



PIPADOR REVISION

MRCOG Part 1 Revision Notes

The Rectum

ANATOMY • LECTURE 16

VISUAL EXAMINATION REVISION NOTES

2026 Edition

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Lecture 16: The Rectum

Anatomy • Visual revision edition

COLOUR CODE USED THROUGHOUT THESE NOTES

RECTUM	UPPER ⅓	MIDDLE ⅓	LOWER ⅓	PERITONEUM	PUDENDAL
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LEARNING OBJECTIVES — tick off as you go

- ☐ Describe rectal gross anatomy: position, flexures, dimensions.
- ☐ Recognise peritoneal coverings at different levels.
- ☐ Identify the three rectal arteries and their origins.
- ☐ Describe lymphatic drainage above and below the pectinate line.
- ☐ Outline rectal innervation.
- ☐ Apply to rectocele, rectovaginal fistula, OASI and cancer.

1 Overview and Gross Anatomy

IN ONE LINE: The last 12–15 cm of the large bowel: from the rectosigmoid junction (S3) to the anorectal junction — a reservoir that triggers defecation.

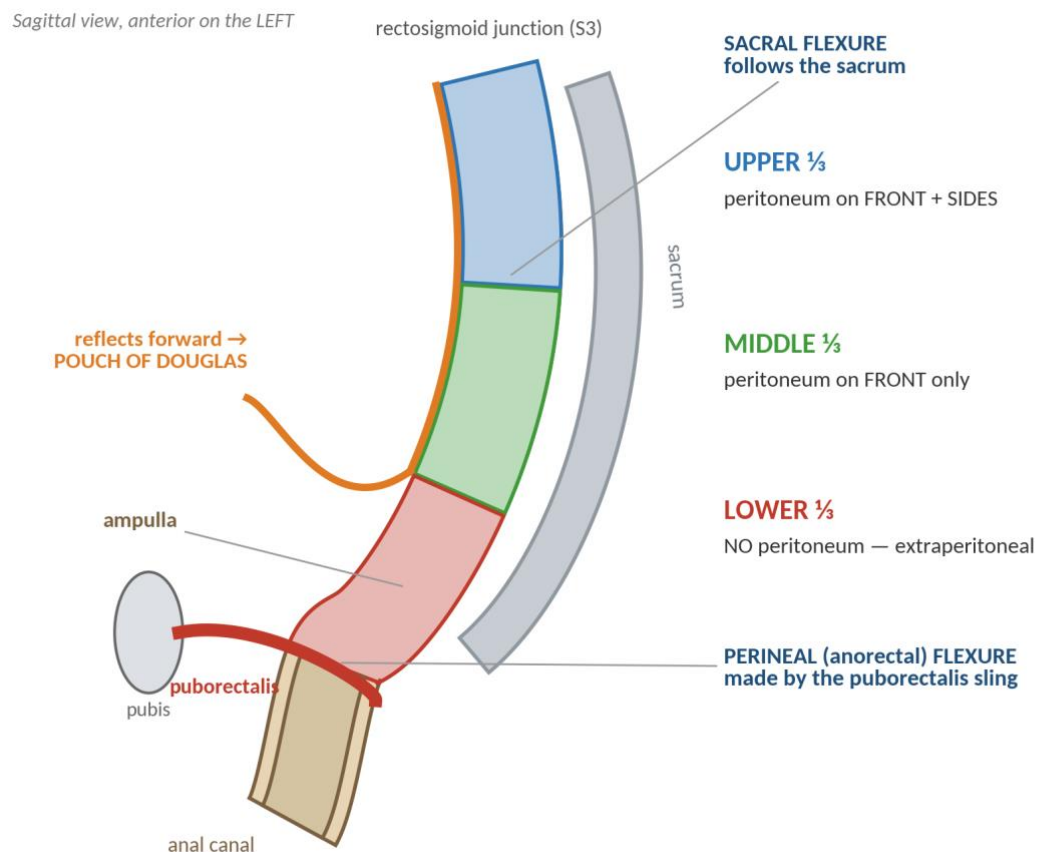


Figure 1. Two AP flexures, three peritoneal zones.

