

Operative vaginal delivery

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Outlines:

- Introduction
- Indications
- Contraindications
- Preparations and risk of failure
- Classification
- Vacuum
- Forceps

Introduction

- Operative vaginal delivery, instrumental delivery and assisted vaginal delivery all indicate the same term.
- it's vaginal birth using any type of forceps or vacuum (ventouse)
- Around 10% to 15% of women gave birth using instrumental delivery.



Indications :

1. Maternal:

- Shorten the 2nd stage of labor: **medical illness**
 - Cardiac disease NYHA class III or IV
 - Hypertensive crisis
 - Myasthenia Gravis
- Maternal exhaustion

2. Fetal :suspected or proven fetal compromise (pathological CTG/ abnormal fetal blood sampling)

3. Inadequate progress: lack of progress for:

- 2 hours (3 hours with regional anesthesia) if nulliparous
- 1 hour (2 hours with regional anesthesia) if parous

Contraindications (mostly fetal)

1. Suspected fetal bleeding disorder (hemophilia)
2. Predisposition to fractures (osteogenesis imperfecta)
3. Extreme prematurity
4. Suspected CPD

5. Malpresentation (vacuum)
6. Premature <34 weeks (vacuum)
7. Dead fetus (vacuum)

Maternal preparations:

- Clear explanation should be given.
- Informed consent to be obtained.
- Appropriate analgesia is in place for mid-cavity rotational deliveries.
- Maternal bladder and bowel must be empty
 - In-dwelling catheter should be removed, or balloon deflated
 - Aseptic technique

staff preparation

- Operator must have the knowledge, experience and skill necessary.
 - Adequate facilities are available (appropriate equipment, bed, lighting).
 - CS to be performed within 30 minutes in case of failure to deliver.
- Personnel present that are trained in neonatal resuscitation

abdominal and vaginal examination prerequisites:

1. Head Should be engaged
 - **Vaginal exam:** Station at level of ischial spines or below
 - **Abdominal exam:** (rule of 5th) Head is $\leq 1/5$ palpable (**1 or 0/5th**)
2. Cervix is fully dilated
3. Membranes ruptured
4. Vertex presentation
5. Exact position of the fetal head has been determined (for proper placement of the instrument)
6. Pelvis is deemed adequate

Risks of failure:

1. Maternal obesity (BMI > 30)
2. Estimated fetal weight > 4 kg or clinically big baby
3. Occipitoposterior position (**not a contraindications**)
4. Mid-cavity delivery or when 1/5th of the head palpable per abdomen (**riskier compared to 0/5th**)

Classification of instrumental delivery:

1. Outlet instrumental delivery

Fetal scalp visible without separating the labia

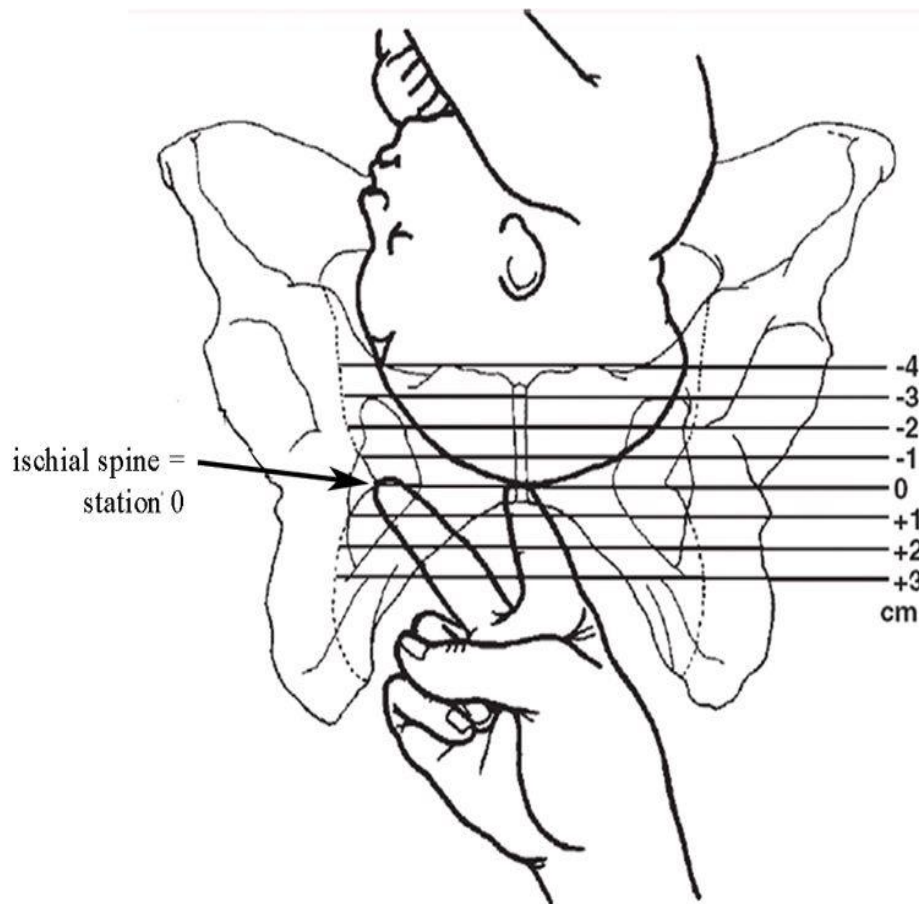
Fetal skull has reached the perineum

1. Low instrumental delivery

Station +2 but not on the perineum

1. Mid instrumental delivery

Station 0 or +1



Outlet

Fetal scalp visible without separating the labia
Fetal skull has reached the perineum
Rotation does not exceed 45°

