actual perfusion, the layers of the abdominal wall including skin, subcutaneous adipose tissue, fascial layers, muscle, peritoneum and other anatomic landmarks, the instructor is able to teach a step-wise approach to many gynecologic surgeries.

The model has a realistic look and feel, making the learning experience much more believable and accurate. The internal video system also allows a camera to be worn by the learner and records what the learner is viewing.

This allows teachers to observe each move made by the surgeon and critique both correct and incorrect maneuvers. This process has enabled students and residents to "get their hands dirty" without having to step foot in a real operating room, accruing operating time and costs, and risking harm to living patients. Learners have commented that they gain confidence in a relatively low stress environment before attempting these procedures for the first time on an actual patient.



CONCLUSIONS/DISCUSSION

With this pelvic surgical model, we are able to simulate multiple pelvic surgeries for various etiologies, including ectopic pregnancy, different types of ovarian cysts, abdominal and vaginal hysterectomy, tubal ligation, oophorectomy, and salpingectomy. This allows endless numbers of surgical possibilities, patients, and operating room time.

Learners can avoid the pressures of the operating room with living patients and can be closely monitored and instructed without the constraints of time, money, and their limited experience. Procedures are easily reproducible, with adjustments made as needed for each learner's specific needs. This novel, high-fidelity pelvic simulator model provides endless possibilities for gynecologic surgical training.