• MIDWIFERY

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TOPICS

1. FEMALE PELVIS
2. ANTENATAL EXAMINATION
3. MECHANISM OF NORMAL DELIVERY
The female pelvis because of its characteristics, aids in child birth. The bony pelvis in normal standing posture transmits the body weight of head, trunk and the upper extremities to the lower extremities. In female it is adapted for child bearing. The obstetrical anatomy of a typical female pelvis is best considered as one unit.
FUNCTIONS OF FEMALE PELVIS

- The primary function of the pelvic girdle is to allow movement of the body, especially walking and running. The women pelvis is adapted for child bearing, and because of its increased width and rounded brim women are less speedy than men.

- The pelvis transmits the weight of the trunk to the legs, acting as a bridge between the femur. This makes it necessary for the sacro-iliac joint to the immensely strong and virtually immobile.

- The pelvis affords protection to the pelvic organs and, to a lesser extent, to the abdominal contents. The sacrum transmits the cauda equina and distributes the nerves to the various parts of the pelvis.
Pelvic bones

- There are four pelvic bones
  - Two innominate (nameless) or hip bones
  - ilium, ischium and pubis
  - One sacrum
  - One coccyx
Innominate bones: each innominate bone is composed of three parts

- Ilium
- Ischium
- Pubic bones

The ilium - ilium is the larger flared out part. When the hand is placed on the hip it rests on the iliac crest, which is the upper border. At the front of the iliac crest can be felt a bony prominence known as the anterior superior iliac spine.

A short distance below it is the anterior inferior iliac spine. There are two similar points at the other end of the iliac crest, namely the posterior superior and the posterior inferior iliac spines. The concave anterior surface of the ilium is the iliac fossa.
- **The ischium** - ischium is the thick lower part. It has a large prominence known as the ischium tuberosity, on which the body rests when sitting. Behind and a little above the tuberosity is an inward projection, the **ischial spine**. In labour the station of the fetal head is estimated in relation to the ischial spines.
The pubic bone- this bone forms the anterior part. It has a body and two oar like projections, the superior ramus and the inferior ramus. The two pubic bones meet at the symphysis pubis and the two inferior rami from the pubic arch, merging into a similar ramus and the ischium. The space enclosed by the body of the pubic bone, the rami and the ischium is called the obturator foramen.
Sacrum: the sacrum is a wedge shaped bone consisting of five fused vertebrae. The upper border of the first sacral vertebra juts forward and is known as the sacral promontory.

The anterior surface of the sacrum is concave and is referred to as the hollow of sacrum. Laterally the sacrum extends into a wing or ala.

Four pairs of holes or foramina pierce the sacrum and through these, nerves from the Cauda Equina emerge to supply the pelvic organs.

The posterior surface is roughened to receive attachments of muscles.
**Coccyx:** the coccyx is a vestigial tail. It consists of four fused vertebra forming a small triangular bone. With its base uppermost articulating with the lower end of the sacrum. During labour it moves backward, having more space for the delivery of the fetus this is called nodding.
Pelvic joints
There are four pelvic joints
- One symphysis pubis
- Two sacroiliac joints
- One sacro-coccygeal joint
The symphysis pubis is formed at the junction of the two pubic bones, which are united by a pad of cartilage.

The sacroiliac joints - these are the strongest joints in the body. They join the sacrum to the ilium and thus connect the spine to the pelvis.

The sacro coccygeal joint - this joint is formed where the base of the coccyx articulate with the tip of the sacrum.
LIGAMENTS OF THE PELVIS

anterior sacroiliac ligament
The sacrotuberous and sacrospinous ligaments complete the greater and lesser sciatic foraminae.
Pelvic ligaments
Each of the pelvic joints is held together by ligaments

- Interpubic ligaments at the symphysis pubis
- Sacro-iliac ligaments
- Sacro-coccygeal ligaments

There are two other ligaments important in midwifery

- The sacro-tuberous ligament
- The sacro-spinous ligament
The sacro-tuberous ligament runs from the sacrum to the ischial tuberosity and the sacro-spinous ligament from the sacrum to the ischial spine. These two ligaments cross the sciatic notch and from the posterior wall of the pelvic outlet.
The pelvis is broadly divided into true pelvis and false pelvis.

- **The false pelvis:** is divided by the linea terminalis into the false pelvis above this demarcation and the true pelvis below it. The false pelvis is the portion above the pelvic brim. It has no obstetric significance relevant to the passage of the fetus through the pelvis.

