



*Reviewed By*  
RAAOUM M. JABOR



# Operative Deliveries & C-section

## Objectives:

- Identify the incidence of operative delivery.
- Mention the indications for operative deliveries including the pre-requisites to be fulfilled before applying forceps or ventouse.
- Identify the rate of caesarean deliveries, their mortality and fetal and maternal morbidity.
- Discuss the types of cesarean deliveries and their complications.
- Indicate when a trial of normal labor may be offered after caesarean section delivery.
- Describe the measures to reduce Caesarean section rates.
- Describe common measures for the prevention of infections, deep vein thrombosis and other complications of operative delivery.
- List the key components of postoperative care



- Explained Slides
- Department's Slides (Dr. Nour)
- **Important**
- **Golden notes**
- Extra
- **Doctor's notes**
- **Previous Doctor's notes**
- **Reference**

**Editing File**

# Operative Vaginal Delivery



## Operative Vaginal Delivery:

### Definition:

- **Operative vaginal delivery:** delivery of the fetus using an instrument through the vaginal route.
- **Operative vaginal delivery:** vaginal deliveries using either a forceps or a vacuum device.

### Incidence:

- 3.5 %

### Instruments Used:

#### Obstetric Forceps

- Metal instruments used to provide traction and/or rotation when mother's expulsive efforts are insufficient for a safe fetal delivery.
- **Classes:** *selection depends on indication.*
  - **Classic / standard:** facilitate delivery by applying traction to the fetal skull.
    - **Example:** simpson forceps.
  - **Specialized**
- **Method:** forceps blades inserted sequentially into vagina (*fetal head sagittal suture is directly between and perpendicular to shanks*) → lock forceps + apply traction with the next maternal pushing effort → pull in a direction parallel to the axis of birth canal at that level (initially downward traction then ever-increasing upward traction) → complete head delivery + shanks nearly perpendicular to floor.
- **Cases to discontinue (abandoned failed forceps) procedure and go for cesarean delivery:**
  - No progress down the birth canal with appropriate traction.
- **Types of forceps operations:** *classified according to station & position of presenting part at the time the forceps are applied.*

#### Vacuum Extractor / Ventouse

- A cuplike instrument that uses a suction cup held against fetal head (*works with suction*).
- **Ease:** VEs > forceps → ↑ VE delivery frequency.
- Contraindicated in preterm delivery because head and scalp are more prone to injury (*intracranial hemorrhage / subdural hematoma*).
- **Method:** confirm no maternal tissue is trapped between cup and fetal head → vacuum seal by a suction pump → apply traction (*using principles similar to forceps delivery*) → maintain fetal head flexion → place posterior edge of suction cup 3 cm from anterior fontanel squarely over sagittal suture → smallest diameter to maternal pelvis → traction parallel to the axis of birth canal + maternal pushing efforts.
- **Cases to discontinue procedure and go for cesarean delivery:**
  - No progress down the birth canal with appropriate traction.
  - 2 "pop-offs".
    - **Pop-off:** detachment of suction cup from fetal head during traction.

#### Outlet Forceps

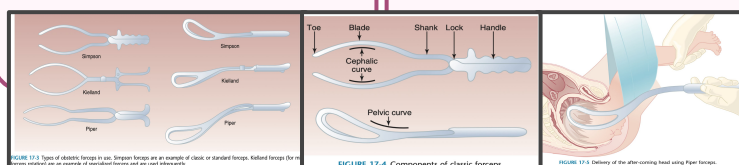
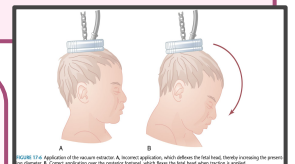
- Scalp is visible at introitus without labia separation.
- Fetal head at perineum.
- Fetal skull at pelvic floor.
- Sagittal suture in anteroposterior or right/left occipitoanterior or posterior position.
- Fetal head rotation not exceeding 45 degrees.

#### Mid Forceps

- Fetal head is engaged.
- Leading point of skull is above station +2 cm.

#### Low Forceps

- Leading part of fetal skull is at station +2 cm or more.
- Two subdivisions:
  - Rotation of 45 degrees or less.
  - Rotation of more than 45 degrees.



# Operative Vaginal Delivery

## Operative Vaginal Delivery:

### Instruments Used:

	Advantage	Disadvantage
<b>Forceps</b>	→ Higher overall success rate for vaginal delivery.	<ul style="list-style-type: none"> <li>→ Higher rates of maternal injury.</li> <li>→ Increased risk of trauma to vaginal and perineal tissues and maternal anal sphincter.</li> </ul>
<b>Vacuum / Ventouse</b>		<ul style="list-style-type: none"> <li>→ Higher rates of fetal morbidity.</li> <li>→ <b>Cephalohematomas:</b> accumulation of blood beneath periosteum.</li> <li>→ <b>Subgaleal hematomas:</b> blood in the space above periosteum (<i>large potential space</i> → allow significant blood loss).</li> <li>→ Retinal hemorrhages.</li> </ul>

## Prerequisite for Forceps and Ventouse

→ You should check on these things before applying an instrument.

Appropriate patient's <b>consent</b> regarding potential risks & benefits should be obtained.	Clearly outlined procedure indication to the patient and in the medical record.	<b>Cervix fully dilated:</b> if cervix is not fully dilated → ulcerations & hemorrhage by instruments pulling on cervix.	<b>Membranes ruptured:</b> whether spontaneously or rupture them by yourself to access fetal head.
<b>Engaged head (station 0):</b> biparietal diameter traverse pelvic inlet ( <i>below mother's ischial spine</i> ) → mother's pelvis isn't too small for baby's head ( <i>could be traumatic</i> ).	<b>Clinical assessment to determine:</b> <ul style="list-style-type: none"> <li>→ Presenting part level.</li> <li>→ Estimate of fetal size.</li> <li>→ Adequacy of maternal pelvis.</li> </ul>	<b>Known fetal head position with no doubt:</b> by palpation of sutures and fontanelles in comparison to maternal pelvis.	<b>Breech presentation:</b> → <b>Forceps</b> can be applied on head after coming for stabilization.
<b>Adequate anesthesia / analgesia</b> via either pudendal nerve block with local infiltration ( <i>for outlet forceps only</i> ) or regional anesthesia.	<b>Empty bladder</b> → <ul style="list-style-type: none"> <li>→ Prevent damage to that structure + provide more room for facilitated delivery.</li> <li>→ If there is no time go with the instrument.</li> </ul>	<b>Vertex presentation:</b> <ul style="list-style-type: none"> <li>→ <b>Ventouse</b> can be only applied on head, suitable for all vertex presentations.</li> <li>→ <b>Forceps</b> can be applied on head.</li> </ul>	<b>Preterm</b> fetal head and scalp are more prone to injury from the suction cup → <b>contraindicated vacuum</b> delivery.
<b>Ventouse</b> must <b>never</b> be used for delivery of fetuses presenting by <b>face or breech</b> .	Adequate <b>episiotomy</b> . → Adequate space to make things easier and prevent perinatal & vaginal lacerations & tears, not routine.		

