GI tract: The Anus

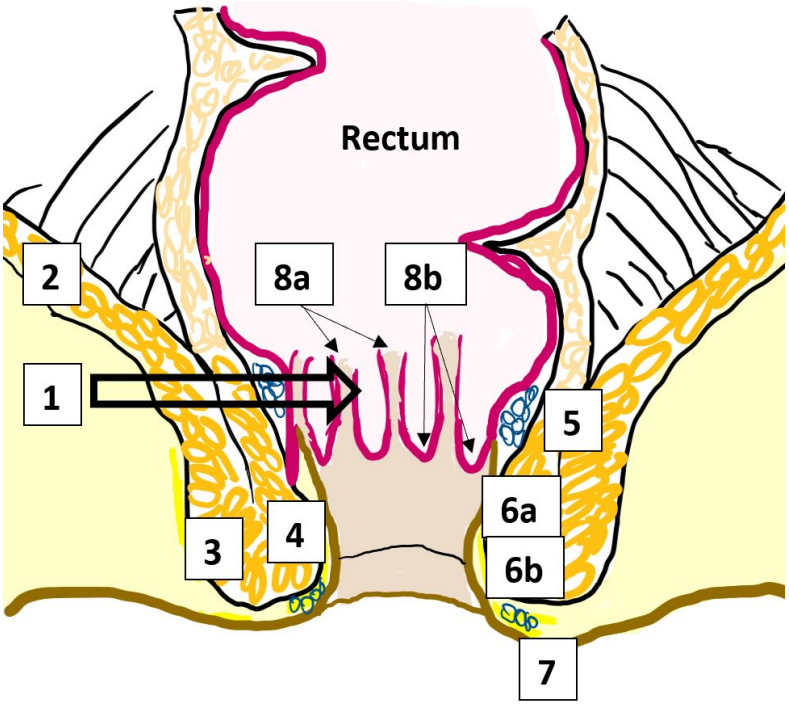
Introduction

- The anorectal region is the junction of the embryologic endoderm and ectoderm. The **dentate line** is the site at which the 2 systems join. Proximal to the dentate line is the rectum, derived from endodermal and connected to the gut. Distal to the dentate line is the anus, which connects to the body wall.

	Proximal (Rectum)	Distal (Anus)	Disease
Epithelium	Glandular	Squamous	Carcinomas
Innervation	Myelinated somatic	Unmyelinated visceral	Hemorrhoids
Lymphatic	Internal iliac chain	External inguinal	Cancer staging
Veins	Sup rectal → portal	Inf rectal → inf iliac	Cirrhosis
Arteries	Sup rectal	Inf pudendal	Anal fissure
Sphincter	Extra-sphincter	Intra-sphincter	Fistula-in-ano

Clinical pathologic correlation of the anorectal region

- Anatomy of the anorectum



1	Pectinate /dentate line
2	Levator ani muscle
3	Ext sphincter
4	Int sphincter
5	Int hemorrhoidal plexus
6a	Anal canal, squamous mucosa
6b	Anal canal, skin
7	Ext hemorrhoidal plexus
8a	Columns of Morgagni
8b	Anal crypts / anal glands

Hemorrhoids

- Introduction:

    - Hemorrhoids are polypoid structures in the anal canal that arise from arteriovenous plexuses that drain into the superior and inferior hemorrhoidal veins
        - External hemorrhoids are distal to the dentate line (#7, image above)
        - Internal hemorrhoids are proximal to the dentate line (#5, image above)
    - Symptomatic hemorrhoids are found in 5% of people.
    - Peak incidence in late middle age (i.e. 55 ± 10 years).
- Pathophysiology:
    - More common with advancing age or aggravating conditions. The hemorrhoidal vascular plexuses gradually begin to bulge and protrude into the anal canal.
    - Aggravating conditions include increased pressure in the pelvis, such as pregnancy and increased portal vein pressure (e.g. cirrhosis) into the superior rectal vein with formation of a portal-systemic shunt.
- Presentation:
    - Symptoms:
        - Internal hemorrhoids have visceral innervation and therefore have no pain or itching. They present as painless bleeding.
        - External hemorrhoids have somatic innervation and therefore can have pain and pruritis.
    - P/E: identified by direct visualization. Exclusion of other causes of rectal bleeding, such as cancer and CIBD.
    - Testing:
        - In patients <40 years, anoscopy is adequate.
        - In patients > 50 years or with alarm symptoms (e.g. pain, systemic symptoms, or change in bowel habits), colonoscopy is warranted.
- Natural history:
    - Prognosis: the challenge is mostly about quality of life.
    - Complications: **thrombosis** of a hemorrhoid causes the sudden onset of acute pain. These tend to resolve over days.
    - Treatment:
        - Conservative: ↑fiber in diet, topical medications, sitz baths
        - Surgery: rubber band ligation for bleeding internal hemorrhoids.

Anal fissure

- Pathophysiology:
    - Anal fissures typically start with a tear to the epithelium of the posterior midline distal anus. This fails to heal about 40% of the time, progressing to chronicity. Spasm of the internal sphincter adds to the pain and may cause ischemia, preventing healing.
    - 90% of fissures are found in the posterior midline as it is a watershed zone with only 50% of the blood supply of anterior region.

    - Trauma, such as the hard stool of constipation, is a common trigger.
- Presentation:
    - Symptoms: anal pain most severe with defecation
    - P/E: tear in the posterior anal epithelium
    - Testing: none needed
- Natural history:
    - Prognosis: acute fissures should heal within one month.
    - Complications: none
    - Treatment:
        - Acute fissures: topical analgesia, fiber to soften stool, topical vasodilators to relax the internal sphincter
        - Chronic fissures: surgery, internal sphincterotomy or fissurectomy.