Feature	Key facts
Position	Lesser pelvis, in front of sacrum and coccyx; between sigmoid colon and anal canal
AP flexures	Sacral — follows the sacral curve (concave forwards) • Perineal (anorectal) — sharp backward bend into the anal canal, made by the puborectalis sling
Lateral curves	Three — corresponding to the three valves of Houston
Ampulla	Dilated lower part above the anorectal junction; main faecal reservoir; distension → defecation reflex

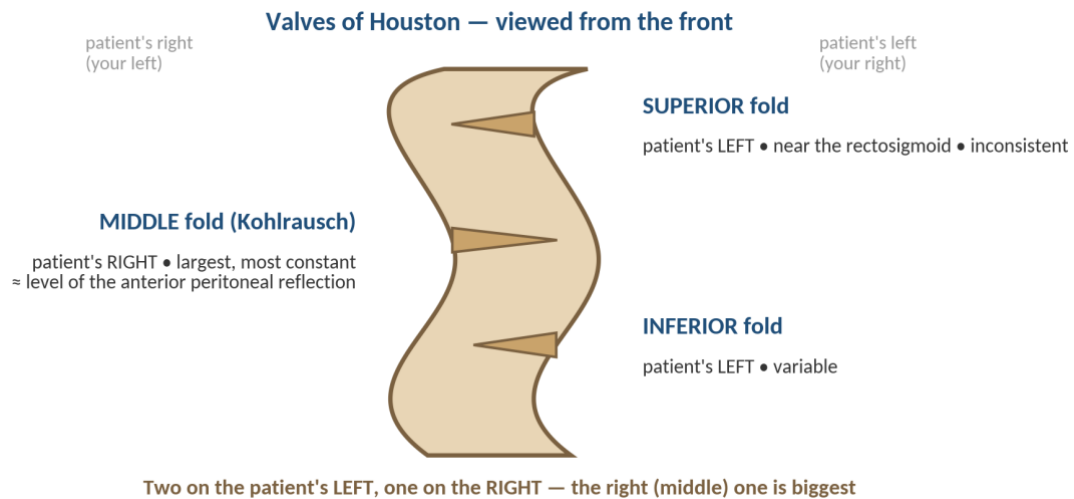
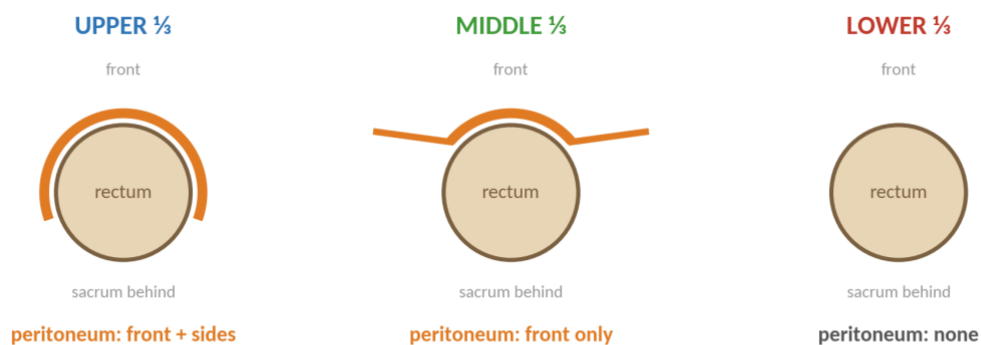


Figure 2. The transverse folds (valves) of Houston.

- Folds contain mucosa, submucosa and only part of the circular muscle — semilunar shelves, not true valves. They slow the descent of faeces and support the faecal mass; the **middle fold** is a sigmoidoscopy landmark.

2 Peritoneal Coverings



Mnemonic: 3 - 1 - 0 (three sides → one side → none), top to bottom

Figure 3. Cross-sections at each level.

MNEMONIC / MEMORY HOOK

3 - 1 - 0 from the top: upper third covered on 3 sides (front + both sides), middle third on 1 (front), lower third on none.

- Peritoneum reflects forward off the middle third to form the **Pouch of Douglas** (rectovesical pouch in the male). The lower rectum is **extraperitoneal**.

