437 Team: Obstetrics and Gynecology

Intrapartum Care

Objectives:

- Differentiate between the signs and symptoms of true and false labor
- Perform the initial assessment of the laboring patient
- Describe the four stages of labor and recognize common abnormalities
- Explain pain management approaches during labor
- Describe methods of monitoring the mother and fetus
- Describe the steps of a vaginal delivery
- List indications for an operative delivery
- Identify maternal risks specific to delivery in developing countries

References:

- Kaplan USMLE step 2 CK - Obstetrics and Gynecology
- Online Meded videos
- Team 435

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Labor

Labor Is defined as a process of regular painful uterine contractions bring about progressive effacement and dilation of the cervix, resulting in delive of the fetus and expulsion of the placenta.

False labor "Braxton-Hicks contractions":
Painless, **irregular** contractions **without** cervical dilatation & effacement

Signs that Labor is within a Few Weeks or Days:

1. Lightening[1] (the mother is relieved when the fetus is engaged).
2. Bloody show (Loss of mucus plug).
3. Rupture of membranes
4. Nesting (a burst of energy that a woman has while she is pregnant).
5. Effacement.
6. Dilation.
7. Consistent (painful) Contraction every 5 minutes for one hour.

Initial assessment of laboring patient

When the mom present to the hospital in labor we must assess:

- ➔ **Fetal heart tone**
- ➔ **Fetal presentation:** cephalic, breech (frank, complete and footling), compound and shoulder.

We also need to do sterile vaginal exam to assess:

- ◆ **Cervical dilation:** Complete dilation is 10 cm
- ◆ **Effacement:** is when the length between external os and internal os is decreased. Is expressed in percentage or in centimeter :
  - 0% un-effaced (2 cm long and 2 cm wide)
  - 100% full effacement (no length or paper thin)
- ◆ **Station:** is the fetal presenting part in relation to ischial spine
  - Ischial spine: 0 station
  - Above ischial spine: -1,-2,-3,-4,-5
  - Below ischial spine: +1,+2,+3,+4,+5

Hacker & Moores

Every woman admitted in labor should have:
Hematocrit or Hemoglobin, Crossmatch, Blood group, Rhesus (Rh) type, hepatitis B status.
Maternal Monitoring:
Maternal pulse rate, blood pressure, respiratory rate, and temperature.
Fetal Monitoring:
The fetal heart rate should be evaluated either by auscultation with a De-Lee stethoscope, by external monitoring with Doppler equipment, or by internal monitoring with a fetal scalp electrode.

1 flattening of the upper abdomen and an increased prominence of the lower abdomen.

Physiology

- An event of increasing levels of oxytocin and prostaglandins along with multiplication of specific receptors leads to Increasing frequency of contractions that is associated with the formation of gap junctions between uterine myometrial cells. Contractions will occur at least every 5 min lasting 30 s.

- **Uterine Changes.**
  - **Upper uterine segment**, containing mostly smooth muscle fiber. The contractile segment becomes thicker as labor progresses, exerting forces that expel the fetus down the birth canal.
  - **The lower uterine segment**, containing mostly collagen fibers, passively thins out with contractions of the upper segment.

- **Cervical Effacement**.
  - **Cervical softening and thinning** occur as increasing levels of oxytocin and prostaglandins lead to breakage of disulfide linkages of collagen fibers, resulting in increasing water content.
  - **Effacement** is often expressed in percentages with the uneffaced (0%) cervix assumed to be 2 cm long and 2 cm wide. Progressive shortening and thinning lead to full effacement (100%) in which the cervix has no length and is paper-thin.

- **Cervical Dilation**.
  - The passive lower uterine segment is thinned and pulled up by the contractile upper segment. In early labor (latent phase), the rate of dilation is slow, but at 6 cm of dilation, the rate accelerates to a maximum rate in the active phase of labor. Complete dilation is expressed as 10 cm.

