

**FIGURE 1** Without the use of a power morcellator, uterine tissue can be removed minimally invasively by manually incising tissue using a C-incision. This approach results in a long strip of tissue—similar to coring an apple.

ILLUSTRATION: JOE GORMAN FOR OBG MANAGEMENT



**SIMULATION TECHNIQUE**

# ExCITE: Minimally invasive tissue extraction made simple with simulation

➔ Use beef tongue, a cardboard box, and a homemade self-retaining wound retractor to teach or perfect your extracorporeal C-incision tissue extraction (ExCITE) technique before entering the OR

**Arnold P. Advincula, MD, and Mireille D. Truong, MD**

In November 2014, following concerns regarding the use of electromechanical, or power, morcellation, we published a surgical technique called the extracorporeal C-incision tissue extraction, or ExCITE, technique, as an alternative to contained tissue extraction during minimally invasive gynecologic procedures such as myomectomy and hysterectomy.<sup>1</sup> This technique was developed to create a simple, reproducible, and minimally invasive approach to tissue extraction without the need for power morcellation. ExCITE is trainee-friendly and teachable.

In this article, we will review the steps for successful execution of the ExCITE technique. In addition, we will describe how

to create your own cost-effective simulation model for teaching, learning, and practicing this technique with a few simple materials found in any craft or grocery store. Simulation is essential. It helps to troubleshoot issues that may arise in an actual case and allows for learning and practicing of surgical techniques to improve the learning curve and efficiency in the operating room (OR).

The model described here is viewable in the video, “The ExCITE technique, Part 2: Simulation made simple” at [obgmanagement.com](http://www.obgmanagement.com). It is archived in Arnold Advincula’s Surgical Techniques Video Channel (<http://www.obgmanagement.com/arnold-advincula-s-surgical-techniques-video-channel.html>) and accessible through the “multimedia” section of the Web site.

## ExCITE operative technique

“Traditional” intracorporeal tissue extraction techniques use power morcellation without specimen containment. The specimen is grasped with a tenaculum and pulled through the device. The specimen is essentially peeled like an apple and results in long strips of tissue with both a “cut” and “noncut” or intact surface due to the way the blade incises the tissue (FIGURE 1). When performing extracorporeal tissue extraction, we are replicating essentially the same mechanism of tissue removal. With ExCITE, however, the specimen is contained,



Dr. Advincula is the Levine Family Professor of Women’s Health and Vice-Chair, Department of Obstetrics & Gynecology, and Chief of Gynecology, Sloane Hospital for Women at Columbia University Medical Center in New York, New York.



Dr. Truong is Assistant Professor and Director, Minimally Invasive Gynecology, Virginia Commonwealth University, Richmond, Virginia.

*Dr. Advincula reports being a consultant to Blue Endo, CooperSurgical, Intuitive Surgical, SurgiQuest, Titan Medical and receiving royalties from CooperSurgical. Dr. Truong reports no financial relationships relevant to this article.*

**IN THIS ARTICLE**

**5 steps to execute ExCITE**

page 42

**Keys to technique success**

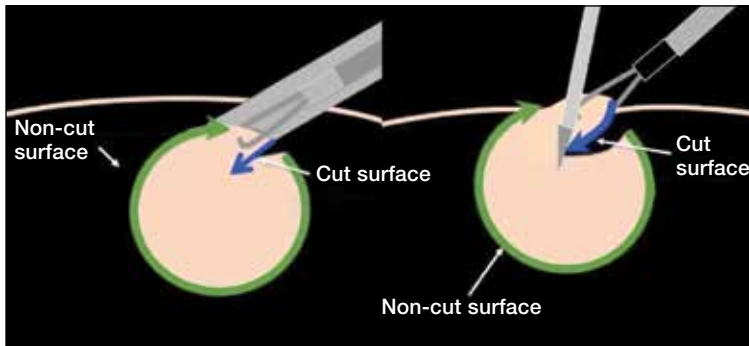
page 43

**Building the simulation model**

page 44



**FIGURE 2** Intracorporeal power morcellation vs extracorporeal manual tissue extraction



there is no power morcellator, and tissue extraction is performed manually (FIGURE 2).

