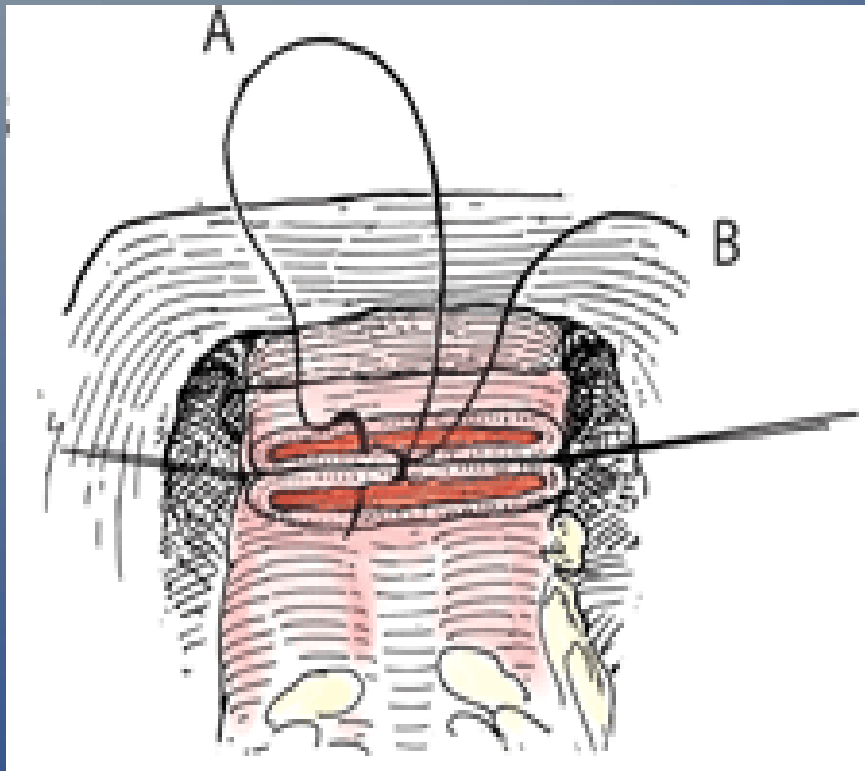


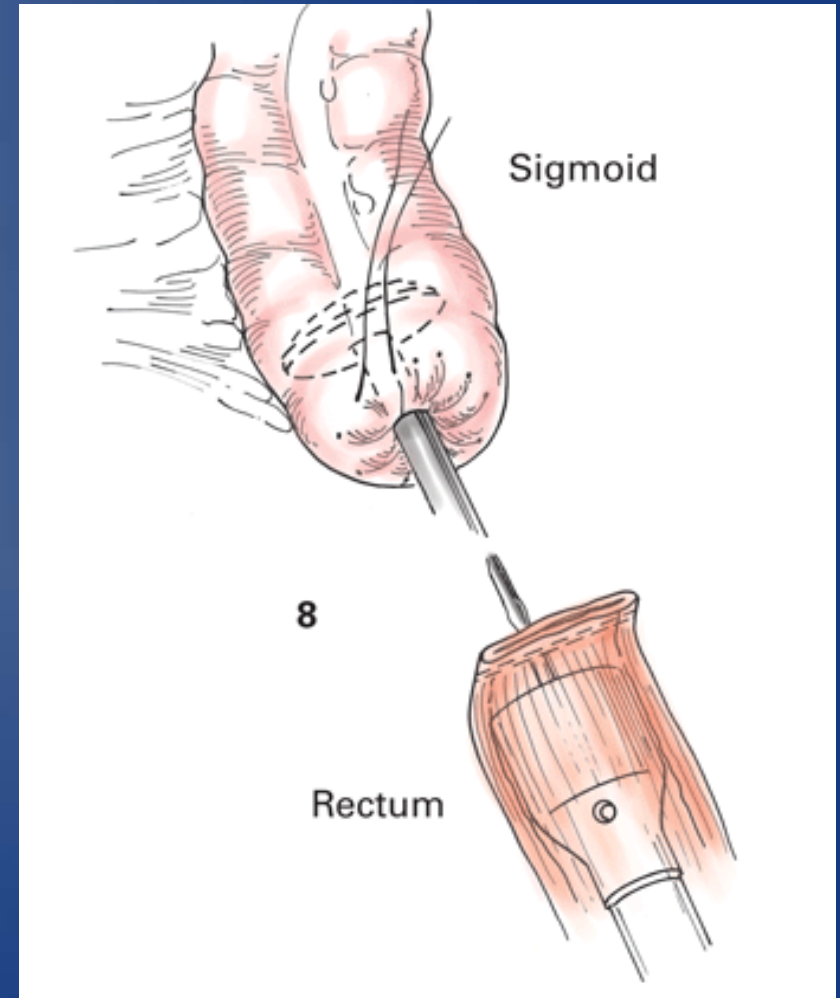
Intestinal Anastomosis Which Technique is Better?

Roseanna Lee
March 1, 2012





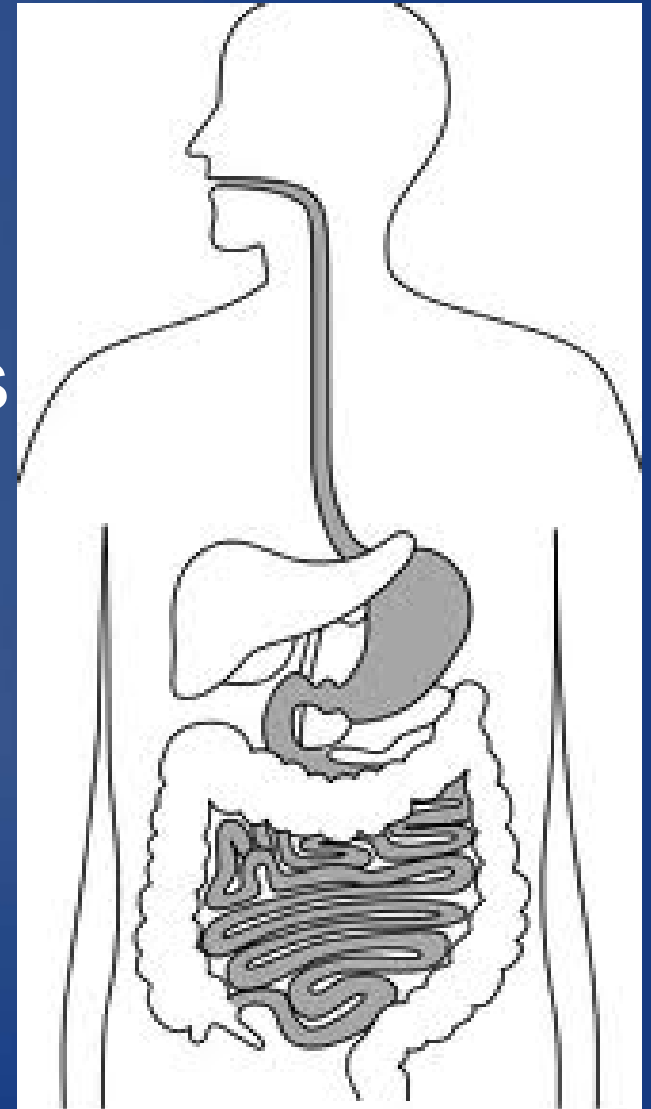
VS





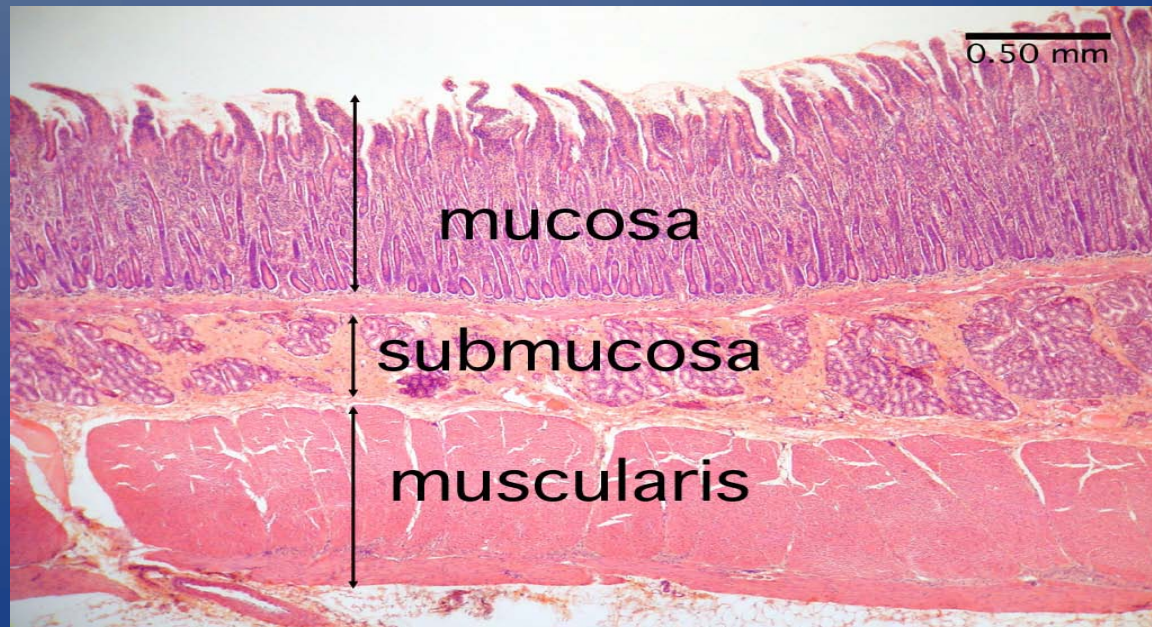
Gastrointestinal Anastomosis

- Provides continuity of the gastrointestinal tract
- Clinically apparent anastomosis leak rates ranges from 2-15%
- Complications associated with anastomotic breakdown increases morbidity and mortality



