Normal Labour

Definition of normal labour

It is the spontaneous delivery of a single, living, term fetus, presenting with vertex, through the birth canal, within 24 hours, without intervention (apart from episiotomy), without fetal or maternal complications

Diagnosis of labour

A. Symptoms:

1. True labour pain

- True labour pain is described as lower abdominal pain, rhythmic in nature (pain comes in attacks with intervening periods free of pain)
- The pain is typically of increasing frequency, intensity, and duration. In contrast, false labour pain is variable in frequency, intensity, and duration
- Also true labour pain is associated with progressive cervical changes
- False labour pain is managed by giving the patient analgesia and if there is no progressive cervical changes the woman is sent home

  N.B. *Braxton Hicks contractions: These are rhythmic contractions of the uterus. It is felt by most of women from the beginning till the end of pregnancy. It is quite similar to pain of menses. It is physiological. Duration is only few seconds. These contractions progress at the end of pregnancy to become labour pain*

2. Vaginal discharge (show)

- The women at the onset of labour may complain of spontaneous passage of mucous tinged with blood. This show is the mucous blug that normally occlude the endocervical canal to prevent ascending infection.
- Women may complain of vaginal spotting following PV examination

B. Signs

1. Uterine contractions

Palpation of the uterus at time of labour shows the presence of uterine contractions. It is felt by palpating the uterus using the palm and the palmar surface of the fingers of the right hand. The uterine contractions are felt as change in the consistency of the uterus from soft to firm. The contractions develop gradually and fade gradually. **Efficient uterine contractions** that define the onset of labour is characterized by:

- ✓ Frequency: 3-5 contractions per 10 minutes
- ✓ Duration: 30-90 second (average 1 minute)

2. Cervical changes: Cervical dilatation & Effacement

Cervical dilatation

It is the degree of dilatation of the cervical canal as tested by the examining fingers during PV examination. The cervical canal has a fusiform shape. The upper constriction is the internal os. The lower end is the external os. The degree of

dilatation is measured for the internal os as the external os may be dilated without labour in multiparous woman (multiparous os).

Effacement

It is the shortening of the cervical canal to be continuous with the uterine cavity. Effacement is described as a percentage of the taken up part of the cervix. For example, 70% effacement means that only 30% of the cervical length is still preserved and the remaining (70%) part is taken up.

N.B. *In nullipara cervical dilatation starts in the internal os then progress to the rest of the cervical canal so that the canal becomes gradually short (effacement). However, in multipara both dilatation and effacement occur simultaneously*

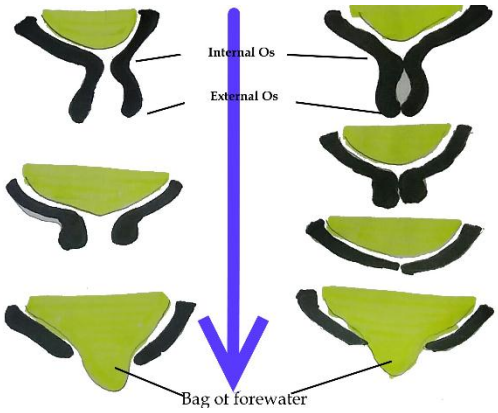


Figure 1: cervical changes in primigravida (Right) & Multipara (Left)

3. **Formation of bag of forewater:** this is protusion of the amniotic sac through the cervix secondary to cervical dilatation and uterine contractions.

Engagement

- **Definition**: It is the passage of the engaging diameter (BPD in case of vertex) of the presenting part through the pelvic brim.
- Normally head is engaged before the onset of labour in primigravida. In multiparous women, it may engage only after full cervical dilatation.
- **Assessment of head engagement: station**
  - ✓ The station is the relation of the lower most part of the presenting part to the level of the ischial spine. The ischial spine is felt as a projecting bone (spine) in the lateral pelvic side wall during PV examination. Palpation of the ischial spine requires some experience.
  - ✓ It is described as a number which corresponds to the distance in centimeters above or below the ischial spine in centimeters
  - ✓ When the engaging diameter reaches the pelvic inlet, it is said that the head became engaged. At engagement, the lowermost part of the fetal head reaches the level of the ischial spine (station 0).
  - ✓ Above ischial spine it is -1, -2, or -3. Below ischial spine it is +1, +2, or +3.
  - ✓ Station -3 the head is usually described as "floating" means that is freely floating in the abdomen above the pelvic inlet. The station +3 the head is usually described as "head on perineum" or "crowning" means that the head separates the vulva even in between the uterine contraction.
  - ✓ Caput may result in a false impression of a "low head"

