Normal Delivery

- Vaginal delivery of a single, living fetus, at 40 weeks gestation, presenting by the vertex with occiput anterior, in 24 hours with no complications (maternal or fetal) & with no surgical interference except episiotomy
- Onset of labor: Theories
- Factors Affecting the Progress of Labor: Review the physiology of uterine contractions, anatomy of the pelvis and fetus

Mechanism & Progress of Labor

- Events preceding the onset of labor (Prelabor)
  1. The lower uterine segment, in late pregnancy, rapidly stretches radially to permit the fetal head to descend. Near term it lies within 7.5 cm of the internal os.
  2. The cervix: undergoes ripening:
  3. The presenting part starts to descend → Engagement (In the majority of PG engagement occurs in the last 3 weeks of pregnancy)

<table>
<thead>
<tr>
<th>The stage</th>
<th>Starts</th>
<th>Ends</th>
<th>duration (hours)</th>
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<tbody>
<tr>
<td>first:</td>
<td>with the onset of labor</td>
<td>With full cervical dilatation</td>
<td>12</td>
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<td>second:</td>
<td>with full cervical dilatation</td>
<td>When the fetus is delivered</td>
<td>1-2</td>
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<td>third:</td>
<td>after fetal delivery</td>
<td>When the placenta &amp; membranes are delivered</td>
<td>up to 1/2</td>
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- The First Stage: a ripened cervix undergoes effacement and dilatation
  1. effacement: is the shortening of the cervical canal from 2.5 cm to merely a circular orifice with paper-thin edges. This process takes place from above down. The edges of the internal os are drawn upward several cm to become part of the lower segment
  2. dilatation: a centrifugal pull is exerted on the cervix → dilatation of the external os till the entire cervix is incorporated in the body & the utero-vaginal canal forms a single tube. Pressure of the vertex & the bag of fore-water on the cervix promote dilatation. Cervical dilatation is divided into 2 phases
    a. latent phase
    b. active phase: is divided into
      1. phase of acceleration,
      2. phase of maximum slope,
      3. phase of deceleration
♦ The Second Stage:
1. descent: accompanies all subsequent movements & is due to uterine contraction & retraction aided by bearing down (contraction of the muscles of the abdominal wall & diaphragm)
   a. The sagittal suture descends in the transverse diameter of the brim in 75% of cases. It lies equidistant from the symphysis & sacral promontory (synclitism).
   b. It may be Asynclitic lie:
      (1) nearer to the symphysis (asynclitism-posterior parietal bone presentation-Litzmann’s obliquity). This is an unfavorable mechanism. It is more in PG
      (2) nearer to the promontory (asynclitism-anterior parietal bone presentation-Naegele’s obliquity). This is a favorable mechanism. It is more in MP
2. **Engagement:**
   a. **Passage of the widest transverse diameter of the presenting part through the plane of the pelvic inlet.** The transverse diameter of engagement will be
      (1) the BPD (9.5 cm) in cases of synclitism
      (2) the SPSP (9 cm) in cases of asynclitism
   b. **diagnosis:**
      (1) history: lightening, pelvic pressure symptoms
      (2) abdominal examination:
         (a) only 2/5 of the head is felt abdominally
         (b) the head is not mobile by the 1st pelvic grip
      (3) PV: lowermost part of the head is at the level of the ischial spines (**station zero**). Station is defined as the distance in **centimeters** between the leading bony portion of the fetal skull and the plane of the maternal ischial spines.
   c. Engagement frequently occurs when labor starts in multipara. **In the majority of PG** engagement occurs in the last 3 weeks of pregnancy. **Nonengagement** of the presenting part may be due to
      (1) occiput posterior position.
      (2) malpresentation
      (3) twins
      (4) macrosomia
      (5) hydrocephalus
      (6) contracted pelvis
      (7) placenta previa
      (8) pelvic tumors: Leiomyoma, ovarian tumors
      (9) full bladder