Histology

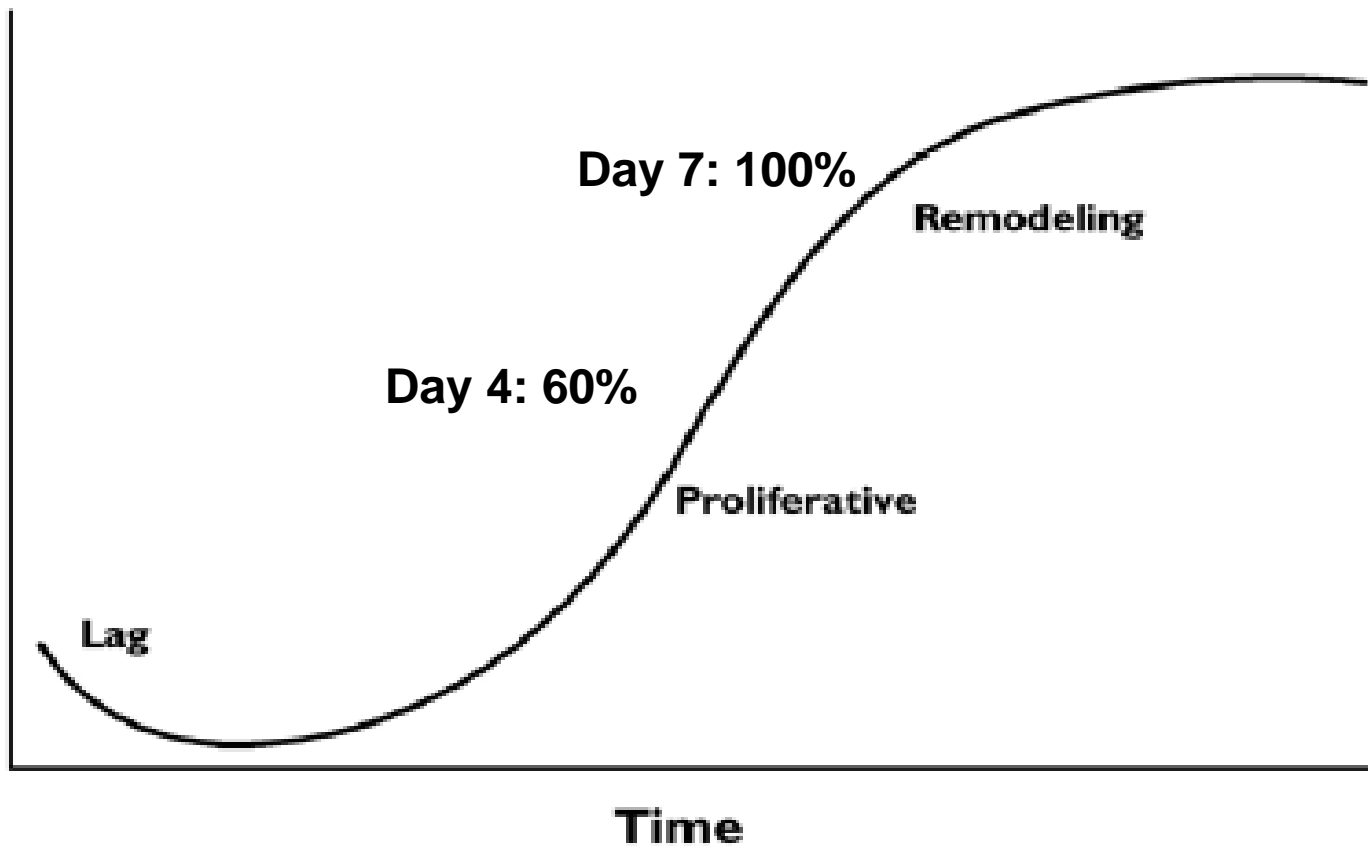
- Submucosal layer contains high content of collagen fibers which provides the the tensile strength of the bowel.
- Collagen is the most important molecule in determining intestinal wall strength



Healing Phases

- Acute inflammatory “lag” phase
 - Neutrophils and macrophages
- Proliferative phase
 - Fibroblast – collagen synthesis in EC matrix
 - Matrix metalloproteinases (MMP) – collagen degradation, increase with sepsis
- Remodeling/maturation phase

**Anastomotic
Strength**



Principles of Successful Intestinal Anastomosis

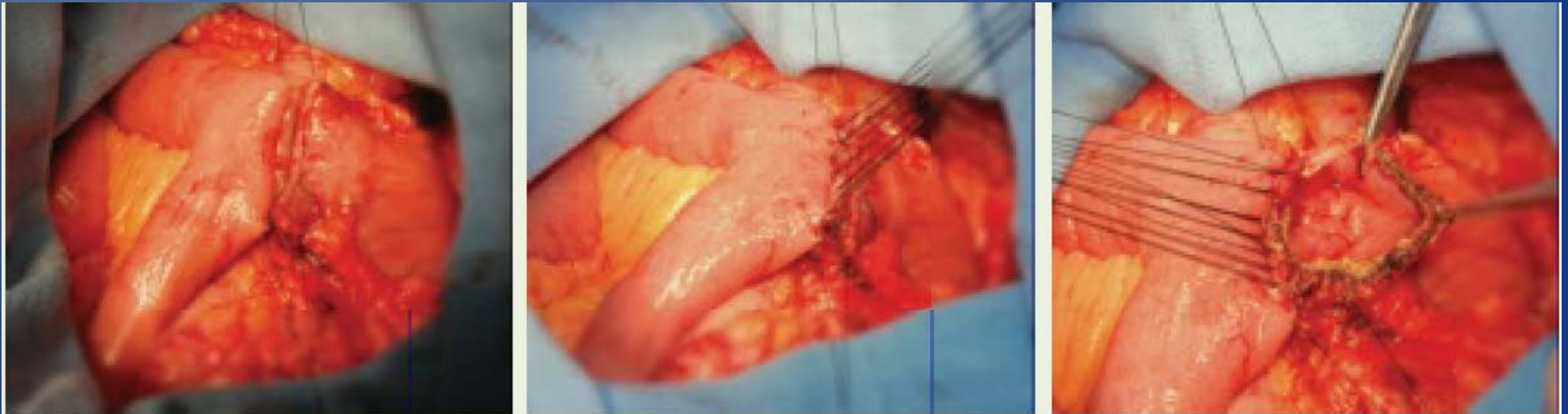
- **Technical Factors**

- Adequate blood supply
- Tension-free
- Minimize contamination
- Meticulous technique

- **Patient-Related Factors**

- Malnourished
- Chronic steroid use
- Diabetes mellitus
- Malignancy, prior chemoradiation
- Hypotension/Shock
- Emergency surgery

Hand Sewn Technique



Continuous versus Interrupted

- Sarin and Lightwood (1989) Br J Surg
- AhChong et al. (1996) Aust N Z J Surg
- Prospective studies comparing single-layer continuous and interrupted suture technique
- No significant difference

Single-layer versus Double-layer

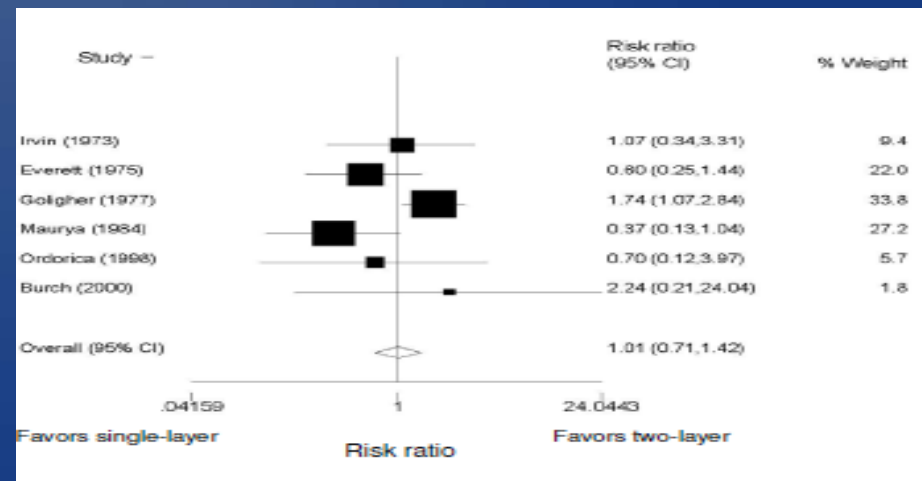
- **Burch et al (2000) – Annals of Surgery**
 - Compared single-layer continuous technique with two-layer interrupted technique
 - Prospective randomized trial
 - No difference in leak rates
 - Lower cost
 - Less time

Table 2. OUTCOME VARIABLES FOR THE STUDY GROUPS

	One-Layer	Two-Layer	P
Number of anastomoses	65	67	
Leaks	2 (3.1%)	1 (1.5%)	.62*
Abscesses	2 (3.1%)	2 (3.0%)	.0*
Time (min)	20.8	30.7	.000†
Length of stay (days)	7.9	9.9	.084†
Cost	\$4.51	\$35.38	

* Fisher exact test.
† Student t test.

