**Anatomy of the Foetal Skull**

It consists of vault, face and base.

The vault is composed of:

- 2 frontal bones separated by the frontal suture,

- 2 parietal bones separated by the sagittal suture,

- the occipital bone separated by the lamboidal suture from the parietal bones, while the coronal suture separates the frontal from the parietal bones.

Each of the 2 parietal bones is separated from the temporal bone on each side by the temporal suture.

The face is the area from the junction of the chin and neck to the root of the nose and supra-orbital ridges.

**The vertex is the area of the vault bounded;**

- anteriorly by the anterior fontanelle and the coronal suture,

- posteriorly by the posterior fontanelle and lamboidal suture,

- laterally by 2 lines passing by the parietal eminencies.

The brow is the area from the nose and supra-orbital ridges to the anterior fontanelle and coronal suture. The Fontanelles:

These are 6 areas lie at the meeting of the sutures. Four fontanelles lie at the anterior and posterior end of the temporal sutures on each side and have no obstetric importance. The anterior and posterior fontanelles are important to diagnose:

i) the vertex presentation,

ii) the position of the occiput,

iii) the degree of flexion of the head.

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| * **Anterior Fontanelle (Bregma)**
* Large, and lozenge-shaped.
* Its floor is membranous.
* Surrounded by 4 bones. (2 frontal bones and 2 parietal).
* The floor is completely ossified 1.5 years after birth.
* The surrounding bones are not overlapping during moulding.
 | **Posterior Fontanelle (Lambda)*** Small and triangular.
* Its floor is bony.
* Surrounded by 3 bones. (2 parietal bones and occipital).
* The floor is completely ossified at full term.
* The surrounding bones are overlapping during moulding.
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**Diameters of Foetal Skull:**

**(A) Longitudinal diameters**:

 (1) Suboccipito-bregmatic = 9.5cm

- from below the occipital protuberance to the centre of the anterior fontanelle (bregma).

- It is the engagement diameter in occipito-anterior with complete flexion.

 (2) Suboccipito-frontal = 10 cm

- from below the occipital protuberance to the anterior end of the bregma.

- It is the engagement diameter in occipito anterior with incomplete flexion.

- It is the diameter that distends the vulva in occipito anterior if the head is allowed to extend after crowning.

**(3) Occipito-frontal = 11.5 cm**

- form the occipital protuberance to the root of the nose.

- It is the engagement diameter in occipito-posterior position.

- It is the diameter that distends the vulva in face to pubis delivery.

- It is the diameter that distends the vulva if the head extends before crowing in occipito anterior. **(4) Submento -bregmatic = 9.5 cm**

- from the junction of the chin and neck to the centre of the bregma.

- It is the engagement diameter in face presentation when the head is completely extended.

 (5) Submento-vertical =11.5 cm

- from the junction of the chin and neck to the vertical point which is a point on the sagittal suture midway between anterior and posterior fontanelles.

- It is the engagement diameter in the incompletely extended face.

- It is the diameter that distends the vulva during face delivery.

**(6) Mento-vertical =13.5 cm**

- from the tip of the chin to the vertical point.

- It is the engagement diameter in brow presentation. As it is longer than the largest diameter of the pelvic brim, the head cannot enter the pelvis.

**(B) Transverse diameters:**

**(1) Biparietal =9.5 cm:** between the 2 parietal eminencies.

 **(2) Subparietal supraparietal = 9cm**

- from below one parietal eminence to above the opposite eminence.

- It is the engagement diameter in case of asynclitism.

 **(3) Bitemporal = 8 cm:** between the anterior ends of the temporal sutures.

 **(4) Bimastoid = 7.5cm:** between the tips of the 2 mastoid processes.

**Obstetric Terms**

**Presentation:**

The part of the foetus related to the pelvic brim and first felt during vaginal examination.

The presentation may be:

**(a) Cephalic (96%):**

 **i) Vertex:** when the head is flexed.

 **ii) Face:** when the head is extended.

 **iii) Brow:** when it is midway between flexion and extension.

**(b) Breech** (3.5%).

**(c) Shoulder** (0.5%).

Cephalic presentation is the commonest as this makes the foetus more adapted to the pyriform-shaped uterus with the larger buttock in the wider fundus and the smaller head in the narrower lower part of the uterus.