The ExCITE technique can be broken down into 5 major steps:

1. specimen retrieval and containment
2. self-retaining retractor placement
3. creation of the C-incision
4. tissue extraction
5. fascial closure.

### 1. Specimen retrieval and containment

First, place the specimen in an endoscopic specimen retrieval bag. Extend the incision at the umbilicus, to approximately 2.5 to 3.5 cm (roughly 2 good fingerbreadths), and exteriorize the bag at the level of the umbilicus.

**FIGURE 3** Self-retaining retractor at the umbilicus



Make the umbilical incision at least 2 fingerbreadths, or approximately 2.5- to 3.5-cm wide.

### 2. Self-retaining retractor placement

Next, place a small disposable self-retaining retractor, (we prefer the extra-small Alexis-O) inside the bag, which helps keep the bag in position at the umbilicus (FIGURE 3).

**Tip.** When inserting the retractor, push it in all the way until the entire bottom ring is inside of the bag. This allows for the retractor ring to deploy. Allow some space between the specimen and the opening of the bag when placing the retractor. Do not pull the bag too tightly against the anterior abdominal wall as this may prevent the retractor ring from deploying fully and make the specimen extraction step more difficult.

### 3. Creation of C-incision

Grasp the specimen with a penetrating clamp (such as a tenaculum, Lahey, or towel clamp) and pull the specimen flush against the incision and retractor. Use a #11 or #10 blade scalpel to create a reverse “C-incision,” with the clamp in your nondominant hand and the scalpel starting the C-incision from your nondominant side moving toward your dominant side. (The curve of the “C” faces your dominant side.)

**Tip.** It is important to make your C-incision wide enough to get an adequate sized specimen strip through the umbilicus but not too wide (ie, too flush with the retractor), as this will decrease your workspace and increase the risk of cutting the retractor or the bag. It is helpful to hold the scalpel like a pencil and use a sawing-like motion rather than trying to advance the scalpel through the tissue in one motion.

### 4. Tissue extraction

Re-grasp the tissue flap, or “nub,” created by the C-incision with the penetrating clamp. While maintaining tension on the specimen, continue cutting with a sawing-like motion, using a reverse C coring technique, keeping one surface completely intact. (Generally this is the surface facing your nondominant side.) When cutting, the tissue becomes a

strip, similar in appearance to when using a power morcellator. In fact, the technique is very similar to peeling an apple all the way around while trying to keep the skin of the fruit intact.

**Tip.** Try to angle the scalpel slightly when cutting the tissue, especially at the curve of the C. In other words, keep the tip of the scalpel toward the center of the strip and the handle away from the center, angled closer to the abdominal wall. When achieving an adequate strip of tissue, often the specimen will start rolling (similar to power morcellation). If this occurs, “go with the roll” by modifying the C-coring incision to a half C and incising along the top part of the C repeatedly until the specimen stops rolling. At that point, complete the C. Be sure to re-grasp near the specimen base as you continue the procedure and as the strip gets longer to prevent premature breakage of the strip and for ease of maintaining tension.

## 5. Fascial closure

After the specimen is completely extracted, remove the self-retaining retractor and specimen bag. Close the fascia at the umbilical incision. We prefer to close the fascia with an 0-polysorb (absorbable) suture in a running fashion, but you may consider an interrupted closure or use delayed absorbable sutures such as polyglyconate/polydioxanone (maxon/PDS).

**Tip.** To facilitate removal of the self-retaining retractor, pull on the specimen retrieval bag at one apex in order to collapse the retractor ring inside the bag. This allows removal of the bag and retractor simultaneously.