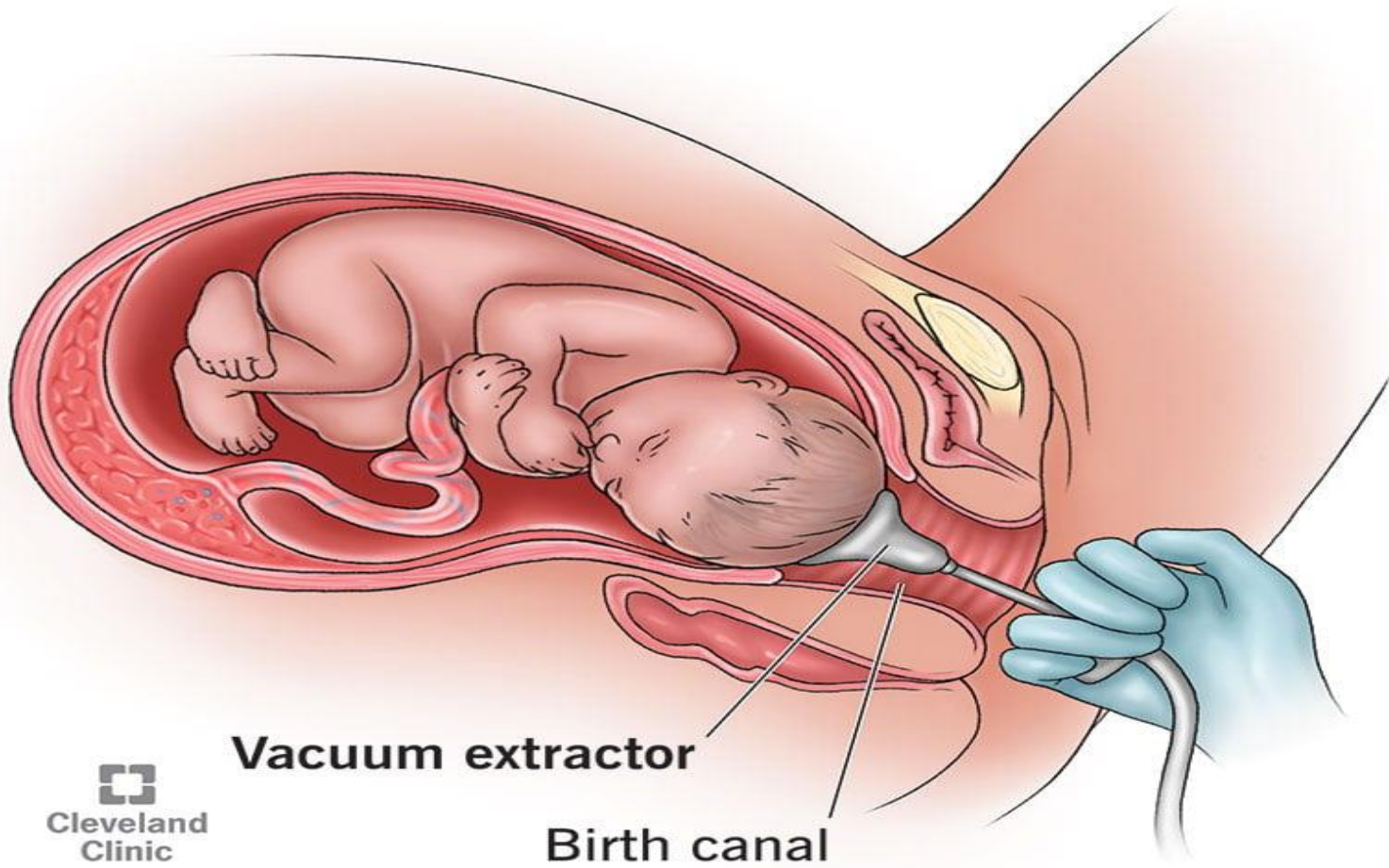
Low

Fetal skull is at station + 2 cm, but not on the perineum
Two subdivisions:
1. Non-rotational $\leq 45^\circ$
2. Rotational $> 45^\circ$

Mid

Fetal head is no more than one-fifth palpable per abdomen
Leading point of the skull is at station 0 or + 1 cm
Two subdivisions:
1. Non-rotational $\leq 45^\circ$
2. Rotational $> 45^\circ$

Vacuum



DEFINITION :

Traction of fetal head by CREATING Negative pressure through a SUCTION cup (RIGID OR SOFT) applied to the head .

OVERVIEW :

- 1) used in the second stage of labour if it has not progressed adequately.
- 2) cannot be used when the baby is in the breech PRESENTATION or for premature births.
- 3) Its generally safe, but it can occasionally have negative effects on the mother or the child.

RIGID VS. SOFT CUPS

-
- **Soft Cups** (polyethylene or silastic) :are associated with less scalp injuries and appropriate for **occipitoanterior** position .



- **Rigid cups** (Metal or Plastic) are more suitable for **occipitoposterior** , **transverse** , and difficult occipitoanterior position where the infant is larger.

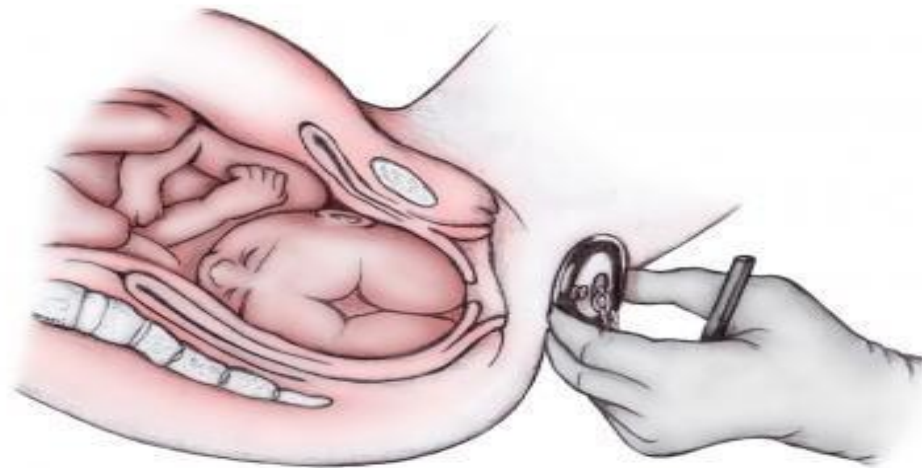


- There is higher rate of failure with soft cups .



