



PIPADOR REVISION

MRCOG Part 1 Revision Notes

The Pelvic Muscles

ANATOMY • LECTURE 2

VISUAL EXAMINATION REVISION NOTES

2026 Edition

MRCOG Part 1 Revision Notes

Lecture 2: The Pelvic Muscles

Anatomy • Visual revision edition

COLOUR CODE USED THROUGHOUT THESE NOTES

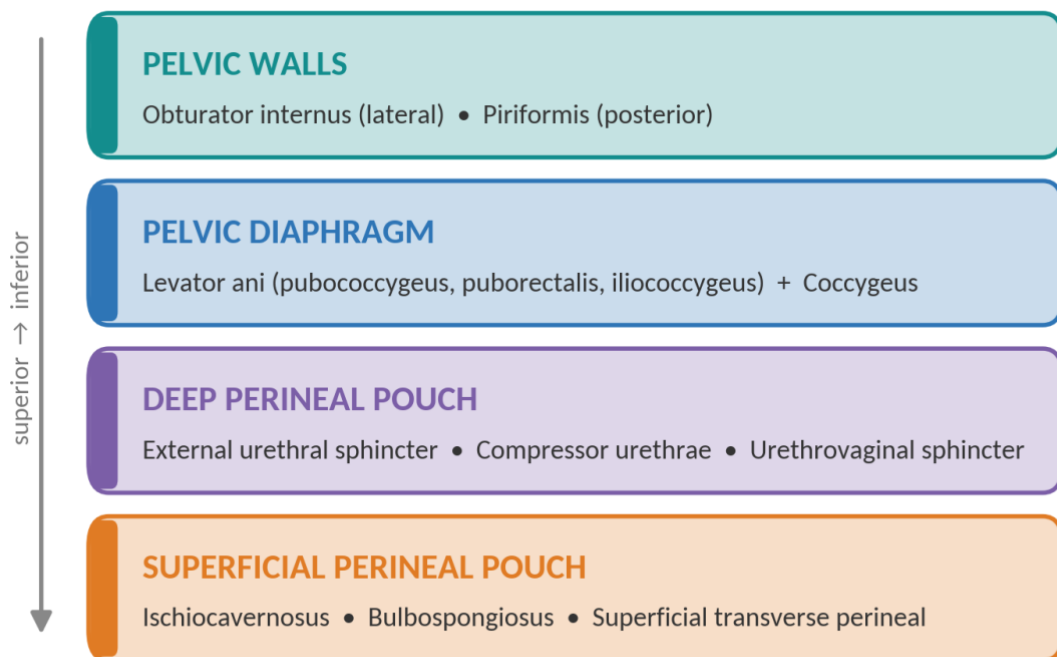
OBTURATOR INT.	PIRIFORMIS	PUBOCOCCYGEUS	PUBORECTALIS	ILIOCOCCYGEUS	COCCYGEUS
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LEARNING OBJECTIVES — tick off as you go

- ☐ Identify the muscles of the pelvic walls (obturator internus, piriformis).
- ☐ Describe the components of levator ani (pubococcygeus, puborectalis, iliococcygeus) and coccygeus.
- ☐ Describe the urogenital triangle muscles.
- ☐ Identify the perineal body.
- ☐ Recognise innervation and function of pelvic floor muscles.
- ☐ Apply knowledge to pelvic organ prolapse and pelvic floor disorders.

1 Overview — Four Layers

IN ONE LINE: Walls line the sides and back; the pelvic diaphragm closes the outlet; the perineal pouches sit beneath it.



Perineal pouches covered in Lectures 18–19

Figure 1. The pelvic muscles as stacked layers, superior to inferior.

Together these muscles form a structural and functional support system for the pelvic viscera — **maintaining continence** and **supporting the birth canal**.

