



Navigating Anorectal Anatomy:
Terms, Planes, Spaces, Structures

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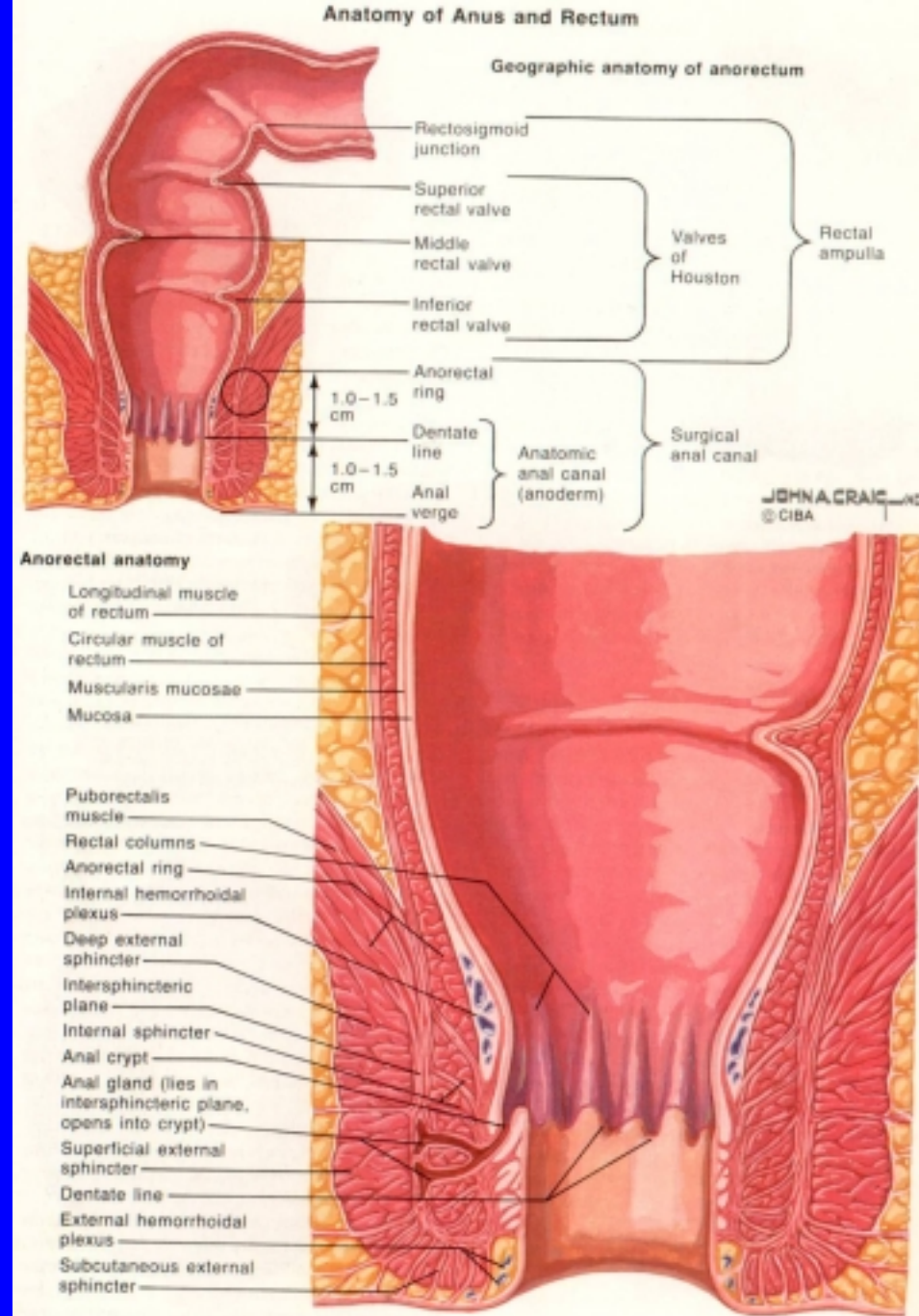
Terms

Rectum:

- no haustra, app. epiploicae
- taeniae coalesce to form a continuous longitudinal coat
- **Ampulla**: differing definitions
- **Houston's valves**
 - middle most constant
 - don't contain all layers

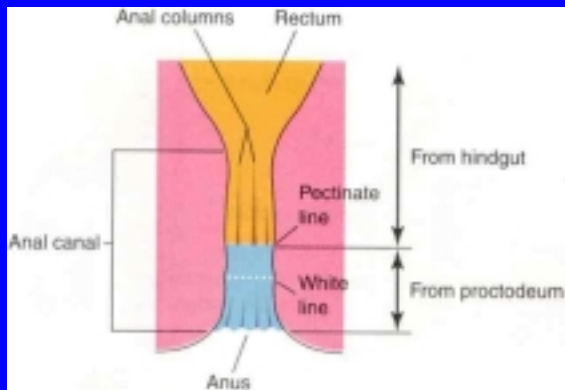
Anal canal:

- **Anal verge**: between perianal skin and anal canal
- **Dentate line**: mucocutaneous jct.
- **Anal columns** of Morgagni
- **Anal valves**: largest posteriorly
- **Anal sinuses**: deep to valves
- **Anal crypts**: receive ducts of anal glands
- **Anal glands**: often tunnel into internal anal sphincter

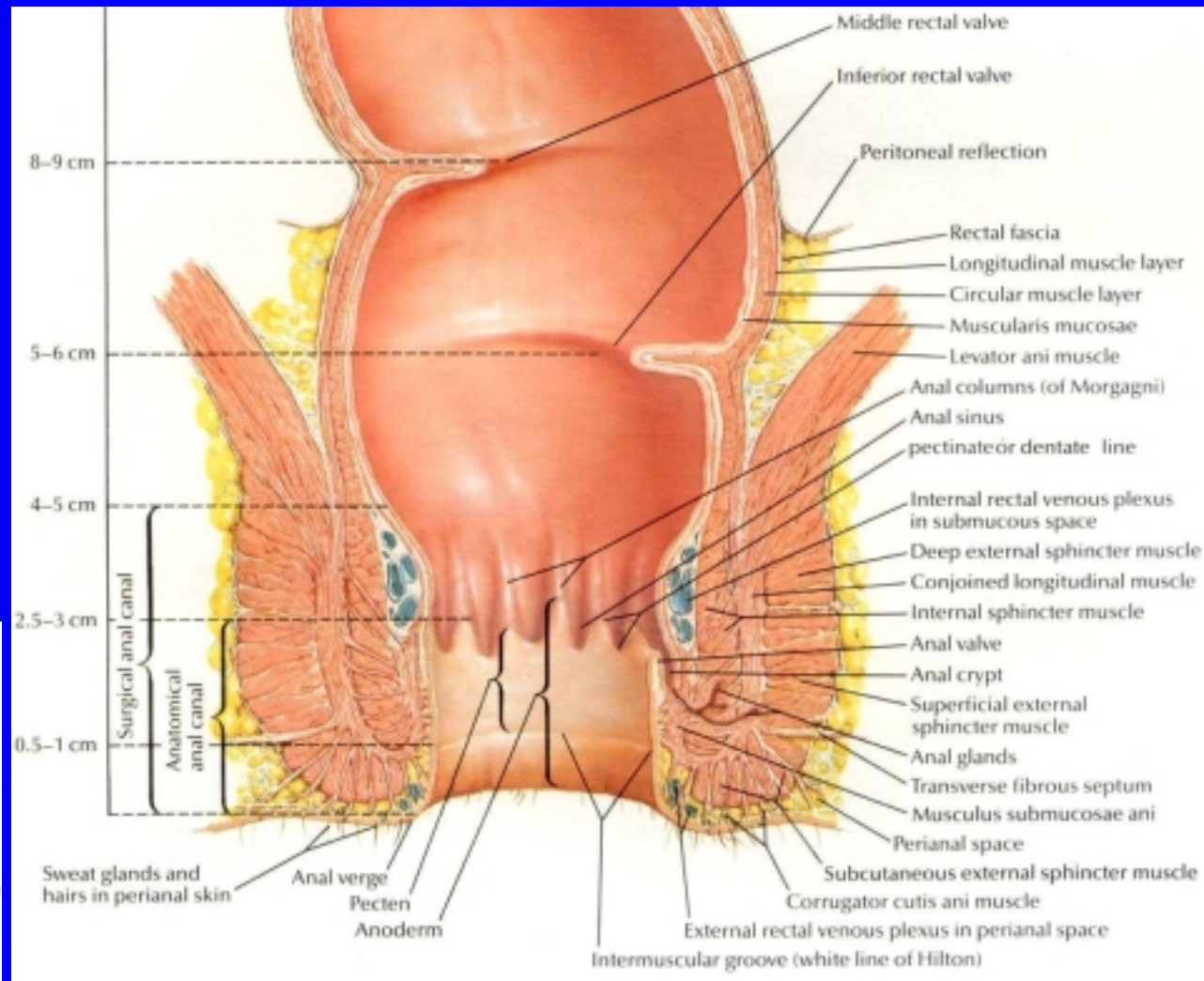


Terms

- **Anorectal ring**: upper border of sphincteric/puborectalis complex
- **Anoderm**: skin devoid of follicles & glands
- Anatomical vs. surgical anal canals
- **White line of Hilton**: intersphinct. groove