- **Shikata et al. (2006) BMC Surgery**
 - Compared single versus two layer intestinal anastomosis
 - Meta-analysis of randomized controlled trials
 - No difference in leak rates





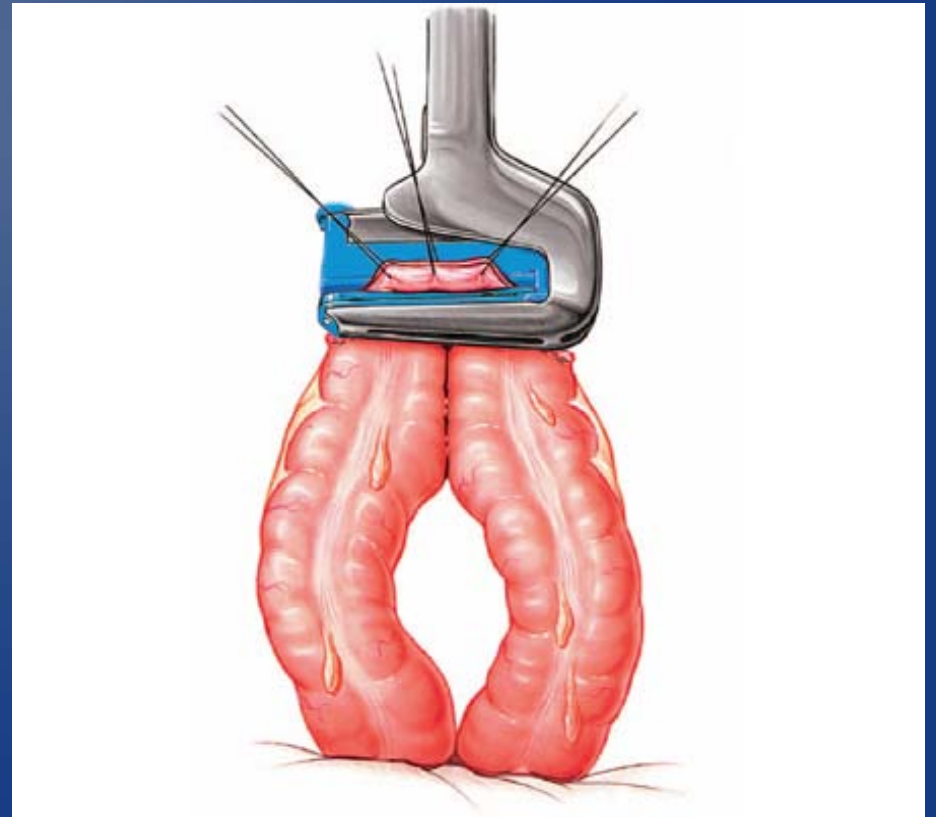
Staple Technique



- Various stapling devices
- Staples come in various width, height, distance between staples
 - Each designed for specific tissues
- Open and laparoscopic uses
- Made of titanium – minimal tissue reaction
- Nonmagnetic – MRI compatible

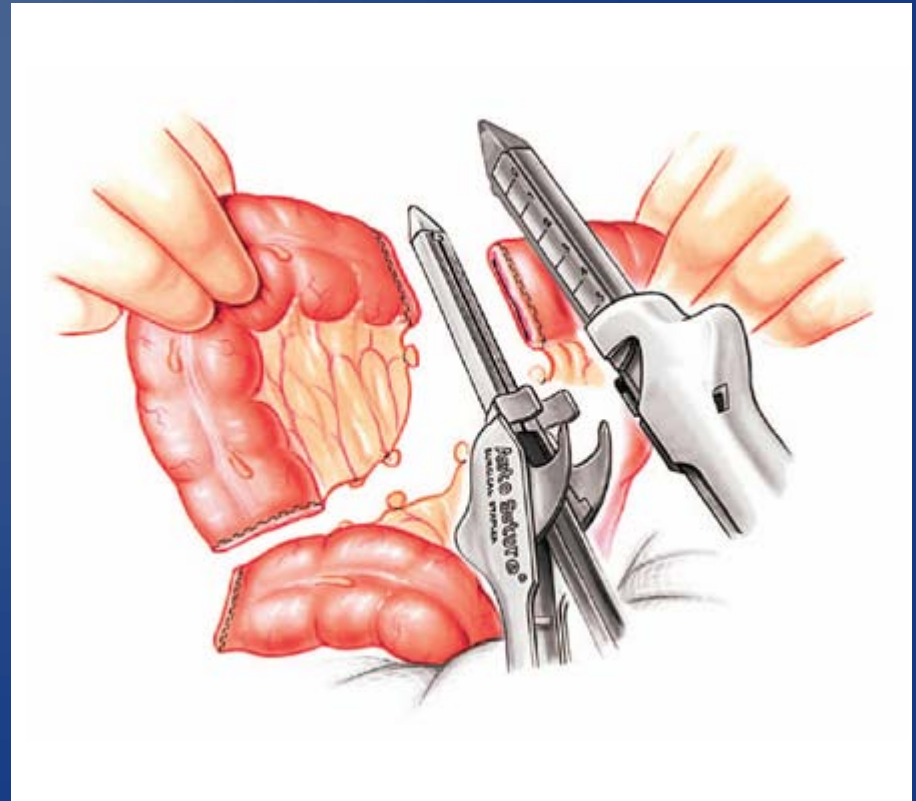
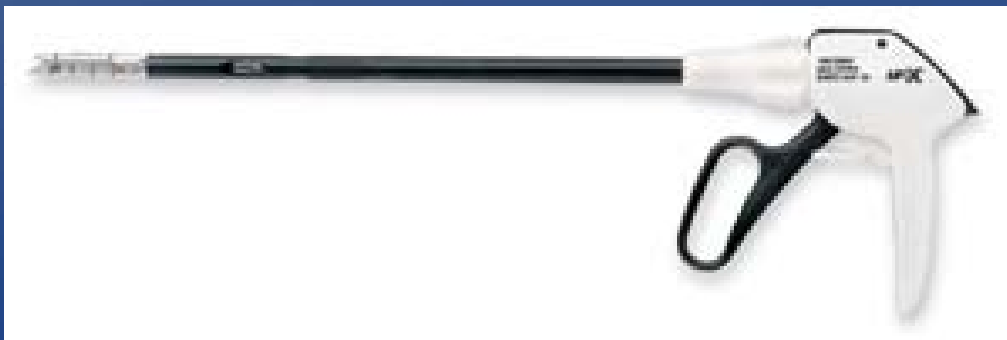
Transverse Anastomosis (TA) Stapler

- 2 staggered rows of staples
- Does not cut



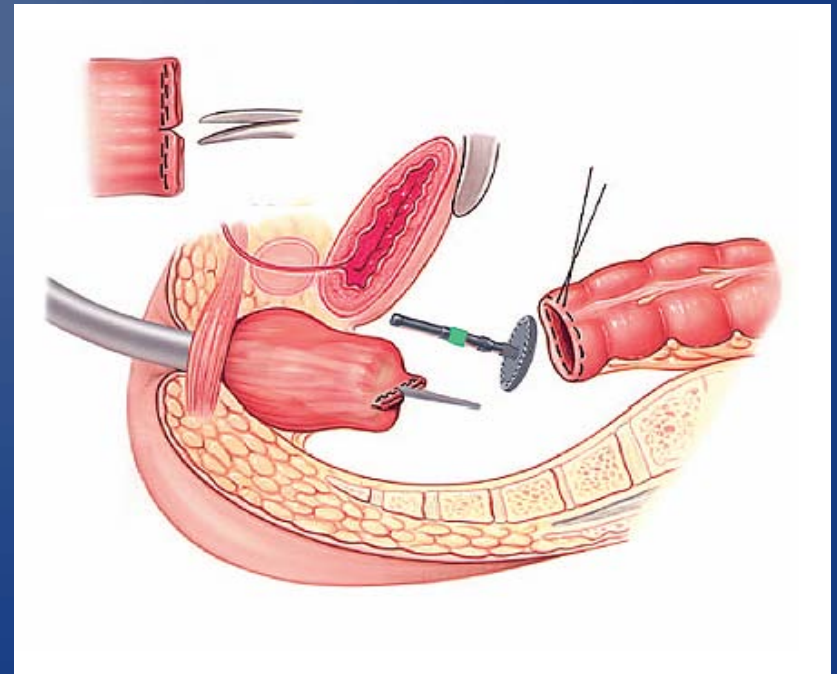
Gastrointestinal Anastomosis (GIA) Stapler