VACUUM EXTRACTION TECHNIQUE

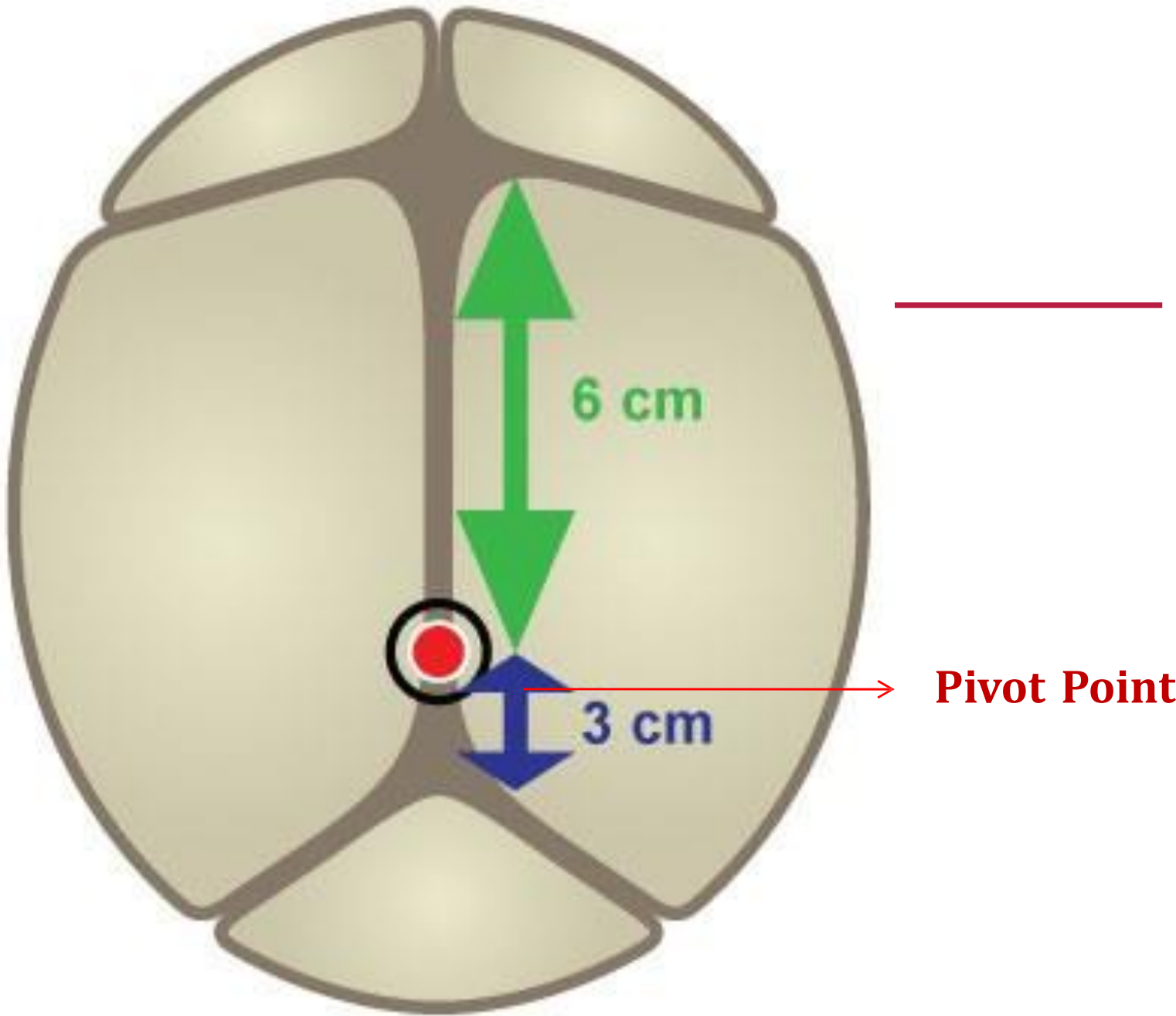
- The doctor holds the vacuum cup in front of the perineum in the same angle and position expected once the extractor has correctly been applied to the fetal head.



