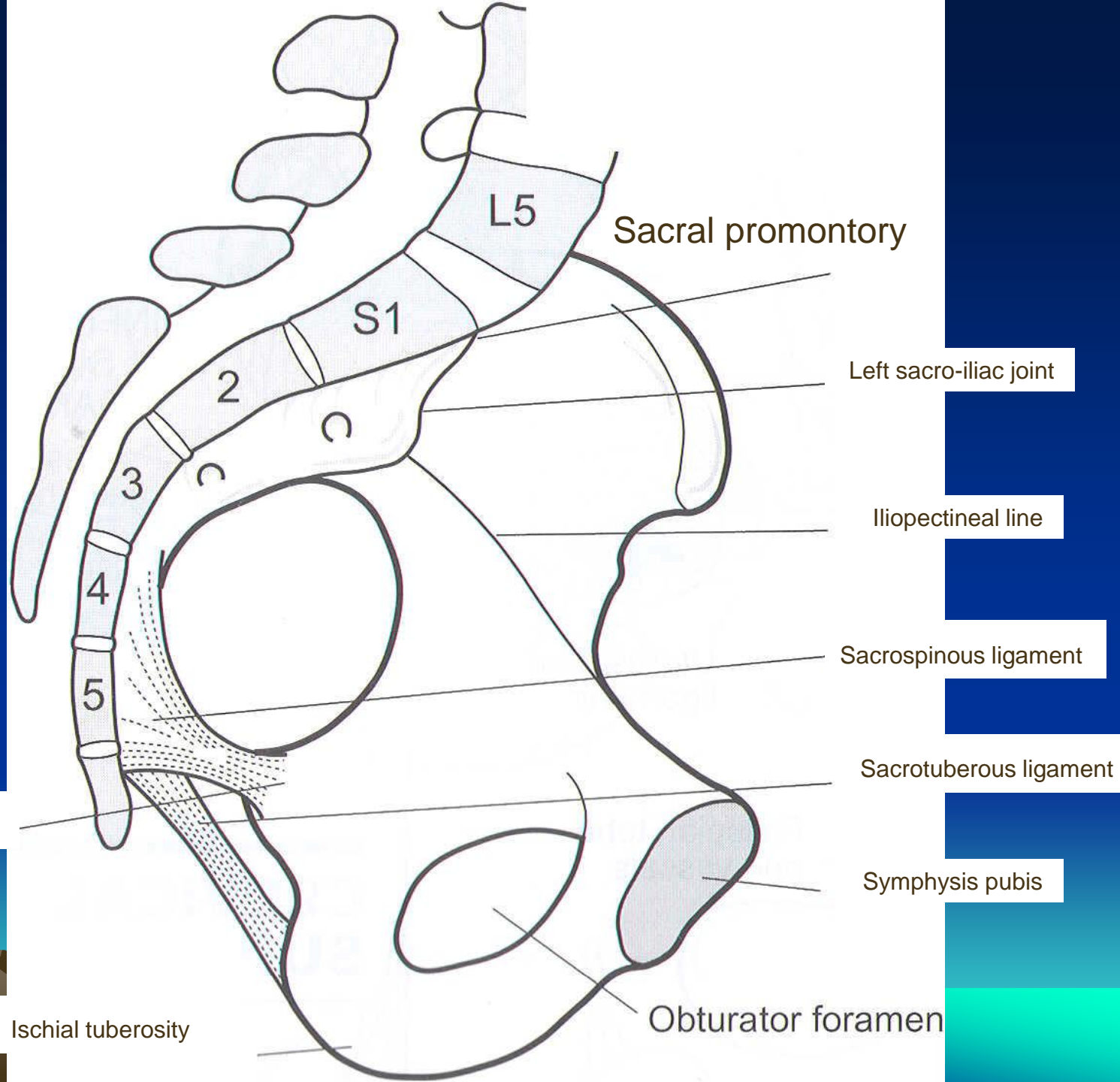


ANATOMY OF THE FEMALE BONY PELVIS and FETAL SKULL

T





THE BONY PELVIS

WHICH BONES COMPOSE THE BONY PELVIS?

- 2 Innominate bones :
 - Ilium
 - Ischium
 - Pubis
- Sacrum
- Coccyx



THE BONY PELVIS

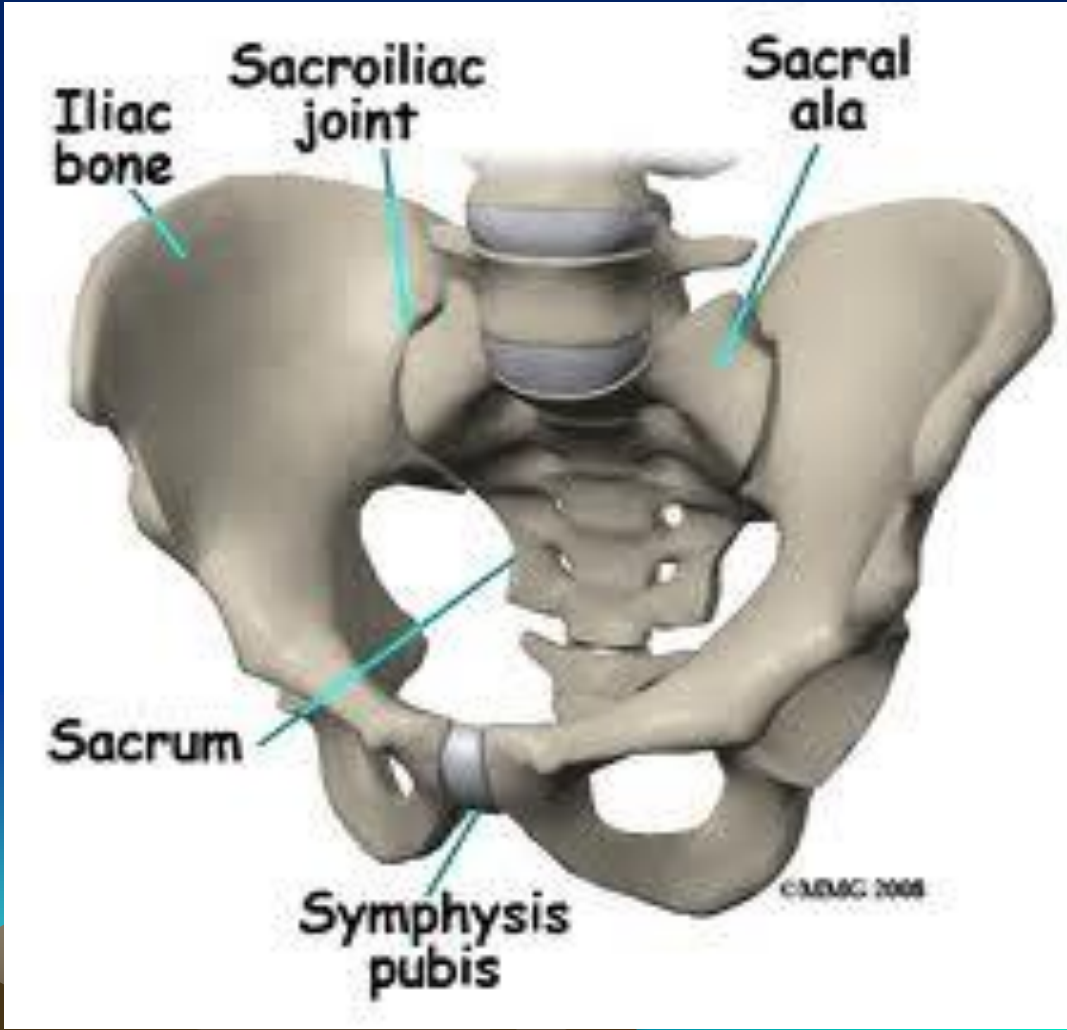
WHAT IS THE PELVIC BRIM?

- It is the inlet of the pelvis which divides the pelvic cavity into false & true pelvis
- It is formed by the sacral promontory, ala of the sacrum, arcuate line of the ilium, iliopubic eminence, pectineal line of the pubis, pubic crest & symphysis pubis
- The plane of the brim is $55-60^\circ$ above the horizontal



(Inlet (Pelvic brim))

passing with the boundaries of pelvic brim and making an angle of 55° with the horizon (angle of pelvic inclination).



THE BONY PELVIS

- The brim is oval in shape:

Anteroposterior diameter (true conjugate)

----- 11.25- 11.5 cm

Transverse diameter ----- 12.5-13.5 cm

The pelvic cavity

- The pelvic canal is curved , the post wall is longer than the anterior

- The most roomy zone with almost round shape

TD---13.5

APD----12.5



The pelvic Cavity

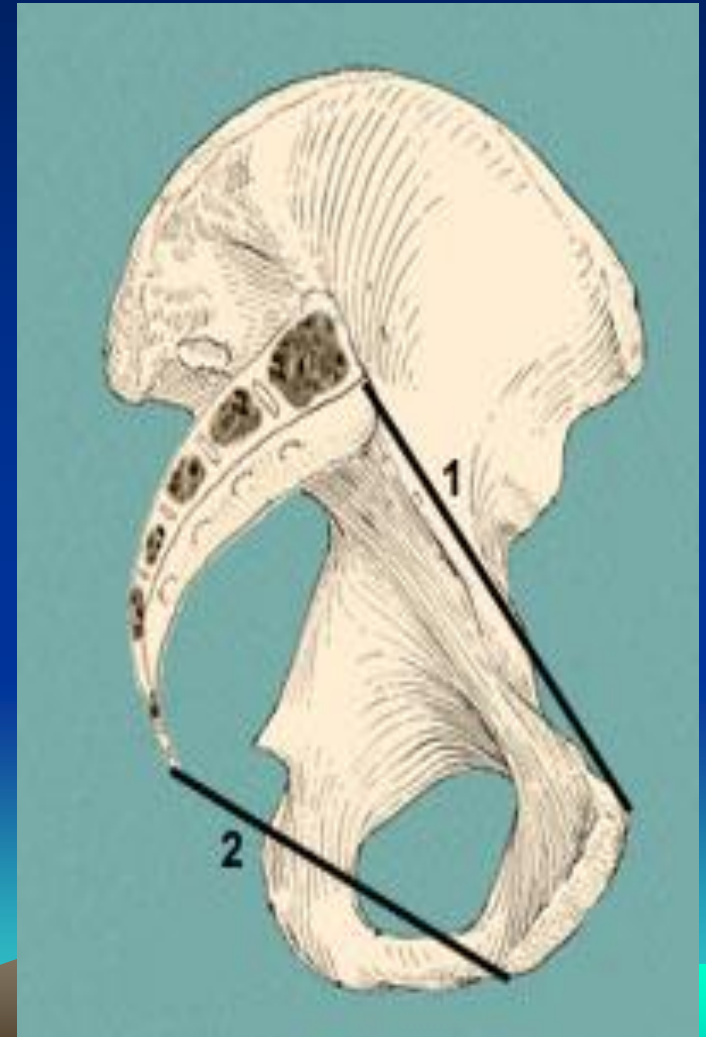
Boundaries:

Above: pelvic brim. 🍷

Below: plane of least pelvic dimensions. 🍷

Anteriorly: symphysis pubis. 🍷

Posteriorly: sacrum. 🍷



2- pelvic cavity *The plane of greatest diameter:*

bordered by:

- the posterior midpoint of the pubis anteriorly
- the upper part of the obturator foramina laterally
- the junction of the 2nd and 3rd sacral vertebrae posteriorly.

