1e. Streeshroni (Female Pelvis) -Types, Diameters and Obstetric significance

(e) Strīśroṇi (Female Pelvis) — Types, Diameters, and Obstetric Significance

Learning objectives

By the end of this chapter you will be able to:

1. describe the bony female pelvis and the planes used in obstetrics; 2) list and define the standard diameters of **inlet, mid-pelvis and outlet** with their average values; 3) explain the **Caldwell–Moloy** pelvis types and their **obstetric implications**; 4) apply the knowledge to clinical pelvimetry, labour mechanics and cephalopelvic disproportion (CPD).

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1) Classical anchor and context

Although numerical pelvimetry is a modern development, Suśruta places anatomy on a firm footing of **direct observation**:

> शरीरे चैव शास्त्रे च दृष्टार्थः स्याद् विशारदः ।
> दृष्टश्रुताभ्यां सन्देहमवापोह्याचरेत् क्रियाः ॥
> *(Suśruta Saṃhitā, Śārīrasthāna 5/51)*

This spirit underlies obstetric pelvimetry: **see, measure, and act**—while respecting pelvic marma-kṣetra (e.g., **basti, guda, vaṅkṣaṇa, kukundara, kaṭikāṭaruṇa**), which are clinically close to the obstetric field. (Suśruta, Śārīrasthāna 6.)

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2) Overview of the female bony pelvis

Female Pelvis Region 3D model

The bony pelvis consists of **two hip bones, sacrum and coccyx**. The **pelvic brim (linea terminalis)** separates the **false (greater) pelvis** above from the **true (lesser) pelvis** below; the **pelvic inlet** is the entrance to the obstetric canal. The inlet's shape varies with pelvis type and governs the **engagement** of the fetal head.

Planes used in obstetrics

- **Pelvic inlet (superior strait)**
- **Mid-pelvis** (plane of least dimensions)—at the level of **ischial spines**
- **Pelvic outlet (inferior strait)**—bounded by the pubic arch anteriorly and the tip of coccyx posteriorly; functionally widens as the coccyx moves backward in second stage.

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3) Pelvic diameters — definitions, average values, and how to remember them

3.1 Pelvic inlet (what decides engagement)

- **Anteroposterior diameters ("conjugates")**
  - **True (anatomical) conjugate:** promontory → upper border of symphysis; **~11.0 cm**.
  - **Obstetric conjugate:** promontory → *nearest point* on posterior symphysis; **~10.5 cm**; **smallest A-P of**

inlet and the real limiting diameter for the fetal head.
    - **Diagonal conjugate:** promontory → lower border of symphysis; **~12.5–13 cm**; **clinically palpable**, used to estimate the obstetric conjugate (subtract ~1.5–2 cm).
- **Transverse diameter:** widest distance between ilipectineal lines; **~13 cm** (largest inlet diameter).
- **Oblique diameters:** from sacroiliac joint on one side to opposite iliopubic eminence; **~12 cm**; **head commonly presents in an oblique**.

Clinical pearl: If the **obstetric conjugate <10 cm** or **transverse <12 cm**, the inlet is considered contracted and risk of CPD rises.

3.2 Mid-pelvis (plane of least dimensions)

- **Interspinous (transverse) diameter:** between ischial spines; **~10.5 cm** on average; **limiting diameter** of the mid-pelvis and often of the whole pelvis—should be **>10 cm**.
- **A-P diameter at mid-pelvis: ~11.5 cm**.

Clinical pearl: Prominent spines or a straight sacrum reduce the effective mid-pelvic space and predispose to **deep transverse arrest**.

3.3 Pelvic outlet (what decides delivery of head/shoulders)

- **Transverse (intertuberous/bituberous) diameter:** inner aspects of ischial tuberosities; **~11 cm**.
- **A-P outlet:**
    - **Anatomical** (coccyx tip → lower border of symphysis): **~11 cm**.
    - **Obstetric** (sacral tip → lower border of symphysis *with coccygeal recession*): **~13 cm** in second stage.

Remember: "**Inlet 13-12-10.5** (Trans-Oblique-Obstetric), **Mid 10.5-11.5** (T-AP), **Outlet 11-13** (T-AP obstetric)."

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4) How we measure—clinical pelvimetry essentials

- **Diagonal conjugate** is measured vaginally from the **sacral promontory** to the **lower edge of the symphysis**; subtract **1.5–2 cm** to estimate the **obstetric conjugate**.
- **Ischial spines** (4 and 8 o'clock) mark the mid-plane; **station 0** is at the spines. Interspinous narrowing suggests **mid-pelvic contraction**.
- **Outlet**: the **subpubic angle**, **intertuberous distance**, and **coccygeal mobility** are assessed clinically; the outlet rarely limits labour unless markedly reduced.