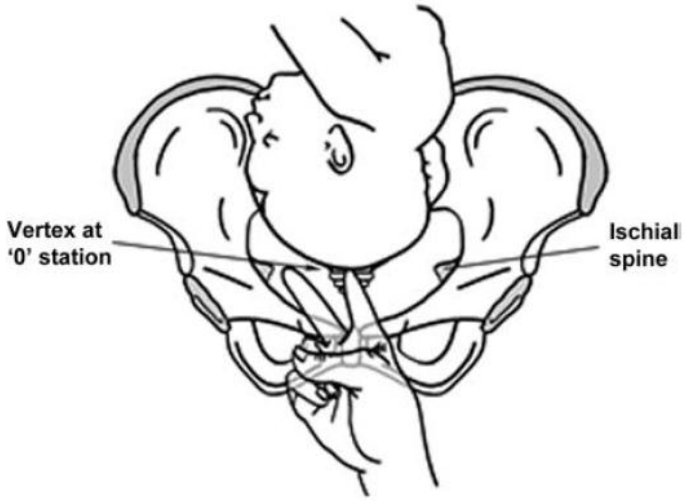


Figure 2: vaginal assessment of station

- **Causes of unengaged head:**
  1 **M**ultipara
  2 **M**iscalculation: preterm
  3 Abnormal **head**: large size (hydrocephalus), abnormally shaped (brachycephaly = elongated occipito-frontal diameter; oxycephaly= vertically elongated head), abnormal presentation (face, brow, compound), abnormal position (occipito-posterior).
  4 **Boney obstruction**: Contracted pelvis
  5 **Soft tissue obstruction**: low corporeal or cervical fibroid, placenta previa, mass impacted in the pouch of Douglas, ovarian tumour, or full bladder

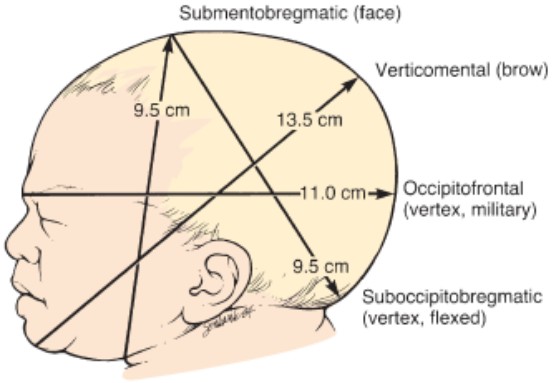


Figure 3: diameters of the fetal head

Stages of normal labour

First stage

- **Definition**: it starts from onset of labour till the full cervical dilatation
- **Cervical dilatation has two phases**:
  a) Latent phase: from the onset of labour to cervical dilatation of 3 cm.
  b) Active phase: from cervical dilatation of 3 cm to full cervical dilatation (10 cm).
- **Duration** of the first stage:
  a) Latent phase: variable duration
  b) Active phase: 8 hours in nullipara and 5 hours in multipara

Second stage

- **Definition**: the second stage starts from the full cervical dilatation till the complete expulsion of the fetus. (i.e. it is the stage of fetal expulsion)

- **Mechanisms of labour:**

For the process of labour to be accomplished, the fetal head & body need to have **cardinal movements** during the passage through the birth canal

A. Mechanism of delivery of the head

1. **Engagement:** see page 2

Box 6-1
Cardinal movements of labour

1. Engagement
2. Descent
3. Flexion
4. Internal rotation
5. Delivery of the head
6. Restitution
7. External rotation
8. Expulsion