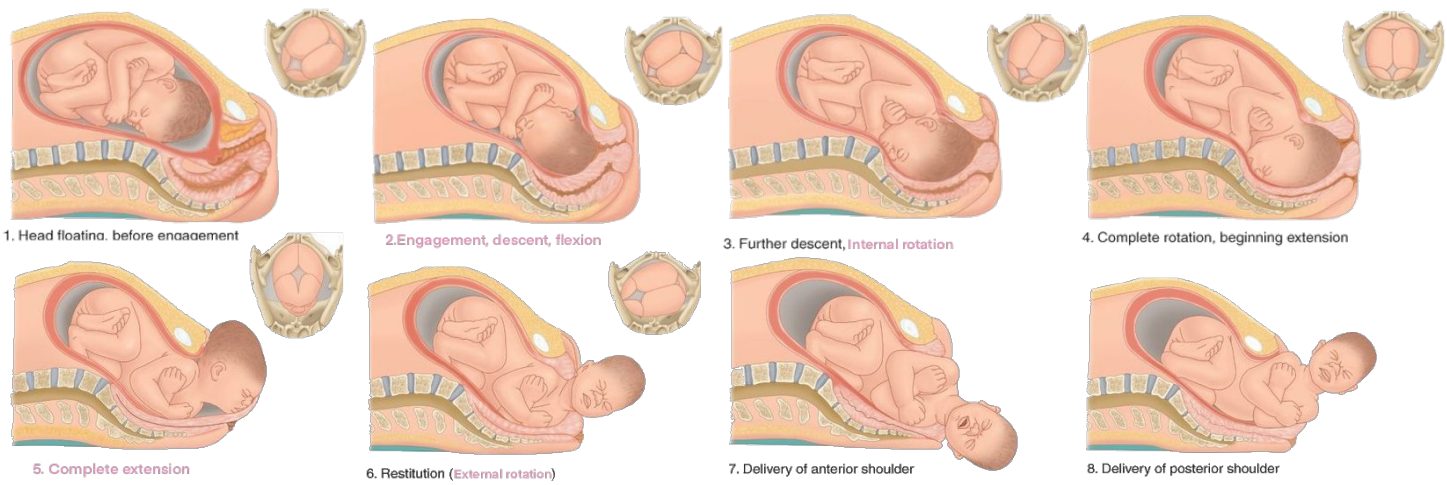
Cardinal Movements of Labor

❏ The first three steps occur simultaneously:

Engagement
Descent
Flexion

❏ The next four occur in order:

Internal rotation
Extension
External rotation
Expulsion



Stages of Labor

Labor Stage	Definition	Function	Duration
Stage 1— Latent phase (Effacement)	-Begins: onset of regular uterine contractions -Ends: acceleration of cervical dilation - It is from 0 cm dilation of cervix to 6 cm. -Longer latent phase is never an indication for c-section	Prepares cervix for dilation	<20 hours in primipara <14 hours in multipara
Stage 1— Active phase (Dilation)	-Begins: acceleration of cervical dilation -Ends: complete (~ 10 cm) cervical dilation - It is from 6 cm dilation of cervix to 10 cm "fully dilated cervix". -Cardinal movements of labor occur. -Slow but progressive labor in first stage. -Main abnormality is arrest of active phase	Rapid cervical dilation	≥0.7 cm/hours primipara ≥1.0 cm/hours multipara
Stage 2 (Descent)	-Begins: 10 cm (complete cervical dilation) -Ends: delivery of baby -maternal pushing efforts are added to uterine contractions to descent the baby -Main abnormality is prolonged second stage.	Descent of the fetus	<3 hours in primipara <2 hours in multipara Add 1 hour if epidural
Stage 3 (Expulsion)	-Begins: delivery of baby -Ends: delivery of Placenta -Signs of placental separation: 1)gush of blood vaginally 2)change of the uterus from long to globular 3) Cord lengthening 4) the fundus rises up -Main abnormality is prolonged third stage.	Delivery of placenta	<30 minutes regardless of the parity
Stage 4 (postpartum care)	-not an official stage of labor but rather a critical 2 h period of close observation of the parturient immediately after delivery. - Close observation of the patient: Blood pressure, pulse rate, and uterine blood loss.		

Obstetric lacerations

Perineal lacerations are classified by the extent of tissue disruption between the vaginal introitus and the anus.