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5) Caldwell–Moloy pelvis types—features and obstetric significance

NB: Most pelves are **mixed**; classification is still useful for anticipating mechanisms and potential dystocia.

5.1 Gynecoid (classic female)

- **Inlet**: rounded/oval, **transverse ≥ AP**; **wide subpubic arch**; non-prominent spines; well-curved sacrum.
- **Labour**: **favourable**—engagement usually transverse → internal rotation to **OA** (occiput anterior) and normal descent.

5.2 Android (masculine)

- **Inlet**: **heart-shaped**, posterior segment narrow; **convergent sidewalls**; **prominent spines**; narrow arch.
- **Labour**: **CPD**, **deep transverse arrest**, persistent OP more likely; higher operative delivery rates.

5.3 Anthropoid

- **Inlet**: **AP > transverse** (long oval); sacrum long; arch comparatively narrow.
- **Labour**: engagement often **OA or OP**; **OP deliveries** occur more often, but vaginal birth is frequently possible.

5.4 Platypelloid

- **Inlet**: **wide transverse, reduced AP** (flattened); shallow cavity; wide arch.
- **Labour**: **late engagement**, **asynclitism** and **transverse arrest** more frequent.

Epidemiologically, classical series reported roughly **gynoid ~41%, android ~32%, anthropoid ~24%, platypelloid ~3%**, with wide ethnic variability; remember that real-world pelves are often **intermediate**.

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6) Why diameters and types matter — obstetric significance

1. **Engagement** (inlet): With a well-flexed head, the **suboccipito-bregmatic diameter (9.5 cm)** must negotiate the **obstetric conjugate (~10.5 cm)** and **transverse (~13 cm)**. Inlet contraction (e.g., severe platypelloid) delays or prevents engagement till labour.
2. **Descent & rotation** (mid-pelvis): The **interspinous diameter (~10.5 cm)** is the **functional bottleneck**. Narrow interspinous or straight sacrum predisposes to **arrest at +1 to +2 station** with **OT/OP** positions (deep transverse arrest).
3. **Expulsion** (outlet): A narrow **intertuberous (~11 cm)** or rigid coccyx impedes delivery of the head/shoulders; however, **coccygeal recession** increases **AP outlet to ~13 cm** during the second stage.
4. **Trial of labour vs. pelvimetry**: Radiologic pelvimetry has limited indications; **a careful clinical trial of labour** remains definitive for functionality of the pelvis.

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7) Tables you can reproduce in the exam

7.1 Planes and diameters (with average values)

Plane	A-P (cm)	Transverse (cm)	Oblique (cm)	Notes
Inlet	**Obstetric ~10.5**; **True ~11.0**; **Diagonal ~12.5–13**	**~13.0**	**~12.0**	Obstetric conjugate is the **limiting A-P**; head engages usually in **oblique**.
Mid-pelvis	**~11.5**	**Interspinous ~10.5**	—	**Plane of least dimensions**; spines are key landmark.
Outlet	**Anatomical ~11; Obstetric ~13**	**Intertuberous ~11**	—	Coccyx moves back in 2nd stage → A-P increases.

7.2 Caldwell–Moloy types

Type	Inlet shape	Pelvic walls & spines	Subpubic arch	Labour tendency
Gynecoid	Round/oval (T ≥ AP)	Non-convergent; spines not prominent	Wide	**Favourable**; OA rotation and vaginal birth likely.
Android	Heart-shaped	Convergent; **spines prominent**	Narrow	**OP/OT**, deep transverse arrest, operative delivery.
Anthropoid	AP-oval (AP > T)	Straight walls	Narrow-moderate	**OP** more frequent; often still vaginal.
Platypelloid	Flat, T wide, AP short	Shallow cavity	Wide	**Late/asynclitic engagement**, transverse arrest.

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8) Applied obstetrics — how to use this at the bedside

- **At term antenatal visits**: if the head remains **high and floating** in a primigravida, consider **inlet disproportion**; check **diagonal conjugate** clinically and reassess progress in early labour.
- **In labour**: persistent **OT** with slow descent → think **mid-pelvic limitation/interspinous narrow**; optimise **flexion** and **rotation** (maternal positioning, oxytocin when appropriate).
- **Second stage**: delayed head delivery with adequate descent but **tight perineum**—remember the outlet mostly adapts (coccygeal recession), but **narrow intertuberous** may still impede shoulders; use **McRoberts + suprapubic pressure** if shoulder dystocia occurs (after standard sequence).
- **Decision-making**: Pelvimetry numbers guide thinking, but **trial of labour** is the true test of pelvic adequacy in most cases.

