Anorectal Diseases

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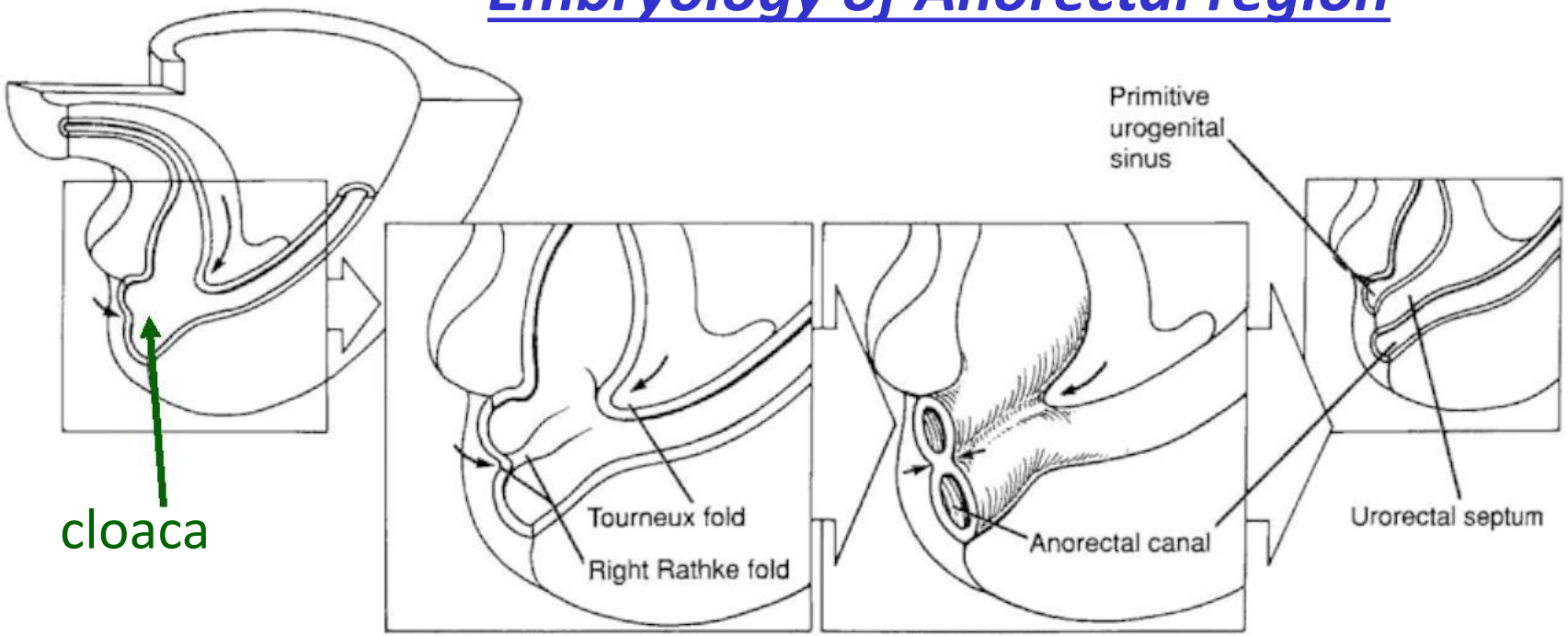
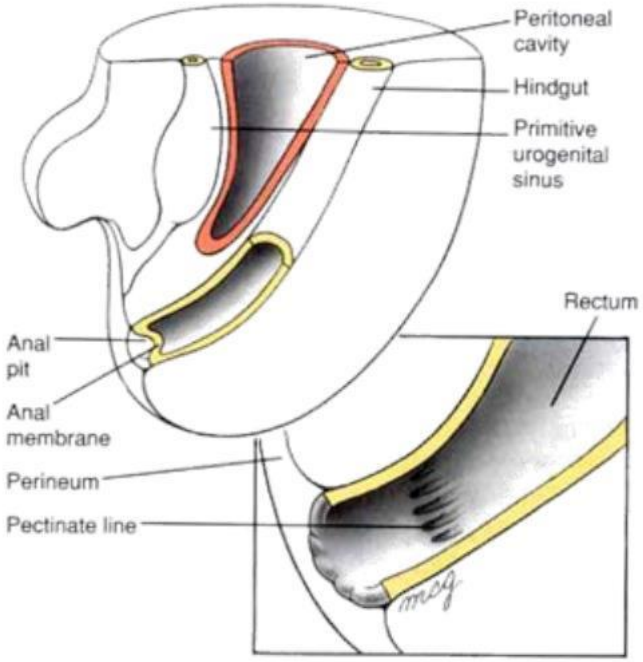
Embryology of Anorectal region





- Subdivision of embryonic cloaca by urorectal septum
- Ectodermal anal pit and membrane rupture and meet the endodermal anorectal canal
- Dentate (pectinate) line is the juncture

From Larsen (1997)

ANATOMY

- Anal canal- 4 cm. long
- Surrounded by the anal sphincter mechanism
- Except during defecation, its lateral walls are kept in apposition by the levatores ani muscles and the anal sphincters
- Upper half of the anal canal is lined by columnar epithelium
- Lower half- stratified squamous epithelium (modified skin)
- Dentate line- the junctions of two types of mucosa

THE UPPER HALF

- Lined by columnar epithelium
- Thrown into vertical folds- anal columns
- Joined together at their lower ends by small semilunar folds- anal valves
- At the base of each valve are small sinuses into which open 4-8 anal glands
- Some of these glands reach the intersphincteric spaces and lead to abscess formation