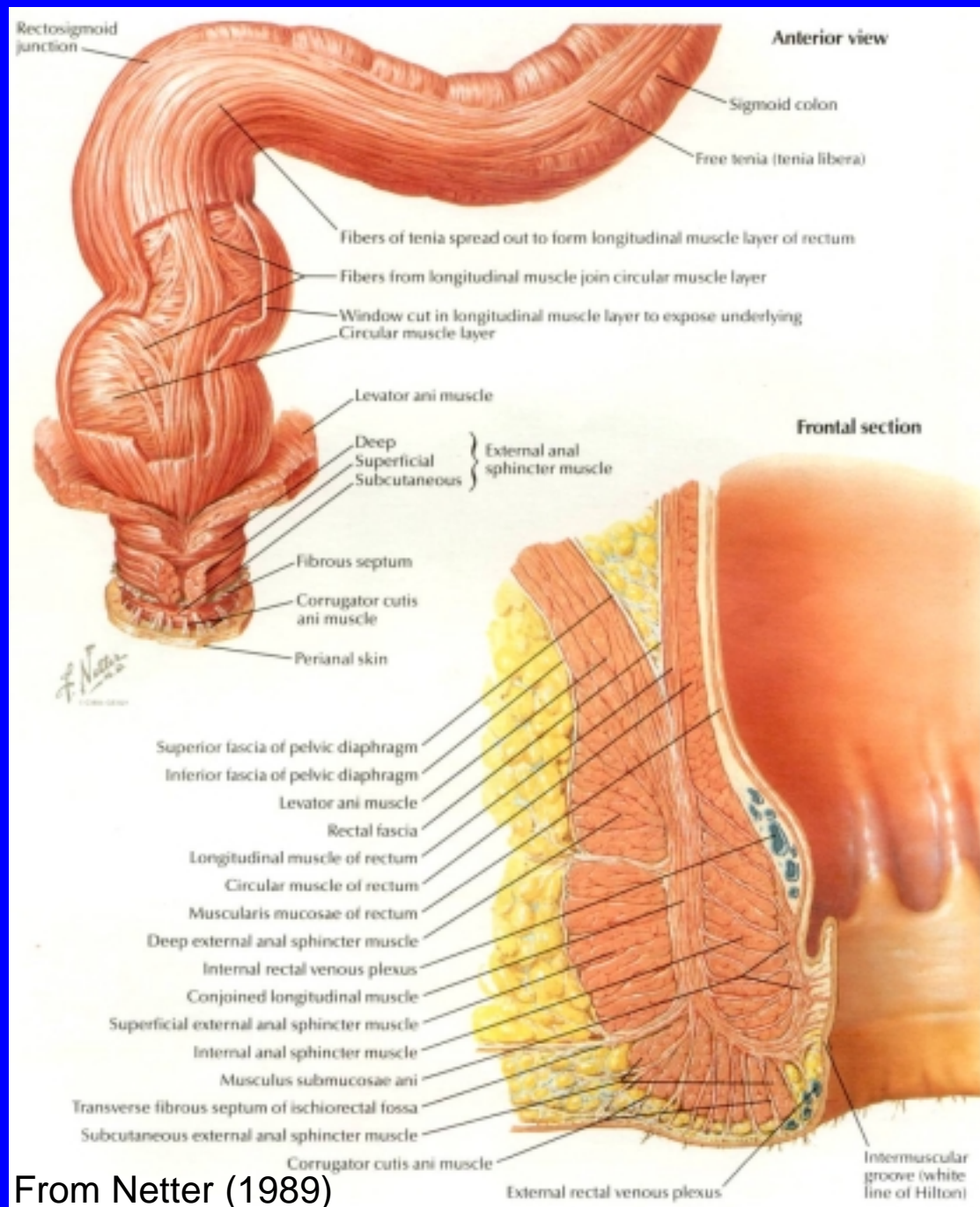
From Moore & Persaud (1998)



From Netter (1989)

Anorectal Muscles

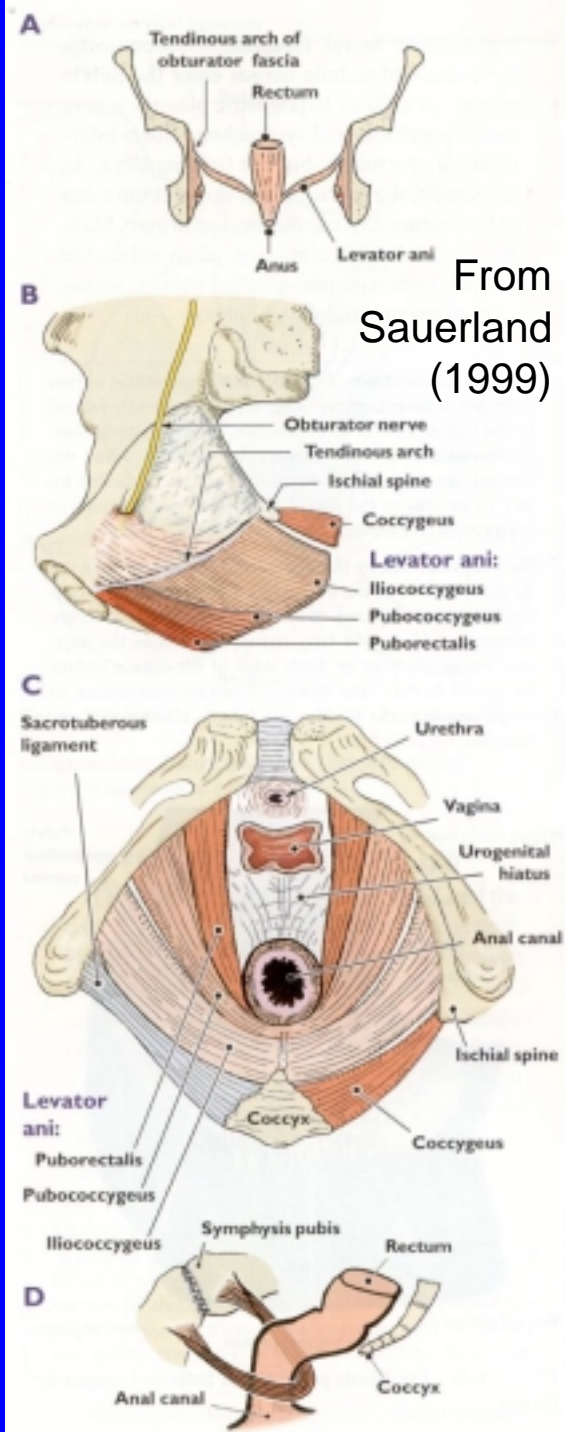
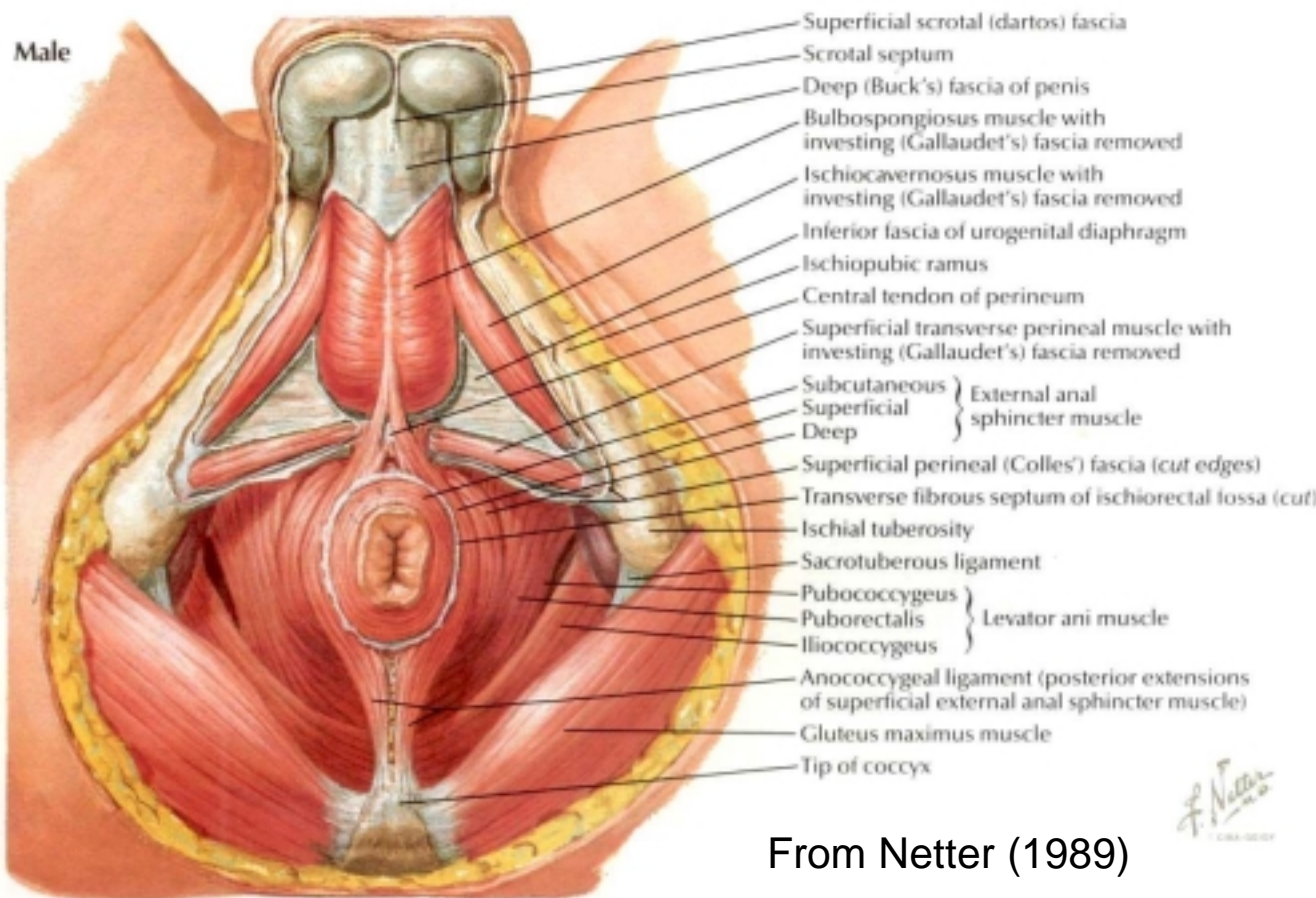
- Circular layer of rectum becomes **internal anal sphincter**
- Longitudinal layer of rectum becomes **intersphincteric fascial plane**
- **External anal sphincter** is composed of three parts
- **Levator ani** contributes **puborectalis**, which is continuous with deep external anal sphincter
- Tube within a tube
 - Inner tube: internal sphincter (smooth muscle)
 - Outer tube: puborectalis/ext. sphincter complex (skeletal muscle)



