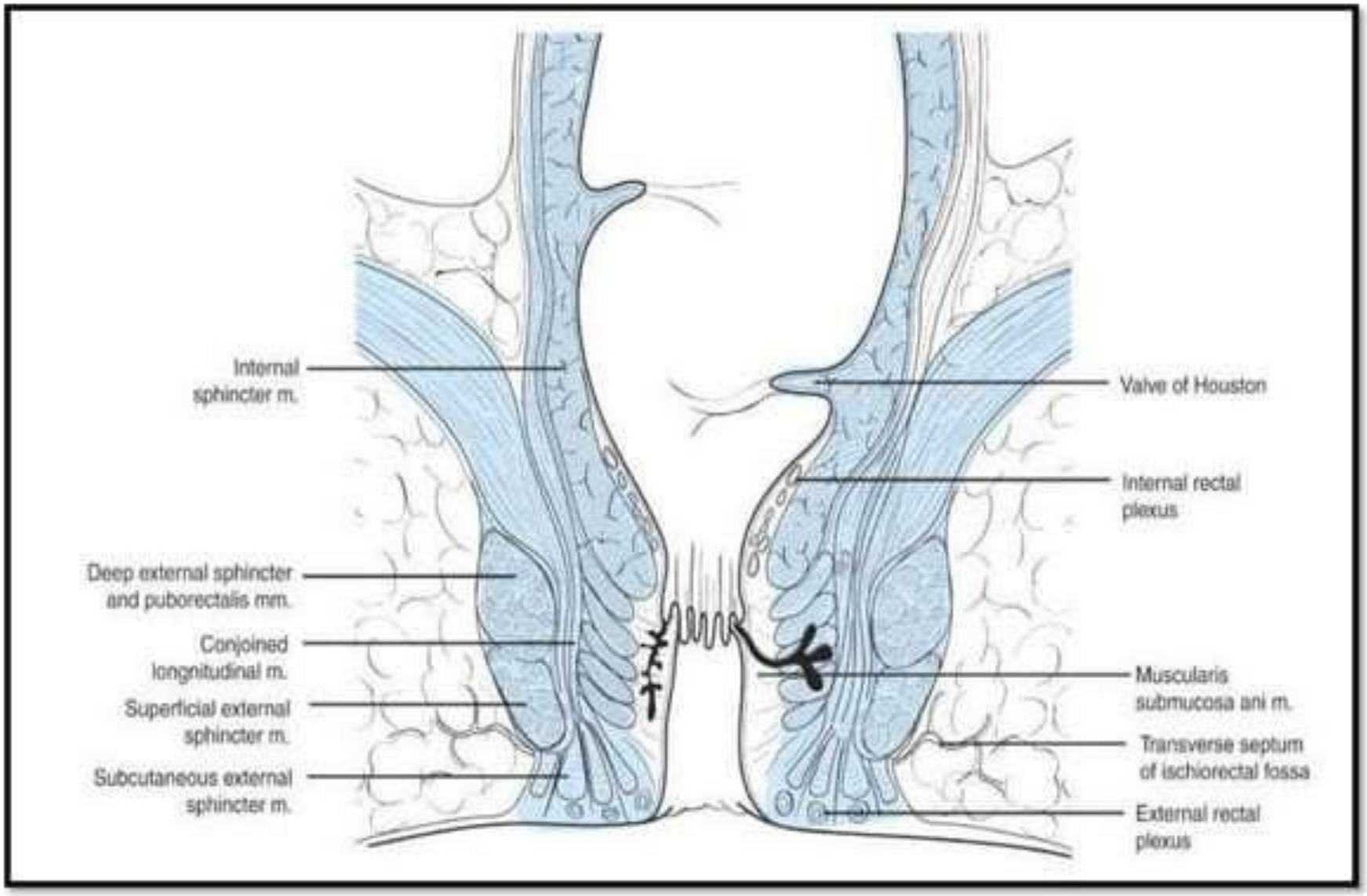
Anorectal Disorders

Anal Canal & Rectum Anatomy
Fissure In Ano Haemorrhoids
Pilonidal Sinus Fistula in Ano
Rectal Prolapse

Anorectal Anatomy



Anorectal Anatomy

Arterial Supply

Inferior rectal A
middle rectal A

Venous drainage

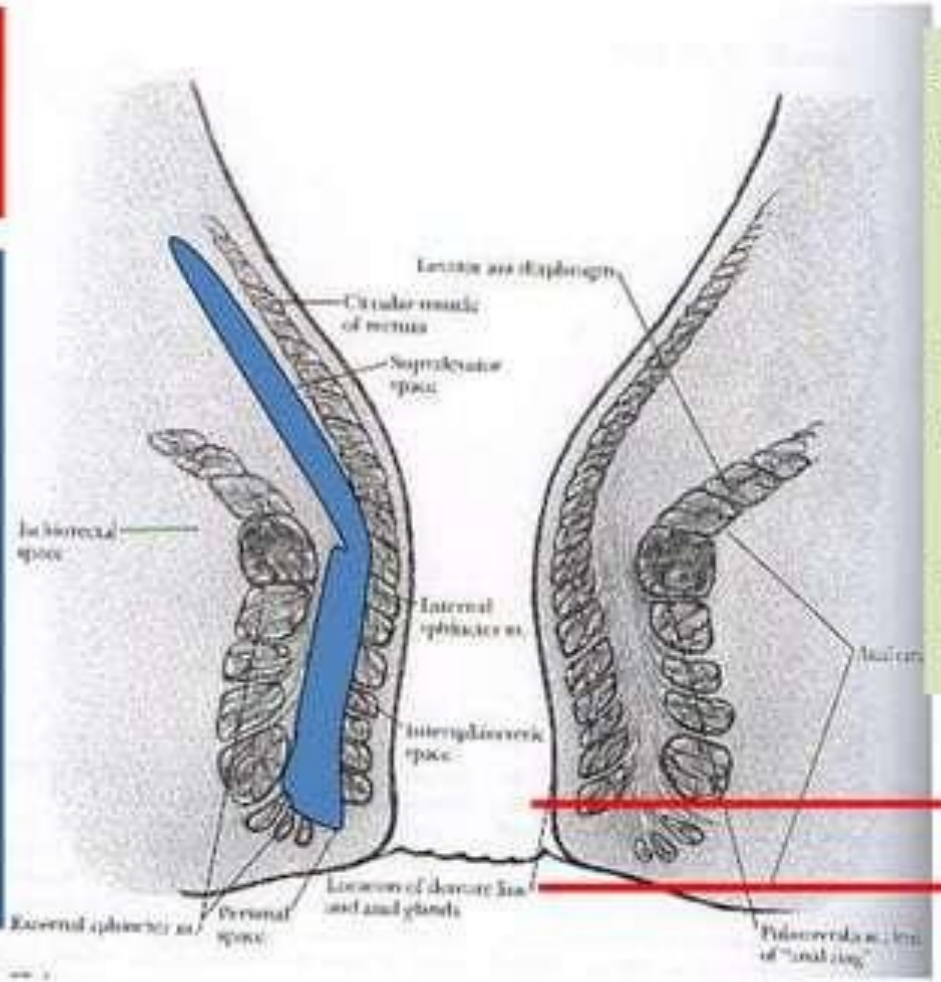
Inferior Rectal V
Middle Rectal V

3 Hemorrhoidal Complexes

L - Lateral

R - Antero-lateral

R - Posterolateral



Nerve Supply

Sympathetic: Superior hypogastric plexus

Parasympathetic:

S234 (nerviergentis)

Pudendal Nerve:

Motor and Sensory

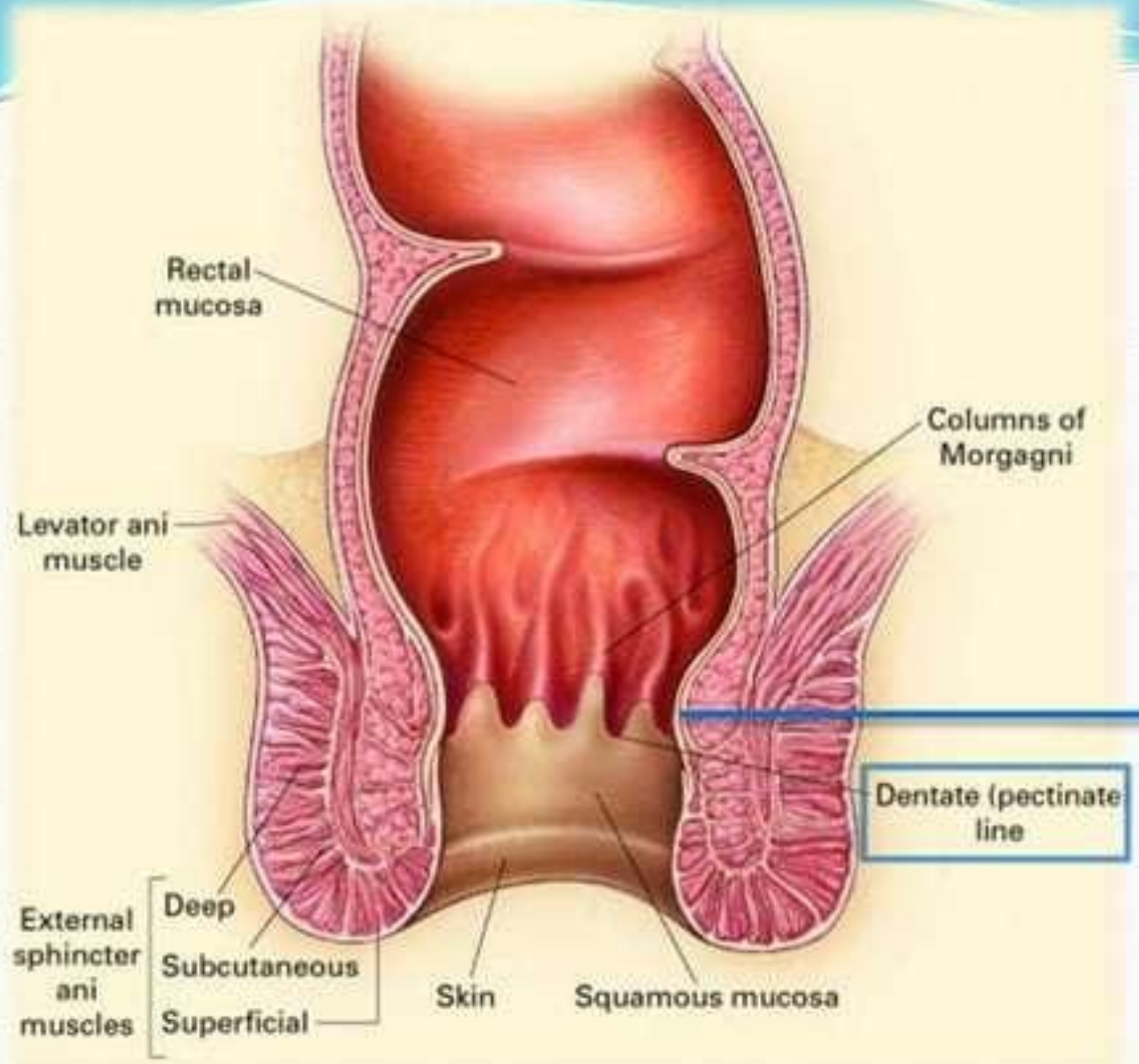
Lymphatic drainage

Above dentate: Inf. Mesenteric

Below dentate: Internal Iliac

Haemorrhoids

- (Greek: *haima* = blood, *rhoos* = flowing;
  synonym: piles, Latin: *pila* = a ball)
- Definition
  - **Hemorrhoids** are normal vascular cushions suspended in the submucosal layer of the anal canal by longitudinal connective tissue and muscle fibers.
  - Internal haemorrhoids are symptomatic anal cushions and characteristically lie in the 3, 7 and 11 o'clock positions
  - External haemorrhoids relate to venous channels of the inferior haemorrhoidal plexus deep in the skin surrounding the anal verge and are not true haemorrhoids



Haemorrhoids

- Pain?
  -> painless
- Bright red bleeding
- Prolapse associated with defecation

Internal

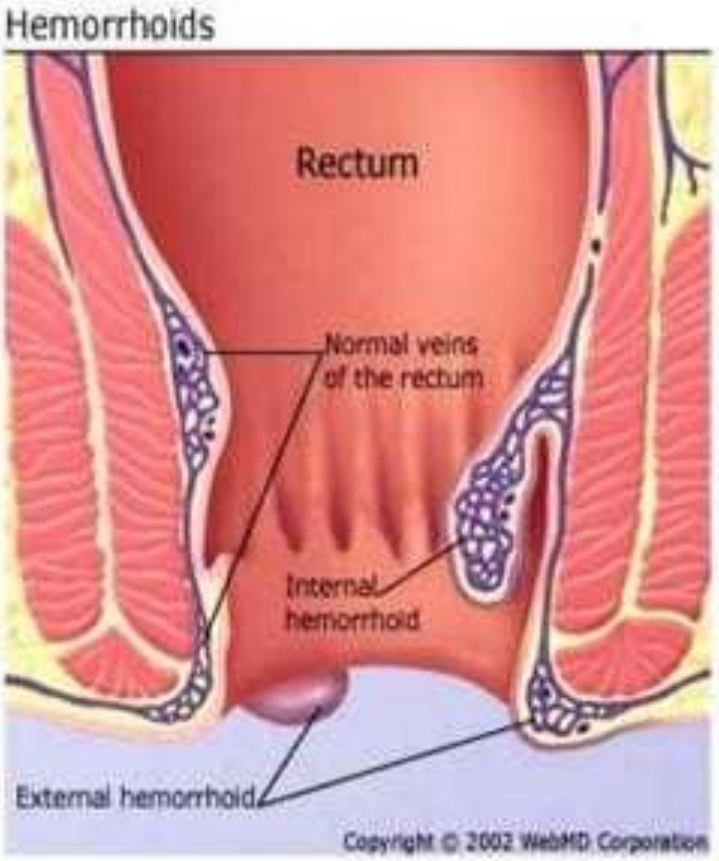
External

- Anoderm
- Swell, discomfort, difficult hygiene

- Pain?
  -> Thrombosed

Background

- They are part of the normal anoderm cushions
- They are areas of vascular anastamosis in a supporting stroma of subepithelial smooth muscles.
- The contribute 15-20% of the normal resting pressure and feed vital sensory information .
- 3 main cushions are found
  - L lateral
  - R anterior
  - R posterior
- But can be found anywhere in anus
- Prevalence is 4%



Pathogenesis

Abnormal haemorrhoids are dilated cushions of arteriovenous plexus with stretched suspensory fibromuscular stroma with prolapsed rectal mucosa

3 main processes:

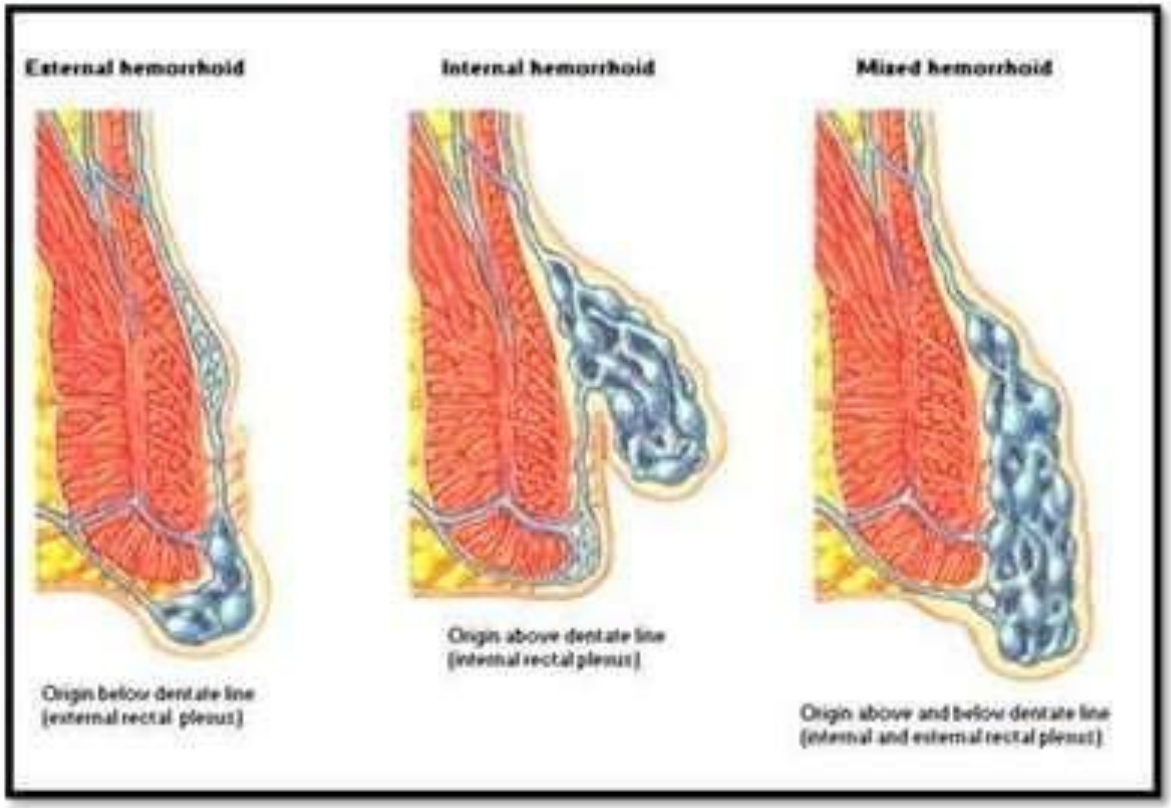
1. Increased venous pressure
2. Weakness in supporting fibromuscular stroma
3. Increased internal sphincter tone

Risk factors

Pathological	Habitual
1. Chronic diarrhea (IBD)	1. Constipation and straining
2. Colon malignancy	2. Low fibre high fat/spicy diet
3. Portal hypertension	3. Prolonged sitting in toilet
4. Spinal cord injury	4. Pregnancy
5. Rectal surgery	5. Aging
6. Episiotomy	6. Obesity
7. Anal intercourse	7. Office work
	8. Family tendency

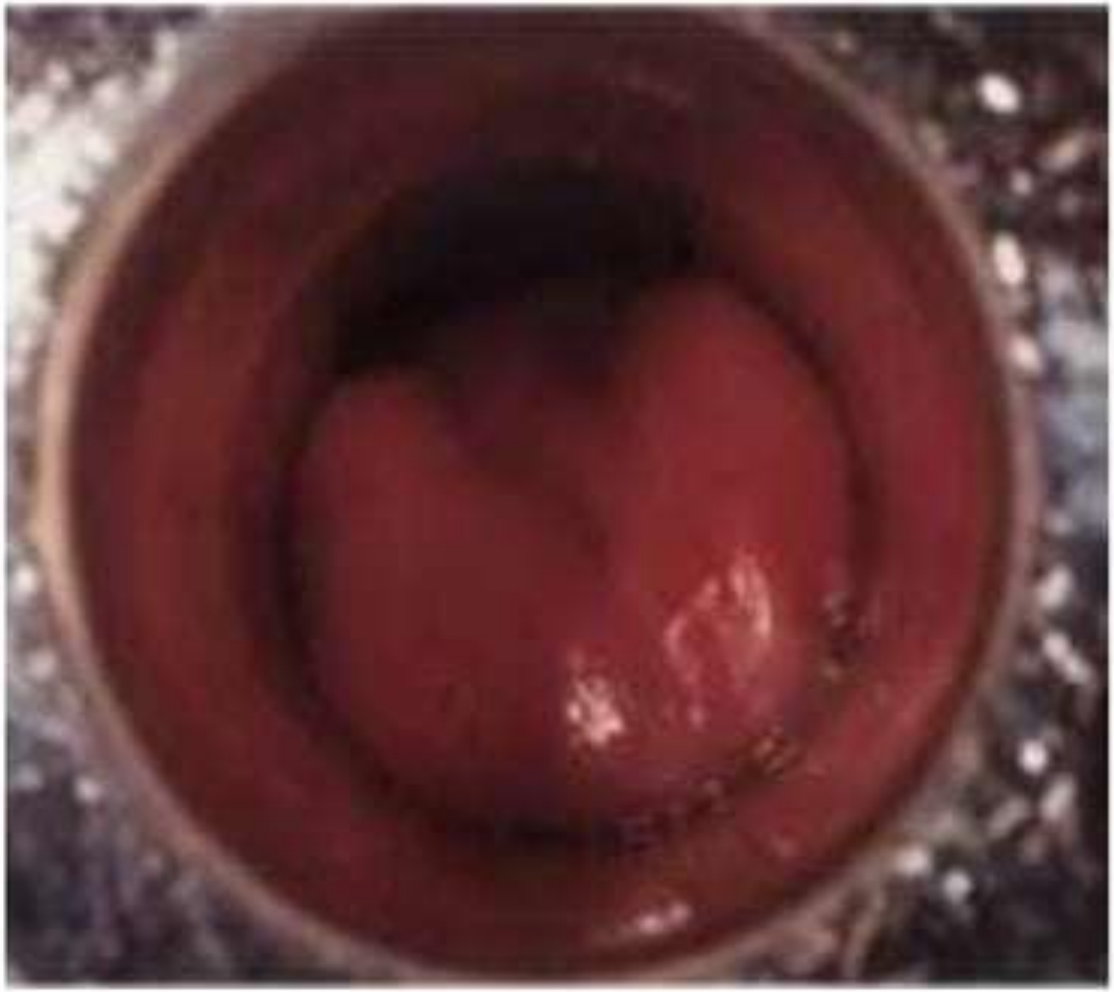
Classification

Degree of prolapse through anus	Origin in relation to Dentate line
•1st: Bleed but No Prolapse, Bulge into Lumen, •2nd: Spontaneous Reduction •3rd: Manual Reduction •4th: Not Reducable	1. Internal: Above DL 2. External: Below DL 3. Mixed



Thrombosed External Piles

First-Degree Internal Haemorrhoids viewed through Proctoscope



Second-Degree Internal prolapsed Haemorrhoids, Reduced Spontaneously

Third-degree Internal prolapsed Haemorrhoids Requiring Manual Reduction

Fourth-Degree Strangulated Internal and thrombosed External Haemorrhoids


Grade I hemorrhoids
Grade II hemorrhoids
Prolapsed grade III hemorrhoids
Prolapsed grade IV hemorrhoids

Clinical Assessment

Examination	History (Full history required)
Local •Inspect for: –Lumps, note colour and reducability –Fissures –Fistulae –Abscess •Digital: –Masses –Character of blood and mucus •Perform proctoscopy **General abdominal examination**	**Haemorrhoid directed:** •Pain acute/chronic/ cutaneous •Lump acute/ sub-acute •Prolapse define grade •Bleeding fresh, post defecation •Pruritis **General GI:** •Change in bowel habit •Mucus discharge •Tenasmus/ back pain •Weight loss •Anorexia •Other system inquiry

Investigations

The diagnosis of haemorrhoids is based on clinical assessment and proctoscopy

Further investigations should be based on a clinical index of suspicion

- **Lab: CBC / Clotting profile/**
- **Proctography: If Rectal Prolapse is suspected**
- **Colonoscopy: If higher Colonic pathology is suspected**

Complications

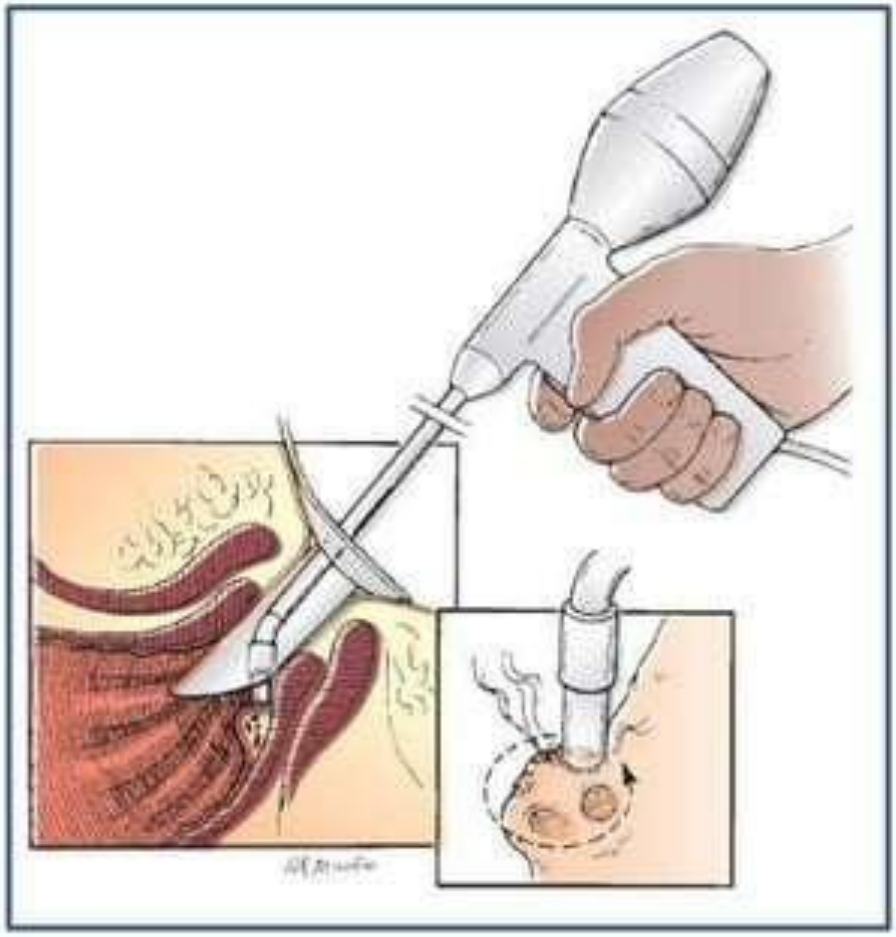
1. **Ulceration**
2. **Thrombosis**
3. **Sepsis and abscess formation**
4. **Incontinence**

Thrombosed Internal Haemorrhoids

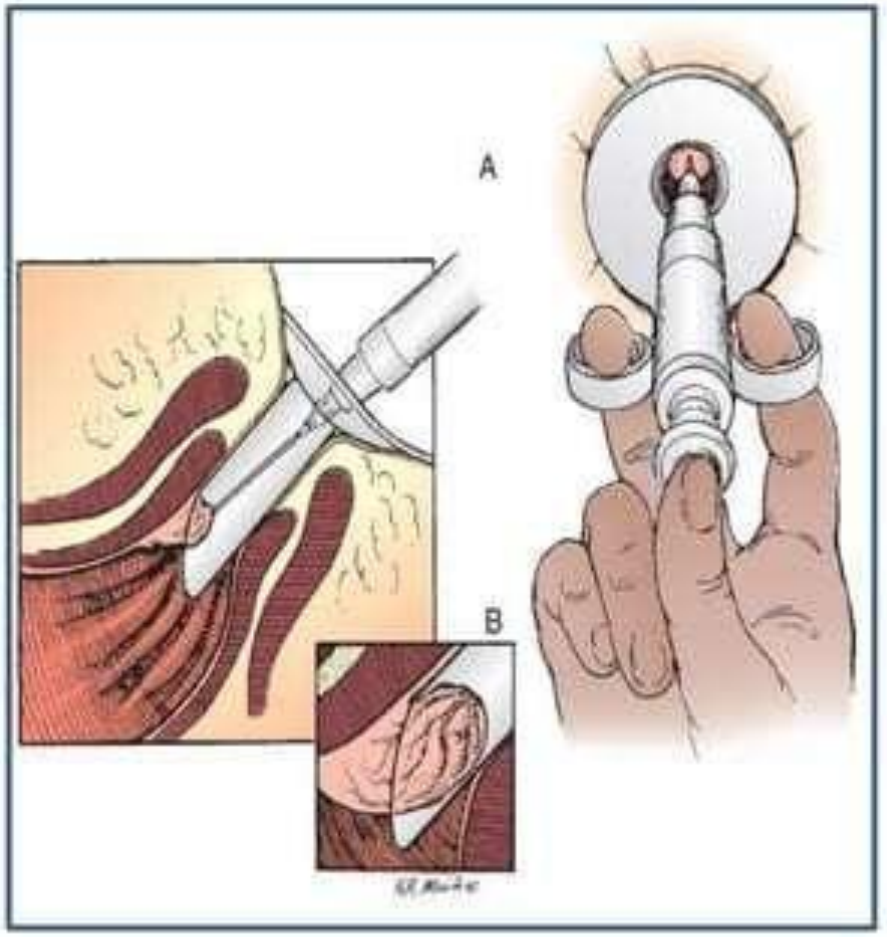
Thrombosed External Haemorrhoids

Internal Haemorrhoids Management

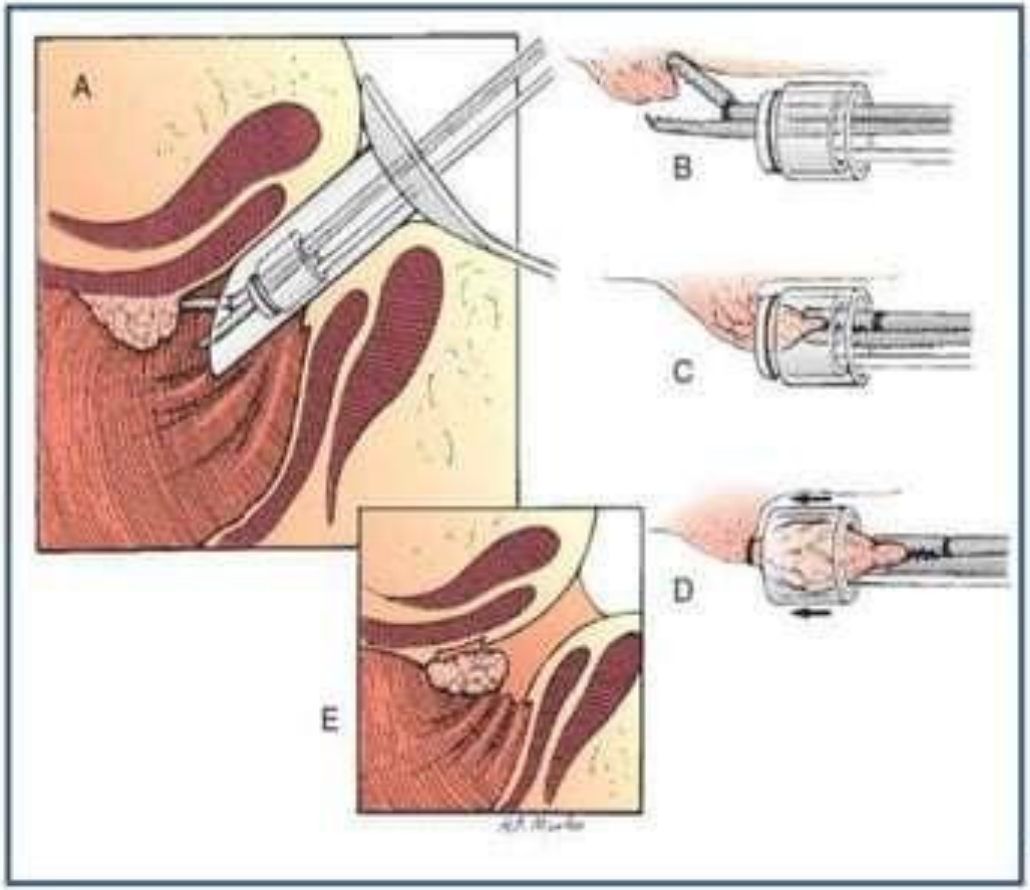
Grade 1&2 • Dietary modification: high fibre diet • Stool softeners • Bathing in warm water • Topical creams NOT MUCH VALUE	**Conservative Measures**
Indicated in **Failed Medical Treatment** & **Grades 3&4** • Injection Sclerotherapy • Rubber band ligation • Laser photocoagulation • Cryotherapy freezing • Stapled haemorrhoidectomy	**Minimally invasive**
Indications: 1. Failed other treatments 2. Severely painful grade 3&4 3. Concurrent other anal conditions 4. Patient preference	**Surgical**