2. **Descent**
   The head descends through the birth canal under effect of the uterine contractions. The process of head descent continue through the birth canal until the head comes out
3. **Flexion**
   During head descent, the head undergo flexion when it meets the resistance of pelvic floor. Flexion of the fetal head brings the smallest head diameter to be the engaging diameter. In case of vertex presentation it is the suboccipito-pregmatic diameter (9.5 cm)
4. **Internal rotation**
   When the engaging diameter of the head reaches the level of the greatest pelvic dimensions, the head rotates so that the head **become direct occipitoanterior** (45° anticlockwise if rotation from the left occipitoanterior (LOA) which represent the most common position)
5. **Delivery of the head**: by extension in vertex presentation
   The lower edge of the maternal symphysis pubis become the fulcrum for the fetal head.
6. **Restitution**
   The internal rotation results in twisting of the fetal neck. Once the fetal head become outside the vulval ring, this twist results in the head to rotate back to its original position (45° clockwise if rotation from the LOA)
7. External rotation
   The head rotates due to passage of the fetal biacromial diameter (it is the distance between the acromions; 12 cm) through the anteroposterior diameter of the maternal pelvis. (The rotation is another 45° clockwise if rotation from the LOA i.e. in the same direction of the restitution). After the external rotation fetal head in the direct lateral position (baby looks to the right maternal thigh in case of LOA)
8. Expulsion: delivery of the fetal trunk
   After the external rotation, the anterior shoulder of the baby lies behind the symphysis pubis and the posterior shoulder lies in the concavity of the sacrum below the sacral promontory. Under the effect of further uterine contractions the anterior shoulder comes out from the under surface of the symphysis pubis and passes the vaginal ring. This is followed by delivery of the posterior shoulder by lateral flexion of the fetal trunk anteriorly. The rest of the fetal trunk and lower limbs follow easily

B. Mechanism of delivery of the shoulders & fetal trunk

1. The shoulder **descent** begin by descent of the posterior shoulder below the sacral promontory to occupy the concavity of the sacrum, then descent of the anterior shoulder below the symphysis pubis
2. The shoulders undergo **internal rotation** so that the biacromial diameter become in the anteroposterior diameter of the pelvis (This is the cause of external rotation of the fetal head)
3. The shoulder deliver by slippage of the anterior shoulder through the vulval ring (introitus) then the posterior shoulder
4. The fetal trunk usually follow delivery of the posterior shoulder the immediately

- ## Duration of the second stage:

It should be less than 2 hours in nullipara and 1 hour in multipara. Extra one hour is allowed for women under epidural analgesia.

