

THE FEMALE PELVIS AND FETAL SKULL:

The female bony pelvis is divided into:

- False pelvis: above the pelvic brim and has no obstetric importance.
- True pelvis: below the pelvic brim and related to the child -birth.

THE TRUE PELVIS

It is composed of inlet, cavity, and outlet.

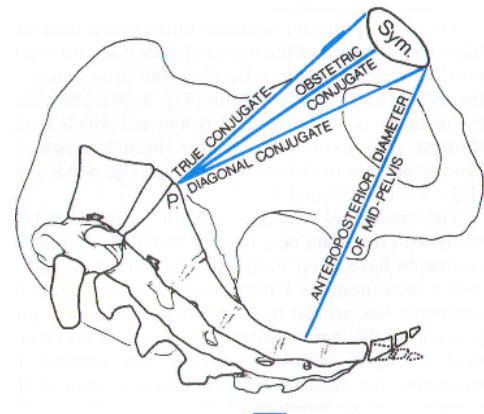
1. The Pelvic Inlet (Brim)

Boundaries

- sacral promontory,
- alae of the sacrum,
- sacroiliac joints,
- iliopectineal lines,
- iliopectineal eminences,
- upper border of the superior pubic rami,
- pubic tubercles,
- pubic crests and
- upper border of symphysis pubis.

Diameters

- Antero -posterior diameters:
 - Anatomical antero-posterior diameter (true conjugate) = 11cm
 - from the tip of the sacral promontory to the upper border of the symphysis pubis.
 - Obstetric conjugate = 10.5 cm
 - from the tip of the sacral promontory to the most bulging point on the back of symphysis pubis which is about 1 cm below its upper border. It is the shortest antero-posterior diameter.
 - Diagonal conjugate = 12.5 cm
 - i.e. 1.5 cm longer than the true conjugate. From the tip of sacral promontory to the lower border of symphysis pubis.
 - External conjugate = 20 cm
 - from the depression below the last lumbar spine to the upper anterior margin of the symphysis pubis measured from outside by the pelvimeter. It has not a true obstetric importance.
- Transverse diameters:
 - Anatomical transverse diameter =13cm
 - between the farthest two points on the iliopectineal lines.
 - It lies 4 cm anterior to the promontory and 7 cm behind the symphysis.
 - It is the largest diameter in the pelvis.
 - Obstetric transverse diameter:
 - It bisects the true conjugate and is slightly shorter than the anatomical transverse diameter.
- Oblique diameters:
 - Right oblique diameter =12 cm
 - from the right sacroiliac joint to the left iliopectineal eminence.
 - Left oblique diameter = 12 cm
 - from the left sacroiliac joint to the right iliopectineal eminence.
 - Sacro-cotyloid diameters = 9-9.5 cm



- from the promontory of the sacrum to the right and left iliopectineal eminence, so the right diameter ends at the right eminence and vice versa.

2. The Pelvic Cavity

It is a segment, the boundaries of which are:

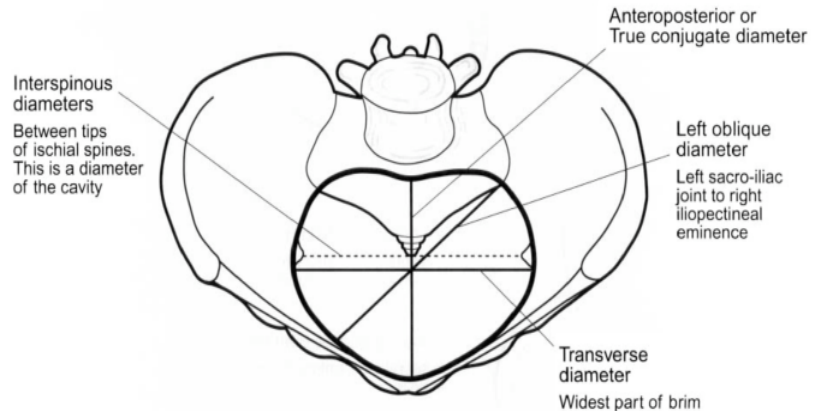
- the roof is the plane of pelvic brim,
- the floor is the plane of least pelvic dimension,
- anteriorly the shorter symphysis pubis,
- posteriorly the longer sacrum.