2 Muscles of the Pelvic Walls

MNEMONIC / MEMORY HOOK

O is on the Outside, P is at the Posterior: Obturator internus = lateral wall • Piriformis = posterior wall

	OBTURATOR INTERNUS	PIRIFORMIS
Wall	Lateral	Posterior
Origin	Obturator membrane + pelvic surface of obturator foramen (ischium and pubis)	Anterior sacrum (S2–S4) + superior margin of greater sciatic notch
Course	Tendon exits via lesser sciatic foramen , turning 90° around the lesser sciatic notch	Passes through greater sciatic foramen , dividing it into supra- and infrapiriform parts
Insertion	Greater trochanter	Greater trochanter
Nerve	Nerve to obturator internus (L5, S1, S2)	Sacral plexus (S1, S2 ± S3)
Action	Lateral rotation of extended thigh; abduction of flexed thigh; stabilises hip	Lateral rotation of extended thigh; abduction of flexed thigh
Clinical	Its fascia gives rise to the tendinous arch of levator ani (origin of iliococcygeus)	Key landmark in greater sciatic foramen; piriformis syndrome (sciatic nerve irritation)

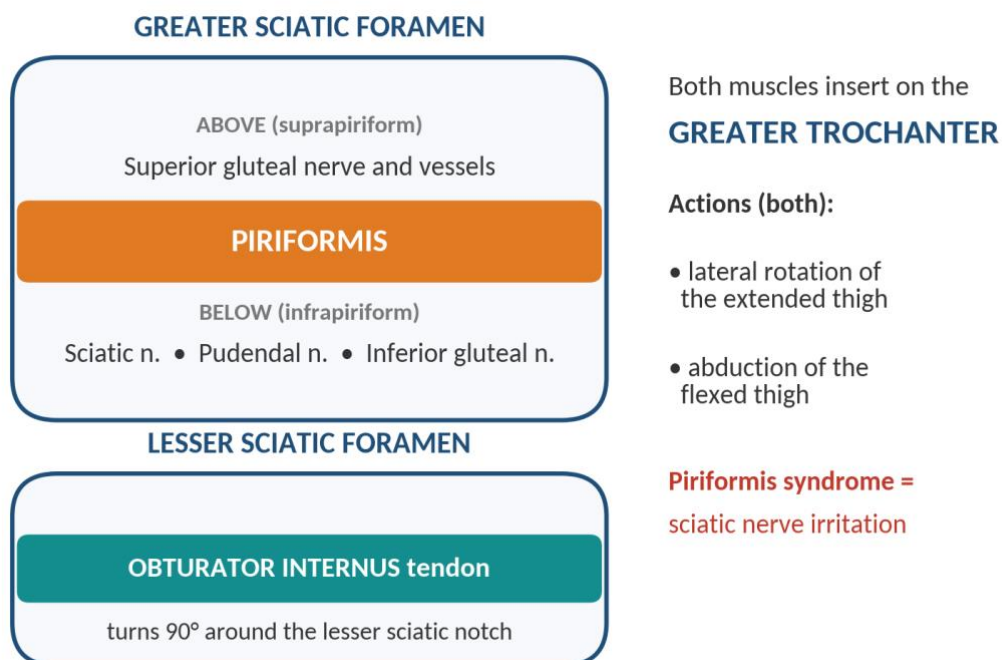
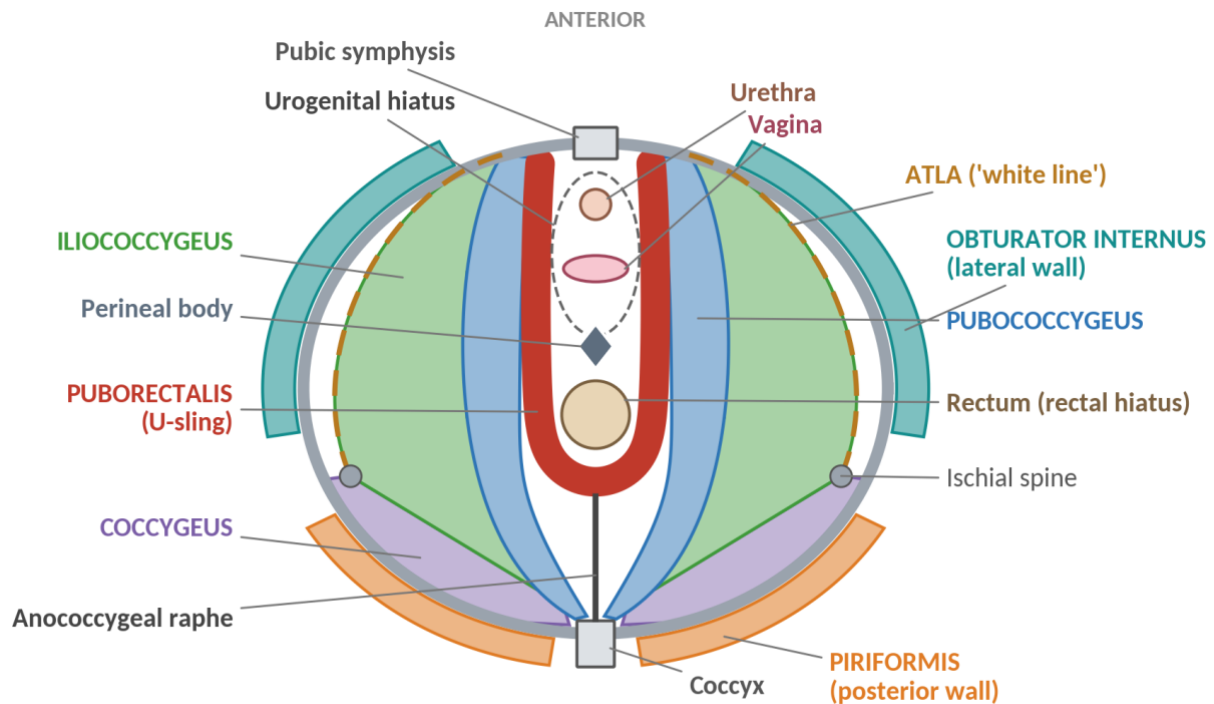


