Navigating Anorectal Anatomy:
Terms, Planes, Spaces, Structures

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**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

From Fry & Kodner (1985) *CIBA*
**Terms**

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

From Fry & Kodner (1985) CIBA
**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 Netter (1989)
Planes, Fasciae, and Spaces

Spaces:
- Perianal space
- Intersphincteric space
- Ischiorectal space
- Deep postanal space
- Supralevator 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
- Supralevator space: posteriorly around rectum via presacral space

From Kodner et al. (1999)
Perianal abscess is most common, followed by ischiorectal, intersphincteric, & supralelevator abscesses

From Netter (1989)
Ischiorectal Abscess

Contralateral communication via deep postanal space

From Netter (1989)
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

From Kodner et al. (1999)