First degree: involve only the vaginal mucosa. Suture repair is often not needed

Second degree: involve the vagina and the muscles of the perineal body but do not involve the anal sphincter; suturing is necessary

Third degree: involve the vagina, the perineal body, and the anal sphincter but not the rectal mucosa; suturing is necessary

Fourth degree: involve all the way from the vagina through to the rectal mucosa; complications of faulty repair or healing

Episiotomy

This is a surgical incision made in the perineum to enlarge the vaginal opening and assist in childbirth. It is one of the most common female surgical procedures.

- **Disadvantages**: more perineal pain than with lacerations; longer return to sexual activity; more extensions into the anal sphincter and rectum
- **Possible indications**: shoulder dystocia, non-reassuring fetal monitor tracing, forceps or vacuum extractor vaginal delivery, vaginal breech delivery, narrow birth canal.

Abnormal Labor

Labor Stage	Definition	Abnormality	Management
Stage 1 Latent phase	Regular uterine contraction and cervical dilation <6cm for >14 hours.	Engagement of fetal head.	- Ballon. Or - Amniotomy: rupture the membrane for her. Or - medications: misoprostol, Oxytocin.
Stage 1 Active phase	Regular uterine contraction and no change in cervical dilation for >4 hours.	The three Ps: -**Pelvis**: size and shape of the maternal pelvis (e.g., small bony pelvis) -**Passenger**: size and position of the infant -**Power:** strength and frequency of contractions	If the problem in the passenger or pelvis, go to C-section. If not, check for the adequacy of the power by intrauterine pressure catheter is a catheter (IUPC), adequate contractions >= 200 mu in 10 minutes. If not adequate give oxytocin, if didn't increases the adequacy go to C-section.
Stage 2	Regular uterine contraction and cervical dilation 10 cm at +1 station and no descent change in 3 hours.	Fetus didn't descent.	Depends on the fetal location regarding the mother's ischial spine: • above the ischial spine: C-section • Below the ischial spine: forceps or vacuum
Stage 3	Failure to deliver the placenta within 30 minutes.	Delayed or prolonged delivery of the placenta means problem in the power.	Start by uterine massage. If didn't work give oxytocin. If didn't work do manual extraction.

Pain in Labor

Pain Pathways:

- Uterine contractions and cervical dilation result in visceral pain (T10 - L1) **[stage 1]**
- Descent of the fetal head and subsequent pressure on the pelvic floor, vagina, and perineum generate somatic pain transmitted by the pudendal nerve (S2–4) **[stage 2]**

Pain control during labor

- Epidural block: the most effective
  - (rare complication is paralysis due injection site hematoma so in women with bleeding tendency be aware)
- Pudendal nerve block: anesthetizes somatic afferent nerve fibers entering the spinal cord at sacral segments S2 to S4. It is usually effective at relieving the perineal pain of the **second stage of labor.**
- IV Opioids: They work best in the early first stage when the pain is primarily visceral and less intense. (All opioids readily cross the placental barrier).

- Nitrous oxide mixture is commonly used and very effective give as inhaler during contraction in 1st, 2nd and 3rd stage.
- Active management of the 3rd stage of labor:
  - This can decrease postpartum hemorrhage It includes:
    i. Fundal massage.
    ii. Gentle cord traction.
    iii. IV \ IM Oxytocin.

Teaching case (video case)

A 23-year old G1P0 woman at 38 weeks gestation comes to Labor and Delivery complaining of a 5-hour history of painful contractions occurring every 5 minutes and lasting 45-60 seconds in duration.

She denies leaking of fluid per vagina, but has noted bloody show.

She reports normal fetal movement.

In reviewing her chart, you find that she has had an uncomplicated prenatal course.

She had an ultrasound at 17 weeks that revealed a male fetus and was consistent with her last menstrual period dating.

A screening culture at 36 weeks was positive for group B streptococcus.

The cervical exam at the 36-week visit was closed and long.

Her blood pressure is 96/54, pulse 92 beats per minute, respirations are 20/minute and oral temperature is 98° F.

Leopold's maneuver reveals the fetal back is palpable at the right side of the maternal abdomen and the vertex is palpable through the maternal abdomen just below her symphysis pubis.

Fetal heart rate (FHR) is in the 150s with moderate variability, with accelerations and no decelerations.

Contractions are noted on the external monitor every 3 minutes.

The patient's cervix is 3 cm dilated, 50% effaced with the fetal vertex at 0 station.