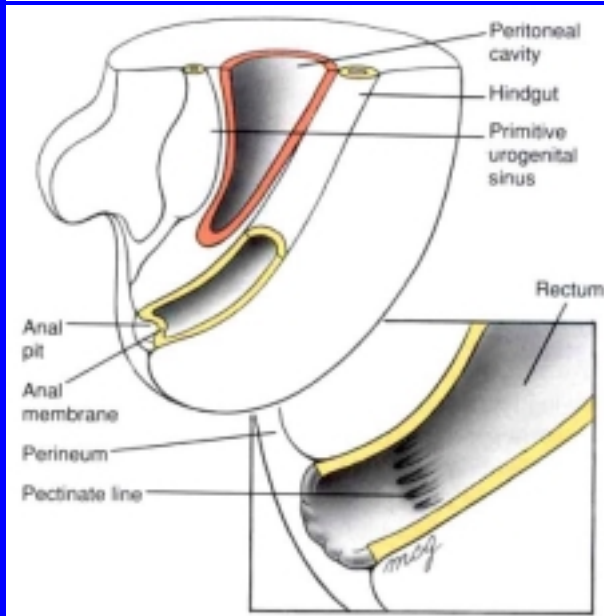
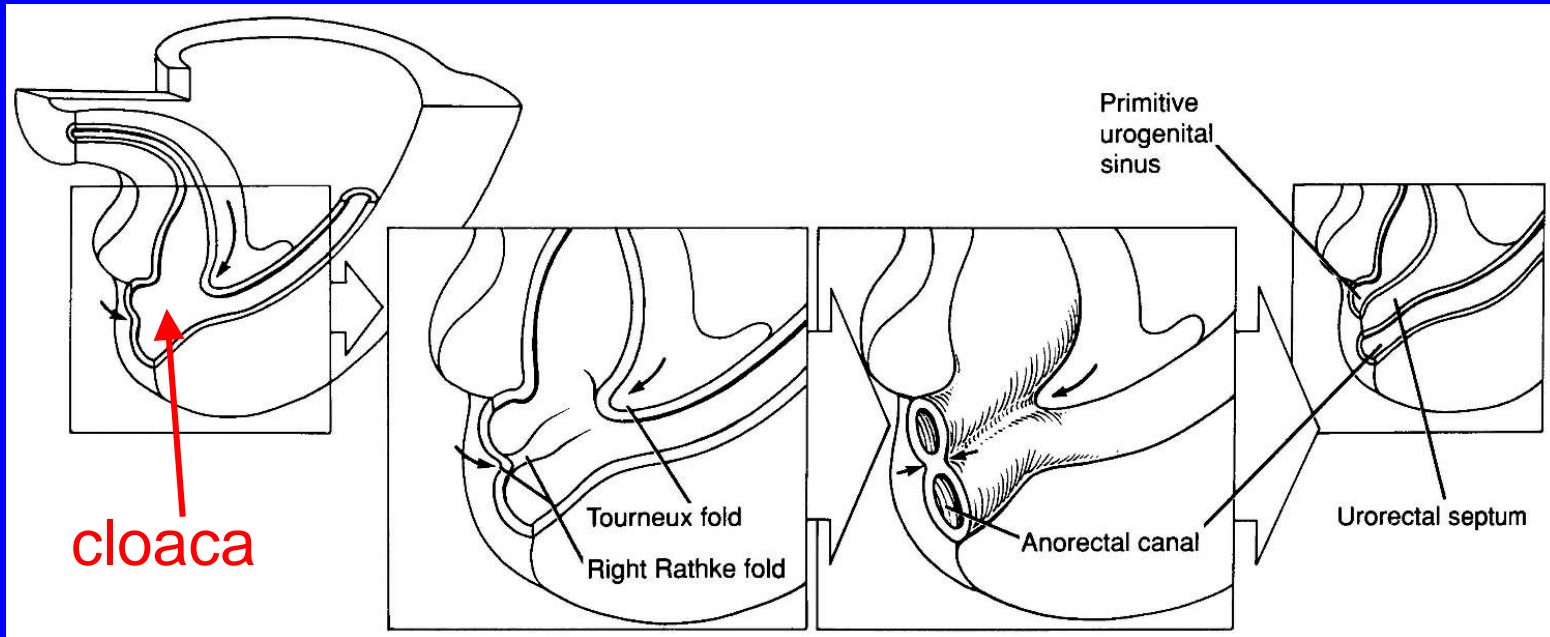
From Netter (1989)

