RECTUM (length & peritoneal covering)

Starts S3

Upper curve right
Upper fold
Middle curve left
Middle fold
Lower curve right
Lower fold

Anal Canal
Anterior & posterior wide bands of longitudinal muscle

Ends at pelvic floor (puborectalis)

12cm long Peritoneum

4cm sides & front

4cm front only

4cm below pelvic floor

RECTUM DETAILS

No appendices epiploicae, no sacculations, no mesentery

Nerves:
Sympathetic - contract smooth muscle sphincters, relax bowel, transmit pain
Parasympathetic - Relax smooth muscle sphincters, contract bowel, transmit feeling of fullness

Folds are mucosa & circular muscle = valves of Houston
The rectum is normally empty but fills before and during defaecation
Upper 2/3 is distensible into abdominal cavity & may store faeces in constipation
Lower 1/3 normally but can distend laterally into the ischio-anal fossa

Note: longitudinal muscle is two wide bands anteriorly & posteriorly that become fibrous within the sphincters. Circular muscle complete but thickened below as internal sphincter
RECTUM - VESSELS/LYMPHATICS

Blood supply: Superior rectal artery from inferior mesenteric
Middle rectal artery from internal iliac.
Smaller inferior rectal artery from internal pudendal
Median sacral may contribute
All arteries supply all layers

Venous drainage: Superior rectal vein to inferior mesenteric which
is portal. Middle rectal to internal iliac (systemic)
Inferior rectal to internal pudendal to internal
iliac (systemic). Portosystemic anastomosis in upper
anal canal where internal & external venous plexuses
meet.

Lymphatics: Follow deep veins and arteries (black arrows below)

RULE: Lymphatics from viscera follow deep arteries back to nodes
around the origin of the artery
RECTUM (length & peritoneal covering)

Starts S3

Upper curve right

Upper fold

Middle curve left

Middle fold

Lower curve right

Lower fold

Anal Canal

12cm long Peritoneum

4cm sides & front

4cm front only

4cm below pelvic floor

Ends at pelvic floor (puborectalis)

RECTUM DETAILS

No appendices epiploicae, no sacculations, no mesentery

Nerves:

Sympathetic - contract smooth muscle sphincters, relax bowel, transmit pain

Parasympathetic - Relax smooth muscle sphincters, contract bowel, transmit feeling of fullness

Folds are mucosa & circular muscle = valves of Houston

The rectum is normally empty but fills before and during defaecation

Upper 2/3 is distensible into abdominal cavity & may store faeces in constipation

Lower 1/3 normally but can distend laterally into the ischio-anal fossa

Note: longitudinal muscle is two wide bands anteriorly & posteriorly that become fibrous within the sphincters. Circular muscle complete but thickened below as internal sphincter
RECTUM - VESSELS/LYMPHATICS

Blood supply: Superior rectal artery from inferior mesenteric
Middle rectal artery from internal iliac.
Smaller inferior rectal artery from internal pudendal
Median sacral may contribute
All arteries supply all layers

Venous drainage: Superior rectal vein to inferior mesenteric which
is portal. Middle rectal to internal iliac (systemic)
Inferior rectal to internal pudendal to internal
iliac (systemic). Portosystemic anastomosis in upper
anal canal where internal & external venous plexuses
meet.

Lymphatics: Follow deep veins and arteries (black arrows below)

RULE: Lymphatics from viscera
follow deep arteries back to nodes
around the origin of the artery
RECTUM - RELATIONS

ANTERIOR

Female
- Recto-uterine pouch (of Douglas)
- Small bowel
- Vagina (posterior fornix)
- Uterus & bladder

Male
- Rectovesical pouch
- Small bowel
- Denonvillier's fascia
- Bladder
- Vas, seminal vesicle
- Prostate

POSTERIOR
Fascia, median sacral & rectal vessels, sympathetic trunk, pelvic splanchnic nerves, piriformis, sacral & coccygeal roots, sacrum, coccyx, anococcygeal body

LATERAL
Peritoneum, fat, nodes, obturator internus & its fascia, Alcock's canal & contents, levator ani & coccygeus, ischio-anal fossa, lateral (fascial) ligaments of rectum

Denonvillier's fascia is probably a double layer of peritoneum acting as a major factor in preventing the spread of cancer in either direction
**CONTINENCE**
- Internal sphincter (involuntary)
- External sphincter (voluntary)
- Recto-anal angle (puborectalis)
- Anal cushions & mucosal folds
- Abdominal pressure on upper anterior part of lower rectum

**NOTE:**
Incontinence can be due to overflow around impacted faeces in constipation

Circular muscle becomes the "involuntary internal anal sphincter" which relaxes with moderate pressure form above

Part of the "voluntary external anal sphincter" that reflexly or voluntary relax with high pressure from above

**INTERNAL & EXTERNAL ANAL SPHINCTERS**
- Deep
- Subcutaneous
- Superficial

**NOTE:**
Incontinence can be due to overflow around impacted faeces in constipation
ANAL CANAL - GENERAL

- 4cm long, from pelvic floor (puborectalis) to outside
- Two distinct halves of 2cm separated by dentate (pectinate) line

**Upper half (2cm)**
- 12 anal columns/valves
- 3 cushions
  - Largely insensitive to touch

**Lower half (2cm)**
- Skin
- Sensitive to touch

3 spongy mucosal cushions are in the upper half, at 3, 7 & 11 o'clock. They contain bright red capillary blood.

They help with continence, air tightness & mucus production.

Enlargement leads to haemorrhoids (piles).

**NOTE:** Although they are at the same level as the venous plexuses (which can enlarge in a portosystemic anastomosis) they are quite separate from them.

**UPPER HALF**
- Endoderm origin
- Columnar mucosa
- Columns, valves & cushions
- Autonomic nerves
- Mainly superior rectal artery
- Portal venous drainage
- Para-aortic lymph nodes
- Adenocarcinoma
- Site of haemorrhoids

**LOWER HALF**
- Ectoderm origin
- Squamous mucosa
- Skin
- Somatic nerves
- Mainly inferior rectal artery
- Systemic venous drainage
- Superficial inguinal nodes
- Squamous carcinoma
- No haemorrhoids

Anocutaneous reflex: Touching the skin near the anus (S2,3,4) gives a reflex contraction of the external anal sphincters.