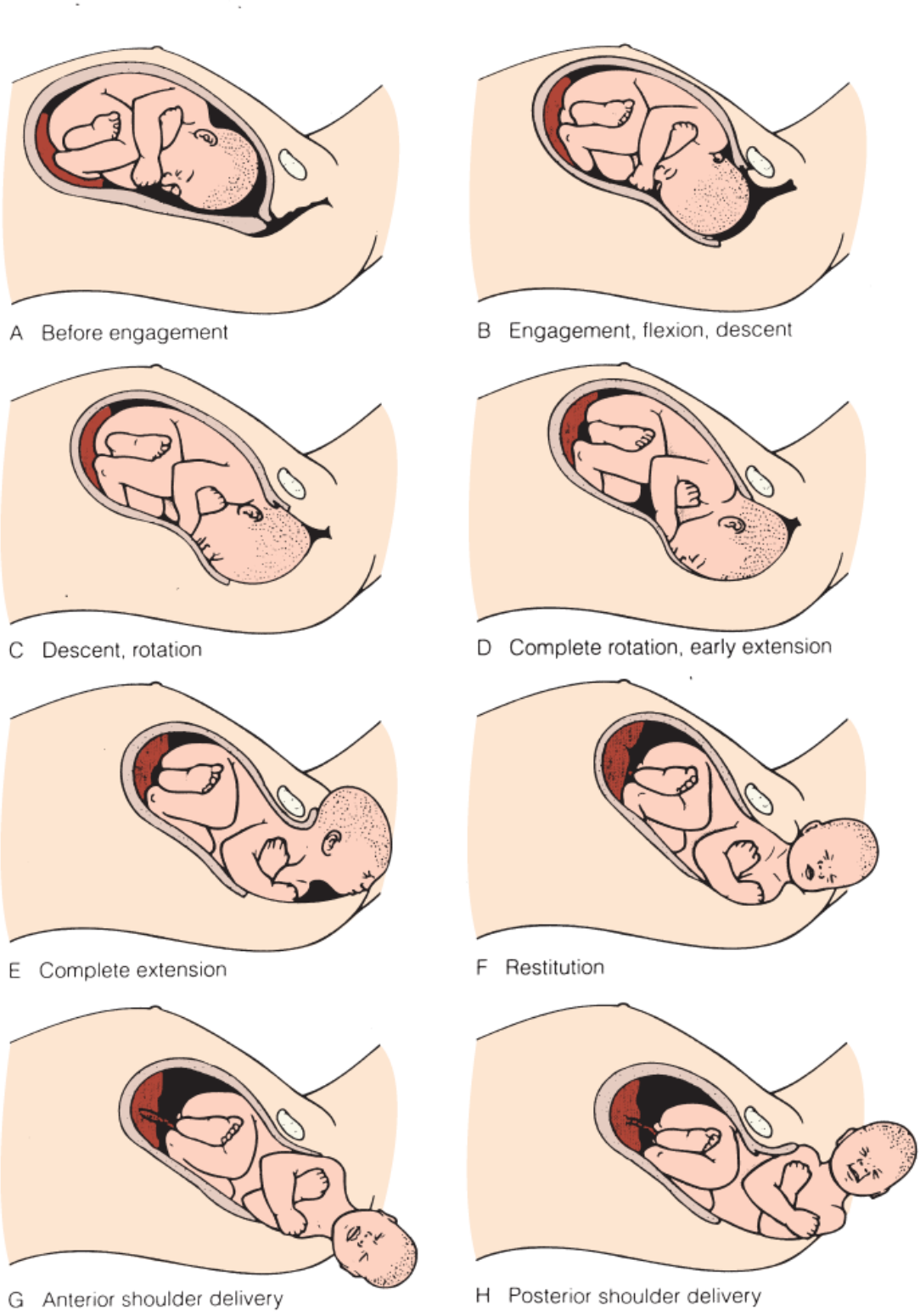


Figure 4: Cardinal movement of labour

Third stage

Definition: it is the stage following expulsion of the fetus till the complete expulsion of the placenta and fetal membranes. (i.e. it is the stage of placental expulsion).

Mechanisms of the third stage: 3 phases

1. Placental separation
2. Placental descent
3. Placental delivery (expulsion)

Mechanism of placental separation

Following expulsion of the fetus, contractions of the uterus results in marked decrease in the uterine volume. The uterus is usually at the level of the umbilicus immediately after delivery of the fetus. This decrease in the uterine volume results in decrease in the surface area of the placental attachment. Physically the placenta has plasticity but not elasticity (i.e. cannot change its surface area). This results in separation of the placenta from its bed. The separation leads to accumulation of blood in the retroplacental space which further increases the separation, and so on.

Placental descent and delivery is accomplished by uterine contraction and maternal expulsive power of bearing down

How the uterus control bleeding from the placental bed:

Immediately after delivery, there is dramatic decrease in the blood coming out from the cervix due to:

a) contraction of the myometrial muscles around the lumens of the blood vessels. The myometrial fibers arrange themselves in a figure of eight; this is called the living ligatures.
b) The exposed ostia of the blood vessels in the placental bed become occluded by the formation of blood clots.

Duration of the third stage:

It should be less than 60 minutes with expectant management and less than 30 minutes with active management.

Management of normal labour

I. Initial assessment

The aim of initial assessment is to detect any risk factor (e.g previous CS, breech, etc) and to diagnose labour.

History taking

This include the usual items of history especially the age, parity, number of livings, time since last delivery/miscarriage, previous caesarean/ instrumental delivery, the last menstrual period (LMP), the outcome of previous deliveries (fetal and maternal), the current complications during this pregnancy, and complaint of the woman (pain, discharge, fluid leakage, fetal movement , etc).

Examination

It includes the usual items of examinations especially general look, vital signs (pulse, blood pressure, respiratory rate, and temperature), obstetric, and PV examination.

Findings on PV examination

Box 6-2
Findings on PV examination
1. Cervical dilatation
2. Effacement
3. Presenting part
4. Station
5. Membranes
6. Pelvis

1. **Cervical dilatation:**
- It is described as centimeters or fingers. When the cervix is dilated to the extent that only a rim of the cervix is felt around the fetal head, it is usually described as "rim"

2. **Effacement:** see page 113
3. **Presenting part**

The vertex is diagnosed by the palpation of the parietal bones with the sagittal suture in between. The posterior fontanelle is felt as a triangular area. The anterior fontanelle is felt as a rhomboid shape

4. **Station:** see page 114
5. **Membranes: intact or ruptured**

The membrane is felt as a bulging cystic bag in front of the fetal skull bone. It becomes tense during contractions. If the membranes are ruptured, the amniotic fluid will be pour out of the cervix. The nature of the amniotic fluid is either clear (normal), blood stained, or meconium stained.