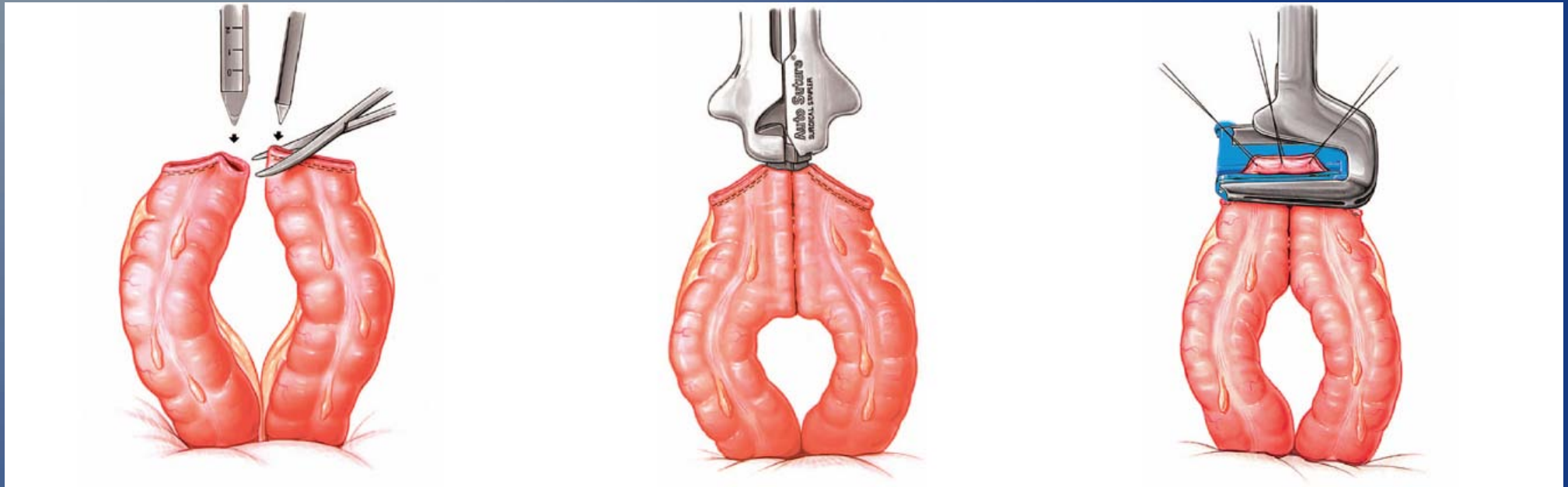
- 2 double rows of staples
- Simultaneously cuts in between the rows

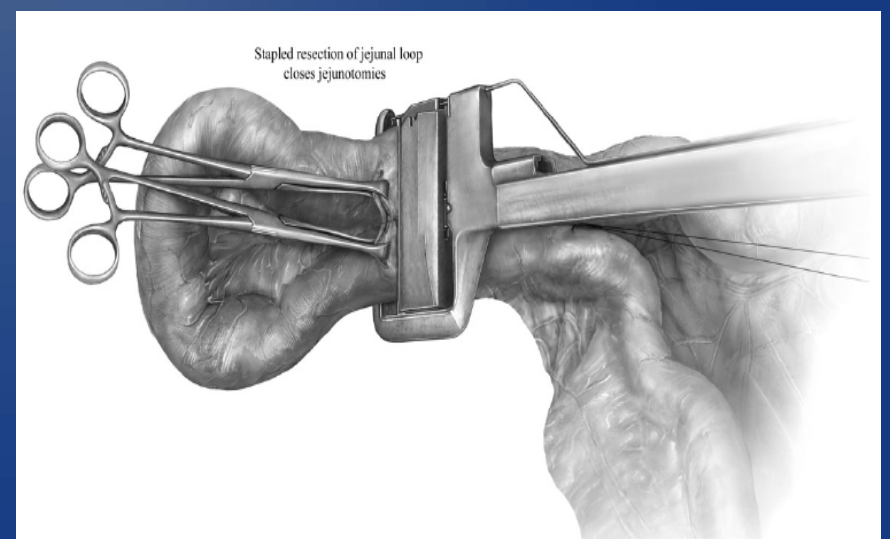
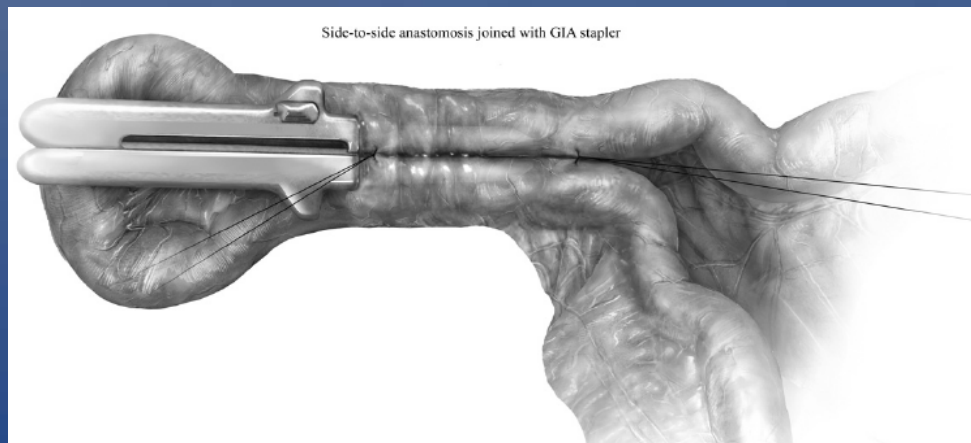
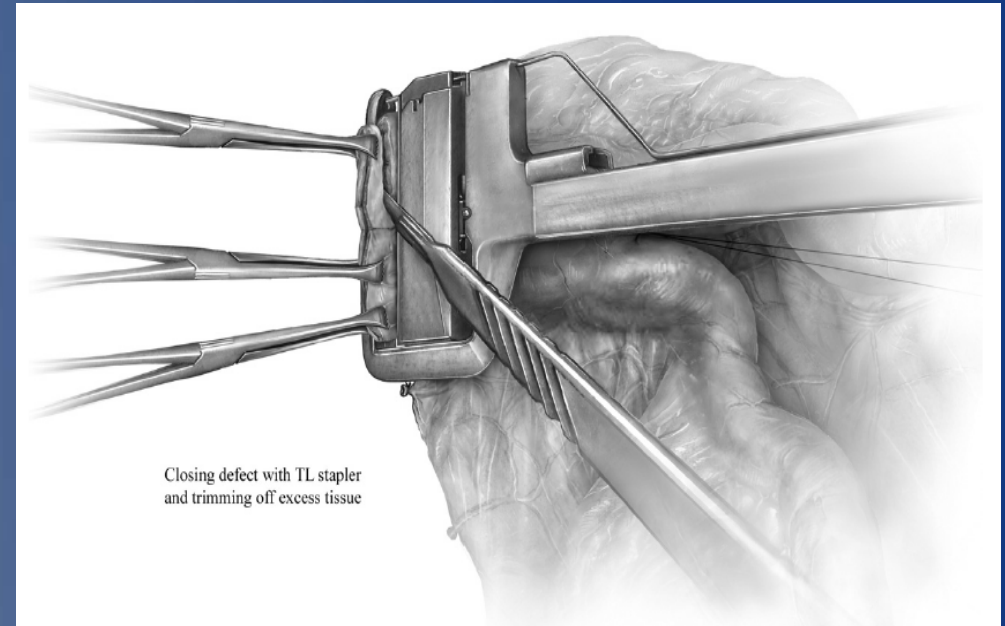
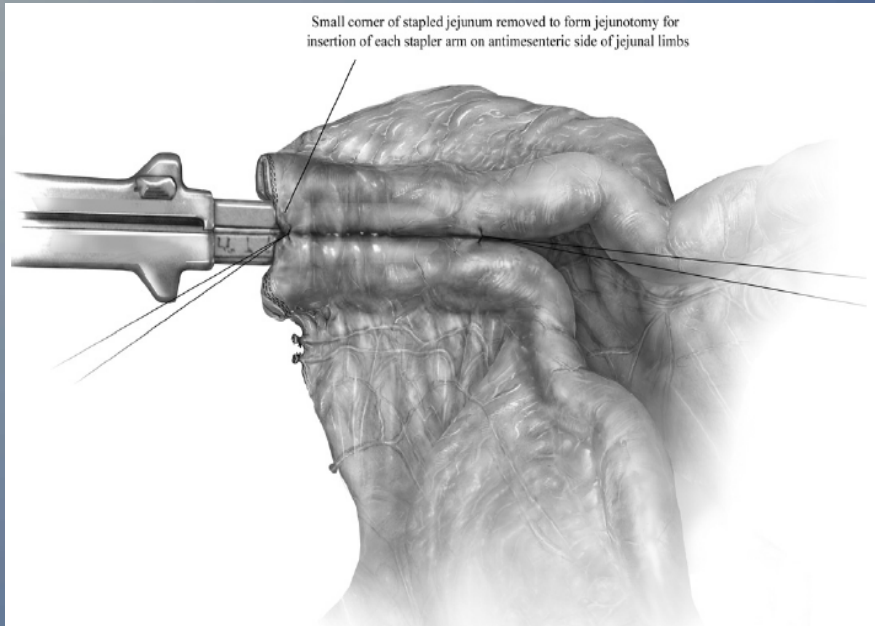


