



PIPADOR REVISION

MRCOG Part 1 Revision Notes

Anatomy of the Breast

ANATOMY • LECTURE 31

VISUAL EXAMINATION REVISION NOTES

2026 Edition

MRCOG Part 1 Revision Notes

Lecture 31: Anatomy of the Breast

Anatomy • Visual revision edition

COLOUR CODE USED THROUGHOUT THESE NOTES

GLAND / DUCTS	ARTERIES	LYMPHATICS	HORMONES	EMBRYOLOGY
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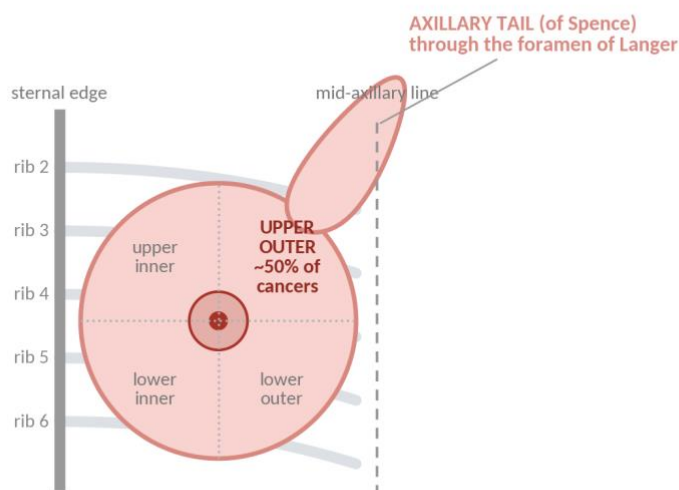
LEARNING OBJECTIVES — tick off as you go

- ☐ Describe the position, extent and structure of the breast.
- ☐ Explain the milk line and its anomalies.
- ☐ Describe the blood supply and venous drainage.
- ☐ Describe lymph drainage, the axillary node groups and Berg levels.
- ☐ Explain the hormonal control of breast development and lactation.
- ☐ Apply to cancer spread, mastitis, galactorrhoea and breast disease in pregnancy.

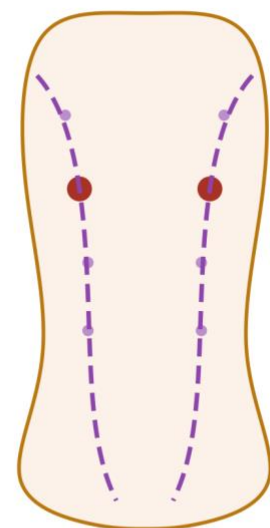
1 Position and Development

IN ONE LINE: A modified apocrine sweat gland (ectoderm) in the superficial fascia of the chest wall — ribs 2 to 6, sternal edge to mid-axillary line.

Extent: ribs 2–6, sternal edge → mid-axillary line
(LEFT breast, front view)



The MILK LINE



axilla → groin • leftover tissue =
POLYTHELIA (extra nipples, ~1–2%)
or POLYMASTIA (extra breast tissue)

Figure 1. Where the breast lies — and where extra breast tissue can appear.

Feature	Detail
Extent	Ribs 2–6; sternal edge → mid-axillary line; axillary tail of Spence through the foramen of Langer

Feature	Detail
Bed	Pectoral fascia over pectoralis major (upper $\frac{2}{3}$); serratus anterior and external oblique (lower $\frac{1}{3}$)
Nipple	~4th intercostal space, mid-clavicular line (nulliparous; varies after pregnancy)
Quadrants	Upper outer holds the most tissue — about half of cancers

THE MILK LINE

- Ectodermal ridge from axilla to groin; only the thoracic part persists
- **Polythelia** (extra nipples, ~1–2%) and **polymastia** (extra tissue) — may swell in pregnancy
- **Amastia / athelia** — rare; linked to **Poland syndrome** (absent pectoralis major)

PUBERTY

- Male and female breasts identical until puberty
- **Oestrogen** → duct growth
- **Progesterone** (with cyclical oestrogen) → lobulo-alveolar development

2 Structure

Breast — sagittal section (schematic)