6. **Pelvis: average or contracted**

The pelvis is assessed during PV examination (internal pelvimetry). Usually we consider the pelvis contracted if the sacral promontory is easily reached (contracted inlet), there is jutting ischial spine or the subpubic angle does not admit two fingers easily (contracted outlet).

II. Management of the first stage

- **Diet**: once labour pain starts, the woman is instructed to have soft drink and light food only. Nothing per mouth (NPO) is needed only if there is high possibility for caesarean section.
- **Evacuation of the bladder and rectum:** the woman is instructed to evacuate the bladder and rectum. Full bladder or rectum may contribute to uterine inertia. In addition soiling of the perineum (and episiotomy) by faeces may occur at time of delivery of the fetal head. Rectal enema for evacuation of the rectum routinely used. If she cannot micturate by herself, evacuation of the bladder using metallic or plastic catheter is done.
- **Position**: the woman is allowed to take any position she like. Lying in bed is not recommended. Walking and setting is encouraged
- **Analgesia**: good analgesia is essential as morphine, bethidine, Entonox (nitric oxide), or epidural analgesia (the best)
- **Maternal & Fetal monitoring:**
  - ❖ The monitoring is best through the partogram
  - ❖ The aim of the monitoring is (1) to detect the mechanical progress of labour (2) to detect maternal or fetal distress
  - ❖ **Maternal monitoring**: the vital signs, presence of dehydration (check the tongue for dryness), uterine contractions, engagement by abdominal examination, PV examination every 2-4 hours to assess the progress of labour (see findings on PV examination above). PV examination should not be done more than every 2 hours except if there is sudden gush of fluid (rupture of membranes) to exclude the occurrence of cord prolapse or if there is bearing down (see later)
  - ❖ **Fetal monitoring:**
  - Low risk women: **Intermittent** auscultation of the fetal heart rate (Every 15 minutes) by the Pinard stethoscope or Sonicaid
  - For high risk women (e.g. PROM, previous 1 caesarean section, breech, Diabetes, preeclampsia, oligohydramnios, etc): **Continuous** electronic fetal monitoring by the Cardiotocogram (CTG)

N.B.1 No bearing down in this stage
N.B.2 Oxytocin is not used routinely in this stages (see prolonged first stage page:)
N.B 3 Women at initial presentation has cervical dilatation ≥ 3cm is put immediately on the alert line