- **The true pelvis:** the true pelvis constitutes the bony passage through which the fetus must pass through to be born vaginally. Therefore, its construction planes and diameters are of utmost interest in obstetrics.
Landmarks of the brim: the inlet has the landmarks, these are the fixed anatomical points on the brim.

1. Sacral promontory
2. Sacral wing or sacral ala
3. Sacro-iliac joint
4. The ilio-pectineal line - the edge formed at the inward aspect of the ilium
5. The ilio-pectineal eminence - a roughened area where the superior ramus of the pubic bone meets the ilium
6. Superior ramus of the pubic bone
7. Upper inner border of the body of pubic bone.
8. Upper inner border of the symphysis pubis.
The pelvic cavity
This extends from the pelvic brim to the pelvic outlet. It forms the *curve of Carus*, which the fetus has to navigate in order to be born and has no specific landmarks.

The pelvic outlet
This is either an ovoid or diamond-shaped space; its perimeter is partially comprised of ligaments. The landmarks of the pelvic outlet are as follows:
- Lower border of the symphysis pubis
- Pubic arch
- Ischial spines and ischial tuberosities
- Sacrotuberous and sacrospinous ligaments
- Lower aspect of the sacrum and the coccyx
The major obstetric interest in the female bony pelvis is that it is not distensible, with only minor degrees of movement being possible at the symphysis pubis and sacroiliac joints.

The various dimensions of the pelvis are significant in the context of childbirth and the successful passage of the fetus through the bony pelvic structure.

The most common type of female pelvis (gynaecoid) is considered to be the optimal shape and size for childbirth;

The diameters of the pelvis
Diameters of the pelvic brim
The pelvic brim
There are three diameters that are measured these are referred as:

- Anterior-posterior diameter
- Oblique diameter (left and right)
- Transverse diameter
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<th>Anteroposterior</th>
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<td>Cavity</td>
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<td>Outlet</td>
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Pelvic measurements given in centimetres
Figure 1.5  Superficial muscles of the perineum.
The puborectalis is actually a part of the pubococcygeus muscle that wraps around the posterior aspect of the rectum forming a sling that holds the rectum forward in the pelvis.

The pubococcygeus and iliococcygeus muscles make up the levator ani. The muscles of the levator ani are important supportive muscles for the midline organs of the pelvis. Any weakness in these muscles can cause clinical problems of urinary or fecal incontinence.
The *levator ani* muscles otherwise known as the pelvic diaphragm or pubovisceralis (pubococcygeus) and iliococcygeus, are composed of striated muscle fibre. They are covered by fascia on their superior and inferior aspects. The anterior midline cleft in the muscles is known as the urogenital hiatus, through which the urethra, vagina and anorectum pass.

The *perineal membrane* is sometimes called the urogenital diaphragm, or the triangular ligament. It lies inferior to the levator ani and attaches the edges of the vagina to the ischiopubic ramus, provides lateral attachments for the perineal body and assists in the support of the urethra. It is suggested that it has a greater supportive function when the levator ani muscles are relaxed.
levator ani is considered as several separate muscle parts:

- pubovaginalis
- coccygeus
- iliococcygeus
- pubococcygeus
- Puborectalis

**origin:**
from a tendinous arch between the pubis and ischial spine on the internal surface of the pelvis

**insertion:**
perineal body
external wall of anal canal
anococcygeal ligament
coccyx
Pubovaginalis originate from the posterior pelvic surface of the body of the pubis bone. Fibres pass inferiorly, medially and posteriorly. 

inserts into the central perineal tendon posterior to the vagina.

The levator ani muscle seen from above looking over the sacral promontory (SAC) showing the pubovaginal muscle (PVM). The urethra, vagina, and rectum have been transected just above the pelvic floor. PAM = puboanal muscle; ATLA = arcus tendineus levator ani; and ICM = iliococcygeal muscle
OBSTETRICAL EXAMINATION

- ABDOMINAL EXAMINATION IN PREGNANCY
- STAGES OF LABOUR
- MECHANISM OF LABOUR AND THE PARTOGRAM
ABDOMINAL EXAMINATION IN PREGNANCY

- Inspection
- Palpation
- Auscultation
- Describe the abdominal distension (pyriform).
- Previous operative (Caesarean) scars
- Striae gravidarum or stretch marks

- Linea nigra- a dark vertical line appearing on the abdomen from the pubis to above the umbilicus during pregnancy due to increase melanocyte-stimulating hormone made by the placenta.
- Visible foetal movements.
ABDOMINAL EXAMINATION IN PREGNANCY- PALPATION

- Fundal height (Symphysis-fundal height)
- Foetal poles
- Foetal lie
- Presentation- cephalic(head), breech, etc
- Attitude
- Level of engagement of presenting part
- State of uterine wall/ myometrium
- Liquor volume
- Estimate foetal weight
- Foetal movements
1) **Symphysis-fundal height (Size and gestational age of the uterus):**

More objective, distance from the symphysis pubis to the uterine fundus (top of the uterus)- size of the uterus directly related to the size of the fetus.