3. **increased flexion:** when the head meets the resistance of the pelvic floor
4. **internal rotation** of the occiput anteriorly $90^\circ$ (2/8 of a circle) in occiput transverse positions or $45^\circ$ (1/8 of a circle) in left or right occiput anterior positions. This brings the longitudinal of the head in the antero-posterior diameter of the outlet. Internal rotation can be explained by:
   a. slope of the pelvic floor: occiput is lower than sinciput (due to increased flexion) & reaches the pelvic floor first to rotate with its slope downward, forward, & medially
   b. shape of the bony pelvis: the head occupies the longest diameter of the inlet (transverse) then rotates to occupy the longest diameter of the outlet (antero-posterior)

5. **extension**: the sub occipital region hinges under the symphysis pubis with the suboccipito-frontal diameter distending the perineum (the perineum sweeps over forehead, nose, mouth & chin to release the head)

6. **restitution**: reversing (untwisting) the movement of internal rotation by the same number of degrees it turned previously but in the opposite direction

7. **external rotation** of the head in the same direction of restitution (i.e. opposite the direction of internal rotation) due to internal rotation of the shoulders

8. delivery of the **shoulders**: by a movement of lateral flexion of the spine, **first the anterior shoulder** appears under the symphysis pubis then the posterior shoulders are delivered. The remainder of the fetus is rapidly expelled

♦ **The Third Stage:**
   1. Uterine contractions & retraction causes a reduced area of placental site to a diameter of 10 cm or less while the placenta is inelastic. The shearing stresses causes placental separation. The placenta usually (80%) separates in the center and descends like an inverted umbrella (**Schultze**) or separates at the lower part (**Duncan**)
   2. the intermediate criss-cross layer of muscle fibers (**the living ligatures of the uterus**) shut off the supply of blood to the placental site.

**Diagnosis of labor**

- **History:**
  1. **true labor pains**: regular, gradually increasing in intensity (amplitude), frequency, & duration, colicky, in the abdomen & back, not terminated by sedation.
  2. **show**: passage of blood tinged mucus plug (operculum)

- **Examination:**
  1. abdominal: uterine contractions **perceived by abdominal palpation**: regular, 3 per 10 minutes, each lasting 60 seconds, of moderate to strong intensity
  2. **PV**: cervical effacement & dilatation and formation of the bag of fore-waters
Management of Normal Labor

- Steps taken for early detection & solving the problems

- The first stage:

1. Admission (booking): revision of antenatal records. Urine sample for glucose & albumin
2. Enema if a constipated full rectum.
3. Shower, changing clothes, Suprapubic & pudendal hair is trimmed short
4. IV cannula + fluids + N.P.O. ± antacid
5. Position:
   a. ambulant: free walk may be allowed (better psychologically, promotes descent, avoid aorto-caval compression)
   b. recumbent: with a lateral tilt to avoid aorto-caval compression
6. Analgesia:
   a. injection: pethidine or morphine.
   b. Inhalation: trilene
   c. Introduction of anesthetic agent into the epidural space (caudal block or epidural block).
   d. Paracervical block: will anesthetize the Frankenhauser’s plexus & will eliminate the pain of cervical dilatation.
7. Assessment of fetal well-being & maternal vital data
8. Assess progress of cervical dilatation: PV examination is done on admission, every 2 hours, after ROM to exclude cord prolapse, and on bearing down.
9. Augmentation:
   a. AROM (amniotomy): Before amniotomy, make sure that the fetal head is well applied to the cervix. After amniotomy, the fetal heart rate should be recorded immediately.