3. The Pelvic Outlet

Anatomical outlet

It is lozenge-shaped bounded by;

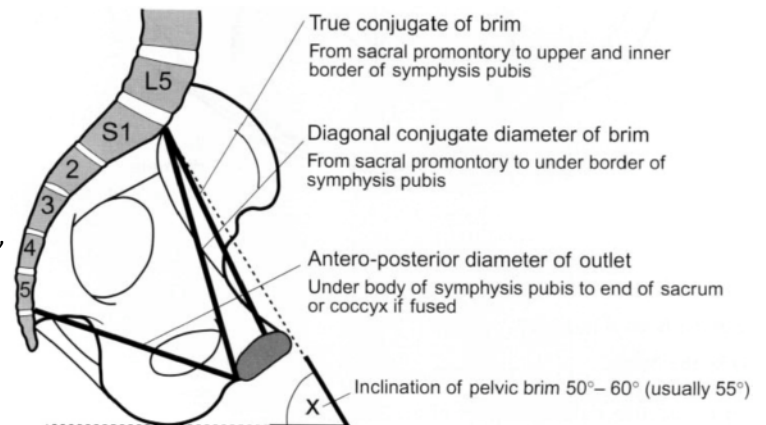
- the lower border of symphysis pubis,
- pubic arch,
- ischial tuberosities,
- sacrotuberous & sacrospinous ligament
- tip of the coccyx.



Obstetric outlet

It is a segment, the boundaries of which are:

- the roof is the plane of least pelvic dimension,
- the floor is the anatomical outlet,
- anteriorly the lower border of symphysis pubis,
- posteriorly the coccyx,
- laterally the ischial spines.

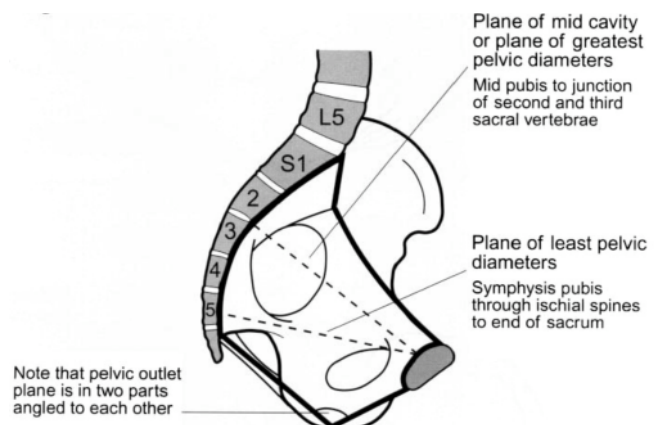


Diameters of pelvic outlet

- Antero - posterior diameters:
 - Anatomical antero-posterior diameter = 11cm
 - from the tip of the coccyx to the lower border of symphysis pubis.
 - Obstetric antero-posterior diameter = 13 cm
 - from the tip of the sacrum to the lower border of symphysis pubis as the coccyx moves backwards during the second stage of labour.
- Transverse diameters:
 - Bituberous diameter = 11 cm
 - between the inner aspects of the ischial tuberosities.
 - Bispinous diameter = 10.5 cm
 - between the tips of ischial spines.

PELVIC PLANES

These imaginary planes lie as follow:



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

2. Plane of mid cavity (plane of greatest pelvic dimensions)

- pass between the middle of the posterior surface of the symphysis pubis and the junction between 2nd and 3rd sacral vertebrae. Laterally, it passes to the centre of the acetabulum and the upper part of the greater sciatic notch.
- It is a round plane with a diameter of 12.5 cm.
- Internal rotation of the head occurs when the biparietal diameter occupies this wide pelvic plane while the occiput is on the pelvic floor, i.e. at the plane of the least pelvic dimensions.