# Operative Vaginal Delivery

## Indications of Operative Therapy:

- Including the instrumental and C-section.
- What are the reasons that you have to go through before you make decision this baby needs delivered by instruments?

### Maternal

- **Prolonged or arrested 2<sup>nd</sup> stage labor<sup>1</sup>:**
  - **Nulliparous 2<sup>nd</sup> stage labor:** lack of continuing progress for 2 hours without regional anesthesia or 3 hours with regional anesthesia.
  - **Multiparous 2<sup>nd</sup> stage labor:** lack of continuing progress for 1 hour without regional anesthesia or 2 hours with regional anesthesia.
  - **2<sup>nd</sup> stage:** from full dilation (10cm) until full expulsion of the baby.
- **To shorten 2<sup>nd</sup> stage labor for maternal conditions benefit:**
  - Strenuous pushing in 2<sup>nd</sup> stage labor is hazardous → forceps delivery + epidural analgesia (↓ strenuous pushing):
    - Hypertension
    - **Cardiac disorders:** you want to shorten the duration for them, you don't want a patient with a cardiac disease to perform a valsalva maneuver.
    - Pulmonary disease
  - Suspicion of immediate or impending fetal compromise as defined by Category III fetal heart rate patterns.
  - To stabilize the after-coming head during a breech delivery.
  - **Poor maternal effort:** mother exhausted and can't push efficiently.
  - **Patients with retinal detachment or post operative for similar ocular conditions:** It is detrimental to perform the valsalva maneuver (*taking a deep breath*) and pushing as well.

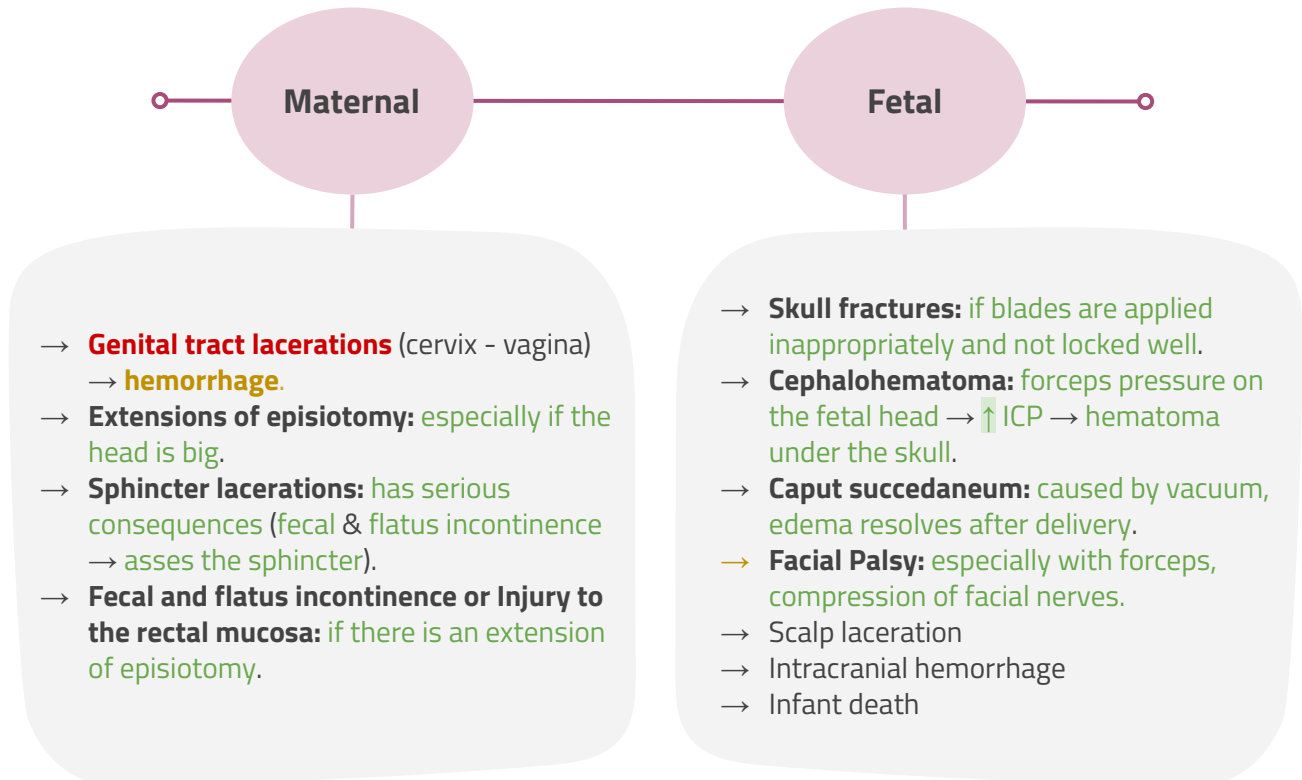
### Fetal

- **Fetal distress/bradycardia:** most common, if fetal heart tracing isn't going the way it should be.
- **Prematurity (forceps only):** to prevent decompression at time of delivery → prevent hemorrhage.
- **Certain malpositions:** you have to know what the malpositions and the difference between presentations, because sometimes it can be corrected with an instruments.