The fetal head rotates to the anterior position in this plane



The pelvic

Anatomical outlet: (A)
Lozenge-shaped,
bounded by:
Lower border of symphysis
pubis.

Pubic arch.

Ischial tuberosities

Sacrospinous &
sacrospinous ligaments.

Tip of the coccyx.



THE BONY PELVIS

THE PELVIC OUTLET

- Lower border of the symphysis pubis, ischial tuberosities & tip of the coccyx
- The subpubic arch has an angle of $\sim 85^\circ$



THE BONY PELVIS

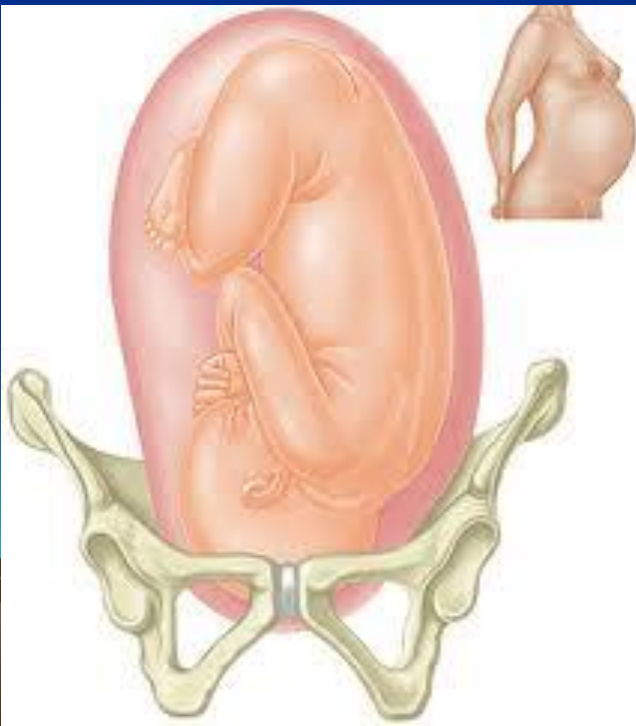
THE OBSTETRIC OUTLET / PLANE OF LEAST PELVIC DIMENSIONS/ MIDPELVIS

- Diamond shaped
- APD ----- lower border of the symphysis pubis to last fixed point of the sacrum----- 12-12.5 cm
- TD ----- between the ischial spines ----- 10-10.5 cm



Diameters of the pelvic

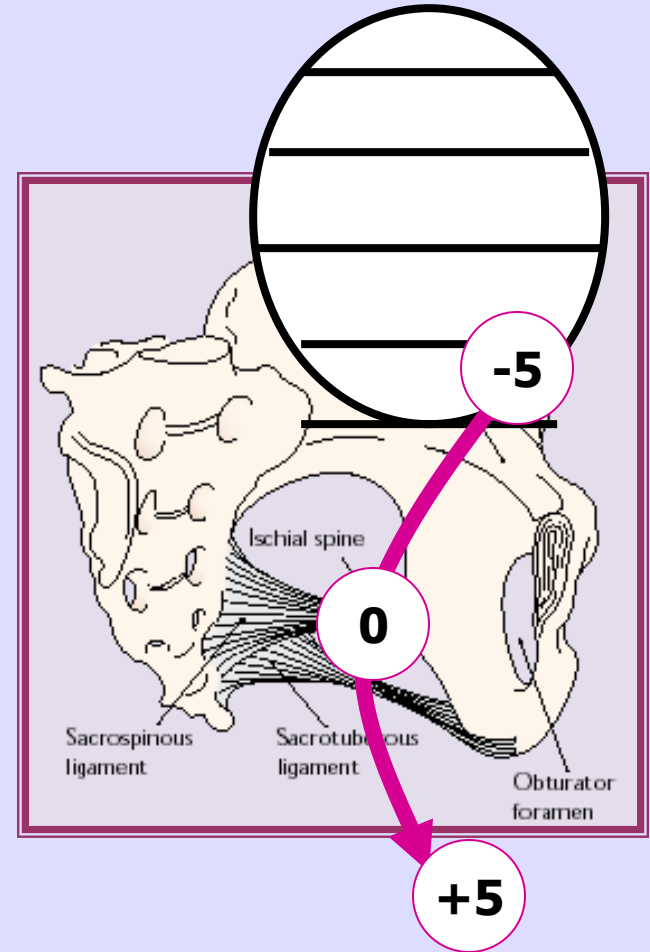
Diameter	Inlet	Cavity	outlet
Anteroposterior diameter	11	12.5	13
Transverse diameter	13	12.5	11



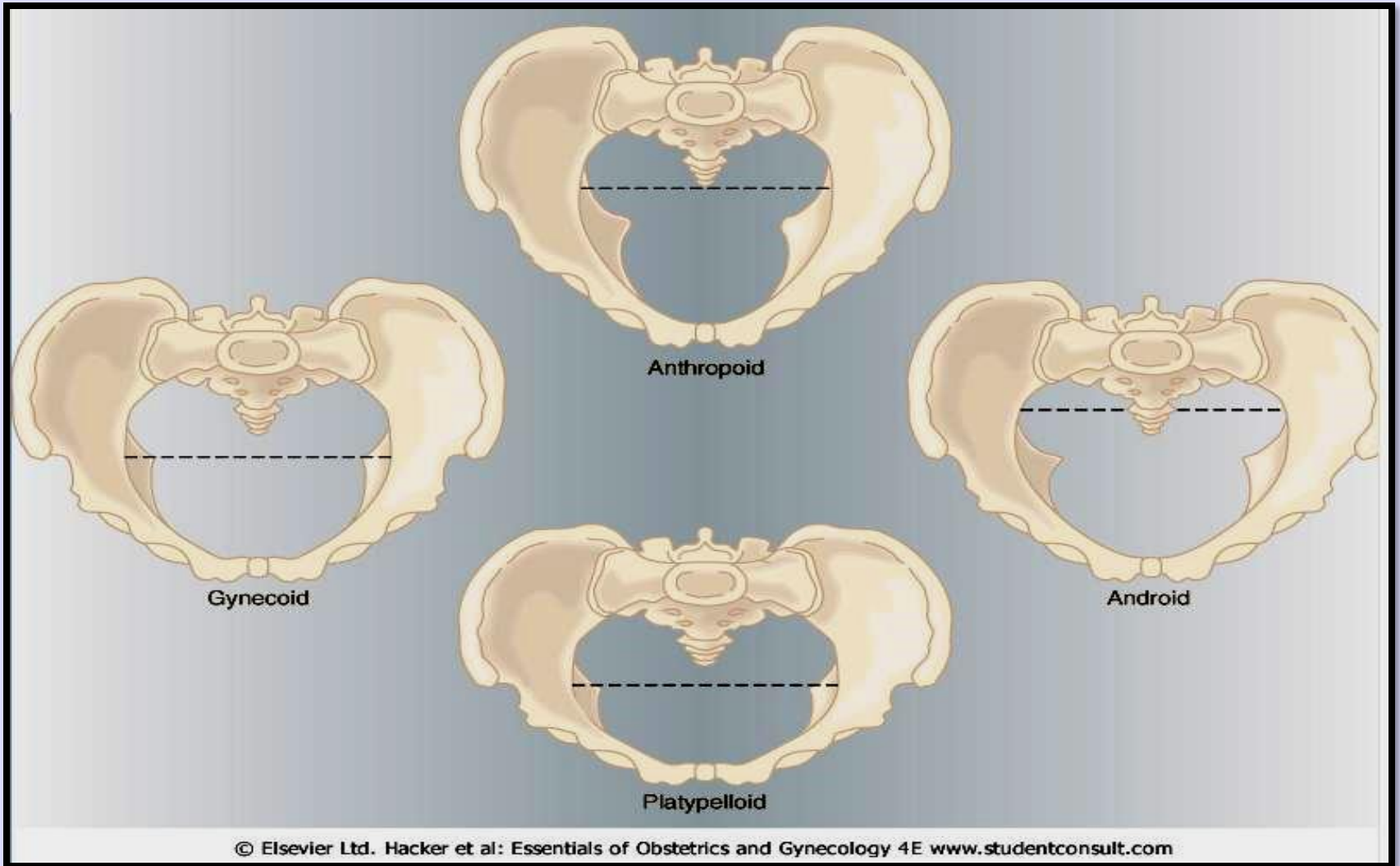
The Fetal Head Has Five Fifths...

fifth above the pelvic brim

- 0 : Head Not Palpable
- 1 : Sinciput felt – Occiput Not Felt
- 2 : Sinciput felt – Occiput Just Felt
- 3 : Sinciput easily felt – Occiput Felt
- 4 : Sinciput High – Occiput easily Felt
- 5 : Complete above pelvic brim




Pelvic Shapes



PELVIC SHAPE

1-GYNECOID

- Typical female pelvis found in 50% of women
 - Rounded—slightly oval inlet
 - Straight pelvic sidewalls with roomy pelvic cavity
 - Good sacral curve
 - Ischial spines are not prominent
 - Pubic arch is wide
- 

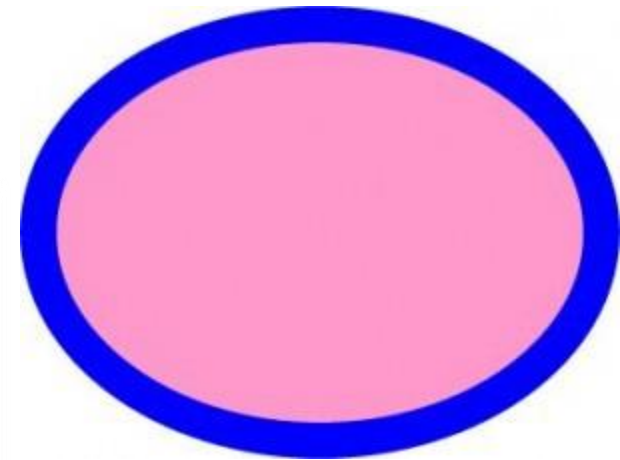
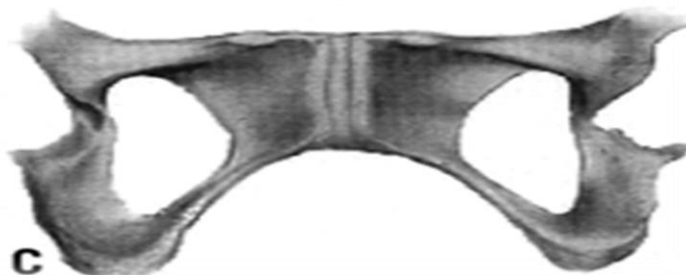
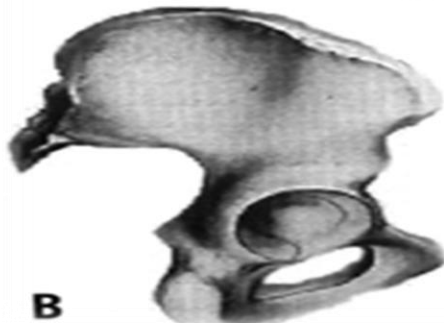


Gynecoid Pelvis

➤ The gynecoid pelvis is


➤ the most common

➤ type of female pelvis.