Figure 2. Piriformis is the 'gatekeeper' of the greater sciatic foramen; obturator internus uses the lesser.

3 The Pelvic Floor (Pelvic Diaphragm)

IN ONE LINE: A muscular hammock closing the pelvic outlet: **PELVIC DIAPHRAGM = LEVATOR ANI + COCCYGEUS.**



Pelvic floor viewed from above (schematic, not to scale). Levator ani = pubococcygeus + puborectalis + iliococcygeus.

Figure 3. The pelvic floor from above — every muscle in its colour. Learn this map first.

Six functions

SUPPORT	CONTINENCE	PRESSURE	SPHINCTERS	EXPULSION	SEXUAL
Bladder, uterus, rectum	Urinary and faecal	Counters cough, lifting	Around urethra, vagina, anus	Defecation, micturition, parturition	Sexual function

4 Levator Ani

IN ONE LINE: A broad, thin sheet of three (sometimes four) named parts blending into one continuous muscle.

Origin — a continuous line from front to back:

1 Pubic body anteriorly	2 Tendinous arch (ATLA) along obturator fascia — the 'white line'	3 Ischial spine posteriorly
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MNEMONIC / MEMORY HOOK

The name is the map: PUBO-COCYGEUS runs pubis → coccyx • PUBO-RECTALIS runs pubis → around the rectum • ILIO-COCYGEUS runs 'ilium' (the white line on the side wall) → coccyx.

4.1 Components

Component	Origin	Insertion	Function
Pubococcygeus	Body of pubis	Coccyx, perineal body, anococcygeal raphe	Main support of pelvic floor
Puborectalis	Body of pubis	U-shaped sling around anorectal junction	Anorectal angle; faecal continence ; voluntary control

Component	Origin	Insertion	Function
Iliococcygeus	ATLA (obturator fascia) + ischial spine	Coccyx and anococcygeal raphe	Supports pelvic floor (postero-lateral)
Pubovaginalis (female)	Body of pubis	Lateral vaginal walls (and perineal body)	Female-specific; vaginal canal support

4.2 Each part in three lines

PUBOCOCCYGEUS — the main portion

- Some fibres surround the urethra (**pubourethralis**) and sling the vagina (**pubovaginalis**)
- Passes back to perineal body, anococcygeal raphe and coccyx
- Primary support for pelvic viscera

PUBORECTALIS — the sling

- U-shaped loop around the anorectal junction
- Holds the **anorectal angle** ~80–100°
- Relaxes in defecation to straighten the angle; key to voluntary continence