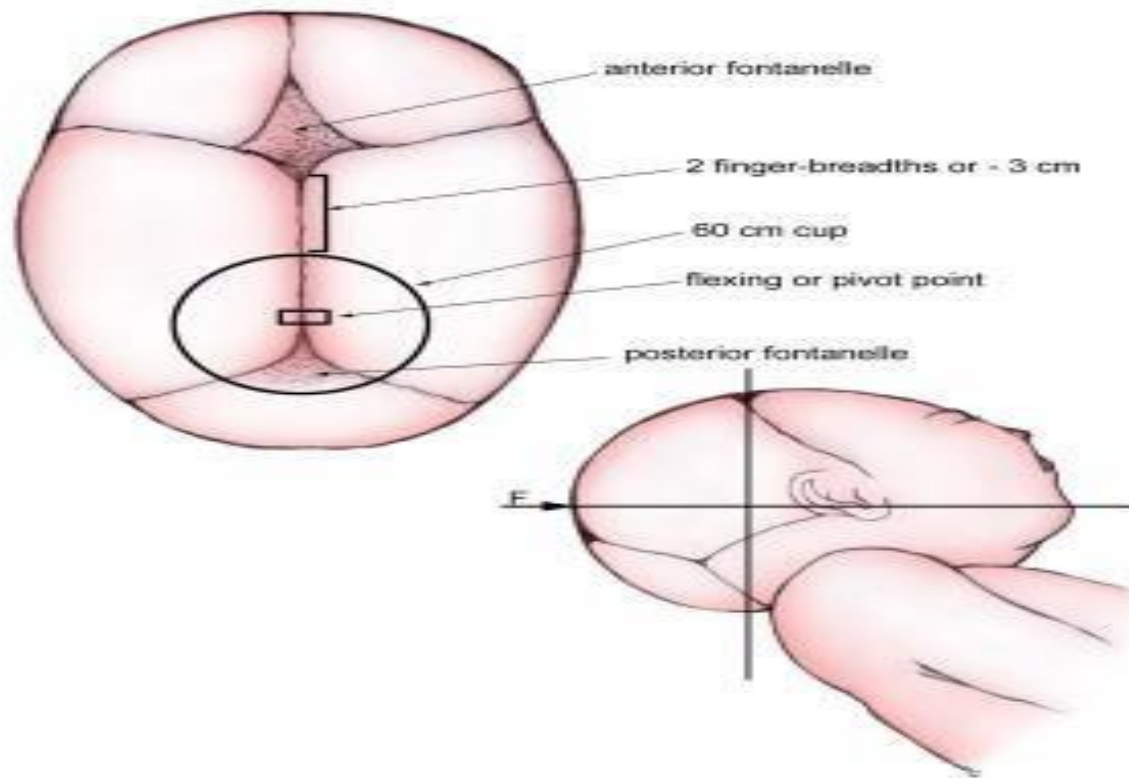
- **Insertion:** the labia are gently spread, and the device is slipped into the vagina and then positioned against the fetal head.
-

- **Correct application :** the vector of traction is directed through the cranial FLEXION point.
- Flexion of fetal head must be maintained to provide the smallest diameter to the maternal pelvis by the correct application .

(the **FLEXION POINT** is a point over the sagittal suture of the fetal skull, located approximately 6 cm posterior to the center of the anterior fontanel or 3 cm anterior to the posterior fontanel.)