1. In nulliparous women, this is defined as lack of continuing progress for 2 hours without regional anesthesia or 3 hours with regional anesthesia. In multiparous women, it is defined as lack of continuing progress for 1 hour without regional anesthesia or 2 hours with regional anesthesia.

# Operative Vaginal Delivery

## Complications of Instrumental Deliveries:



## Trial of Incidental Delivery:

### Trial of Incidental Delivery

- Should be performed in O.R. with an anesthetist present + pediatrician to resuscitate.
- All teams ready to proceed to C.S. in case failed instrumental delivery.

# Caesarean Section



## Caesarean Section:

### Definition:

- **Cesarean delivery:** delivery of the fetus through an incision in the maternal abdomen and uterus.
- Hospitals offering obstetric services must have the personnel and equipment needed to perform an emergent cesarean delivery within 30 minutes.
  - **Risk of uterine rupture:** vaginal births after a prior cesarean delivery (VBAC) > women who have not had a prior cesarean delivery.

### Epidemiology:

- **Rate:** ≈ 25%.
- **Maternal mortality:** 5 – 6 / 100,000 Caesarean Section.
  - ↑ cesarean delivery > vaginal delivery because of ↑ postpartum infections + hemorrhage, + thromboembolism.
- **Perinatal mortality:** 3/1000 in USA & 7/1000 in the UK.

### Factors attributed to ↑ cesarean delivery:

- Assumed benefit for the fetus.
- Postponing childbirth until a later age → higher risk & relatively low maternal risk in general.
- Societal preference.
- Fear of litigation.

### Classification of cesarean section:

- **Elective:** planned and timed.
- **Emergency:** unplanned, during labor or before the onset of labour.

### Indication for cesarean section:

- **Cephalopelvic disproportion (CPD) - dystocia:** 30%.
  - Most common indication for cesarean delivery.
  - **Literal meaning:** the pelvis is too small for the fetal head.
  - **Actual practice meaning:** failure of the adequate progress in labor, which may be related to dysfunctional labor or suboptimal fetal head orientation.
- **Repeat cesarean:** 25 - 30%.
- **Breech presentation:** 10-15%.
- **Fetal malpresentation:** most commonly refers to breech presentation, but also means any fetal orientation other than cephalic.
- **Fetal distress:** 10-15%.
- Previous **full-thickness, non-transverse incision** through the myometrium (**absolute indication**).
  - Occurs in all classical cesarean deliveries and some myomectomy surgeries.
- All pregnancies complicated by **placenta previa** should also be delivered by cesarean delivery.
- **Category III EFM strip:** FHR monitor pattern suggests the fetus may not be tolerating labor, but commonly this is a false-positive finding.

# Caesarean Section

## Caesarean Section:

### Types of Cesarean Delivery:

- When you look at the skin does not always coincide with what you can find in the uterus.
- Cesarean deliveries are classified by the uterine incision, not by the skin incision.
- The type of uterine incision has important implications regarding risk of uterine rupture in future pregnancies.
- **Uterine rupture:** separation of the uterine incision.
  - May cause significant maternal complications by massive hemorrhage & fetal damage or death.

If you see a scar on the mother's bikini, it doesn't mean uterus was opened the same.  
**Most common combination:** low transverse skin incision + low transverse segment uterine incision.

### Skin Incision

- **Types:**
  - **Low transverse:** most common.
  - Midline.

### Uterine Incision

#### Upper Segment (classical):

- Made in contractile fundus of uterus.
- Less commonly performed.
- Easy to perform.
- No bladder dissection is needed.
- Significant risk of uterine rupture both before labor and in subsequent labor: 5%.
- **Types:**
  - Transverse.
  - Vertical.
- **Indications:**
  - Preterm breech in a woman with an undeveloped lower uterine segment.
  - Transverse back down fetal position.
  - Poor access to the lower segment because of myomas or adhesions.
  - Planned cesarean hysterectomy.
  - Presence of cervical cancer (rare indication).
- **Advantages:** any fetus/es regardless of intrauterine orientation can be delivered, lower segment varicosities or myomas can be bypassed.
- **Disadvantages:** trial of labor in a subsequent pregnancy is unsafe (↑ risk of bleeding & adhesions).

#### Lower Segment:

- Made in noncontractile portion of uterus.
- One of the **best and most commonly used**.
- Bladder must be dissected off the lower uterine segment.
- Low chance of uterine rupture in subsequent labor: 0.5% → we prefer it than upper segment.
- **Types:**
  - Transverse
  - Vertical
- **Advantages:** trial of labor in a subsequent pregnancy is safe (↓ risk of bleeding & adhesions).
- **Disadvantages:** fetus(es) must be in longitudinal lie.

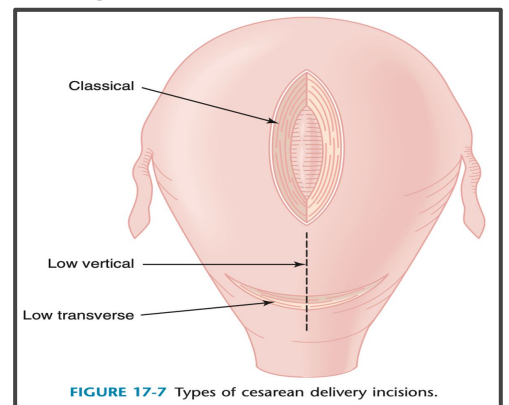


FIGURE 17-7 Types of cesarean delivery incisions.

### Vertical Classical Cesarean Delivery

- Vertical incision is made in upper segment of uterus through myometrium.
- **Uterine rupture risk:** 4 - 7%.
- Must have cesareans for all subsequent deliveries.

### Low Vertical Cesarean Delivery

- A vertical incision made in lower segment of uterus through myometrium, although incision invariably extends into upper segment.

### Low Transverse Cesarean Delivery (LTCDs)

- Uterine incision made transversely in lower uterine segment after bladder flap.
- Incision of choice, less bleeding & easy repair.
- **Advantages:**
  - ↓ (<1%) risk of symptomatic uterine rupture rate in subsequent pregnancy.
  - Higher if labor induction / augmentation.