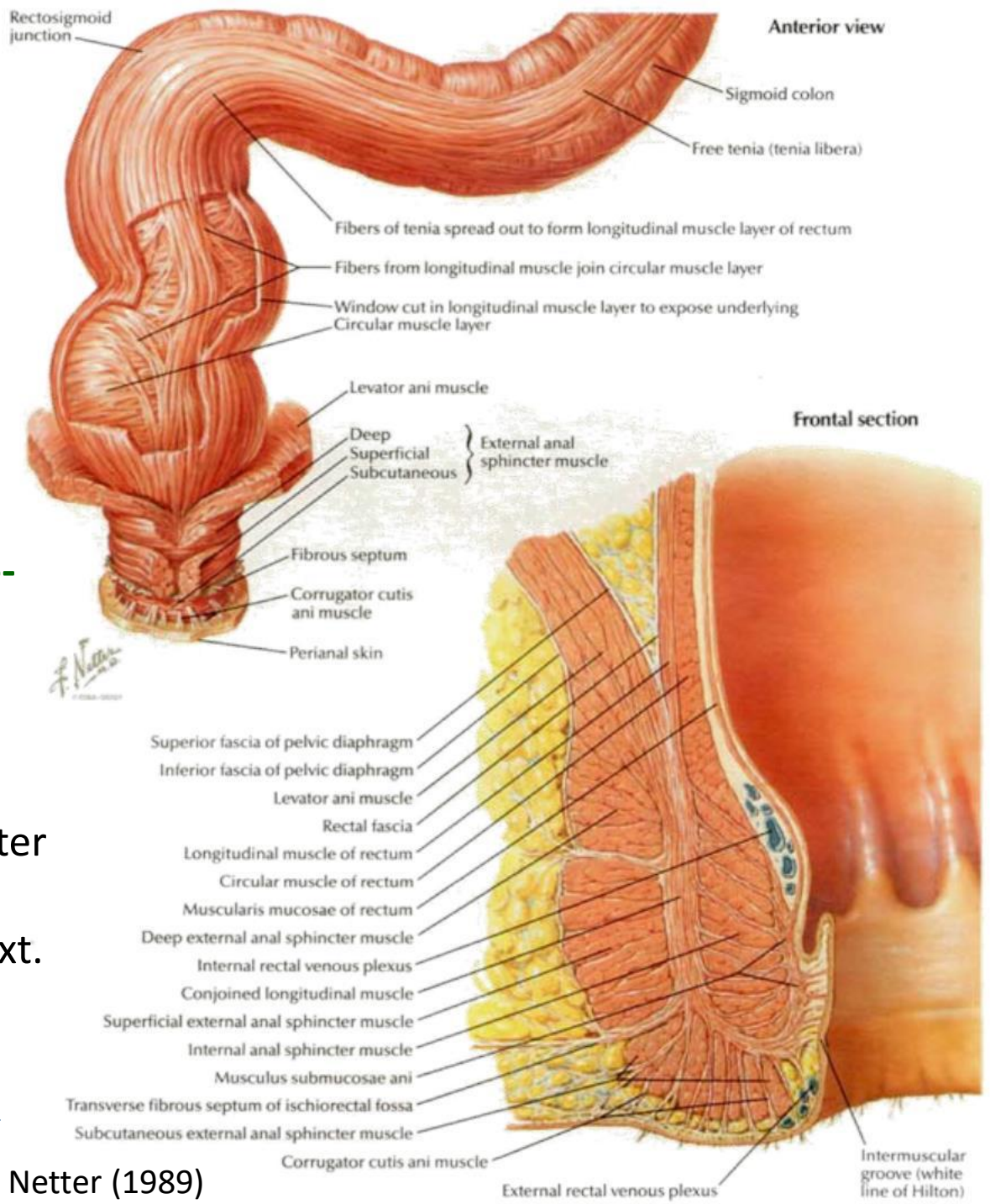
THE LOWER HALF

- Lined by stratified squamous epithelium which gradually merges at the anus with the perianal epidermis
- There are no anal columns
- Nerve supply is from somatic inferior rectal nerve
- Sensitive to pain, temperature, touch and pressure

Anorectal Muscles

- Circular layer of rectum becomes **internal anal sphincter**
- Longitudinal layer of rectum becomes **intersphincteric fascial plane**
- **External anal sphincter** is composed of three parts
- **Levator ani** contributes **puborectalis**, which is continuous with deep external anal sphincter

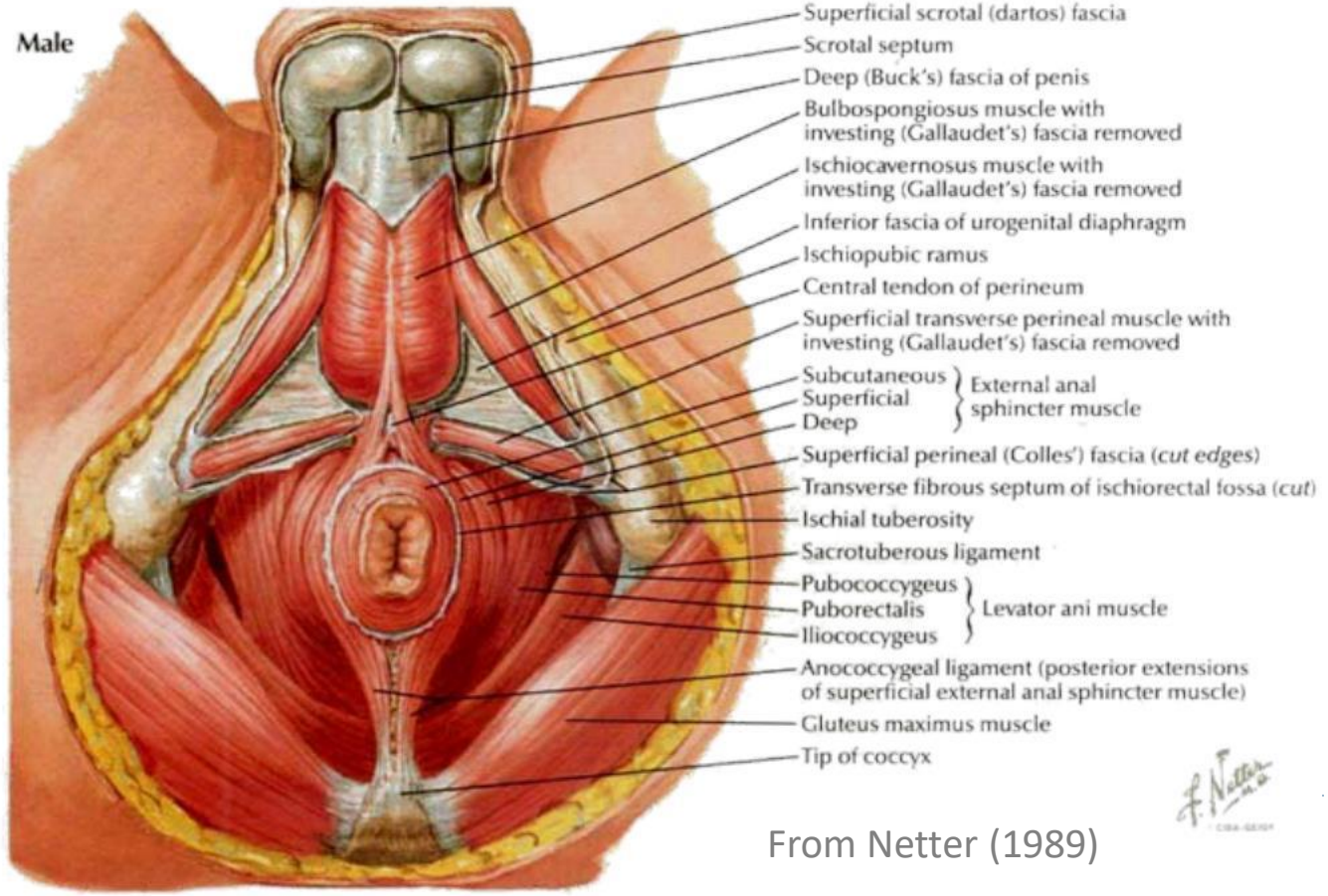
- Tube within a tube
  - Inner tube: internal sphincter (smooth muscle)
  - Outer tube: puborectalis/ext. sphincter complex (skeletal muscle)



From Netter (1989)

Anorectal Muscles

- **Levator ani:** major support of pelvic floor
- **Puborectalis**
  - forms muscular sling around anorectal junction
  - controls anorectal angle and hence plays an important role in fecal continence and defecation