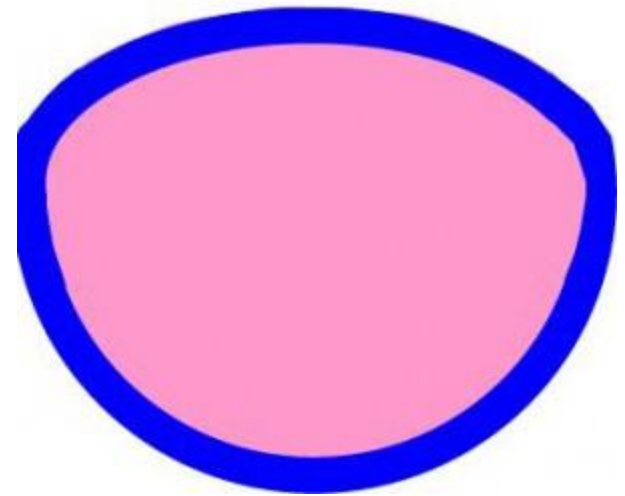
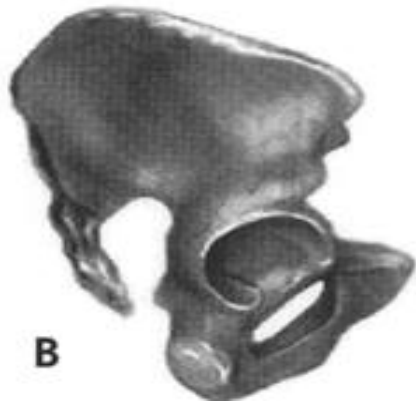
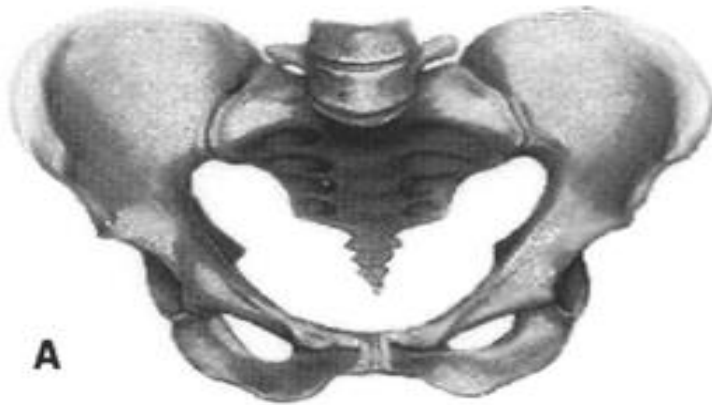


PELVIC SHAPE

2-ANDROID

- Typical male pelvis found in 1/3 white women 1/6 non-white
 - Pelvic brim is heart shaped
 - Pelvis funnels from above downwards (convergent sidewalls)
 - Narrow pubic arch
 - Prominent spines
- 

Android Pelvis



PELVIC SHAPE

3-ANTHROPOID

- 25% white women & 50% nonwhite
- Pelvic brim APD > TD
- Long & narrow pelvic canal with long sacrum
- Straight pelvic sidewalls

4-PLATYPELLOID

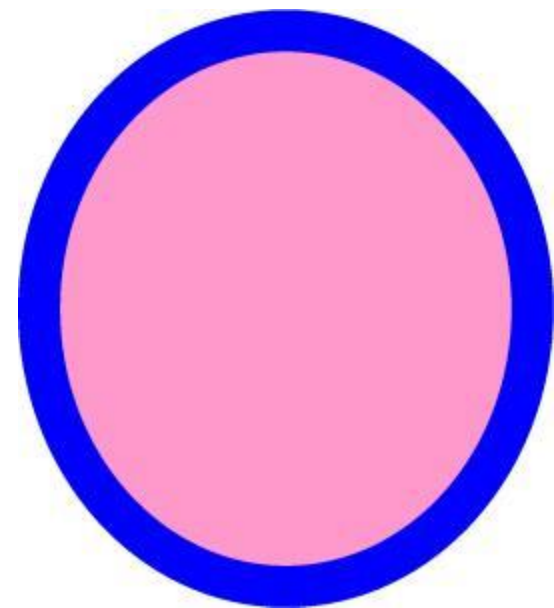
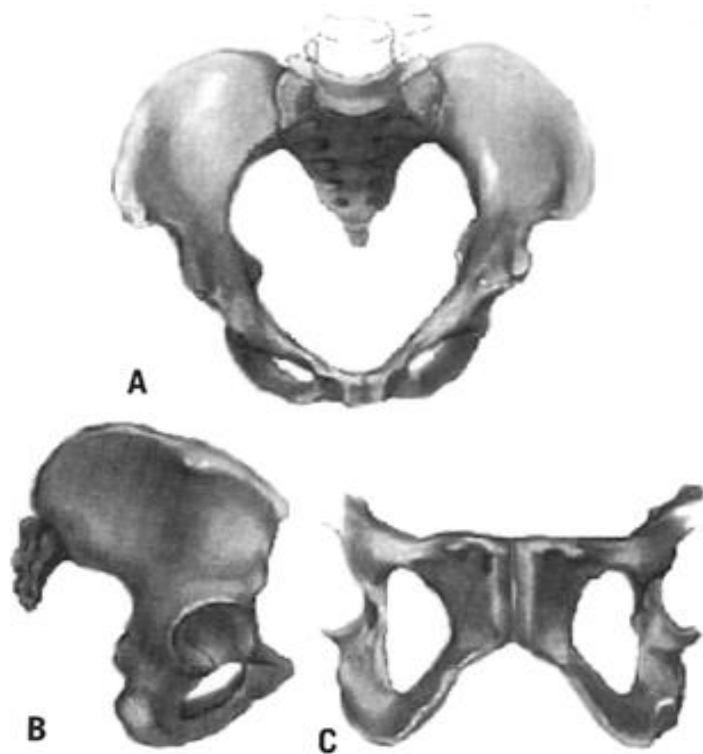
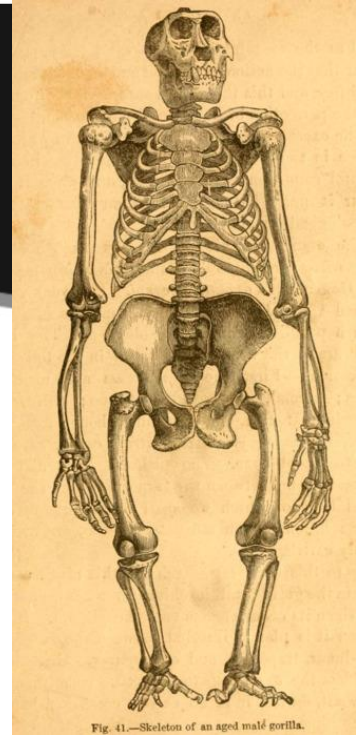
- 3% of women
- Pelvic brim TD >>>APD ➔ kidney shape
- Sacral promontory pushed forwards



Anthropoid Pelvis



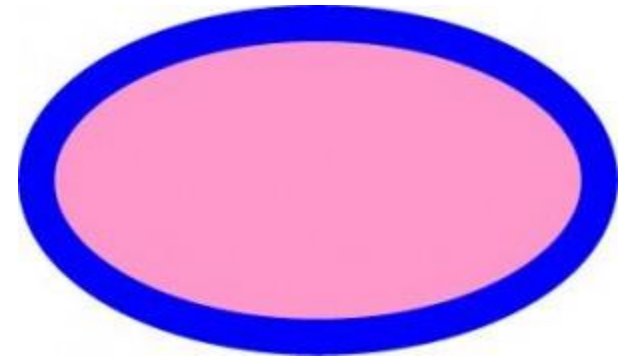
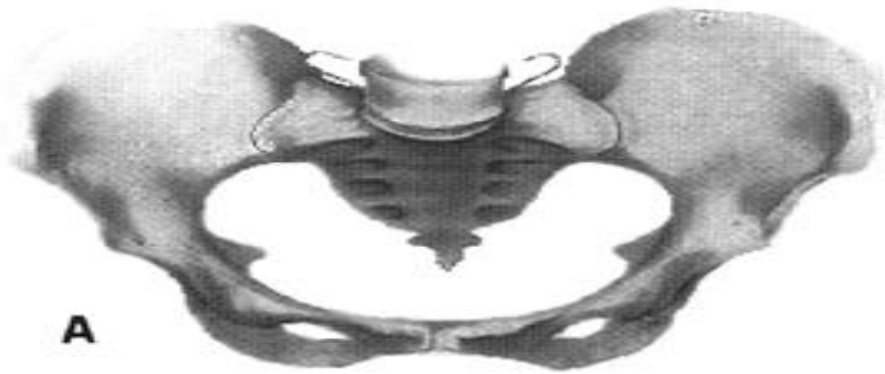
Reser...

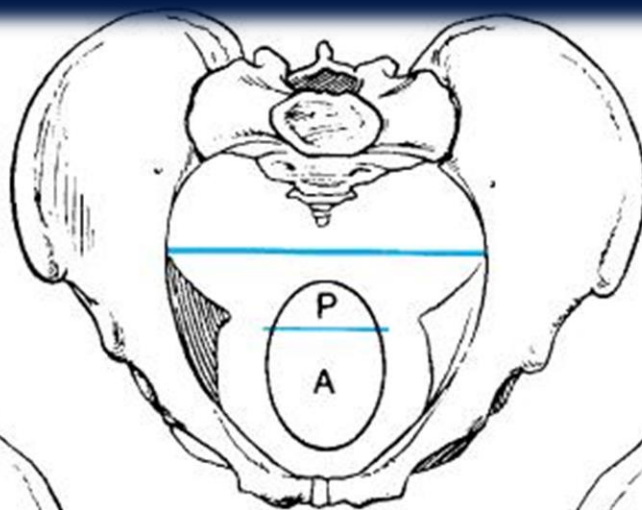




Platypelloid Pelvis

- ▶
- ▶

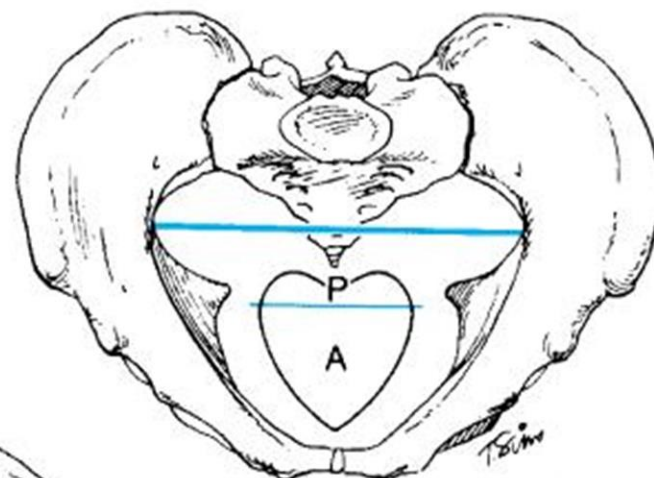




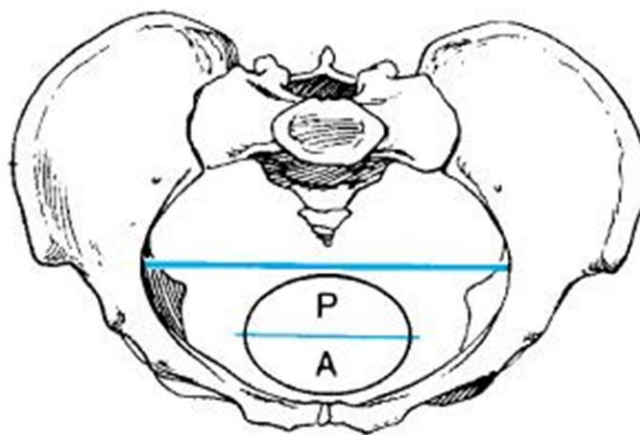
Anthropoid



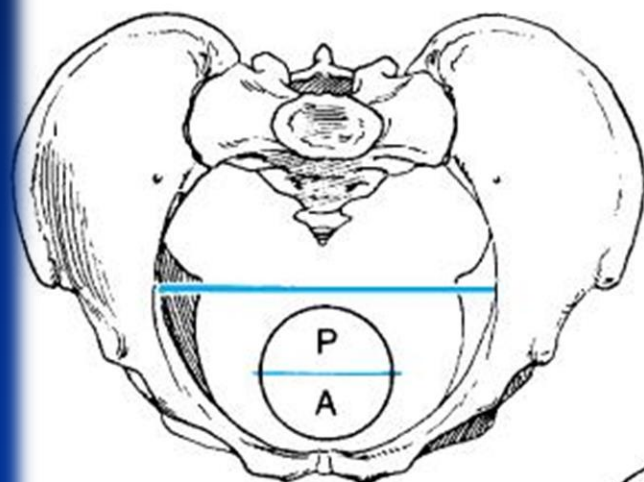
Intermediates



Android



Platypelloid



Gynecoid

PELVIC WALLS

The inner aspect of the bony pelvis is covered with muscles

- Above the brim --- iliacus & psoas
- Sidewalls ---- obturator internus & its fascia
- Post wall ---- pyriformis
- Pelvic floor ---- levator ani & coccygeus