# Caesarean Section

## Caesarean Section Complications:

### Complications of Upper Segment

- ↑↑ **bleeding:** thicker, more muscle.
- **Organ injury:** bowel - bladder - ureter.
- **Adhesions formation.**
- **Rupture scar in future pregnancy:** higher than lower segment scar.
- **More difficult to repair:** 2 - 3 layers.

### Complications of Lower Segment

- **Haemorrhage.**
- **Organ injury:** bowel - bladder - ureter.
- **Adhesions, especially bladder.**
- **Rupture scar.**
- **Abnormal placentation in future pregnancy:** placenta tends to like to implant onto C-section scars.
  - Low lying placenta.
  - Previa.
  - Accreta.
  - Increta.
  - Percreta.
- **Extension of incision:**
  - Lateral to uterine artery.
  - Downwards to vagina, difficult to repair.

### Common Postoperative Complications

- **Atelectasis:** due to administration of anesthesia.
- **Infections:**
  - Endometritis.
  - Wound.
  - **UTI:** catheter.
  - Pneumonia.
- **DVT & PE:** we have now a protocol to prevent it.

## When can a Trial of Labour be Offered After C-section?

- Vaginal birth after cesarean (VBAC) can be offered for **non recurrent indications** (fetal distress - cord prolapse - placental abruption - breech presentation).
- **Pelvic adequacy** is confirmed by proper clinical (clinical pelvimetry) radiological methods as needed.
- **Lower Segment scar:** upper segment scar is a contraindication to a vaginal birth.
- **Placental localization:** you have to make sure that the placenta is not on the scar.
- Assure **scar integrity** by proper post operative history.
  - You have to know if the patient developed an infection or hematoma post operatively, because there is a risk of scar rupture.
- Standard of care is to offer VBAC after **one previous C-section** and not multiple
- **Safe set up:** tertiary care center which can perform **emergency C-section** as needed.
- Patients **approval.**



# Caesarean Section

## Measures to Reduce / Prevent C-section Rate:

- Proper antenatal care for early detection and management of conditions that lead to ↑ C.S. Rate e.g:
  - Controlling macrosomia (**large baby**) in diabetes.
  - Early detection of HTN to **prevent preeclampsia**.
  - Post term **if you keep the baby to the 41 and 42 weeks they will become big and hard to deliver vaginally.**
  - **Performing external cephalic version (ECV) for breeches:**
    - Converts a breech fetus to the vertex position to avoid a cesarean delivery for breech presentation.
    - Performed under ultrasonic guidance in labor and delivery suite after the 36<sup>th</sup> or 37<sup>th</sup> week of gestation + tocolytic may be given to ↓ uterine tone + use external manipulation to guide the fetus to vertex presentation.
    - Fetal risk due to umbilical cord entanglement and placental abruption is low (<1%).
    - **Success rate: ≈ 60%.**
      - **Factors affecting the success rate:** parity - gestational age - placental location - cervical dilation - fetal station.
- **Prevent infections:**
  - Prophylactic antibiotics.
  - Aseptic technique.
  - Prevention of anemia.
- **To prevent DVT:**
  - TEDS stocking.
  - Thromboprophylaxis.
  - Early ambulation.
- **Two clinical interventions ↓ cesarean delivery rates:**
  - **External cephalic version (ECV):** *mentioned above.*
  - **Vaginal Birth After Cesarean Delivery (VBAC):**
    - A prior cesarean is the 2<sup>nd</sup> most common overall cause of cesarean delivery (25 - 30%).
    - **Trial of labor requirements:**
      - One or two previous LTCDs performed.
      - Uterine incision did not extend into cervix or upper segment.
      - No history of prior uterine rupture.
      - Adequate **maternal pelvic dimensions** should be noted by clinical examination.
    - **Overall success rate: ≈ 70%**, depending on previous cesarean delivery indication.
    - **Maternal morbidity:** repeat cesarean delivery > successful vaginal delivery.
    - **Perinatal morbidity:** repeat cesarean delivery = successful vaginal delivery.
      - Uterine rupture → 10x ↑ perinatal mortality & substantial maternal morbidity.

## Post Delivery Care:

- Vital Signs hourly then x 4 hours
- I.V. fluids
- Analgesia
- **Checking Fundus + Lochia:** the blood that comes after delivery.
- Urine output + catheter care
- Wound care
- Antibiotics
- **Thromboprophylaxis**
- Early ambulation
- Breast care and breastfeeding

# 439 Summary

## Operative Deliveries and C-section

### Operative Vaginal Delivery:

- It is the delivery of the fetus using an instrument through the vaginal route
- Instruments used:
  - Forceps
  - Vacuum (ventouse extractor)
    - Contraindicated** in face presentation, breech and **preterm delivery to prevent injury to scalp** (intracranial hemorrhage, subdural hematoma) since its more prone to injury
- Indications for operative therapy (instrumental and C-section):

Maternal	Fetal
<ul style="list-style-type: none"> <li>Prolonged or arrested 2nd stage of labor</li> <li>To shorten the second stage of labor for maternal benefit:                             <ul style="list-style-type: none"> <li>Cardiac disorders</li> <li>Pulmonary disease</li> <li>HTN</li> <li>Retinal detachment</li> <li>Post ocular OP</li> <li>Poor maternal effort</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Suspicion of immediate or impending fetal compromise/distress</li> <li>Prematurity (use forceps only)</li> <li>Certain malpositions (breech)</li> </ul>

- Prerequisites for instrumental deliveries (forceps and ventouse):

Must be checked	Conditions to be fulfilled
<ul style="list-style-type: none"> <li>Full dilation of cervix (10 cm)</li> <li>Rupture of membranes (spontaneously or artificially)</li> <li>Engagement of fetal head (station 0)</li> <li>Vertex (cephalic) presentation                             <ul style="list-style-type: none"> <li>Forceps can be used to stabilize the head in breech position</li> <li>Ventouse can only be applied on the head</li> </ul> </li> <li>Head position known</li> </ul>	<ul style="list-style-type: none"> <li>Adequate analgesia</li> <li>Empty bladder</li> <li>Adequate episiotomy</li> </ul>

