

**Wayne State University
Department of Surgery**

General Surgery Residency Program

Intestinal Anastomosis Module

Intestinal Anastomosis Module

(Two-layer hand sewn end-to-end bowel anastomosis)

I. OBJECTIVES

Cognitive

By the end of this laboratory session students should.....

- 1) Know all layers of the intestinal wall.
- 2) Know the technique of a two-layer hand sewn end-to-end bowel anastomosis.
- 3) Know the appropriate instruments used in two-layer hand sewn end-to-end bowel anastomosis.

Technical

By the end of this laboratory session students should be able to.....

- 1) Demonstrate proficiency at placing interrupted Lembert stitches for the posterior outer layer.
- 2) Demonstrate proficiency at performing a continuous running stitch for the posterior inner layer closure.
- 3) Demonstrate proficiency at performing a continuous Connell stitch for the anterior inner layer closure.
- 4) Demonstrate proficiency at placing interrupted Lembert stitches for the anterior outer layer.
- 5) Demonstrate the proper technique to check for mucosal inversion and intestinal luminal patency.
- 6) Demonstrate the proper technique for performance of a two-layer hand-sewn end-to-end bowel anastomosis.

II. ASSUMPTIONS OF PRE-TRAINING SURGICAL SKILLS AND KNOWLEDGE

Students will have reviewed the appropriate reading material regarding the use of specific surgical instruments and suture in intestinal surgery, the different suturing techniques used for single and two-layer bowel anastomoses. Specific reading material is available in the appendix for this module (located in the section after the evaluation forms).

III. PREPARATION

- 1) Operative Strategy in General Surgery-Volume I. Chassin, J.L.. Springer-Verlag, New York, NY 1980
- 2) Chassin's Operative Strategy in General Surgery. An Expositive Atlas. 3rd Edition. Chassin J.L., Scott-Conner C.E.H.. Springer-Science, New York, NY 2002
- 3) Intestinal Anastomosis-Gastrointestinal Tract and Abdomen, Britton, J., Souba WW, Fink MJ, Jukovich GJ, et al.. ACS Surgery: Principles & Practice. New York, WebMD Inc, 2003.1

IV. ANATOMICAL CONSIDERATION

Students will have reviewed and committed to memory all the layers of the intestinal wall. This should include knowledge regarding each layer's specific microscopic and macroscopic composition. Students should know the specific anatomical characteristics for the small and large intestine, respectively.

V. DESCRIPTION OF LABORATORY MODULE

This module will be taught in the student conference room on the 4th floor in the Harper Professional building within the Department of Surgery offices.

The assigned faculty mentor will present an overview of the cognitive and technical objectives for this module. Following the presentation the faculty mentor will provide a technical demonstration of the module to all of the students. This demonstration will include performance of a two-layer hand sewn end-to-end bowel anastomosis.

Students will work in pairs for this module. One student will act as the surgeon and the second student will serve as the first assistant. Two 20mm-30mm x 200mm double-layer simulated bowels will be used to simulate the intestines.

Each student is expected to perform a two-layer hand sewn end-to-end bowel anastomosis. The surgical techniques for this module should be practiced a minimum of two times. The faculty mentor(s) will circulate around the room offering support and guidance with immediate instructional feedback as required.

Student performance will be evaluated and graded using the following three testing modalities:

- 1) Procedural Evaluation Form - Checklist
- 2) Time to Completion Assessment
- 3) Global Rating Scale

VI. MODULE INSTRUCTION, NARRATIVE DESCRIPTION, SKILL DESCRIPTION and TRAINING METHOD

SKILL	TECHNIQUE
1) Performance of posterior outer layer.	<p>1. Apply noncrushing intestinal clamps proximal and distal to prevent spillage of intestinal contents. Non-toothed forceps should be used to grasp intestinal tissue. Place two ends of the bowel side to side with open ends pointing upward. Rotate intestinal clamps outward exposing serosa of intestines just above the clamps.</p> <p>2. <i>Interrupted seromuscular Lembert stitches</i> are used to produce the posterior outer layer. This stitch is placed in the seromuscular layer performed using 3-0 or 4-0 ‘pop-off’ silk sutures. The stitch catches about 3mm-5mm of tissue, including a bit of submucosa. The Lembert stitches should be placed using the technique of <i>successive bisection</i>. The initial Lembert suture should be placed at the midpoint of the bowel. Each stitch should be about 5mm-10mm apart. Secure each Lembert stitch with 3-4 square knots. The stitches can be tied as each stitch is placed or they can be tied after all stitches are placed. Release noncrushing intestinal clamps.</p>
2) Performance of posterior inner layer closure	<p>1. Select two 3-0 silk or 3-0 Vicryl sutures for the posterior inner layer closure. Each suture is placed next to each at the midpoint of the bowel. Each stitch is a full thickness bite. Each suture is individually secured with 3 square knots and then tied to each other with 3 additional square knots.</p> <p>2. The posterior inner layer is closed using <i>full thickness continuous running over-and-over stitches</i>. Each suture is then ran from the midpoint outwards to the corners of the bowel. Adequate full thickness suture bites should be at least 3mm from cut edge of the bowel.</p>
3) Performance of anterior inner layer closure	<p>1. Once the sutures have reached the corners of the bowel the continuous over-and-over stitch is changed to a <i>full thickness running Connell stitch</i> for the anterior inner layer closure. Once the two sutures have reached the midpoint of the anterior inner layer they are tied and secured to each other with 4 square knots. It is important for the student to note that when placing bowel stitches the needle should enter the bowel at right angles and the curve of the needle should be followed as it exits from the bowel.</p> <p>2. Following completion of the posterior and anterior inner layer closure the student should check for inversion of mucosa and patency of the bowel lumen using an <i>imbrication technique, “feeling for the doughnut”</i>. This is done by opposing the thumb and forefinger across the inner layer</p>

	repair.
4) Performance of anterior outer layer repair	<p>1. <i>Interrupted seromuscular Lembert stitches</i> are used to produce the anterior outer layer. This stitch is placed in the seromuscular layer performed using 3-0 or 4-0 ‘pop-off’ silk sutures. The stitch catches about 3mm-5mm of tissue on either side of the anterior inner layer suture line. The Lembert stitches should be placed using the technique of <i>successive bisection</i>. The initial Lembert suture should be placed at the midpoint of the bowel. Each stitch should be about 5mm-10mm apart. Secure each Lembert stitch with 3-4 square knots. The stitches can be tied as each stitch is placed or they can be tied after all stitches are placed. .</p> <p>2. Following completion of the anterior outery layer the student should check for inversion of mucosa and patency of the bowel lumen using an <i>imbrication technique, “feeling for the doughnut”</i>. This is done by opposing the thumb and forefinger across the inner layer repair.</p>

VII. EQUIPMENT REQUIREMENTS and MATERIALS NEEDED

- W.L. Gore Suture Board (old boards if available)
- Double Layer Simulated Bowel: 20mm OD or 30mm OD x 200mm
- Debaquey vascular forceps
- Tissue forceps
- #10 blade scalpel
- Metzenbaum scissors
- Suture scissors
- Doyen non-crushing intestinal clamps (2)
- Regular Mayo-Hegar needle driver
- Tissue needle driver
- 3-0 braided silk sutures
- Stopwatch
- One faculty evaluator

VIII. REFERENCES

IX. TIME LENGTH

1 ½ - 2 hours

X. APPENDIX