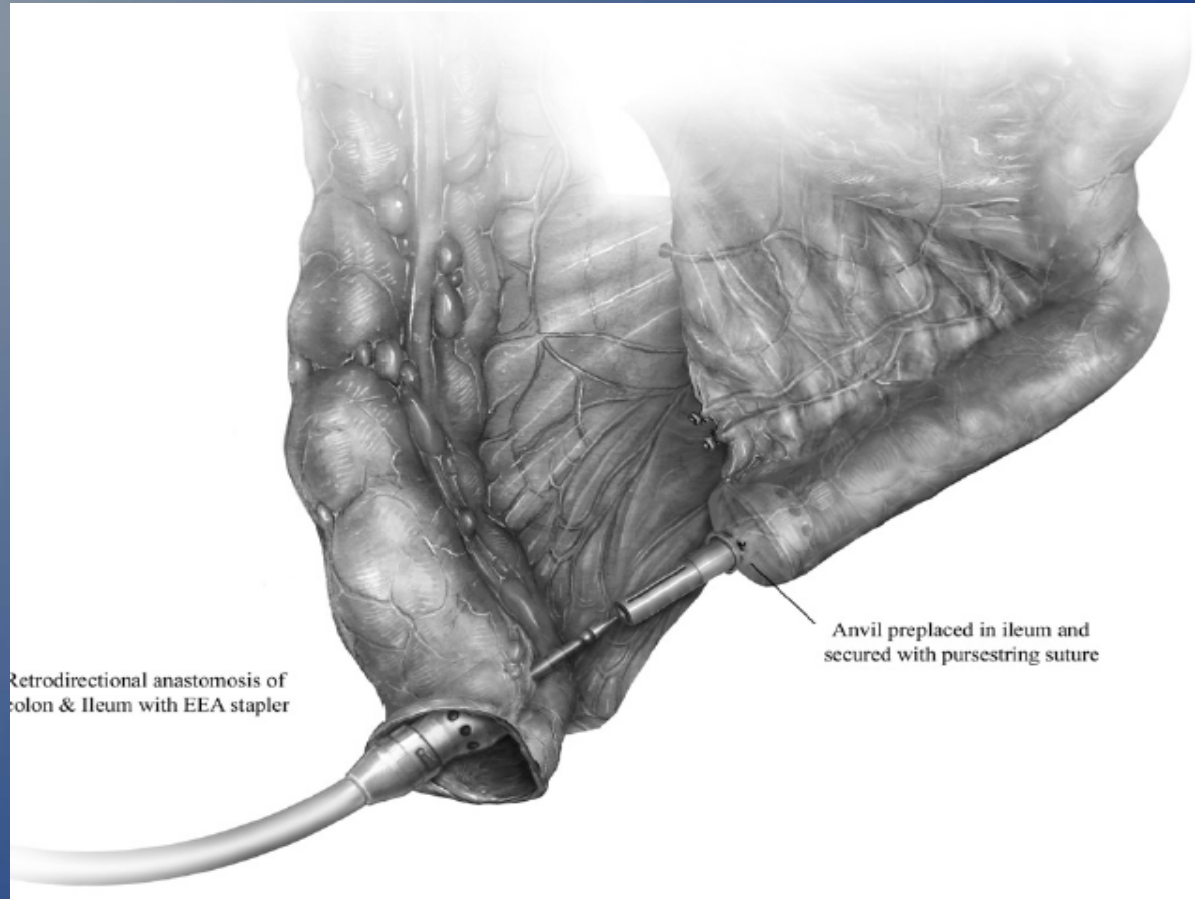
End-to-end Anastomosis (EEA) circular stapler

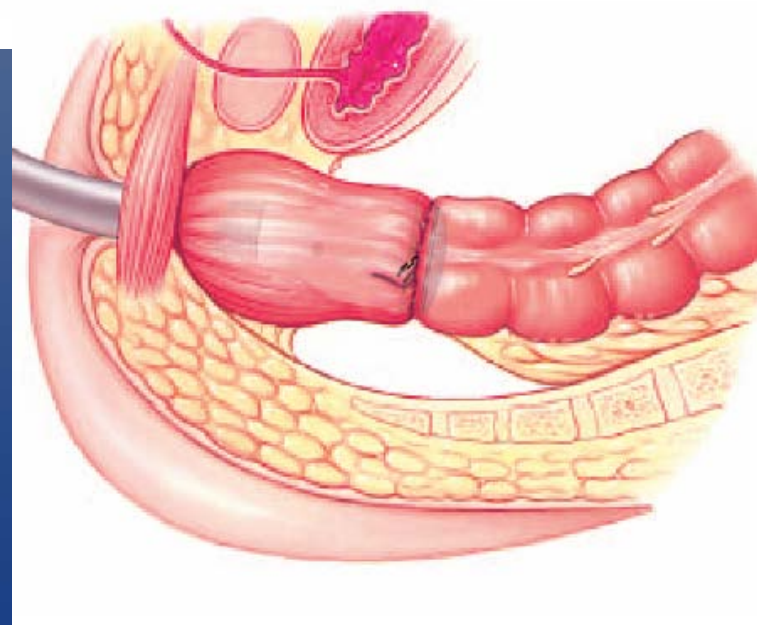
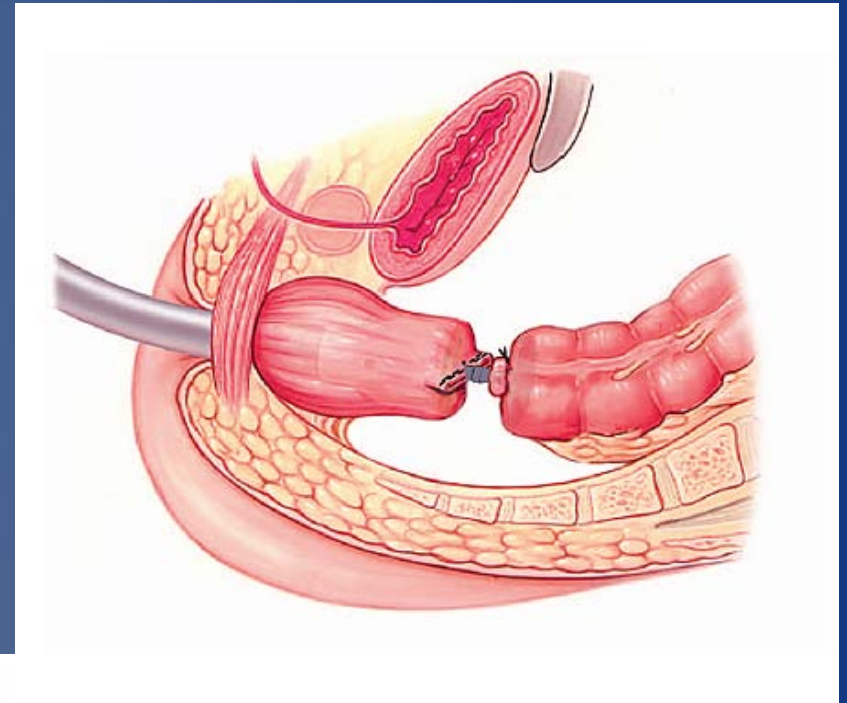
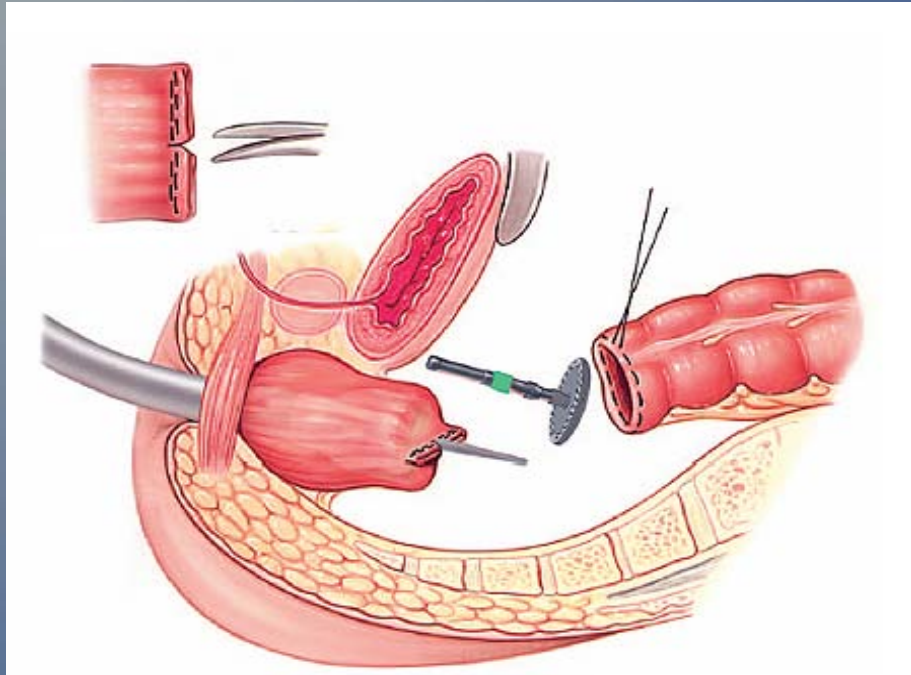
- Double rows of staples in circle
- Tissue cut within the circle of staples with cylindrical knife