PELVIC LIGAMENTS

Ligaments

- **Sacrospinous ligament** → lateral aspect of the sacrum to ischial spines
- **Sacrospinous ligament** → lateral aspect of the sacrum to inner aspect of ischial tuberosity
- **Sacroiliac ligament** → medial surface of the ilium to sacrum
- **Iliolumbar ligament** → iliac crest to transv lumbar vertebra

ADEQUACY OF THE PELVIS TO ACHIEVE VAGINAL DELIVERY

WHAT IS THE OBSTETRIC CONJUGATE?

The shortest APD between sacral promontory & mid of symphysis pubis

Can only be measured radiologically

$N > 10 \text{ cm}$



ADEQUACY OF THE PELVIS TO ACHIEVE VAGINAL DELIVERY

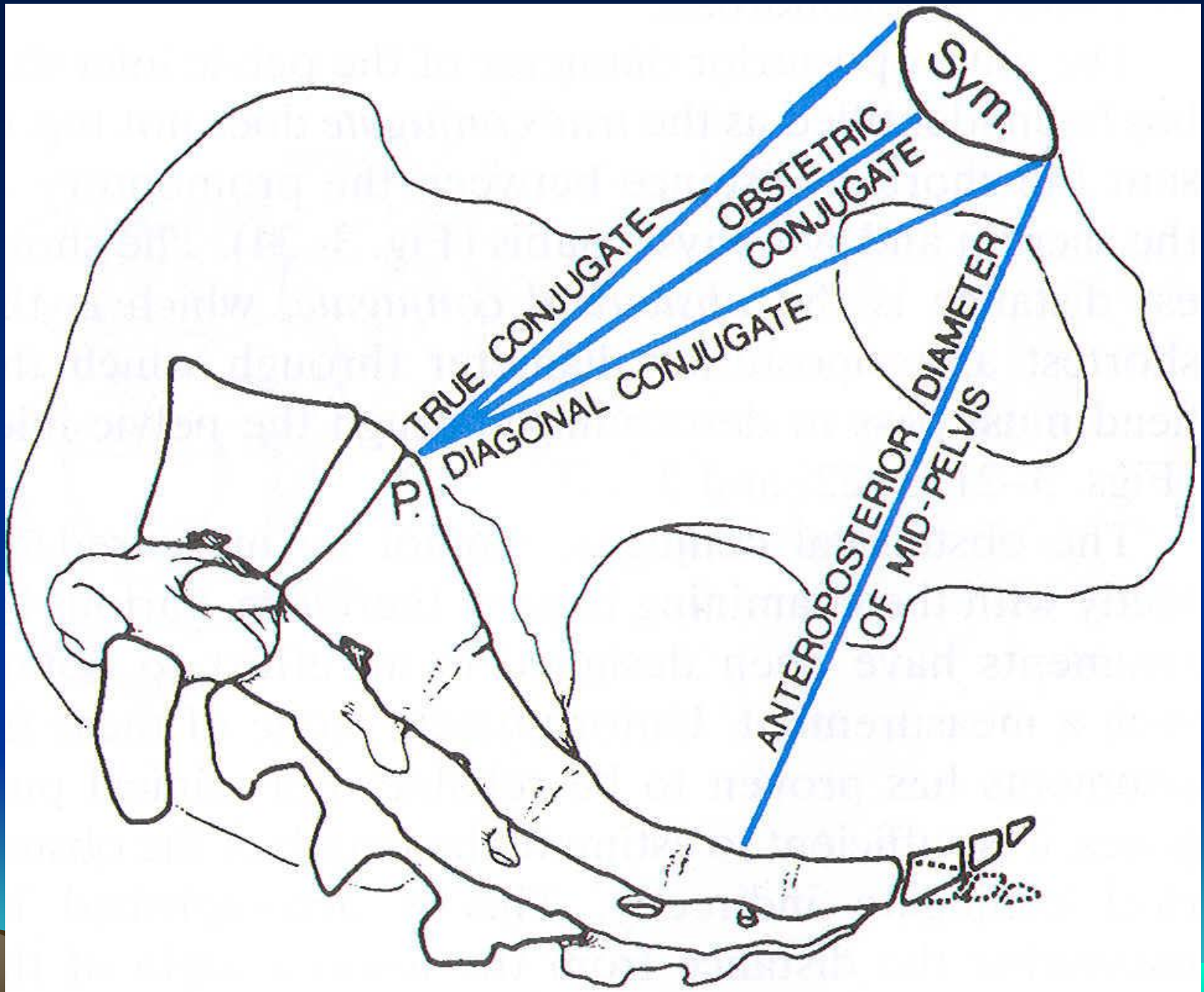
➤ **WHAT IS THE TRUE CONJUGATE?**

- APD between promontory of the sacrum & superior margin of the symphysis pubis

➤ **WHAT IS THE DIAGONAL CONJUGATE?**

- Distance between sacral promontory & inferior margin of the symphysis pubis
- Measured clinically





Clinical pelvimetry

- Adequacy of the pelvis is assessed by pervaginal examination that done at 36 weeks of gestation
- Because the maximum period of relaxation of ligament occurs at that gestation due to hormonal effects
- The diameters of the pelvis are assessed accurately
- This examination is called clinical pelvimetry

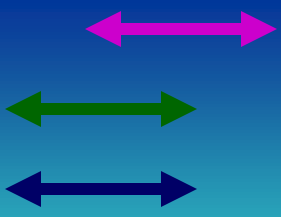
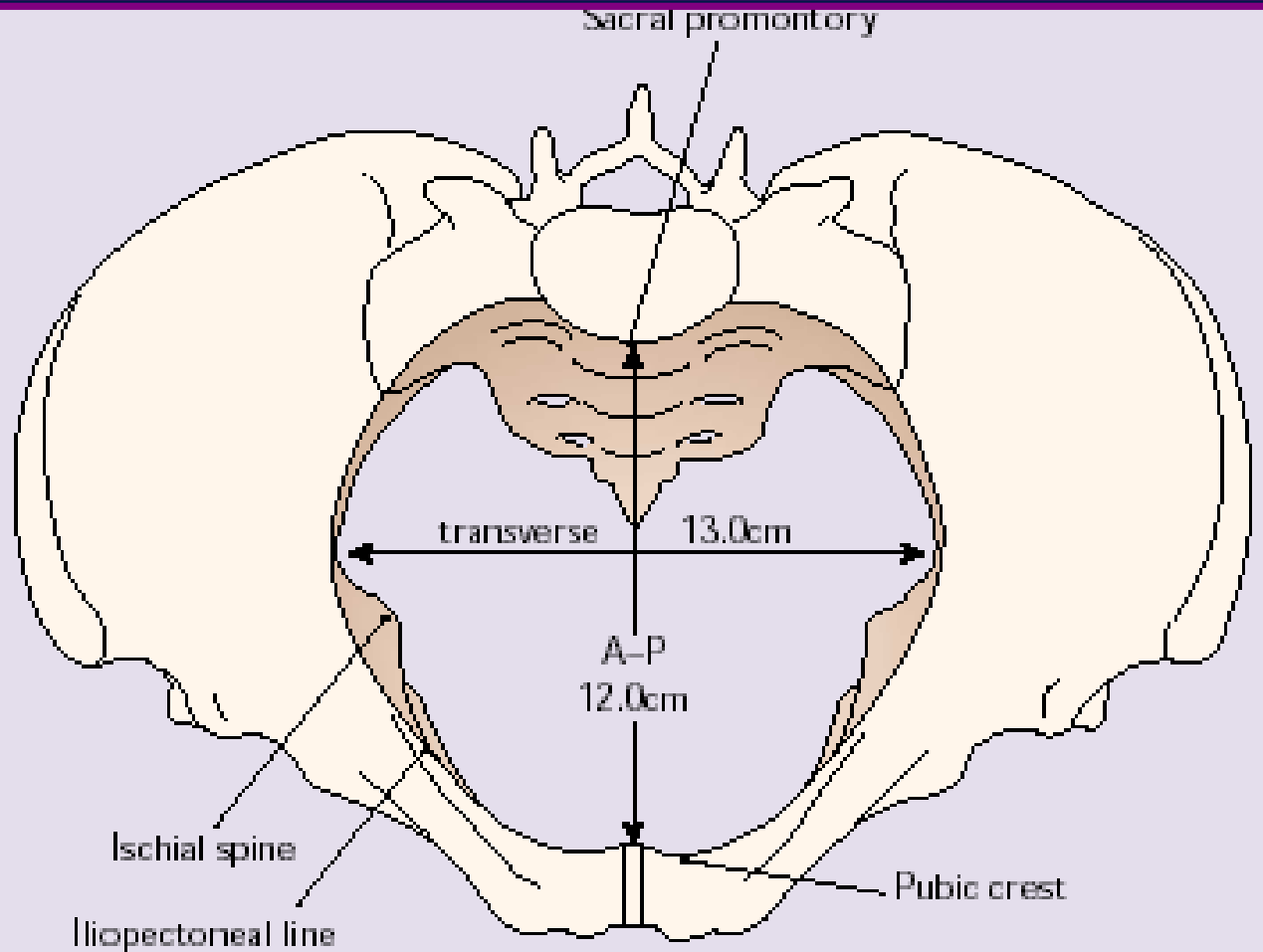


ADEQUACY OF THE PELVIS TO ACHIEVE VAGINAL DELIVERY

WHAT IS MEANT BY CLINICALLY FAVORABLE PELVIS?

