

ANATOMIC RELATIONS OF FETAL SKULL AND MATERNAL PELVIS IN LABOUR

OBJECTIVES

- Understand the principles of diagnosis of CPD and be able to appreciate the landmarks in;
 - POPP
 - Brow presentation and why vaginal delivery is impossible
 - Face presentation and why mento-posterior position usually leads to caesarean delivery whereas mento-anterior position usually leads to vaginal delivery.
- **IMPORTANT WORDS:-** Bregma, Occiput, Mentum, Glabella parietal eminences and Vertex

PLAN

- Fetal skull bones, sutures and fontanelles.
- Fetal skull diameters
- Maternal pelvic bones and joints
- Caldwell – Moly classification of pelvic types
- Abnormalities of the pelvis
- Normal pelvic diameters
- Pelvimetry

FETAL SKULL BONES

- Fetal skull is made up of the **vault, face and base**
- The vault bones are not fused at birth to allow molding during labor.
- The **vault** consists of two **parietal** bones, two **frontal** bones, two **temporal** and one **occipital** bone.
- The **anterior fontanalle** is between the **sagital ,frontal** and **coronal** sutures. It closes about 18 months after delivery.
- The **posterior fontanalle** is between the **sagital** and **lambdoid** sutures. It closes soon after birth.

IMPORTANT LANDMARKS OF FETAL SKULL

- The **BREGMA** – at the anterior fontanalle
- The **VERTEX** – area between parietal eminences, posterior and anterior fontanalle
- The **GLABELLA** – the root of the nose
- The **MENTUM** – the chin