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<tr>
<th>AROM (AMNIOTOMY)</th>
<th>INTACT MEMBRANES</th>
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<td>1. to accelerate progress</td>
<td>1. the maintenance of even hydrostatic pressure equally applied to the whole fetal surface</td>
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<td>2. To inspect the amniotic fluid for meconium or blood.</td>
<td>2. risk of intrauterine infection is reduced during prolonged labor</td>
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<td>3. To get access for internal fetal monitors.</td>
<td>3. favors anterior rotation in cases of occiput posterior position</td>
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<td>4. oxytocin is never used till clear liquor is seen</td>
<td>4. The cord can not prolapse.</td>
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<td>5. oxytocin is often ineffective with intact membranes</td>
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<td>6. oxytocin may increase the risk of amniotic fluid infusion unless free drainage is established</td>
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b. oxytocin IV drip: Synthetic oxytocin (syntocinon) is diluted in isotonic electrolyte solution & should be administered via a controlled infusion device. protocols of oxytocin infusion

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<th>initial dose (mU/min)</th>
<th>increase dose (mU/min)</th>
<th>interval between doses (min)</th>
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<tbody>
<tr>
<td>2.5</td>
<td>2.5</td>
<td>30</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>20</td>
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(1) Side effects are dose related:
   (a) maternal:
      (i) uterine hyperstimulation: tachysystole, hypertonus.
      (ii) ruptured uterus (scar or obstructed labor especially in MP)
      (iii) hypotension: only with rapid intravenous injection
      (iv) water intoxication: only observed after prolonged administration at least 40 mU/min.
   (b) Fetal: intrapartum fetal distress (± death)
   (c) neonatal jaundice
(2) contraindications:
(a) if vaginal delivery is not an option e.g. contracted pelvis, transverse lie, placenta previa
(b) Upper segment uterine scar
(c) fetal distress
(d) history of precipitate labor

- **The Second Stage:**
  1. **position** in the delivery room: lithotomy
  2. evacuate the bladder (if full) by a catheter
  3. Auscultation of fetal heart, assess progress of descent
  4. augmentation (if indicated)
  5. ask the patient to bear down with contraction.
  6. **Episiotomy** is done, if indicated, after crowning. It is an incision of the perineum during labor (most frequently done obstetric procedure)
     a. **indications:** if perineal tear is anticipated (see etiology of perineal tears)
     b. **values:**
        (1) to avoid perineal tears which are irregular, more difficult to repair, and may extend to anal sphincter, anal canal & rectum
        (2) to avoid intracranial hemorrhage (preterm labor, after coming head of the breech)
     c. technique: local infiltration using 10 cc 1% lignocaine. Using an episiotomy scissors starting at the posterior fourchette to cut the vagina, skin, perineal body. It’s either median or mediolateral. After delivery of the fetus and placenta, it s repaired in layers
     d. complications:
        (1) May extend to anal sphincter, anal canal & rectum (in median episiotomy)
        (2) Hemorrhage, Infection, Tender scar and dysparuenia
  7. when the subocciput appears under the pubis, support the head to allow gradual extension in-between contractions. Do not allow rapid delivery of the head during a contraction
  8. suction of nose & oropharynx once the head is delivered
  9. if coils of cord are around the neck: they are slipped over the head or divided between clamps
  10. delivery of the shoulders by guiding the head downward to deliver the anterior shoulder then lifting the head up to deliver the posterior shoulder.
  11. keep the head down to facilitate drainage of secretions.
  12. Clamping of the cord (**early versus delayed** by 2 kochers placed 20 cm from the umbilicus & the cord is cut in-between. Handle the neonate to the attending neonatologist for care of the newborn.

- **The Third Stage.**
  1. **Active management of third stage of labor** Review JC episode 7.
  2. Repair of the episiotomy: vagina (continuous starting above the apex) then perineal body then skin

- Management of the **“Fourth Stage”** of Labor: many complications of birth occur during the first hour after delivery. This time is referred to as the “fourth stage” of labor, though it is not officially a labor stage. Every 15 minutes: assess vital signs, look for evidence of uterine atony or postpartum hemorrhage, inspect the perineum for any signs of hematoma formation. The newborn should be observed closely for any signs of compromise.