- Sacral promontory can not be felt
- Ischial spines are not prominent
- Subpubic arch accept 2 fingers
- Intertuberous diameter accept 4 knuckles on pelvic exam





The True Conjugate = 11 cm

The Obstet. Conjugate = 10.5cm

The Diagonal Conjugate = 12 cm



FETAL SKULL

The skull is formed of the face , the vault & the base

The bones that form the skull are : two frontal bones, two parietal bones, two temporal bones wings of the sphenoid & occipital bone

The bones of the face & base are heavy & fused

The bones of the vault are 2 frontal ,2 parietal & occipital

The bones of the vault are not joined thus changes in the shape of the fetal head during labor can occur due to molding



RELATION BETWEEN FETUS & PELVIS



- *LIE*
- *PRESENTATION*
- *PRESENTING PARTS*
- *ATTITUDE*
- *DENOMINATOR*
- *POSITION*
- *CEPHALIC PROMINENCE*



- *LIE*
- *The relationship b/w the long axis of fetal ovoid to the long axis of uterine ovoid*

LONGITUDINAL LIE

TRANSVERSE LIE

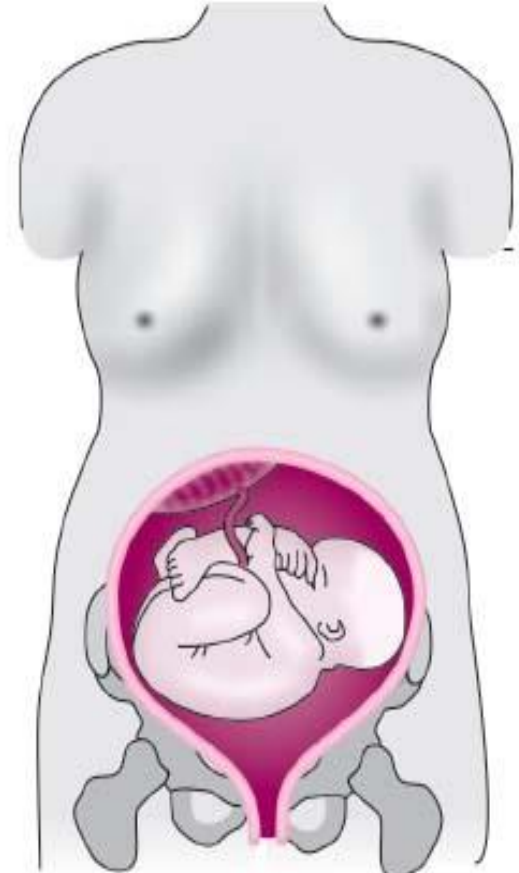
OBLIQUE LIE



Longitudinal lie
Vertex presentation



Longitudinal lie
Breech presentation



Transverse lie
shoulder presentation

➤ ***PRESENTATION***

➤ ***That part of the fetus that lies over the pelvic inlet & occupies the lower poles of the uterus***

➤ ***3 presentation***

CEPHALIC

PODALIC/BREECH

SHOULDER





Vertex presentation



Breech presentation



Shoulder presentation

➤ ***PRESENTING PARTS***

➤ ***The most dependant part of the fetus,
which is felt first on vaginal examination***

***In cephalic presentation depending upon
degree of flexion,***

vertex

brow

face

deflexed head

- *In breech presentation*
- *Flexed breech (fetal legs may be flexed)*
- *Extended breech (extended at knees)*
- *Footling breech (completely extended)*



FETAL PRESENTATION

HEAD PRESENTATION

(97 %)

CEPHALIC presentation



FACE presentation



VERTEX presentation



BROW presentation



BREECH PRESENTATION

(3-4 %)

FRANK breech



COMPLETE breech



FOOTLING breech



4 MOTHER.INFO

➤ *ATTITUDE*

➤ *The relation of fetal parts to each other*

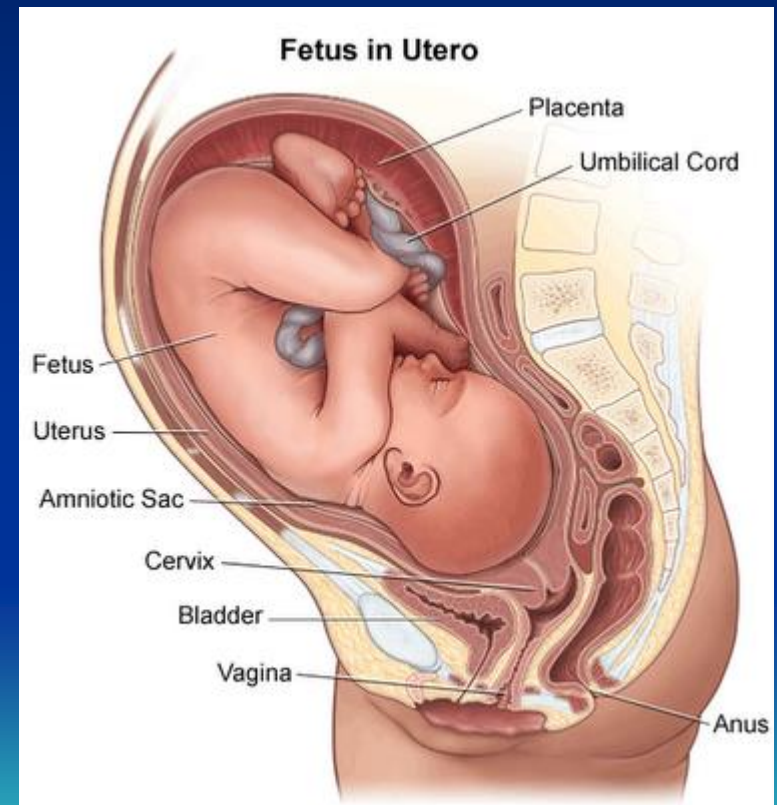
➤ *Main attitudes*

FLEXION

EXTENSION



- ***TYPICAL FETAL ATTITUDE***
- ***universal flexion with head flexed over chest, arms & legs flexed in front of the body and back curved forward***

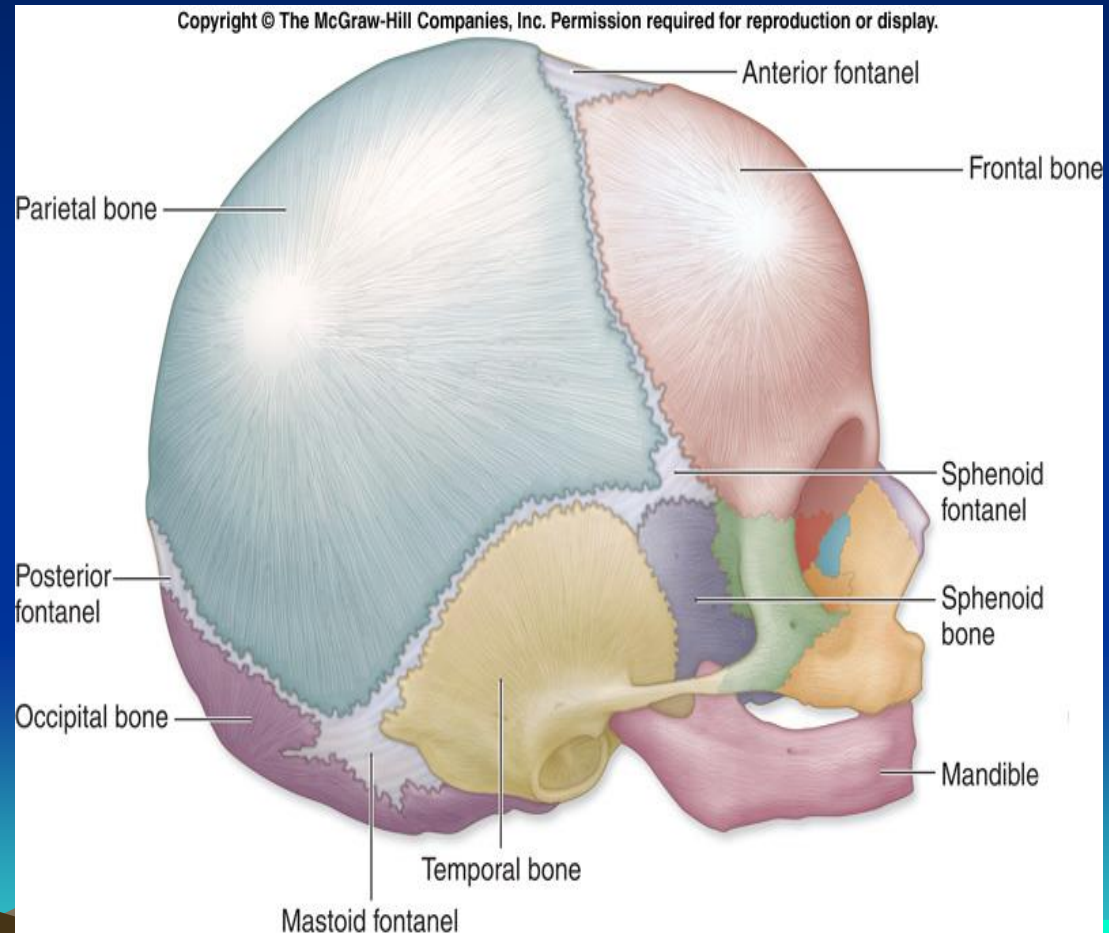


Frequency of lie and presenting part

Lie	Presentation and presenting part
Longitudinal 99.5%	Vertex 96%
Transverse or oblique 0.5%	Face 0.5%
	Brow 0.5%
	Breech 3%
	Shoulder 0.5%

Fetal head

- Landmarks
- Sutures
- Fontanelles
- Diameters



Fetal head

From an obstetrical point of view it's **the most important part:**

- largest
- least compressible part of the fetus.
- most frequent presenting part