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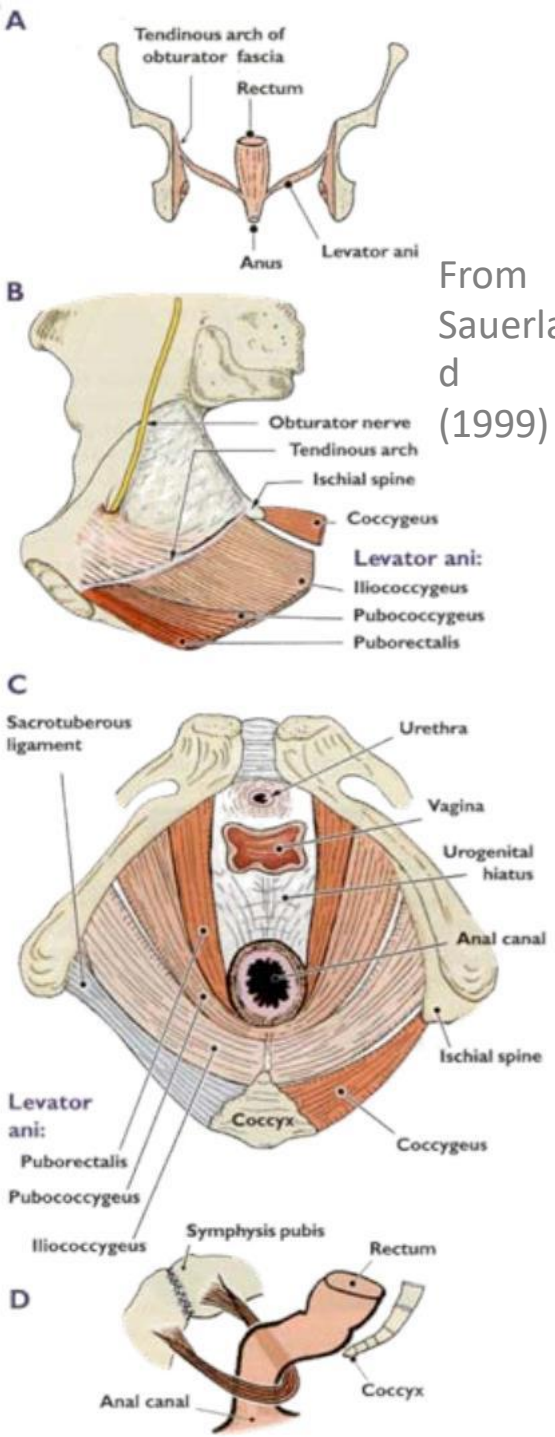
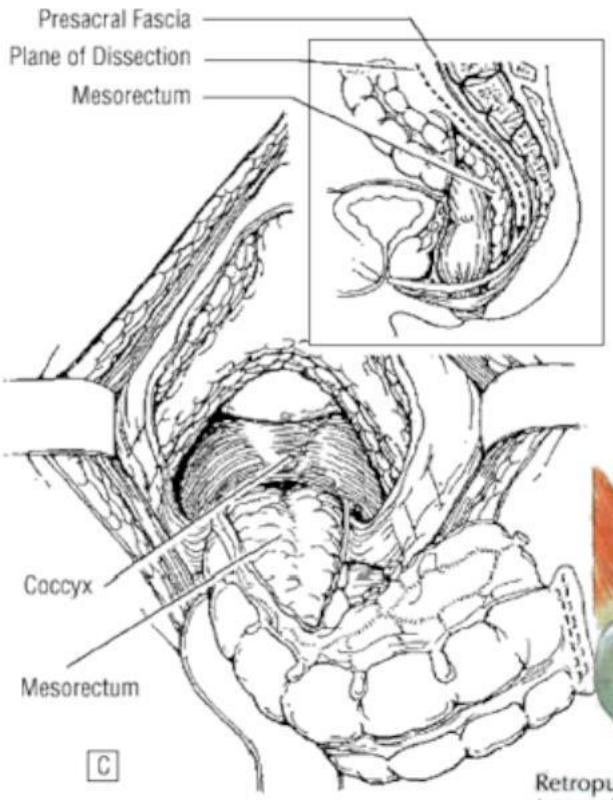


From Sauerland (1999)

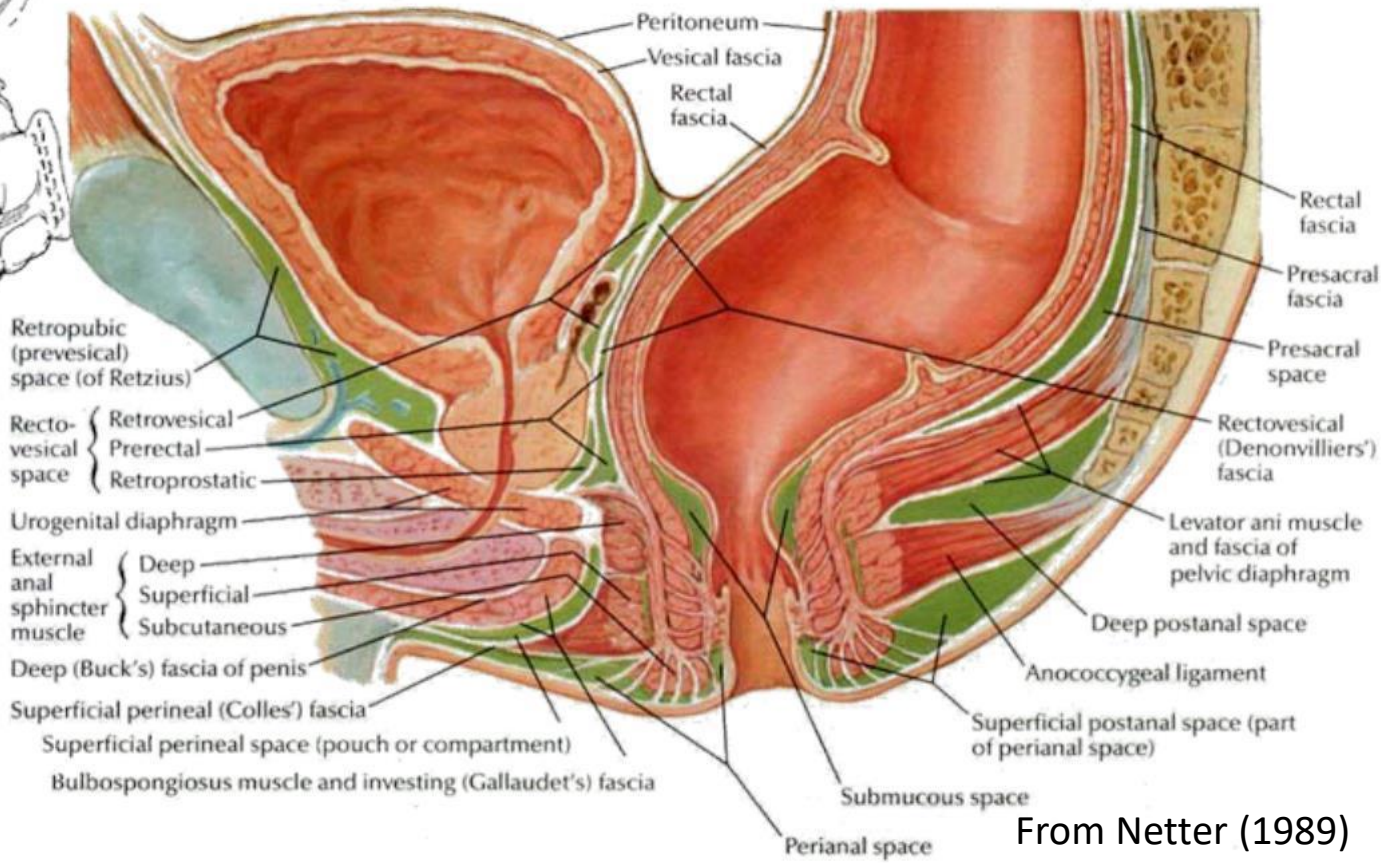
Planes, Fasciae, and Spaces



From Read & Kodner (1999) *Arch. Surg.*

Fasciae:

- Presacral (Waldeyer's) fascia
- Rectovesical (-vaginal; Denonvillier's) fascia: middle rectal vessels
- Lateral ligg. (stalks): acc. middle rectal vessels
- Rectal fascia proper: rectum & mesorectum



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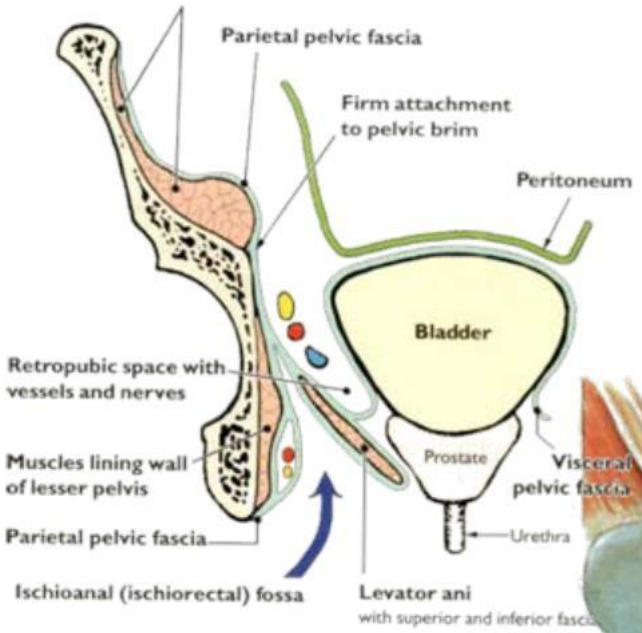
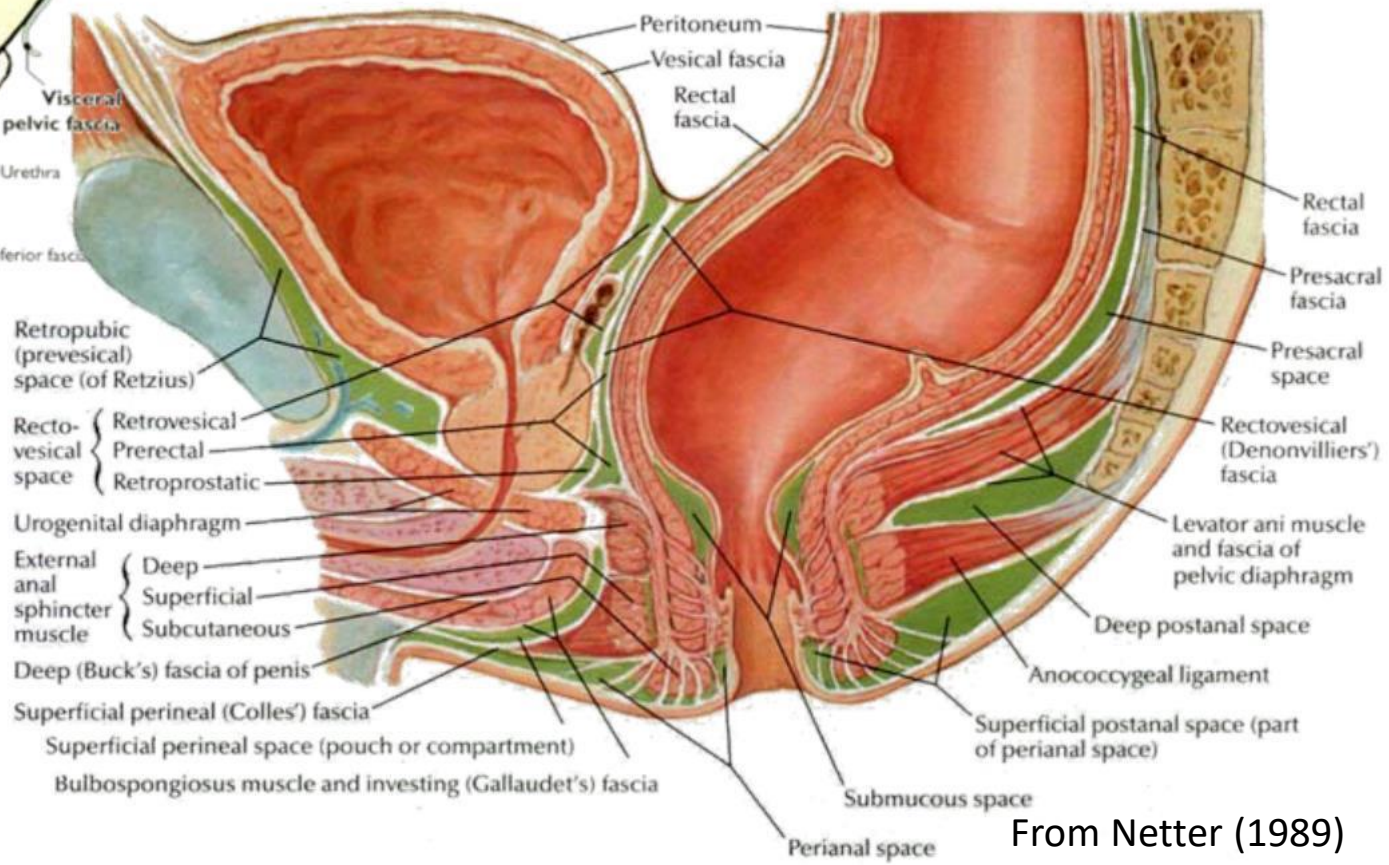
Planes, Fasciae, and Spaces



From Sauerland (1999)

Spaces:

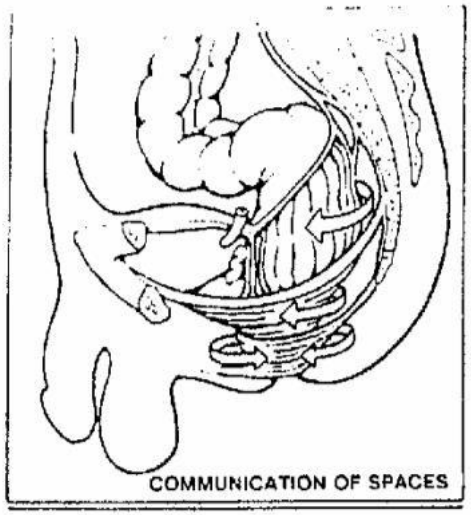
- Perianal space
- Intersphincteric space
- Ischiorectal space
- Deep postanal space
- Supralevator space
- Presacral space
- Submucous space
- Rectovesical space