MEAN FETAL SKULL DIAMETERS AT TERM

(i) VERTICAL DIAMETERS

A **suboccipito bregmatic** = **9.5cm**

in well flexed vertex presentation

B **suboccipito-frontal** = **10cm**

inadequately flexed vertex presentation

C **Occipito frontal** = **11.5cm**

from glabella to posterior fontanelle in persistent occipito posterior position

D **Mento vertex** = **13cm**

in brow presentation

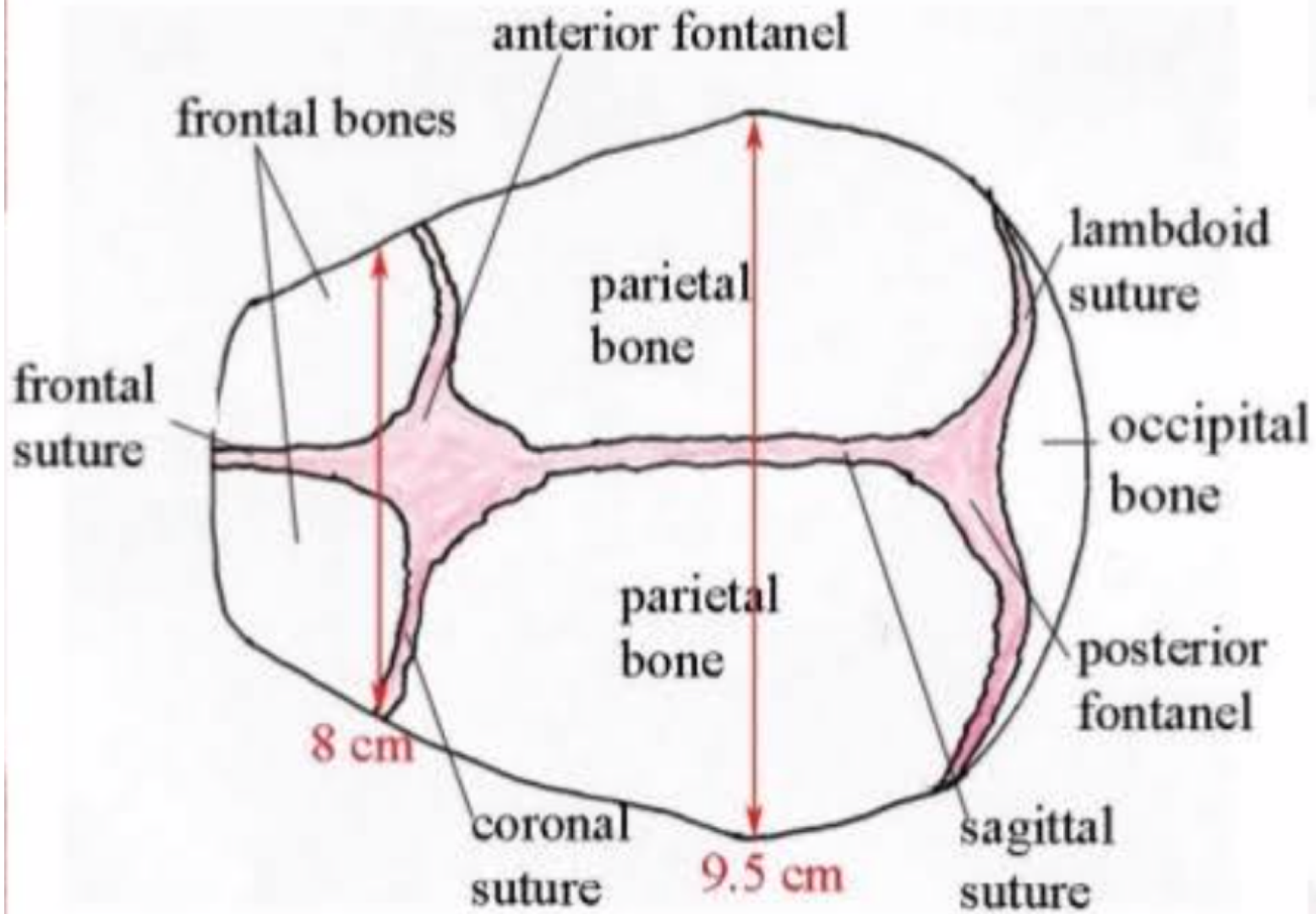
E **Submento bregmatic** = **9.5cm**

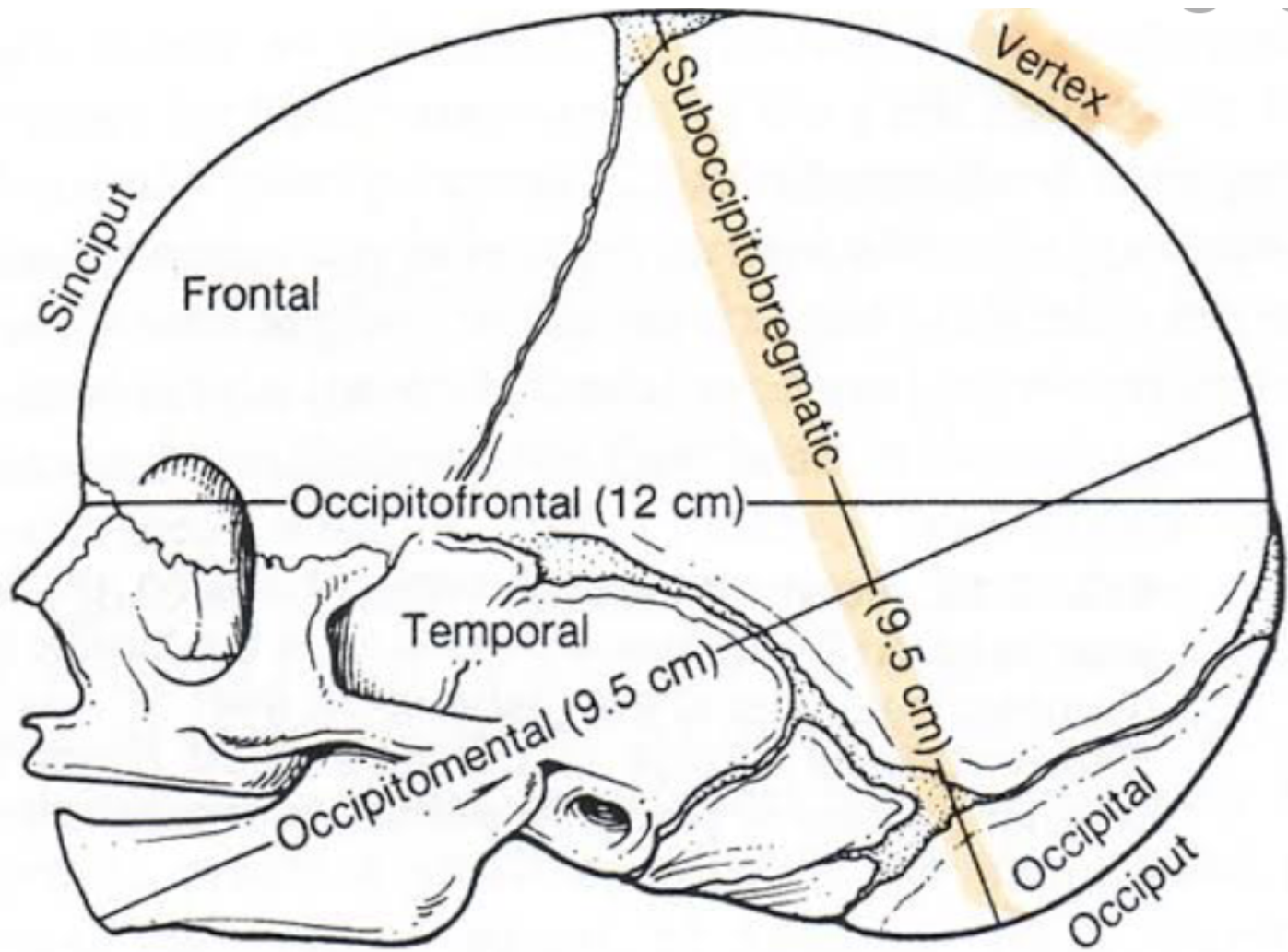
in fully extended with face presentation.