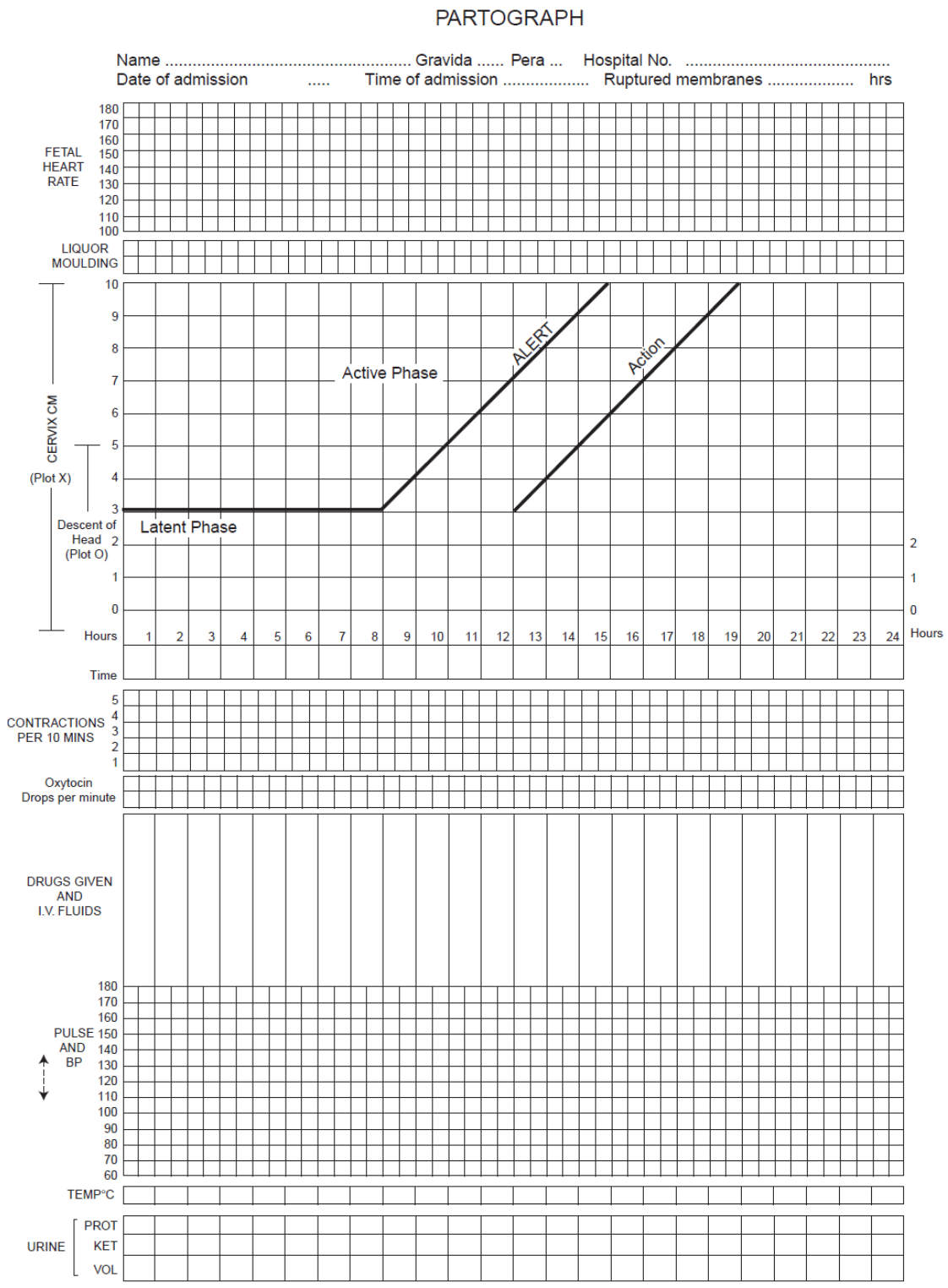


Figure 6: WHO Partogram

III. Management of the second stage

- **Diet, Position**, **Analgesia,** and **Maternal monitoring**: the same as the first stage
- **Shifting the mother to labour room:**
  Care of the woman during the first stage is usually in a labour ward. It is usual for nullipara to be shifted in the active phase of the second stage (beginning of bearing down) and multipara are shifted once the cervix is fully dilated. The labour room is equipped by labour bed that facilitate care in lithotomy position. It has the equipment for anaesthesia, surgical instruments, medications, and baby resuscitation tools.
- **Lithotomy position**
  The labouring woman at this stage is usually agitated and in pain. Care must maintain the patient dignity. After sterilization by iodine solution, keep the patient's abdomen, legs, and thighs covered. Only leave the area of the perineum exposed.
- **Fetal monitoring**

✓ Low risk women: Intermittent auscultation of the fetal heart rate (Every 5 minutes) by the Pinard stethoscope or Sonicaid

✓ For high risk women: continuous electronic fetal monitoring by the Cardiotocogram (CTG).

- **Encouraging the woman to bear down "Couching"**
  The woman is encouraged to bear down up based on her urge (i.e. once she has the feeling to do so). The obstetrician may guide the woman to bear down at time of uterine contraction and to take a rest at time of uterine relaxation.
- **Episiotomy:**
  Definition: it is incision in the vagina and perineum to allow for easy passage of the fetal head.
  Timing: time of crowning (the head separates the labia majora and is seen by inspection). It may be done earlier in multiparous woman as the process of delivery may be fast. Care must be taken to avoid early episiotomy as it results in more blood loss. In addition sometimes the second stage become prolonged and the woman needs caesarean section. So, the decision to do episiotomy is done only if the delivery of the fetal head is eminent.
  Indications
  1. Rigid perineum: almost all nulliparous women and some multiparous woman needs episiotomy. The decision for multiparous woman is taken individually.
  2. Preterm delivery: the head of the preterm baby is smaller than the head of the term baby but it is softer and the intracranial vessels are more vulnerable. The preterm head cannot tolerate the compression-decompression forces during its passage through the birth canal.
  3. Before forceps or Ventouse

4. Breech delivery

Types: Mediolateral, midline, and J-shaped type.

