



# ANASTOMOSIS

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# ANASTOMOSIS

- The word anastomosis comes from the Greek 'ana', without, and 'stoma', a mouth, reflecting the joining of a tubular viscous (bowel) or vessel (usually arteries) after a resection or bypass procedure.

# ANASTOMOSIS OF BOWEL

## Essentials for safe bowel anastomosis

### Local

- Good blood supply (no tension)
- Inverting anastomosis with appropriate suture
- Accurate apposition and suture technique (or stapling)
- Avoidance of tissue damage by clamps

# ANASTOMOSIS OF BOWEL

## Essentials for safe bowel anastomosis

### Systemic

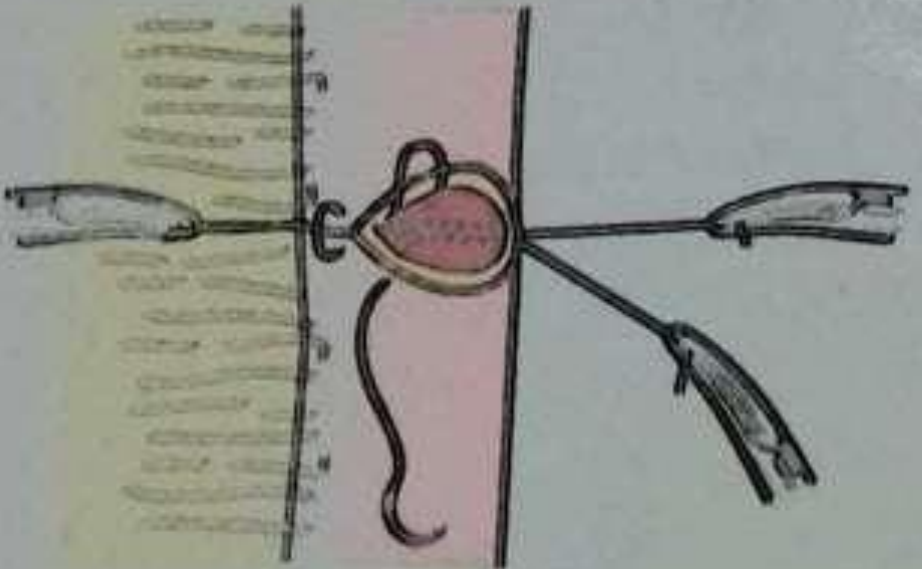
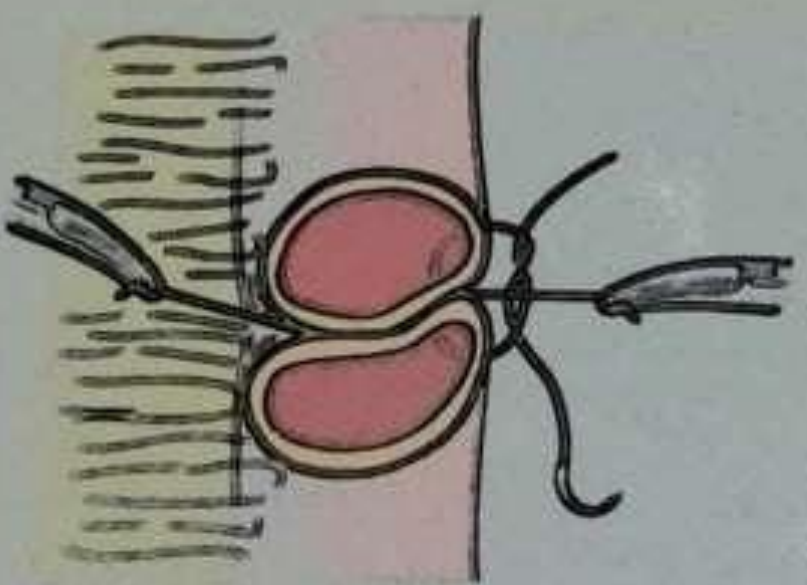
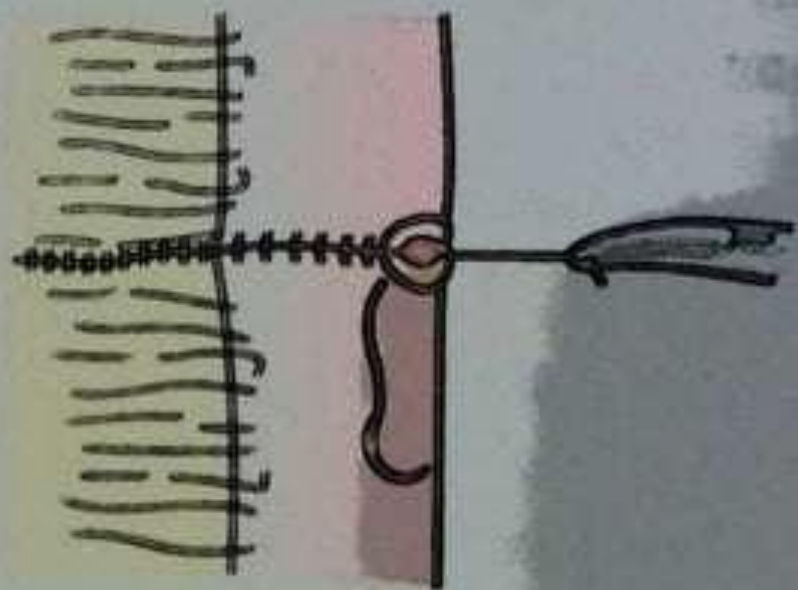
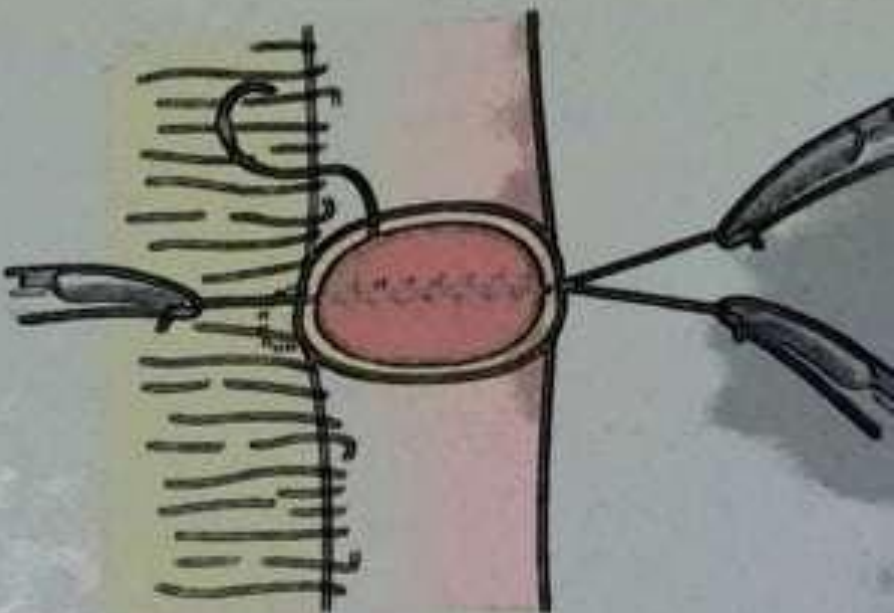
- Bowel preparation (and avoidance of spillage)
- Antibiotic prophylaxis
- Maintenance of good perfusion and tissue oxygenation during anaesthesia (correction of shock)
- Adequate nutritional attention
- Adequate resectional margins (cancer or inflammatory bowel disease) and avoidance of chemotherapy/radiotherapy