- Complications of instrumental deliveries (forceps and ventouse):

Maternal	Fetal
<ul style="list-style-type: none"> <li>Genital tract lacerations (cervix, vagina) which will lead to a hemorrhage</li> <li>Extension of episiotomy → Sphincter lacerations → Fecal and flatus incontinence or injury to the rectal mucosa (4th degree obstetric laceration)</li> </ul>	<ul style="list-style-type: none"> <li>Facial palsy caused by forceps</li> <li>Cephalohematoma: most common complication caused by ventouse</li> <li>Caput succedaneum caused by vacuum/ventouse (resolves after delivery)</li> <li>Skull fractures</li> <li>Intracranial hemorrhage</li> <li>Scalp laceration</li> <li>Infant death</li> </ul>

### C-section:

- A signed consent for hysterectomy is considered before CS

Indications	<ul style="list-style-type: none"> <li>Repeat C-section (commonest indication)                             <ul style="list-style-type: none"> <li>Cephalopelvic disproportion: pelvis is too small for the fetal head</li> <li>Fetal malpresentation                                     <ul style="list-style-type: none"> <li>Breech presentation</li> <li>Transverse lie while mother is in labor</li> </ul> </li> </ul> </li> <li>Prolonged second stage of labor and fetal head station is above ischial spine</li> <li>Category III EFM strip</li> <li>Emergency CS indications:                             <ul style="list-style-type: none"> <li>Severe vaginal bleeding of unknown etiology (suspected placental separation)</li> <li>Suspected uterine rupture</li> <li>Pathological CTG (particularly persistent, severe fetal bradycardia)</li> <li>Fetal acidosis (fetal scalp pH &lt; 7.20)</li> <li>Immediate threat to life of mother or fetus</li> <li>Pulsating cord prolapse</li> </ul> </li> </ul>
Types	<p>(Most common combination is low transverse skin incision and lower segment uterine incision)</p> <ul style="list-style-type: none"> <li>Based on skin incision: low transverse or midline</li> <li>Based on uterine incision:</li> </ul>

## Lower segment vs Upper segment

	Lower segment	Upper segment
Overview	<ul style="list-style-type: none"> <li>Best and most commonly used</li> <li>Made in the noncontractile portion of uterus</li> <li>Transverse or vertical</li> </ul>	<ul style="list-style-type: none"> <li>Less commonly performed</li> <li>Made in contractile fundus</li> <li>Transverse or vertical</li> </ul>
Advantages	<ul style="list-style-type: none"> <li>Trial of labor in subsequent pregnancy is safe</li> <li>Lower risk of uterine scar rupture, bleeding and adhesion</li> </ul>	<ul style="list-style-type: none"> <li>Any fetus(es) regardless of orientation can be delivered</li> <li>Lower segment varicosities or myomas can be bypassed</li> <li>Technically easier and not bladder dissection needed</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>The fetus(es) must be in longitudinal lie</li> <li>Bladder must be dissected off the lower uterine segment</li> </ul>	<ul style="list-style-type: none"> <li>Trial of labor in subsequent pregnancy is unsafe</li> <li>Higher risk of uterine scar rupture, bleeding, and adhesion</li> </ul>
Complications	<ul style="list-style-type: none"> <li>Hemorrhage</li> <li>Organ injury</li> <li>Adhesions, esp bladder</li> <li>Rupture of scar</li> <li>Abnormal placentation in future pregnancy</li> <li>Extension of incision (laterally to uterine artery, downwards to vagina)</li> </ul>	<ul style="list-style-type: none"> <li>More bleeding</li> <li>Organ injury (bladder, ureter, bowel)</li> <li>Adhesion formation</li> <li>Rupture of scar (higher)</li> <li>More difficult to repair</li> </ul>
Complications	<ul style="list-style-type: none"> <li>Atelectasis, infections (endometritis, wound, UTI, pneumonia), DVT/PE.</li> <li>Measures to reduce C-section rates:                             <ul style="list-style-type: none"> <li>Controlling macrosomia in DM</li> <li>Early detection of HTN</li> <li>Performing ECV for breeches</li> <li>Avoid post-term labor</li> </ul> </li> </ul>	

Indications for Vaginal Birth After Cesarean (VBAC): is a trial of labor that is offered after:

- One previous C-section, NOT multiple
- Non-recurrent indications (fetal distress, cord prolapse, placental abruption, breech etc. NOT small pelvis)
- Pelvic adequacy
- Lower segment scar
  - CI if previous delivery was upper segment c-section
- Scar integrity

- Placental localization (you have to make sure the placenta is not on the scar)
- Safe set up: (tertiary care center which can perform emergency c-section as needed)
- Patient's approval

### Post-delivery care:

- Prevent infections (prophylactic abx, aseptic technique, prevention of anemia)
- Prevent DVT (thromboprophylaxis; heparin, TEDS stocking, early ambulation)
- Vital signs hourly then x 4 hours
- Check fundus and lochia
- Urine output and catheter care
- IV fluids
- Analgesia
- Breast care and breastfeeding

# Quiz

## Question 1:

- A G9P8+0 lady at 42 weeks is having a prolonged second stage of labor. The presentation is vertex occiput posterior with head at 1 cm above ischial spine and cervix is 8cm dilated. What is an absolute contraindication for vacuum delivery in this case?
- A. Head station.
  - B. Parity.
  - C. Vertex occiput posterior presentation.
  - D. Gestational age.

## Question 2:

- A 41-weeks pregnant lady G2P1 with previous cesarean section due to failure to progress. She has been in the second stage of labor for 55 minutes and the fetal head is at -2 station. The fetal heart is showing bradycardia for 10 minutes deceleration. What would be the best option for management?
- A. Augmentation with oxytocin.
  - B. Emergency cesarean section.
  - C. Forceps delivery.
  - D. Vacuum extraction.