CORRECT APPLICATION



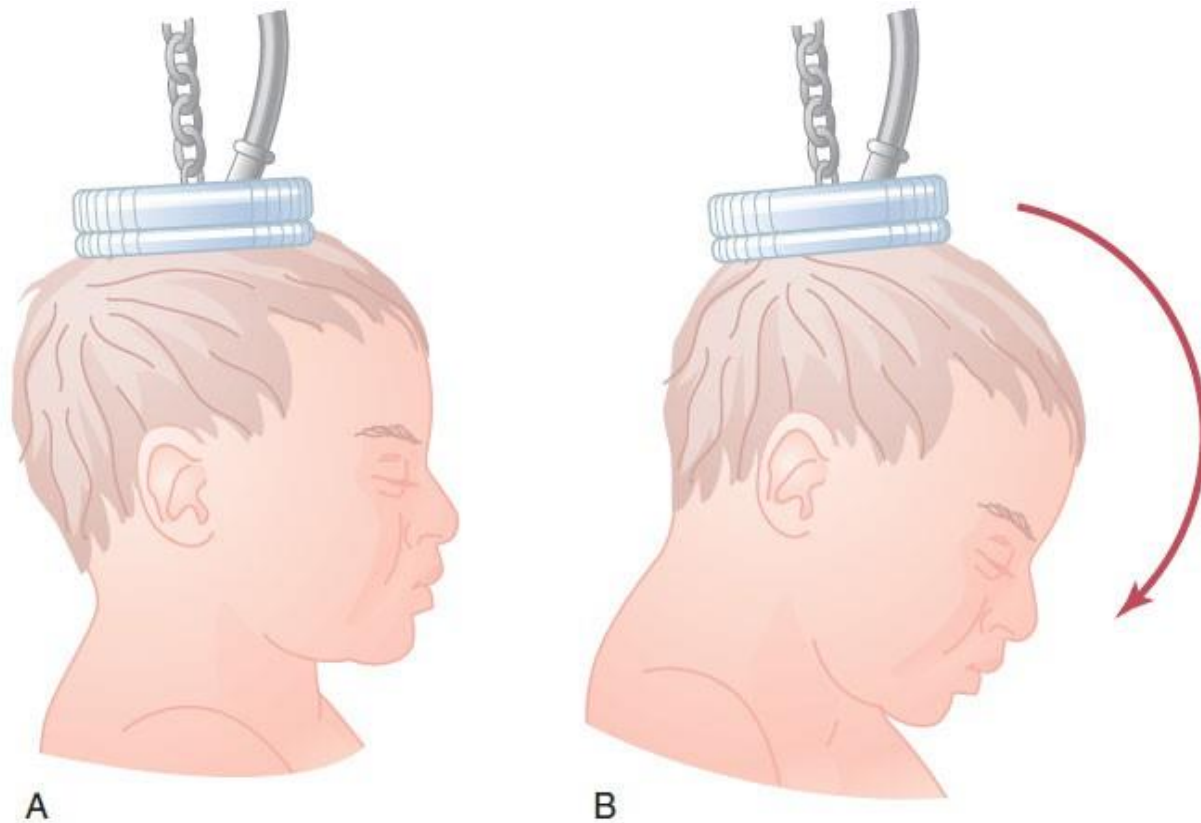
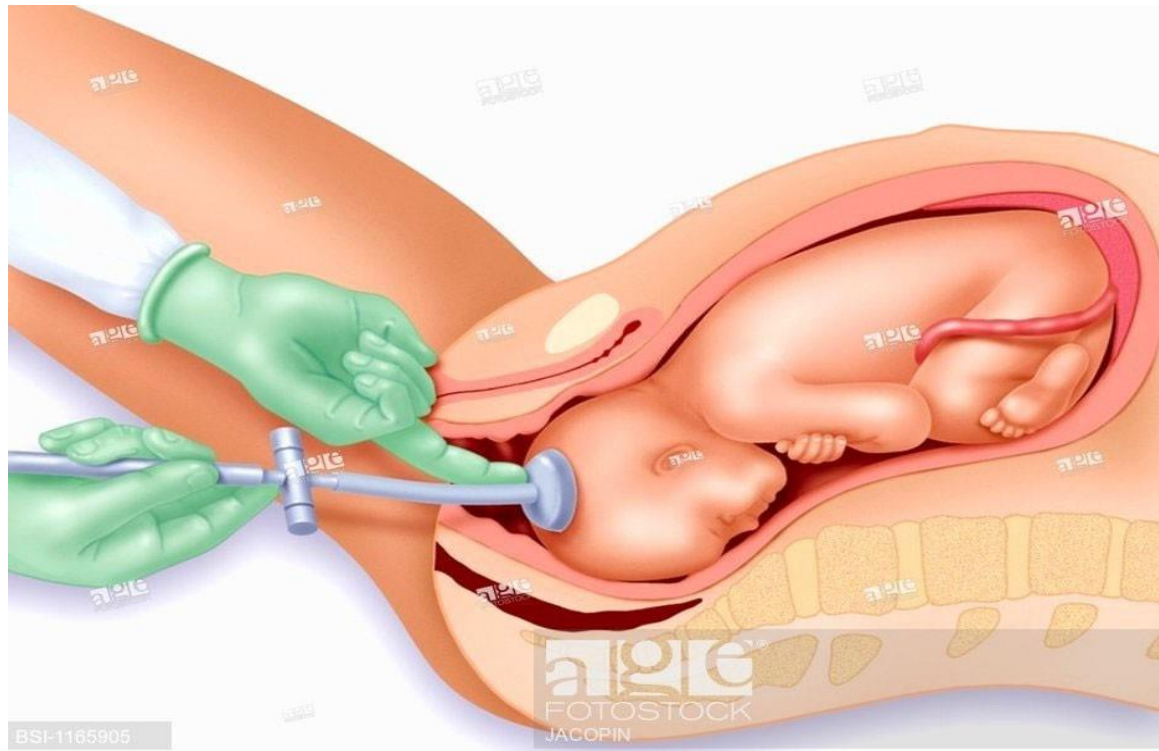