3 Relations

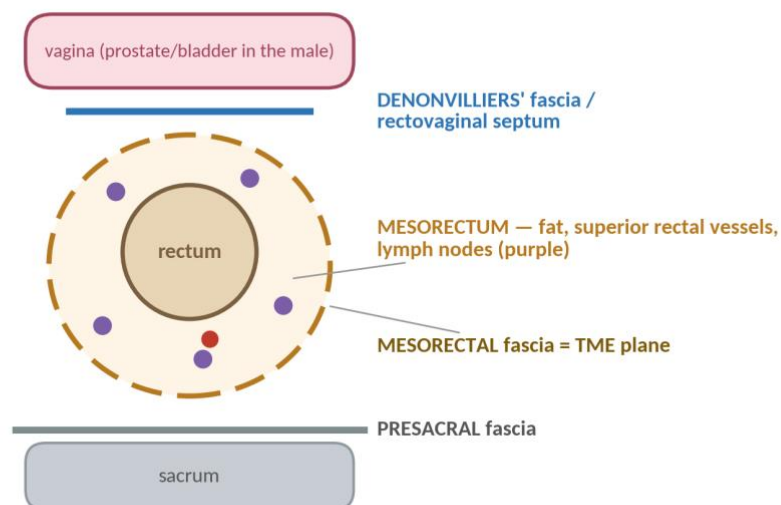
	FEMALE	MALE
Anterior — upper	Small bowel and sigmoid in the Pouch of Douglas	Bladder, bowel coils
Anterior — middle	Posterior vaginal wall — across the Pouch of Douglas above, directly via the rectovaginal septum below	Bladder base, seminal vesicles, vas ampullae, lower ureters, prostate
Anterior — lower	Perineal body, lower vagina	Perineal body

Side	Relations
Posterior	Sacrum, coccyx, median sacral vessels, sympathetic chain, coccygeus, levator ani (piriformis higher up)
Lateral	Sacral plexus, pelvic vessels, uterosacral ligaments (sides of the POD), ureters, pararectal fossae

4 Wall Layers and Fascia

Layer	Detail
1. Mucosa	Simple columnar epithelium with goblet cells; lamina propria; muscularis mucosae
2. Submucosa	Connective tissue; submucosal venous plexus
3. Muscularis externa	Inner circular + outer longitudinal — a continuous longitudinal coat (no taeniae); circular layer thickens below into the internal anal sphincter
4. Serosa / adventitia	Serosa where peritonealised (upper); adventitia below

Axial schematic, anterior at the TOP



TME removes the rectum inside its fascial envelope — sparing the pelvic nerves outside it

Figure 4. The mesorectum and its fascial envelope.

- **Denonvilliers' fascia** lies between rectum and prostate/bladder in the male; the female equivalent is the rectovaginal septum.

- Behind lies the **presacral fascia**; **Waldeyer's (rectosacral) fascia** runs from it to the mesorectal fascia at about S4 (the name is often used loosely for the presacral fascia itself).

5 Blood Supply, Lymphatics and Nerves

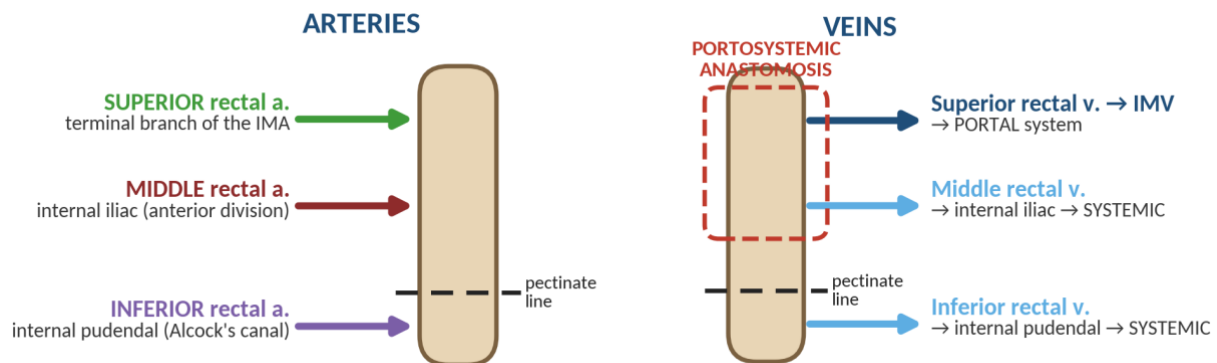


Figure 5. Three arteries in; portal and systemic veins out.

MNEMONIC / MEMORY HOOK

Superior from the gut (IMA → portal); Middle and Inferior from the iliacs (→ systemic). Where they meet = a portosystemic anastomosis.

- Anastomoses are extensive; watershed around the pectinate line. **Internal** venous plexus above the pectinate line (submucosal), **external** below (subcutaneous).