# END TO END 2 LAYER TECHNIQUE

## PRINCIPLES

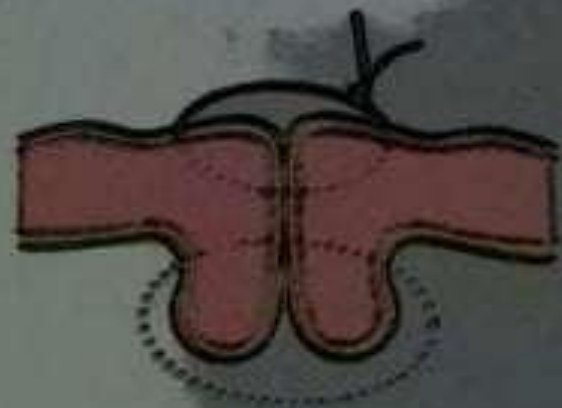
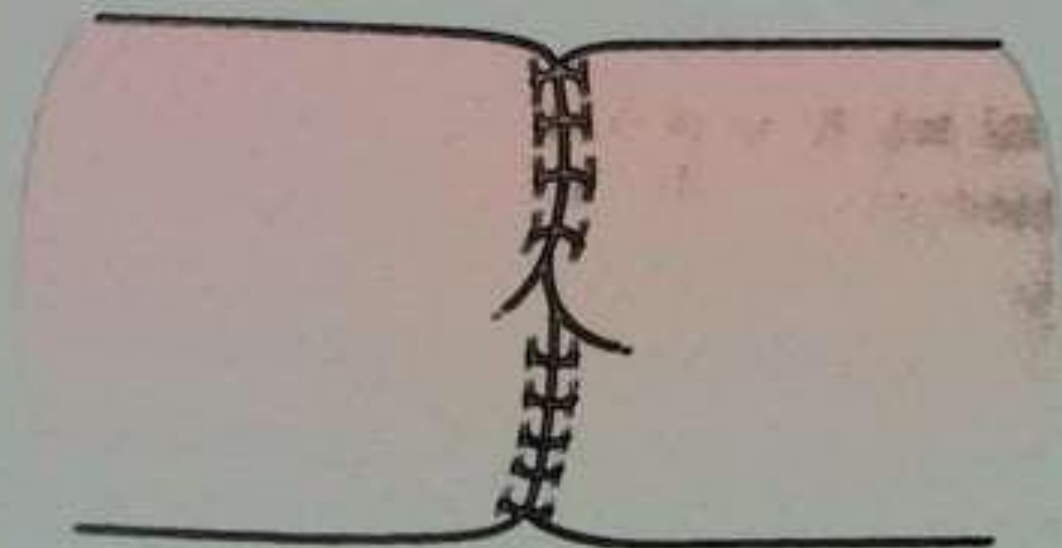
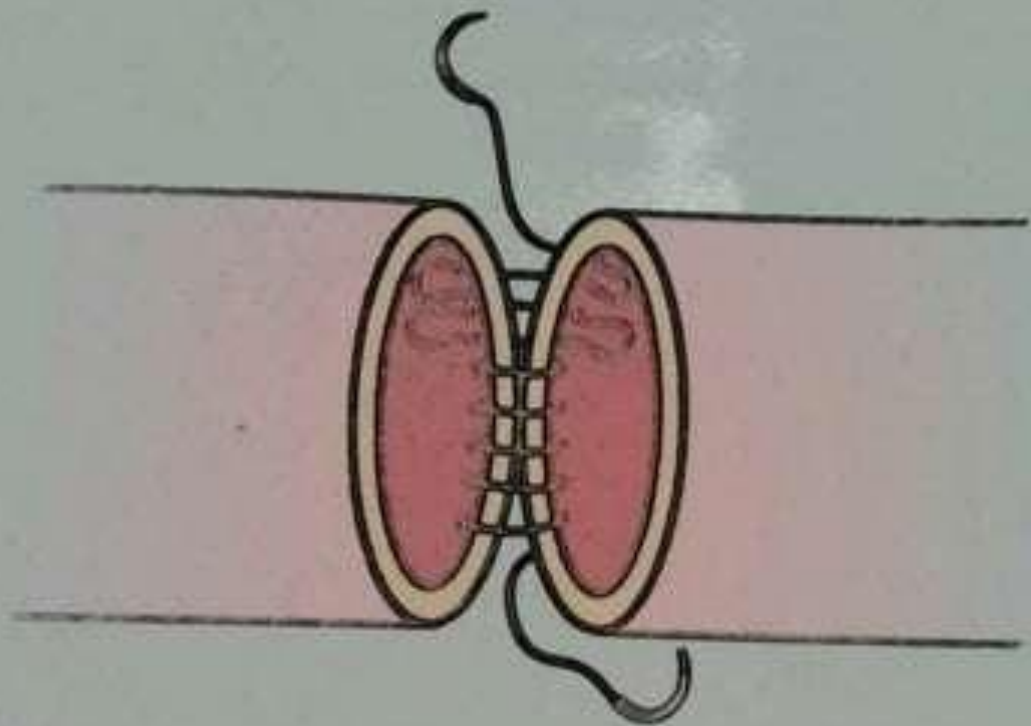
- The bowel ends must be brought together without tension.
- Stay sutures, which avoid the need for tissue forceps, may help with the placement of the posterior, continuous, seromuscular layer and allow rotation of the anastomosis.
- The inner continuous all-layers connell suture can be undertaken first. An inverting seromuscular Lembert layer is then applied second.
- The apposition of bowel edges should, in each layer, be as accurate as possible.
- Bites should be approximately 5mm deep and 5mm apart.