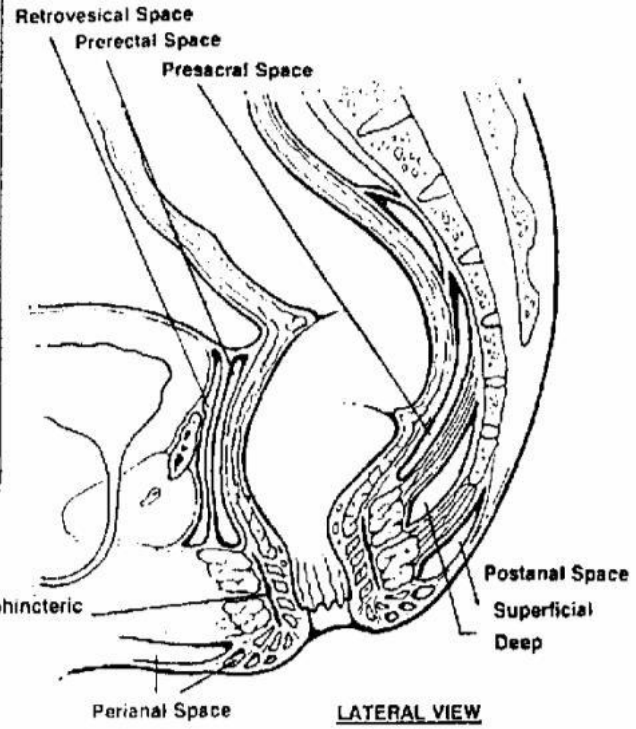


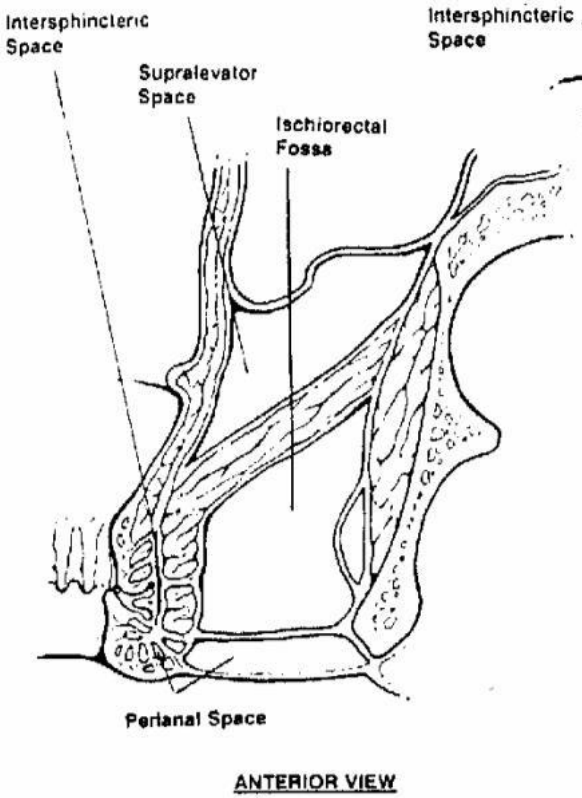
From Netter (1989)

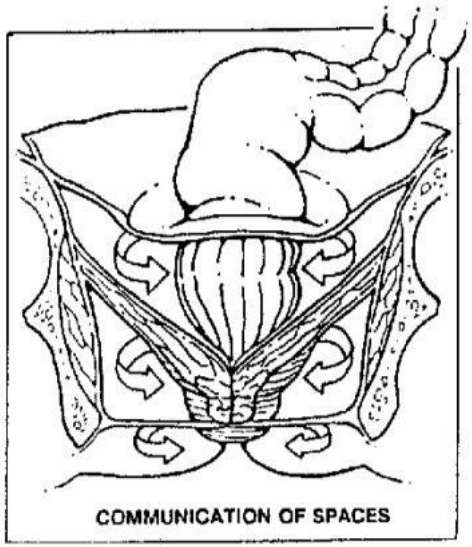
Communication of Spaces

- Perianal space: around anus below transverse septum
- Ischiorectal space: posteriorly around anorectal region via deep postanal space
- Supralevator space: posteriorly around rectum via presacral space







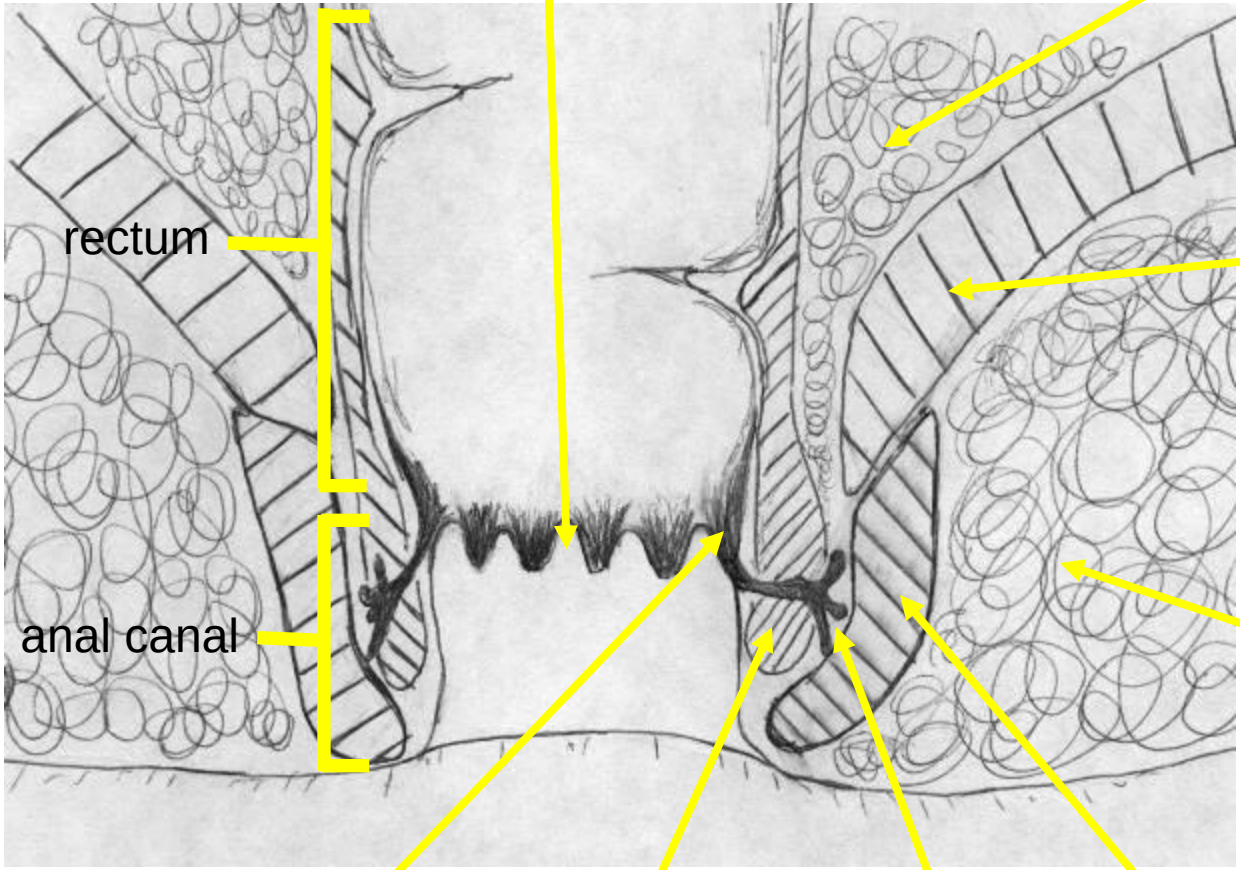


From Kodner et al. (1999)

Anorectal abscesses

- Anorectal abscesses result from obstruction of anal crypts and subsequent bacterial overgrowth and infection of the anal glands
- Commonly caused by S. aureus, gram negatives, and anerobes
- The collection of infected fluid enlarges and spreads into one (or more) planes …