Fistula in ano

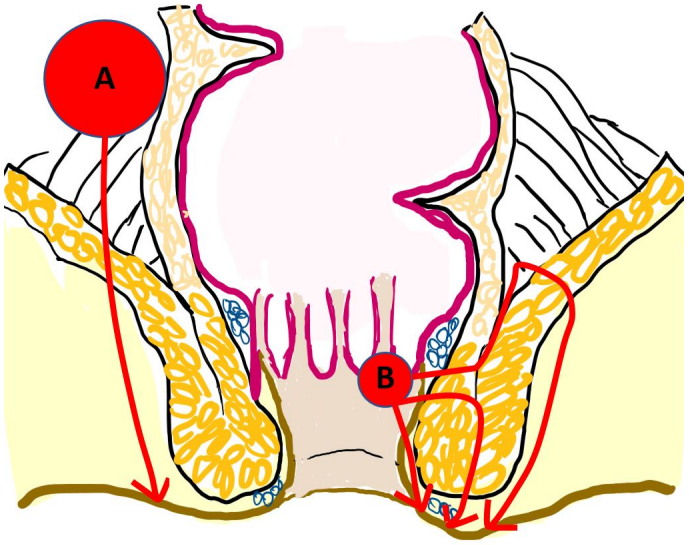
Introduction:

- A fistula in ano is an epithelialized tract that connects the perianal skin to the GI tract. Local fistula in ano connects to the rectum.

Vocabulary: fissure, sinus, and fistula

- Fissure: a crack in the epithelium
- Sinus: a track that connects an internal space with an epithelial surface. For example, an osteomyelitis abscess draining to the skin
- Fistula: a track connecting 2 epithelial-lined organs. For example, in Crohn disease, a common internal fistula is a colovesicle fistula (i.e. colon to the bladder).

- Pathophysiology:
    - Intrasphincteric (local) fistula in ano: most start with a perianal crypt abscess that drains to the nearest skin.
        - There are 8-10 anal crypt glands found circumferentially in the dentate line region.
    - Extrasphincteric (non-local): Crohn disease, diverticulitis with pericolonic abscess.



Fistula in ano

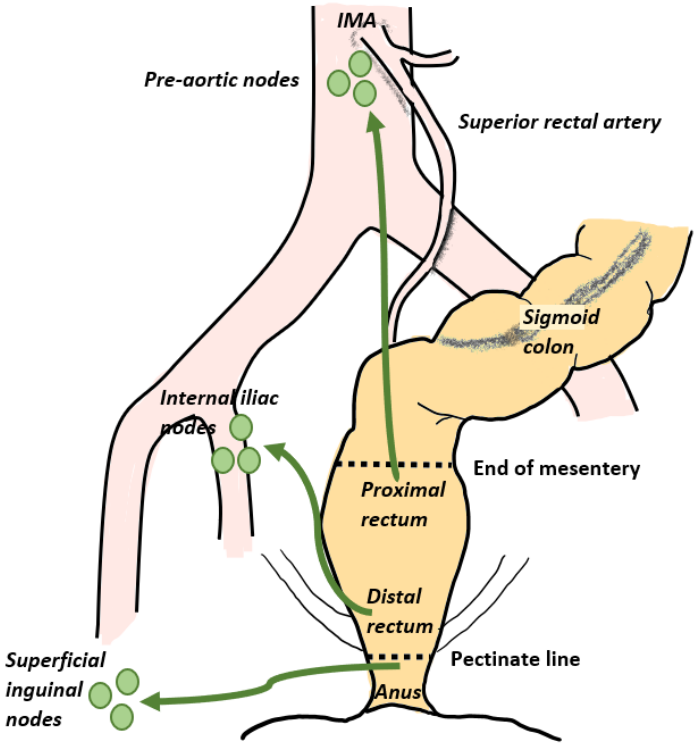
A. Extrasphincteric origin
B. Intrasphincteric (local) origin

- Presentation:
  - Symptoms: formation of a painful perianal papule that ruptures, draining fecal & purulent material
  - P/E: fecal/purulent material can be squeezed from the perianal papule
  - Testing: none is typically needed, as this is a clinical diagnosis
- Natural history:
  - Prognosis: tend to persist
  - Treatment: surgical excision of the entire fistula tract.

Anal carcinoma

- Epidemiology:
  - An uncommon neoplasm that is increasing in incidence due to HPV infection.
  - Risk factors:
    - HPV infection.
      - Associated with high risk HPV infection elsewhere in the patient.
      - Similar risk factors to other HPV related cancers.
    - Immunosuppression.
      - Squamous cell carcinomas in all areas have an increased incidence with loss of immunity.
      - Increased incidence with HIV infection
    - Cigarette smoking
- Pathophysiology:
  - Pathology: Squamous cell carcinoma

- Anorectal condyloma acuminatum are seen in 50% of males and 30% of females
- Staging: TNM
  - Tumor: as there are no anatomical barriers, "T" is by size. T1 < 2 cm, T2 2-5 cm.
  - Nodes: spread can be external to the external inguinal nodes and from there to the external iliac nodes > internal iliac nodes.



Lymphatic drainage of the rectum and anus

- Presentation:
  - Symptoms: anal bleeding, pain, mass
  - P/E:
    - Mass
    - External inguinal lymph nodes can be palpated for metastases.
  - Testing: biopsy
- Natural history:
  - Prognosis: depends on stage

Stage	TNM	Survival[1]
I	T1	75%
II	T2 &T3	65%
III	N(+)	40-50%
IV	M(+)	20%

1. 5 year survival

- Treatment:
  - Concurrent chemoradiation
  - Surgical excision when possible for local disease