# END TO END 2 LAYER TECHNIQUE

- Suture materials should be of 2/0–3/0 size and made of an absorbable polymer, mounted on an atraumatic round-bodied needle.
- ‘Parachuting’ or ‘purse-stringing’ a proximal dilated bowel lumen into narrower distal bowel risks a poor anastomosis and subsequent leakage.
- In such a case, a side-to-side or end-to-side anastomosis may be safer.
- The Cheatle split (making a cut into the anti-mesenteric border) may help to enlarge the lumen of distal, collapsed bowel.

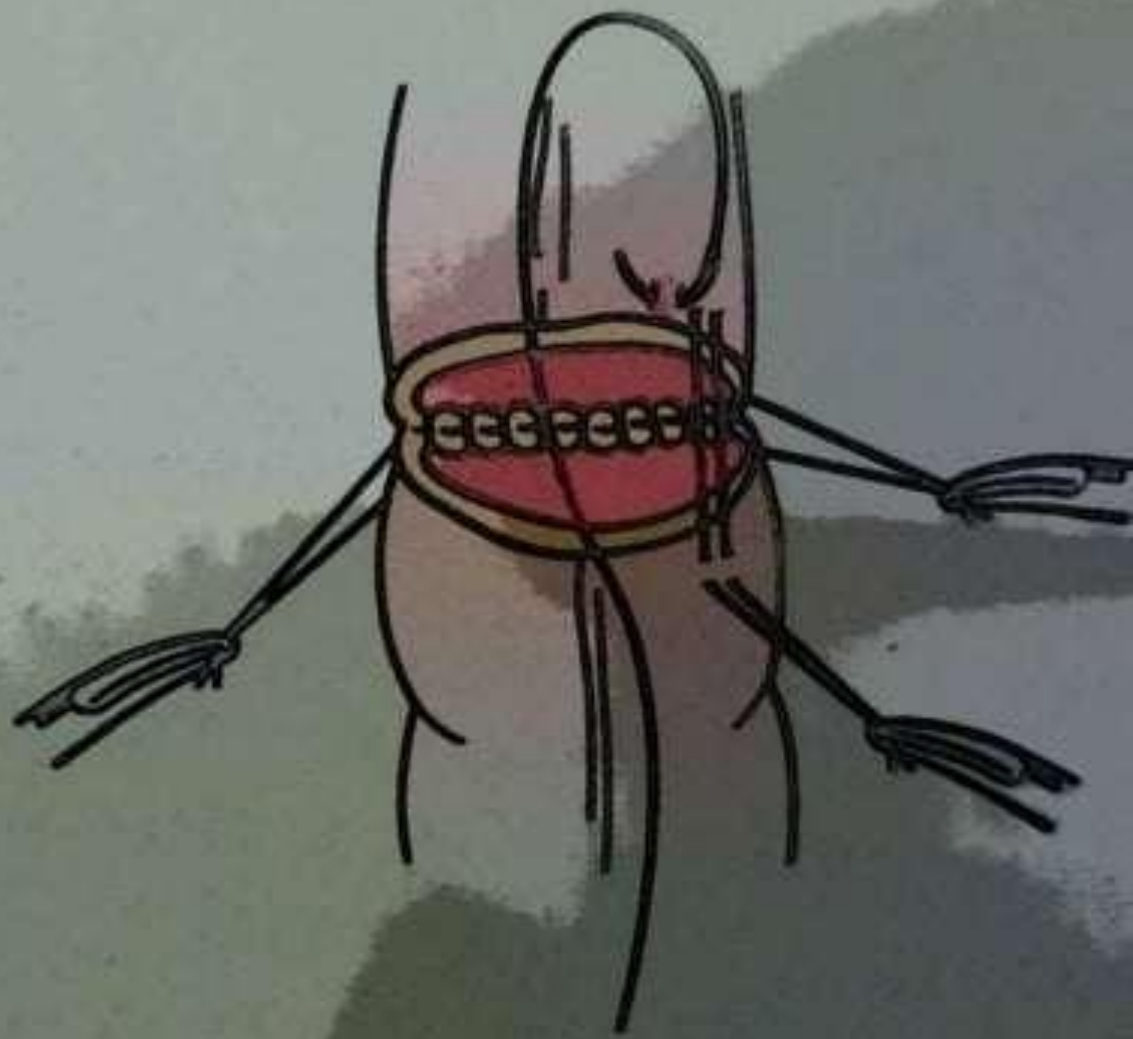
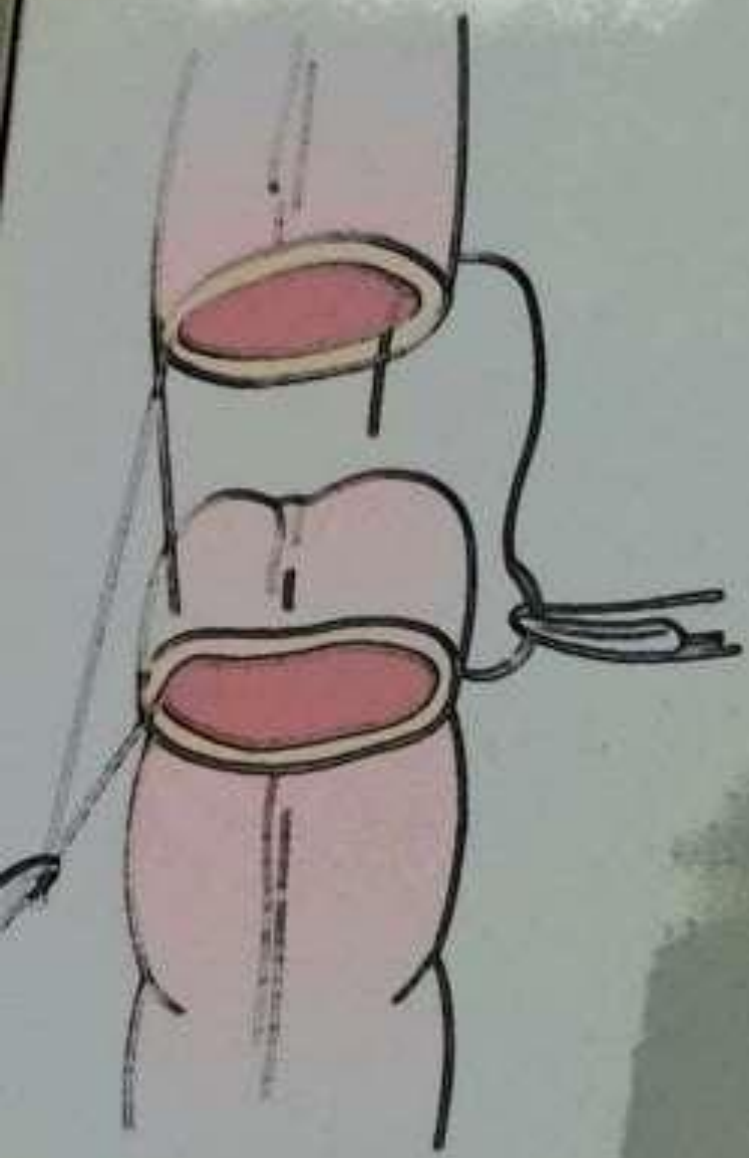