usually with mento-anterior position.

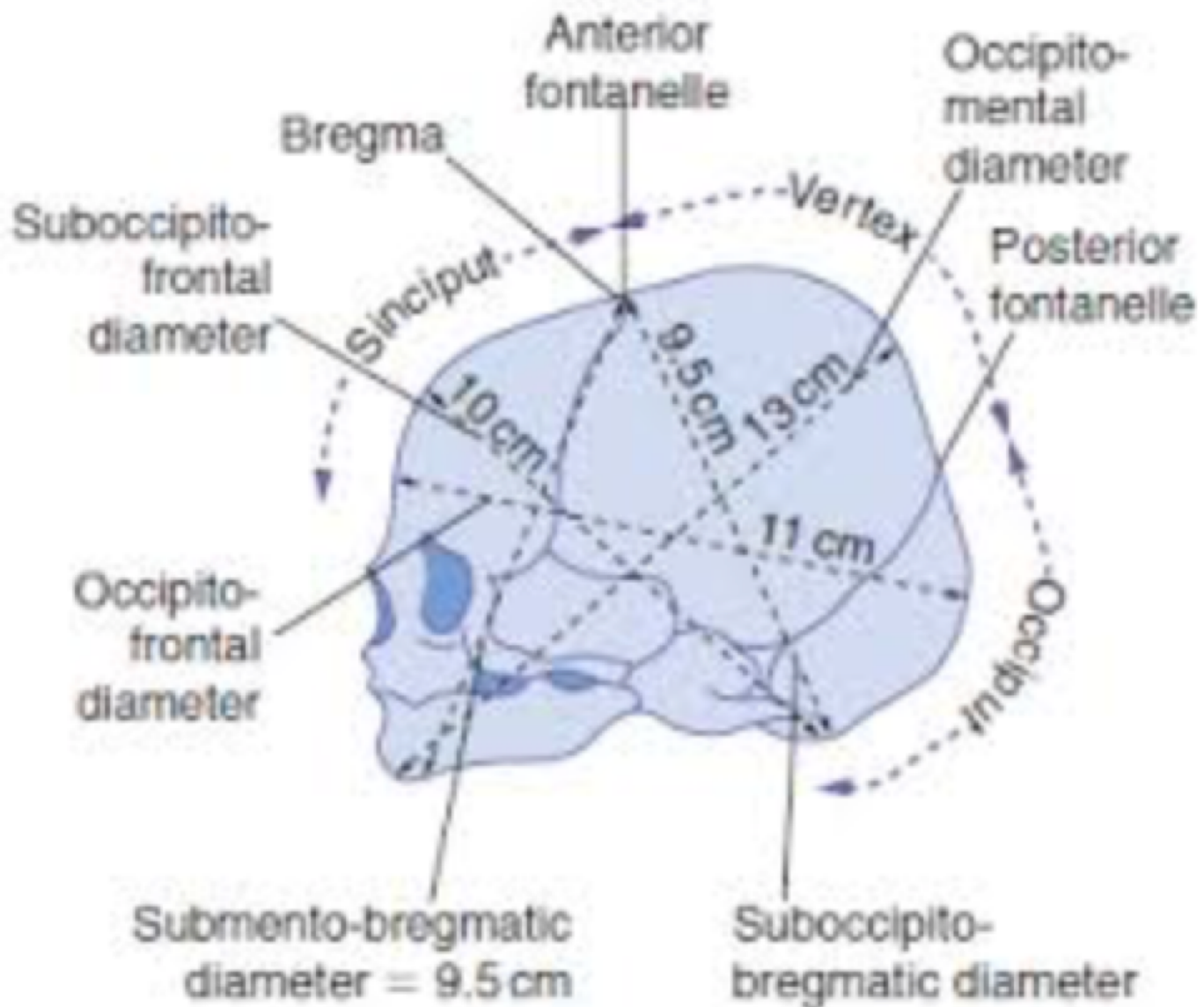
(ii) TRANSVERSE DIAMETER:

A **Biparietal diameter(BPD)** = 9.5cm





A





CIRCUMFERENCE OF FETAL HEAD

- A In the plane of suboccipito- bregmatic diameter = **29cm**
The smallest and most suitable for vaginal delivery.

- B In the plane of mentovertical diameter
(brow presentation) = **38cm.**
The largest, vaginal delivery is impossible

Diameters:

• SOB = 9.5 cm

• SOF = 10 cm

• OF = 11.5 cm

• MV = 14 cm

• SMV = 11.5 cm

• SMB = 9.5 cm

VERTEX

BROW

FACE

Complete flexion

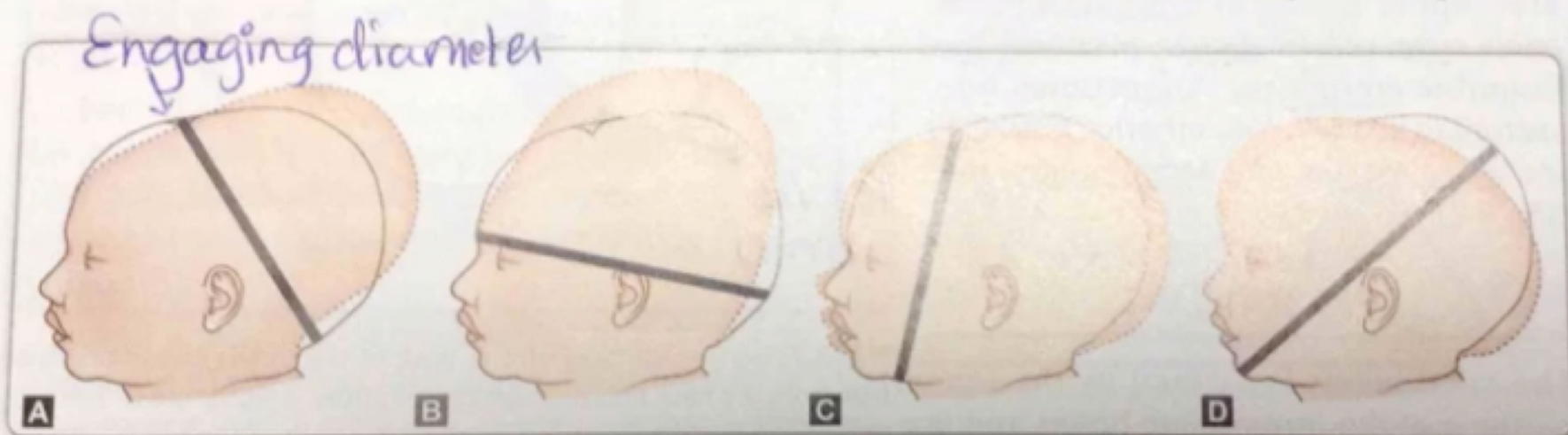
Incomplete flexion

Masked deflexion

Partial extn.

Incomplete extn.

Complete extn.



Figs 9.5A to D: Types of molding in cephalic presentations (shown by dotted line): (A) Vertex presentation with well flexed head; (B) Vertex presentation with deflexed head (sugar loaf head); (C) Face presentation; (D) Brow presentation

MATERNAL PELVIC BONES AND JOINTS

- ❑ The pelvis consists of 4 parts
 - Sacrum
 - Coccyx
 - 2 Innominate bones
- ❑ Each innominate bone consists of the pubis, ilium and ischium.
- ❑ The bones are joined anteriorly at the pubic symphysis by the **fibrocartilaginous** joint that allows relaxation in pregnancy under hormonal influence
- ❑ Posteriorly, two sacroiliac joints which are **synovial** (diarthroidial joints).
- ❑ The sacro-coccygeal joint allows free coccygeal movements.