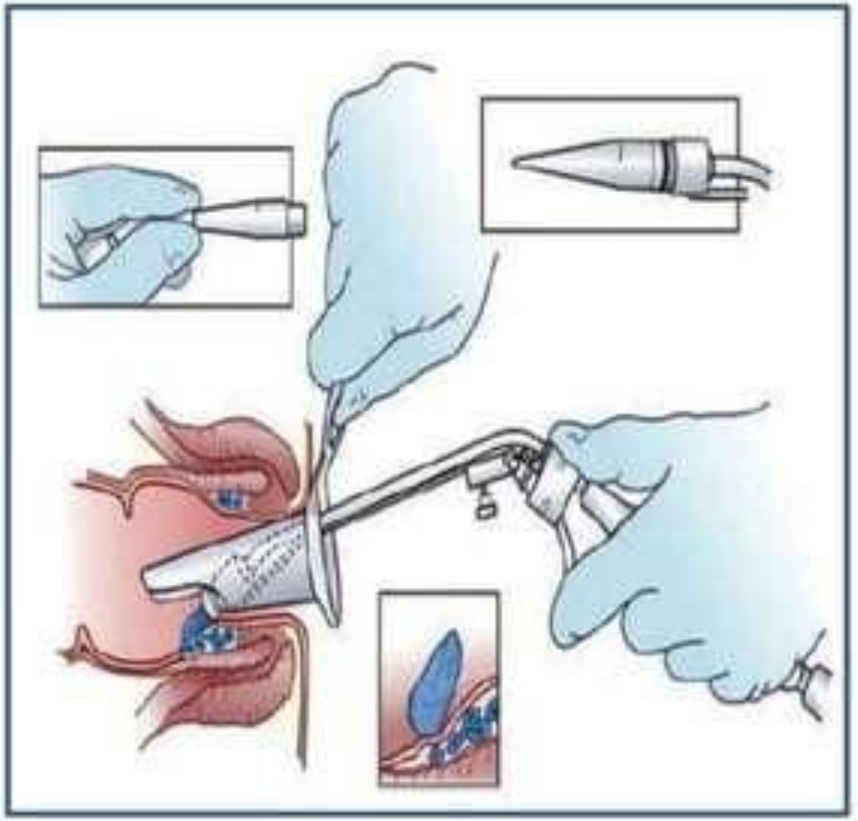
Infrared coagulation. Left, Coagulator inserted through a Hirschman anoscope. Right, Coagulation points



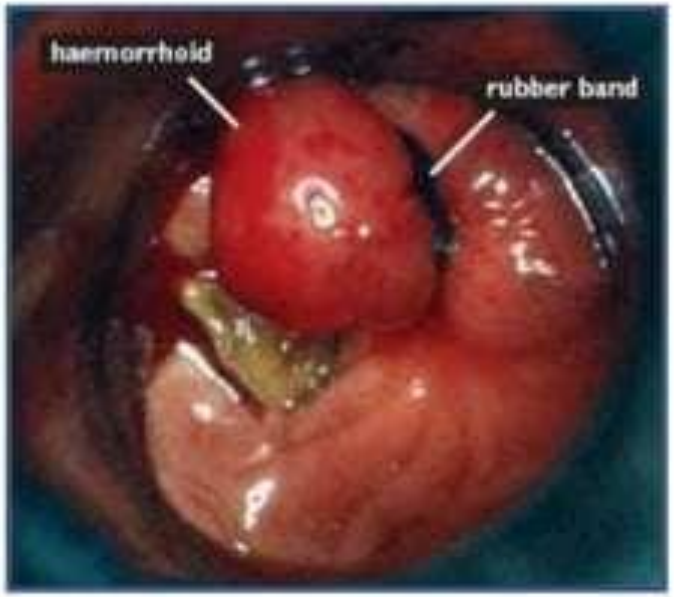
Sclerotherapy (A) Injection of internal hemorrhoid. (B) Postinjection striations.

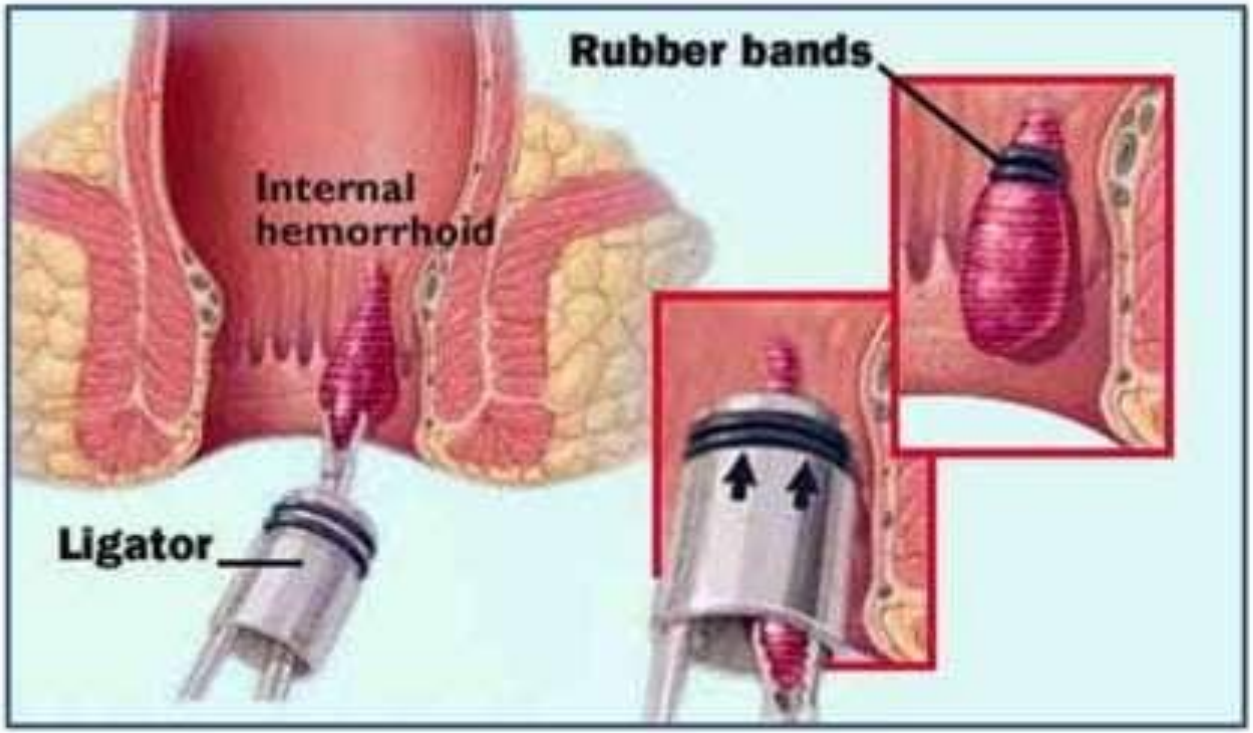


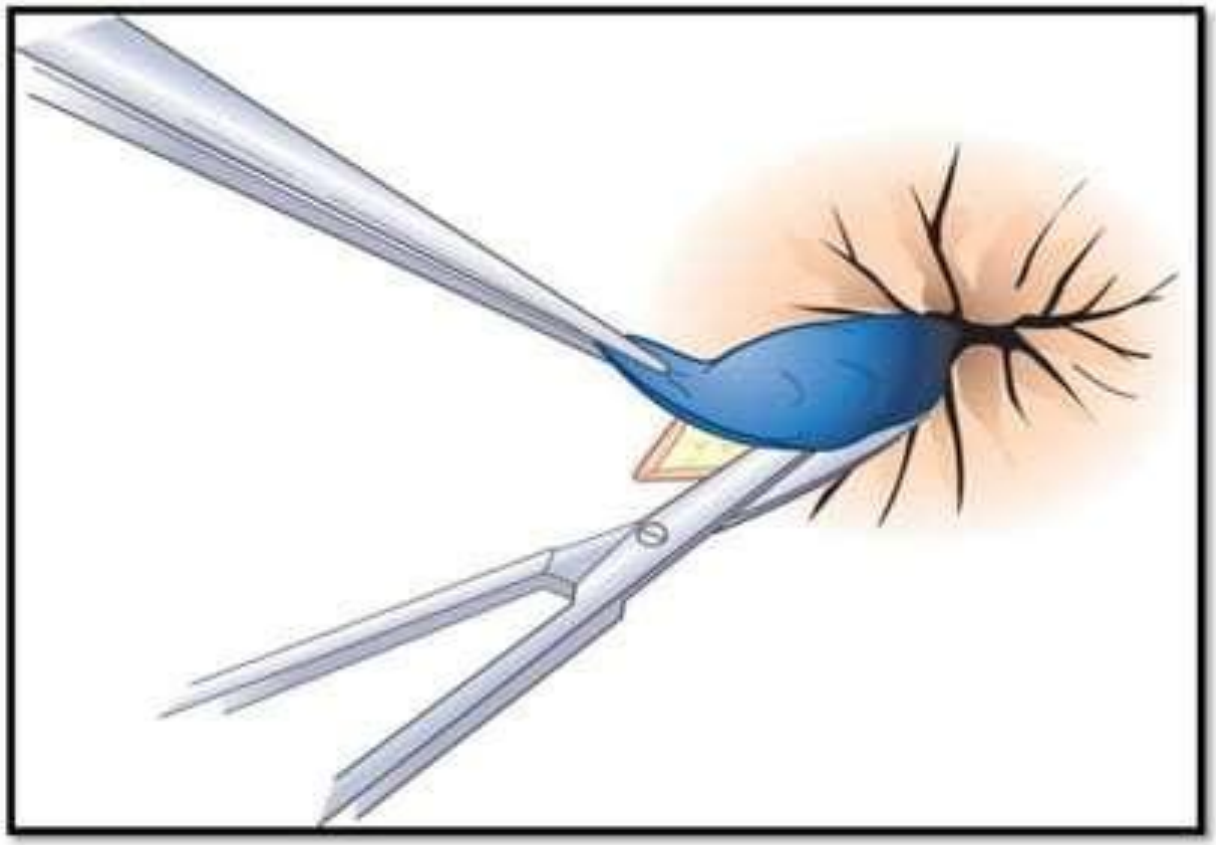
(A) **Ligator** in a **Hirschman anoscope**. (B) Internal hemorrhoid being grasped. (C) Internal hemorrhoid pulled up into drum. (D) O-ring applied to internal hemorrhoid. (E) Appearance of hemorrhoid after ligation.



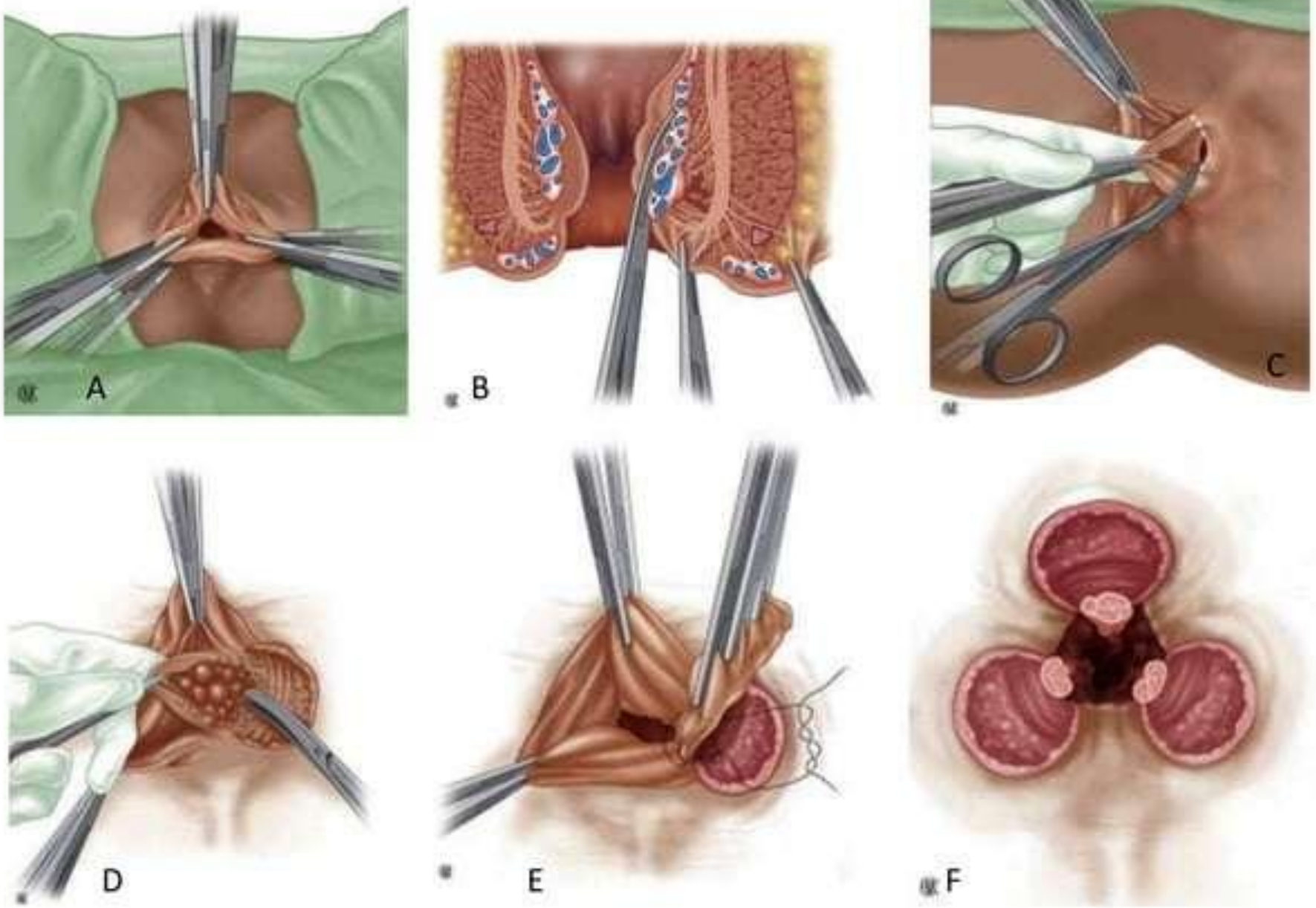
Rubber band ligation for an internal hemorrhoid.


