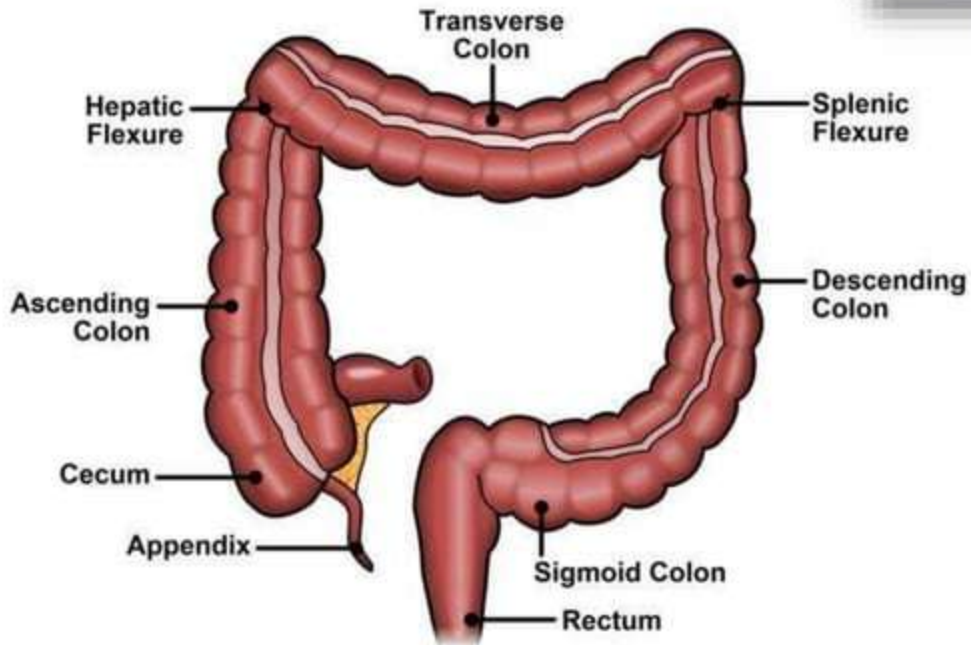
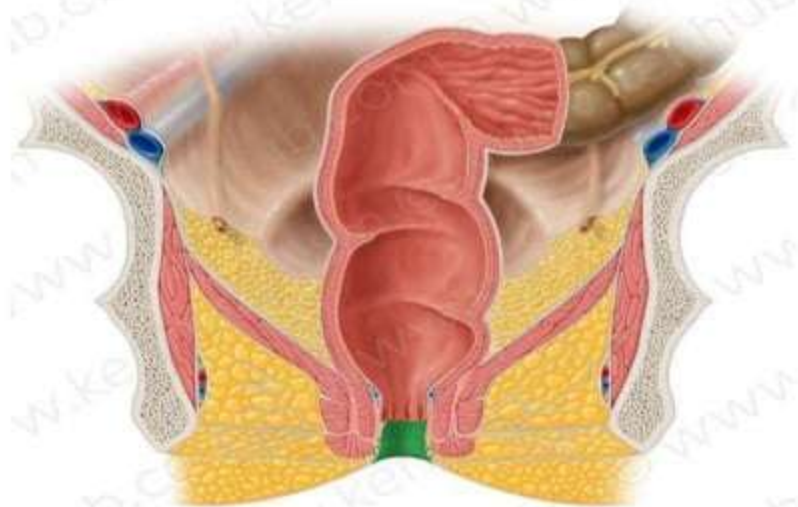


ANATOMY OF RECTUM AND ANAL CANAL

DR. GAURAV SANGAM
M.S (Ayu)
Consulting Proctologist
and Anorectal Surgeon

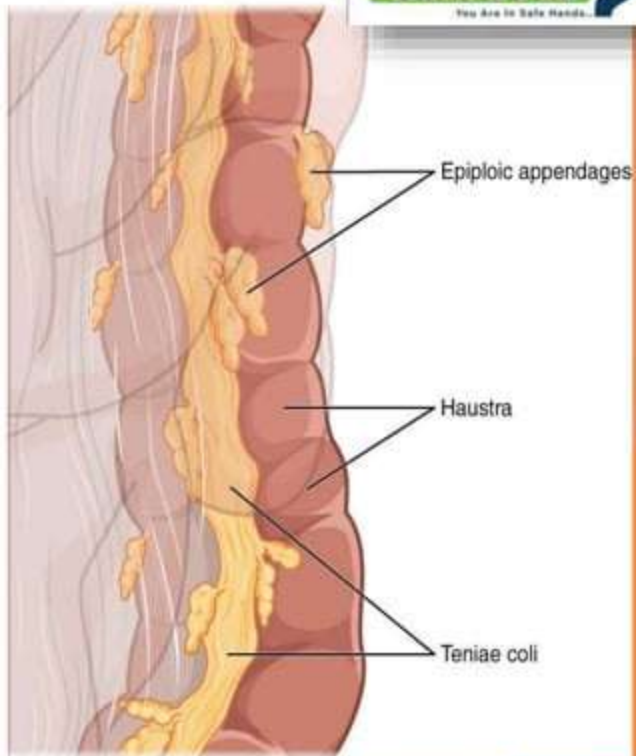


RECTUM



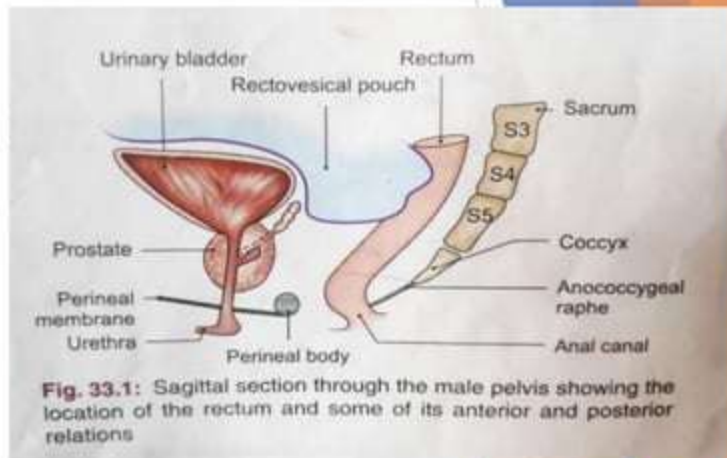
- ▶ Distal part of large gut
- ▶ Between sigmoid colon and anal canal
- ▶ It is curved in antero posterior and side to side