# END TO END 1 LAYER TECHNIQUE; END TO SIDE ANASTOMOSIS

- This interrupted single-layer extramucosal (seromuscular) suture is probably the most widely practised technique.
- They are useful in the following circumstances:
- when access is not easy, as in transabdominal oesophagogastric anastomoses or after low anterior resection;
- when there is disparity in the bowel lumen;
- when the bowel serosa is lacking.



# INTESTINAL ANASTOMOSIS

- Ensure viable bowel ends before and after anastomosis
- Use atraumatic clamps if soiling is a risk
- Avoid risk to mesenteric vessels by clamps or sutures
- Synthetic polymers are the most conventional sutures for hand-sewn inverting anastomoses
- Interrupted and continuous suture techniques are comparably safe
- Disposable staple units are an alternative with safe inverting or everting anastomoses



# ANASTOMOSIS OF VESSELS

- Vascular anastomosis require more precision than bowel anastomosis as they must be immediately watertight at the end of the operation when the clamps are removed.
- The intimal suture line must be as smooth as possible to minimize the risk of thrombosis and embolus, and regular to avoid leak.
- Suture size depends on vessel calibre: 2/0 is suitable for the aorta, 4/0 for the femoral artery and 6/0 for the popliteal to distal arteries.
- Microvascular anastomoses are made using a loupe and an interrupted suture down to 10/0 size.