haemorrhoid
rubber band


Rubber bands
Internal hemorrhoid
Ligator

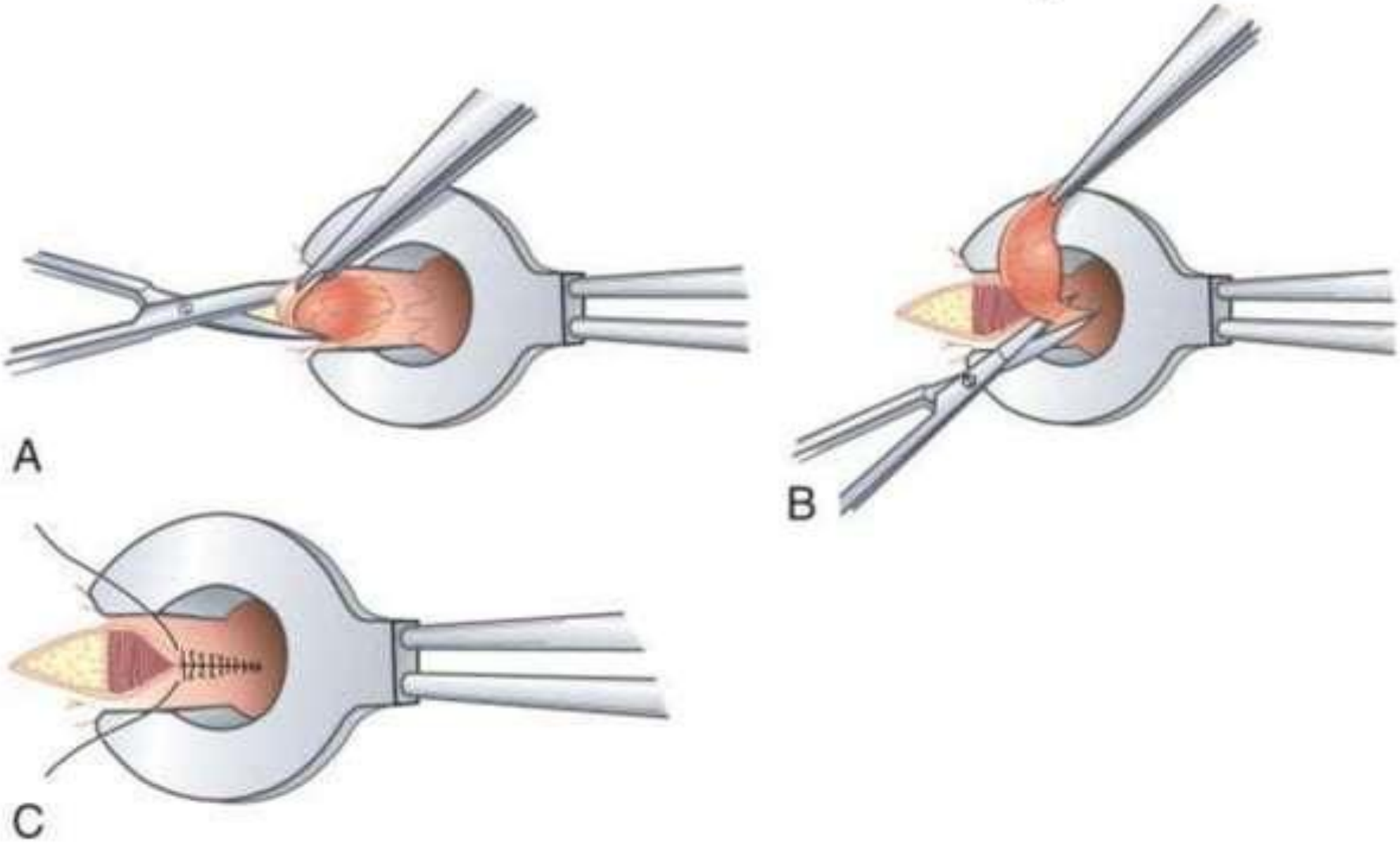


Excision of Thrombosed External Hemorrhoid.
The area is infiltrated with local anesthetic, and the thrombosed hemorrhoid is excised sharply. The wound is left open.



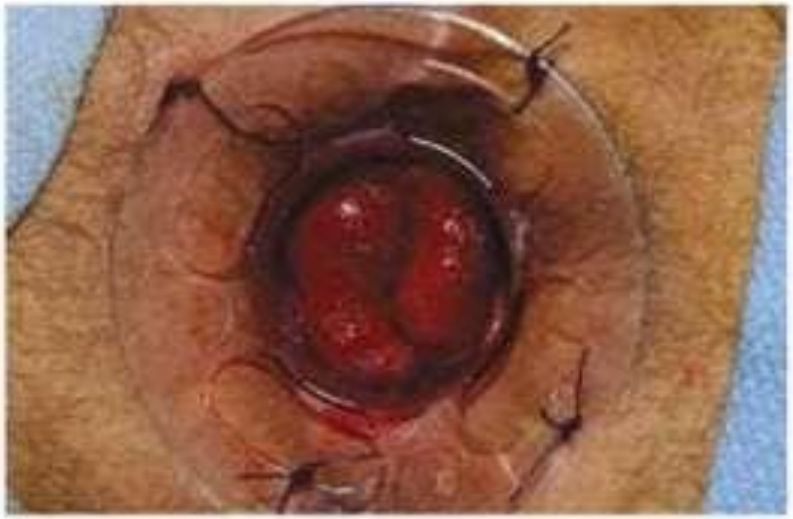
The open Milligan-Morgan hemorrhoidectomy.

Closed Hemorrhoidectomy



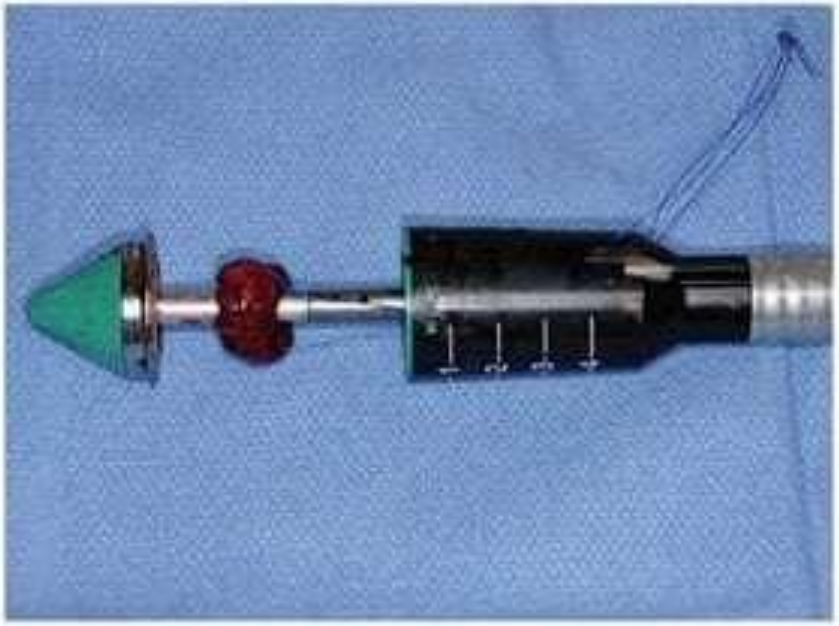
A

Grade 4 Hemorrhoid before Reduction



B

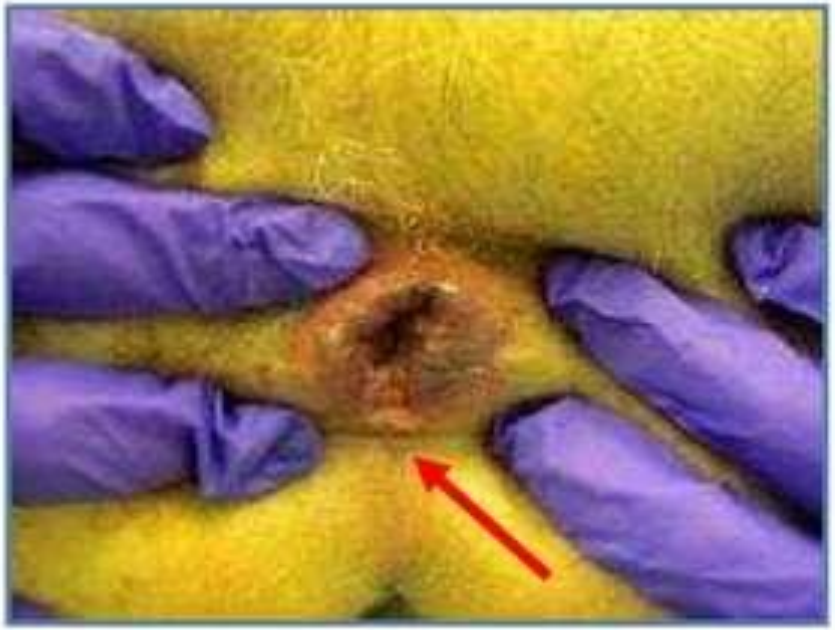
Placement of Stapling Device Obturator

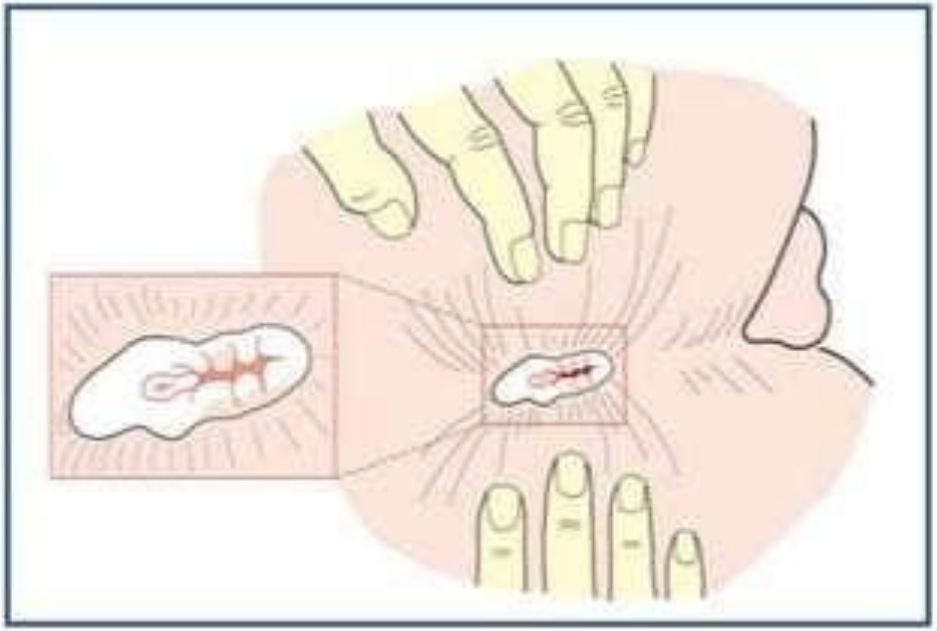


Stapling Device

Anal Fissure

Definition : An anal fissure (synonym: fissure-in-ano) is a longitudinal split in the anoderm of the distal anal canal,which extends from the anal verge proximally towards, but not beyond, the dentate line.





Anal Fissure

- Young & middle aged adults
- Male = Female
- Location – posterior midline (most common)

  Anterior midline fissures – more common in females
- In any event, length of each fissure is remarkably constant, extending from the dentate line to the anal verge and corresponding roughly to the lower half of the internal sphincter

Pathology

- Acute fissures – heal promptly with conservative treatment
- Secondary changes if present, it does not heal readily
  - Sentinel pile
  - Hypertrophied anal papilla
  - Long standing
    - Fibrous induration in lateral edges of fissure
    - Fibrosis at the base of ulcer (internal sphincter)
  - At any stage
    - Frank suppuration – intersphincteric / perianal abscess

Etiology

- Initiation – trauma
- Why midline posterior fissures are more common?
- Dietary factors
  - Decreased risk – raw foods, vegetables, whole grain bread
  - Increased risk – white bread sausages etc.
- Secondary fissure
  - Crohn's disease
  - Previous anal surgery, especially hemorrhoidectomy
  - Fistula-in-ano surgery
  - Anterior fissure in females resulting from childbirth
  - Long standing loose stools with chronic laxative abuse

Pathophysiology

- Initiation – trauma
- Perpetuation of fissure – abnormality of internal anal sphincter
- Higher resting pressure within the internal anal sphincter in pts with fissures than in normal control
- Rectal distension → reflex relaxation of internal anal sphincter → overshoot contractions in these patients → sphincter spasm and pain
- Elevated sphincter pressures cause ischemia of the anal lining resulting in pain and failure to heal
- Posterior commissure perfused more poorly than the other portion of the anal canal

Clinical Features

- **Pain and spasm**
  - Sharp, agonizing during defecation, recurrent, worsens constipation.
- **Bleeding**
  - In small amounts,
  - approximately 70% of patients note bright red blood on the toilet paper or stool
- **Discharge**
  - Irritation and pruritis ani due to malodorous discharge of the pus
- **Constipation**
- Painless non-healing fissure with occasional bleed – may be a progenitor of IBD

Diagnosis

- Inspection – Acute fissure is seen as Linear tear
  - most important
- Palpation
- Proctoscopy