**Technique:**
- Palpate down from xiphi-sternum to determine the highest part of the uterus (fundus), may not always be in the midline.
- Mark this point with a pen after obtaining her permission.
- A tape measure turned upside-down (blinded to avoid bias) is then placed from the mid-point on the uppermost border of the symphysis pubis over the curve of the uterus to the marked highest point of the uterus.
- The tape is then turned and actual measurement in cm is recorded, preferably in graphic form.
ABDOMINAL EXAMINATION IN PREGNANCY-PALPATION

Fundal height is measured in centimeters from the pubic symphysis to the top most portion of the uterus.

Pubic Symphysis
2) Palpation of the contents of the uterus:

- The fundal grip

(foetal poles):
- Both hands placed over the fundus and the contents of the fundus determined.

- A hard smooth, round pole indicates a fetal head.

- A softer triangular pole continuous with the fetal body is the fetal buttocks (breech).
The lateral grip (Fetal lie):
- Move both hands in a downward direction from the fundus along the sides of the uterus to determine the "lie" of the foetus.
- "Lie" is the relationship btw the longitudinal axis of the foetus and the longitudinal axis of the mother.
- The "lie" is usually longitudinal
  -(transverse lie and oblique lie)
- Can also determine which side the foetal back is situated by feeling the firm regular surface of the foetal back on one side and the irregular, lumpy surface as the foetal limbs on the other side.
Pawlik's grip (Presenting part):

-The thumb and middle fingers of the right hand are placed wide apart over the suprapubic area to determine the presenting part.

-Presenting part of fetus is the lowest most part of the fetus at the inlet of the pelvis (the lower fetal pole as opposed to the fetal pole in the fundus).

-Cephalic or breech presentation distinguished from each other as indicated in the previous slide.
Deep pelvic grip:
Determines two points about the fetus

1) The attitude of the fetal head:
- The examiner turns around to face patients feet.
- Each hand placed on either side of the fetal trunk lower down.
- The hands moved downwards towards the fetal head.
- Note made as to which hand first touches the fetal head (This point called cephalic prominence).
- Cephalic prominence helps determine the attitude (i.e. flexion, deflexed or extended) of fetal head.
- If cephalic prominence is on the opposite side of fetal back, fetal head is well flexed (normal position).
- If cephalic prominence on the same side as fetal back, fetal head is extended (abnormal position).
- If examiners hands reach the fetal head equally on both sides, fetal head is deflexed ('Military position, indicating mal-position)
2) Engagement of the fetal head:

- Continue moving both hands down around the fetal head, determine how far around the head you can get.
- Engagement of the fetal head defined as having occurred once the widest transverse diameter of the fetal head (bi-parietal diameter) has passed through the pelvic inlet into the true pelvis.
- Examiner should be able to palpate part of fetal head still in the lower abdomen (also called the 'false' pelvis but cannot palpate the part of fetal head in the true pelvis.

If you divide the fetal head into five-fifths, you estimate how many fifths of the fetal head can be felt. If 5, 4 or 3 fifths can still be palpated, most of the head is still up, hence the widest part of the head has not engaged into the pelvis.
- If only 2, 1 or 0 fifths of fetal head felt, the widest part of the head has engaged into the pelvis.
The Leopold's Manouevre.
Additional uterine assessment:

1) The myometrium (uterine wall):
- Comment on whether the myometrium is soft (normal antenatal state) or contracting (normal state when in labour is 30-60 sec period of being firm to hard followed by 2-5 min interval of being soft).
- It may also be hard in abruptio placentae or irritable whenever palpation of uterus attempted as in intrauterine growth impairment of the foetus.

2) The liquor volume:
- Assessment made of the volume of amniotic fluid surrounding the foetus.
- Reduced volume called Oligohydranios and foetal parts are easily felt.
- Increased volume called polyhydramnios and there is difficulty in feeling the foetal parts.
3) Estimate foetal weight:

- Difficult and requires practice.
  - Foetus of 28wks gestation and SFH of 28cm is approx 1.1kg
  - A 34wk foetus with SFH of 34cm is approx 2.2kg
  - A term foetus (40wks) with variable SFH btw 36 and 40cm is approx 3.3kg.
  - Each week btw these parameters accounts for about 200g.