Sacculations , appendices epiploicae , and taeniae are absent



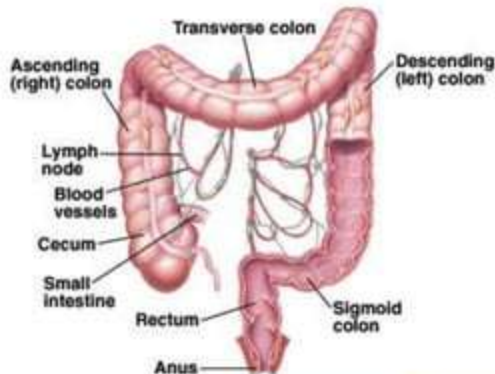
RECTUM

- ▶ Rectum proceeds
- ▶ Downward
- ▶ Downward and forward
- ▶ Follows concavity of sacrum and coccyx
- ▶ Ends 2-3 cm in front and below the tip of coccyx



RECTUM

- ▶ **Situation:**
- ▶ In posterior part of lesser pelvis
- ▶ In front of sacrum and coccyx
- ▶ 12 cm long
- ▶ Its is continuation of sigmoid colon (rectosigmoid junction at S3) and ends at anorectal junction (2-3cm in front and little below tip of coccyx)



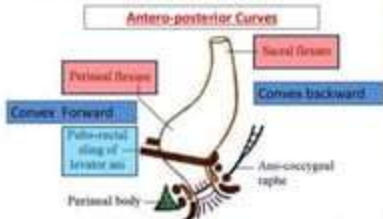
RECTUM

- ▶ **Curves:**
- ▶ Anteroposterior curves:
- ▶ Sacral Flexure
- ▶ Perineal Flexure

- ▶ Lateral Curves:
- ▶ Upper right
- ▶ Middle left
- ▶ Lower right

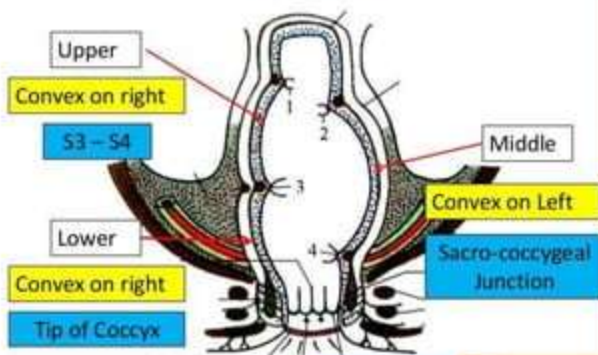
Rectum - Curvatures

- 2 types :- Antero-posterior & Lateral



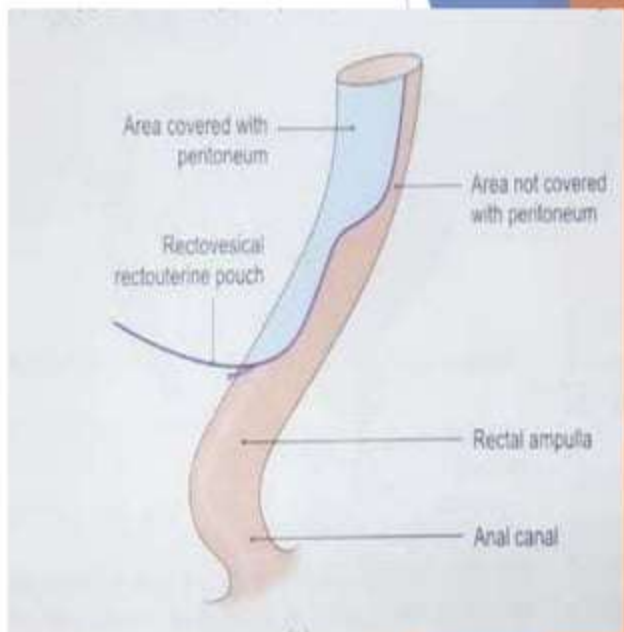
Rectum - Curvatures

Lateral Curves



RECTUM

- ▶ **Relations:**
- ▶ **Peritoneal relations:**
- ▶ **Upper 1/3rd - in front and sides**
- ▶ **Middle 1/3rd - only in front**
- ▶ **Lower 1/3rd - no covering**