# ANASTOMOSIS OF VESSELS

- Polypropylene-like sutures with indefinite integrity give the best results
- Intimal suture line must be smooth
- Knots must be secure
- Needle must pass from within outwards

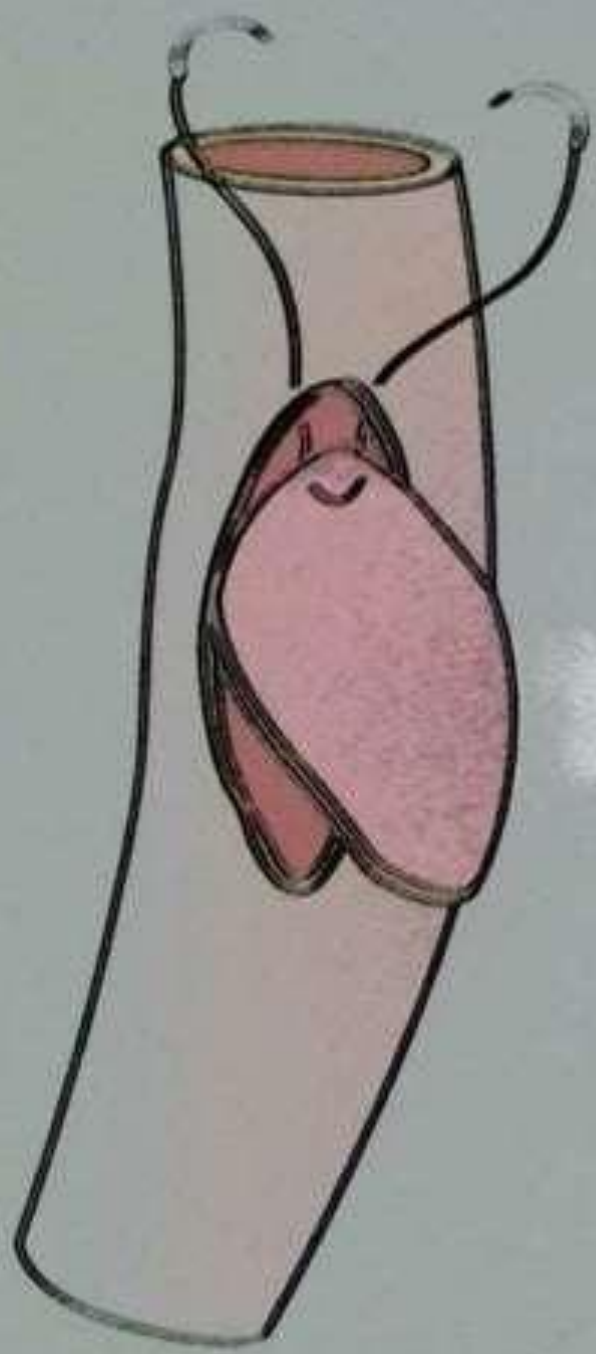
# CLOSURE OF AN ARTERIOTOMY

- The vessel walls must be treated with care, particularly the intima, two single-ended sutures allow a knot to be placed externally at each end of the arteriotomy and a final knot to be easily placed in the middle at the end of each side of the arterial closure.
- Vessels should always be sewn with the needle moving from in to out the lumen to avoid creating an intimal flap and to fix any atherosclerotic plaque.
- The final closure is made easily at the middle of the arteriotomy where the superior and inferior suture lines meet with the knot tied externally.