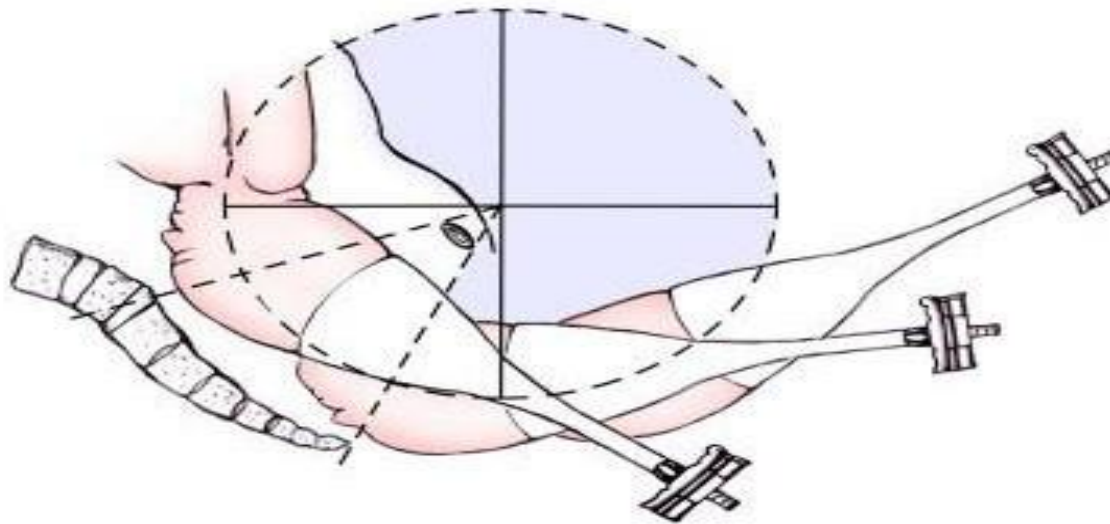
FIGURE 17-6 Application of the vacuum extractor. **A**, Incorrect application, which deflexes the fetal head, thereby increasing the presenting diameter. **B**, Correct application over the posterior fontanel, which flexes the fetal head when traction is applied.

360° CHECK SHOULD BE PERFORMED TO ENSURE THAT THE PELVIC TISSUE OF THE MOTHER (CERVIX OR VAGINA) OR UMBILICAL CORD IS NOT TRAPPED IN THE VACUUM CUP



TRACTION :

Once the doctor has verified cup placement, full vacuum is applied (450-600 mm Hg) with onset of contraction and the traction pulls along the axis of the pelvis , handle perpendicular to the cup , paralleling the uterine contractions with the aid of maternal pushing effort .