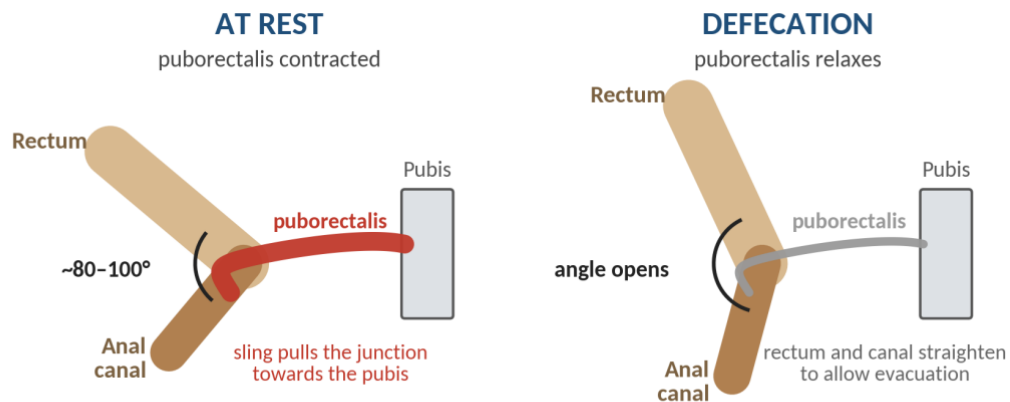
ILIOCOCCYGEUS — the back

- Arises from the ATLA ('white line') and ischial spine
- Forms the posterior part of levator ani
- Inserts into coccyx and anococcygeal raphe; postero-lateral support

THE TWO HIATUSES — the weak spots

- **Urogenital hiatus** (anterior): urethra + vagina
- **Rectal hiatus** (posterior): rectum
- Areas of potential weakness — **site of prolapse**

4.3 Puborectalis and the anorectal angle



Sagittal view, anterior to the right (schematic)

Figure 4. Puborectalis holds the anorectal angle at rest and relaxes to straighten it for defecation.

4.4 Innervation — a dual supply

FROM ABOVE (pelvic surface)

Direct branches of **S3, S4** (sometimes S5) — nerve to levator ani

FROM BELOW (perineal surface)

Pudendal nerve (S2–S4), perineal branch

CLINICAL LINK

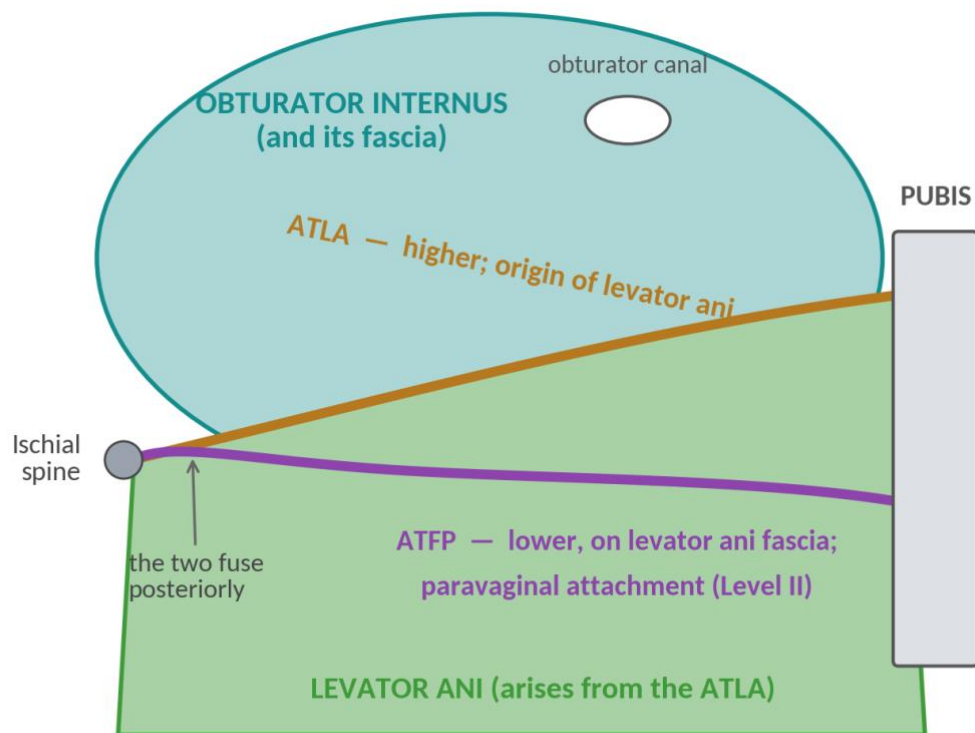
Mixed innervation matters for **pudendal nerve injury** and continence.

5 Coccygeus (Ischiococcygeus)

IN ONE LINE: Triangular muscle behind levator ani, lying on the deep surface of the sacrospinous ligament.