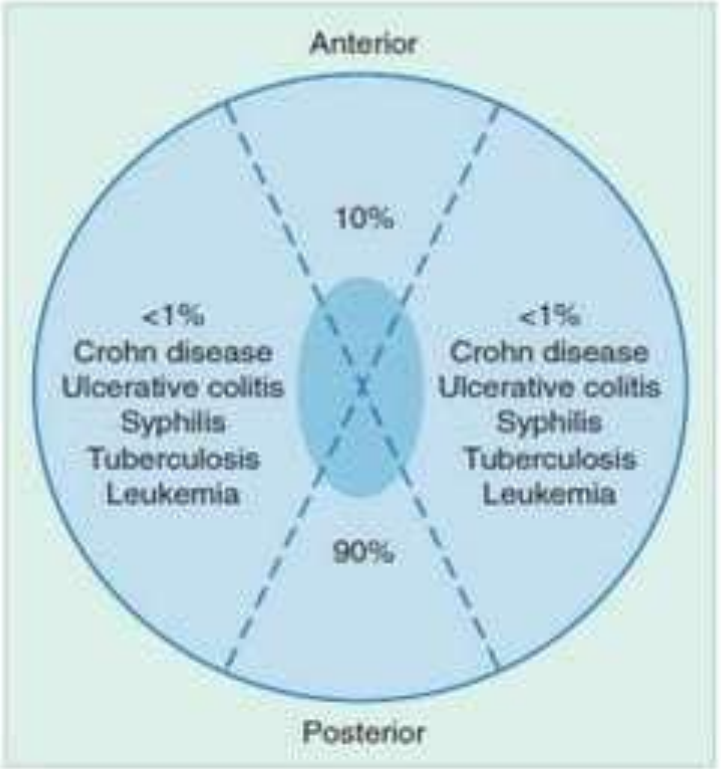
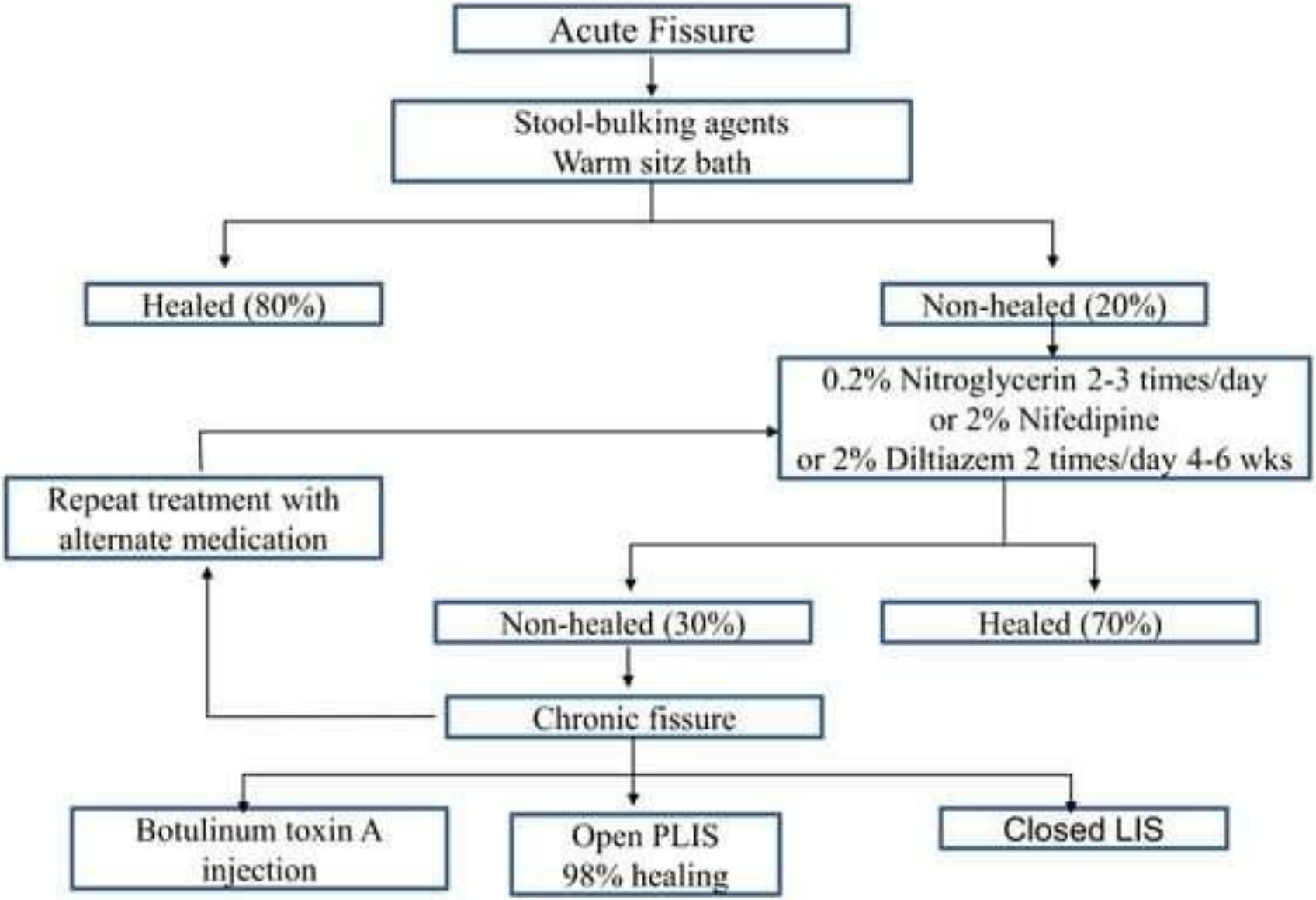


FIGURE 159.2 Diagram of the location of typical fissures and atypical fissures where a systemic illness should be suspected.

Treatment


Acute Fissure
Stool-bulking agents
Warm sitz bath
Healed (80%)
Non-healed (20%)
0.2% Nitroglycerin 2-3 times/day
or 2% Nifedipine
or 2% Diltiazem 2 times/day 4-6 wks
Repeat treatment with
alternate medication
Non-healed (30%)
Healed (70%)
Chronic fissure
Botulinum toxin A
injection
Open PLIS
98% healing
Closed LIS

Acute anal fissure:

- Spontaneous healing, High fiber diet, adequate water intake and warm sitz bath, stool softener/bulk laxative, suppositories
- Sodium tetradecyl sulphate

Sitz bath

Pharmacological Management

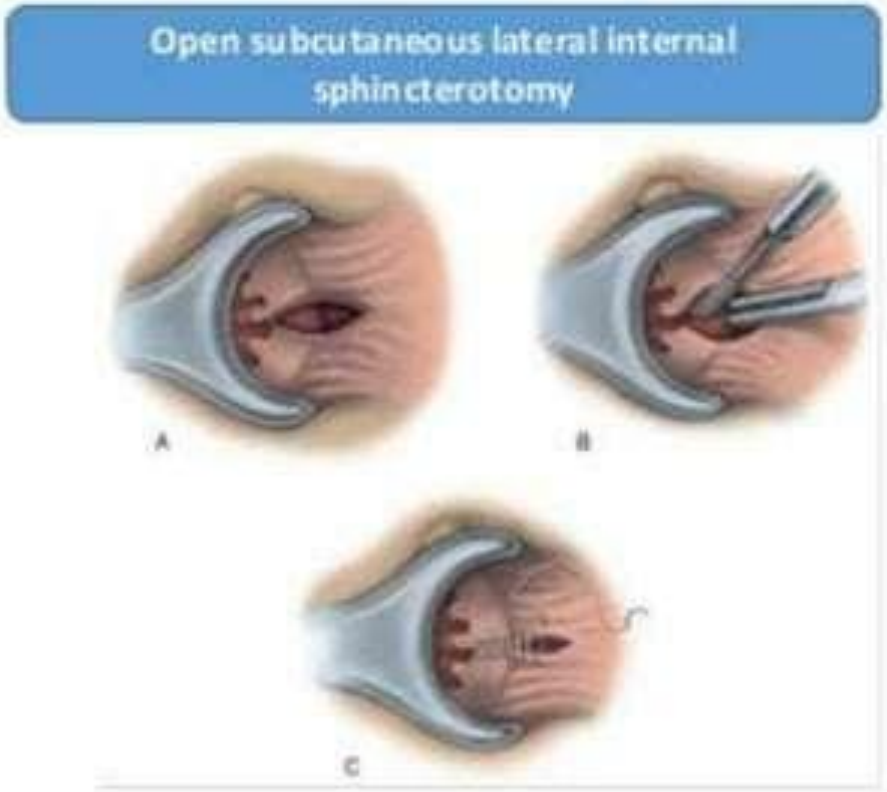
- By enhancing internal anal sphincter (IAS) relaxation via
  - nitric oxide donation
  - intracellular Ca2+ depletion
  - muscarinic receptor stimulation
  - adrenergic inhibition

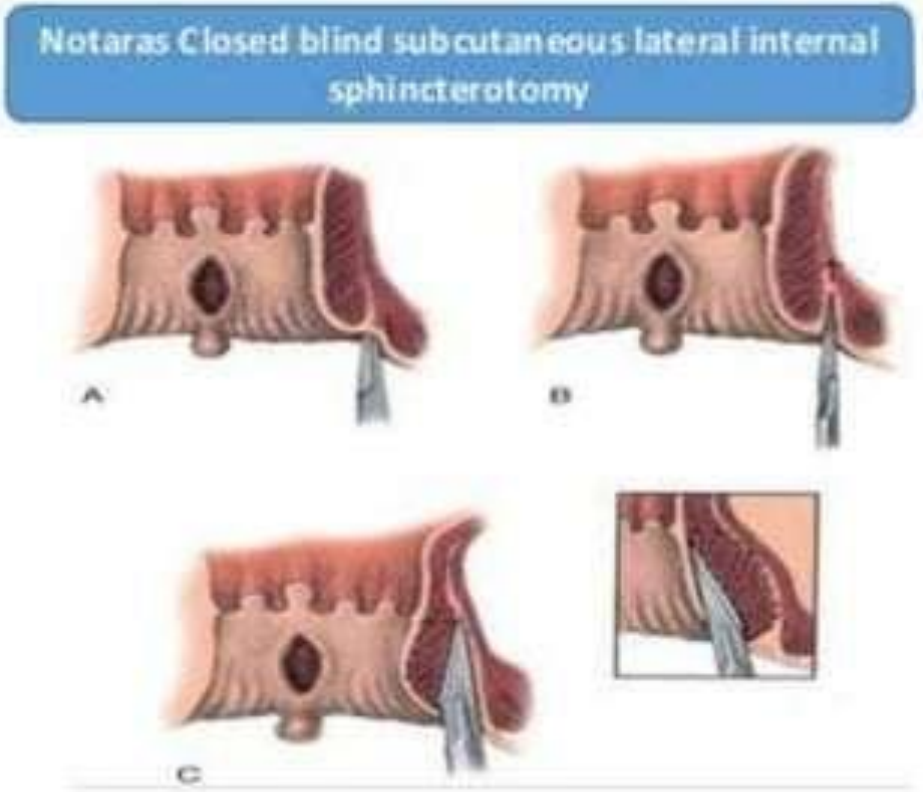
- This improves blood supply at the site of the fissure that would promote healing of anal fissures

- Nitric oxide donors and calcium channel blockers, agents that directly reduce resting anal pressure, has now largely replaced traditional surgical methods as first-line treatment for chronic anal fissure

Operative Measures

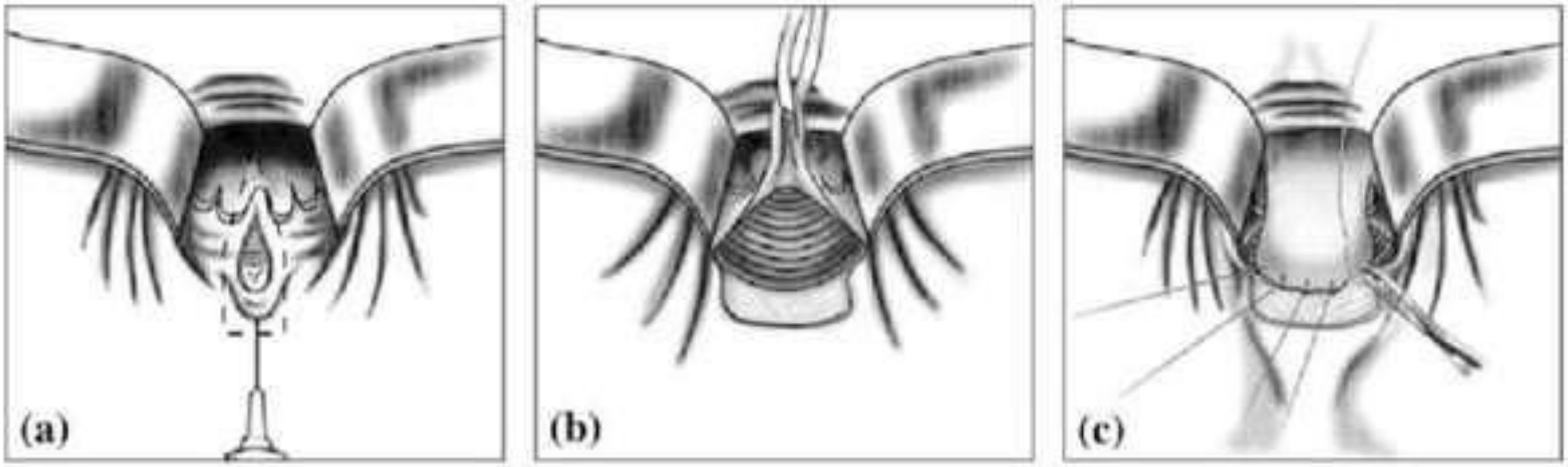
- PosteroLateral Internal Sphinceterotomy
  - Open PLIS
  - Closed PLIS





Operative Measures

- **Anal Advancement Flap**
  - After excision of the edges of the fissure and its base overlying the internal sphincter,
  - an inverted house-shaped flap of perianal skin is carefully mobilised on its blood supply
  - advanced without tension to cover the fissure,
  - then sutured with interrupted absorbable sutures



Pharmacological Sphincterotomy

- Pharmacological manipulation of anal sphincter tone as an alternative modality to surgery for the treatment of anal fissure

- Shares the same goal as lateral sphincterotomy without its possible long-term side effects

- Pharmacological agents lower anal canal resting pressure producing chemical sphincterotomy without causing permanent damage to the anal sphincter mechanism

Other Agents

- Botulinum Toxin A
- L-arginine
- Gonyautoxin
- Topical sildenafil

Pilonidal sinus

Pathogenesis:

A sinus tract at natal cleft resulting from:

- Blockage of hair follicle
- Folliculitis
- Abscess followed by sinus formation.
- Hair trapping
- Foreign body reaction
- The sinus tract is cephald

Associated with:

- Caucasians
- Hirsute
- Sedentary occupations
- Obese
- Poor hygeine

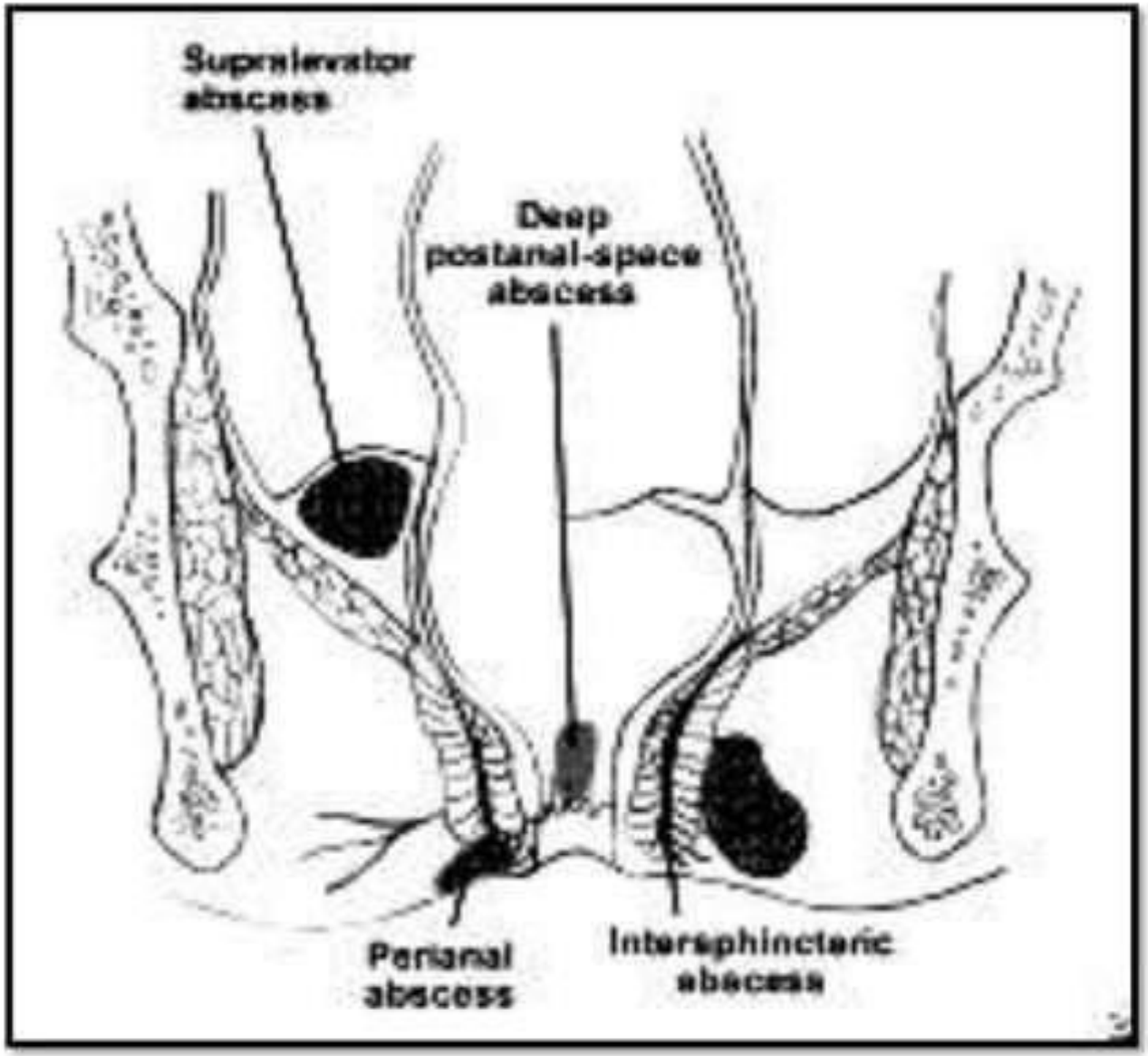
Presentation & Treatment

Presentation	Clinical	Treatment
Acute	Abscess	Incision and drainage Recurrence: 40%
Chronic	Pain and discharge	Wide local excision • with primary closure or • closure by secondary intension Recurrence: 8-15%

Perianal Abscess

- Infection originates in the intersphincteric plane, most likely in one of the anal glands.