- ✓ All types start in the mid-point of the posterior forchette
- ✓ The direction of cut in the midline type is directly toward the anus. It may cause injury to the anal sphincter.
- ✓ The mediolateral type is the most common type. It is directed posterolaterally at 45° usually on the right side.
- ✓ The J-shaped type start as a midline cut the curves away from the anus.

Technique:

Infiltrate the perineal skin and vaginal skin by 10 ml of 1% Lidocaine. Insert one blade of the episiotomy scissor in the vagina between the stretched index and middle fingers of the left hand to protect the fetus. Cut the tissues generously to allow the head to pass easily. Small episiotomy incision may results in extension of the episiotomy with difficult repair.

Figure 7: Technique of Episiotomy. Note crowning of the head

Repair the episiotomy by absorbable sutures (like Chromic 2/0 or Vicryl rapide 2/0). Start by suturing the vaginal apex of the incision by continuous sutures until the junction between the vaginal and the perineal skin is reached. Then repair the perineal muscles using interrupted sutures. Lastly repair the perineal skin by interrupted sutures.

Complications:

1. **Extension of the episiotomy**: this results in deep apex or branching tear. This is usually repaired under general anaesthesia as the exposure will be better and the infiltration anaesthesia is usually insufficient to provide patient comfort during the repair.
2. **Traumatic Postpartum haemorrhage**: due to failure to identify extension or tears or failure to adequately repair them
3. **Infection**: it may be due to bad suturing technique as cutting the sutures too short or improper sterilization.

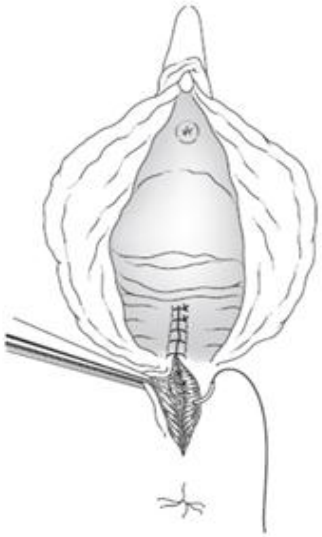


Figure 8: repair of episiotomy

4. **Hematoma**: paravaginal hematoma may extend in the retroperitoneum up to the kidneys. It is usually due to missing vessels at the vaginal apex.

- **Delivery of the fetal head:** The fetal head is expelled exclusively by the maternal effort (bearing down).
  - ❖ Role of the obstetrician in delivery of the fetal head is (1) to support of the head when it stretch the vaginal ring (stage of crowning) to prevent early extension of the fetal head. Early extension results in perineal trauma. (2) to support of the perineum at time of delivery of the head by extension. (3) perform episiotomy in the proper time.
- **Delivery of the shoulders & fetal trunk:** Usually the maternal effort is quite sufficient to result in easy expulsion of the fetal trunk immediately after delivery of the head.
  - ❖ **Role of the obstetrician in delivery of the shoulder:** is that sometimes, there is delay in the delivery of the trunk. The obstetrician simulate the normal mechanism of labour by grasping the fetal head in between the two hands (using the index and middle fingers of each hand to hook the oociput and the sinciput). Draw the head gently posteriorly until the anterior shoulder appears below the symphysis pubis. Then, draw the head gently upward until the posterior shoulder is delivered. This technique is called **assisted delivery of the shoulder**. Then axial traction on the trunk to deliver the rest of the body.