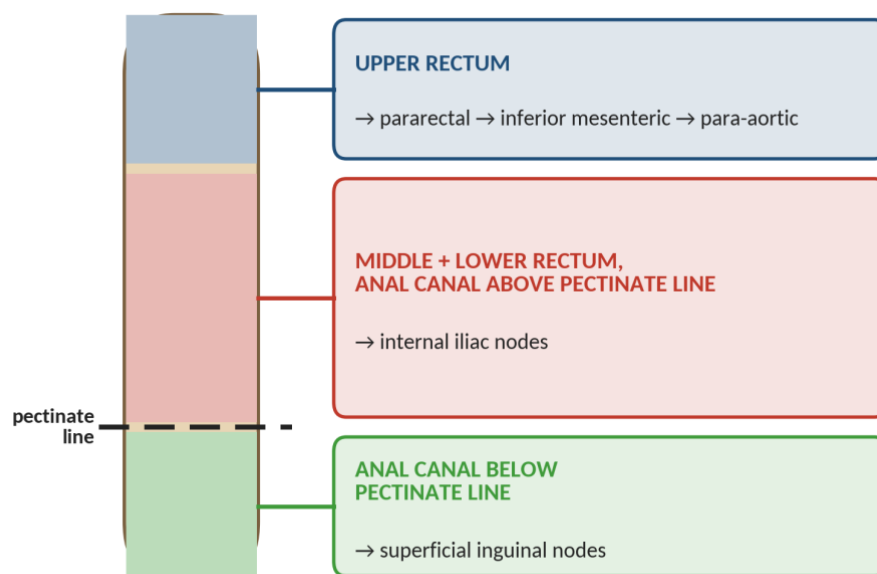


Figure 6. Lymph drainage by level (from Lecture 5).

SYMPATHETIC (T12–L2)

- Via the superior → inferior hypogastric plexuses
- Inhibits peristalsis; contracts the internal anal sphincter

PARASYMPATHETIC (S2–S4)

- Pelvic splanchnic nerves
- Stimulates peristalsis; relaxes the internal sphincter
- Rectal distension afferents travel with them (below the gut pain line)
- Somatic pudendal sensation below the pectinate line

6 Embryology and the Pectinate Line

- Hindgut (endoderm) → **cloaca** → divided by the **urorectal septum** (weeks 4–7) into the **urogenital sinus** in front (bladder, urethra, lower vagina) and the **anorectal canal** behind (rectum, upper anal canal).
- The **anal membrane** separates the anorectal canal from the ectodermal **proctodeum** and ruptures at ~7–8 weeks.

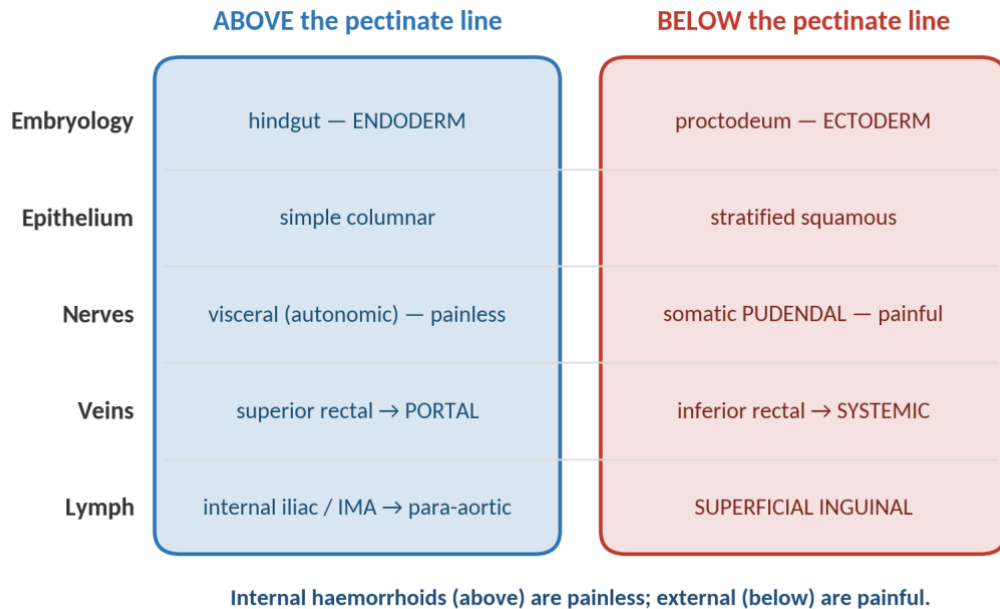


Figure 7. Everything changes at the pectinate (dentate) line.