4) Foetal movements:

- During the examination note any foetal movements (kicks and rolling motions).
- Healthy foetuses move, sick or sleepy foetuses don't move.
Auscultation of the foetal heart:
- Auscultated with a foetal stethoscope (Pinard's foetal stethoscope) or with a doptone machine.
- Best place to listen is over the foetal back, closer to the cephalic pole.
- The normal foetal heart rate is btw 110 to 160 beats per minute.
MECHANISM OF LABOUR AND PARTOGRAPH
Definitions

✓ Labour:
Regular involuntary coordinated, painful uterine contractions associated with cervical effacement and dilatation
- Regular frequent uterine contractions
  +
- Cx changes (dilatation & effacement)
  or
- SROM

✓ Delivery:
Expulsion of the product of the conception after fetal viability.
The First Stage

- **start**
  - onset of labour
- **end**
  - Cervix reached full dilatation

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The Second Stage

- **start**
  - Cervix reached full dilatation
- **end**
  - expulsion of the fetus

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Third Stage “Placenta Stage”

- **start**
  - delivery of the child.
- **end**
  - expulsion of placenta.
MECHANISMS OF NORMAL LABOUR
Occiput anterior

Anterior
Occipital bone
Pubis

Right
Left
Occiputo anterior positions

Left occiput anterior

Right occiput anterior

Occiput anterior
D: Descent
F: Flexion
I: Internal rotation of the fetal head
C: Crowning
E: Extension
R: Restitution
I: Internal rotation of the shoulders
E: External rotation of the fetal head
L: Lateral flexion of the body
**Descent:**
-The fetal head descends through the pelvic inlet to the mid-pelvis in the LOA position.

**Flexion:**
-During this process the fetal head becomes more and more flexed.

**Internal rotation:**
-The foetus rotates 45 degrees internally, from LOA position, to direct occipito-anterior position (OA) due to the shape of the pelvic floor muscles (levator ani muscles).

**Birth by extension:**
-The foetal head passes through the pelvic outlet in the direct OA position and is born through the introitus by now extending the head.
Restitution:
- The foetal had undergone 45 degrees internal rotation relative to the maternal pelvis and also relative to the rest of the foetal body.
- Now that it is free of the maternal introitus, the baby's head will revert back to its original position relative to its body, i.e. back to an LOA position by turning back 45 degrees.
External rotation:
- At the same time as internal rotation and the birth of the head, the foetal shoulders have descended in an oblique diameter through the pelvic inlet to the mid-pelvis.
- As restitution of baby's head takes place, the fetal shoulders now undergo internal rotation from their oblique diameter into a direct anterior-posterior position in order to negotiate the pelvic outlet, just as the head did.
- The baby's free head rotates further from LOA position to a direct left occipito-transverse position (LOT).
- Both restitution and external rotation take place as one movement.
Birth of the shoulders:
The shoulders are now born. The anterior shoulder is born under the pubic symphysis and pivots there while the posterior shoulder is born over the perineum by lateral flexion.

Birth of the trunk and extremities:
Once the shoulders are born, the rest of the baby is born with relative ease.
Internal rotation of shoulder
External rotation of head
Lateral flexion of body
Crowning
Delivery
1. Head floating, before engagement
2. Engagement; descent, flexion
3. Further descent, internal rotation
4. Complete rotation, beginning extension
5. Complete extension
6. Restitution (external rotation)
7. Delivery of anterior shoulder
8. Delivery of posterior shoulder
Cardinal movements of labour (LOA)

Head is delivered by Extension

Restitution

External rotation
Head is delivered by EXTENSION
RESTITUTION

[Diagram of fetal and cranial structures]
EXTERNAL ROTATION

Posterior fontanel
STAGES OF LABOUR

- First stage of labour
- Second stage of labour
  1. The maternal well-being
  2. The progress of labour
  3. The fetal well-being
- Third stage of labour
AIMS

• Delivery of a normal healthy child

• To anticipate, recognize and treat potential abnormal conditions before significant hazard develops for the mother or the fetus.
PRINCIPLES

- Diagnosis of labour
- Monitoring the progress of labour
- Ensuring maternal well-being
- Ensuring fetal well-being.
MANAGEMENT OF LABOUR

I. LABOUR Assessment
II. Preparation and care
III. Partogram
THANK YOU