The remainder of the physical exam is unremarkable

1. Is this patient in labor? What elements of the case history support a diagnosis of labor?

● True labor is defined as progressive dilation and effacement of the cervix in response to regular uterine contractions.
● False labor is defined as contractions at term that do not result in cervical change and are termed "Braxton-Hicks" contractions.

2. In addition to determining whether this patient is in labor or not, what should be included in the initial evaluation of a patient who presents in labor?

- It's important to take full history if possible. including the chief complain, issues and complications with her current or previous pregnancies, details about her past deliveries and details about the follow up visits and the routine screening tests.
- Starting with the general appearance of the mother in the physical examination, we should notice whether the patient is in severe pain and distressed, if yes we should obtain a brief and quick hx and Px.
- Establish the gestational age through comparison of available dating criterion such as last menstrual period, sonography, and physical exam (e.g. fundal height).
- Identify any maternal medical or obstetrical complications of pregnancy by review of patient records and focused history and physical exam.
- Identify any fetal conditions by review of patient records and focused history and physical exam.
- Review routine screenings tests (e.g. group B streptococcus)
- Identify any new maternal conditions that may impact labor management (e.g. preeclampsia, chorioamnionitis).
- Establish fetal viability using either external ultrasound Doppler or bedside sonography.
- Evaluate the fetal presentation and estimated fetal weight using either **Leopold's maneuvers** it's important to know the fetus lie (this maneuver is may OSCE station), vaginal exam, or bedside sonography.
- Assess the adequacy of the maternal pelvis through physical examination (clinical pelvimetry) and review of patient's prior labor outcomes, if applicable.
- Assess the cervical status and membrane status. In the pelvic examination, we should assess the effacement, dilation, position of the cervix and station.

3. What is the stage and phase of labor for this patient?

She is at latent phase of first stage because the cervical dilation is less than 6

- Stage 1: is the onset of labor to full cervical dilation (10 cm) is divided into a latent and active phase.
    - Latent phase: < 4 cm dilation "it can last for days"
    - Active phase: > 4 cm dilation "1.2 – 1.5 cm dilation every hour"
    - New study shows : Transition from latent to active phase is at 6 cm, rather than 4 cm
- Stage 2: starts from the complete dilation to time of delivery.
- Stage 3: starts from delivering the baby to the expulsion of the placenta, take up to 30 minutes.
- Stage 4: is the immediate postpartum period after delivering the placenta to 2 hours later.

4. What are your next steps in management of this patient?

- Appropriate prophylaxis (e.g. group B streptococcus) Penicillin IV
- Fetal heart rate monitoring (external vs. internal and intermittent vs. continuous)
- Uterine contraction monitoring (external vs. internal) Every 2-4 hours in the early stages.
- Partogram is a graphic presentation for both maternal and fetal data during labour.
- Serial assessment of maternal labor progress (dilation, effacement, station)
- Serial assessment of maternal pain status

5. What options for pain management are available for this patient?

- Pain Pathways:
  - **Uterine contractions and cervical dilation result in visceral pain (T10 - L1)**
  - **Descent of the fetal head and subsequent pressure on the pelvic floor, vagina, and perineum generate somatic pain transmitted by the pudendal nerve (S2–4).**

- Analgesia and Anesthesia options:
  - **Systemic narcotics**
  - **Regional:**
    - **Local anesthetic agents**
    - **Pudendal block**
    - **Para-cervical block** It cusses bradycardia for the fetus so it's not used currently
  - **Continuous lumbar epidural** The most effective
  - For pain relief in the first stage we give narcotic analgesics
  - **Prepared childbirth (e.g.Lamaze classes)**

6. Describe the process by which the fetus descends through the birth canal and the steps of vaginal delivery.

● The fetus descends through the maternal pelvis through various flexions and rotations called the cardinal movements of labor:
Engagement (In the transverse diameter)- Descent - Flexion - Internal rotation - Extension - External rotation - Expulsion

7. What are other methods of delivery if the patient had not been able to push effectively or if fetal intolerance of labor had developed?