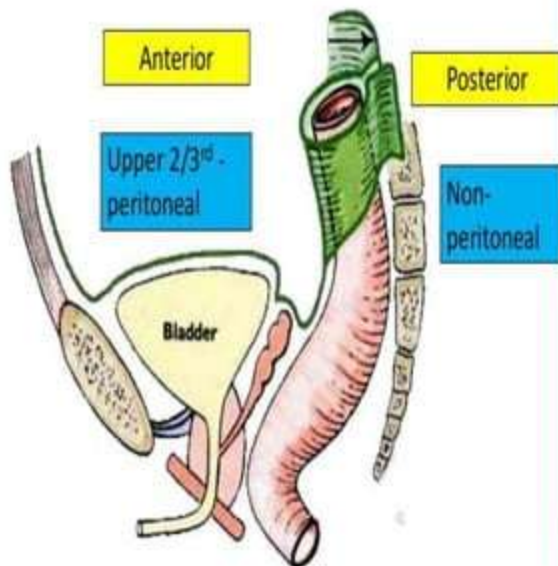


RECTUM

- ▶ Viseral Relations:
- ▶ Anteriorly:
- ▶ Male - upper 2/3rd - rectovesical pouch and coils of intestine.
- ▶ Lower 1/3rd - Bladder, ureter, seminal vesicles
- ▶ Female - upper 2/3rd - Rectouterine pouch and upper part of vagina
- ▶ Lower 1/3rd - lower part of vagina

Relations

Peritoneal Relations

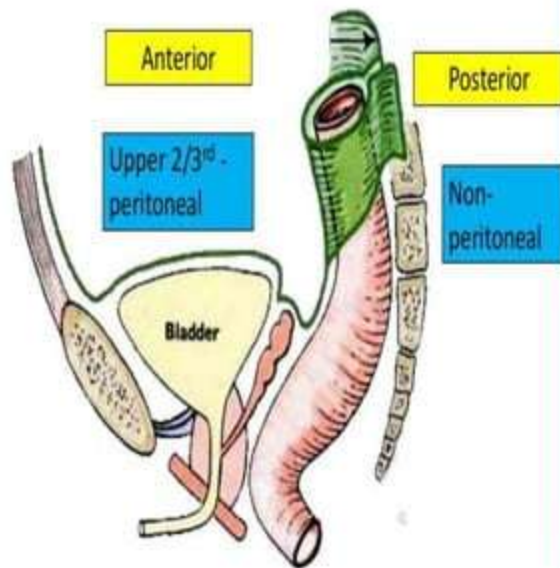


RECTUM

- ▶ **Viseral Relations:**
- ▶ Posteriorly :
- ▶ In both sexes
- ▶ Lower three pieces of sacrum, coccyx and ano coccyxgeal ligament

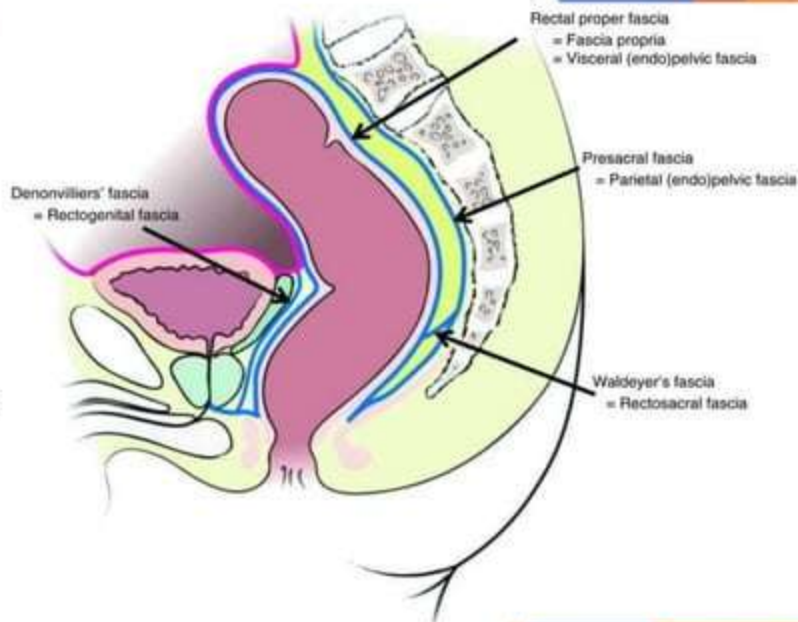
Relations

Peritoneal Relations



RECTUM

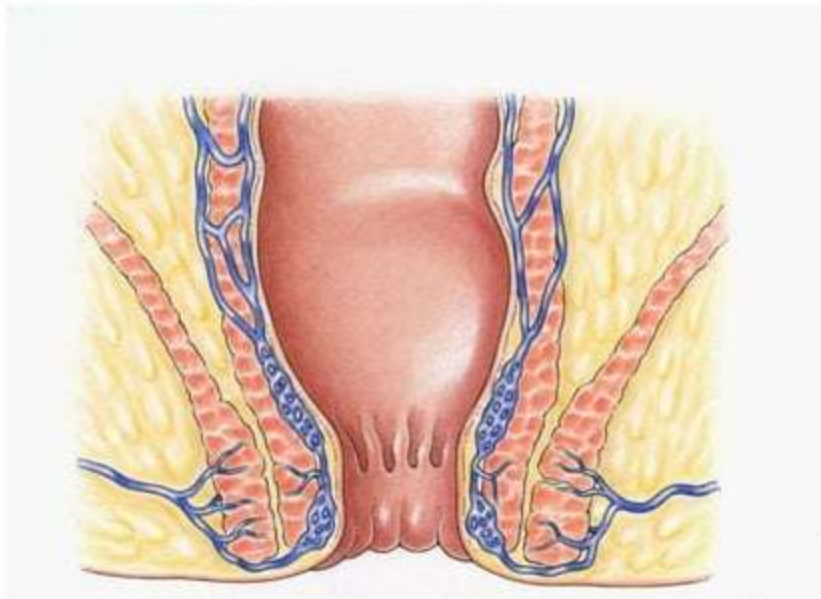
- ▶ Support of rectum:
- ▶ Pelvic floor
- ▶ Fascia of Waldeyer (Posteriorly)
- ▶ Lateral ligaments of the rectum
- ▶ Fascia of Denovilliers (anteriorly)
- ▶ Pelvic peritoneum