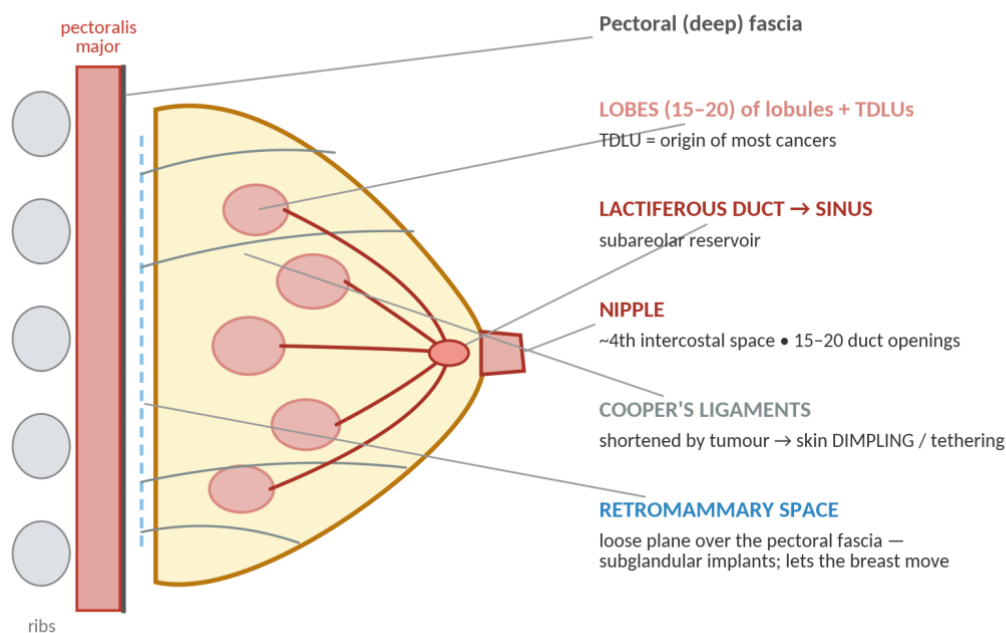


Figure 2. Inside the breast.

Component	Detail
Lobes (15–20)	Each drains by one lactiferous duct → lactiferous sinus (subareolar reservoir) → nipple
Lobules / TDLUs	Clusters of alveoli; terminal duct–lobular unit = origin of most cancers and fibrocystic change
Alveolus	Secretory epithelium wrapped in contractile myoepithelial cells (oxytocin target)

Component	Detail
Stroma	Fat (dominant after the menopause) and fibrous tissue; Cooper's ligaments from skin to pectoral fascia
Nipple + areola	Nipple: smooth muscle, duct openings, sympathetic supply. Areola: Montgomery's glands (tubercles) — lubricating, antibacterial
Retromammary space	Loose plane between the breast and the pectoral fascia — subglandular implants; posterior spread of abscess

EXAM HOOK

Dimpling / tethering = tumour shortening **Cooper's ligaments**. **Peau d'orange** = **dermal lymphatic obstruction** (skin oedema pitted by hair follicles) — e.g. inflammatory cancer. Two different mechanisms.

3 Blood Supply and Nerves

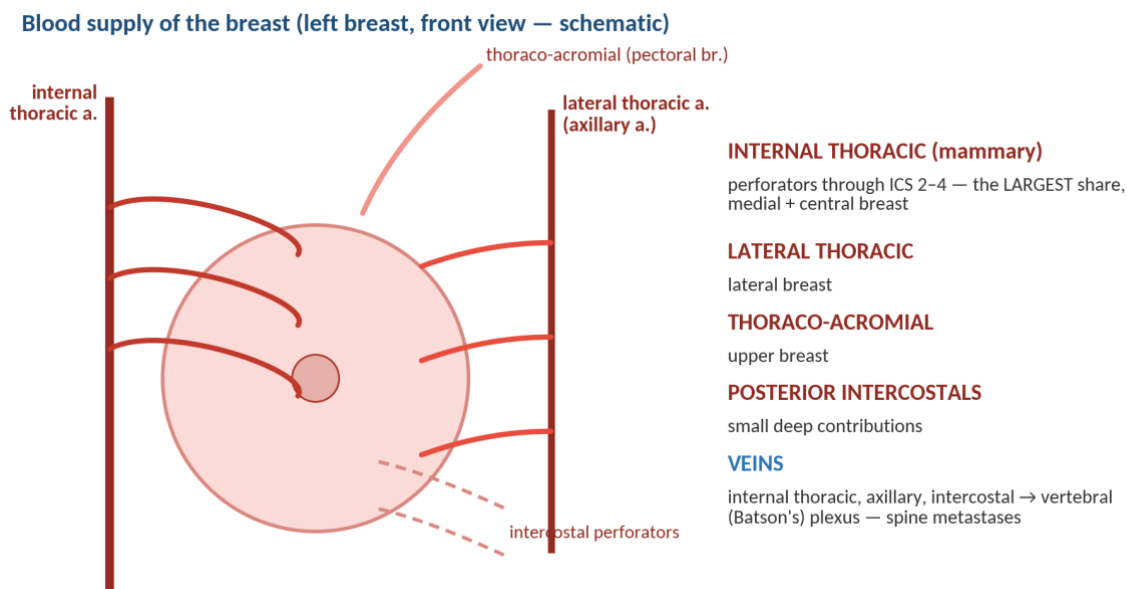


Figure 3. Arterial supply of the breast.