Feature	Detail
Origin	Ischial spine
Insertion	Lateral coccyx and inferior sacrum
Relation	Deep surface of the sacrospinous ligament — often considered one fibromuscular layer with it
Nerve	Branches of S4, S5
Action	Supports pelvic floor posteriorly; pulls coccyx forward after defecation / childbirth

6 Two Tendinous Arches — Don't Mix Them Up



Medial view of the right pelvic sidewall (schematic). Anterior to the right.

Figure 5. Both arches run from pubis to ischial spine; the ATFP lies below the ATLA and the two fuse posteriorly.

	ATLA — arcus tendineus levator ani	ATFP — arcus tendineus fasciae pelvis
What it is	Thickening of the obturator internus fascia	Thickening of the fascia on the pelvic (superior) surface of levator ani
Runs	Pubic body → ischial spine	Back of lower pubis → ischial spine
Position	Higher	Lower — the two fuse posteriorly near the spine

	ATLA — arcus tendineus levator ani	ATFP — arcus tendineus fasciae pelvis
Job	Origin of levator ani (iliococcygeus)	Paravaginal attachments — DeLancey Level II
If damaged	—	Paravaginal defect → cystocele

EXAM HOOK

'White line' is used for both in different texts — in paravaginal repair it means the **ATFP**. State which arch you mean.

7 Functional Anatomy — Levator Plate and DeLancey

- The **levator plate** is the horizontal portion of levator ani — the platform the pelvic organs rest on.
- Levator **tone keeps the urogenital hiatus closed**.
- Levator defects (e.g. **avulsion in childbirth**) widen the hiatus → **prolapse**.

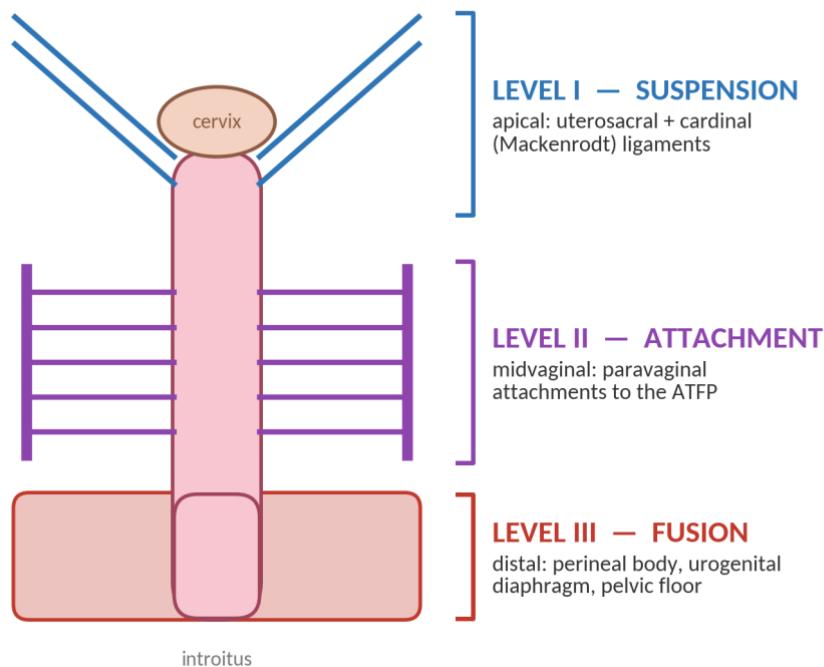


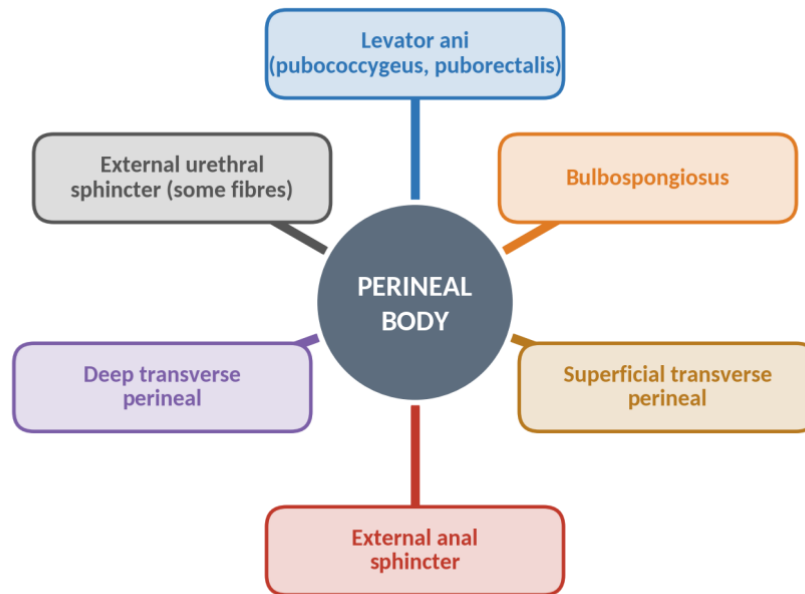
Figure 6. DeLancey's three levels of vaginal support.