ANAL CANAL

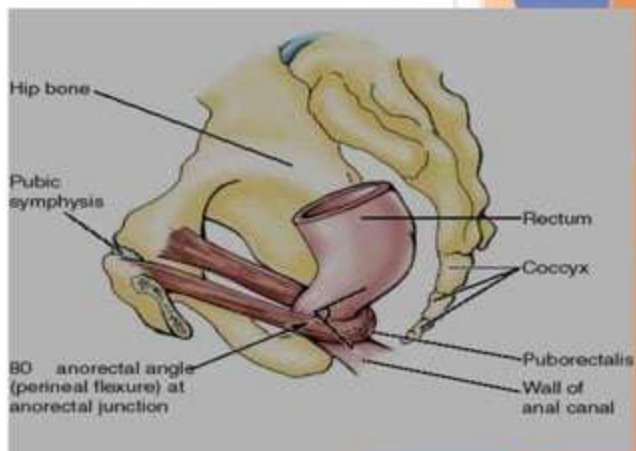
ANAL CANAL

- ▶ Below the level of pelvic diaphragm
- ▶ In between right and left ischioanal fossa



ANAL CANAL

- ▶ Length and direction:
- ▶ 3.8 cm long
(15mm, 15mm, 8mm)
- ▶ Extends from anorectal junction to the anus
- ▶ It is directed downward and backward



ANAL CANAL

- ▶ **Relations:**
- ▶ Anteriorly :
- ▶ Both sexes - perineal body
- ▶ males - membranous urethra and bulb of penis
- ▶ Females - lower end of vagina
- ▶ Posteriorly :
- ▶ Anococcygeal ligament
- ▶ Tip of coccyx
- ▶ Laterally: ischioanal fossa
- ▶ All -round: sphincter muscles

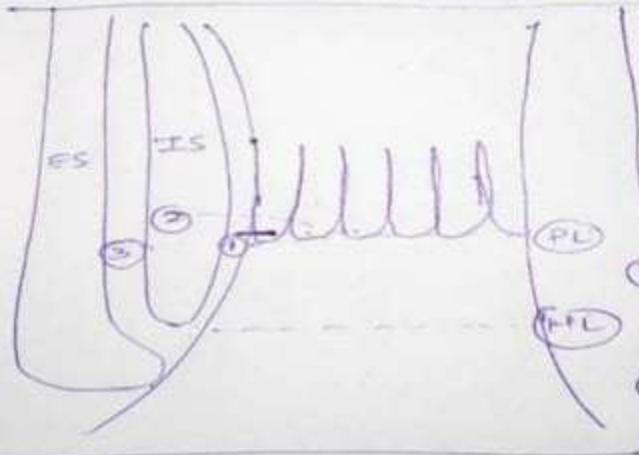
ANAL CANAL

- ▶ **Division of anal canal:**
- ▶ Upper mucosa (15mm) - mucous membrane
- ▶ 8-10 vertical folds - column of Morgagni
- ▶ Anal valves
- ▶ Anal sinus/anal crypts
- ▶ Dentate line/ pectinate line



10 longitudinal folds / rectal columns
column of Morgagni.

4-8 → Anal glands → In apex of crypt
→ 2 glands open in 1 crypt
→ Half crypts have no gland.



① Average short tubular portion open in submucosa
↓
further branches mostly confined to submucosa.

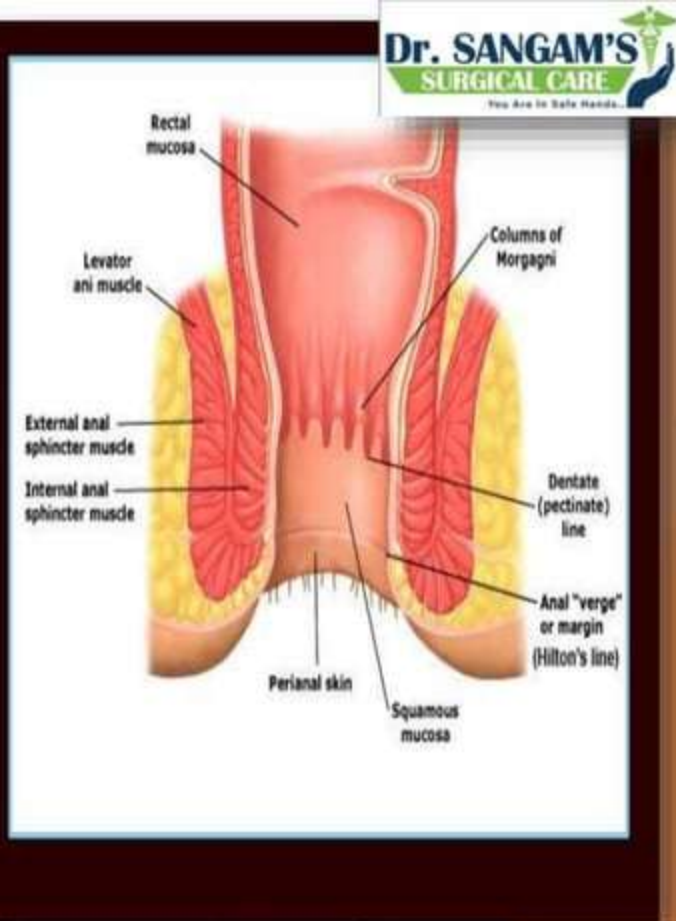
② $\frac{2}{3}$ → Enter Internal sphincter

③ $\frac{1}{3}$ → Enter Intersphincteric space.