## Question 3:

- A primipara is in labor and an episiotomy is about to be cut. Compared with a midline episiotomy, which of the following is an advantage of mediolateral episiotomy?
- A. Ease of repair
  - B. Fewer breakdowns
  - C. Less blood loss
  - D. Less extension of the incision

## Question 4:

- A 23 years old G1 at 38 weeks gestation presents in active labor at 6 cm dilated with ruptured membranes. On cervical Examination the fetal nose, eyes ,and lips can be palpated. The fetal heart rate tracing is 140 beats per minute with accelerations and no decelerations. The patient's pelvis is adequate. Which of the following is the most appropriate management for this patient?
- A. Perform immediate cesarean section without labor.
  - B. Allow spontaneous labor with vaginal delivery.
  - C. Perform forceps rotation in the second stage of labor to convert mentum posterior to mentum anterior and to allow vaginal delivery.
  - D. Attempt manual conversion of face to vertex in 2<sup>nd</sup> stage of labor.

B	D	B	A
4	3	2	1

# Quiz

## Question 1:

- A 28-years old G1 at 38 weeks had a normal progression of her labor. She has an epidural and has been pushing for 2 hours. The fetal head is direct occiput anterior at +3 station. The fetal heart rate tracing is 150 beats per minute with variable decelerations. With the patient's last push the fetal heart rate had a prolonged deceleration to the 80 seconds for 3 minutes. You recommend forceps to assist the delivery owing to then on reassuring fetal heart rate tracing. Compared to the use of the vacuum extractor, forceps are associated with an increased risk of which of the following neonatal complications?
- A. Cephalohematoma
  - B. Retinal Hemorrhage
  - C. Jaundice
  - D. Corneal abrasions

## Question 2:

- In order to facilitate delivery, operative vaginal delivery involves application of forceps or a vacuum extractor to the fetal head to assist during the 2nd stage of labor. Which of the following is not considered an indication for operative vaginal delivery?
- A. In nulliparous women, lack of continuing progress for 2 hours with a regional anesthetic.
  - B. Maternal cardiac dysfunction.
  - C. Maternal exhaustion.
  - D. Fetal distress.

## Question 3:

- Indications and prerequisites for delivery with the ventouse include:
- A. Delay In The Second Stage.
  - B. The Cervix Is Fully Dilated.
  - C. Gestation less than 34 weeks.
  - D. Fetal Distress In The Second Stage.
  - E. Fetal membranes are ruptured.

## Question 4:

- Which of the following is not an advantage of the midline episiotomy are:
- A. Less blood loss.
  - B. Reduced Incidence Of Dyspareunia.
  - C. Less anal sphincter damage.
  - D. Less pain in the postpartum period.
  - E. It is easier to repair.

C	ABCDE	A	D
4	3	2	1

# Reference

For transvaginal cerclage, the suture is typically removed before the onset of labor. For abdominal cerclage, cesarean delivery is performed. Patients must be counseled thoroughly regarding the risks associated with cerclage, which include bleeding, infection, iatrogenic rupture of amniotic membranes, and damage to adjacent organs (bladder and bowel).

## Operative Delivery

The incidence of operative obstetric delivery in the United States today is approximately 35–40%, of which 10–15% are operative vaginal deliveries using either a forceps or a vacuum device. **Approximately 25–30% of all deliveries are cesarean deliveries.** Each operative procedure has inherent benefits and risks.

### OBSTETRIC FORCEPS

Forceps are instruments designed to provide traction and/or rotation of the fetal head when the expulsive efforts of the mother are insufficient to accomplish safe delivery of the fetus. Commonly used forceps are shown in Figure 17-3. There are two classes of obstetric forceps: classical forceps and specialized forceps. Forceps selection depends on the obstetric indication.

**Classic or standard forceps are used to facilitate delivery by applying traction to the fetal skull.** The components of each blade are illustrated in Figure 17-4. The blades have a **cephalic curve** designed to conform to the curvature of the fetal head. Simpson forceps (an example of classic or standard forceps) have a tapered cephalic curve that is designed to fit on a molded fetal head. The **pelvic curve** of classic forceps approximates the shape of the birth canal.

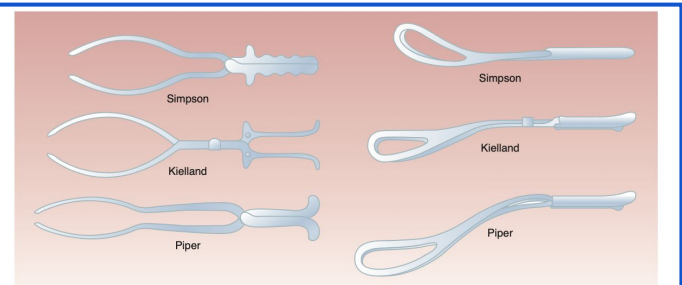


FIGURE 17-3 Types of obstetric forceps in use. Simpson forceps are an example of classic or standard forceps. Kielland forceps (for mid forceps rotation) are an example of specialized forceps and are used infrequently.

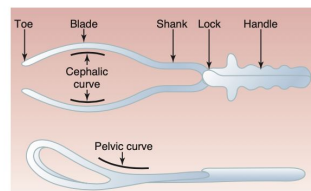


FIGURE 17-4 Components of classic forceps.

### Indications

In general, there are four indications for an operative vaginal delivery:

- Prolonged second stage of labor.** In nulliparous women, this is defined as lack of continuing progress for 2 hours without regional anesthesia or 3 hours with regional anesthesia. In multiparous women, it is defined as lack of continuing progress for 1 hour without regional anesthesia or 2 hours with regional anesthesia.
- Suspicion of immediate or impending fetal compromise as defined by Category III fetal heart rate patterns.**
- To stabilize the after-coming head during a breech delivery (Figure 17-5).**

- To shorten the second stage of labor for maternal benefit.** Maternal conditions such as hypertension, cardiac disorders, or pulmonary disease, in which strenuous pushing in the second stage of labor is considered hazardous, may be indications for forceps delivery. Epidural analgesia, which also decreases strenuous pushing during the second stage of labor, may also be recommended for this purpose.