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9) Integration with Āyurveda

- **Strīśroṇi** functionally houses the **apatyapatha** and **garbhāśaya**. Classical learning emphasises **direct observation and cautious procedures** around pelvic marma; modern obstetrics concretises this with measurements and planes. Quote **Su. Śā. 5/51** (above) to justify the centrality of anatomy before intervention.
- **Marma caution**: procedures near **basti** (suprapubic), **guda/perineum**, **vaṅkṣaṇa** (inguinal) should respect vital structures—mapping neatly onto modern concerns of bladder, urethra, rectum, neurovascular bundles.

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10) High-yield revision bullets

- **Inlet**: obstetric conjugate **10.5 cm**, **transverse 13 cm**, **oblique 12 cm**. **Diagonal conjugate** is the measurable proxy.
- **Mid-pelvis**: **interspinous 10.5 cm** (key bottleneck); **AP 11.5 cm**.
- **Outlet**: **intertuberous 11 cm**, **AP anatomical 11 cm → obstetric 13 cm** with coccygeal recoil.
- **Types**: **Gynecoid** best; **Android → OT/OP** and arrest; **Anthropoid → OP** deliveries; **Platypelloid → late/asynclitic engagement**.
- **Function beats form**: **clinical trial of labour** trumps static imaging for most decisions.

Self-assessment

A) Short Answer Questions (60–80 words each)

1. Define **obstetric conjugate**, **true conjugate** and **diagonal conjugate**. How do you estimate the obstetric conjugate clinically?
2. List the **diameters of the mid-pelvis** and explain their obstetric importance.
3. Tabulate the **four Caldwell–Moloy pelvis types** with one obstetric implication each.
4. Write a short note on the **pelvic outlet** diameters and how they change in second stage of labour.
5. Explain the significance of **ischial spines** for clinical pelvimetry and fetal **station**.

B) Long Answer Questions (10 marks)

1. Describe the **planes and diameters** of the female pelvis with average values and clinical methods of assessment. Add a note on **contracted pelvis** and **trial of labour**.
2. Discuss the **Caldwell–Moloy classification** of pelvis, correlating each type with **mechanisms of labour**, common **malpositions** and likely **interventions**.

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C) MCQs (single best answer)

1. The **smallest A-P diameter** of the pelvic **inlet** is:
   A) True conjugate B) **Obstetric conjugate** C) Diagonal conjugate D) External conjugate. **Ans: B**.
2. The **limiting diameter of the mid-pelvis** is usually:
   A) AP diameter B) **Interspinous diameter** C) Intertuberous D) Oblique. **Ans: B**.
3. In a **platypelloid** pelvis, labour commonly shows:
   A) Easy OA rotation B) **Late engagement/asynclitism** C) Brow presentation D) Compound presentation. **Ans: B**.
4. The **intertuberous** diameter (outlet transverse) in an average pelvis is about:
   A) 9 cm B) **11 cm** C) 13 cm D) 15 cm. **Ans: B**.
5. **Diagonal conjugate** is measured from:
   A) Sacral promontory to **lower** border of symphysis B) Promontory to upper border C) Promontory to posterior symphyseal surface D) PSIS to pubic symphysis. **Ans: A**.

References

Classical

- **Suśruta Saṃhitā**, Śārīrasthāna 5/51 emphasising direct anatomical study before clinical action. National Institute of Indian Medical Heritage **e-Samhita** portal.
- **Suśruta Saṃhitā**, Śārīrasthāna 6 — Marma-vibhāga (regional marmas relevant to pelvis/perineum: **basti, guda, vaṅkṣaṇa, kukundara, kaṭikāṭaruṇa**, etc.).

Modern & standard academic sources

- **StatPearls (NCBI Bookshelf)** — *Anatomy, Abdomen and Pelvis, Pelvic Inlet*: inlet diameters (true/obstetric/diagonal conjugates; transverse, oblique), Caldwell–Moloy overview and typical proportions.
- **Gabbe's Obstetrics: Normal and Problem Pregnancies** (chapter: Normal Labor and Delivery) — planes (inlet, mid-pelvis, outlet), interspinous as limiting diameter, average mid-pelvic diameters, and clinical pelvimetry protocol.
- **GFMER (WHO-collaborating training resource)** — outlet diameters: intertuberous (~11 cm); AP anatomical (~11 cm) vs obstetric (~13 cm with coccygeal recession).
- **ScienceDirect Topic – Pelvimetry** — obstetric conjugate and inlet considerations.
- **Recent imaging review (CT-based)** — descriptive features of pelvis types and obstetric relevance.

30-second recap

- **Inlet:** obstetric conjugate **10.5 cm**, transverse **13 cm**, oblique **12 cm**; **diagonal conjugate** measured clinically.
- **Mid-pelvis: interspinous 10.5 cm** (key limiter).
- **Outlet: intertuberous 11 cm**; **AP increases to 13 cm** in second stage.
- **Types:** Gynecoid best; Android → **OT/OP**; Anthropoid → **OP** often; Platypelloid → **late/asynclitic**.
- **Clinically:** trial of labour decides functional adequacy.