- This may result in
  - simple intersphincteric abscess
  - extend vertically either upward
  - downwards horizontally
  - circumferentially resulting in varied clinical presentations.

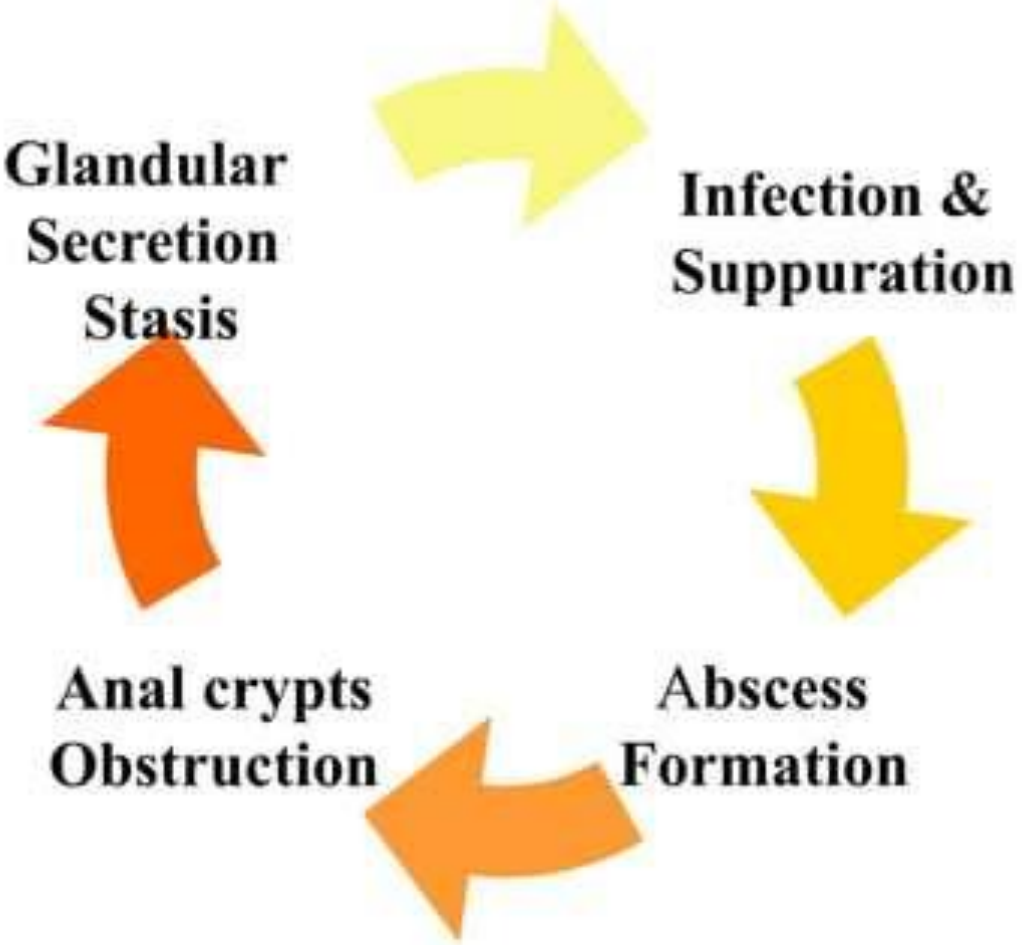

Suprasevator abscess
Deep postanal-space abscess
Perianal abscess
Intersphinctaric abscess

Aetiology & Pathogenesis:

- 4-10 glands at dentate line.
- Infection of the cryptglandular epithelium resulting from obstruction of the glands.
- Ascending infection into the intersphincteric space and other potential spaces.
- Bacteria implicated: *E.Coli., Enterococci, bacteroides*

- Other causes:
  - Crohn
  - TB
  - Carcinoma, Lymphoma and Leukaemia
  - Trauma
  - Inflammatory pelvic conditions (appendicitis)

Pathophysiology

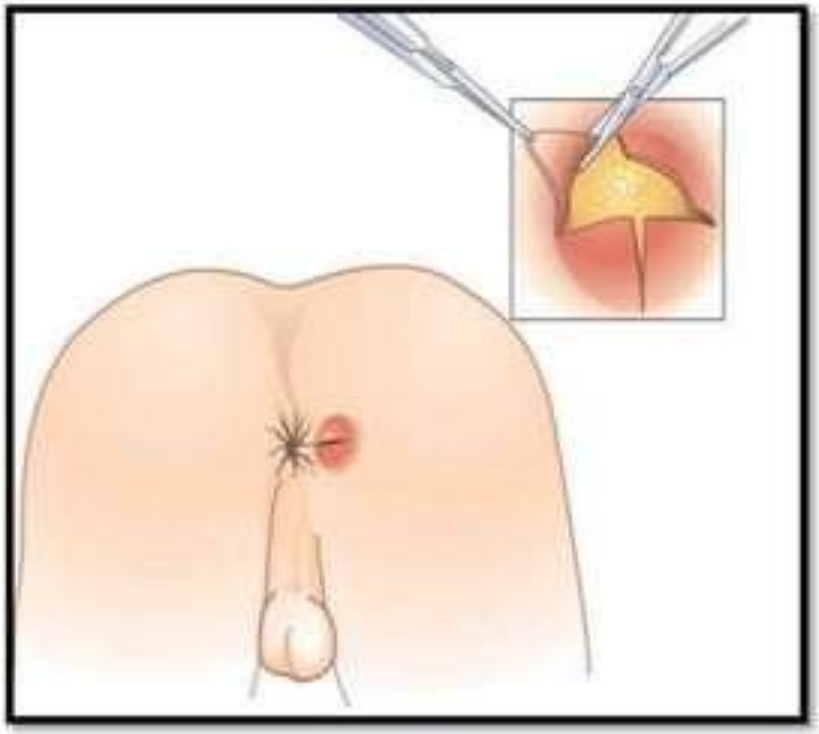


Clinical Presentation

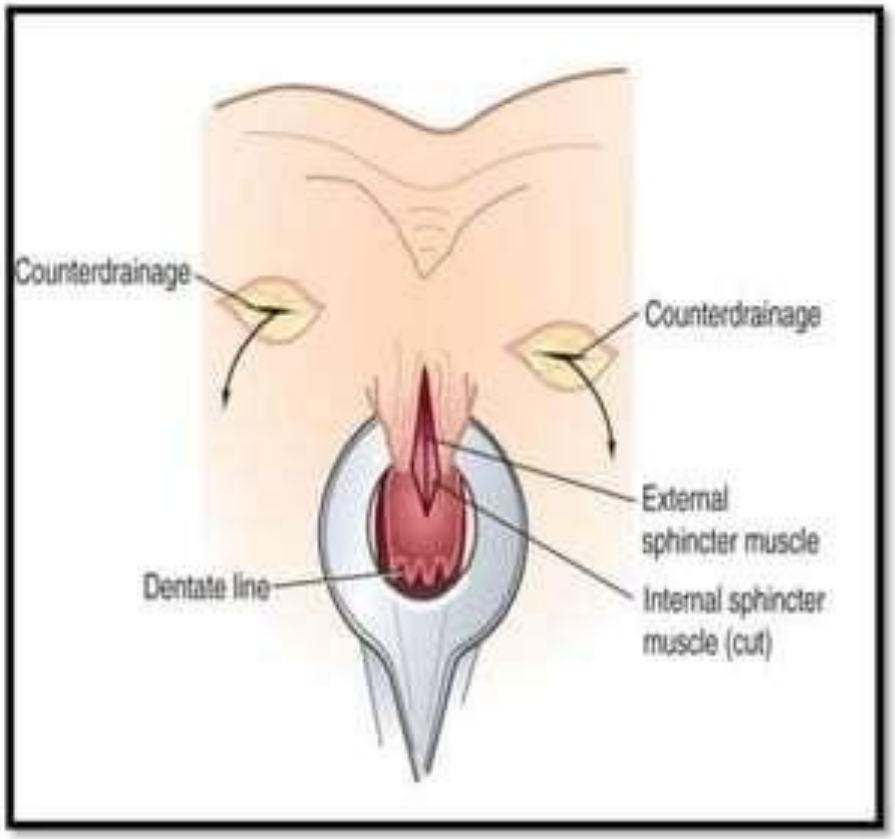
Clinical presentation	Site of Abscess
• Perianal pain, discharge (pus) and fever • Tender, fluctuant, erythematous subcutaneous lump	Perianal
• Chills, fever, ischiorectal pain • Indurated, erythematous mss, tender	Ischio-rectal
• Rectal pain, chills and fever, discharge • PR tender. Difficult to identify are. EUA needed	Intersphincteric Supralevator

Treatment

- Abscesses should be drained when diagnosed.
- Simple and superficial abscesses can most often be drained under local anesthesia
- Patients who manifest systemic symptoms, immunocompromised and those with complex, complicated abscesses are best treated in a hospital setting.
- An intersphincteric abscess is drained by dividing the internal sphincter at the level of the abscess



Incision and drainage of anorectal abscess



Modification of Hanley's technique for incision and drainage of horseshoe abscess

Fistula In Ano

- Definition :
  - A fistula-in-ano, or anal fistula, is a **chronic abnormal communication**, usually lined to some degree by granulation tissue, which runs outwards from the **anorectal lumen** (the internal opening) to an external opening on the **skin** of the perineum or buttock (or rarely, in women, to the vagina).

Fistula in Ano

- In anorectal abscess 50% develop a persistent fistula in ano.

- The fistula usually originates in the infected crypt (internal opening) and tracks to the external opening, usually the site of prior drainage.

The course of the fistula can often be predicted by the anatomy of the previous abscess.

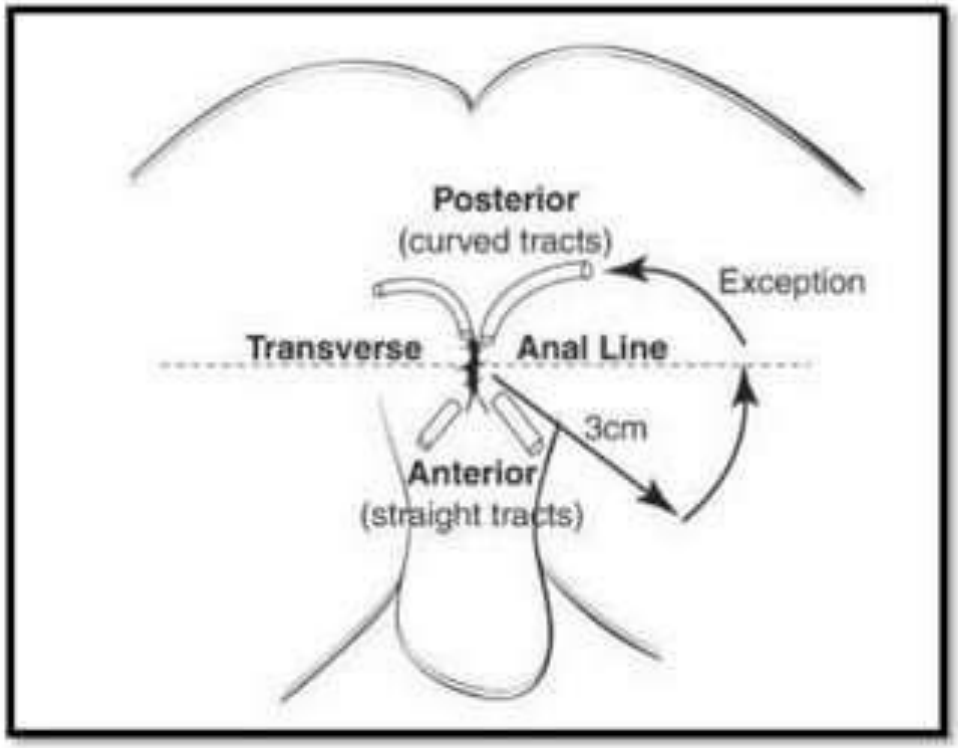
- Majority of fistulas are cryptoglandular in origin, trauma, Crohn's disease, malignancy, radiation, or unusual infections (tuberculosis, actinomycosis, and chlamydia) may also produce fistulas.
- A complex, recurrent, or non healing fistula should raise the suspicion of one of these diagnoses.

Diagnosis

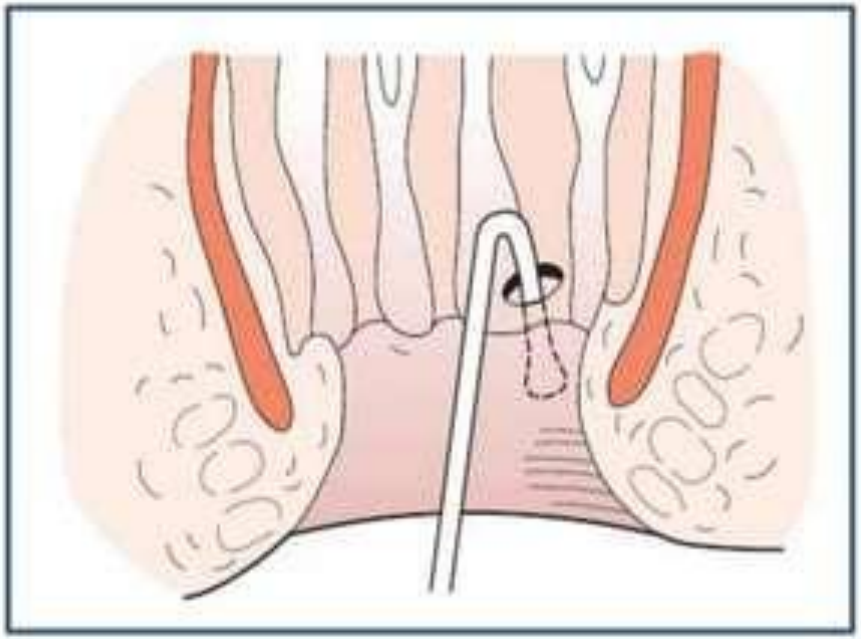
- Patients present with persistent drainage from the internal and/or external openings.
- An indurated tract is often palpable.
- Goodsall's rule can be used as a guide in determining the location of the internal opening
- Fistulas with an external opening anteriorly connect to the internal opening by a short, radial tract.
- Fistulas with an external opening posteriorly track in a curvilinear fashion to the posterior midline.