THE PELVIS

Is in two parts;

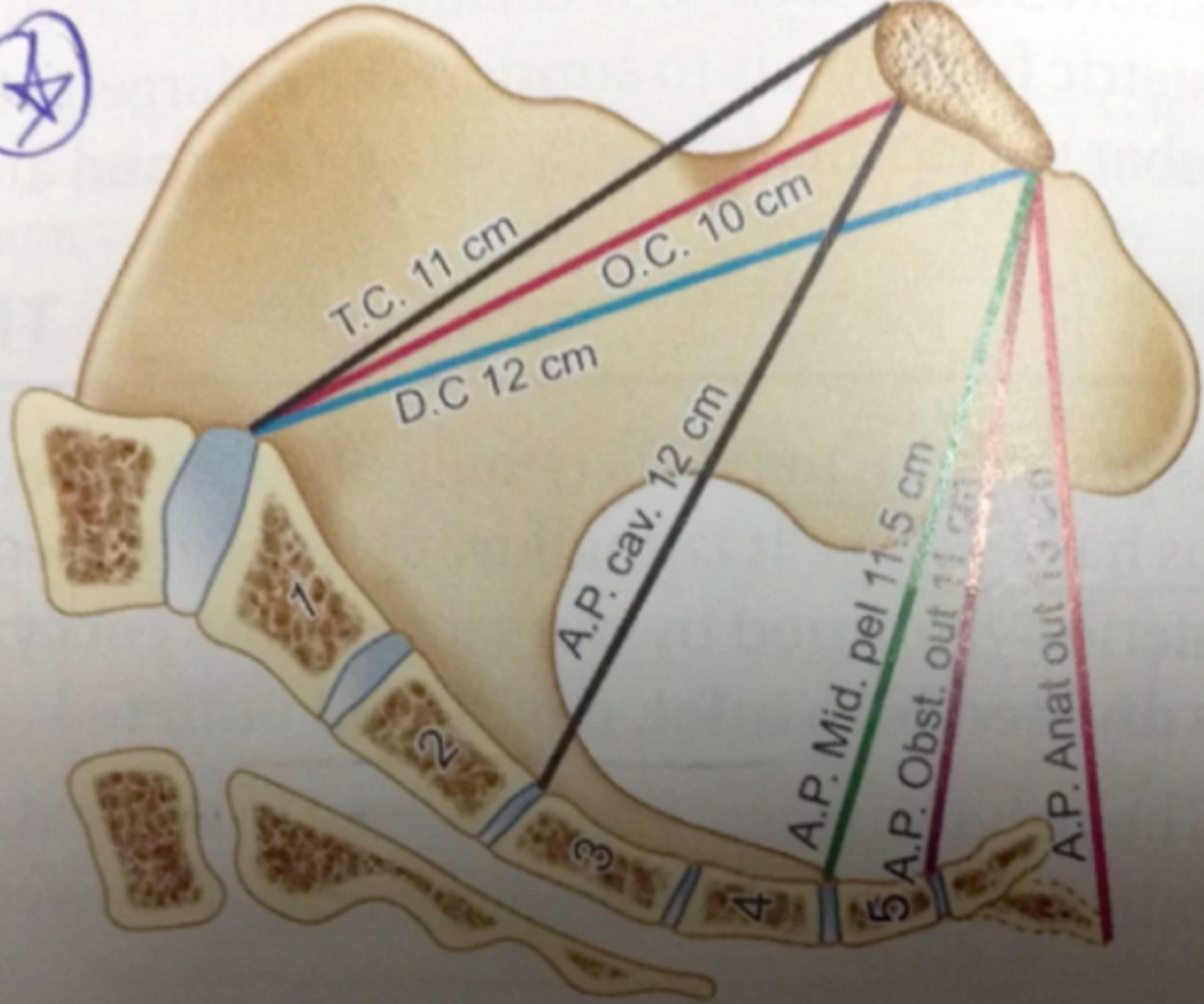
- (a) False pelvis – not of obstetric value
- (b) True pelvis – of obstetric value

It comprises of the inlet, cavity and outlet.