④ Some may penetrate external sphincter

ANAL CANAL

- ▶ Middle part (15mm)
- ▶ Mucous membrane
- ▶ Bluish appearance because of dense venous plexus
- ▶ Pecten/transitional zone
- ▶ Lower limit of pecten - White line of Hilton (subcutaneous part of ext sphincter and lower border on int sphincter)
- ▶ Lower part (8mm)
- ▶ Lined by true skin



ANAL CANAL

- ▶ **Anal Sphincters:**
- ▶ Internal anal sphincter:
- ▶ Involuntary
- ▶ Circular muscle
- ▶ Surround upper 3/4th 30 mm of anal canal till white line of Hilton

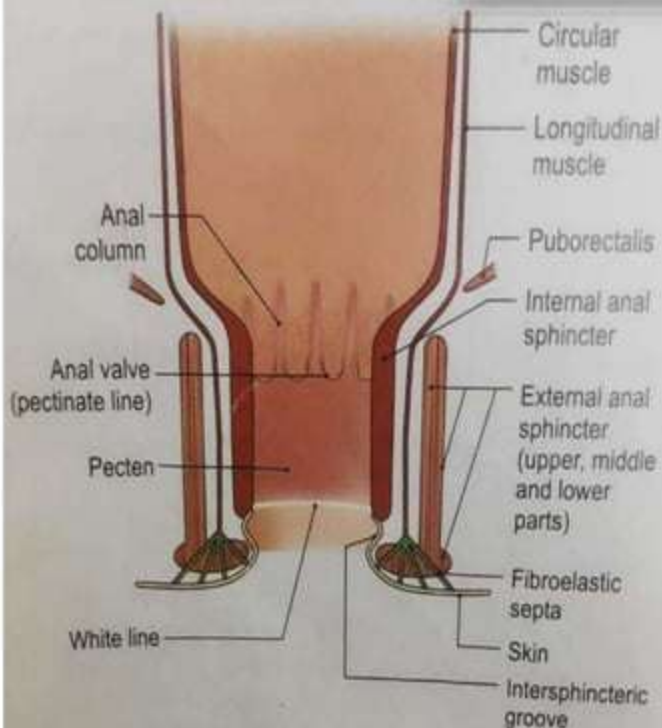
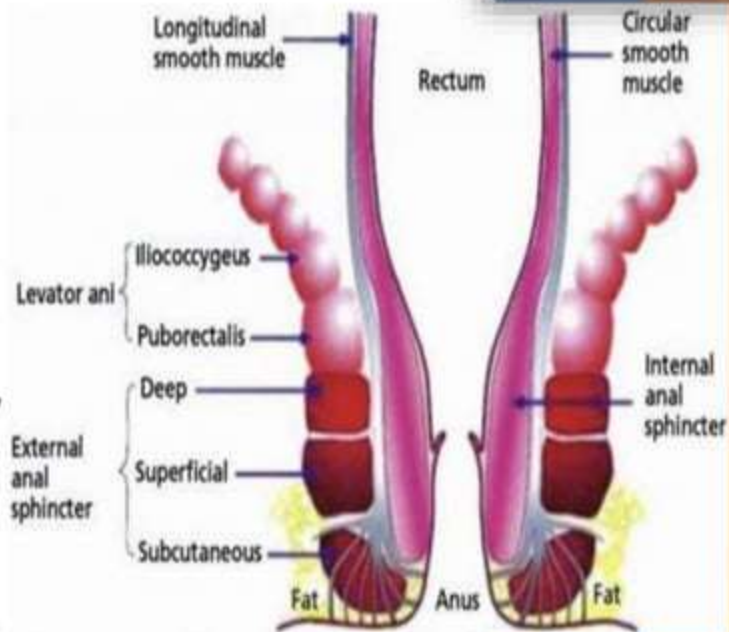


Fig. 33.11: Coronal section through the wall of the anal canal

ANAL CANAL

- ▶ External anal sphincter:
- ▶ Voluntary
- ▶ Striated muscle
- ▶ 3 parts - superficial, deep and subcutaneous
- ▶ Longitudinal muscle

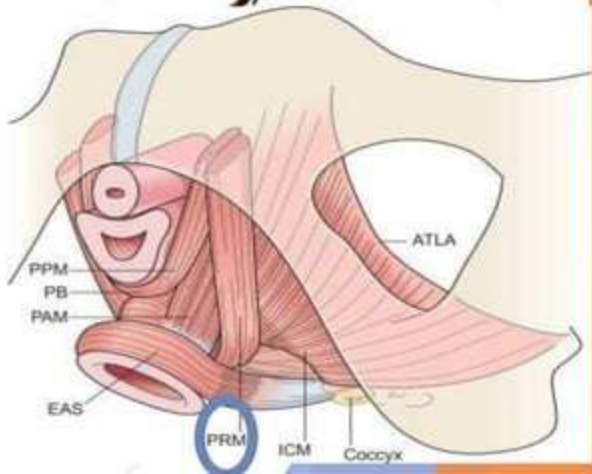
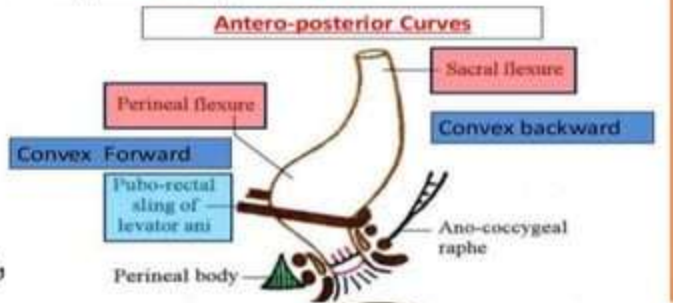


ANAL CANAL

- ▶ **Anorectal ring:**
- ▶ Muscular ring present at anorectal junction
- ▶ By fusion of puborectalis, upper most part of ext sphincter and int sphincter
- ▶ Ring can be felt with per rectal digital examination
- ▶ Ring is less marked anteriorly where the fibres of puborectalis are absent.