Exceptions: Anterior external opening is greater than 3 cm from the anal margin. Such fistulas usually track to the posterior midline.

Goodsall's rule to determine location of internal opening



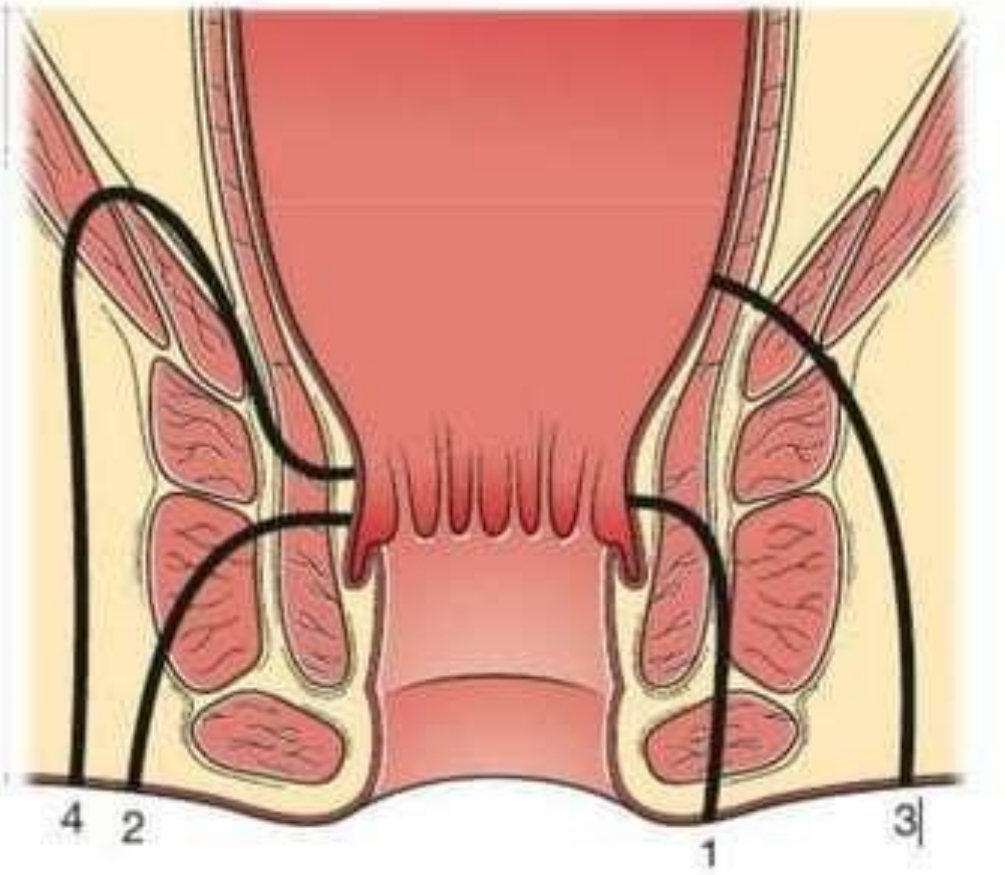
Goodsall's rule



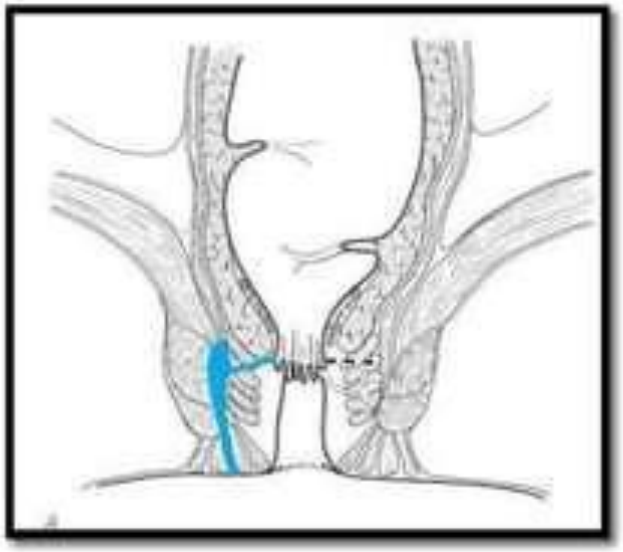
Retrograde probing of an anal canal sometimes reveals the Internal orifice of the fistula

- Fistulas are categorized based upon their relationship to the anal sphincter complex and treatment options are based upon these classifications:

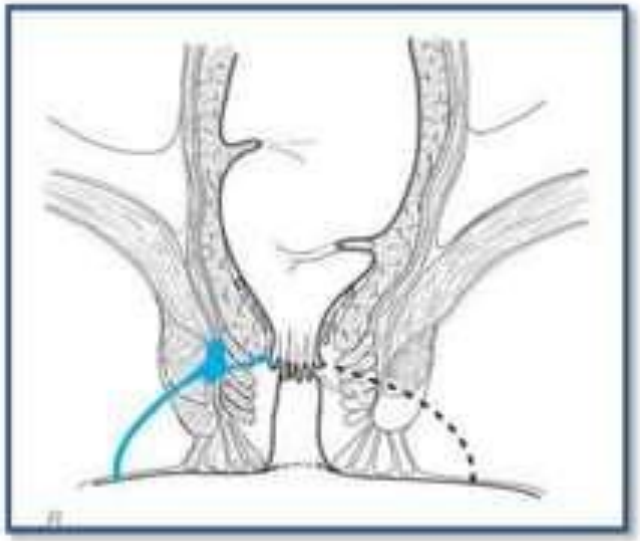
  - **Intersphincteric fistula** tracks through the distal internal sphincter and intersphincteric space to an external opening near the anal verge.
  - **Transsphincteric fistula** often results from an ischiorectal abscess and extends through both the internal and external sphincters
  - **Suprasphincteric fistula** originates in the intersphincteric plane and tracks up and around the entire external sphincter
  - **Extrasphincteric fistula** originates in the rectal wall and tracks around both sphincters to exit laterally, usually in the ischiorectal fossa



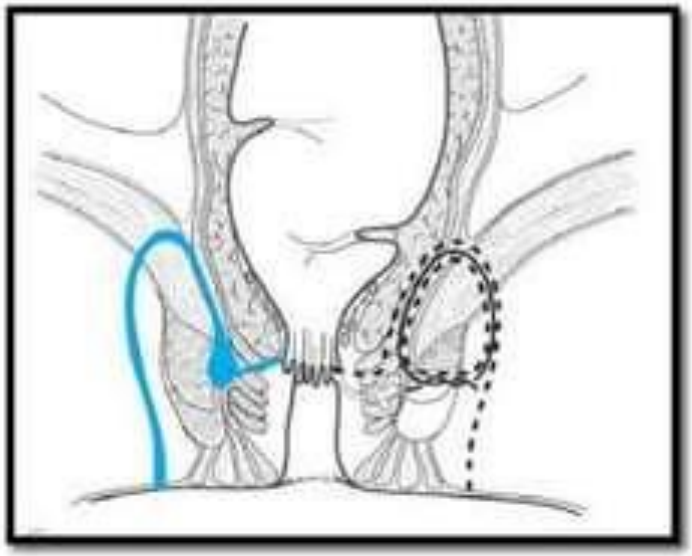
Types of anal fistula (**Parks' classification**):
1, intersphincteric; 2, trans-sphincteric; 3, suprasphincteric;
4, extrasphincteric primary tracks.



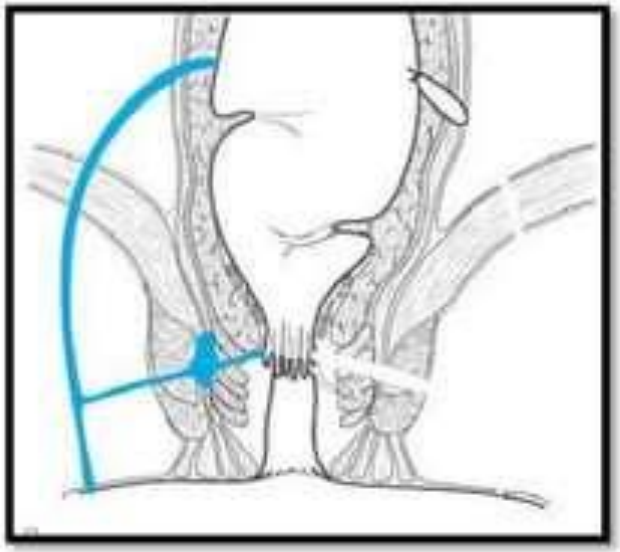
Intersphincteric



Trans sphincteric



Suprasphincteric



Extrasphincteric

Special investigations

- Manometry :
  - functional anal sphincter length,
  - resting tone and voluntary squeeze
- Endoanal Ultrasound :
  - sphincter integrity
  - EUS with hydrogen peroxide, can also be used to delineate fistulae
- MRI :
  - Gold Standard
  - demonstrate secondary extensions
- Fistulography and computed tomography(CT)
  - if Extrasphincteric fistula is suspected.

Treatment

- **Goal of treatment** of fistula in ano
  - Eradication of sepsis
  - with preservation of continence

- The external opening is usually visible as a red elevation of granulation tissue with or without concurrent drainage.

- The internal opening may be more difficult to identify.

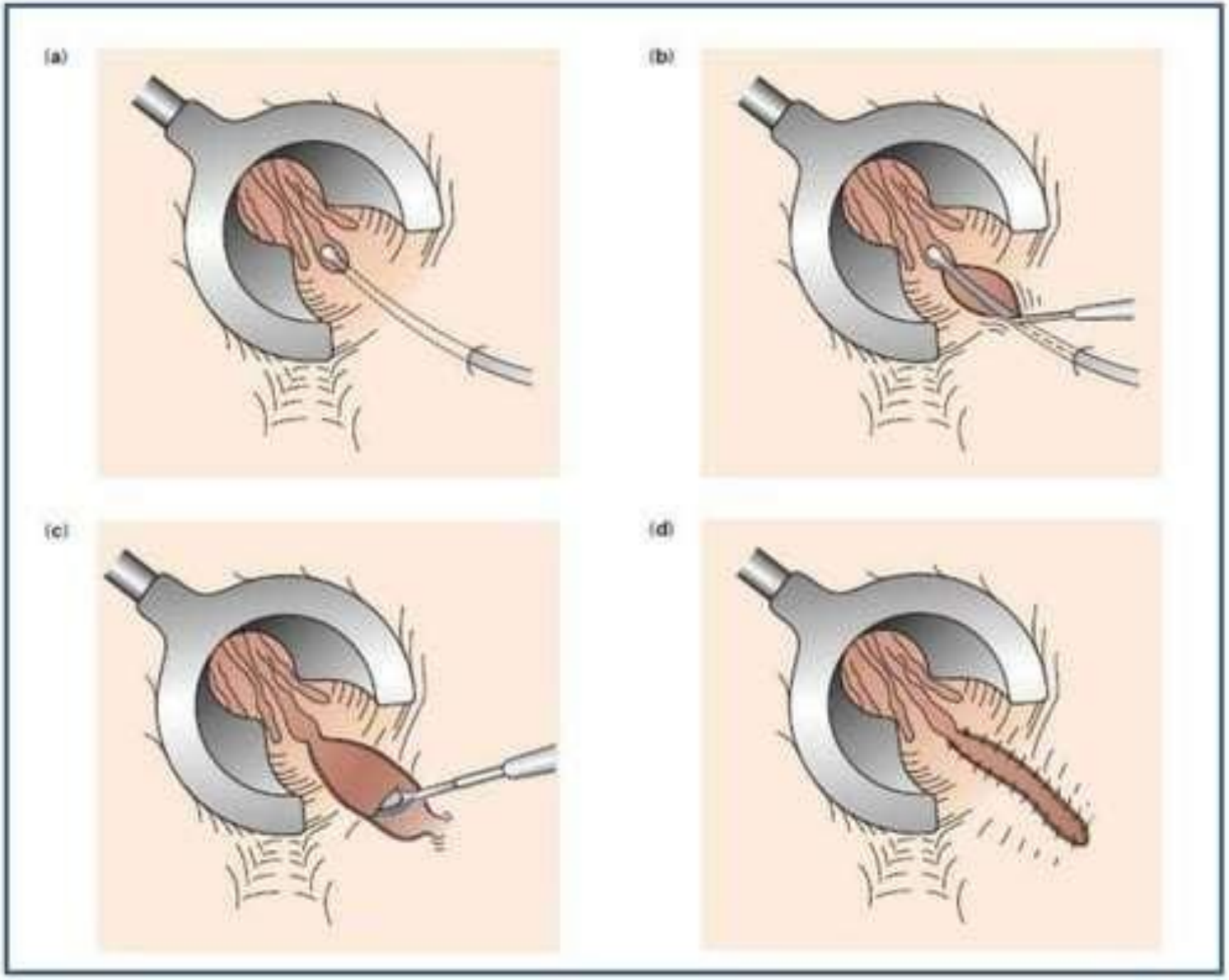
- Injection of hydrogen peroxide or dilute methylene blue may be helpful

Fistulotomy

- John of Arderne(600 years ago) - fistulous track must be laid open from its termination to its source.
- Involves division of **all** those structures lying between the external and internal openings.
- Used for :
  - Intersphincteric fistulae & Trans-sphincteric fistulae
  - involving **less than 30%** of the voluntary musculature
- Granulation tissue is curetted and sent for HPE

Fistulectomy

- This technique involves coring out of the fistula, usually by diathermy cautery
- It allows better definition of fistula anatomy than fistulotomy especially the level at which the track crosses the sphincters and the presence of secondary extensions



Fistulotomy. (a) A grooved probe is passed from the external to internal openings. (b) the track laid open over the probe . (c)The track is curetted to remove granulation tissue, (d) the edges of the wound are trimmed and the wound may then be marsupialised .

Setons (Latin: *seta* = bristle)

- **Loose setons** are tied such that there is no tension upon the encircled tissue; there is no intent to cut the tissue.

- **Cutting setons** aim to achieve the high fistula eradication rates associated with fistulotomy, but without the degree of functional impairment endowed by division of the sphincters at a single stage
- A variety of seton material has been used, either elastic and 'self-cutting' or non-elastic and tightened at intervals, with the sphincter being divided at varying speeds

Treatment (contd)

- High transsphincteric and suprasphincteric fistulas are treated by initial placement of a *seton*.
- Extrasphincteric fistulas are rare, and treatment depends upon both the anatomy of the fistula and its etiology.
- Complex and/or nonhealing fistulas may result from Crohn's disease, malignancy, radiation proctitis, or unusual infection.
- Proctoscopy should be performed in all cases of complex and/or nonhealing fistulas to assess the health of the rectal mucosa.
- Biopsies of the fistula tract should be taken to rule out malignancy.

LIFT PROCEDURE

- Ligation of intersphincteric fistulous tract **(LIFT)**
  - 2007 by Rojanasakul
  - Approach involves Obliteration of the fistula by **Ligation**
  - Perineal incision is made over Intersphincteric groove
  - Portion of the intersphincteric fistula tract is excised
  - **Defect** in the internal and external sphincter is **suture ligated** with absorbable suture.
  - Intersphincteric space - reapproximated with interrupted absorbable suture
  - Skin incision is closed with interrupted chromic.