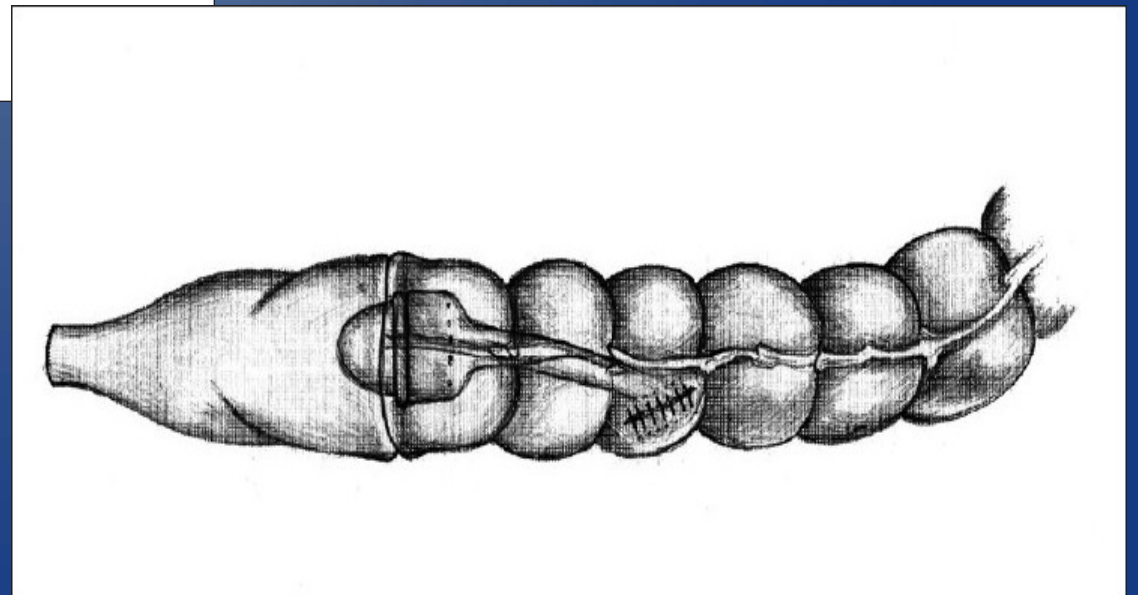
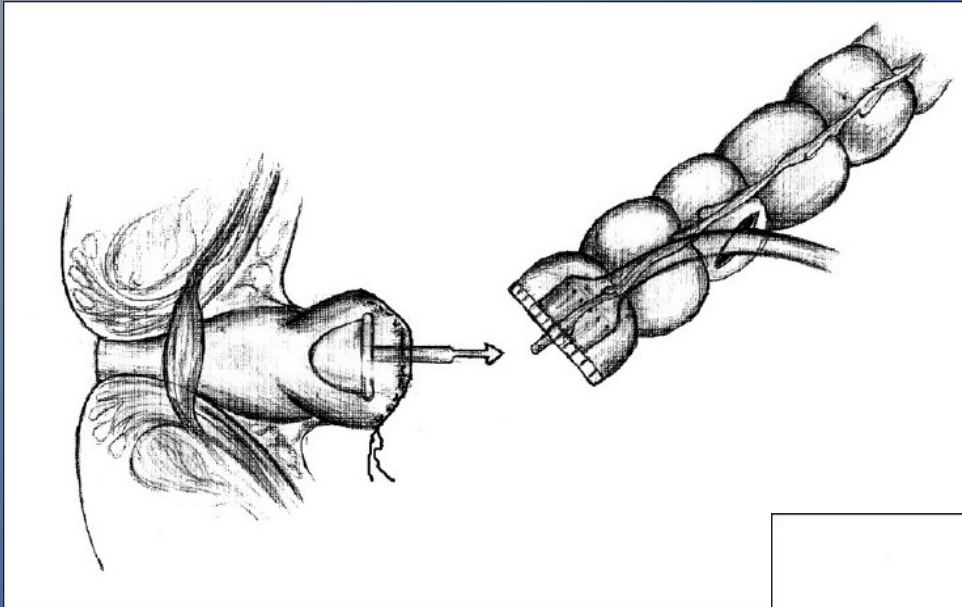


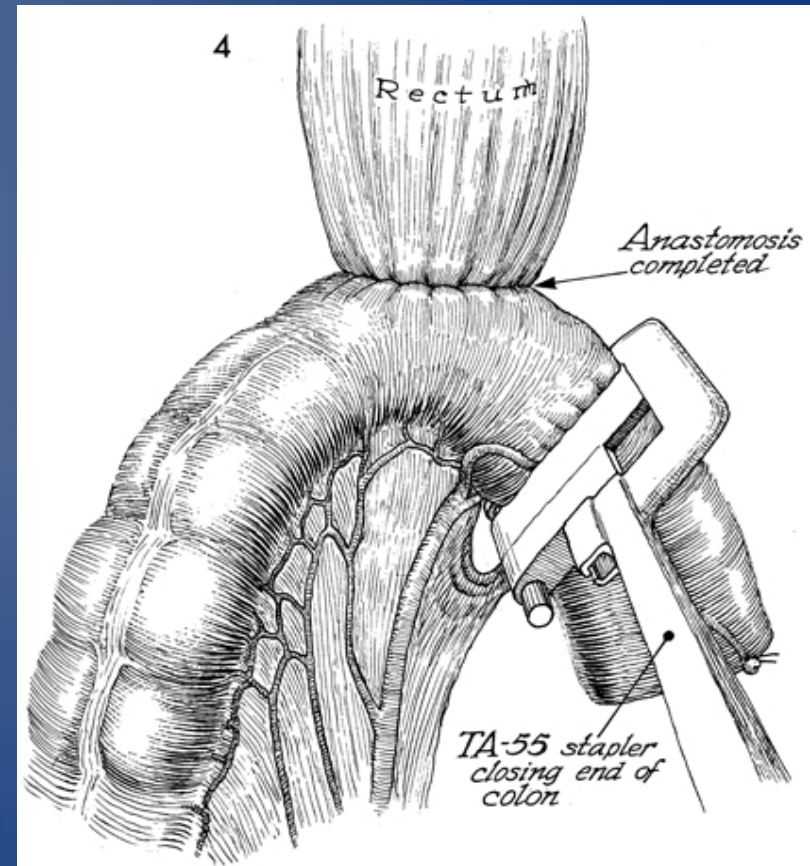
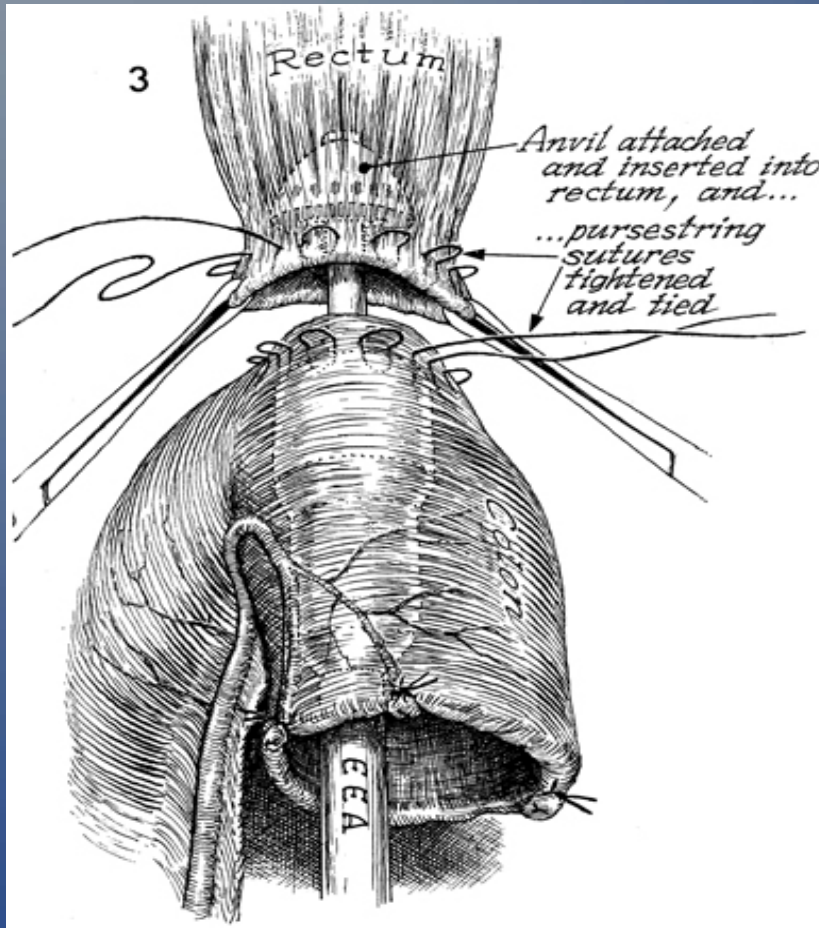












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Handsewn vs Stapled in Ileocolic Anastomosis

- Choy et al. (2011) Cochrane Review
- Stapled functional end-to-end ileocolic anastomosis is associated with fewer leaks than handsewn.
- Subgroup analysis of cancer patients showed leak rate of 1.3% vs 6.7% in stapled vs handsewn group.

Figure 1. Forest plot of comparison: 1 All studies, outcome: 1.1 Overall anastomotic leak.

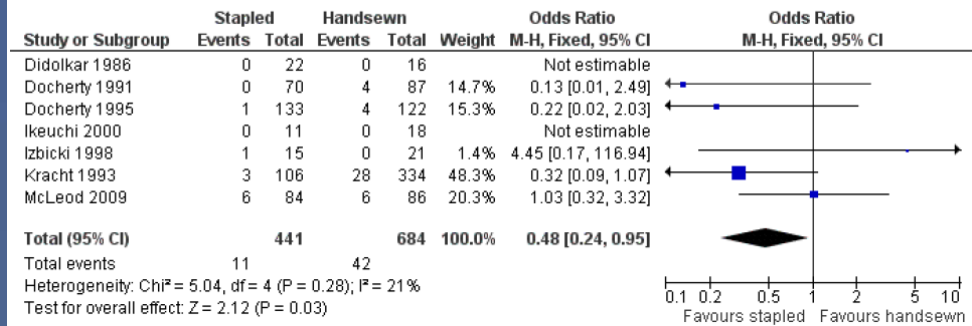


Figure 3. Forest plot of comparison: 2 Cancer, outcome: 2.1 Overall anastomotic leak.