 **Position:**

The relation of the foetal back to the right or left side of the mother and whether it is directed anteriorly or posteriorly.

**The denominator:** is a bony landmark on the presenting part used to denote the position.

 In vertex it is the occiput.

 In face it is the mentum (chin).

In breech it is the sacrum.

In shoulder it is the scapula.

Occipito-anterior positions are more common than occipito posterior positions because in occipito - anterior positions the concavity of the anterior aspect of the foetus due to its flexion fits with the convexity of the vertebral column of the mother due to its lumbar lordosis.

\* In each presentation, except the shoulder, there are 8 positions.

 In vertex presentation they are:

- Left occipito -anterior (LOA) 60%.

- Right occipito-anterior (ROA) 20%.

- Right occipito - posterior (ROP) 15%.

- Left occipito-posterior (LOP)5%.

- Left occipito-transverse (LOT).

- Right occipito - transverse (ROT).

- Direct occipito -anterior (DOA).

- Direct occipito - posterior (DOP).

LOA is more common than ROA, and ROP is more common than LOP as in LOA and ROP the head enters the pelvis in the right oblique diameter which is more favourable than the left oblique because:

i) anatomically, the right oblique is slightly longer than the left,

ii) the pelvic colon reduces the length of the left oblique.

**Lie:** It is the relation between the long axis of the foetus and that of the mother.

- Longitudinal in cephalic and breech presentations.

- Transverse or oblique in shoulder presentation.

**Attitude:** The relation of foetal parts to each other.

- Flexion in the majority of cases.

- Extension in face presentation.

 **Synclitism:** The posture in which the 2 parietal bones are at the same level.

**Asynclitism:** - The posture in which one parietal bone is at a lower level than the other due to lateral inclination of the head.

- Asynclitism is beneficial in bringing the shorter subparietal supraparietal diameter (9 cm) to enter the pelvis instead of the longer biparietal (9.5 cm).

- Slight degree of asynclitism may occur in normal labour.

(1) Anterior parietal bone presentation:

- The anterior parietal bone is lower and the sagittal suture is near to the promontory.

- It occurs more in multigravidas due to laxity of the abdominal wall.

- It occurs also in contracted flat pelvis.

(2) Posterior parietal bone presentation:

- The posterior parietal bone is lower and the sagittal suture is near to the symphysis.

- It occurs more in the primigravidas due to tense abdominal wall. Anterior parietal bone presentation is more favarouble because;

1.The head lies more in the direction of the axis of the pelvic inlet. mphysis pubis.

2. During correction of asynclitism, the head meets only the resistance of the sacral promontory while in posterior parietal bone presentation the head meets the resistance of the whole length of the sy

3. In posterior parietal bone presentation the head stretches the anterior wall of the lower uterine segment with liability to rupture.

**Engagement:**

- It is the passage of the widest transverse diameter of the presenting part, which is the biparietal in vertex presentation, through the pelvic inlet.

- The engaged head cannot be easily grasped by the first pelvic grip, but it can be palpated by the second pelvic grip.

- Rule of fifths: 2/5 or less of the foetal head is felt abdominally above the symphysis pubis.

- Vaginally: the vertex is felt vaginally at or below the level of ischial spines.

 **Stations: with reference point of ischial spine (+5) to (-5 )**

Station 0 the vertex at the level of ischial spines.

Stations -1, -2 and -3 represents 1,2 and 3 cm respectively above the level of ischial spines.

Stations +1, +2 and +3 represents 1,2 and 3 cm respectively below the level of ischial spines.

- In the primigravidas, engagement of the head occurs in the last 3-4 weeks of pregnancy due to the tonicity of the abdominal and uterine muscles.

- In the multipara, the head is usually engaged at the onset of labour or even at the beginning of the second stage due to less tonicity.

**Causes of non-engagement:**

 (I) Faults in the passenger:

1- Large head.

2- Hydrocephalus.

3- Occipito-posterior positions.

4- Malpresentations.

5- Multiple pregnancy.

6- Placenta praevia.

7- Short cord.

8- Polyhydramnios.

 (II) Faults in the passages:

1- Contracted pelvis.

2- Pelvic tumours.

3- Full bladder or rectum.

(III) Faults in the power:

Atony of the abdominal muscles.