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



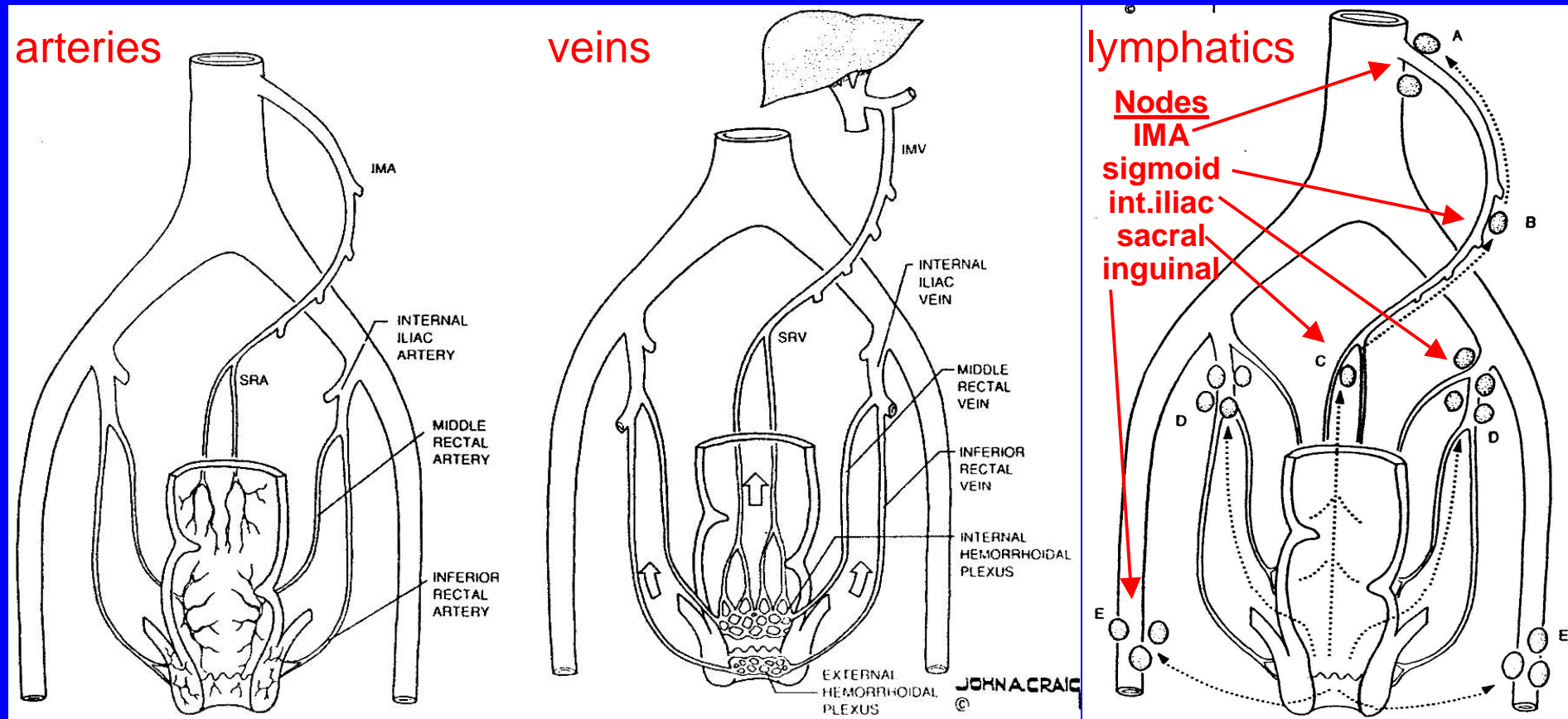
Embryology of Anorectal region



- 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)

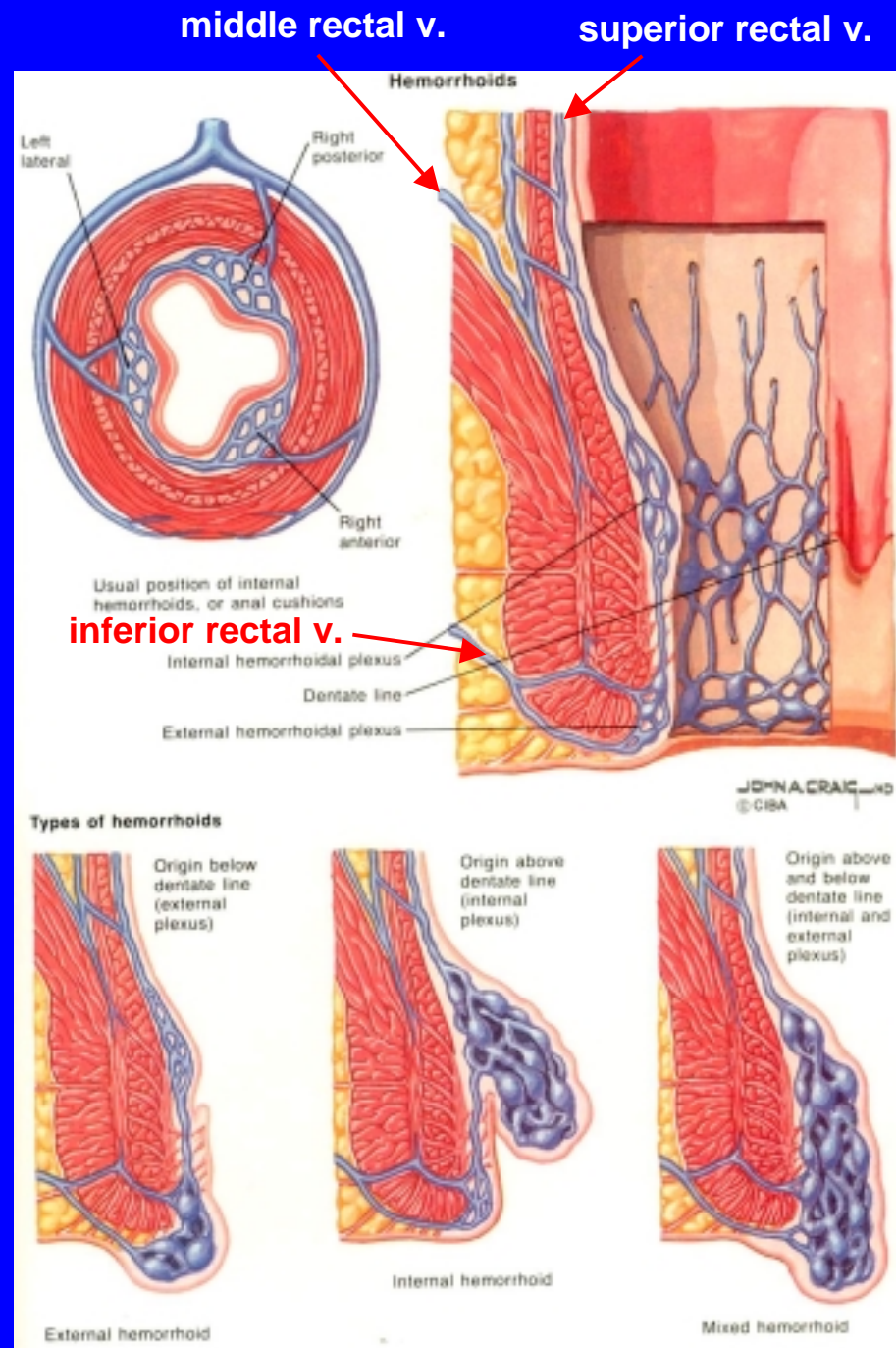
Blood Supply & Lymphatics: The Dentate Line as a Watershed



From Kodner et al. (1999)

Hemorrhoids

- **Anal cushions:** 3 consistently placed submucosal vascular plexuses formed by anastomosis of rectal veins within anal columns
- Anal cushions are normal—their varicosity and prolapse is not
- **Internal hemorrhoids**
 - Above dentate line
 - Generally painless
- **External hemorrhoids**
 - Below dentate line
 - Generally painful