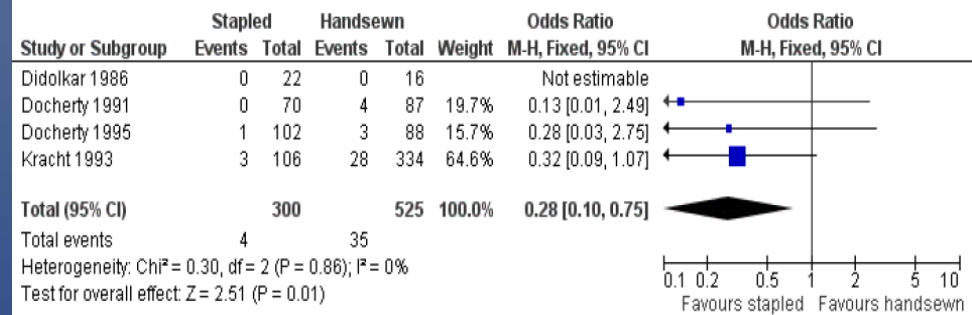
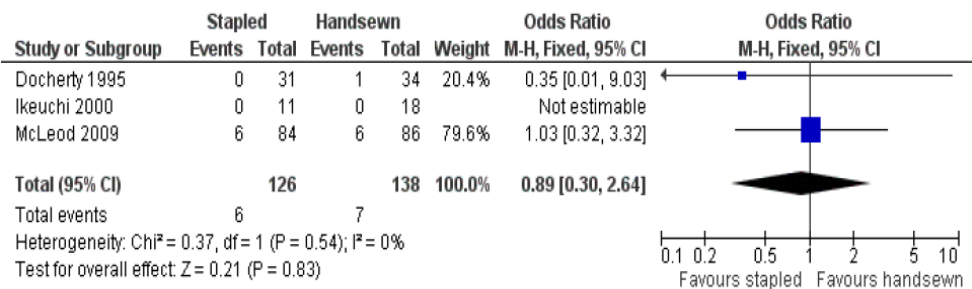
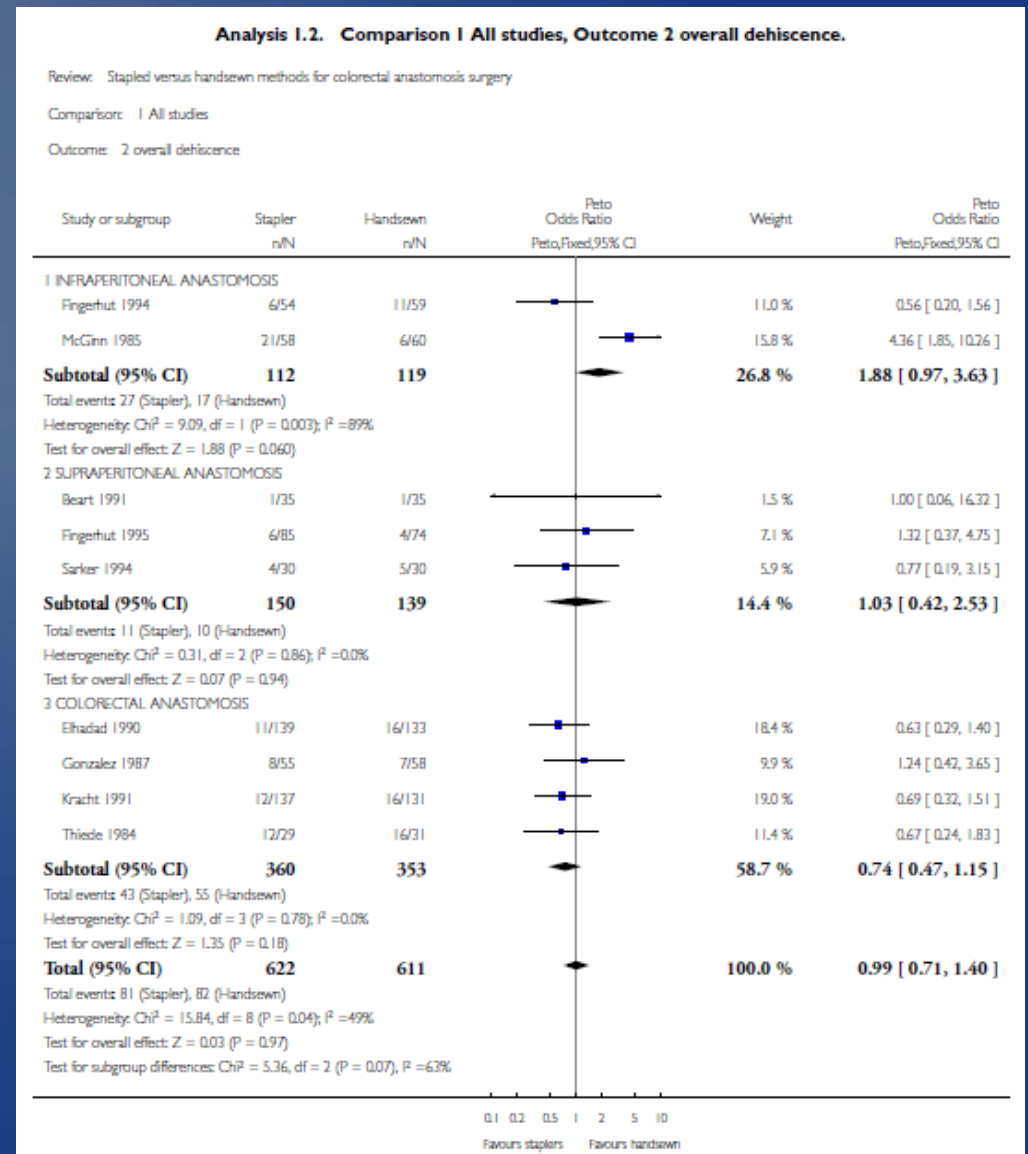


Figure 5. Forest plot of comparison: 3 Non-Cancer, outcome: 3.1 Overall anastomotic leak.



Handsewn vs Stapled in Colorectal Anastomosis

- Neutzling et al. (2012) Cochrane Review
- Insufficient evidence to demonstrate any superiority of stapled over handsewn techniques in colorectal anastomosis



Handsewn vs Stapled Anastomosis in Trauma

- Demetriades et al. (2002) J Trauma
 - Prospective multicenter study of trauma patients that underwent colon resection with primary anastomosis
 - No significant difference between handsewn or stapled techniques

- Handsewn

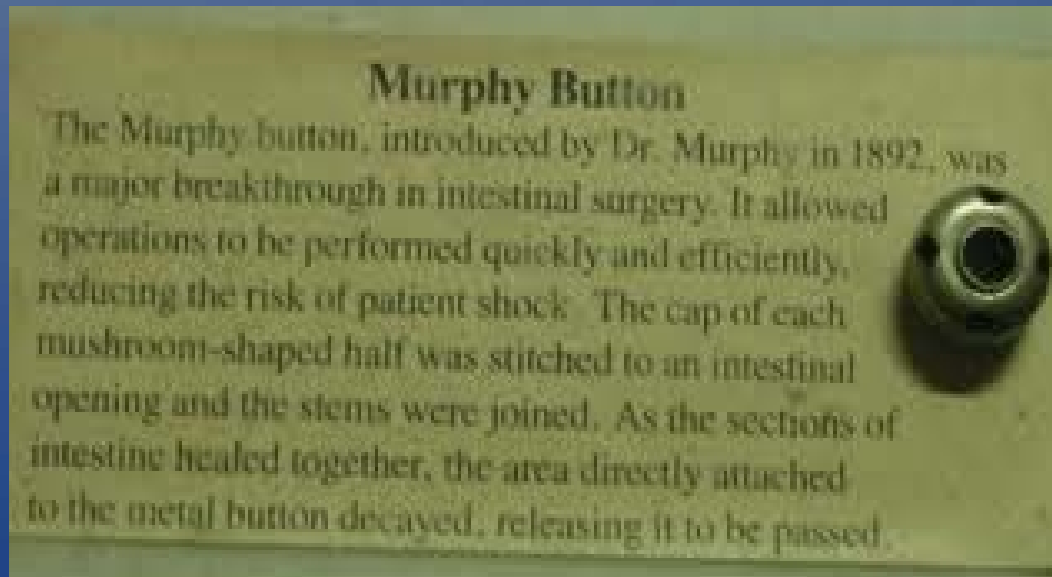
- Low cost
- Longer operating time
- Learning curve
 - surgeons experience
 - great variability

Staple

- Expensive
- Shorter operating time
- Easy to learn
 - Little variability
- Malfunctioning of device/Misfiring