- Modes of operative delivery:
  - **Operative vaginal delivery (forceps or vacuum)**
  - **Cesarean delivery**
- Indications for operative delivery can be put into 4 categories:
  - **Maternal indications (e.g. poor expulsive effort)**
  - **Fetal indications (e.g. fetal intolerance of labor, anomalies/malformations)**
  - **Abnormal labor (e.g. secondary arrest of dilation in the active phase)**
  - **Elective (primary or repeat Cesarean)**

EXTRA
cases from Kaplan

Conduct of normal spontaneous Labor (CASE)

A 20-year-old primigravida comes to the maternity unit at 39 weeks' gestation complaining of regular uterine contractions every 3 min for the past 6 h. The contractions are becoming more frequent. She denies any vaginal fluid leakage. Vital signs are blood pressure 125/75 mm Hg, pulse 80 beats/min, respirations 17 breaths/min. On pelvic examination the fetus is cephalic presentation at −1 station. The cervix is 5 cm dilated, 90% effaced, and soft and anterior in position. On the electronic fetal monitor (EFM) the fetal heart rate baseline is 135 beats/min with moderate variability, frequent accelerations and no decelerations. How will you manage this patient?

PREADMISSION

The parturient is not admitted to the maternity unit until cervical dilation is at least 4–5 cm, unless premature membrane rupture has occurred. Fetal presentation is confirmed to be cephalic.

ADMISSION

On admission intravenous access is established, and oral clear liquid may be ingested. The patient is allowed whatever position is comfortable; however, the lateral recumbent position is encouraged as it optimizes uteroplacental blood flow.

FIRST STAGE

The fetal heart rate is assessed, usually with continuous electronic monitoring. Cervical dilation and fetal head descent are followed through appropriately spaced vaginal examinations. Amniotomy is performed in the active phase when the fetal head is well applied to the cervix. Obstetric analgesia is administered at patient request.

SECOND AND THIRD STAGES

Maternal pushing efforts augment uterine contractions in the second stage of labor. An episiotomy is not routine but is performed as indicated. After delivery of the fetus, the placenta is allowed to spontaneously separate, after which IV oxytocin is administered to prevent uterine atony and bleeding.

RECOVERY PERIOD

For the first 2 hours postpartum, the parturient is observed closely for excessive bleeding and development of preeclampsia.

Abnormal labor (prolonged latent phase)

A 29-year-old multigravida at 40 weeks' gestation is being observed in the maternity unit. She states she has been having regular uterine contractions for 24 h but cervical dilation remains at 1–2 cm. Her vital signs are stable. EFM tracing is reassuring regarding fetal status.

Diagnosis. Prolonged latent phase requires that, the cervical dilation is <6 cm for a duration of >20 h in a primipara or >14 h in a multipara.

Cause. Latent-phase abnormalities are most commonly caused by injudicious analgesia. Other causes are contractions, which are hypotonic (inadequate frequency, duration, or intensity) or hypertonic (high intensity but inadequate duration or frequency).

Management. This involves (a) therapeutic rest with narcotics or sedatives, (b) oxytocin administration, or (c) amniotomy. Cesarean delivery is never appropriate management for prolonged latent phase.

OB triad: 1-Pregnant with regular uterine contractions 2-Cervix dilated 2 cm 3- No cervical change in 14 h

Abnormal labor (Arrested Active phase)

A 22-year-old primigravida at 39 weeks' gestation has progressed in labor to 8 cm of cervical dilation but has not changed for 3 h. Her vital signs are stable. EFM tracing is reassuring regarding fetal status.

Diagnosis. Arrested active phase is diagnosed if membranes are ruptured and cervical dilation has not changed for (a) ≥4 h with adequate uterine contractions or (b) ≥6 h of IV oxytocin administration with inadequate uterine contractions.

Cause. Active-phase abnormalities may be caused by either abnormalities of the passenger (excessive fetal size or abnormal fetal orientation in the uterus), abnormalities of the pelvis (bony pelvis size), or abnormalities of powers (dysfunctional or inadequate uterine contractions).

Management. This is directed at assessment of uterine contraction quality. Contractions should occur every 2–3 min and last 45–60 s with 50 mm Hg intensity. If contractions are hypotonic, IV oxytocin is administered. If contractions are hypertonic, give morphine sedation. If contractions are adequate, proceed to emergency cesarean section.

