Abnormal Labour

Stage 4
Figure 14.2 The pelvic brim

Figure 14.3 Sagittal section of the pelvis demonstrating the anterior–posterior (AP) diameters of the inlet and outlet
Anatomy of the female pelvis and the fetus relevant to labour

- **The pelvic brim and inlet**
- The pelvic brim is the inlet of the pelvis and bounded in front by the symphysis pubis (the joint separating the two pubic bones) on each side by the upper margin of the pubic bone, the ileopectineal line and the ala of the sacrum posteriorly by the promontory of the sacrum.

- The normal transverse diameter in this plane is 13.5 cm and is wider than the anterior-posterior diameter which is normally 11 cm. Angle of the inlet is normally 60 degree to the horizontal in the erect position.
**The pelvic midcavity**

The pelvic midcavity can be described as an area bounded in front by the middle of the symphysis pubis on each side by the pubic bone, the obturator fascia and the inner aspect of the ischial bone and spine posteriorly by the junction of the 2nd and 3rd sections of the sacrum.

The cavity is almost rounded, as the transverse and anterior diameter are similar at 12 cm, the ischial spine are palpable vaginally and are used as landmarks to assess the descent of the head during vaginal examination (station) they are also used as landmarks for providing an anesthesia block to the pudendal nerve.

Pudendal nerve passes behind and below the ischial spine on each
The pelvic outlet

The pelvic outlet is bounded in front by the lower margin of the symphysis pubis on each side by the descending ramus of the pubic bone, the ischial tuberosity and the sacrospinous ligament posteriorly by the last piece of sacrum. The AP diameter of the pelvic outlet is 13.5 cm and the transverse diameter is 11 cm.

A variety of pelvic shapes has been described and these may contributed to difficulties in labor.
Figure 14.6 The android pelvis: (a) brim, (b) lateral view, (c) outlet

Figure 14.7 The anthropoid pelvis: (a) brim, (b) lateral view, (c) outlet

Figure 14.8 The platypelloid pelvis: (a) brim, (b) lateral view, (c) outlet

The perineum always involved in a second-degree perineal tear and
Figure 14.4  The pelvic outlet
**Gynaecoid pelvis**

- Present in 40% of women
- Pelvic inlet is rounded
- With transverse diameter larger than antero-posterior diameter
- Side wall is straight, well rounded sacroscaicitic notch,
- Well curved sacrum, spacious sub pubic angle = 90 degree, average prominence of spine, head forced to occipital anterior position
Figure 14.5  The gynaecoid pelvis: (a) brim, (b) lateral view, (c) outlet
- **Anthropoid pelvis**
  - 20% of female, long narrow oval inlet, long antero-posterior diameter large posterior inclination of sacrum, spine not prominent but close, narrow subpubic angle, precipitate occipital-posterior position
- **Android pelvis**

- In 30% of women tringular inlet with flat post segment widest diameter closed to sacrum, side is convergent, long and narrow sacrosciatic notch, shallow sacral curve, narrow subpubic arch, prominent spine, forced to be occipit-trasverse position (funnel shape) deep trasverse arrest
**Platypelloid pelvis**

- Flattened gynaecoid pelvis 3% of female pelvis
- Oval shape inlet, straight or divergent round sacrosciatic notch posterior inclination of sacrum wide bispinous diameter wide subpubic angle, fetal head engage in transverse diameter increased risk of obstructed labour.
The pelvic floor

This is formed by the two levator ani muscles which with their fascia form a musculofascial gutter during the 2nd stage of labour.

The perineal body is a condensation of fibrous and muscular tissue lying between the vagina and the anus.

It receives attachments of the posterior ends of the bulbocavernous muscles, the medial ends of the superficial and deep transverse perineal muscles and the anterior fibers of the external anal sphincter, it is always involved in a 2nd degree perineal tear and an episiotomy.
The pelvic floor muscles are made up of the levator ani (pubo-coccygeus and ilio-coccygeus)
Figure 14.10 The perineum, perineal body and pelvic floor from below, showing superficial (a) and deeper (b) views. The pelvic floor muscles are made up of the levator ani (pubo-coccygeus and ilio-coccygeus).
The fetal skull is made up of the vault, face, base.

The sutures are the lines formed where the individual bony plates of the skull meets one another.