A

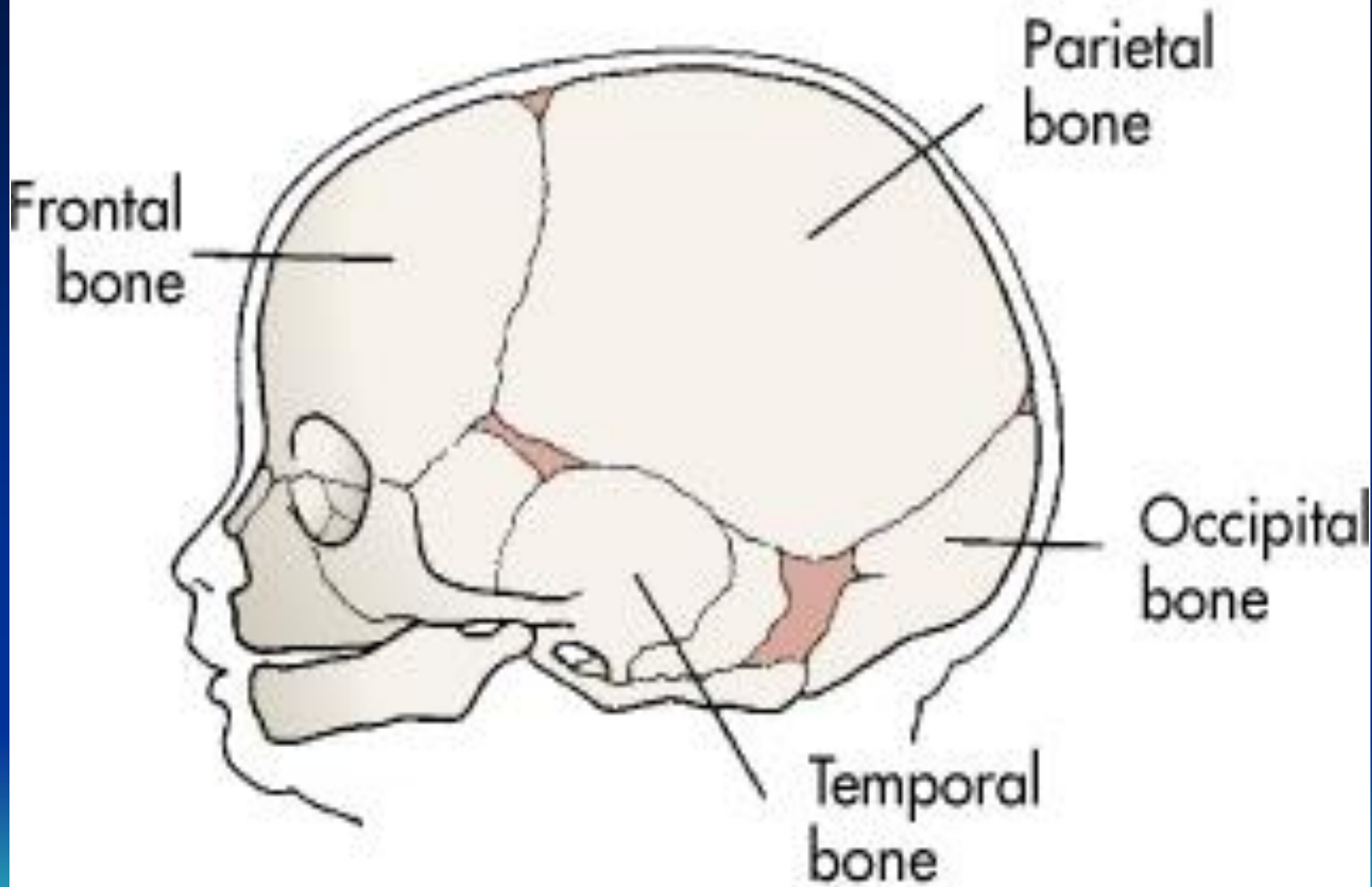


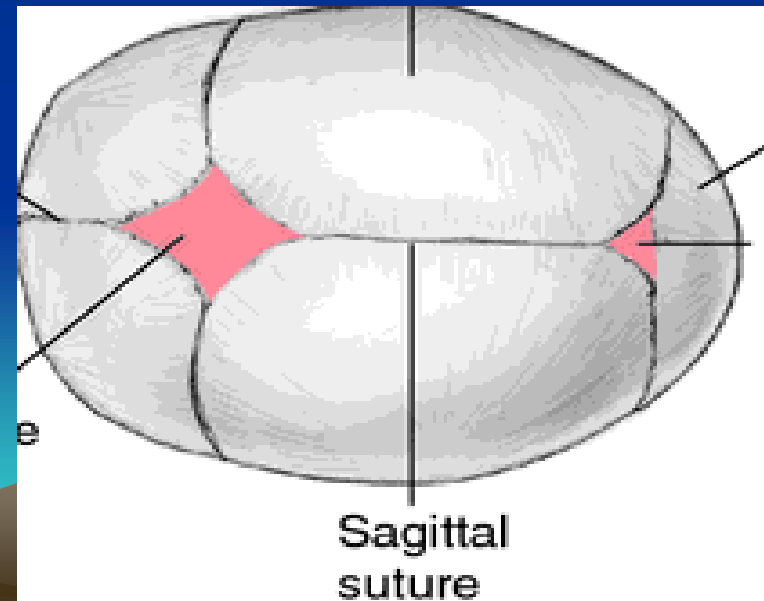
Fig. 18-1A Fetal head at term. Bones.
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Sutures

➤ Membrane-occupied spaces between the cranial bones

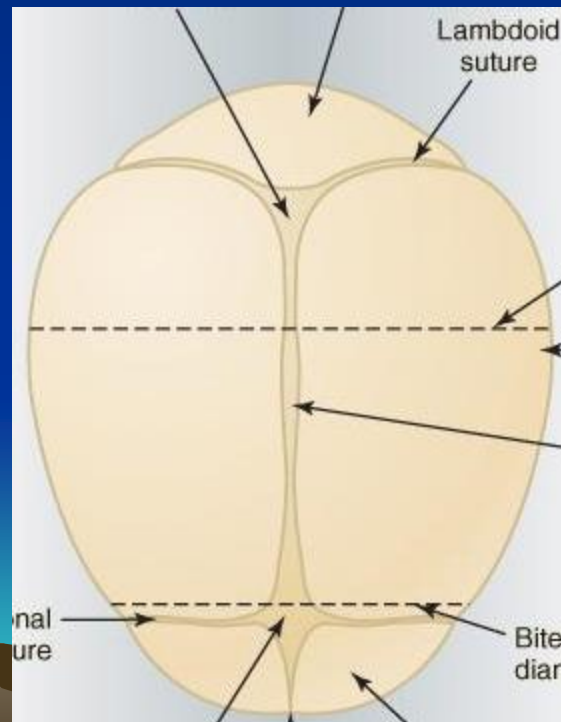
1-Sagittal suture:

- lies btw the parietal bones
- extends in an AP direction btw the fontanelles
- divides the head into right and left sides



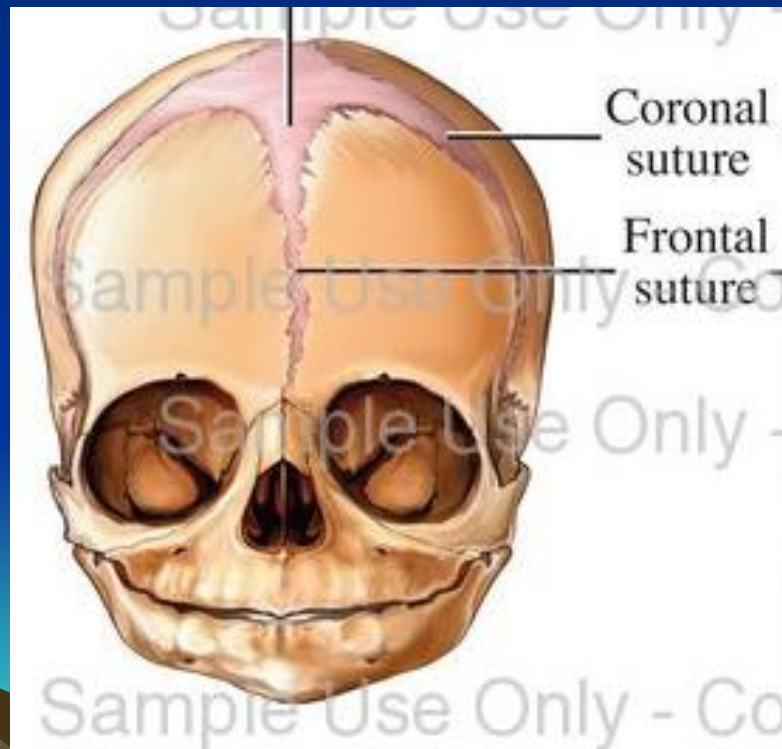
2-lambdoid suture:

- extends from the posterior fontanelle laterally
- separate the occipital from the parietal bones.



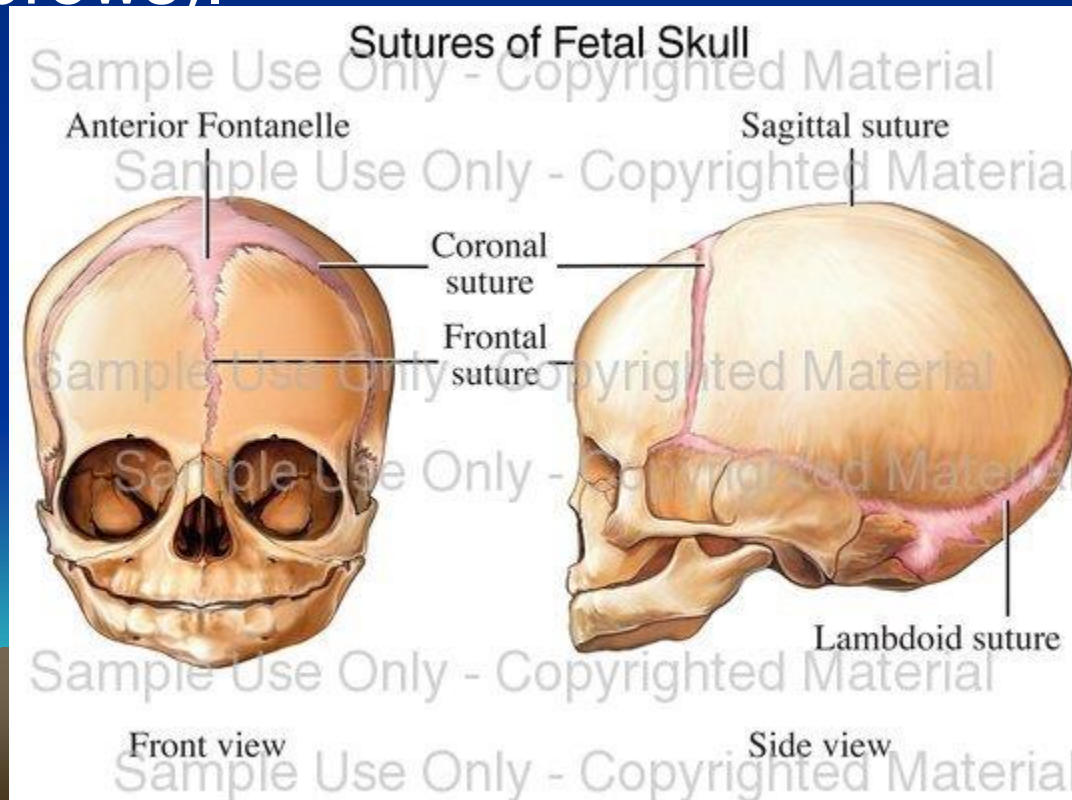
3-coronal suture:

- extends from the anterior fontanelle laterally
- separate the parietal and frontal bones.



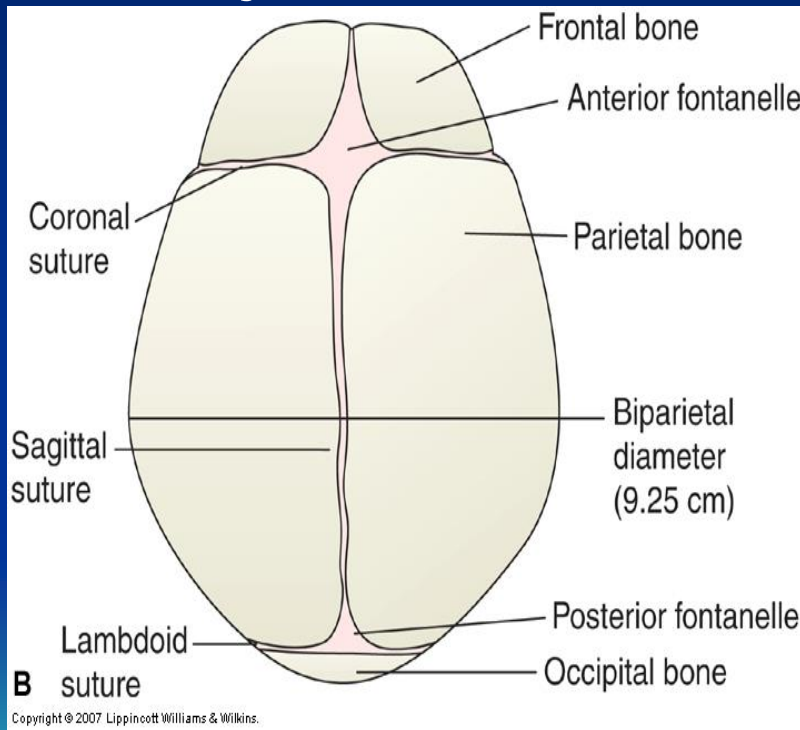
4- frontal suture:

- lies between the frontal bones
- extends from the anterior fontanelle to the glabella (the prominence between the eyebrows).