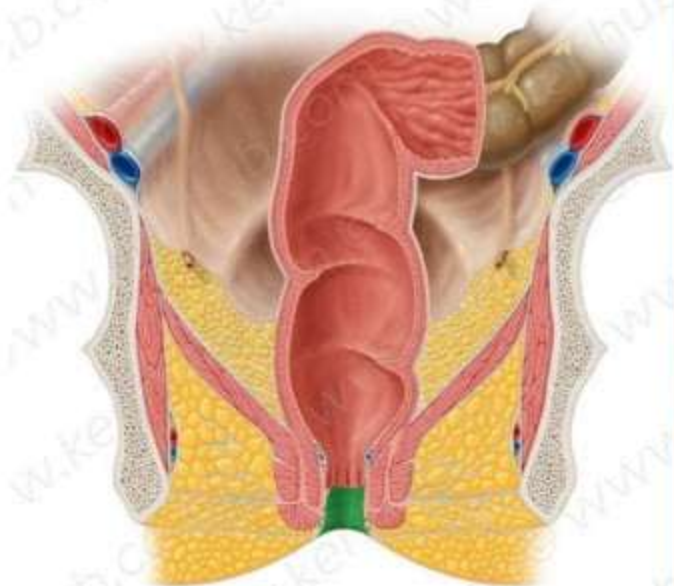
Rectum - Curvatures

- 2 types :- Antero-posterior & Lateral

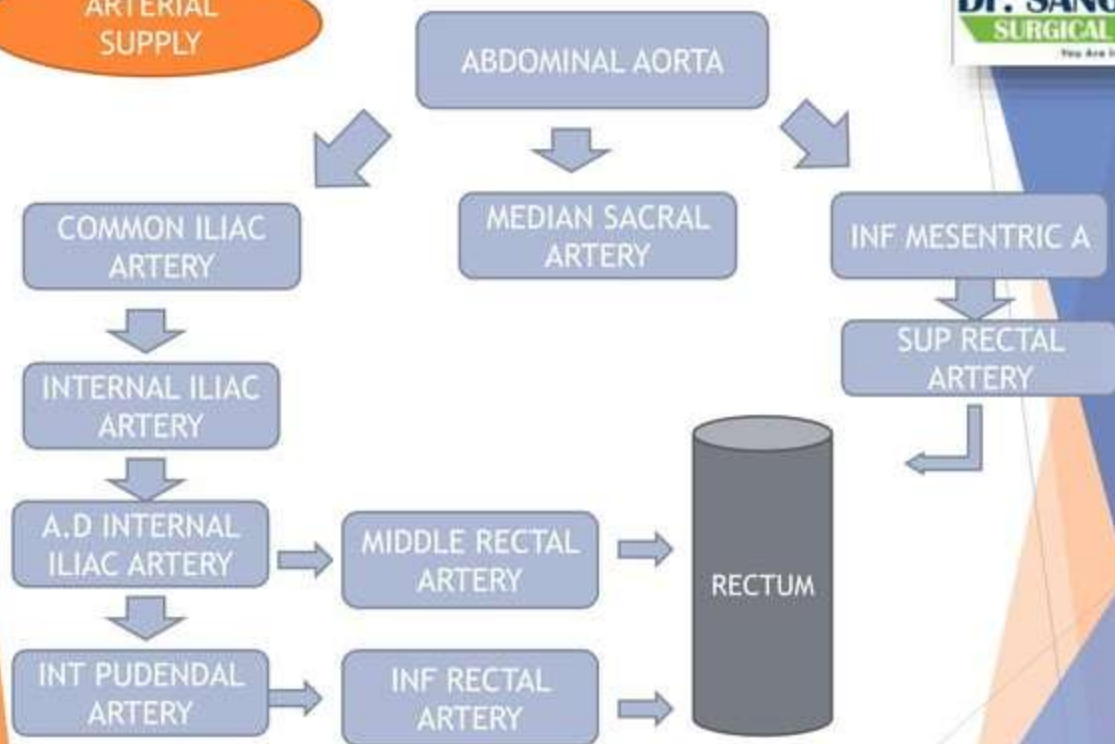


ANAL CANAL

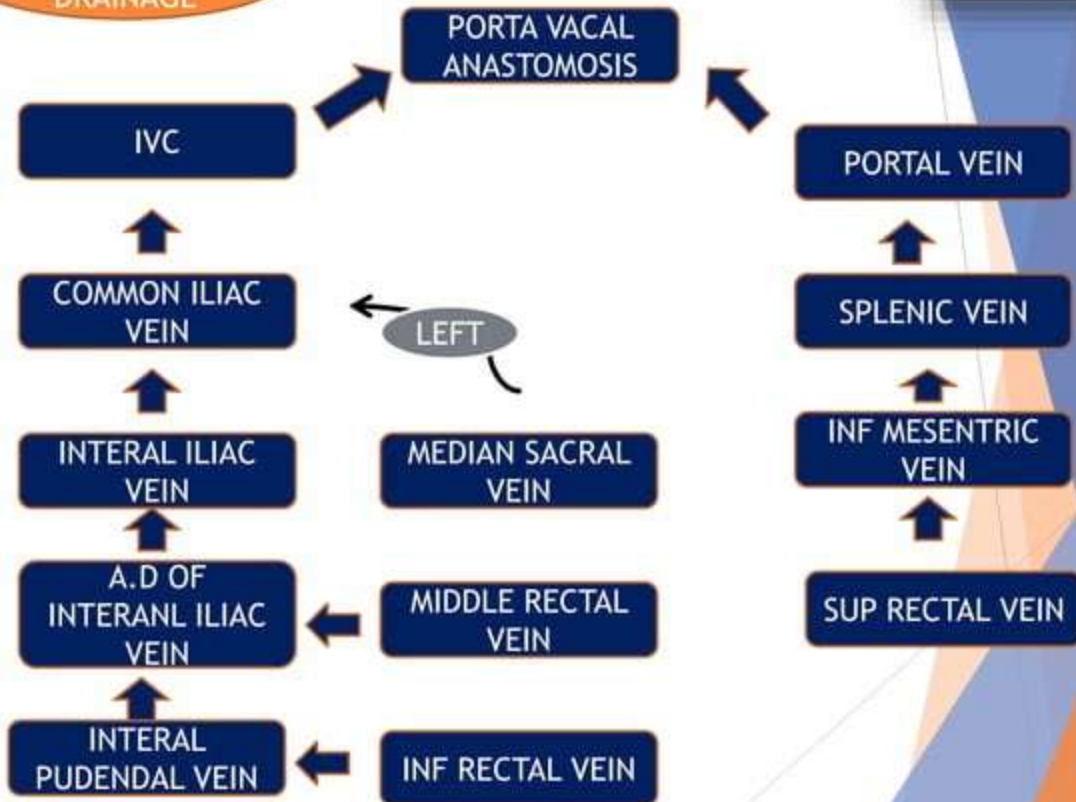
- ▶ **Surgical spaces in anal canal:**
- ▶ Ischiorectal fossa
- ▶ Perianal space
(small loculi, tightly)
- ▶ Ischiorectal space
(large loculi, loose)
- ▶ Submucous space
- ▶ Intersphincteric space
- ▶ Supra levatoric space



ARTERIAL
SUPPLY



VENOUS DRAINAGE



ANAL CANAL

- ▶ **Blood supply:**
- ▶ superior rectal artery - Inf Mesenteric artery
- ▶ Middle rectal artery- from anterior division of internal iliac artery