Sutureless Compression Anastomosis

- Murphy's Button – introduced by Dr John Benjamin Murphy in 1892

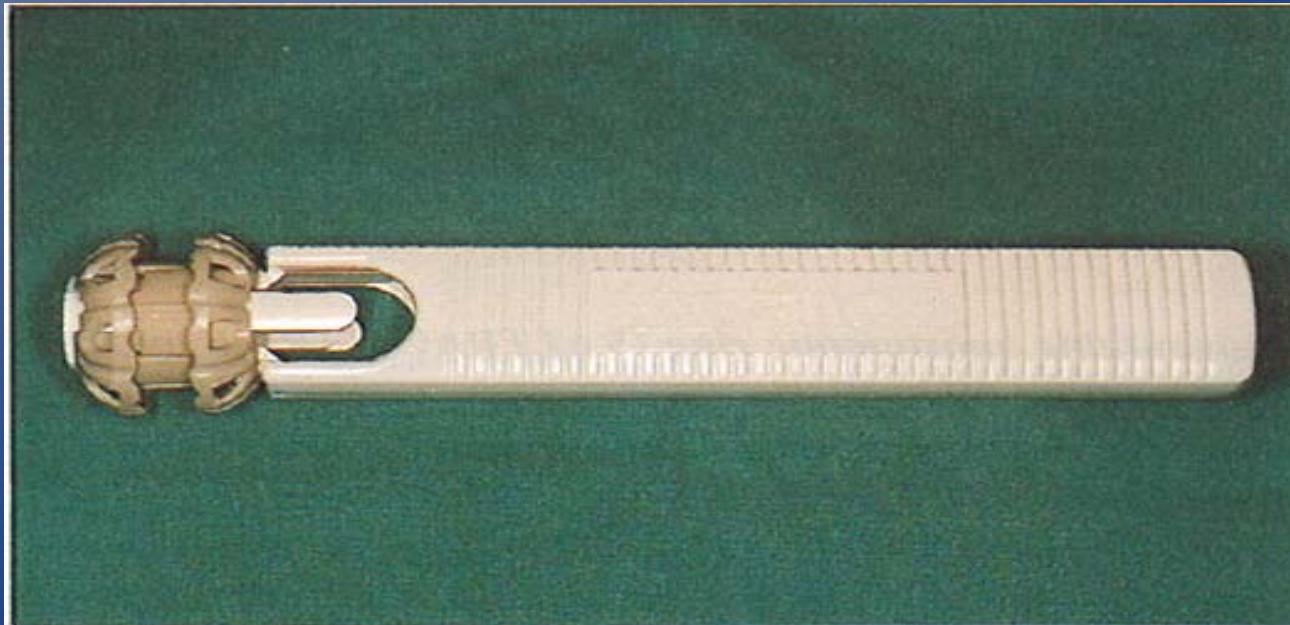


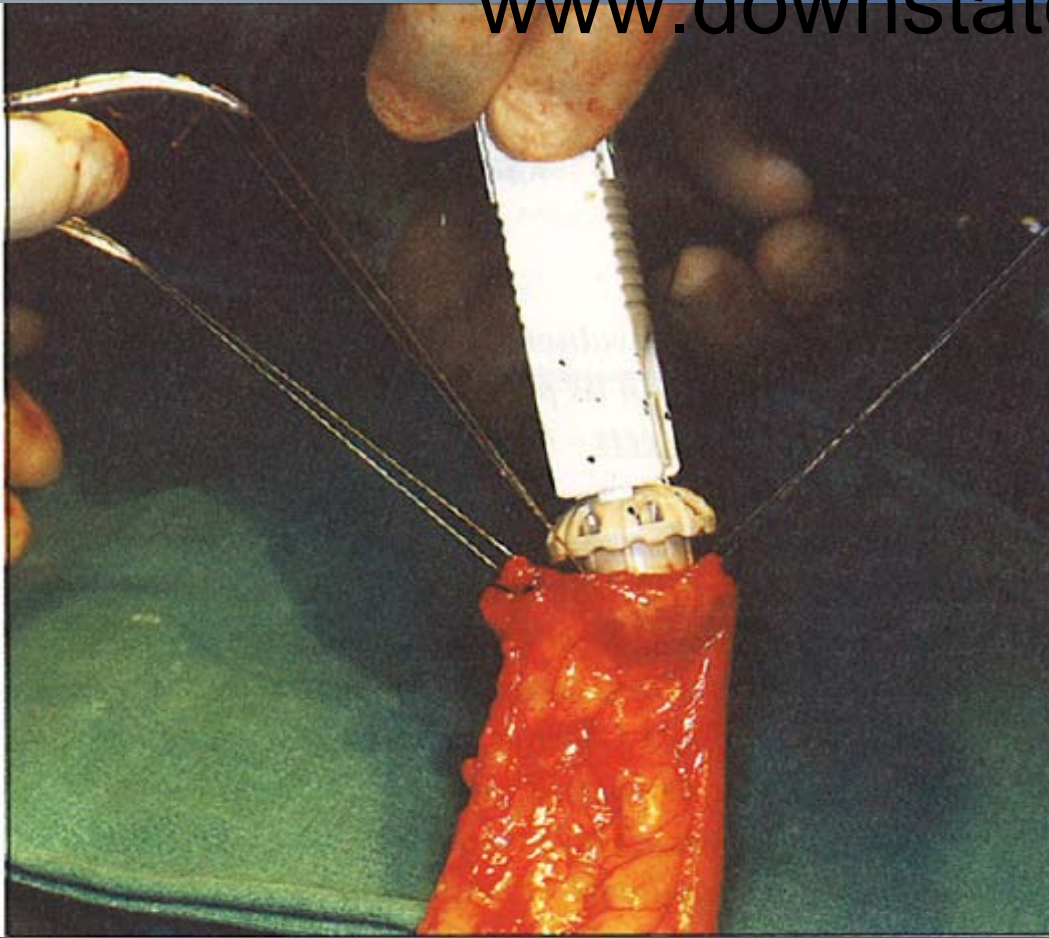
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Valtrac BAR

(Biofragmentable Anastomosis Ring)

- Introduced in 1985 by Hardy et al
- Double-segmented ring composed of polyglycolic acid and barium sulphate





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Biofragmentable ring for end-to-end, end-to-side and side-to-side anastomosis.



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8886808900	Valtrac™ Bowel Anastomosis	1
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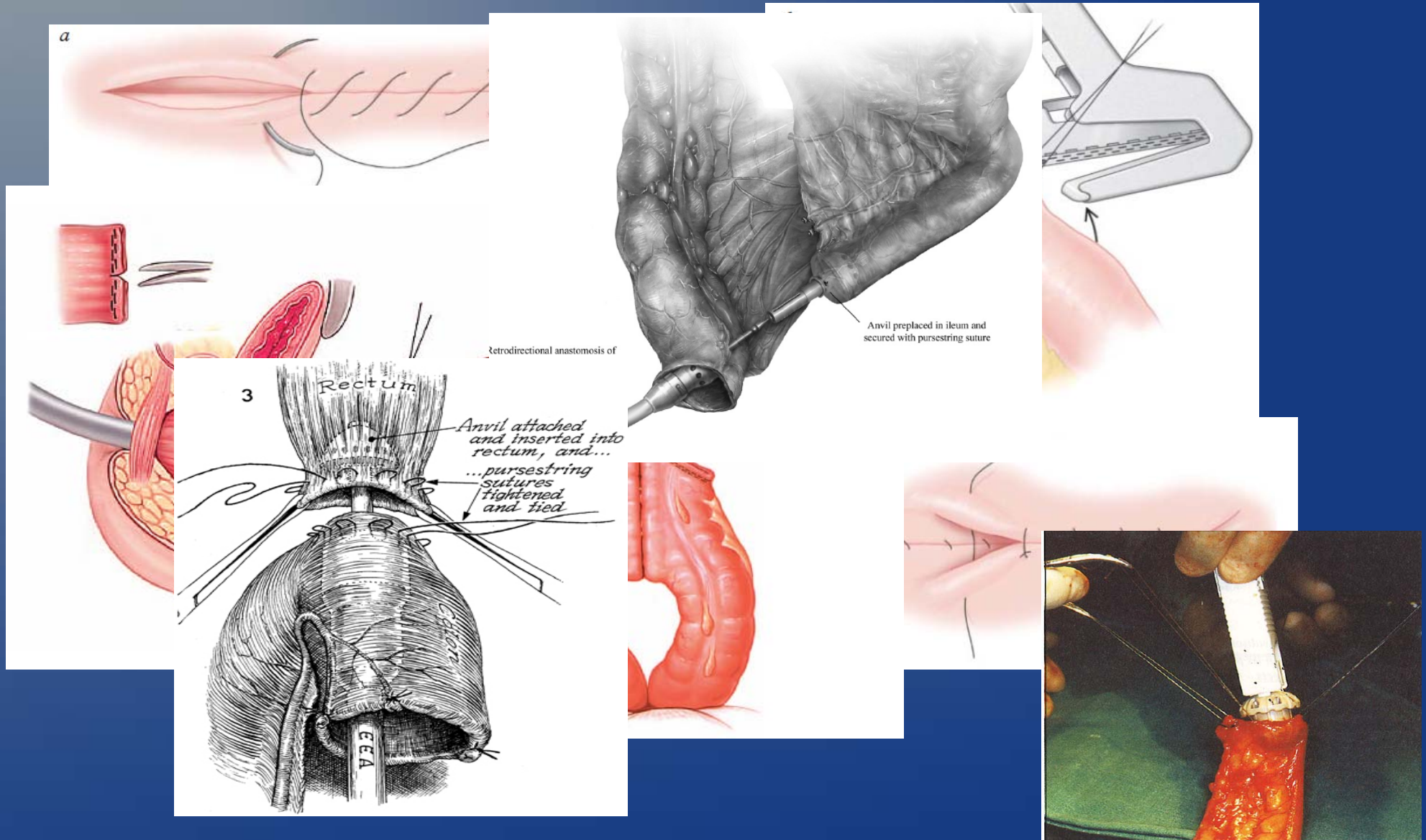
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So which is the better technique??



Principles of Successful Intestinal Anastomosis

- **Technical Factors**

- Adequate blood supply
- Tension-free
- Minimize contamination
- Meticulous technique

- **Patient-Related Factors**

- Malnourished
- Chronic steroid use
- Diabetes mellitus
- Malignancy, prior chemoradiation
- Hypotension/Shock
- Emergency surgery