

# 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:

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).

# 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 दृष्टार्थ: स्याद् विशारद: । दृष्टभुताभ्यां सन्देहमवापोद्याचरेत् क्रिया: ॥ (Suśruta Samhitā, 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.)

# 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.

# 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

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- **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)."

# 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.

# 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.

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## 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**.

# 6) Why diameters and types matter — obstetric significance

- 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.
- 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.

# 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 <b>limiting A-P</b> ; head engages usually in <b>oblique</b> .	
Mid-pelvis ~11.5		Interspinous ~10.5 $-$		<b>Plane of least dimensions</b> ; 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

Туре	Inlet shape	Pelvic walls & spines	Subpubic arch	<b>Labour tendency</b>
Gynecoid	Round/oval (T $\geq$ AP)	Non-convergent; spines not prominent	Wide	<b>Favourable</b> ; OA rotation and vaginal birth likely.
Android	Heart-shaped	Convergent; spines prominent	Narrow	<b>OP/OT</b> , deep transverse arrest, operative delivery.
Anthropoid	AP-oval (AP $>$ T)	Straight walls	Narrow-moderate	<b>OP</b> 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

# 9) Integration with Ayurveda

- Strīśroni 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, vankṣaṇa (inguinal) should respect vital structures—mapping neatly onto modern concerns of bladder, urethra, rectum, neurovascular bundles.

# 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**.
- 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 Samhitā, Śārīrasthāna 6 Marma-vibhāga (regional marmas relevant to pelvis/perineum: basti, guda, vankṣana, kukundara, kaṭikāṭaruna, 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.

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