- ▶ Medial sacral artery -from back of aorta

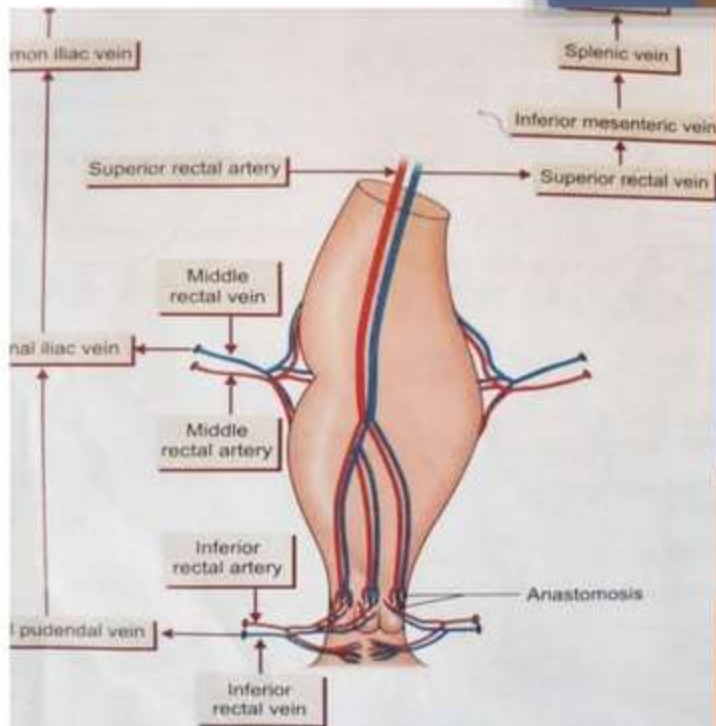


Fig. 33.6: Blood supply of rectum and anal canal

ANAL CANAL

- ▶ **Venous drainage:**
- ▶ Superior hemorrhoidal veins - inf mesentric
- ▶ Inferior hemorrhoidal veins - common iliac
- ▶ Middle hemorrhoidal veins - common iliac

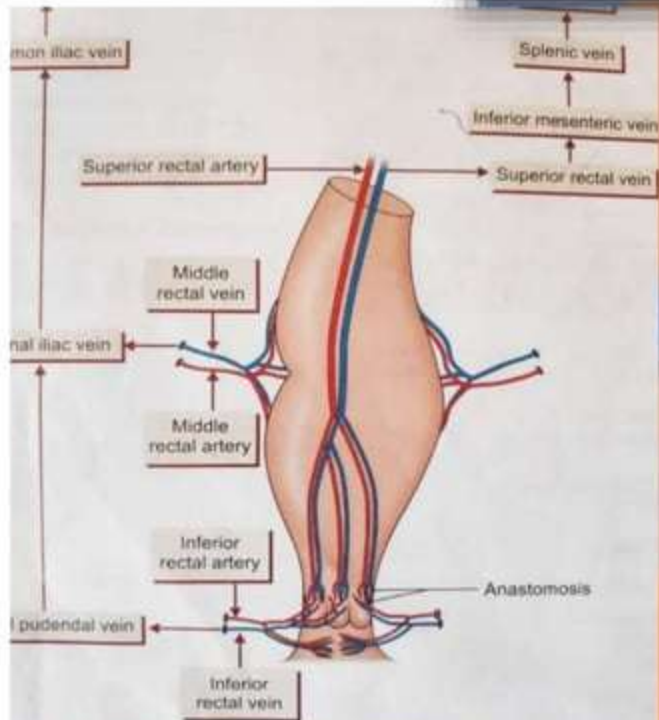


Fig. 33.6: Blood supply of rectum and anal canal

ANAL CANAL

- ▶ Nerve supply:
- ▶ Above pectinate line:
 - Sympathetic - L1,L2
 - Parasympathetic - S2,S3,S4
 - Pain sensation are carried by both of them