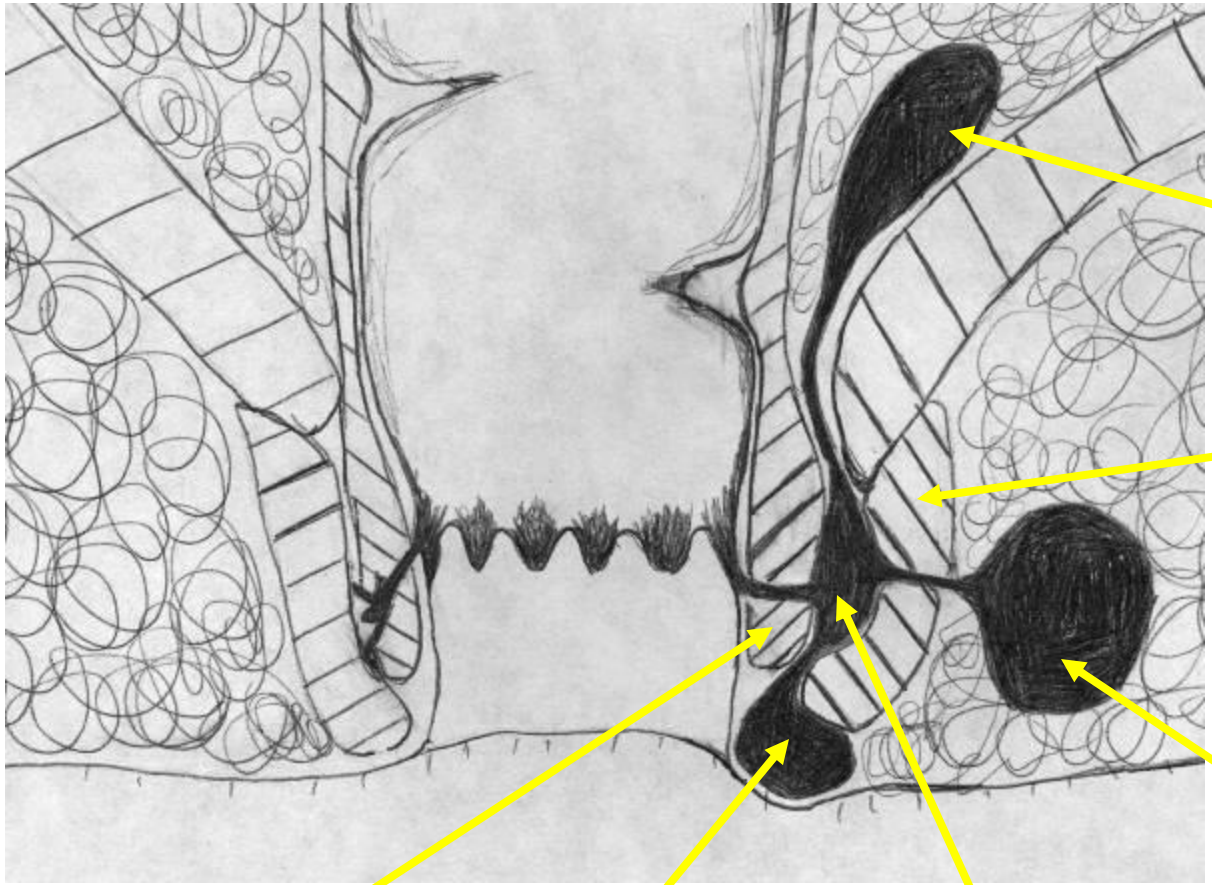
Normal Anal Anatomy (coronal section)



Anatomic Classification of Abscesses

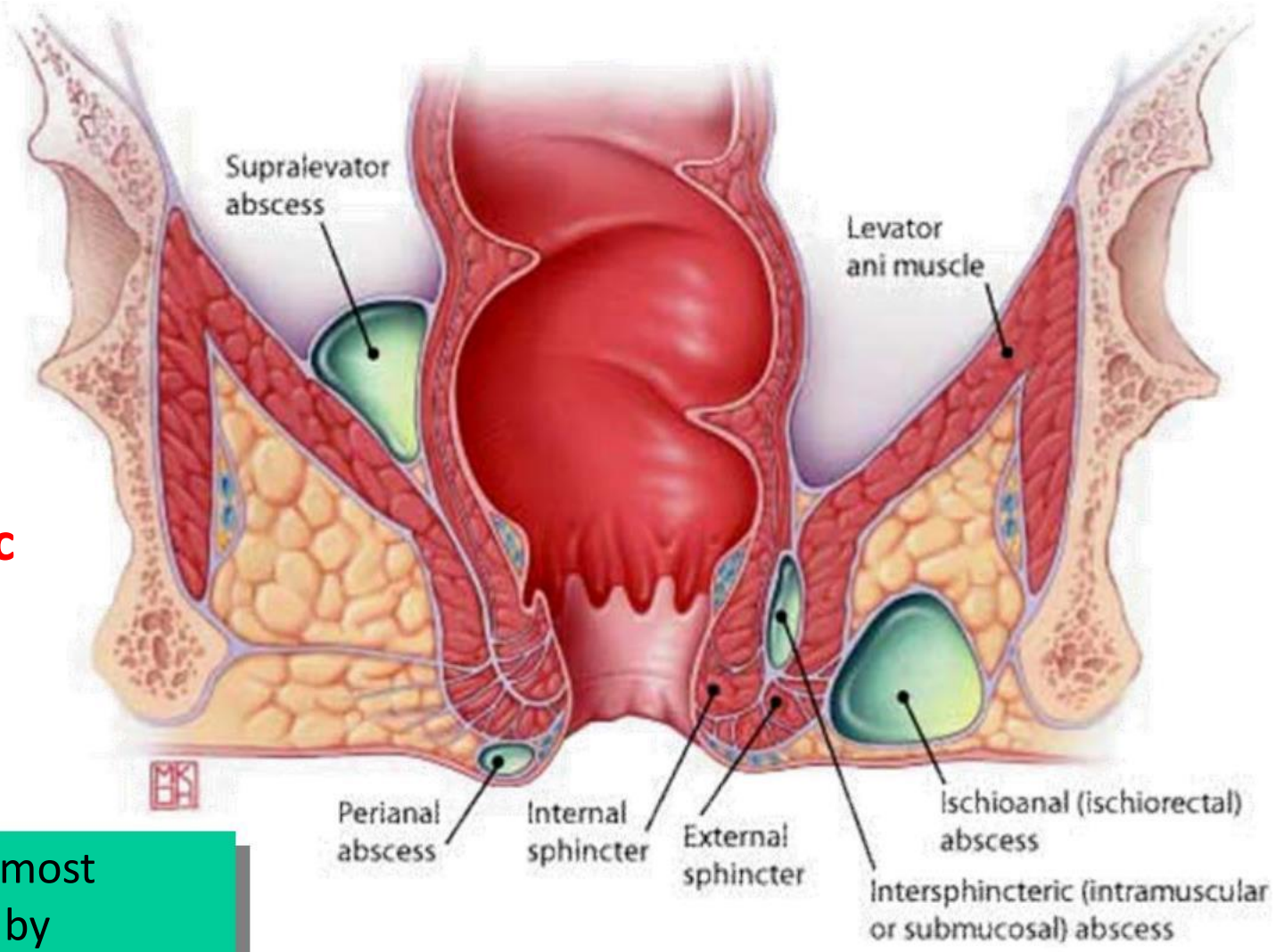
- 4 abscess locations (diagram to follow):
  - Perianal – between internal and external sphincters, spreading inferiorly towards the skin
  - Intersphicteric – remaining between the sphincters
  - Ischiorectal – advancing through the external sphincter into the ischiorectal fat
  - Supralevator – extending between the sphincters, superiorly above the levator ani