1) PELVIC INLET (BRIM) – Bounded by:-

- (i) Horizontal ramii of pubic bones and pubic symphysis anteriorly.
- (ii) Alae of the sacrum
- (iii) Sacral promontory
- (iv) Two ileo-pectineal lines

The smallest diameter at the inlet is between the pubic Symphysis and the sacral promontory.



THE MID PELVIS

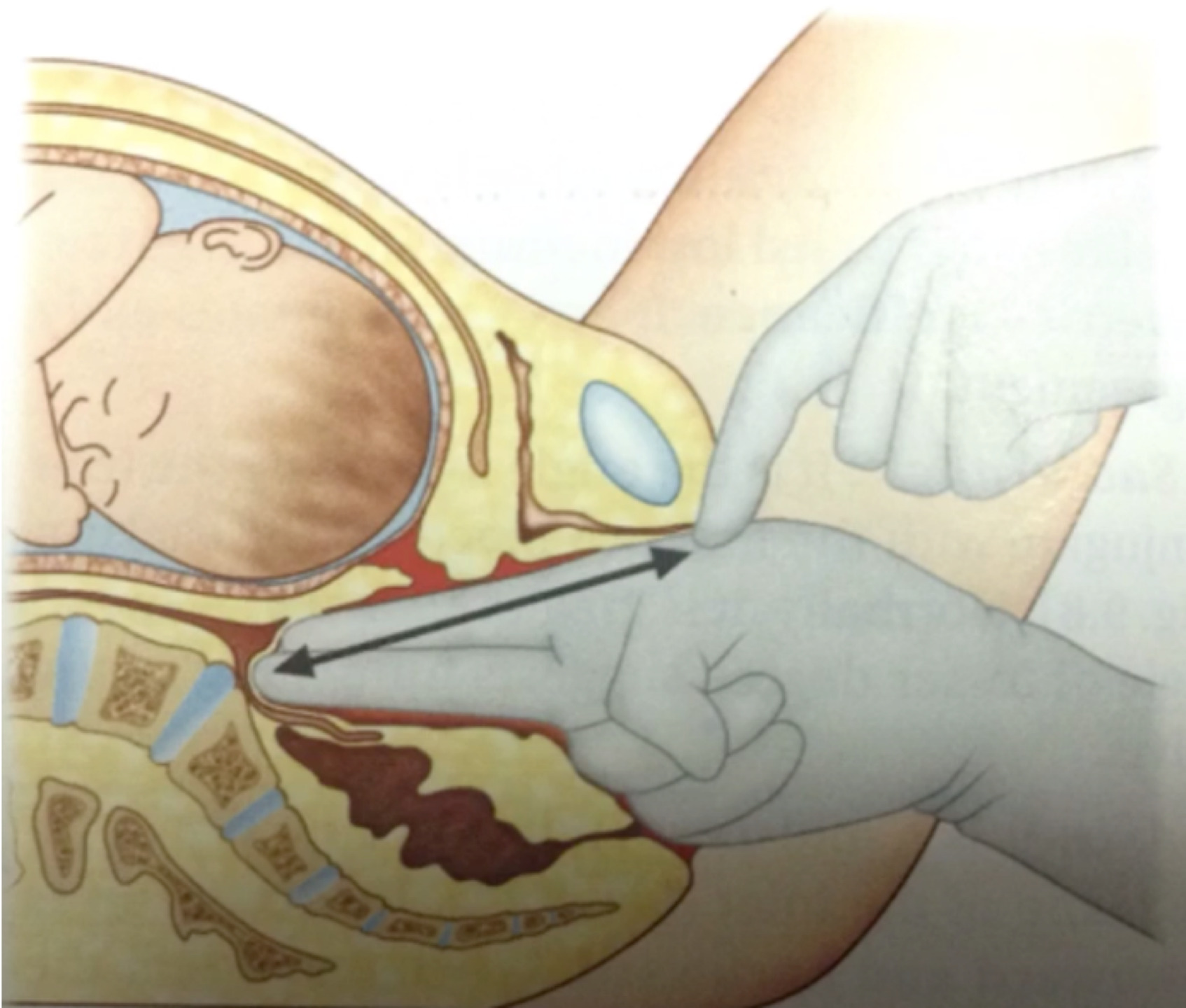
- Middle of public symphysis anteriorly
 - 2 pubic bones
 - Obturator fascia
 - Ischial bones(inner surface)
 - 2nd and 3rd sacral junction
 - The ischial spines lie slightly below
-
- The interspinous diameter approx 10cm is usually the smallest diameter of the pelvis.
 - In deep transverse arrest the BPD is at this level and the head can't rotate or move forward.