OB triad: 1-Pregnant with regular uterine contractions 2- Cervix dilated 8 cm
3- No cervical change in 4 h

Abnormal labor (prolonged second stage)

A 20-year-old primigravida at 41 weeks' gestation has progressed in labor to 10 cm of cervical dilation and has been pushing for the past 3 h. The fetus is cephalic presentation, right occiput transverse position. The fetal head has not descended below +2 station. Her vital signs are stable. EFM tracing is reassuring regarding fetal status.

Diagnosis.

- Nulliparous women: After complete dilation, no progress in either descent or rotation of the fetus after ≥3 h without epidural anesthesia and ≥4 h with epidural anesthesia.
- Multiparous women: After complete dilation, no progress in either descent or rotation of the fetus after ≥2 h without epidural anesthesia and ≥3 h with epidural anesthesia.

Management. Assessment of uterine contractions and maternal pushing efforts. IV oxytocin can strengthen the contractions. Enhanced coaching to optimize maternal pushing should be utilized as needed. If they are both adequate, assess whether the fetal head is engaged. If the head is not engaged, proceed to emergency cesarean. If the head is engaged, consider a trial of either obstetric forceps or a vacuum extractor delivery.

OB triad: 1-Pregnant with regular uterine contractions 2-10 cm dilation at +1 station
3- No descent change in 3 h

Abnormal labor (prolonged third stage)

A 20-year-old primigravida at 39 weeks' gestation underwent a spontaneous vaginal delivery 40 min ago of a healthy 3,500 g daughter. However, the placenta has still not delivered. Her vital signs are stable.

Diagnosis. Failure to deliver the placenta within 30 minutes.

Cause. May be inadequate uterine contractions. If the placenta does not separate in spite of IV oxytocin stimulation of myometrium contractions, think of abnormal placental implantation (e.g., placenta accreta, placenta increta, and placenta percreta).

Management. May require manual placental removal or rarely even hysterectomy.

Obstetric complication (prolapsed umbilical cord)

A 34-year-old multigravida with a known uterine septum comes to the maternity unit at 34 weeks' gestation complaining of regular uterine contractions. She underwent a previous cesarean at 37 weeks' gestation for breech presentation. Pelvic examination determines that the fetus is a footling breech. Her cervix is 6 cm dilated with bulging membranes. During the examination, the patient's bag of waters suddenly ruptures, and a loop of umbilical cord protrudes through the cervix between the fetal extremities.

Diagnosis: Umbilical cord prolapse is an obstetric emergency because if the cord gets compressed, fetal oxygenation will be jeopardized, with potential fetal death.

Prolapse can be

- occult (the cord has not come through the cervix but is being compressed between the fetal head and the uterine wall)
- partial (the cord is between the head and the dilated cervical os but has not protruded into the vagina)
- complete (the cord has protruded into the vagina).

Risk Factors. Rupture of membranes with the presenting fetal part not applied firmly to the cervix, malpresentation.

Management: Do not hold the cord or try to push it back into the uterus. Place the patient in knee-chest position, elevate the presenting part, avoid palpating the cord, and perform immediate cesarean delivery.

Obstetric complication (shoulder Dystocia)

A 20-year-old primigravida at 39 weeks' gestation was pushing in the second stage of labor for 90 min and has just delivered the fetal head. However, in spite of vigorous pushing efforts by the mother and moderate traction on the fetal head, you are unable to deliver the anterior shoulder. Since delivery of the fetal head, 30 s has passed. The fetal heart rate is now 70 beats/min.

Diagnosis: This diagnosis is made when delivery of the fetal shoulders is delayed after delivery of the head. It is usually associated with fetal shoulders in the anterior- posterior plane, with the anterior shoulder impacted behind the pubic symphysis.

Risk Factors: Include maternal diabetes, obesity, and postdates pregnancy, which are associated with fetal macrosomia. Even though incidence increases with birth weight, half of shoulder dystocias occur in fetuses <4,000 grams.

Management: Includes suprapubic pressure, maternal thigh flexion (McRobert's maneuver), internal rotation of the fetal shoulders to the oblique plane (Wood's "corkscrew" maneuver), manual delivery of the posterior arm, and Zavanelli maneuver (cephalic replacement).

OB triad: 1-Second stage of labor 2-Head has delivered 3- No further delivery of body