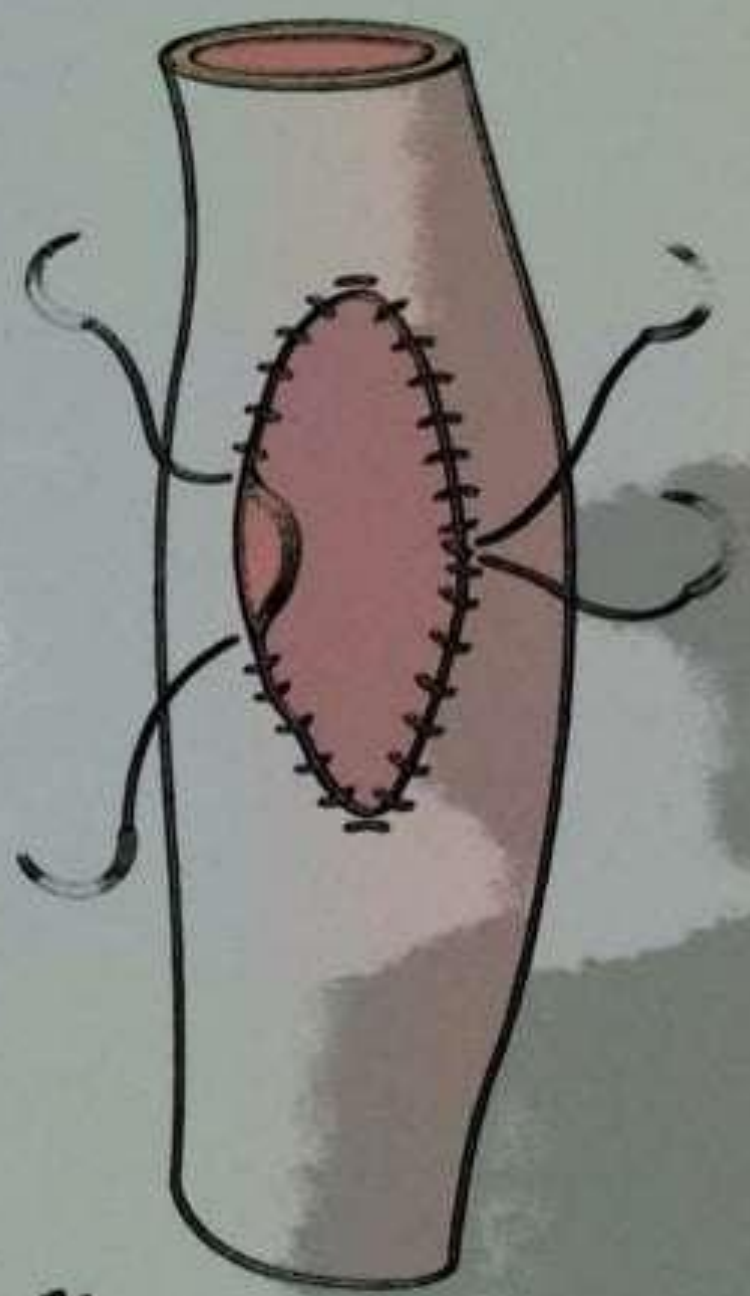
# CLOSURE OF AN ARTERIOTOMY USING A VENOUS PATCH

- Once again, the suture line can be started at the top and bottom with a double-ended suture.
- The first knot is then placed halfway along the edge of the suture line.
- The closure is completed with a final knot on each side at the midpoint of the vein patch graft, using the in-out technique with fixation of plaque and avoidance of damage to the intima using atraumatic forceps.





(a)



(b)

STOMACH SUTURES AND



# COMPLICATIONS

- **Leakage**
- Bowel – peritonitis
- Vessel – haematoma, haemorrhagic shock (early), pseudoaneurysm (late)
- **Stenosis**
- Bowel – obstruction after fibrous stricture or disease recurrence
- Vessel (early and late) – thrombosis, occlusion, gangrene

# FACTORS AFFECTING ANASTOMOSIS HEALING

## **Local**

- Persisting disease process: cancer, chronic inflammation
- Distal obstruction
- Poor blood supply: rectum, oesophagus
- Poor technical aspects: haematoma, dead space, poor perfusion
- Presence of foreign body
- Gross contamination/infection

# FACTORS AFFECTING ANASTOMOSIS HEALING

## **Systemic**

- Shock of any cause
- Metabolic diseases: diabetes, uraemia, jaundice
- Immunosuppression: cancer, acquired immunodeficiency syndrome (AIDS), steroids
- Malnutrition: cancer

# CONCLUSION

- Two of the most basic skills in surgery are suturing and knot tying.
- These techniques ought to be mastered before the surgeon in training enters the operating theatre.
- The surgical skills laboratory is the place to practise and master the techniques.
- Without practice, that skill will not develop.....



Thank You!