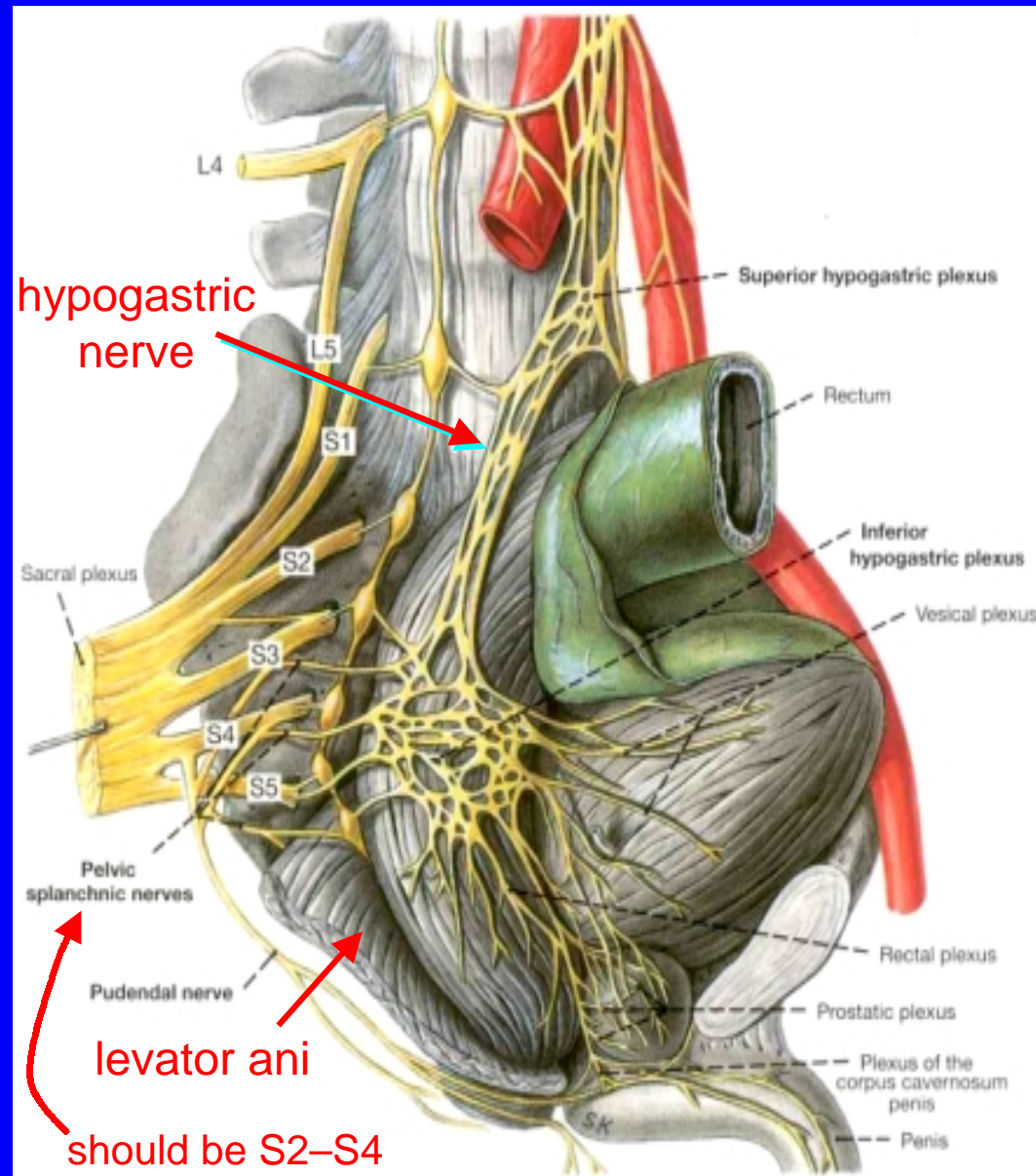
Nerve Supply to the Anorectal Region

Somatic innervation

- **Pudendal nerve (S2–S4)**
 - **Inferior rectal n.:** sensory & motor to muscles & mucosa below dentate line
 - **Perineal n.:** sensory & motor to perineal region

Autonomic innervation

- Sympathetics from thoracolumbar segments via **sup. hypogastric plexus & hypogastric nn.**
- Parasympathetics from S2–S4 (**nervi erigentes**)
- Unite in **inf. hypogastric plexus**
- Distributed to pelvic viscera & sexual organs

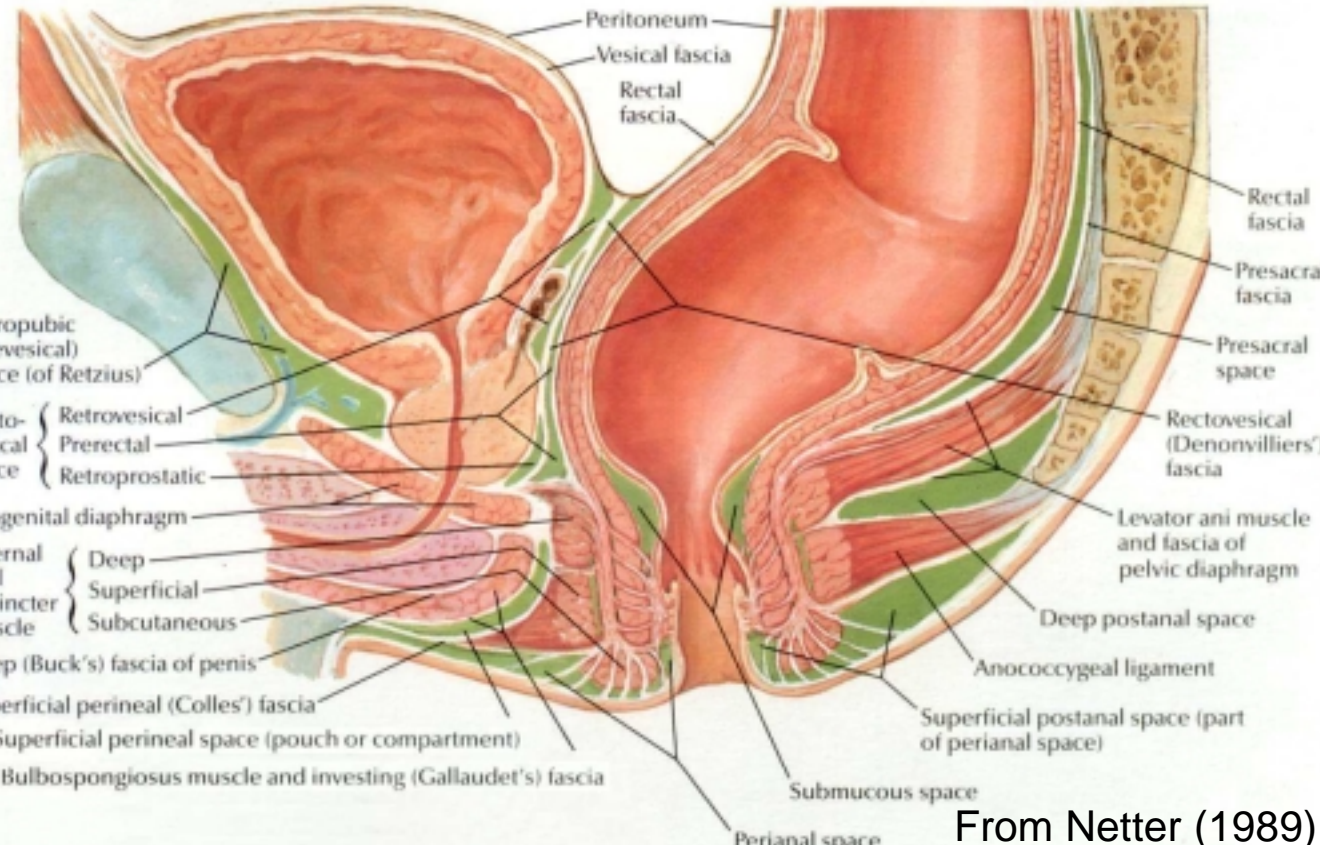
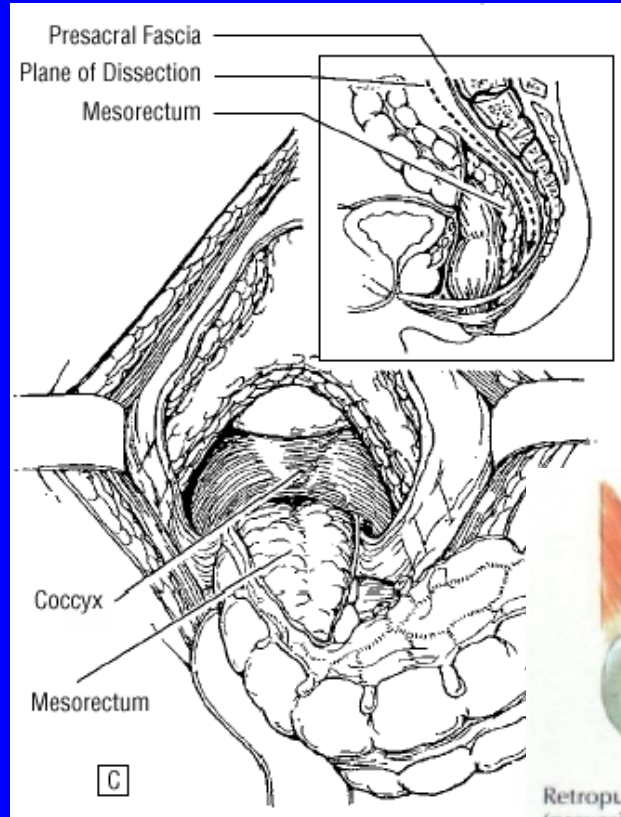


From Clemente (1997)