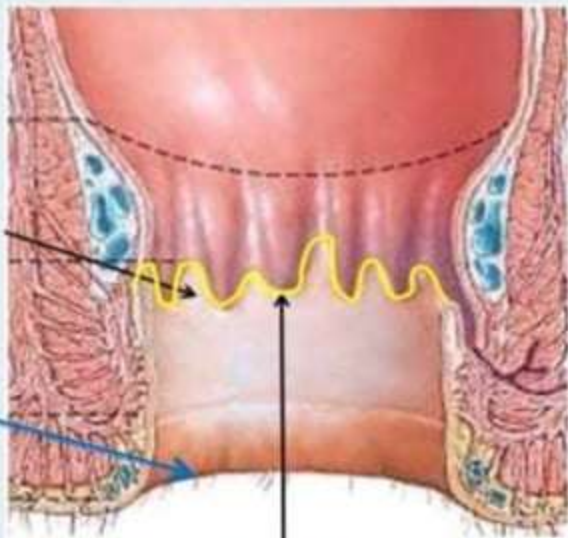
ANAL CANAL

- ▶ Below the pectinate line:
- ▶ By somatic nerves(inferior rectal - S2,S3,S4)

- ▶ Sphincter:
 - ▶ Internal - contracts by sympathetic and relaxed by parasympathetic
 - ▶ External - inferior rectal nerve and perineal branch of the fourth sacral nerve

The anatomic anal canal

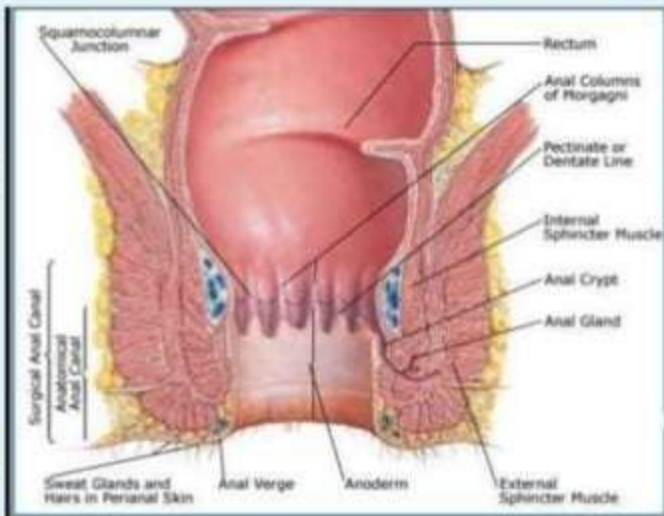
- The *anatomic anal canal* extends from **the dentate or pectinate line** to the anal verge.



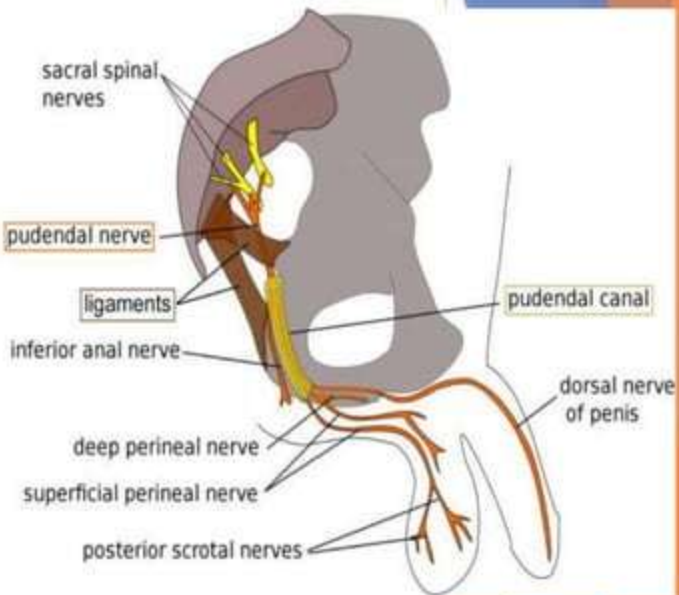
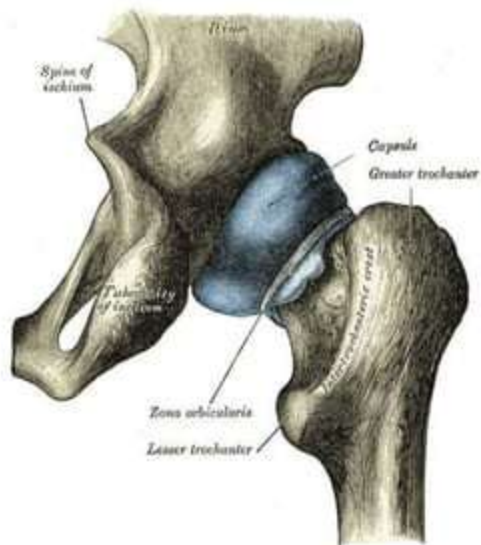
Pectinate Line / Dentate Line

The surgical anal canal

- **The surgical anal canal:**
 - It begins at the **anorectal junction**
 - terminates at **the anal verge.**



ANAL CANAL



Pudendal nerve - branches off into inferior rectal nerve

Supplies sphincter, skin around the anus, lining of the anal canal

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