### Keys to success

- **Perfect the cutting technique; it is imperative to achieve tissue removal in long strip-like pieces for efficiency.** Achieving the “saw cut” is like connecting the dots on a piece of paper with a pencil, where you try not to lift up the pencil (or the scalpel in this case). Rock the tissue back and forth with your nondominant hand and pull the specimen flush to the

incision. This helps expose maximal surface area so you can continue to cut tissue pieces that are as large as possible. When rocking, move your dominant (cutting) and nondominant (holding the specimen with the tenaculum) hands in opposite directions.

- **Ensure that the appropriate amount of tissue is cut when performing the C-incision.** If the tissue strip is too thick, it becomes hard to see and incise the tissue, especially as you come around the back curve of the C. Limited visualization will increase your risk of cutting the retractor or the bag. If the cut is too thick, angle the scalpel in to make the tissue strip thinner (ie, make a “V-like” incision into the noncut surface). If the tissue strip becomes small, do the opposite; instead of cutting at a diagonal toward the noncut surface, aim out from your last incision (“V-out”). You should re-grasp below the narrowed area of the strip in this case before continuing to cut to prevent premature breakage of the strip.
- **Maintain traction on the specimen.** Keep it flush against the abdominal wall and the opening of the self-retaining retractor. Use your finger to help “roll” the specimen when continuing the C-incision, if necessary. Maintaining traction will help avoid the need to use your finger.
- **If you cannot remove the tissue fully intact, reorient or resect, and move forward.** When the tissue is not easily extractable, try to roll the specimen by pushing near or behind the junction of the cut surface and the specimen. This helps reorient the specimen and exposes more smooth, noncut surfaces so coring can continue. The strip of tissue may need to be completely incised at times. If this occurs, drop the specimen back into the bag, find a smoother surface, re-grasp, and begin the C-incision again.

To view ExCITE performed in real-time during removal of an 8-cm, 130-g fibroid after a robot-assisted laparoscopic myomectomy, access the video “The Extracorporeal C-Incision Tissue Extraction (ExCITE)

## WATCH THE VIDEO!

### The ExCITE technique, Part 2: Simulation made simple

by Arnold P. Advincula, MD, and Mireille D. Truong, MD



Use this QR code to download the video to your Smartphone,\* or go to [obgmanagement.com](http://obgmanagement.com)

\*Free QR readers are available at the iPhone App Store, Android Market, and BlackBerry App World.



**Perfecting the C-incision technique is vital to ensure intact, efficient tissue removal**



technique” at obgmanagement.com, found in Arnold Advincula’s Surgical Techniques Video Channel.

### Building the ExCITE simulation model

Creation of the ExCITE simulation model can be broken down into 4 simple steps: creating the self-retaining retractor, building the torso, preparing the specimen, and simulating the ExCITE technique.

#### Supplies

To complete all 4 steps, you will need several materials, all of which are easily accessible and easy to prepare for simulation (FIGURE 4).

- 1 beef tongue (2–3 lb)
- 1 pantyhose
- 2 silicone rings (4–5 cm in diameter, such as those used as wrist bracelets for cancer awareness)
- 1-gallon resealable (Ziploc) plastic bags
- 8x12 cardboard/corrugated box (or plastic storage box)
- duct or masking tape
- instruments:
  - #11-blade (or your preference) scalpel
  - penetrating clamps (tenaculum, Lahey, or towel clamps)

Note that beef tongue, given its muscular texture, closely mimics uterine tissue and therefore is used to represent the fibroid or uterus during simulation. Sometimes, a piece of beef tongue can be marbled, or fatty, in which case it can simulate a

degenerated fibroid. Beef tongue usually comes in one large piece, which could be suitable for up to 4 surgical exercises. The cost of a single tongue is approximately \$20 to \$30, so it averages about \$5 to \$7 per exercise/surgical trainee.