Planes, Fasciae, and Spaces

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



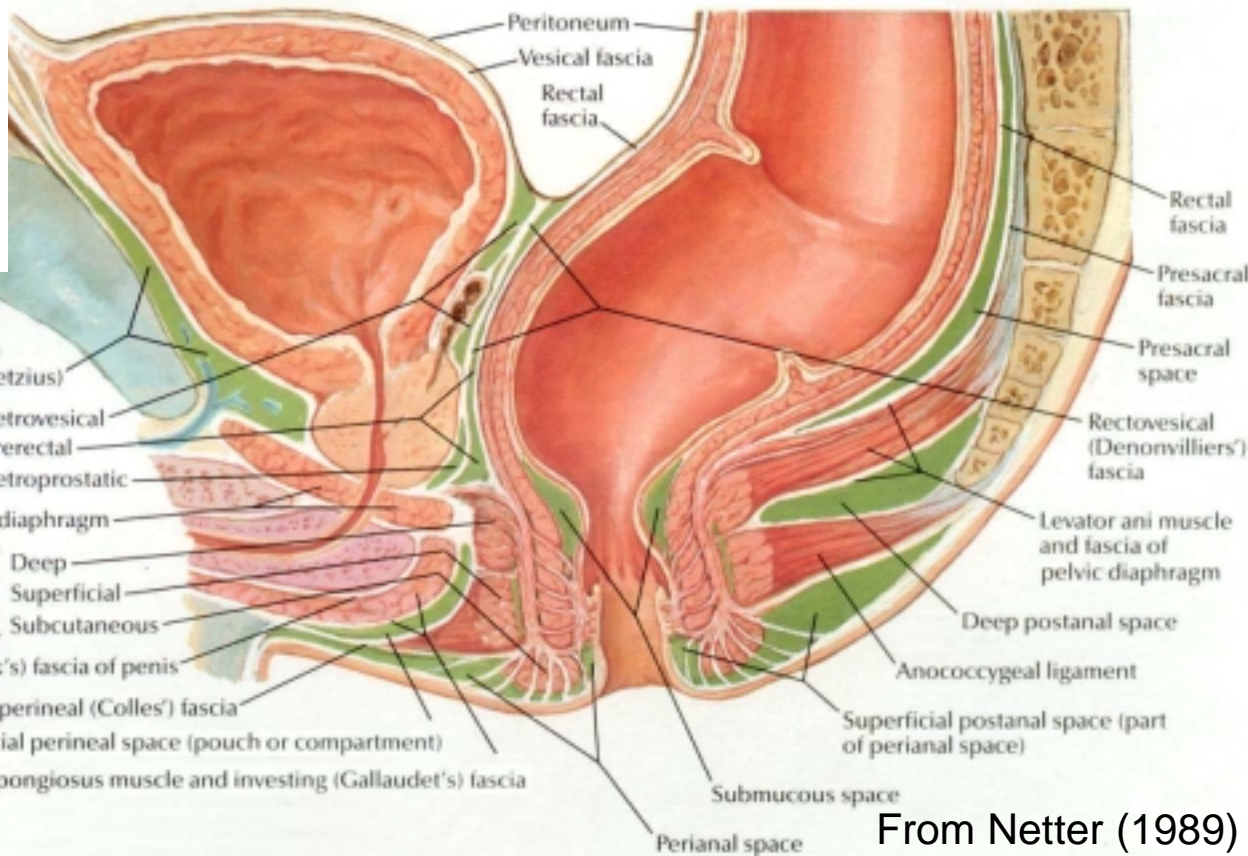
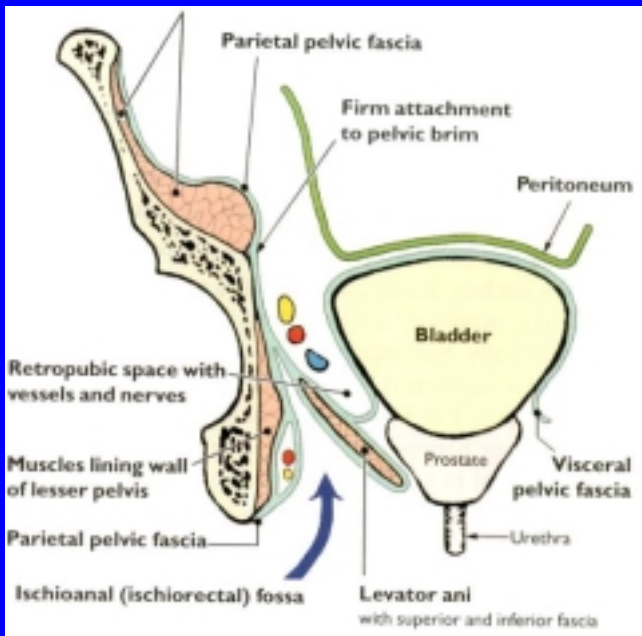
From Read & Kodner (1999) *Arch. Surg.*

From Netter (1989)

Planes, Fasciae, and Spaces

Spaces:

- Perianal space
- Intersphincteric space
- Ischioanal space
- Deep postanal space
- Suprlevator space
- Presacral space
- Submucous space
- Rectovesical space

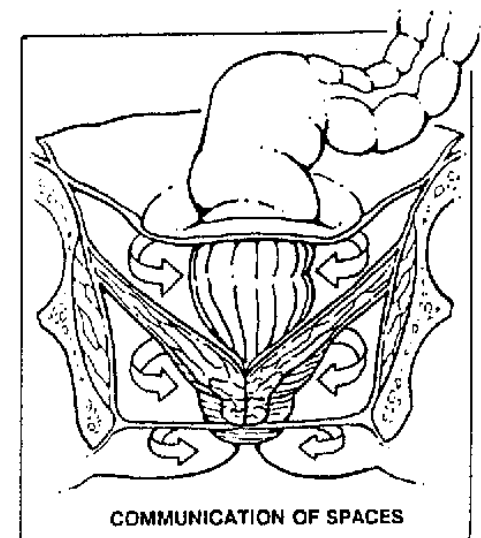
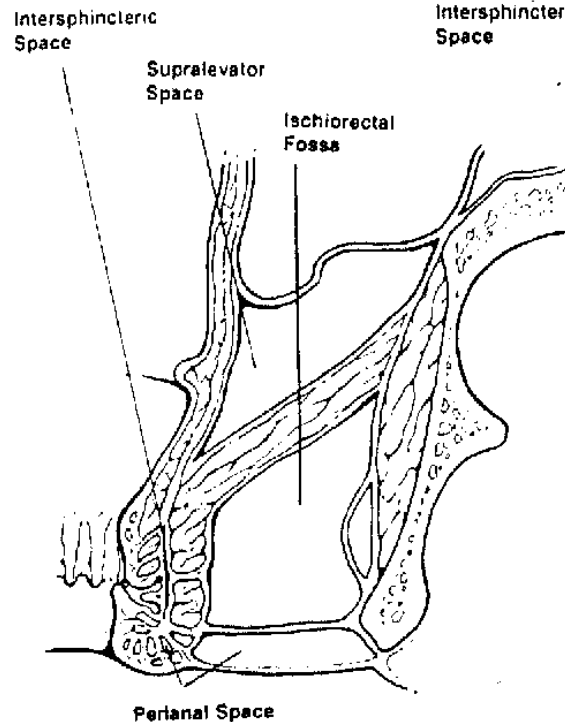
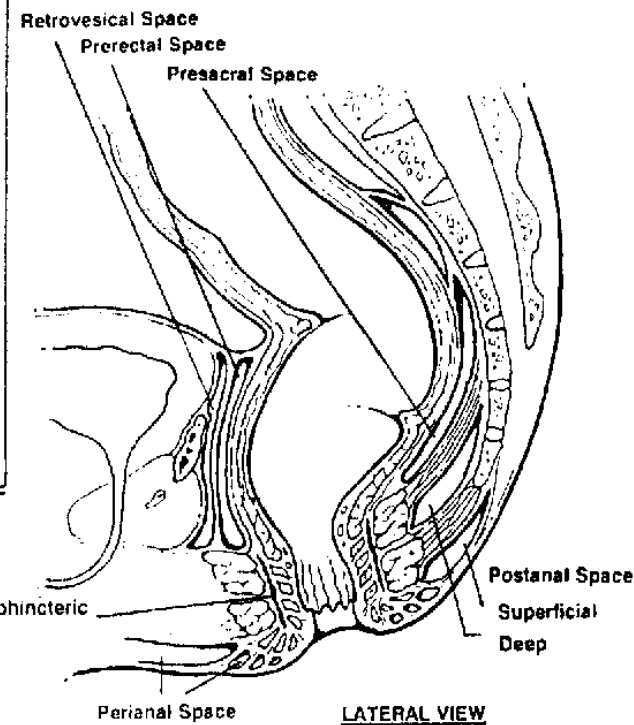
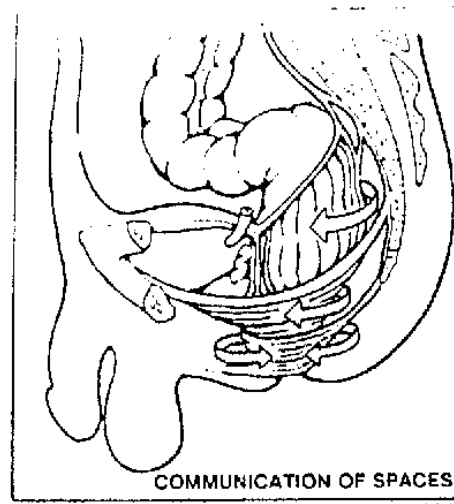


