Anorectal conditions

Objectives:

Resources:

- Davidson's.
- Slides
- Surgical recall.
- Raslan's notes.

Done by: Monerah Alsalouli, Hadeel Algurair &Abdulrahman Alsayyari
Sub-leader: Hadeel Algurair
Leaders: Abdulrahman Alsayyari & Monerah Alsalouli
Reviewed by: Ahmad Alyahya

[Color index | Important | Notes | Extra]
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Once you stop learning you start dying.

Basic review:

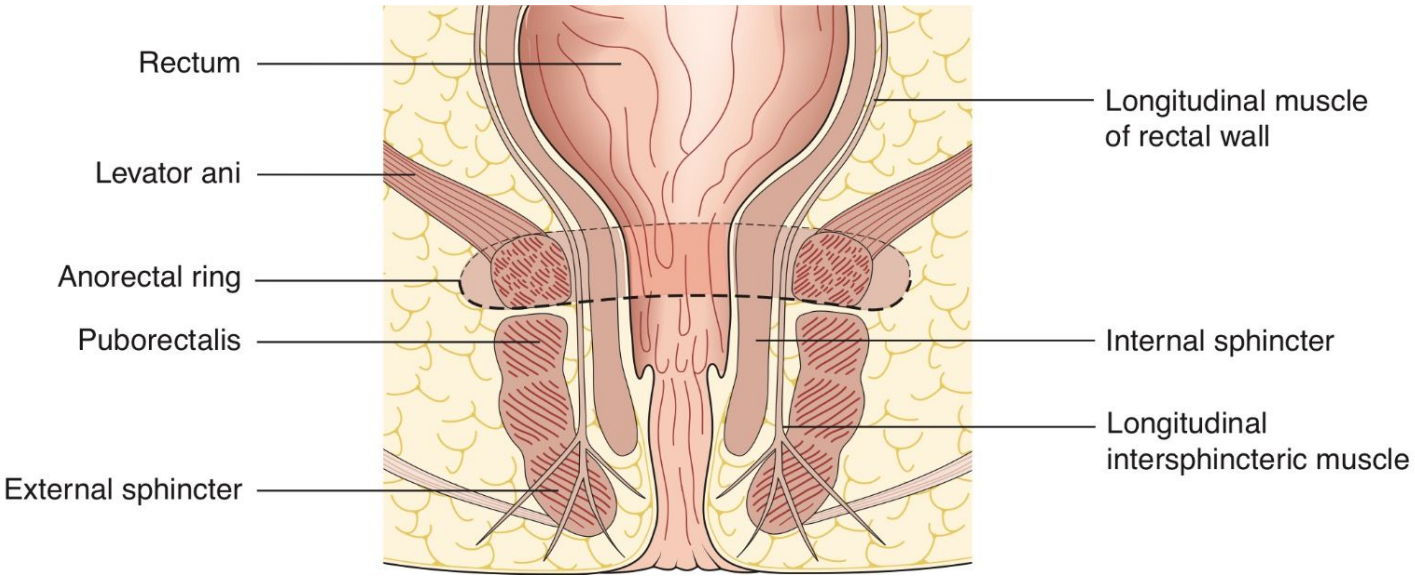
- **Applied surgical anatomy**

- The anal canal is about 3-4 cm long. It consists of 2 concentric muscle layers known as:

1. **Internal sphincter**[1]**:** controlled by ANS with fibers from pelvic sympathetic system, lower lumbar ganglia, pre-aortic/inferior mesenteric plexus. Involuntary muscle used to control gas
2. **External sphincter:** is under voluntary control, innervated by internal pudendal N, sacral P. To control stool, lined by columnar epithelium.

- The circular smooth muscle tube of external sphincter blends with lower part of levator ani, known as puborectalis sling.