- Veins follow the arteries to the **internal thoracic**, **axillary** and **intercostal** veins; intercostal veins link to the valveless **vertebral (Batson's) plexus** — a route for spinal metastases.
- **Nerves**: anterior and lateral cutaneous branches of **intercostal nerves T4–T6**; the nipple is **T4**. Sympathetic fibres only (vessels, nipple smooth muscle) — **no parasympathetic supply**; milk ejection is hormonal.

4 Lymphatic Drainage

Route	Drains	Share
Axillary nodes	Most of the breast, especially lateral/upper outer	~75%
Internal thoracic (parasternal)	Medial breast and deep tissue	Most of the rest
Posterior intercostal nodes	Deep tissue near the chest wall	Small
Across the midline / rectus sheath	To the other breast; subdiaphragmatic nodes and liver	Occasional

Axillary nodes — Berg levels are defined by PECTORALIS MINOR

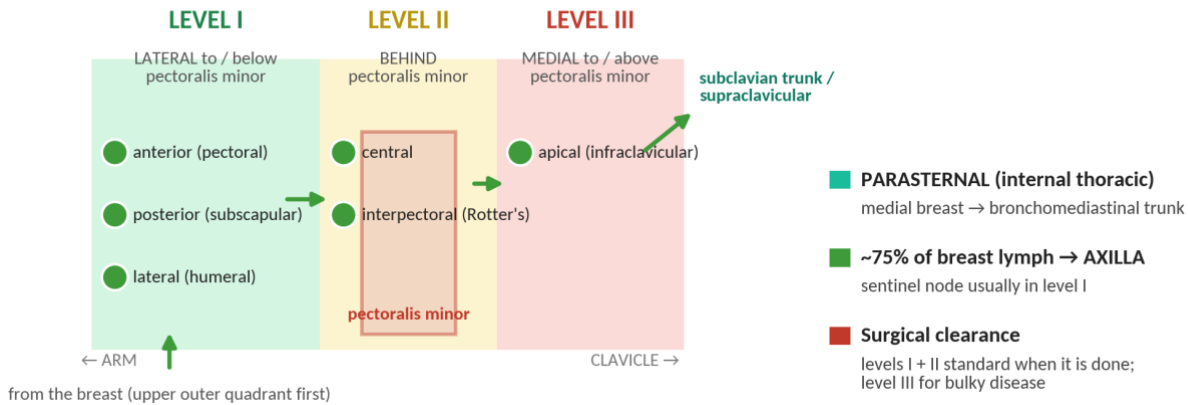


Figure 4. Axillary node groups and Berg levels.

MNEMONIC / MEMORY HOOK

Berg levels follow PECTORALIS MINOR: I = lateral/below, II = behind, III = medial/above. Five groups: **A P L C A** — Anterior, Posterior, Lateral, Central, Apical — lymph flows towards the apex.

SENTINEL NODE BIOPSY

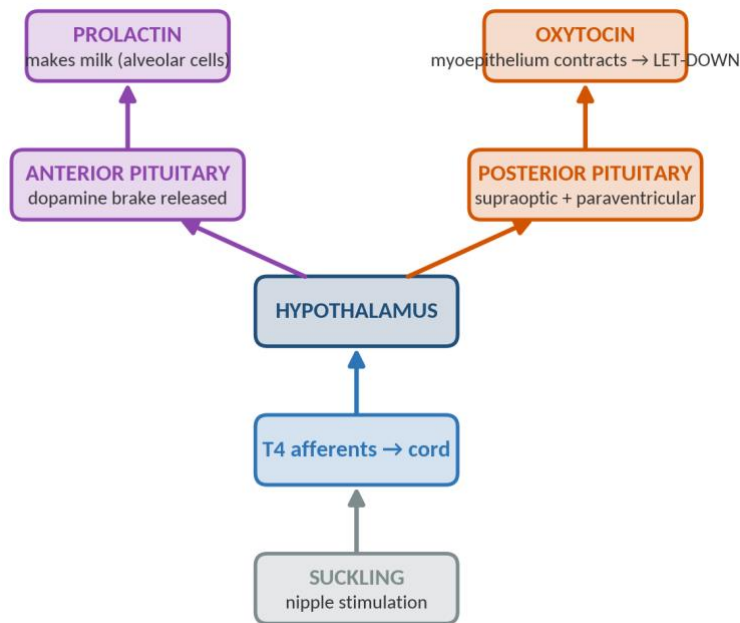
- Radioisotope (technetium-99m colloid) ± blue dye, injected around the tumour or areola
- Gamma probe + visual identification
- Negative → no axillary clearance: less **lymphoedema** and shoulder morbidity