3. Plane of obstetric outlet (plane of least pelvic dimensions): passes from the lower border of the symphysis pubis anteriorly, to the ischial spines laterally, to the tip of the sacrum posteriorly.

4. Plane of anatomical outlet: passes with the boundaries of anatomical outlet and consists of 2 triangular planes with one base which is the bi-tuberous diameter.

- Anterior sagittal plane: its apex at the lower border of the symphysis pubis.
- Posterior sagittal plane: its apex at the tip of the coccyx.
- Anterior sagittal diameter: 6-7 cm
 - from the lower border of the symphysis pubis to the centre of the bituberous diameter.
- Posterior sagittal diameter: 7.5-10 cm
 - from the tip of the sacrum to the centre of the bituberous diameter.

PELVIC AXES

Anatomical axis (curve of Carus)

- It is an imaginary line joining the centre points of the planes of the inlet, cavity and outlet.
- It is C shaped with the concavity directed forwards.
- It has no obstetric importance.

Obstetric axis

- It is an imaginary line, represents the way passed by the head during labour.
- It is J shaped, passes downwards and backwards along the axis of the inlet till the ischial spines where it passes downwards and forwards along the axis of the pelvic outlet.

Note: At the Level of Ischial Spines:

- The plane of obstetric outlet (plane of the least pelvic dimensions) is at this level.
- The levator ani muscles are situated at this level and its ischio-coccygeous part is attached to the ischial spines.
- The obstetric axis of the pelvis changes its direction.
- The head is considered engaged when the vault is felt vaginally at or below this level.
- Internal rotation of the head occurs when the occiput is at this level.
- Pudendal nerve block is carried out at this level.
- The external os of the cervix is located normally.
- The vaginal vault is located nearly.
- The ring pessary should be applied above this level for treatment of prolapse.

FETAL SKULL

SUTURES :

Sagittal suture:- This lies in between two parietal bone.

Coronal suture:- This lies in between the frontal and parietal bone on either side.

Frontal suture:- This lies in between two frontal bone.

Lambdoid suture:- It lies in between the parietal and occipital bone on either side.

CLINICAL IMPORTANCE OF SUTURE:-

1. These sutures permit gliding movement of one bone over the other during moulding of the head in the vertex presentation, as a result the diameter of the head get smaller so passage of head through the birth canal become easier.
2. Position of fontanelle and sagittal suture can identify attitude and position of vertex.
3. From the digital palpation of the sagittal suture during labour, degree of internal rotation and degree of moulding of the head can be noticed.
4. In deep transverse arrest, this sagittal suture lies transversely at the level of the ischial spines.

AREAS OF SKULL

A. Vertex:-

It is the quadrangular area bounded anteriorly by the bregma and coronal sutures behind by the lambda and the lambdoid sutures and laterally by the line passing through the parietal eminences.

B. Brow:-

It is an area bounded on one side by the anterior fontanelle and the coronal sutures and on the other side by the root of the nose and supra-orbital ridges of the either side.

C. Face:-

It is an area bounded on one side by the root of the nose and the supra-orbital ridges and on the other by the junction of the floor of mouth with neck.

Anterior fontanelle or bregma:-

It is a diamond shaped area of unossified membrane formed by the junction of 4 sutures.

The sutures are:-

Anteriorly:- frontal suture

Posteriorly:- sagittal suture

Laterally, on both side:-coronal suture.

It is felt on fetal head surface as a soft shallow depression.

It ossifies by 18 months after birth.

Posterior fontanelle or lambda:-

It is the triangular depressed area at the junction of the three sutures.

Anteriorly:- sagittal suture

Posteriorly:- 2 lambdoid sutures at both side.