- Anomalies: imperforate anus (anorectal malformation), cloacal malformations, congenital rectovaginal fistula.

7 Clinical Correlations

RECTOCELE

- Rectum bulges into the posterior vaginal wall — **rectovaginal fascia** defect
- Bulge, incomplete emptying, **digitation**
- PFMT, pessary, posterior colporrhaphy

RECTOVAGINAL FISTULA

- Obstructed/prolonged labour** (commonest worldwide); failed 4th-degree repair
- Hysterectomy, posterior repair, Crohn's, radiation, cancer
- Flatus/faeces per vaginam
- EUA, MRI, endoanal USS; flaps, Martius graft, sphincteroplasty

OASI + ENDOMETRIOSIS

- 3rd/4th-degree tears** — 4th includes rectal mucosa (Lecture 20; RCOG GTG 29)
- DIE of the rectovaginal septum/anterior rectum: dyschezia, cyclical PR bleeding

RECTAL CANCER + HAEMORRHOIDS

- Adenocarcinoma: bowel change, bleeding, tenesmus
- MRI rectum** staging; **TME** ± neoadjuvant chemoradiotherapy
- Haemorrhoids: internal (painless) vs external (painful, thrombose)

EXAM HOOK

PR exam (left lateral or lithotomy): tags, fissures, haemorrhoids, fistulae, blood • tone, masses, **Pouch of Douglas nodules**. Imaging: MRI (cancer staging), endoanal USS (sphincters), CT, colonoscopy, defecating proctography (prolapse/rectocele).

8 MRCOG Exam Pearls — Last-Minute Page

Numbers to know

12–15 cm Length	S3 Rectosigmoid junction	2 AP flexures	3 Valves of Houston
3–1–0 Peritoneal sides by third	3 Rectal arteries	T12–L2 Sympathetic	S2–S4 Parasympathetic

HIGH-YIELD CHECKLIST

- ☐ 12–15 cm, from S3 to the anorectal junction.
- ☐ Sacral flexure + perineal flexure (puborectalis).
- ☐ Three valves of Houston; the middle (patient's right) is largest.
- ☐ Peritoneum: upper ⅓ front + sides; middle ⅓ front; lower ⅓ none.
- ☐ Female anterior relations: Pouch of Douglas → vagina → perineal body.
- ☐ Superior rectal (IMA), middle rectal (internal iliac), inferior rectal (internal pudendal).
- ☐ Superior rectal vein → portal; middle/inferior → systemic — portosystemic anastomosis.
- ☐ Lymph: upper → IMA/para-aortic; middle/lower → internal iliac; anal canal below pectinate → superficial inguinal.
- ☐ Pectinate line: endoderm/ectoderm; columnar/squamous; visceral/somatic; portal/systemic.
- ☐ Cloaca split by the urorectal septum.
- ☐ TME = standard rectal cancer surgery; preserves autonomies.
- ☐ Rectovaginal fistula: obstructed labour worldwide; also surgery, Crohn's, radiation.

Quick-fire self-test — cover the right-hand column

Question	Answer
Which muscle creates the perineal flexure?	Puborectalis
Largest valve of Houston and its side?	Middle — patient's right
Peritoneum on the middle third?	Front only
Which part of the rectum is extraperitoneal?	Lower third
Origin of the superior rectal artery?	Inferior mesenteric artery
Origin of the inferior rectal artery?	Internal pudendal artery
Superior rectal vein drains to...?	Portal system (via IMV)
Lymph from the anal canal below the pectinate line?	Superficial inguinal nodes
Epithelium below the pectinate line?	Stratified squamous

Question	Answer
What divides the cloaca?	Urorectal septum
Commonest cause of rectovaginal fistula worldwide?	Obstructed / prolonged labour

9 References

- Standring S, editor. Gray's Anatomy. 42nd ed. 2020.
- Moore KL et al. Clinically Oriented Anatomy. 8th ed. 2017.
- RCOG Green-top Guideline No. 29. Management of Third- and Fourth-Degree Perineal Tears.