- dentate (pectinate) line represents the line of fusion between the endoderm + ectoderm. The canal lining below this line is innervated by PNS, **so conditions affecting this region such as abscess, tumor, anal fissure > result in anal pain.**



- **Blood supply and lymphatics**

- The anal canal above the pectinate line is supplied by the terminal branches of the superior rectal (hemorrhoidal) artery, which is the terminal branch of the inferior mesenteric artery. The middle rectal artery (a branch of the internal iliac artery) and the inferior rectal artery (a branch of the internal pudendal artery) supply the lower anal canal.
- Beneath the anal canal skin (below the pectinate line) lies the external hemorrhoidal plexus of veins, which drains into systemic veins. Beneath the anal canal mucosa (above the pectinate line) lies the internal hemorrhoidal plexus of veins, which drains into the portal system of veins. The anal canal is, therefore, an important area of portosystemic venous connection (the other being the esophagogastric junction). Lymphatics from the anal canal drain into the superficial inguinal group of lymph nodes.

[1] Visceral supply, cause pain only in cases of stretch or ischemia.

Hemorrhoids

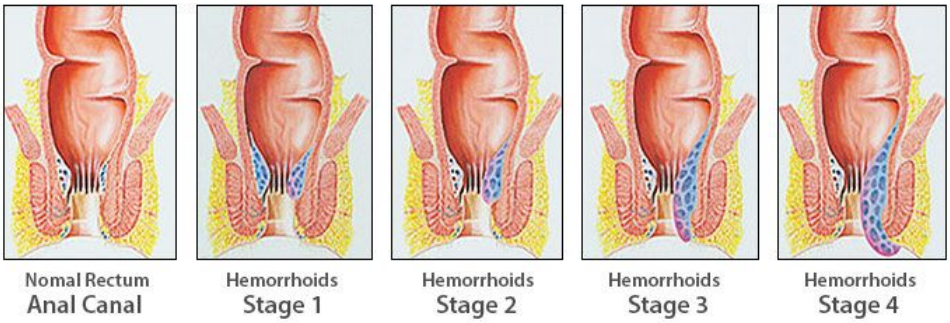
Pathophysiology:

Anything that increases the intra-abdominal pressure (Chronic straining secondary to constipation or occasionally diarrhea) can cause engorgement or enlargement of the normal fibrovascular cushions lining the anal canal → Fibrovascular cushions lose their attachment to the underlying rectal wall, which will cause:

- Prolapse of internal hemorrhoidal tissue through the anal canal.
- The overlying mucosa becomes more friable and the vascularity increases → subsequent rectal bleeding occurs.

Hemorrhoids is considered as a part of our normal anatomy, only when it gets symptomatic it becomes a pathological condition.

Internal Hemorrhoids	External Hemorrhoids
Originating **above** the dentate line	Originating **below** the dentate line.
Painless[2] with bleeding	Thrombosis → painful, mostly without bleeding.
Classified into 4 grades based on the history[3]: • **Grade I** - bleeding without prolapse. • **Grade II** - prolapse with spontaneous reduction.[4] • **Grade III** - prolapse with manual reduction.[5] • **Grade IV** - incarcerated, irreducible prolapse.[6]	–

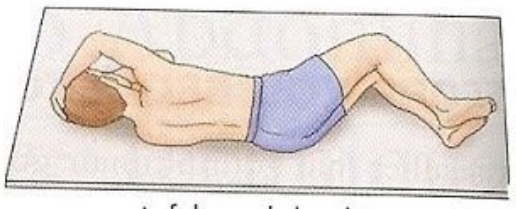


Symptoms:

- Bright red blood per rectum.
  - Very commonly drips into the toilet water.
  - Blood may also be seen while wiping after defecation.
- Prolapsing anal mass.
  - prolapse usually occurs in association with a bowel movement.
  - May also prolapse during walking or heavy lifting as a result of increased intra-abdominal pressure.
- Extreme pain.

[2] mucosa above the pectinate line is innervated by visceral nerves (do not transmit pain); mucosa below the pectinate line is innervated by somatic nerves (transmit pain)
[3] Not examination since you won't be able to see the changes
[4] Grade I,II: 90% of cases can be managed by lifestyle modifications (by avoiding constipation).
[5] 70% will need surgery.
[6] Always will have a surgery.