IF THE SENTINEL NODE IS POSITIVE

- Traditionally: axillary clearance of **levels I + II** (III for bulky disease)
- Now often **no further surgery** for limited nodal disease treated with breast conservation + radiotherapy, or **axillary radiotherapy** instead (Z0011, AMAROS)
- Lymphoedema after clearance ~**15–20%**, higher with radiotherapy

5 Hormones, Pregnancy and Lactation

Phase	Changes
Menstrual cycle	Luteal swelling and nodularity (oestrogen + progesterone) — examine days 7–10 of the cycle
Pregnancy	Ductal + alveolar proliferation (oestrogen, progesterone, prolactin, hPL); larger, heavier; darker, wider areola; prominent Montgomery's tubercles; visible veins (Haller's network); colostrum from mid-pregnancy but full lactation held back by progesterone
After delivery	Placenta out → progesterone falls → prolactin acts → milk
Involution	After lactation and the menopause, glands replaced by fat — mammograms easier to read

**Why milk comes AFTER delivery:**

- colostrum is made from mid-pregnancy
- high placental PROGESTERONE blocks full lactation
- placenta out → progesterone falls → prolactin acts unopposed
- no parasympathetic supply: let-down is hormonal (oxytocin)

Figure 5. The suckling reflex.

MNEMONIC / MEMORY HOOK

Prolactin PRODUCES; Oxytocin OUTPUTS (let-down). Anterior pituitary makes; posterior pituitary pushes.

6 Clinical Correlations

CANCER SPREAD + STAGING

- **Nodal status = strongest prognostic factor**
- N1 mobile level I/II • N2 fixed I/II or internal mammary alone • N3 infraclavicular (III), supraclavicular, or internal mammary + axillary
- **Inflammatory cancer:** dermal lymphatics, peau d'orange, redness
- **Paget's of the nipple:** eczematous nipple — underlying ductal cancer

PREGNANCY + LACTATION

- **Pregnancy-associated breast cancer** ~1 in 3000; diagnosed late — ultrasound first
- **Mastitis:** *Staph. aureus* via cracked nipple — antibiotics, **keep feeding/emptying**; drain an abscess
- **Galactorrhoea:** raised prolactin — pituitary adenoma, antipsychotics, hypothyroidism

7 MRCOG Exam Pearls — Last-Minute Page

Numbers to know

2–6 Ribs	4th ICS Nipple	15–20 Lobes / ducts	~75% Lymph to axilla
3 Berg levels	5 Axillary node groups	T4 Nipple dermatome	~50% Cancers in upper outer quadrant

HIGH-YIELD CHECKLIST

- ☐ Modified apocrine sweat gland; ribs 2–6; axillary tail; nipple at the 4th ICS.
- ☐ Milk line axilla → groin: polythelia, polymastia; Poland syndrome.
- ☐ 15–20 lobes → lactiferous ducts and sinuses; TDLU = cancer origin.
- ☐ Cooper's ligaments → dimpling; dermal lymphatic block → peau d'orange.
- ☐ Arteries: internal thoracic (largest, ICS 2–4), lateral thoracic, thoraco-acromial, intercostals.
- ☐ Veins → Batson's plexus → spinal metastases.
- ☐ Lymph: ~75% axillary; medial → parasternal. Berg levels relative to pectoralis minor.
- ☐ Sentinel node biopsy; clearance of I + II only when needed.
- ☐ Nerves T4–T6; nipple T4; no parasympathetic supply.
- ☐ Prolactin makes milk (anterior pituitary); oxytocin ejects it (posterior).
- ☐ Progesterone blocks lactation until the placenta is delivered.
- ☐ Mastitis: keep feeding; PABC ~1 in 3000.

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

Question	Answer
Vertical extent of the breast?	Ribs 2–6
What is the axillary tail of Spence?	Breast tissue passing into the axilla through the foramen of Langer
Where do most breast cancers arise?	Terminal duct–lobular unit
What causes skin dimpling?	Tumour shortening Cooper's ligaments
Largest arterial supply to the breast?	Internal thoracic (perforators, ICS 2–4)
Where does most breast lymph drain?	Axillary nodes (~75%)
Berg level II nodes lie where?	Behind pectoralis minor
Dermatome of the nipple?	T4
Hormone for milk let-down?	Oxytocin (posterior pituitary)
Why no full lactation before delivery?	High placental progesterone
Advice for lactational mastitis?	Antibiotics and keep feeding/emptying the breast

8 References

- Standring S, editor. Gray's Anatomy. 42nd ed. 2020.
- Moore KL et al. Clinically Oriented Anatomy. 8th ed. 2017.
- NICE NG101. Early and locally advanced breast cancer: diagnosis and management. 2018 (updated).