From Sauerland (1999)

From Netter (1989)

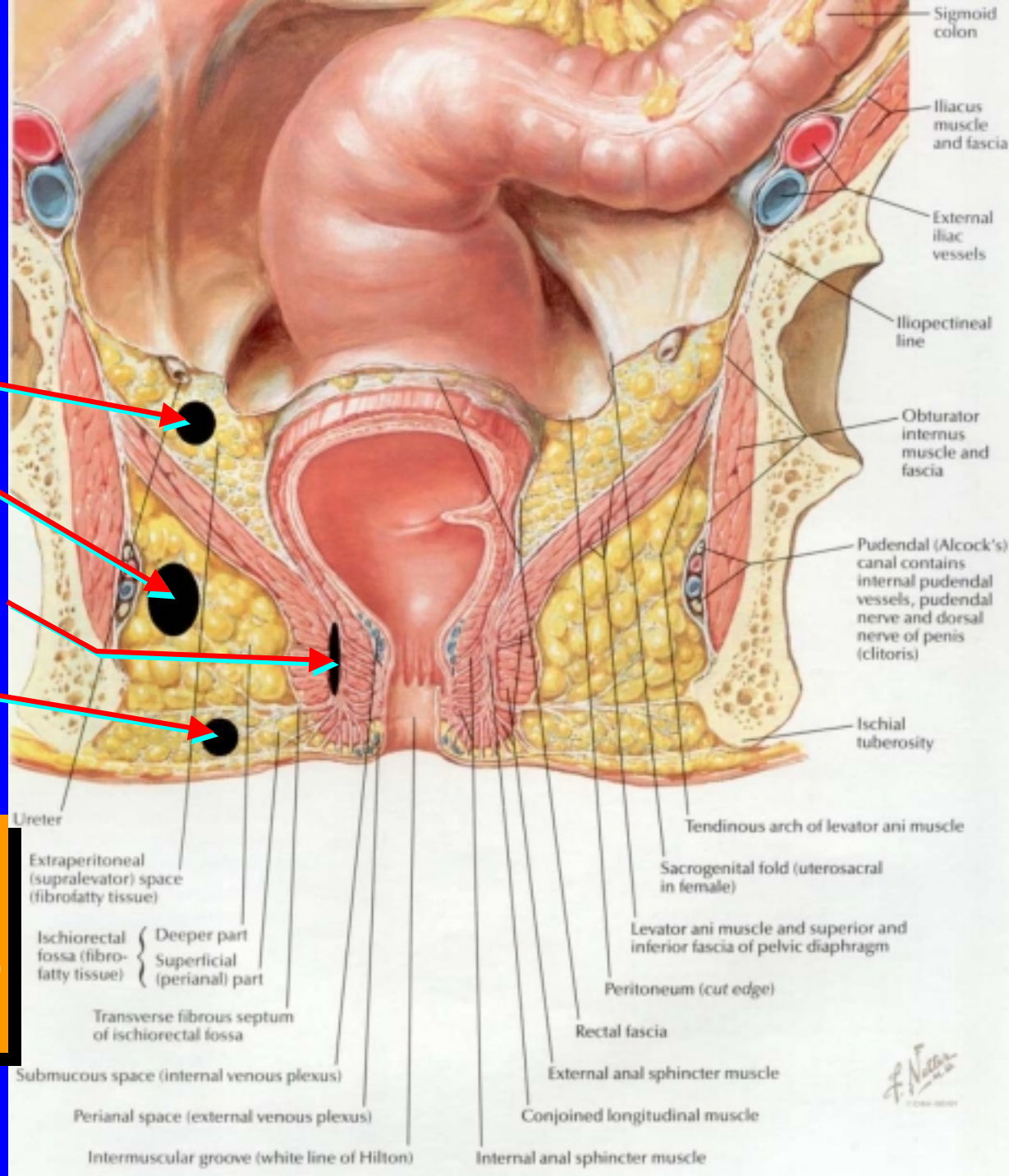
Communication of Spaces

- Perianal space: around anus below transverse septum
- Ischiorectal space: posteriorly around anorectal region via deep postanal space
- Supralelevator space: posteriorly around rectum via pre-sacral space



Sites of Anorectal Abscess

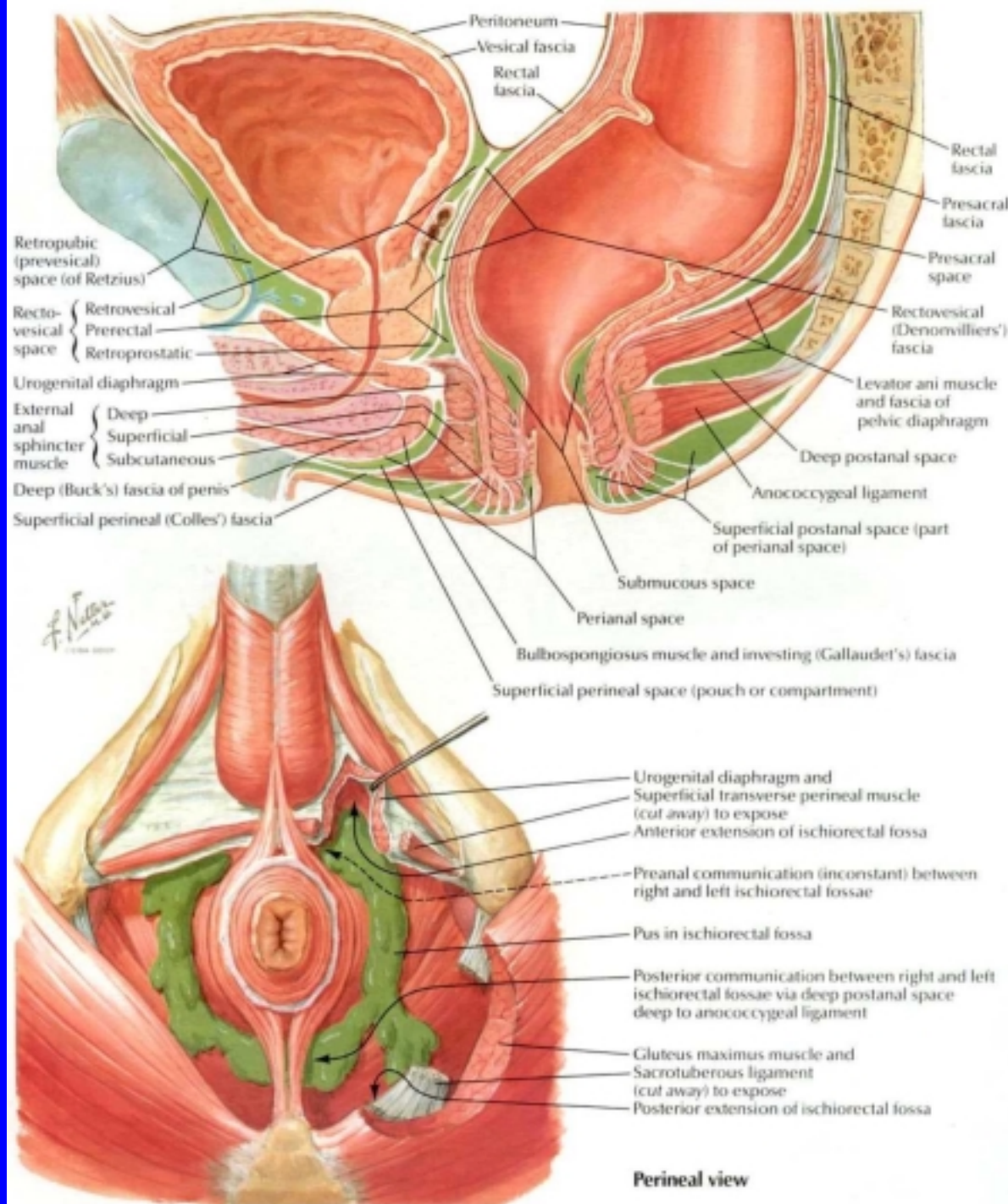
- supralelevator
- ischiorectal
- intersphincteric
- perianal