Physical examination:


Left lateral decubitus

- Patients should be examined in the **left lateral decubitus position**
- **Inspection:**
  - any rashes, condylomata, or eczematous lesions.
  - external sphincter function
  - Any abscesses, fissures or fistulae
- **Palpation:**
  - lubricated finger should be gently inserted into the anal canal while asking the patient to bear down
  - The resting tone of the anal canal should be ascertained as well as the voluntary contraction of the puborectalis and external anal sphincter.
  - Masses should be noted as well as any areas of tenderness.
  - internal hemorrhoids are generally not palpable on digital examination.
  - anoscopy is performed.
  - The side viewing anoscope should be inserted with the open portion in the right anterior then right posterior and finally the left lateral position
  - Hemorrhoidal bundles will appear as bulging mucosa and anoderm within the open portion of the anoscope.

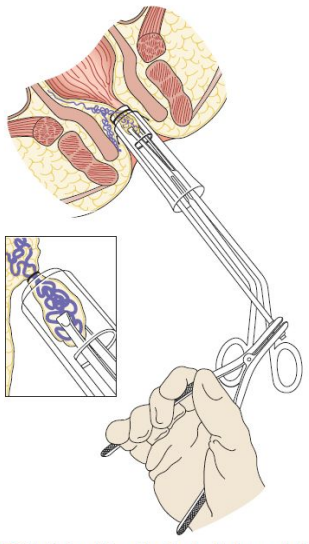
Evaluation of rectal bleeding:

● Rule-out rectal cancer **(VERY IMPORTANT)**.

Low risk for cancer	High risk for cancer
young individual with bleeding associated with hemorrhoidal disease and no other systemic symptoms, and no family history	>50 y/o, positive family history, dark blood, recent change in bowel habits
Anoscopy and rigid sigmoidoscopy	Perform endoscopy before treatment to rule out proximal neoplasia.

Treatment:

- Varies from simple reassurance to operative hemorrhoidectomy.
- Treatments are classified into three categories:
  1. Dietary and lifestyle modification.
  2. Non operative/office procedures.
  3. Operative hemorrhoidectomy.



1. DIETARY AND LIFESTYLE MODIFICATIONS:

a. The main goal of this treatment is to minimize straining at stool.
b. Achieved by increasing fluid and fiber in the diet, recommending exercise, and perhaps adding fiber agents to the diet such as psyllium.
c. if necessary, stool softeners may be added.

2. OFFICE TREATMENT:

RUBBER BAND LIGATION

- Grade I or Grade II hemorrhoids and, in some circumstances, Grade III hemorrhoids.
- Complications include bleeding, pain, thrombosis and life threatening perineal sepsis.
- In case of internal hemorrhoids, there's a high risk of ischemia with the wrong placement of ligation involving the submucosa (full thickness). Should be removed immediately.
- successful in two thirds to three quarters of all individuals with first and second degree hemorrhoids.
- Hemorrhoidectomy was necessary in 2.1% related to persistent symptoms.

INFRARED COAGULATION

- Generates infrared radiation which coagulates tissue protein & evaporates water from cells.
- is most beneficial in Grade I and small Grade II hemorrhoids.

BICAP ELECTROCOAGULATION

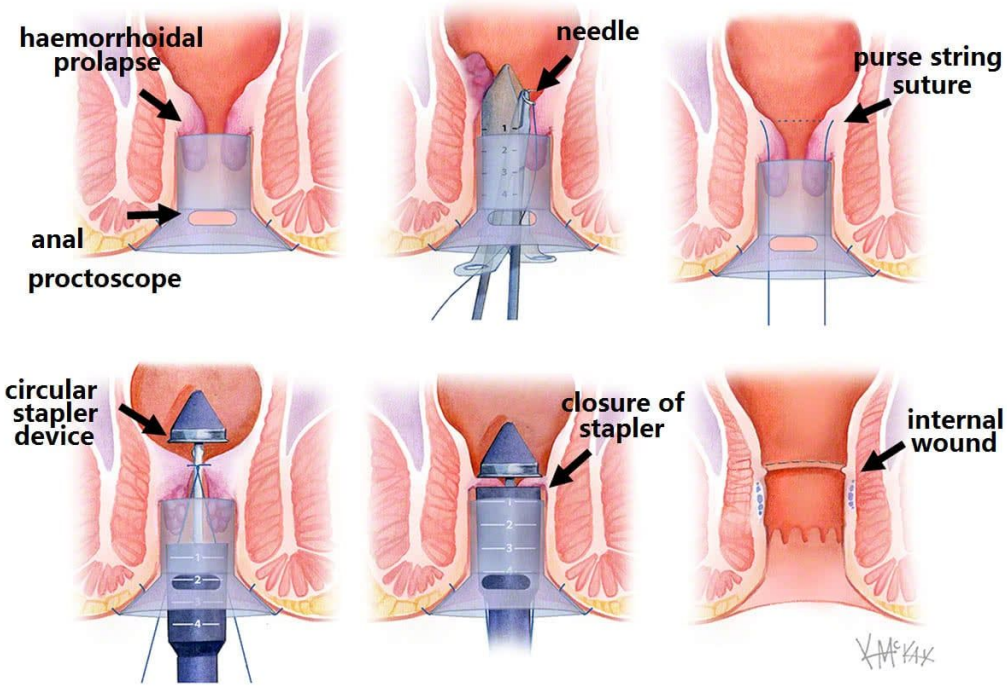
- It works, in theory, similar to photocoagulation or to rubber banding.
- the probe must be left in place for ten minutes.
- poor patient tolerance minimized the effect of this procedure.