#### 1. Create the self-retaining retractor

Supplies: pantyhose, 2 silicone rings

A self-retaining retractor is tubular and made up of a thin plastic material that has a pliable ring on either end. The pantyhose is used to simulate the tubular plastic material, and the silicone bracelets serve as the ring ends of the retractor. The retractor should be large enough so that it does not slip through the incision.

First, cut off the toe end of the pantyhose. Measure and cut a pantyhose strip to approximately 38 cm (15 in). Place one end of the pantyhose through the center of one of the silicone bracelets and wrap it around the edges of the bracelet. Make it as even as possible all the way around the ring. Roll the pantyhose over the bracelet twice more to secure it. Repeat these steps for the other end of the pantyhose to create the simulated self-retaining retractor (FIGURE 5).

#### 2. Build the torso

Supplies: cardboard (ie, office paper box) or plastic box, scissors, duct tape

Place the cardboard box upside down and cut a hole (approximately 2–3 cm wide) at the center of the box top (technically the bottom of the box) to simulate the umbilical

**FIGURE 4** Supplies



**FIGURE 5** Simulated self-retaining retractor



incision. Cut another opening on either side of the box (large enough to fit a hand so that the specimen can be inserted inside the box). When performing the ExCITE technique, a constant upward traction is required. In order to keep the box from lifting off the table, tape the box to the table with masking or duct tape. Alternatively, place weights in the bottom of the inside of the box.

### 3. Prepare the specimen

**Supplies:** beef tongue, resealable plastic bag  
To simulate the contained fibroid or uterus, slice the beef tongue into 3 to 4 pieces (approximately 1-lb pieces) and place one piece of beef tongue inside the resealable plastic bag. Using the side opening in the box, place the bag with the specimen inside the box, and pull the bag through the “umbilical incision” hole, just as you would in a real case. When exteriorizing the bag, ensure some slack so the simulated self-retaining retractor can be placed inside the bag with the ring rolled over it (FIGURE 6).

### 4. ExCITE technique simulation:

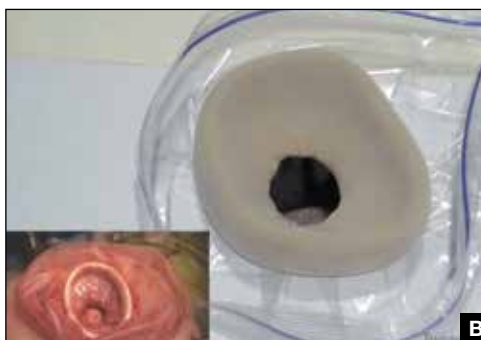
#### Grasp, cut, extract

**Supplies:** #11-blade scalpel, penetrating clamps (tenaculum, Lahey, or towel clamps). After exteriorizing the bag, place the self-retaining retractor inside the bag and roll the silicone ring until the retractor is flush with the anterior abdominal wall. Grab the specimen (beef tongue) inside the bag. Perform the ExCITE technique using the beef tongue and the simulated model to fully remove the specimen (FIGURE 7).

### Ready, set, simulate

There are many advantages to being able to teach and practice the ExCITE technique outside of the OR. Simulation helps the surgeon to better understand the nuances of tissue extraction in a risk-free environment, and it can improve efficiency in the OR. Building the simulation model as we have described is simple, quick, and inexpensive. We hope that this technique will add to your surgical armamentarium so that you can

**FIGURE 6** “Torso” box and placement of self-retaining retractor



**FIGURE 7** Intact, extracted beef tongue specimen



continue to provide your patients minimally invasive gynecologic surgical options. We recommend that you view both of our videos related to the ExCITE technique and its simulation model at [obgmanagement.com](http://obgmanagement.com), and soon you will be ready to teach or practice the ExCITE technique. 📌

#### Reference

1. Truong MD, Advincula AP. The Extracorporeal C-Incision Tissue Extraction (ExCITE) technique. *OBG Manag.* 2014;26(11):56.