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

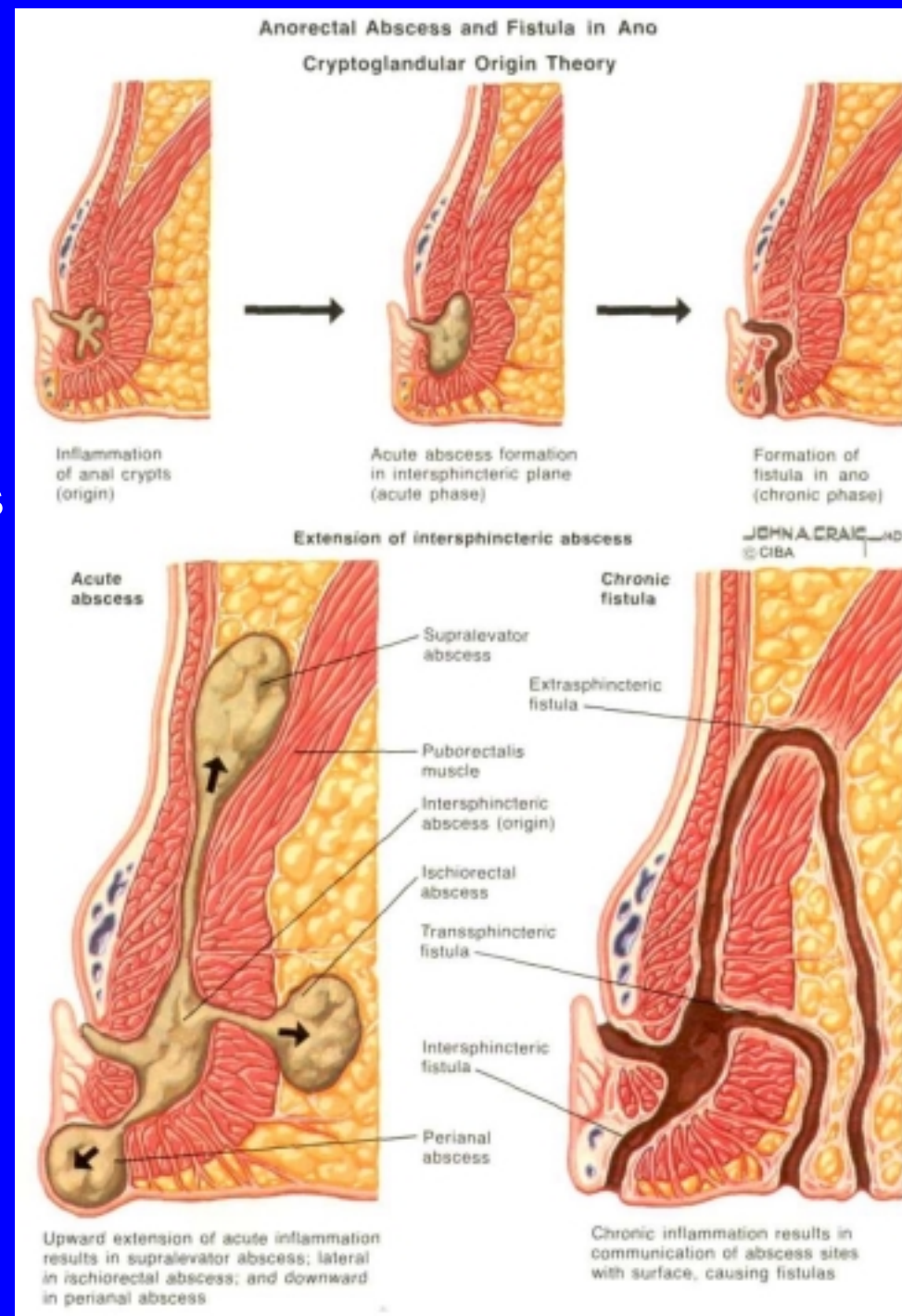
Ischiorectal Abscess

Contralateral communication
via deep postanal space



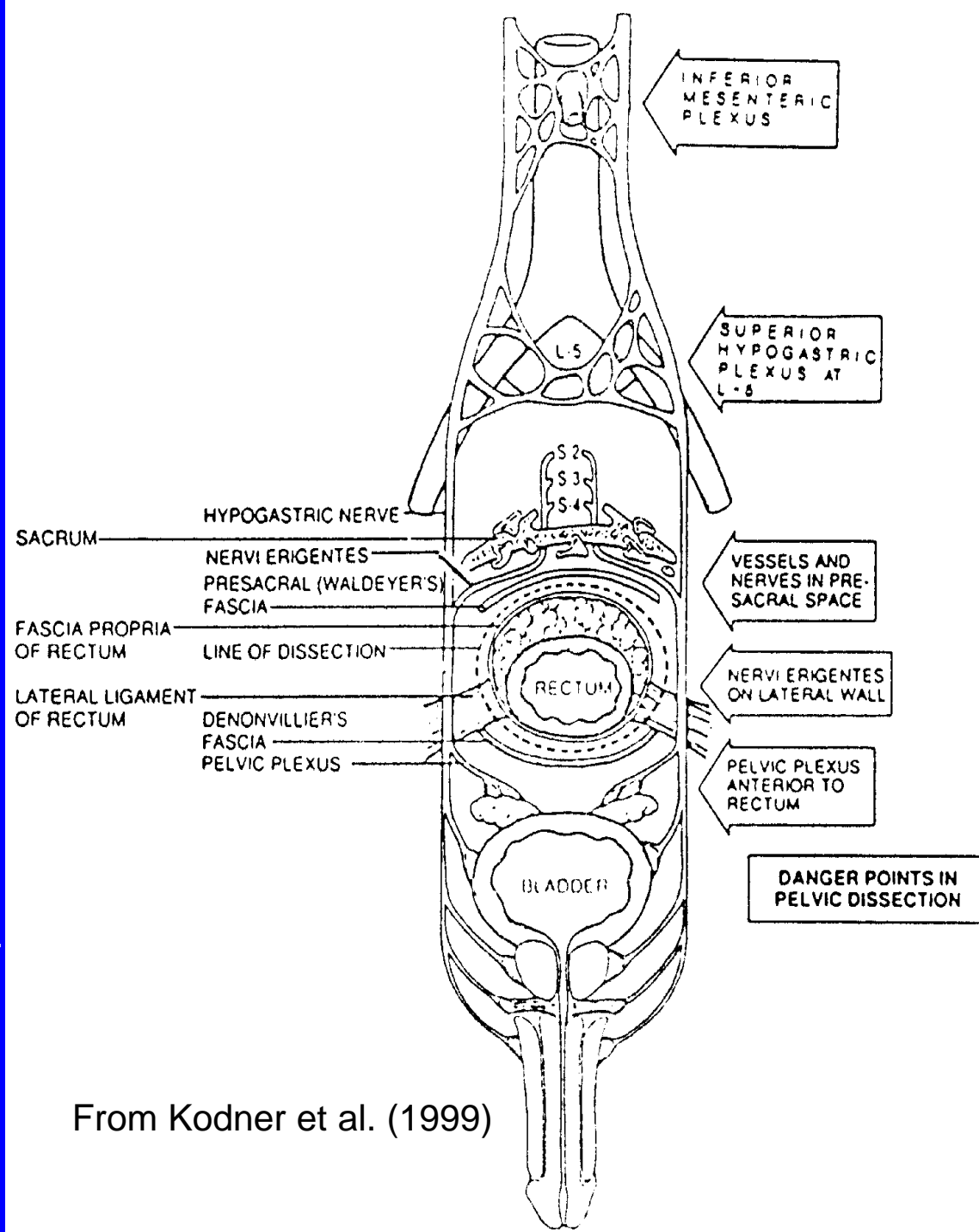
Abscess & Fistula

- 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



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From Kodner et al. (1999)