SCLEROTHERAPY

- Injection of an irritating material into the submucosa in order to decrease vascularity and increase fibrosis.
- Injecting agents have traditionally been phenol in oil, sodium morrhuate, or quinine urea.
- Manual anal dilatation was first described by Lord .
- Cryotherapy was used in the past with the belief that freezing the apex of the anal canal could result in decreased vascularity and fibrosis of the anal cushions.

3. HEMORRHOIDECTOMY

- The triangular shaped hemorrhoid is excised down to the underlying sphincter muscle.
- Wound can be closed or left open.
- stapled hemorrhoidectomy has been developed as an alternative to standard hemorrhoidectomy



Recall:

What are hemorrhoids?
Engorgement of the venous plexuses of the rectum, anus, or both; with protrusion of the mucosa, anal margin, or both
Why do we have "healthy" hemorrhoidal tissue?
It is thought to be involved with fluid/air continence
What are the signs/symptoms?
Anal mass/prolapse, bleeding, itching, pain
Which type, internal or external, is painful?
External, below the dentate line
If a patient has excruciating anal pain and history of hemorrhoids, what is the likely diagnosis?
Thrombosed external hemorrhoid (treat by excision)
What are the causes of hemorrhoids?
Constipation/straining, portal hypertension, pregnancy
What is an internal hemorrhoid?
Hemorrhoid above the (proximal) dentate line
What is an external hemorrhoid?
Hemorrhoid below the dentate line
What are the three "hemorrhoid quadrants"?
1. Left lateral
2. Right posterior
3. Right anterior

Classification by Degrees, Define the following terms for internal hemorrhoids:
- **1st-degree hemorrhoid:** Hemorrhoid that does not prolapse
- **2nd-degree hemorrhoid:** Prolapses with defecation, but returns on its own
- **3rd-degree hemorrhoid:** Prolapses with defecation or any type of Valsalva maneuver and requires active manual reduction (eat ber!)
- **4th-degree hemorrhoid:** Prolapsed hemorrhoid that cannot be reduced

What is the treatment?
- High-fiber diet, anal hygiene, topical steroids, sitz baths
- Rubber band ligation (in most cases anesthetic is not necessary for internal hemorrhoids)
- Surgical resection for large refractory hemorrhoids, infrared coagulation, harmonic scalpel

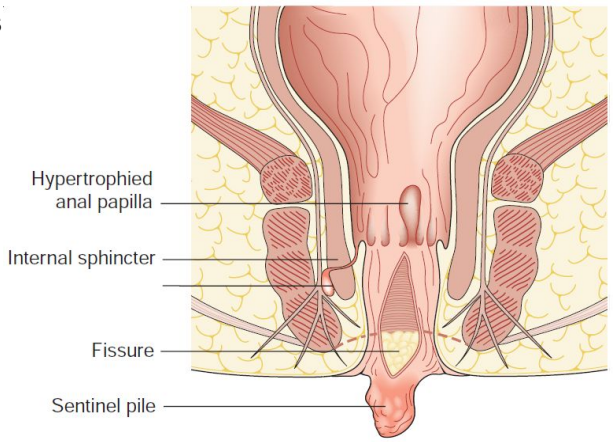
What is a "closed" vs. an "open" hemorrhoidectomy?
- **Closed** (Ferguson) "closes" the mucosa with sutures after hemorrhoid tissue removal
- **Open** (Milligan-Morgan) leaves mucosa "open"