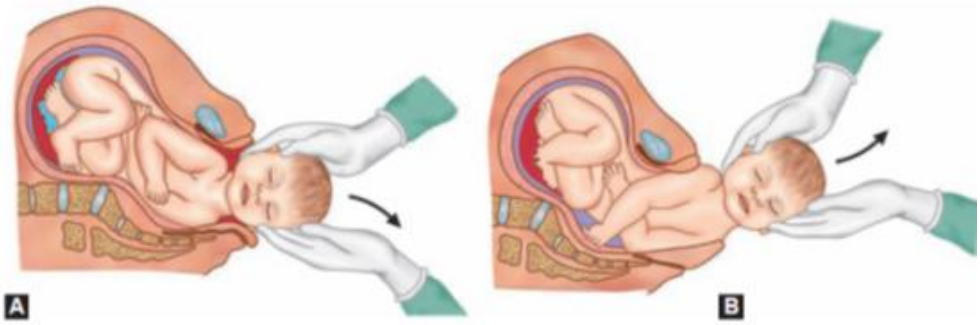


Figure 9: assisted delivery of the shoulders

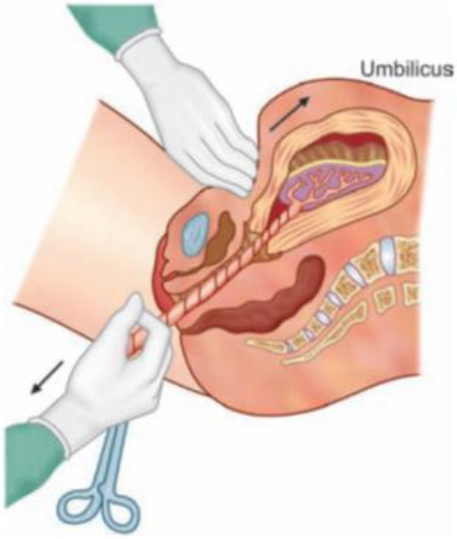
  - ❖ **Role of the obstetrician in delivery of the trunk:** is to be ready to catch the baby's feet with right hand and support the fetal body by the left hand to prevent slippage of the baby on the ground because expulsion of the fetal trunk may be so fast

IV. Management of the third stage

1. Deliver the placenta

A. **Expectant (physiological) management:** It is less commonly used. It involves (1) delayed cord clamping: the cord is clamped after 30-60 seconds of delivery (2) there is no traction on the cord. The placenta delivers by maternal efforts only

B. **Active management**: It is the most commonly used method. It involves (1) Early cord clamping (2) give 5 IU Oxytocin direct intravenous or 10 IU intramuscular by the time of delivery of the anterior shoulder (3) controlled cord traction when there is signs of placental separation.



Controlled cord traction

Box 6-3
Signs of placental separation
- Elongation of the cord
- Sudden gush of blood
- The uterus become hard and globular

This is the usual **method of delivery of the placenta.** It is also known as **Brandt-Andrews method**. It is done by grasping the cord by the right hand and the palmar surface of the left hand press on the suprapubic area. The pressure on the suprapubic area is approximately at the junction between the upper and the lower uterine segment. The body of the uterus is pushed backward and upward.
This suprapubic pressure (1) prevents inversion of the uterus; (2) prevents the uterus from descent with traction; and (3) help separation of the placenta.

N.B. delayed cord clamping and milking of the cord to bring more blood to the baby from the placental circulation may improve the total blood volume of the newborn. This practice is contraindicated in baby with Rh incompatibility or baby who needs immediate resuscitation

2. Examine the placenta and membranes for completeness.
Retained part of the placenta (cotyledon) or membranes is a cause of postpartum haemorrhage.

3. Examine the genital tract

- ❖ Bimanual examination: the uterus must be contracted. This is confirmed by palpation of the lower abdomen using the left hand. The examining right hand in the birth canal check for emptiness of the uterine cavity
- ❖ Inspect the vagina and perineum:
  - o Retract the posterior vaginal wall by the index and middle finger of the right hand. Sim's speculum or vaginal retractor is used in difficult cases
  - o Check for angle of the episiotomy & any tear
  - o Observe for the amount and colour of the blood coming from the vagina: normally the blood is dark. The presence of fresh blood may indicate traumatic postpartum haemorrhage. The amount of the bleeding is assessed by experience as usual or increased. The woman should not come out of the labour room if there is bleeding

4. **Repair of episiotomy and any tear**
   This is usually done under local anaesthesia. General anaesthesia is indicated if (1) the woman cannot tolerate the suturing under local anaesthesia; (2) the episiotomy apex is extended and cannot be reached easily; (3) cervical tear
5. **Shift the mother from the labour room to the postnatal ward**
6. **Encourage the woman to breastfeed her baby**
   This help uterine contraction (through endogenous secretion of Oxytocin) and continuation of breastfeeding
7. **Observation for vaginal bleeding**

The first hour following delivery is called the "fourth stage of labour" as most of the postpartum haemorrhage occur during this hour.