It ossifies as term.

DIAMETER OF SKULL

The engaging diameter of the fetal skull depends on the degree of the flexion of the presenting part.

A. The antero-posterior diameter which may be engaged are:-

1. Sub-occipito bregmatic:-

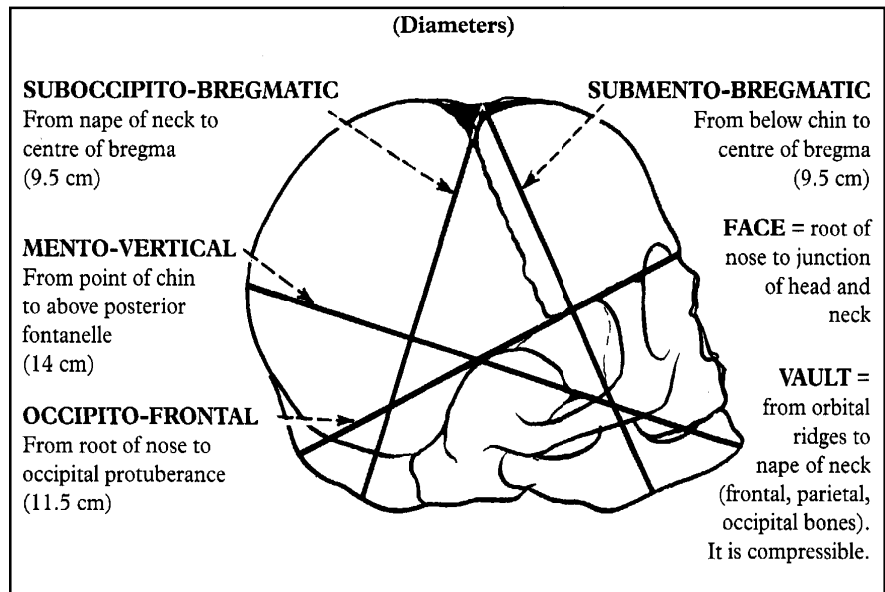
It extends from the nape of the neck to the centre of anterior fontanelle.

Length:- 9.5cm

Attitude:- complete flexion
 Presentation:- Vertex.
 Clinical importance:- Smallest diameter.

2. Suboccipito frontal:-
 It extends from the nape of the neck root of nose.
 Length:- 10cm
 Attitude:- Incomplete flexion.
 Presentation:- Vertex.

3. Occipito-frontal:-
 Extends from the occipital eminence the root of the nose (Glabella).
 Length:- 11.5cm
 Attitude:- Marked deflexion
 Presentation:- vertex
 Clinical importance:- This engaging diameter may give rise to prolonged labour.



4. Mento-vertical:-
 It extends from the mid-point of the chin to the center of the sagittal suture.
 Length:- 14cm
 Attitude :- Partial extension.
 Presentation:- Brow
 Clinical importance:- In this engaging diameter, baby has to be delivered by caesarean section.

5. Sub-mento vertical:-
 It extends from the junction of the floor of the mouth and neck to the center of the sagittal suture.
 Length:- 11.5cm
 Attitude: - Incomplete extension.
 Presentation:- Face
 Clinical importance:- In this engaging diameter, baby has to be delivered by caesarean section.

6. Sub-mento bregmatic:-
 It extends from the junction of the floor of the mouth and neck to the centre of bregma.
 Length:-9.5cm
 Attitude:-Complete extension
 Presentation:-Face
 Clinical importance:- In this engaging diameter, baby has to be delivered by caesarean section.

B. The transverse diameter are:-

1. Bi parietal diameter:-
 It extends between 2 parietal eminences.
 Length:- 9.5cm
 Attitude: - irrespective of position of head this diameter always engages.

2. Bi temporal diameter:-
 Distance between the anterior-inferior ends of the coronal suture.
 Length:- 8.5 cm