What are the dreaded complications of hemorrhoidectomy?
- Exsanguination (bleeding may pool) proximally in lumen of colon without any signs of external bleeding)
- Pelvic infection (may be extensive and potentially fatal)
- Incontinence (injury to sphincter complex)
- Anal stricture

What condition is a contraindication for hemorrhoidectomy?
Crohn's disease
Classically, what must be ruled out with lower GI bleeding believed to be caused by hemorrhoids?
Colon cancer (colonoscopy)

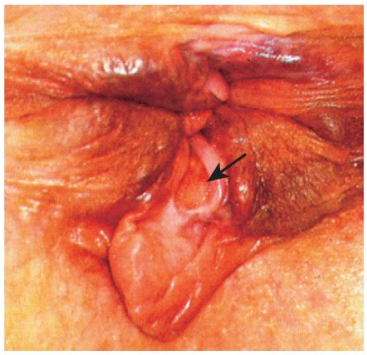
Anal Fissure[7]

- Fissure is a tear in the anal canal extending from just below the dentate line to the anal verge.
- Most commonly in young and middle age adults.
- The cardinal symptom is pain during and for minutes to hours following defecation.
- Bright red blood is common.
- Over 90% of anal fissures are located in the posterior midline.
- Almost all the rest located in the anterior midline. Usually due to a systemic disease. E.g. Crohn's
- **features of chronicity (>6 weeks):** Distal sentinel tag, a proximal hypertrophied anal papilla, fibrotic edges, and exposed internal sphincter fibres.



Etiology and Pathogenesis:

In brief: Increased pressure → hypertrophy of the muscles → low blood supply → ischemia → tear of anal canal under the dentate line → very painful.



- The initiating factor is trauma, typically overstretching of the anoderm by a large hard stool.
- mostly found in the posterior midline because:
  - It has the least blood supply (has small blood vessels)
  - Lack of tissue support
  - Lack of maximal stretching at this site.
- Failure to heal is secondary to poor perfusion of the anoderm in the posterior midline.
- Posterior midline ischaemia is the result of arterial anatomy and internal anal sphincter hypertonicity.

Treatment: (The main goal is to increase the blood supply to the tissue) same approach as hemorrhoids.

- Warm baths (sitz bath) and a diet sufficiently high in fibers to achieve soft bulky stools allows approximately 50% of acute anal fissures to heal within three weeks.
- Stool softeners and fibre supplements are reasonable additions.
- Recurrence is common, in the range of 30-70%, but can be reduced to 15-20% by maintaining a high fibre diet

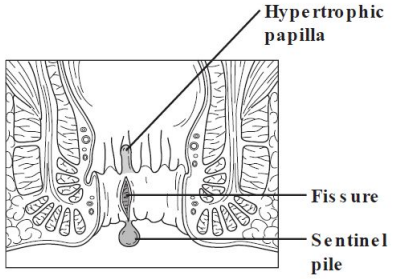
[7] Always associated with hemorrhoids (same pathophysiology)

Acute Fissure (Topical Application)	Chronic Fissure
● Topical application of **nitroglycerin**, a nitric oxide donor, causes a transient lowering of resting anal pressure and an increase in anodermal blood flow. - A 92% healing rate within two weeks. ● Topical **calcium channel blockers** (2% diltiazem, 0.3% nifedipine) . - Heal 65-95% of fissures . - The most common side effects are: ● Headache ● Flushing ● Symptomatic hypotension	● Are unlikely to heal with warm baths and a high fibre diet. ● **Medical or surgical Sphincterotomy:** - **Botulinum Toxin**: Botulinum toxin has been injected into the external and internal sphincters to paralyze the muscles, with short term follow up, healing rates of 80% have been achieved[8]. - I**nternal Sphincterotomy:** Lateral internal sphincterotomy (LIS) → we cut a portion of the muscle to increase the blood supply → achieves healing in over 95% within several weeks. - Anal Dilatation.