THE PELVIC OUTLET

Is diamond shaped and bound by:-

- Lower margin of the pubic symphysis
- Descending ramii of pubic bones
- Ischial tuberosities
- Sacro-tuberous ligaments
- 5th sacral bone

The smallest diameter in the pelvic outlet is the inter-tuberal diameter

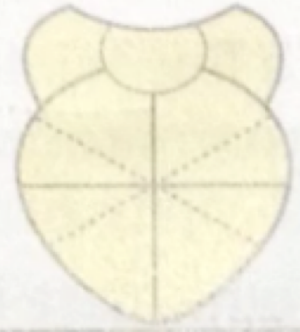


NORMAL PELVIC DIAMETERS

	Antero- posterior(cm)	Transverse(cm)
Inlet	11	13.5
Midcavity	11.5	12
Outlet	13.5	11



Brim



Cavity



Outlet



Anteroposterior
Oblique
Transverse

11	12	13
12	12	
13	12	11

FEATURES OF THE 4 TYPES OF FEMALE PELVIS

FEATURE	(1)Weight
GYNAECOID	Light
ANDROID	Heavy
ANTHROPOID	Medium
PLATYPELLOID	Medium

FEATURE	(2)Inlet
GYNAECOID	round
ANDROID	Heart-shaped
ANTHROPOID	Oval(A/P)
PLATYPELLOID	Oval(lat)

FEATURES	(3)Subpubic arch	(4)Side Walls
GYNAECOID	Wide 90° - 100°	straight
ANDROID	$<70^{\circ}$	Convergent
ANTHROPOID	$<90^{\circ}$	Convergent
PLATYPELLOID	$>100^{\circ}$	Straight

FEATURE	(5) Ischial Spines	(6) Interspino us Diameter
GYNAECOID	Not Prominent	Wide
ANDROID	Prominent	Narrow
ANTHROPOI D	Less Prominent	Narrow
PLATYPELLO ID	Prominent	Wide

FEATURE	(7) Sacral Curve	(8) Sacral Vertebrae
GYNAECOID	Concave Curves posteriorly	5
ANDROID	Curves Forward	5
ANTHROPOID	Straight	5 or 6
PLATYPELLOID	Short Curves posteriorly	5

FEATURE	(9)Sacro-sciatic notch	(10)Frequency
GYNAECOID	Wide	50% of all
ANDROID	Narrow	30% in whites 15% in blacks
ANTHROPOID	Wide	50% in blacks 25% in whites
PLATYPELLOID	Wide	<3% of all

PELVIC TYPES VS LABOR OUTCOME

FEATURE	(11)Waste space of Morris	(12)OUTCOME
GYNAECOID	Minimal	SVD
ANDROID	High	CPD
ANTHROPOID	High	POPP
PLATYPELLOID	Minimal	SVD

ABNORMALITIES OF THE PELVIS

1. Developmental causes may lead to;

- Contracted pelvis (childhood malnutrition)
- **High assimilation**(6 sacral vertebrae)
- **NAEGLE'S** oblique pelvis with one sided fusion of ischium and ilium
- **ROBERT'S** contracted pelvis with bilateral fusion of ischium and ilium.

2. Diseases or injury

- Rickets
- Poliomyelitis
- Malunion of pelvic fractures

3. Abnormalities of spine, hip joints or lower limbs may lead to;

- Kyphosis
- Spondylolithesis
- Congenital dislocation of the hip

RADIOLOGICAL PELVIMETRY

- **ELP** –done after 36 weeks of gestation to minimize effects of radiation to fetus
- **CT SCAN** – less radiation but expensive
- **MRI** – no ionizing radiation, accurate, can evaluate soft tissues but expensive.
- Note; radiological pelvimetry is of minimal or no value in modern obstetrics.

INDICATIONS FOR ELP

- Previous one caesarean
- Breech presentation
- Previous pelvic disease
- Previous vacuum extraction

CONCLUSION

- The anatomical relations of fetal skull to maternal pelvis are the most important prognostic determinants of labor.