### Types of Forceps Operations

Forceps application is classified according to the station and position of the presenting part at the time the forceps are applied. The American College of Obstetricians and Gynecologists has proposed the following classifications:

- Outlet forceps:** The scalp is visible at the introitus without separating the labia, fetal head at perineum, fetal skull at pelvic floor, sagittal suture in anteroposterior or right/left occipitoanterior or posterior position, and rotation of the fetal head not exceeding 45 degrees.
- Low forceps:** The leading part of the fetal skull is at station +2 cm or more (using the 5-point scale of 0 cm, +1, +2, +3, +4, and +5). Low forceps have two subdivisions: rotation of 45 degrees or less and rotation of more than 45 degrees.
- Mid forceps:** The fetal head is engaged, but the leading point of the skull is above station +2 cm. **Before performing a forceps-assisted vaginal delivery, appropriate consent from the patient regarding potential risks and benefits should be obtained.** The indication for the procedure should be clearly outlined to the patient and in the medical record. **The cervix**

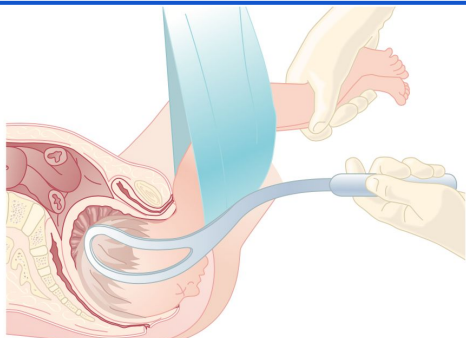


FIGURE 17-5 Delivery of the after-coming head using Piper forceps.

must be fully dilated, membranes ruptured, and the fetal head engaged into the pelvis (0 station). Clinical assessment to determine the level of the presenting part, an estimate of the fetal size, and the adequacy of the maternal pelvis is mandatory. **There must be no doubt regarding the position of the fetal head.** This evaluation is performed by palpation of the sutures and fontanels in comparison to the maternal pelvis. **Anesthesia must be adequate** via either pudendal nerve block with local infiltration (for outlet forceps only) or regional anesthesia. **The bladder should be emptied** to prevent damage to that structure and to provide more room to facilitate delivery.

### Forceps Technique

The forceps blades are inserted sequentially into the vagina such that the sagittal suture of the fetal head is directly between and perpendicular to the shanks. Damage to maternal tissues may be avoided by the operator placing one hand into the vagina to guide the toe of the blade along the natural pelvic curve of the birth canal. With the next maternal pushing effort, the forceps are locked and traction is applied. The direction of pull should be parallel to the axis of the birth canal at that level, such that typically there is downward traction initially, followed by ever-increasing upward traction as delivery of the fetal head occurs. With complete delivery of the head, the shanks are nearly perpendicular to the floor. **If progress of the fetal head is not obtained with appropriate traction,**

the procedure should be abandoned (failed forceps) in favor of a cesarean delivery.

### VACUUM EXTRACTION

The vacuum extractor (VE) is an instrument that uses a suction cup that is applied to the fetal head. **Because of the relative ease of using VEs compared with using forceps, the frequency of VE delivery has increased in the United States.** After confirming that no maternal tissue is trapped between the cup and the fetal head, the vacuum seal is obtained using a suction pump. Traction is then applied using principles similar to those described above for a forceps delivery. Flexion of the fetal head must be maintained to provide the smallest diameter to the maternal pelvis by placing the posterior edge of the suction cup 3 cm from the anterior fontanel squarely over the sagittal suture. This is illustrated in Figure 17-6. With the aid of maternal pushing efforts, traction is applied parallel to the axis of the birth canal. Detachment of the suction cup from the fetal head during traction is termed a “pop-off.” If progress down the birth canal is not obtained with appropriate traction, or if two “pop-offs” occur, the procedure should be discontinued in favor of a cesarean delivery. **The indications for vacuum delivery are the same as for forceps delivery.**

The prerequisites for use of the VE are also the same as for forceps, with a few exceptions. **The VE is contraindicated in preterm delivery** because the preterm fetal head and scalp are more prone to injury from the

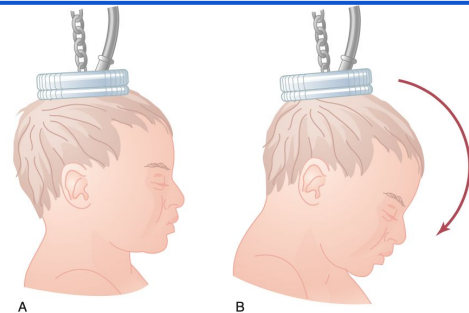


FIGURE 17-6 Application of the vacuum extractor. A, Incorrect application, which deflexes the fetal head, thereby increasing the presenting diameter. B, Correct application over the posterior fontanel, which flexes the fetal head when traction is applied.

suction cup. The VE is suitable for all vertex presentations, but unlike forceps, **it must never be used for delivery of fetuses presenting by the face or breech.**

### COMPARISON OF FORCEPS AND VACUUM DELIVERY

Understanding the potential advantages and disadvantages of each operative vaginal delivery instrument allows the operator to counsel the mother appropriately and to choose the device that is best suited for the particular clinical situation.

Forceps have a higher overall success rate for vaginal delivery. **The failure rate for forceps is 7%, whereas the failure rate for vacuum extraction is 12%. In general, forceps deliveries cause higher rates of maternal injury, and vacuum extraction causes higher rates of fetal morbidity.** Forceps have an increased risk of trauma to vaginal and perineal tissues and damage to the maternal anal sphincter. In contrast, neonates delivered by vacuum have more **cephalo-hematomas** (accumulation of blood beneath the periosteum) and exclusively have **subgaleal hematomas** (blood in the space above the periosteum that has a large potential space and can allow significant blood loss) and retinal hemorrhages. **Sequential use of one instrument followed by the other has been associated with a disproportionately high fetal morbidity rate and should be approached with extreme caution.** Long-term retrospective studies of adolescents who were delivered by normal vaginal delivery, forceps, vacuum extractions, and cesarean delivery have shown little difference in physical or cognitive outcomes.

### CESAREAN DELIVERY

Cesarean delivery is delivery of the fetus through an incision in the maternal abdomen and uterus. Hospitals offering obstetric services must have the personnel and equipment needed to perform an emergent cesarean delivery within 30 minutes. This is especially true for vaginal births after a prior cesarean delivery (VBAC), where the risk of uterine rupture is higher than in those women who have not had a prior cesarean delivery.

