

Temple University Department of Surgery Surgical Skills Lab

BASIC LAPAROSCOPIC SKILLS

I. OBJECTIVES

By the end of this session the residents will be familiar with and demonstrate knowledge of:

- 1) Laparoscopic equipment
 - a) laparoscope and optics
 - b) instrumentation and trocars
- 2) Dry model exercises
 - a) triangulation and camera orientation
 - b) demonstrate facility with instrument handling by performing basic skills exercises

II. ASSUMPTIONS

Laparoscope and Optics

Light Source: In order for the camera to pick up a clear image from the abdominal cavity the intensity of light transmitted to the abdomen must be adequate. Most light sources for laparoscopic use range in power from 100-300 watts (anything less is insufficient to visualize clearly all the internal organs). Light sources are either halogen or xenon. They transmit similar intensity but the character of the light is different. The light is transmitted via a fiberoptic cable, through the scope, and into the abdomen. This allows for most of the intensity to reach the abdomen with little or no heat.

Video Camera: The microchip camera is an optical/electronic interface that transmits the image from the laparoscope to the video monitor via a processor. Depending on the size of the monitor the image is magnified 10 to 12x. There are one-chip and three-chip cameras, the greater the number of chips the better the resolution. Axial orientation of the camera must be maintained to insure proper orientation of the image.

Grasping Forceps

Grasping forceps are designed to handle and manipulate different types of tissue. The handle is usually a pistol-grip design although in-line handles are often more comfortable to use. The design of the head is

what determines the function. If the instrument is intended to hold firmly onto tissue it may have prominent teeth and be quite traumatic to organs like the bowel or spleen. Others are designed like Babcocks in order to be atraumatic.

Dissection Instruments and Scissors

Dissectors and scissors for laparoscopic use are essentially modifications of open surgical instruments (ie: metzenbaum scissors, mixters etc.). Other instruments are exclusively designed for laparoscopy like hook dissectors and spatulas. All of these tools are designed to be attached to electrocautery in order to maintain hemostasis during dissection.

III. SUGGESTED READING

Surgical Skills Manual.

IV. ANATOMICAL CONSIDERATION

Trocar placement for laparoscopic abdominal procedures: a simple standardized method.

Journal of the American College of Surgeons, Volume 198, Issue 1, January 2004, Pages 163-173
George S Ferzli and Abe Fingerhut.

V. DESCRIPTION OF LABORATORY MODULE

After an overview of laparoscopic equipment participants will perform the following initial laparoscopic steps:

Step 1: review laparoscopic tower and assemble camera, light source & laparoscope

Step 2: review basic laparoscopic instruments

Step 3: instrument handling in basic skills exercises

VI. DESCRIPTION OF TECHNIQUE/PROCEDURE

Pegboard – Using laparoscopic grasper, move rings (plastic-coated lifesavers) on & off sequentially numbered pegs with right, then left hand. Task timed for each hand (max=5 min.), pre- and post-instruction. Score points deducted for dropped rings.

Bean drop – Using laparoscopic grasper, pick up beans (n=10) & drop them into an inverted specimen cup through a 15mm hole with right, then left hand. Task timed for each hand (max=5 min.), pre- and post-instruction. Score points deducted for dropped beans.

Rope pass – Using 2 laparoscopic graspers, pass a length of rope (~4 ft.) from right to left hand (and vice-versa), grasping only on 1-inch black segments that are 3 inches apart. Task timed (max=5 min.) pre- and post-instruction. Score points deducted for grasping rope on unmarked areas.

Pattern cutting – Using laparoscopic scissors & grasper, cut a pre-marked circular pattern out of the middle of a suspended piece of cloth. Task timed (max=5 min.) pre- and post-instruction. Score points deducted for deviation from pattern line (+/- 5mm).

Endo-clip – Using a laparoscopic grasper to assist, deploy an endoclip-applier to place 2 endoclips onto marked targets on a suspended piece of tubing, then bisect the tubing between the clips. Task timed (max=5 min.) pre- and post-instruction. Score points deducted for distance of endoclips from marks.

Endo-knot – Using a laparoscopic grasper to assist, deploy an endo-knot device onto a marked piece of tubing that is suspended from one end. Cut the suture end with laparoscopic scissors. Task timed (max=5 min.) pre- and post-instruction. Score points deducted for distance of endo-knot from mark.

VII. EQUIPMENT NEEDED

- laparoscopic video box trainer
- 10mm 0° and 30° laparoscope
- Assortment of laparoscopic instruments
- Veress needle & trocars
- Laparoscopic camera, fiber-optic light source and monitor
- Supplies for basic laparoscopic skills exercises

VIII. REFERENCES

1. Steixner B, Milner R, Jensen A, Goldberg AJ, Grewal H. Teaching Laparoscopic Skills to Surgical Residents: Can it be done in the Laboratory? JLS 2004; 8:S105–S106
2. Jensen A, Grewal H, Milner R, Gaughan J, Rolandelli R. Does postgraduate year (PGY) level of surgical training affect basic laparoscopic skill acquisition in the laboratory? Ped Endosurgery & Innov Techniques 2003; 7: 98.
3. Jensen A, Grewal H, Milner R, Gaughan J, Rolandelli R. Sleep deficits do not affect acquisition of laparoscopic skills in the laboratory setting. Surg Endosc, 2003; 17 (suppl): S252.