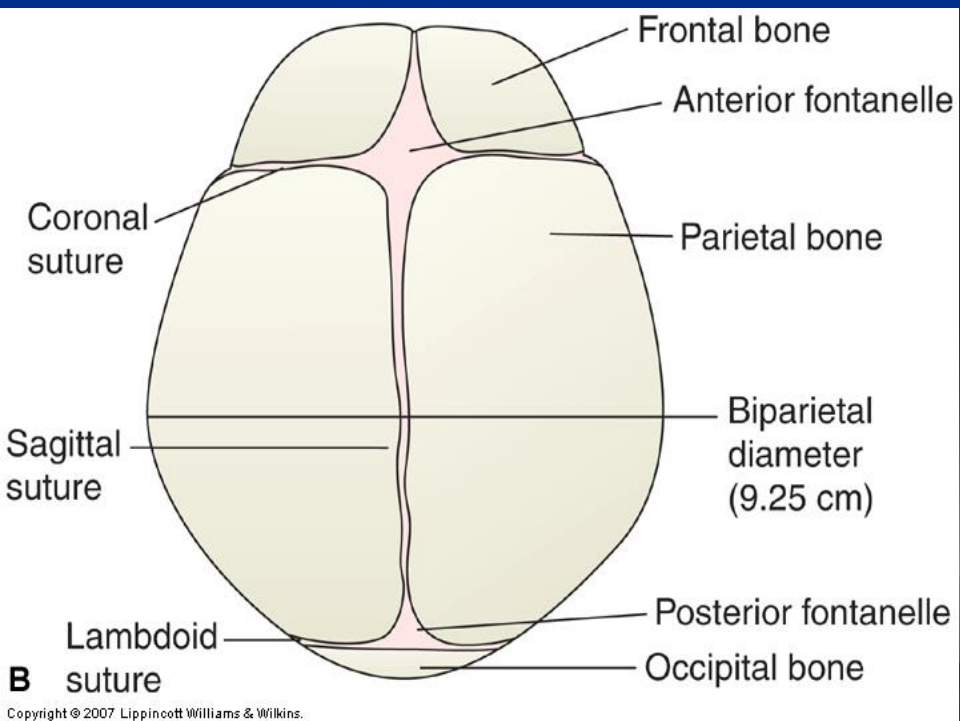
The anterior fontanelle (bregma) :

- ✓ diamond shaped area(2 × 3 cm) of unossified membrane formed by the junction of 4 suture.



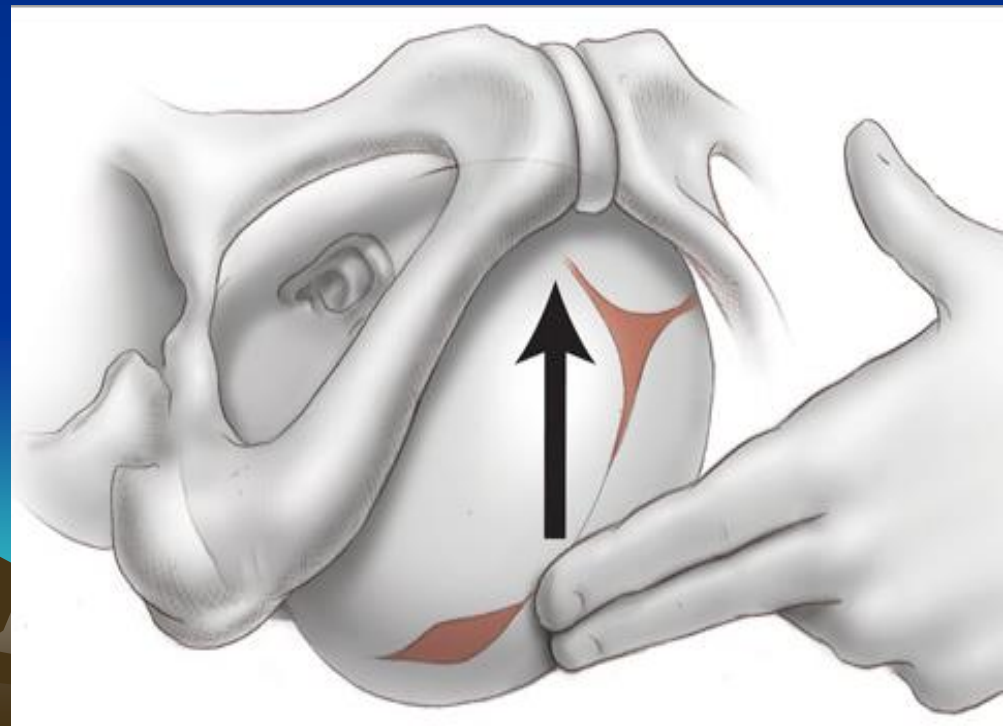
The posterior fontanelle:

- ✓ It is the **triangular depressed** area at the junction of 3 suture:
- closes at **6 to 8 weeks** of life
- **Y- or T-shaped**



Clinical importance of sutures

- Position of fontanelle & sagittal suture can **identify attitude and position of vertex**.
- By palpating the sagittal suture during labour, **degree of internal rotation & molding** of the head can be noticed.
- In deep transverse arrest, this sagittal suture lies transversely at the level of the ischial spines.



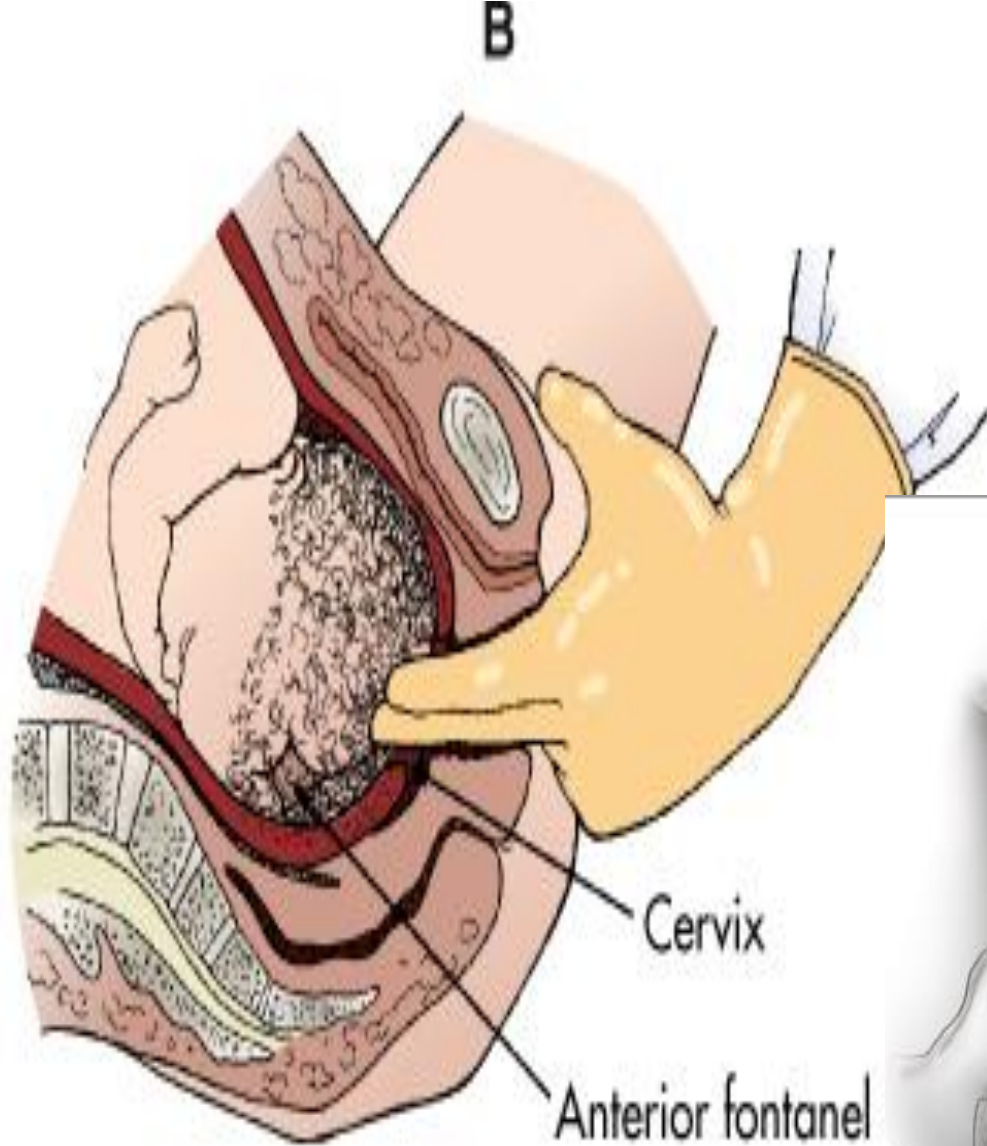
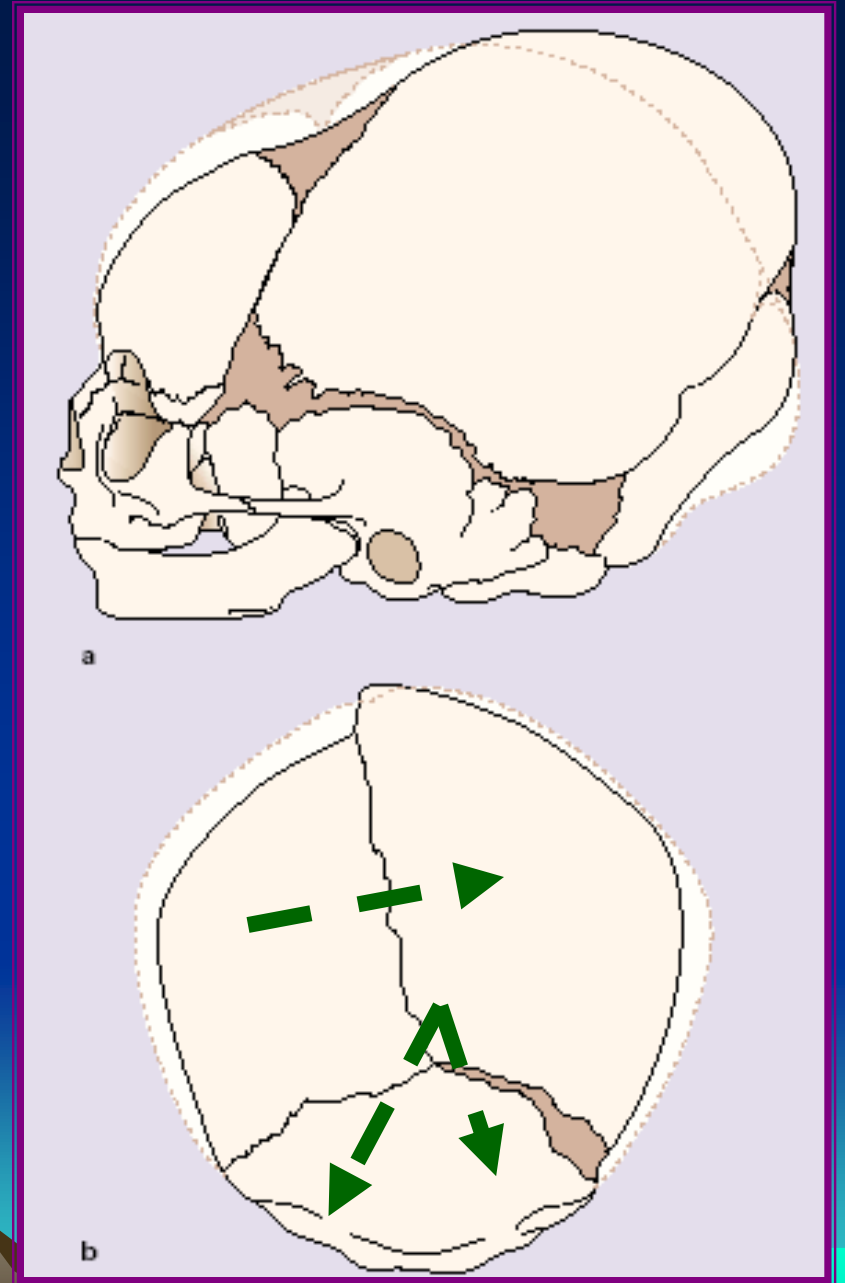


Fig. 21-11B Vaginal examination. Palpation of sagitt
Cervix effaced and partially dilated.
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Moulding...