Cesarean delivery is the most common major operation performed in the United States today. **The rate of cesarean deliveries has increased over fivefold, from 5% of births in 1970 to at least 25–30% of births currently.** The dramatic increase in the cesarean delivery rate has been attributed to many factors, including assumed benefit for the fetus; the fact that women are postponing childbirth until a later age, when the risk is higher; relatively low maternal risk in general; societal preference; and fear of litigation.

The perinatal benefits of cesarean delivery are largely based on unquantified and scanty evidence. **There has been over a 10-fold decrease in perinatal mortality in the United States over the last 40 years** concurrent with advances in prenatal, intrapartum, and neonatal care. How much of this improvement has been due to the increased use of cesarean delivery is debatable, with the exception of management of the term breech delivery. With the latter delivery method, **perinatal and neonatal mortality and significant neonatal morbidity have been shown to improve from 5.0% for those delivered vaginally to 1.6% for those delivered by cesarean.**



# Reference

The overall maternal mortality rate from cesarean delivery is currently less than 1 in 1000, but this is about five times greater than the rate for vaginal delivery. However, recent studies have shown that the maternal mortality rate for an elective cesarean delivery approximates that of vaginal delivery. This is due to advances in surgical techniques, anesthetic care, blood transfusions, and antibiotics.

The maternal morbidity associated with cesarean delivery is increased compared with vaginal delivery because of increased postpartum infections, hemorrhage, and thromboembolism.

### Indications

Four indications account for 90% of the marked increase in cesarean deliveries over the past 40 years: dystocia (30%), repeat cesarean (25-30%), breech presentation (10-15%), and fetal distress (10-15%). An absolute indication for a cesarean delivery is a previous full-thickness, nontransverse incision through the myometrium. This occurs in all classical cesarean deliveries and some myomectomy surgeries. All pregnancies complicated by placenta previa should also be delivered by cesarean delivery.

### Types of Cesarean Delivery

Cesarean deliveries are classified by the uterine incision (Figure 17-7), not by the skin incision. In the low transverse cesarean delivery (LTCD), the uterine incision is made transversely in the lower uterine segment after a bladder flap is established. The advantages of this approach include decreased rate of rupture

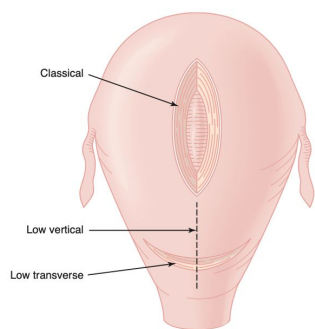


FIGURE 17-7 Types of cesarean delivery incisions.

of the scar in a subsequent pregnancy and a reduced risk of bleeding, peritonitis, paralytic ileus, and bowel adhesions.

For the classical cesarean delivery, a vertical incision is made in the upper segment of the uterus through the myometrium. A vertical incision may also be made in the lower segment, in which case the procedure is referred to as a low vertical cesarean, although the incision invariably extends into the upper segment. The common indications for a classical cesarean delivery include preterm breech in a woman with an undeveloped lower uterine segment, transverse back-down fetal position, poor access to the lower segment because of myomas or adhesions, or a planned cesarean hysterectomy. The presence of cervical cancer is a rare indication.

The type of uterine incision has important implications regarding risk of uterine rupture in future pregnancies. Uterine rupture, defined as separation of the uterine incision, may cause significant maternal complications caused by massive hemorrhage and fetal damage or death. A LTCD incision is associated with a less than 1% risk of symptomatic uterine rupture in the subsequent pregnancy, although this risk may be higher if labor induction or augmentation is carried out. A classic cesarean delivery carries a 4-7% risk of uterine rupture. Patients with a classical uterine incision are thus destined to have repeat cesareans for all subsequent deliveries.

### Prevention

Two clinical interventions have been shown to reduce cesarean delivery rates: external cephalic version (ECV) and VBAC.

**EXTERNAL CEPHALIC VERSION.** ECV converts a breech fetus to the vertex position to avoid a cesarean delivery for breech presentation. This procedure is performed under ultrasonic guidance in the labor and delivery suite after the 36th or 37th week of gestation. A tocolytic may be given to decrease uterine tone. Using external manipulation, the fetus is gently guided to the vertex presentation. Fetal risk due to umbilical cord entanglement and placental abruption is low (<1%).

The success rate of ECV is about 60%. Parity, gestational age, placental location, cervical dilation, and fetal station affect the success rate. An ECV program can decrease the rate of cesarean delivery in this group of patients by more than half, and an obstetric service's overall cesarean delivery rate by approximately 2%.

**VAGINAL BIRTH AFTER CESAREAN DELIVERY.** A prior cesarean is the second most common overall cause of cesarean delivery (25-30%). In fact, about 10-15% of pregnant women have had a previous cesarean delivery.

A trial of labor may be offered if one or two previous LTCDs have been performed, the uterine incision did not extend into the cervix or upper segment, and there is no history of prior uterine rupture. Adequate maternal pelvic dimensions should be noted by clinical examination. Personnel and equipment should be immediately available in case an emergent cesarean delivery is required within 30 minutes.

The overall success rate of VBAC is approximately 70%, although it ranges from 60% (dystocia) to 90%

(malpresentation), depending on the indication for the previous cesarean delivery. Compared with repeat cesarean delivery, a successful vaginal delivery is associated with less maternal morbidity without any increase in perinatal morbidity. If uterine rupture does occur, there may be a 10-fold increase in perinatal mortality and substantial maternal morbidity as well.



## Med 441 Team:

### Leader:

Sarah Alhamlan

### Members:

Amira Alrashedi

# Good Luck!



## Med 438 Team:

### Leaders:

Ateen Almutairi - Lama ALzamil

### Members:

Sarah Alkhalife – Norah Alharbi  
Njoud Alali



## Med 439 Team:

### Leader:

Bushra Alotaibi

### Members:

Noura Bamarei - Raghad Alasiri