Recall:

What is anal fissure?
Tear or fissure in the anal epithelium
What is the most common site?
Posterior midline (comparatively low blood flow)
What is the cause?
Hard stool passage (constipation),hyperactive sphincter, disease process (e.g., Crohn's disease)
What are the signs/symptoms?
Pain in the anus, painful (can be excruciating) bowel movement, rectal bleeding, blood on toilet tissue after bowel movement, sentinel tag, tear in the anal skin, extremely painful rectal exam, sentinel pile, hypertrophic papilla
What is a sentinel pile?
Thickened mucosa/skin at the distal end of an anal fissure that is often confused with a small hemorrhoid
What is the anal fissure triad for a chronic fissure?

1. Fissure
2. Sentinel pile
3. Hypertrophied anal papilla



What is the conservative treatment?
Sitz baths, stool softeners, high fiber diet, excellent anal hygiene, topical nifedipine, Botox
What disease processes must be considered with a chronic anal fissure?
Crohn's disease, anal cancer, sexually transmitted disease, ulcerative colitis, AIDS
What are the indications for surgery?
Chronic fssure refractory to conservative treatment
What is one surgical option?
Lateral internal sphincterotomy (LIS)—cut the internal sphincter to release it from spasm
What is the "rule of 90%" for anal fissures?

- 90% occur posteriorly
- 90% heal with medical treatment alone
- 90% of patients who undergo an LIS heal successfully

[8] I stopped using it because i think it's ineffective.

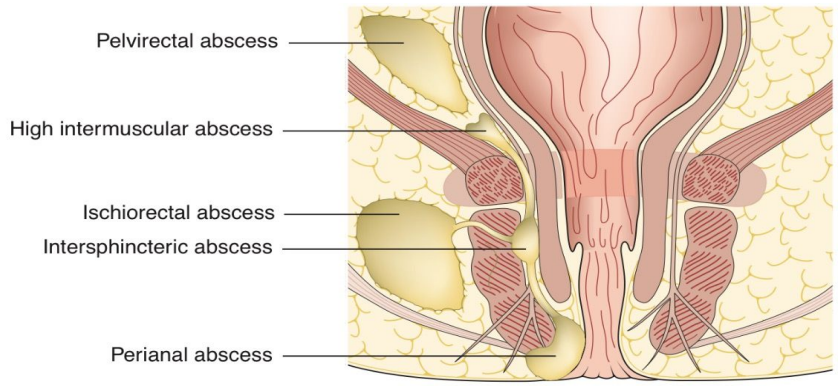
Perianal abscess and fistula

- Around the anal canal and the rectum there are very important spaces that contribute in the pathology of the abscess formation. These spaces contain ducts and anal glands.

Pathophysiology:

The Cryptoglandular hypothesis accounts for 90% of cases. It states that infection of the anal glands associated with the anal crypts is the primary cause of anal fistula and abscess. How is that? When an anal gland duct becomes occluded, the obstructed gland may become infected with gut organisms such as coliforms and bacteroides which will cause anal abscess formation. Abscess will accumulate at the space in which their duct was occluded: The fact that the anal glands are situated in the intersphincteric space explains the routes that the infection may take as pus tracks along the line of least resistance through the tissue spaces. Rarely, patients with established sepsis elsewhere may develop metastatic suppuration in the perianal region.

- **Other specific causes for anal abscess (10%):**
  - Crohn's → inflammation → abscess.
  - Ulcerative colitis (rarely, it may cause abscess formation)
  - TB
  - Actinomycosis
  - Carcinoma
  - Trauma
  - Radiation
  - Foreign body
  - Lymphoma
  - Pelvic inflammation
  - Leukemia



Types	Explanation
Intersphincteric space	Between the internal sphincter and the external sphincter.
Ischiorectal fossa	second most common site ,it's a serious problem. As the ischiorectal space is horseshoe-shaped and there are no fascial barriers within it, infection can track extensively, affect the contralateral space ,pt presents with swelling in both buttocks associated with difficulty in sitting.
Perianal space	**most common.**
Supralevator space	(pelvirectal,high intramuscular) This space has **NO ducts**. It gets the abscess from intra abdominal pathological conditions Eg. perforated appendix, diverticulitis, Crohn's ...it is specific!