At the time of labour, the sutures joining the bones of the face and the skull are firmly united the vault of the skull is formed by the parietal bones and parts of the occipital, frontal and temporal bones.

Between these bones there are four membranous sutures, the sagittal, frontal coronal and lambdoidal sutures.

The anterior fontanelle or bregma (diamond shape) is at the junction of the sagittal, frontal coronal sutures.

The posterior fontanelle triangular in shape lies at the junction of the sagittal and lambdoidal sutures between the two parietal bones and the occipital bones.
Figure 14.13 The diameters of the fetal skull
Figure 14.12  A schematic representation of moulding of the fetal skull
It allows these bones to move together and even to overlap the parietal bones usually tend to slide over the frontal and occipital bones.

The bones themselves are compressible together these characteristics of the fetal skull allow a process called moulding to occur, which effectively reduces the diameter of the fetal skull and encourages progress through the bony pelvis without harming the underlying brain.
- **Vertex** the area of the fetal skull bounded by the two parietal eminences and the anterior and posterior fontanelle.

- **The diameter of fetal skull**
- The attitude of the fetal head refers to the degree of flexion and extension at the upper cervical spine.
- Different longitudinal diameters are presented to the pelvis in labour depending on the attitude of the fetal head.
Further extension of the head **Occipito-frontal** diameter present this is measured from the root of the nose to the posterior fontanelle and is 11.5 cm.

The largest longitudinal diameter that may present is the **Mentvertical** which is taken from the chin to the furthest point of the vertex and measure 13 cm known as Brow presentation and it is usually too large to pass through the normal pelvis.
Extension of the fetal head beyond this point results in a smaller diameter, submentobregmatic diameter is measured below the chin to the anterior fontanelle and is 9.5 cm. This is clinically a face presentation.
<table>
<thead>
<tr>
<th>Attitude</th>
<th>Well flexed</th>
<th>Less well flexed (partially extended) or deflexed</th>
<th>Extended ‘brow presentation’</th>
<th>Hyperextended ‘face presentation’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td>Suboccipito-bregmatic</td>
<td>Occipito-frontal</td>
<td>Occipito-mental</td>
<td>Submento-bregmatic</td>
</tr>
<tr>
<td>Measurement</td>
<td>9.5 cm</td>
<td>11.5 cm</td>
<td>13.0 cm</td>
<td>9.5 cm</td>
</tr>
</tbody>
</table>

*Figure 14.14 The effect of fetal attitude on the presenting diameter*
Abnormal labour
Labour becomes abnormal when there is poor progress (as evidenced by a delay in cervical dilatation or descent of the presenting part) and/or the fetus shows signs of compromise. Also, if there is a fetal malpresentation, a multiple gestation, a uterine scar, or if labour has been induced, labour cannot be considered normal.
Poor progress in the first stage of labour

Poor progress in labour has been defined already as cervical dilatation of less than 2 cm in 4 hours, usually associated with failure of descent and rotation of the fetal head.

Progress in labour is dependent on three variables:

1. the powers, i.e. the efficiency of uterine contractions,
2. the passenger, i.e. the fetus (with particular respect to its size, presentation and position),
3. the passages, i.e. the uterus, cervix and bony pelvis.

Abnormalities in one or more of these factors can slow the normal progress of labour.
Dysfunctional uterine activity
This is the most common cause of poor progress in labour. It is more common in primigravidae and perhaps in older women and is characterized by weak and infrequent contractions.
The assessment of uterine contractions is carried out by clinical examination and by uterine tocography. However, this can only provide information about the frequency and perhaps duration of contractions. Intrauterine pressure catheters are available and these do give a more accurate measurement of the pressure being generated by the contractions, but they are rarely necessary.
A frequency of four to five contractions per 10 minutes is usually considered ideal. Fewer contractions than this does not necessarily mean progress will be slow, but more frequent examinations may be indicated to detect poor progress earlier. Women should be offered hydration, good pain relief and emotional support.

When poor progress in labour is suspected it is usual to recommend repeat vaginal examination 2, rather than 4, hours after the last. If delay is confirmed, the woman should be offered artificial rupture of membranes (ARM) and, if there is still poor progress in a further 2 hours, advice should be sought from an obstetrician regarding the use of an oxytocin infusion to augment the contractions.