MNEMONIC / MEMORY HOOK

DeLancey from the top down: SUSPEND → ATTACH → FUSE (Level I apical, Level II midvaginal, Level III distal)

8 Perineal Body (Central Perineal Tendon)

IN ONE LINE: *The anchor point of the perineum — six muscles meet here.*



Pyramidal fibromuscular mass between vagina and anus — the junction of the urogenital and anal triangles

Figure 7. Muscles attaching to the perineal body.

- Pyramidal fibromuscular mass in the midline between **vagina and anus** (females) or rectum and bulb of penis (males).
- Lies at the junction of the **urogenital and anal triangles**; vital for support and continence.

CLINICAL LINK

Damaged in **3rd/4th degree tears**, episiotomy or chronic strain — **repair must reconstruct the perineal body**.

9 Perineal Pouches (Brief — see Lectures 18–19)

DEEP PERINEAL POUCH	SUPERFICIAL PERINEAL POUCH
• External urethral sphincter (striated) • Deep transverse perineal (males) • Compressor urethrae (female) • Urethrovaginal sphincter (female) <i>Older name 'urogenital diaphragm'; lies below levator ani in the anterior perineum; adds support.</i>	• Ischiocavernosus • Bulbospongiosus • Superficial transverse perineal

10 Sphincter Mechanisms

	URINARY	ANAL
Internal (smooth, involuntary)	At bladder neck; sympathetic (T11–L2)	Continuation of rectal smooth muscle; involuntary
External (striated, voluntary)	In deep perineal pouch; puddental (S2–S4)	Subcutaneous, superficial and deep parts; puddental (inferior rectal branch)
Levator ani help	Pubourethralis fibres add support	Puborectalis maintains the anorectal angle

MNEMONIC / MEMORY HOOK

Internal = Involuntary (smooth muscle, autonomic) • **External = Extra control** (striated, pudendal, voluntary)

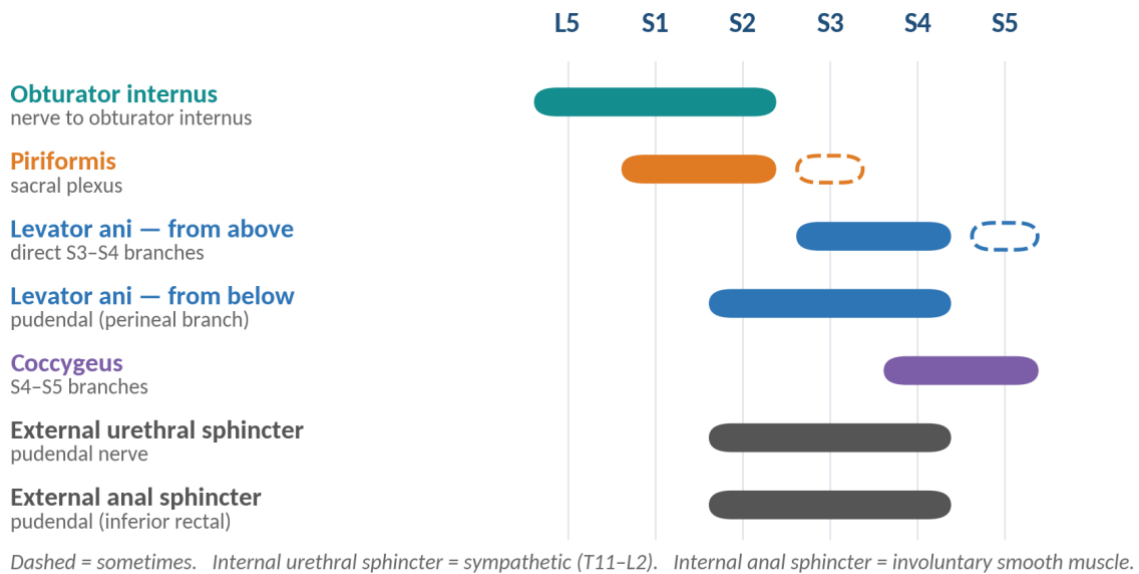
Nerve roots at a glance

Figure 8. Root values for every muscle in this lecture.