Clinical features

the patient presents with acute anal pain and tenderness. There is usually no evidence of suppuration on inspection of the perianal region. Pain often prevents digital examination. main differential diagnosis is acute anal fissure.

How to treat the anal abscess?

1. Incision and drainage.
2. Give Parenteral antibiotic (metronidazole,cephalosporins) **only** for patient who are Immunocompromised, Valvular disease, Diabetics, Extensive disease ischiorectal abscess or severe cellulitis and with Systemic manifestation[9].) so In uncomplicated cases, antibiotics have no place after incision and drainage.

When we drain the abscess, we produce a small channel between the end of the bowel and the skin near the anus, this is called fistula. 60% percent of the fistulas after drainage will close spontaneously, 40% will remain. We don't know why & how.

- Studies have shown that it can be related to the source of bacteria. when a culture was done to the pus, GI tract bacteria have shown to cause Fistula compare to skin bacteria.
- The abscess is an acute manifestation, and the fistula is a chronic condition.

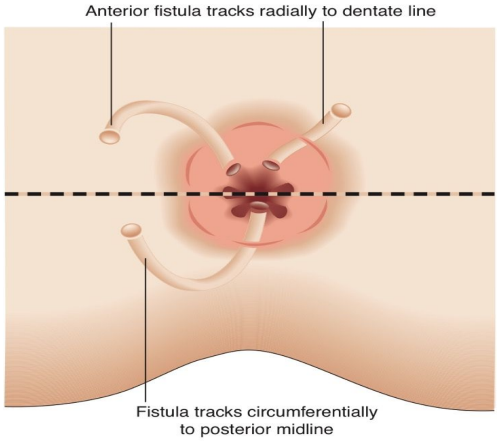
Evaluation of Anal Fistula.

- is results in stasis and infection of the anal gland (cryptoglandular infection). Abscess precedes all such cases of fistula, although the sepsis is often subclinical. Inappropriate surgical drainage of perianal abscess is responsible for a small significant proportion of fistula + recurrent fistula.

- An accurate preoperative assessment of the anatomy of an anal fistula is very important.

- **Five essential points of a clinical examination of an anal fistula:**
    1. location of the internal opening.
    2. location of the external opening.
    3. location of the primary track.
    4. location of any secondary track.
    5. determination of the presence or absence of underlying disease.
    6. Amount of muscle involved (important in the management)

- **Goodsall's Law** is a rough rule of thumb as to the likely course of fistulous tracts. Thus, when the fistula opens on the perianal skin of the anterior anus, the tract usually passes radially directly to the anal canal like 2 o'clock with 2 o'clock However, when the opening is posterior to a line drawn between the 3 o'clock and 9 o'clock positions , then the tract usually passes circumferentially backwards and enters the anal canal in the midline (6 o'clock position).



[9] Fever, tachycardia

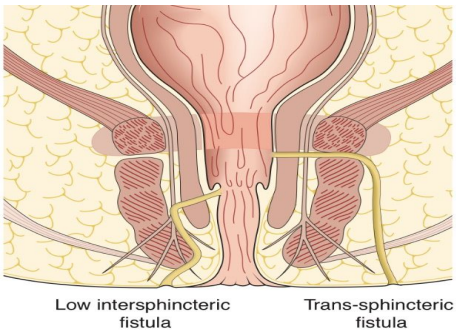
Clinical features and assessment:

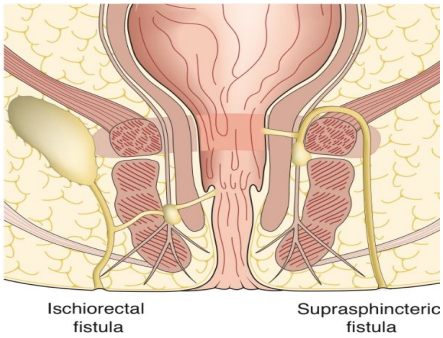
In most cases, the patient presents with a chronically discharging opening in the perianal skin, associated with pruritus and perianal discomfort.