The infusion is commenced at a slow rate initially, and increased carefully every 30 minutes, according to a well-defined protocol. Continuous EFM is necessary as excessively frequent and augmented contractions may cause fetal compromise.
Cephalopelvic disproportion

Cephalopelvic disproportion (CPD) implies anatomical disproportion between the fetal head and maternal pelvis. It can be due to a large head, small pelvis or a combination of the two. Women of small stature (1.60 m) with a large baby in their first pregnancy are likely candidates to develop this problem.

**Causes**

**Pelvis** (previous fracture or metabolic bone disease).

**Fetal**

- Hydrocephalus may cause macrocephaly
- Fetal thyroid and neck tumours may cause extension at the fetal neck.

**Relative**

- Malposition of the fetal head.
Cephalopelvic disproportion is suspected in labour if:

- progress is slow or actually arrests despite efficient uterine contractions;
- the fetal head is not engaged;
- vaginal examination shows severe moulding and caput formation;
- the head is poorly applied to the cervix.

Oxytocin can be given carefully to a primigravida with mild to moderate CPD as long as the CTG is reactive. Relative disproportion may be overcome.

Oxytocin must never be used in a multiparous woman where CPD is suspected.
Malpresentations

Vital to good progress in labour is the tight application of the fetal presenting part on to the cervix. **Face presentations** may apply themselves poorly to the cervix and the resulting progress in labour may be poor, although vaginal birth is still possible. **Brow presentations** are associated with the mento-vertical diameter, which is simply too large to fit through the bony pelvis unless flexion occurs or hyperextension to a face presentation.
Figure 14.25 Vaginal examination in the left mento-anterior position. The circle represents the pelvic cavity, with a diameter of 12 cm.
Figure 14.26  The mechanism of labour with a face presentation. The head descends with increasing extension. The chin reaches the pelvic floor and undergoes forward rotation. The head is born by flexion.
Figure 14.28 Vaginal examination with brow presentation. The circle represents the pelvic cavity, with a diameter of 12 cm. The mento-vertical diameter of 13 cm is too large to permit engagement of the head.
Figure 14.27  Brow presentation. The head is above the brim and not engaged. The mento-vertical diameter of the head is trying to engage in the transverse diameter at the brim.
Abnormalities of the birth canal (the passages’)

- The bony pelvis may cause delay in the progress
- Abnormalities of the uterus and cervix can also delay labour.
- Unsuspected fibroids in the lower uterine segment can prevent descent of the fetal head.
- Delay can also be caused by ‘cervical dystocia’, a term used to describe a non-compliant cervix which effaces but fails to dilate because of severe scarring, usually as a result of a previous cone biopsy.
Poor progress in the second stage of labour

Birth of the baby is expected to take place within 3 hours of the start of the active second stage (pushing) in nulliparous women, and 2 hours in parous women. The causes of second-stage delay can again be classified as abnormalities of Powers (epidural analgesia dehydration and ketosis) passenger (persistent OP position of the fetal head) passages (narrow mid-pelvis (android pelvis)).

Instrumental birth should be considered for prolonged second stage. This may be safely performed in the labour room, or may be more safely carried out in theatre.
Figure 14.29  Deep transverse arrest of the head
Risk factors for poor progress in labour

- Small woman
- Big baby
- Dysfunctional uterine activity
- Malpresentation
- Malposition
- Early membrane rupture
- Soft-tissue/pelvic malformation
Patterns of abnormal progress in labour
The use of a partogram to plot the progress of labour improves the detection of poor progress

**Figure 14.30** Abnormalities of the partogram
Prolonged latent phase occurs when the latent phase is longer than the arbitrary time limits discussed previously. It is more common in primiparous women and probably results from a delay in the chemical processes that occur within the cervix which soften it and allow effacement. Prolonged latent phase can be extremely frustrating and tiring for the woman. ‘Primary dysfunctional labour’ is the term used to describe poor progress in the active phase of labour (2 cm cervical dilatation/4 hours) and is also more common in primiparous women. It is most commonly caused by inefficient uterine contractions, but can also result from CPD and malposition of the fetus.
**Secondary arrest** occurs when progress in the active phase of first stage is initially good but then slows, or stops altogether, typically after 7 cm dilatation. Although inefficient uterine contractions may be the cause, fetal malpositions, malpresentations and CPD feature more commonly than in primary dysfunctional labour.
Fetal compromise in labour

Concern for the well-being of the fetus is one of the most common reasons for medical intervention during labour. The fetus may already be compromised before labour, and the reduction in placental blood flow associated with contractions may uncover this and ultimately lead to fetal hypoxia and eventually acidosis.