- Reshaping of the fetal skull:
 - Obliteration of the sutures.
 - Overlapping of the bones of the vault:
 - One parietal bone overlaps the other.
 - Both overlap the occipital bone.
- It accounts for diminution of the biparietal diameter and suboccipitobregmatic diameters by 0.5-1 cm. Or even more.



➤ ***DENOMINATOR***

- ***An arbitrarily chosen point on the presenting part of the fetus which is used to describe the position.***



Presentations of the fetus

Presentation	Attitude	Denominator
Cephalic		
vertex occipitoanterior	Flexion	Occiput
vertex occipitoposterior	Deflexion	occiput
brow	Extension	brow
face	Complete extension	Chin or mentum
Podalic or breech		sacrum
shoulder		acromion

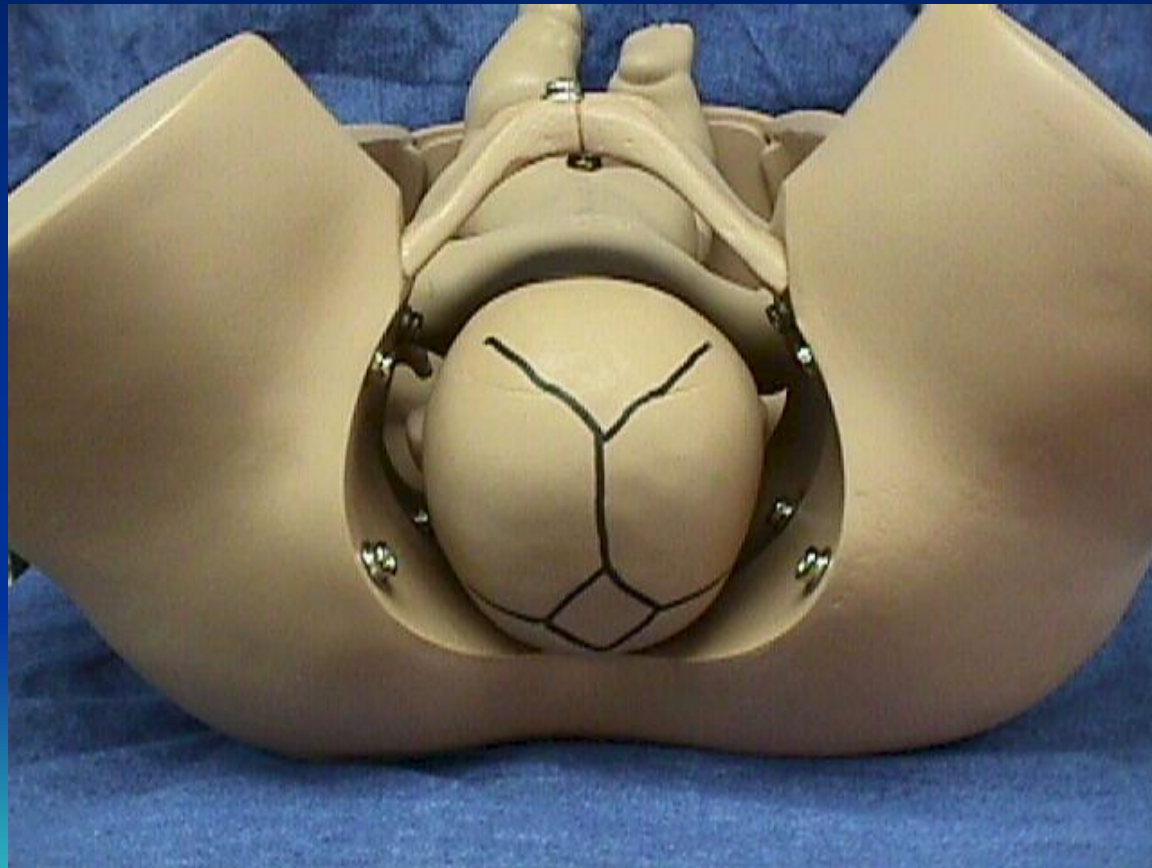
- ***POSITION***
- ***The relationship of the denominator to maternal sacroiliac joint in***
- ***the four quadrants of the maternal pelvis.***



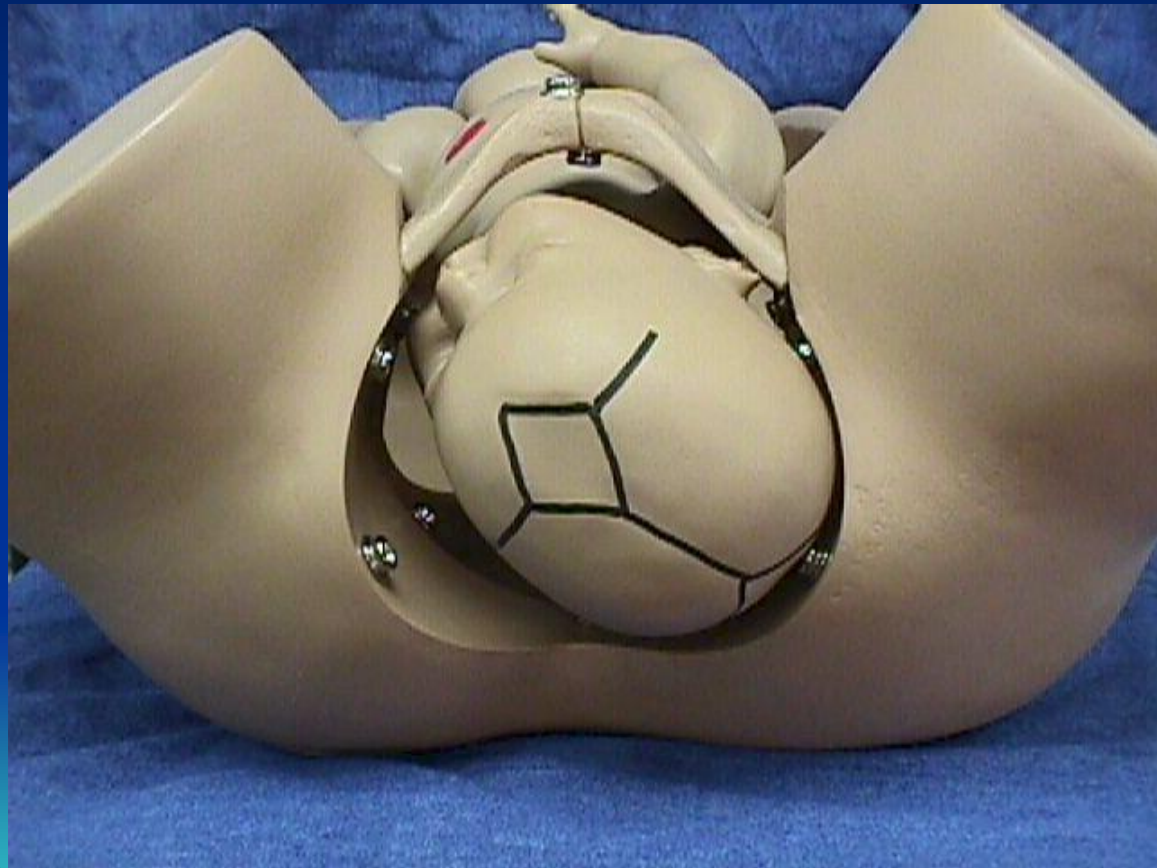
- In vertex presentation
- *Left occipitoanterior(common)*
- *Left occipitotransverse*
- *Left occipitoposterior*
- *Right occipitoanterior*
- *Right occipitotransverse*
- *Right occipitoposterior*



Occipitoanterior



Left occipitoposterior



LeftOccipitoanterior



Anteroposterior diameters of the fetal skull

AP diameter	Attitude	Presenting part
Suboccipitobregmatic 9.4 cm	Complete flexion	Vertex occipitoanterior
Suboccipitofrontal 10.5 cm	Incomplete flexion	Vertex occipitoposterior
Occipitofrontal 11 cm	Deflexion	Vertex occipitoposterior
Verticomenal 13.5 cm	Extension	Brow
Submentobregmatic 9.4 cm	Complete extension	face





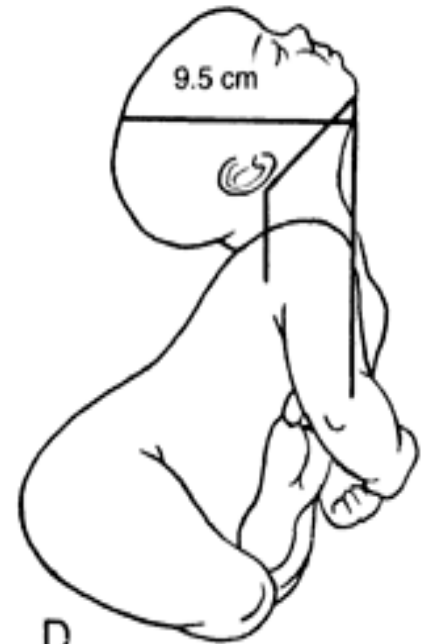
A



B



C



D

FETAL SKULL DEFINITIONS

Bregma →

- Ant fontanelle

Brow →

- lies between bregma & root of the nose

Face →

- lies between root of the nose & suborbital ridges

Occiput →

- bony prominence behind post fontanelle

Vertex →

- diamond shaped area between ant & post fontanelles & parietal eminences



FETAL SKULL SUTURES

- **Frontal suture** ➡
between 2 frontal bones
- **Sagittal suture** ➡
between 2 parietal bones
- **Coronal suture** ➡
between parietal & frontal
- **Lambdoid suture** ➡
between parietal & occipital
- **Temporal suture** ➡
between inferior margin of the parietal &
temporal

FETAL SKULL FONTANELLES

➤ Anterior fontanelle ➡

diamond shaped space between coronal & sagittal suture 3 * 3 cm , ossifies at 18 m

➤ Post font (lambda) ➡

triangle shaped space between sagittal & lambdoid suture

FETAL SKULL DIAMETERS

➤ **Occipitofrontal 11.5 cm** ➡

Root of the nose to the most prominent point of the occiput

A deflexed head presents with this diameter

➤ **Mentovertical 13 cm** ➡

Chin to most prominent point of the occiput

The presenting diameter in brow presentation

The largest diameter of the fetal head

➤ **Submentobregmatic 9.5 cm** ➡

Chin to middle of bregma

The presenting diameter in face presentation

MOULDING OF THE HEAD

- Occurs with descent of the fetal head into the pelvis to **reduce the head circumference**
- Frontal bones **slip under** parietal bones
- Parietal bones **override** each other
- Parietal bones **slip under** the occipital bone



MOULDING OF THE HEAD

DEGREE OF MOULDING

Assessed vaginally

➤ 0 ➡

suture lines are separate

➤ +1 ➡

suture lines meet

➤ +2 ➡

suture lines overlap but can be reduced by gentle digital pressure

➤ +3 ➡

overlap irreducible