MNEMONIC / MEMORY HOOK

'S2, 3, 4 keeps the pelvic floor off the floor' — the pudendal nerve (S2–S4) supplies both external sphincters and levator ani from below.

11 Clinical Correlations**PELVIC ORGAN PROLAPSE**

- Weak or defective levator ani support
- **Levator avulsion** (puborectalis torn from pubis) in vaginal birth, especially forceps / large head
- MRI or 3D-USS identifies defects
- **PFMT** (Kegel) strengthens levator ani

URINARY INCONTINENCE

- **Stress UI**: incompetent urethral closure; weak pelvic floor
- **PFMT first-line** for stress UI (NICE NG123)

FAECAL INCONTINENCE

- Anal sphincter injury (**OASI**)
- Puborectalis dysfunction → loss of anorectal angle
- Pelvic floor physiotherapy with biofeedback

PELVIC PAIN

- Levator ani spasm / hypertonic pelvic floor
- Trigger points in pelvic floor muscles
- Pelvic floor physiotherapy

CHILDBIRTH INJURY

- Stretching, tearing or avulsion of levator ani
- Risks: **prolonged second stage, instrumental (esp. forceps), macrosomia**
- Long term: prolapse, incontinence

PELVIC FLOOR SURGERY

- Mesh procedures largely **paused in UK since 2018**
- Native tissue: colporrhaphy, **sacrospinous fixation**, sacrocolpopexy
- Needs sound pelvic muscle anatomy

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Numbers to know

80–100° Anorectal angle at rest	S3–S4 Levator ani direct supply	S2–S4 Pudendal nerve	S4–S5 Coccygeus
L5–S2 Obturator internus	T11–L2 Internal urethral sphincter	3 (+1) Levator parts (+ pubovaginalis ♀)	2018 UK mesh pause

HIGH-YIELD CHECKLIST

- ☐ Pelvic walls: obturator internus (lateral), piriformis (posterior).
- ☐ Pelvic diaphragm = levator ani + coccygeus.
- ☐ Levator ani: pubococcygeus, puborectalis, iliococcygeus (+ pubovaginalis in females).
- ☐ Puborectalis: U-sling around anorectal junction; maintains anorectal angle for faecal continence.
- ☐ Levator ani innervation: direct S3–S4 branches + pudendal nerve.
- ☐ ATLA ('white line'): thickening of obturator fascia; origin of iliococcygeus.
- ☐ ATRP: paravaginal support (DeLancey Level II); damage → paravaginal defect → cystocele.
- ☐ Coccygeus: ischial spine → coccyx/sacrum; deep to sacrospinous ligament.
- ☐ Perineal body: attachment for levator ani, bulbospongiosus, transverse perineals, external anal sphincter.
- ☐ Urogenital and rectal hiatuses = gaps in levator ani.
- ☐ DeLancey: I apical (uterosacral/cardinal), II midvaginal (ATRP), III distal (perineal body).
- ☐ PFMT first-line for stress urinary incontinence.

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

Question	Answer
Which muscle forms the lateral pelvic wall?	Obturator internus
Through which foramen does the obturator internus tendon leave the pelvis?	Lesser sciatic foramen
What two muscles make up the pelvic diaphragm?	Levator ani + coccygeus
Which part of levator ani maintains the anorectal angle?	Puborectalis
What is the normal resting anorectal angle?	~80–100°
Iliococcygeus arises from which structure?	ATLA (tendinous arch of levator ani) + ischial spine
Damage to the ATRP produces which defect?	Paravaginal defect → cystocele

Question	Answer
Which DeLancey level do the uterosacral–cardinal ligaments provide?	Level I (apical suspension)
Coccygeus lies on the deep surface of which ligament?	Sacrospinous
Nerve roots of the pudendal nerve?	S2–S4
First-line treatment for stress urinary incontinence (NICE NG123)?	Pelvic floor muscle training

13 References

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