Abscess Anatomy



Sites of Anorectal Abscess

- supralevator
- ischiorectal
- intersphincteric
- perianal



Perianal abscess is most common, followed by ischiorectal, intersphincteric, & supralevator abscesses

From Pfenninger & Zainea (2001)

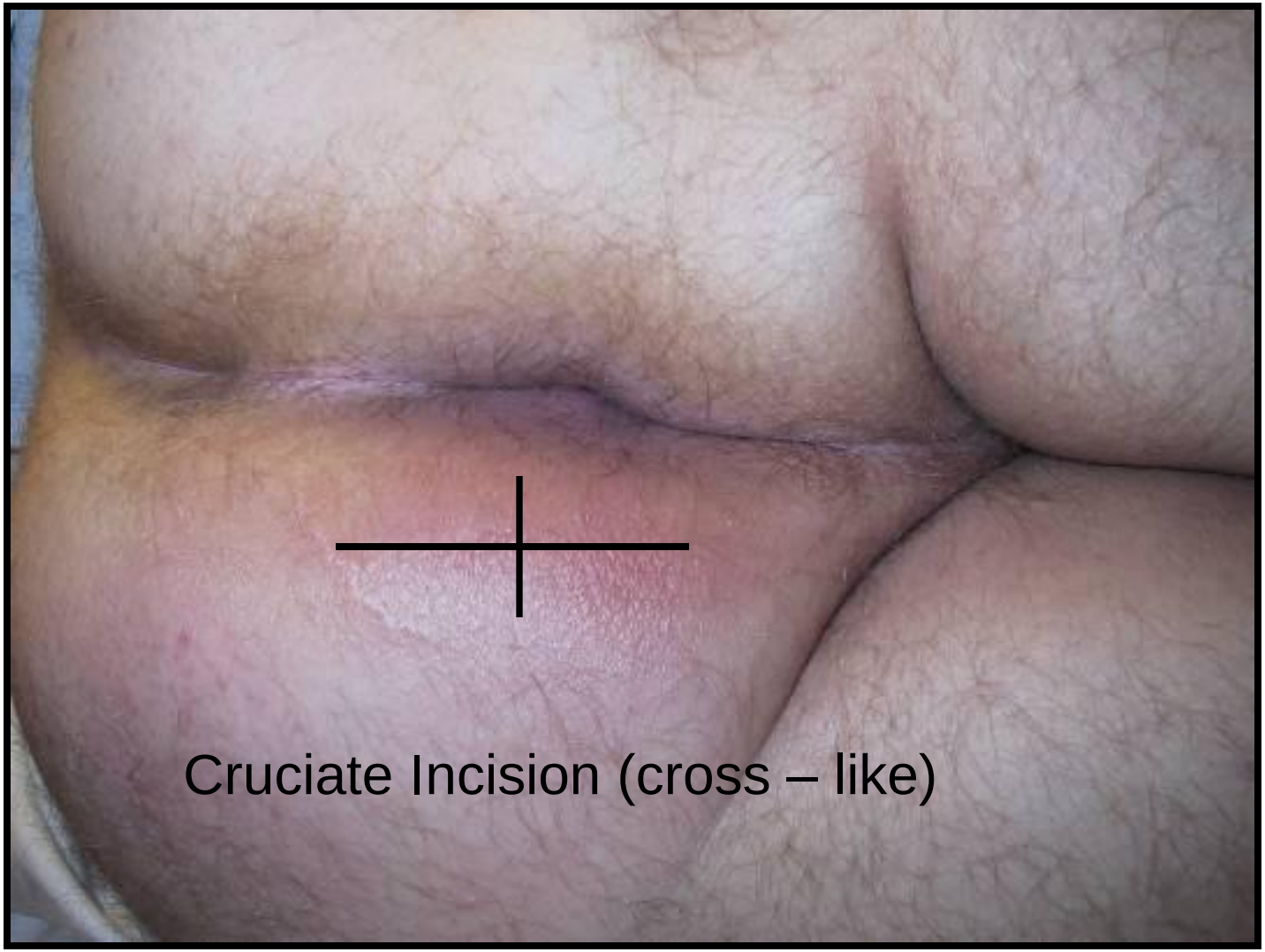
Anorectal Abscess, discussion

- Presentation
  - Continuous rectal pain exacerbated by increased abdominal pressure, walking and/or sitting.
  - Occasionally: fever, urinary retention, pelvic sepsis

- Diagnosis
  - History and Physical - tender, erythematous mass
  - Confirmed by needle aspiration
  - CT, MRI, or anal ultrasound in complicated cases
  - Colonoscopy to rule out IBD and malignancy
  - 10% of Crohn's patients first present with perianal disease!

Discussion, continued

- Treatment
  - Antibiotics alone will lead to treatment failure
  - Prompt incision and exploration required (must identify supralevator disease and fistulas)
  - Surgical emergency in IBD, diabetic or immunocompromised patients
  - Biopsy if suspicious for cancer or IBD
  - Post-op drainage (by opening and drain placement)
  - Post-op antibiotics
  - Prognosis for avoiding systemic infection is excellent once drained but ~50% progress to chronic fistula in ano