Investigation:

1. requires only PR examination in most simple fistulae, you touch around the external opening to feel a cord-like structure, this is a canal, the end of it is the internal opening. you feel a dimple inside.
2. complicated fistula requires **MRI** or examination under anaesthetic (EUA) inject a liquid or gas bubbles (hydrogen peroxide) into the external opening then follow it until it comes out from the internal opening.

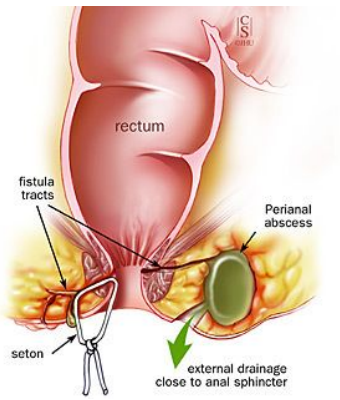
Classifications:





Management:

- Low fistulae should be laid open by surgery.
- The laying-open technique (**fistulotomy**) is useful for 85-95% of primary fistulae. Posterior fistulotomy is easier than anterior especially in females, as the muscle of the pelvic floor might be damaged (thin). when a fistula is formed in the anterior wall, we never cut it.
- High complex fistulae should be repaired by **seton** (in crohn's pt to prevent infection).



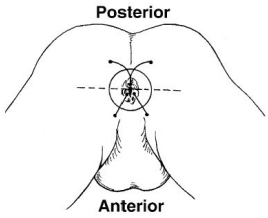
Cutting Seton	Thick suture placed through the fistula tract and staged pulling[10] is done, so it will allow fibrosis and **maintain continence**
Draining Seton	A length of suture material looped through the fistula which keeps it open and allows pus to drain out. It only relieves symptoms and can be used in patient with crohn's disease

- Curettage (cleaning the inflamed tissue) is performed to remove granulation tissue.
- Marsupialization (open the site of abscess) of the edges to improve healing times.
- Treat the underlying cause if it due to underlying disease.

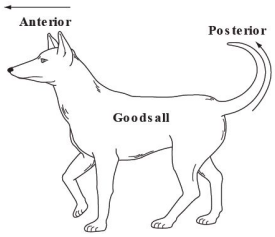
[10] Tell the patient to pull the suture repeatedly.

Recall:

What is anal fistula?
Fistula from rectum to perianal skin
What are the causes?
Usually anal crypt/gland infection (usually perianal abscess)
What are the signs/symptoms?
Perianal drainage, perirectal abscess, recurrent perirectal abscess, “diaper rash,” itching
What disease should be considered with fistula in ano?
Crohn’s disease
How is the diagnosis made?
Exam, proctoscope

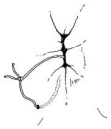


What is Goodsall’s rule?
Fistulas originating anterior to a transverse line through the anus will course straight ahead and exit anteriorly, whereas those exiting posteriorly have a curved tract
How can Goodsall’s rule be remembered?
Think of a dog with a straight nose (anterior) and curved tail (posterior)

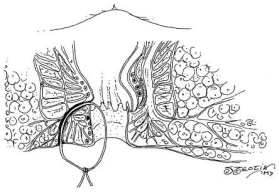


What is the management of anorectal fistulas?

1. Define the anatomy
2. Marsupialization of fistula tract (i.e., llet tract open)
3. Wound care: routine Sitz baths and dressing changes
4. Seton placement if fistula is through the sphincter muscle



What is a seton?
Thick suture placed through fistula tract to allow slow transection of sphincter muscle; scar tissue formed will hold the sphincter muscle in place and allow for continence after transection
How do you find the internal rectal opening of an anorectal fistula in the O.R.?
Inject H_2O_2 (or methylene blue) in external opening—then look for bubbles (or blue dye) coming out of internal opening!



What is a sitz bath?
Sitting in a warm bath (usually done after bowel movement and TID)
What is perirectal abscess?
Abscess formation around the anus/rectum
What are the signs/symptoms?
Rectal pain, drainage of pus, fever, perianal mass
How is the diagnosis made?
Physical/digital exam reveals perianal/ rectal submucosal mass/ fluctuance
What is the indication for postoperative IV antibiotics for drainage?
Cellulitis, immunosuppression, diabetes, heart valve abnormality
What percentage of patients develops a fistula in ano during the 6 months after surgery?
50%