Rectal Prolapse

- Also termed **'Rectal procidentia'**
- Protrusion of the rectum beyond the anus
- 6:1 female to male predominance
- Peak incidence is in the 6^{th} - 7^{th} decades of life

Classification of Rectal Prolapse

- **Mucosal Prolapse**: mucous membrane and submucosa of the rectum protrude outside the anus for approximately 1–4 cm
- **Full thickness Prolapse**: prolapse with all layers
- Grade 1: occult prolapse
- Grade 2: prolapse to but not through anus
- Grade 3: any protrusion through anus

Risk factors

- Chronic constipation ; Chronic diarrhea
- Female sex - torn perineum ; Male -Urethral Obstruction
- often associated with third-degree haemorrhoids, **mucohaemorrhoidal prolapse**
- A/w : cystic fibrosis, neurological disorder, Hirschsprung's disease, rectal polyps and maldevelopment of the pelvis.
- Following Sx for Fistula-in-ano

Anatomic abnormalities seen in patients with rectal prolapse

- Deep rectovaginal or rectovesical pouch
- Lax pelvic floor musculature
- Failure of normal relaxation of the external sphincter
- Redundant sigmoids
- Pudendal nerve injury

Presentation

Primary complaint -Rectal prolapse(in patient terms -coming out)

May mistake it as haemorrhoids

- Tenesmus
- Bleeding
- Mucus discharge
- Constipation
- Fecal incontinence
- Sensation of incomplete evacuation
- Rectal prolapse can be **incarcerated** and represent a surgical emergency.

Complications of prolapse

- Ulceration
- Strangulation
- Urinary and fecal incontinence
- Spontaneous rupture with evisceration

Investigations

- Colonoscopy -
  - Only if Indicated
  - Rule out additional pathology, such as a neoplasm which may be causing the prolapse
- **Anorectal manometry** and pudendal nerve terminal motor latency (**PNTML**) should be considered in patients with fecal incontinence
- Patients with constipation should undergo **colonic transit studies**
- Dynamic pelvic floor MRI
- Endorectal ultrasound
- Cinedefecography

Treatment for Mucosal Prolapse

- IN INFANTS AND YOUNG CHILDREN
  - **Digital repositioning**. parents taught to replace the protrusion; underlying causes are addressed.
  - **Submucosal injection** or **banding**
    - 5% phenol in almond oil or rubber band ligation
- IN ADULTS
  - **Local treatments** Submucosal injection of 5% phenol in almond oil or rubber band ligation
  - **Excision** of the prolapsed mucosa.
    - Endoluminal stapling technique or
    - Internal Delorme's procedure

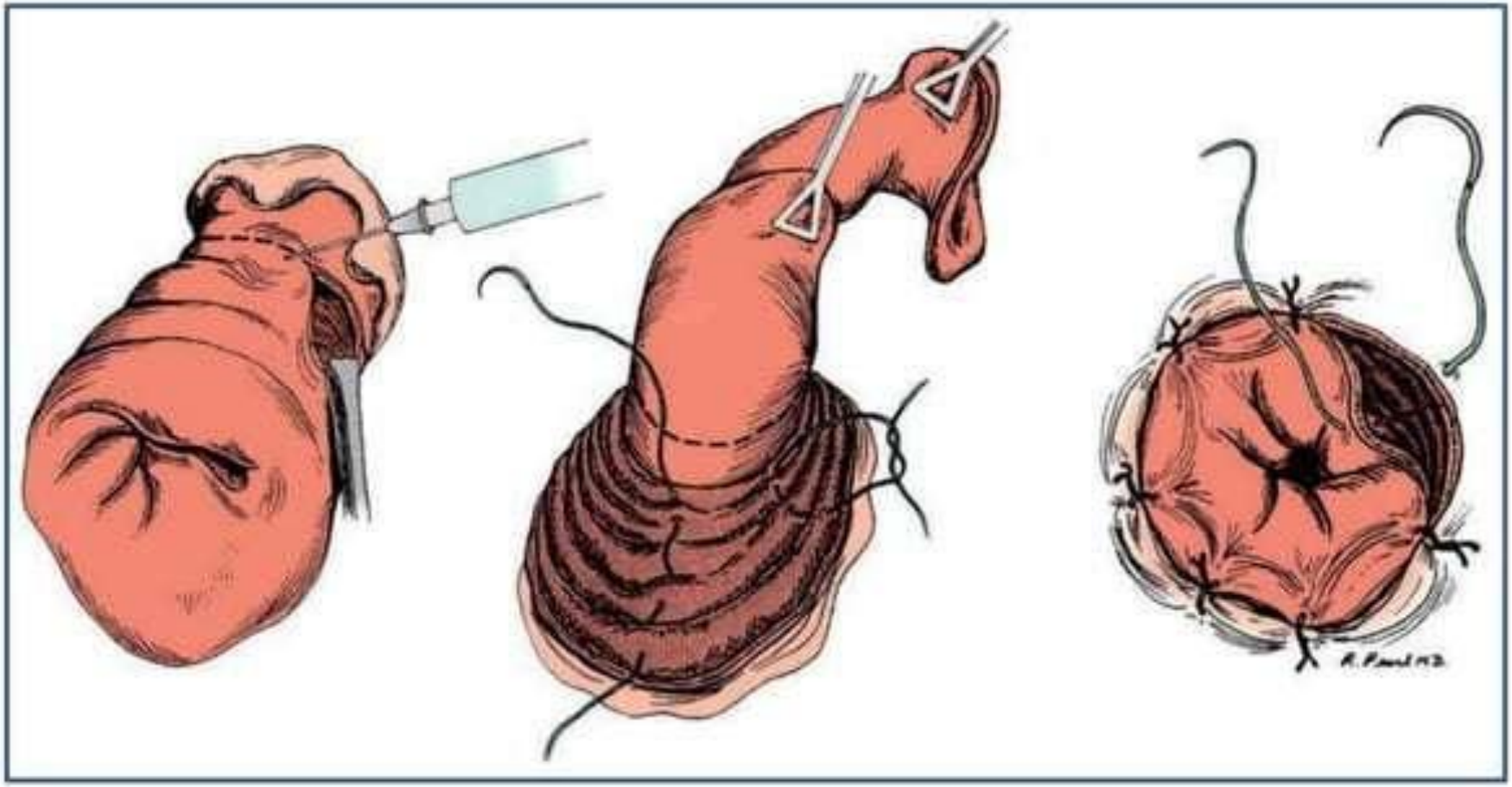
Treatment for Complete Prolapse

- Surgery :
  - **PERINEAL APPROACH**
    - Thiersch operation -
      - steel wire, or silastic or nylon tape, placed around anal canal
    - Delorme's operation -
      - rectal mucosa is stripped circumferentially
      - underlying muscle is plicated with a series of sutures
      - concertinaed towards the anal canal
    - Altemeier's procedure -
      - full-thickness resection
      - hand-sewn or stapled anastomosis

PERIANAL APPROACH

Thiersch anal encirclement procedure.

Anorectal mucosectomy with muscular plication (**Delorme procedure**).



Perineal proctosigmoidectomy (Altemeier procedure).

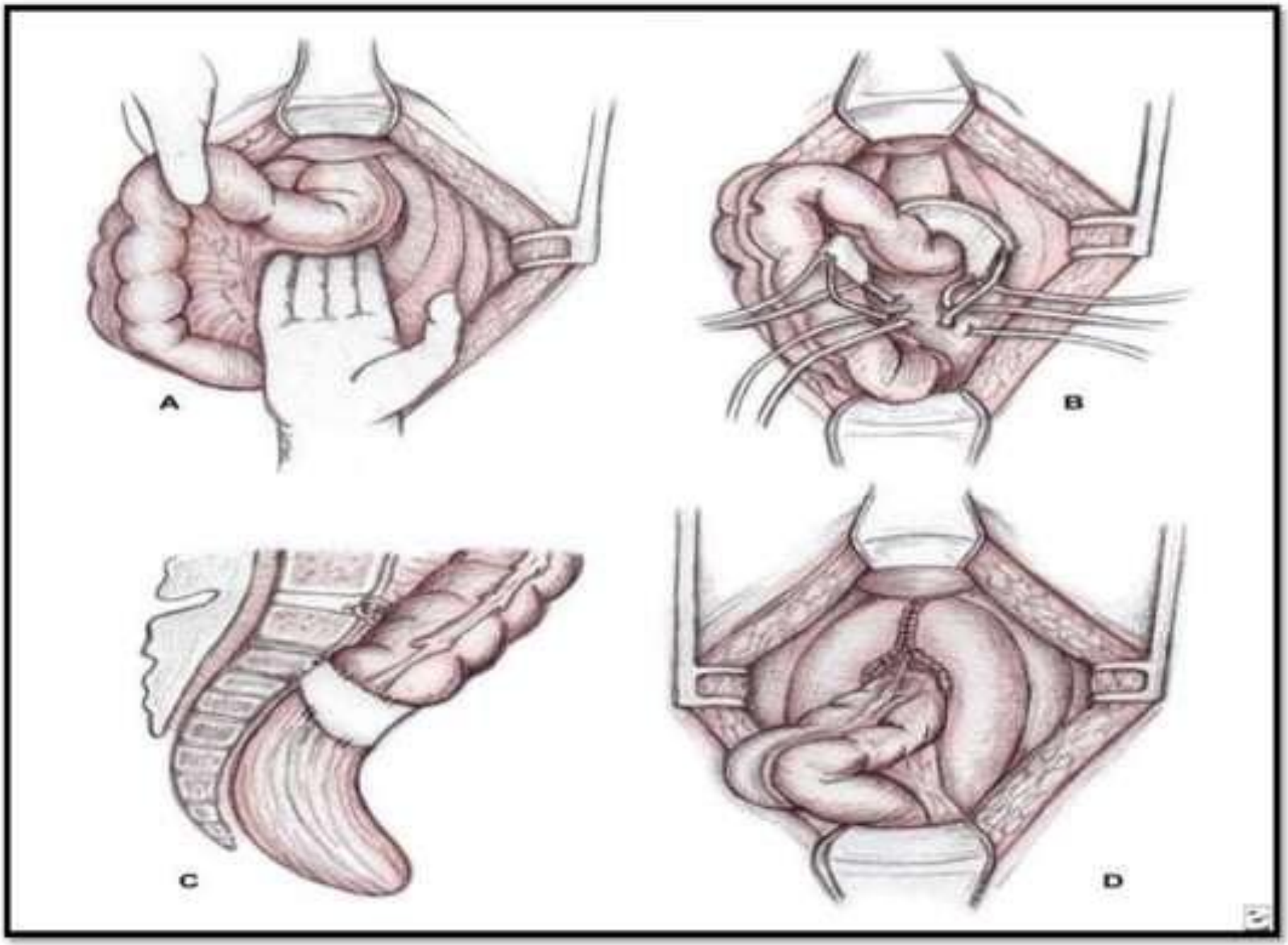
ABDOMINAL APPROACH

- **Principle** : fix the rectum in its normal anatomical position

Ripstein procedure:

- Mobilization : dissection between mesorectum and the presacral fascia
- Anterior mobilization : level of vagina or seminal vesicles
- Polypropylene Mesh : placed around anterior wall of the rectum and posteriorly between sacrum and rectum
- Done at the level of the peritoneal reflection
- Low recurrence rates: 0-9.6%
- High rate of complications

Rectopexy



Wells' posterior Ivalon rectopexy

- First described in 1959
- Low recurrence rates: 3.0-6.0%
- Morbidity rate of up to 19%
- Complications: mesh erosion resulting in fistula formation

Suture rectopexy

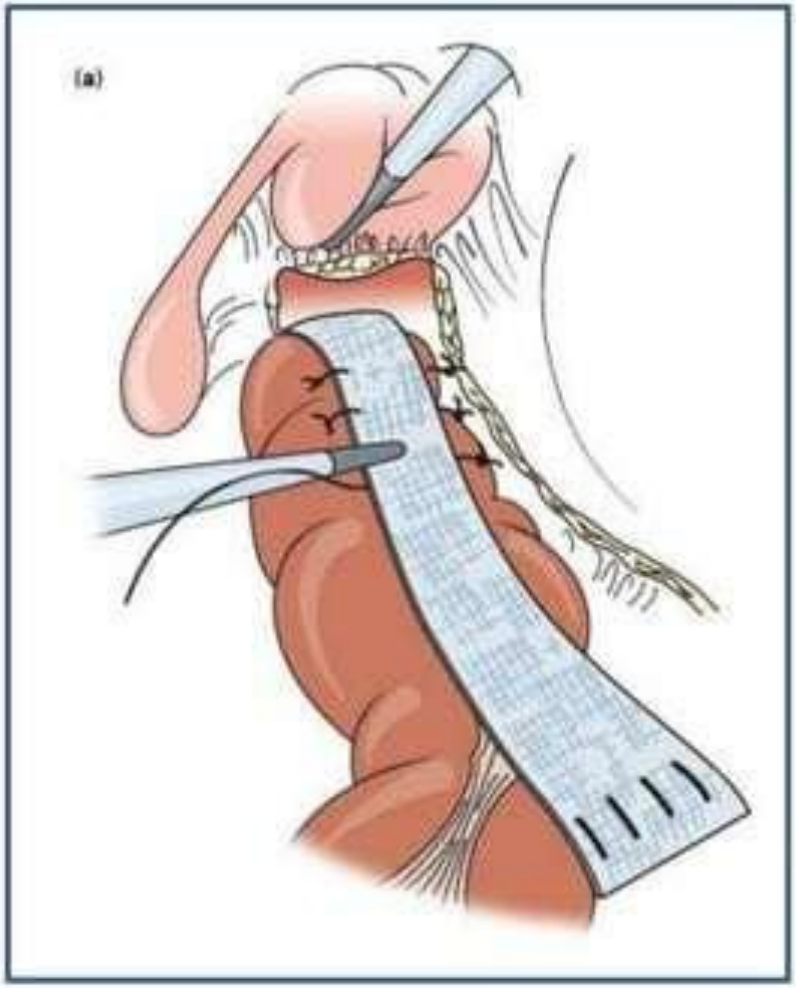
- In 1959, Cutait proposed suture rectopexy without the implantation of mesh.

Suture rectopexy with resection

- First described by Frykman in 1955
- Combined resection with rectopexy
- Recommended for rectal prolapse patients with a long, redundant sigmoid colon
- It has decreased rates of post-operative constipation
- **For patients with a long, redundant sigmoid and significant pre-op constipation, it is the procedure of choice**
- Recurrence rates of 0-5%
- Additional theoretical advantage of prevention of sigmoid volvulus
- Complication rates shown to be similar to rectopexy alone

Laparoscopy

- Similar recurrence rates and functional outcomes compared to similar open procedures
- Longer OR times but shorter hospital stays
- Cost analysis shows decreased costs due to shorter hospital stays



(a) Laparoscopic ventral mesh rectopexy: a prostheticmesh is sutured to the front of the lower rectum and used to resuspend the rectum by securing the proximal end of the mesh to the sacral promontory.

(b)Intraoperative image of a robotic ventral mesh rectopexy showing suturing of the mesh to the anterior rectum after dissection of the rectovaginal septum.

Conclusion

- Rectal prolapse is a complicated disease process due to a combination of factors
- Thorough pre-operative workup is required to determine the appropriate procedure
- Recent evidence supports that **perineal approaches** may offer patients acceptable outcomes not clearly inferior to abdominal approaches