Fetal compromise may present as fresh meconium staining to the amniotic fluid, or an abnormal CTG.
Risk factors for fetal compromise in labour

- Placental insufficiency – intrauterine growth restriction (IUGR) and pre-eclampsia
- Prematurity
- Postmaturity
- Multiple pregnancy
- Prolonged labour
- Augmentation with oxytocin
- Uterine hyperstimulation
- Precipitate labour
- Intrapartum abruption
- Cord prolapse
- Uterine rupture/dehiscence
- Maternal diabetes
- Cholestasis of pregnancy
- Maternal pyrexia
- Chorioamnionitis
- Oligohydramnios
Recognition of fetal compromise

- Meconium staining of the amniotic fluid is considered significant when it is either thick or tenacious, dark green, bright green or black.
- Change in the heart rate is noted with intermittent auscultation, particularly fetal tachycardia, bradycardia or fetal heart rate decelerations.

To classify the CTG as ‘normal’, ‘suspicious’ or ‘pathological’
Figure 14.31  Fetal tachycardia with a heart rate of 190 bpm
Figure 14.32  Fetal bradycardia to a heart rate of 90 bpm, lasting approximately 11 minutes
Figure 14.33 Loss of baseline variability (<5 bpm), with a fetal heart rate of 140 bpm
Figure 14.34  Fetal heart rate: early decelerations
Figure 14.35  Fetal heart rate: variable decelerations
Figure 14.36  Fetal heart rate: late decelerations
CTG signs suggestive of fetal compromise

• Fetal tachycardia (160 bpm, or a steady rise over the course of the labour)
• Loss of baseline variability (5 bpm)
• Recurrent late decelerations
• Persistent variable decelerations
• Fetal bradycardia (100 bpm for more than 3 minutes)
Management of possible fetal compromise

continue observation of the CTG If a CTG becomes ‘pathological’, vaginal examination to exclude malpresentation and cord prolapse
If the cervix is fully dilated, it may be possible to deliver the baby vaginally using the forceps or ventouse. Alternatively, if the cervix is not fully dilated, a fetal blood sampling can be considered.
A normal pH value is above 7.25. A pH below 7.20 is confirmation of fetal compromise. Values between 7.20 and 7.25 are ‘borderline’.
An abnormal result mandates immediate delivery, by Caesarean section if the cervix is not fully dilated.
Fetal blood pH estimation
Resuscitating the fetus in labour

- Maternal dehydration and ketosis can be corrected with intravenous fluids.
- Maternal hypotension secondary to an epidural can be reversed by a fluid bolus.
- Uterine hyperstimulation from excess oxytocin can be treated by turning off the infusion temporarily and using tocolytic drugs, such as terbutaline.
- Venocaval compression and reduced uterine blood flow can be eased by turning the woman into a left lateral position.
Women with a uterine scar

Approximately 20 per cent of all deliveries in developed countries are by Caesarean section. Uterine rupture or dehiscence (partial rupture) occurs in approximately 1 in 200 women who labour spontaneously with a pre-existing lower segment uterine scar. The risk is two to three times higher than this in women with a previous upper segment incision.
Signs of uterine rupture

severe lower abdominal pain, vaginal bleeding, haematuria, cessation of contractions, maternal tachycardia and fetal compromise

Uterine rupture

carries serious maternal risks (shock, need for blood transfusion and operative repair, possibly a hysterectomy) and also serious fetal risks (including hypoxia, permanent neurological injury and intrapartum death).
Rupture of the uterus is particularly likely to occur:

- late in the first stage of labour,
- with induced or accelerated labour,
- in association with a large baby

Relative contraindications to VBAC include:

- two or more previous Caesarean section scars,
- the need for induction of labour (IOL)
- a previous labour progress and outcome suggestive of CPD.
• Labour after a previous Caesarean section is known as ‘vaginal birth after Caesarean’ (VBAC). Approximately 70–80 per cent of women who attempt a VBAC will give birth vaginally and the remainder will need repeat Caesarean delivery.
• A previous classical Caesarean section is an absolute contraindication to attempting vaginal birth.
• Continuous CTG monitoring is strongly recommended and there should be a low threshold for urgent delivery by repeat Caesarean section.