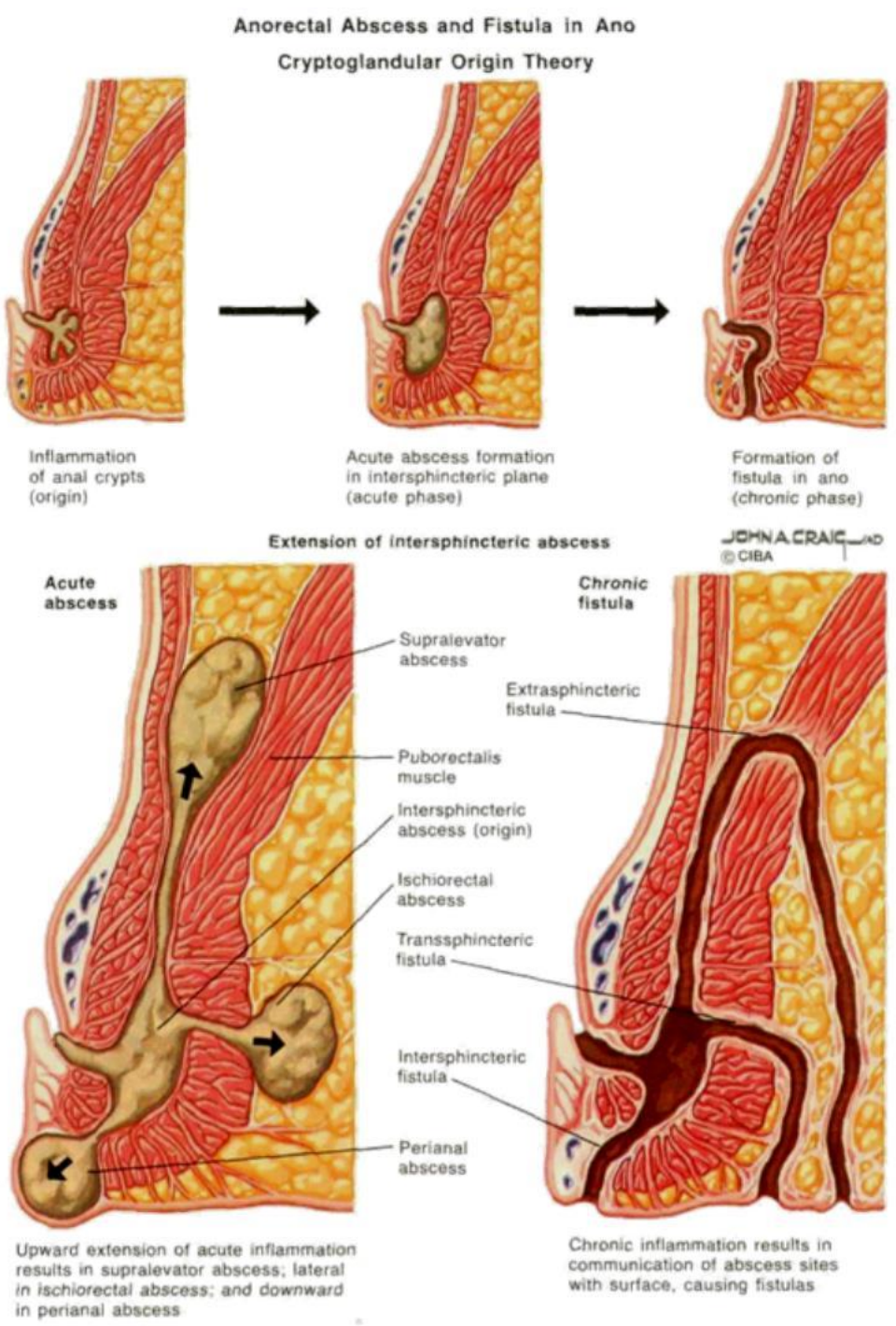

Cruciate Incision (cross – like)

Abscess & Fistula

- 95% results from a cryptoglandular source
- Originate as intersphincteric abscess
- Can spread to other spaces

  - Abscess in acute phase, fistula in chronic phase

  - Fistula in ano: fistula with external opening in perianal skin & internal opening at dentate line



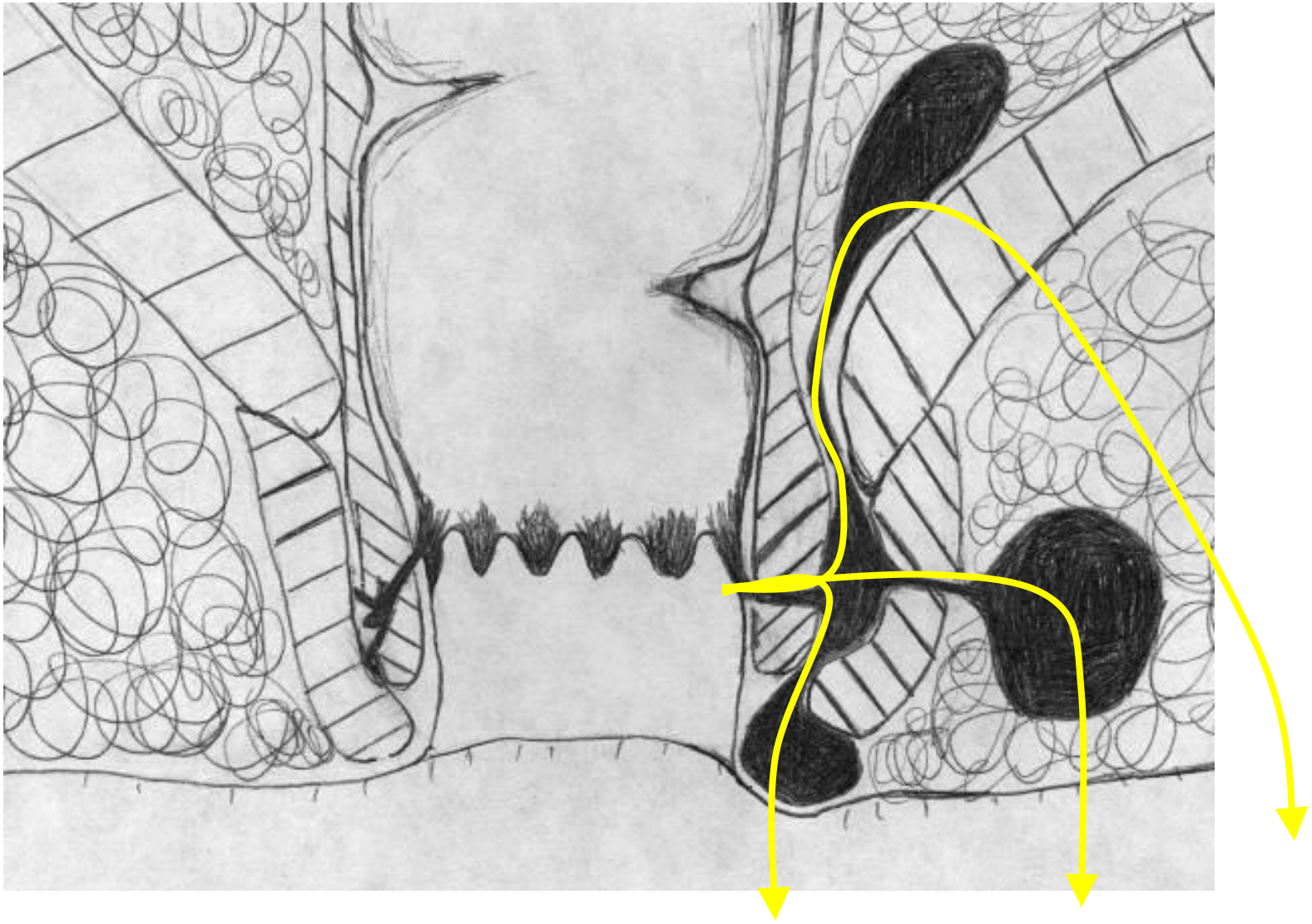
From Fry & Kodner (1985) *CIBA*

Follow-up, continued

External opening of the anal fistula is the remainder of the excision made earlier

Fistula in Ano

- 50% of surgically treated abscesses progress to become anal fistulas
- These fistulas consist of an abnormal communication between the anal canal and perianal skin. In this case it would be along the path of the original abscess tract.
- Fistulas present with symptoms of pain and swelling similar to abscesses but often also produce a discharge of pus or bloody drainage from their external openings



The fistula tracts will follow the course of the original abscess cavities and subsequent external drainage.

Treatment of Anal Fistulas

- Surgery is the only definitive treatment for anal fistulas
- The traditional operation, a fistulotomy, consists of cutting down to, and opening, the fistula tract
- Depending on the depth of the tract, a portion of the external sphincter may need to be transected. This can lead to incontinence and the potential risks of any operation must be weighed against its benefit
- In select cases, other options, such as mucosal advancement flap or chronic Seton placement, may be indicated.
- Newer treatments, such as absorbable fistula plugs made from porcine mucosa, simply "plug" up the tract of the fistula and in select cases may heal deeper fistulas without the need for a fistulotomy

References

- Brunicardi CF et al. *Schwartz's Principles of Surgery*. 8th Edition.
- Doherty GM et al. *Current Surgical Diagnosis and Treatment*. 12th Edition.
- Kasper DL. *Harrison's Internal Medicine*. 16th Edition.
- Photographs courtesy of Dr. Randolph Steinhagen
- Illustrations by Ezra Teitelbaum

Thank you