The gentle but effective M-Style[®] Mushroom[®] Cup has a proven success rate of up to 97% with laceration rates averaging less than 1.59%.^{3,4,5}

- Applying **rotational** force to rotate the head of the fetus is contraindicated because it can lead to detachment of the cup, cephalohematoma of the fetus, and scalp laceration .
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- **“ Pop-off “**

>>Detachment of the suction cup from the fetal head during traction

- IF two “pop-offs” occur ,the procedure should be discontinued in favor of CS .
- Maximum time from application to delivery should ideally be less than **15-20 minutes** .

BIRTH INJURIES

- fetal death or severe fetal injury from vacuum extraction (VE) is low, ranging from 0.1-3 cases per 1,000 extraction procedures.
- The most common injuries are to the fetal scalp.

INJURIES :

- **Cephalo-hematomas** :collection of blood between fetal scalp and skull
- **Caput succedaneum**
- **Subgaleal hemorrhages** :bleeding in the potential space between the skull periosteum and the scalp galea aponeurosis .
- **Intracranial hemorrhage , Scalp Lacerations**
- radiographic or ultrasonic studies of the CNS performed on newborns who were delivered by instrumental assistance ,help to discover injuries more frequently than clinical examination .

CAPUT SUCCEDANEUM



- A swelling at the top of the head after a ventouse delivery , in most cases nothing but oedema of the scalp skin and shortly disappear.

MATERNAL INJURY

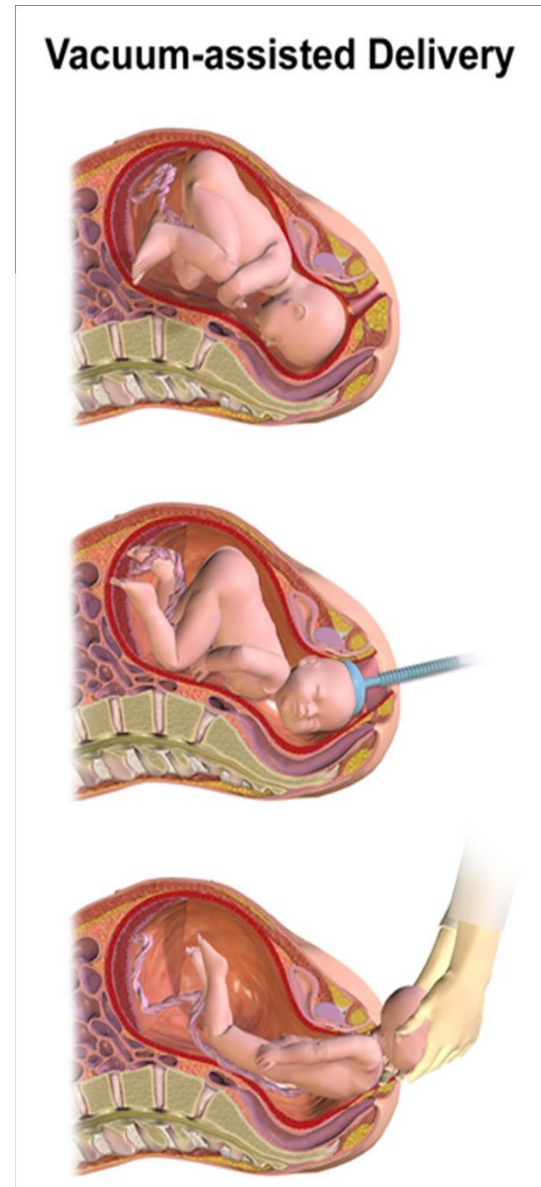
- Vacuum extraction has a low rate of maternal injury in comparison with forceps operations or cesarean delivery
- such as urinary incontinence, fecal incontinence, pelvic organ prolapse, and occasionally fistula formation.

- **Advantages** of VE :

- 1 less training
- 2 no risk of excessive traction
- 3 less injury to mother

- **Disadvantages** :

- 1 cannot be used for → preterm , face or breech presentation
- 2 need more complex equipments
- 3 more trauma for baby



FAILURE

01

Head does not descend with each pull

02

Head is not delivered after 3 pulls

03

Head is not delivered after 20 minutes

04

The cup slips off the head with maximum pressure

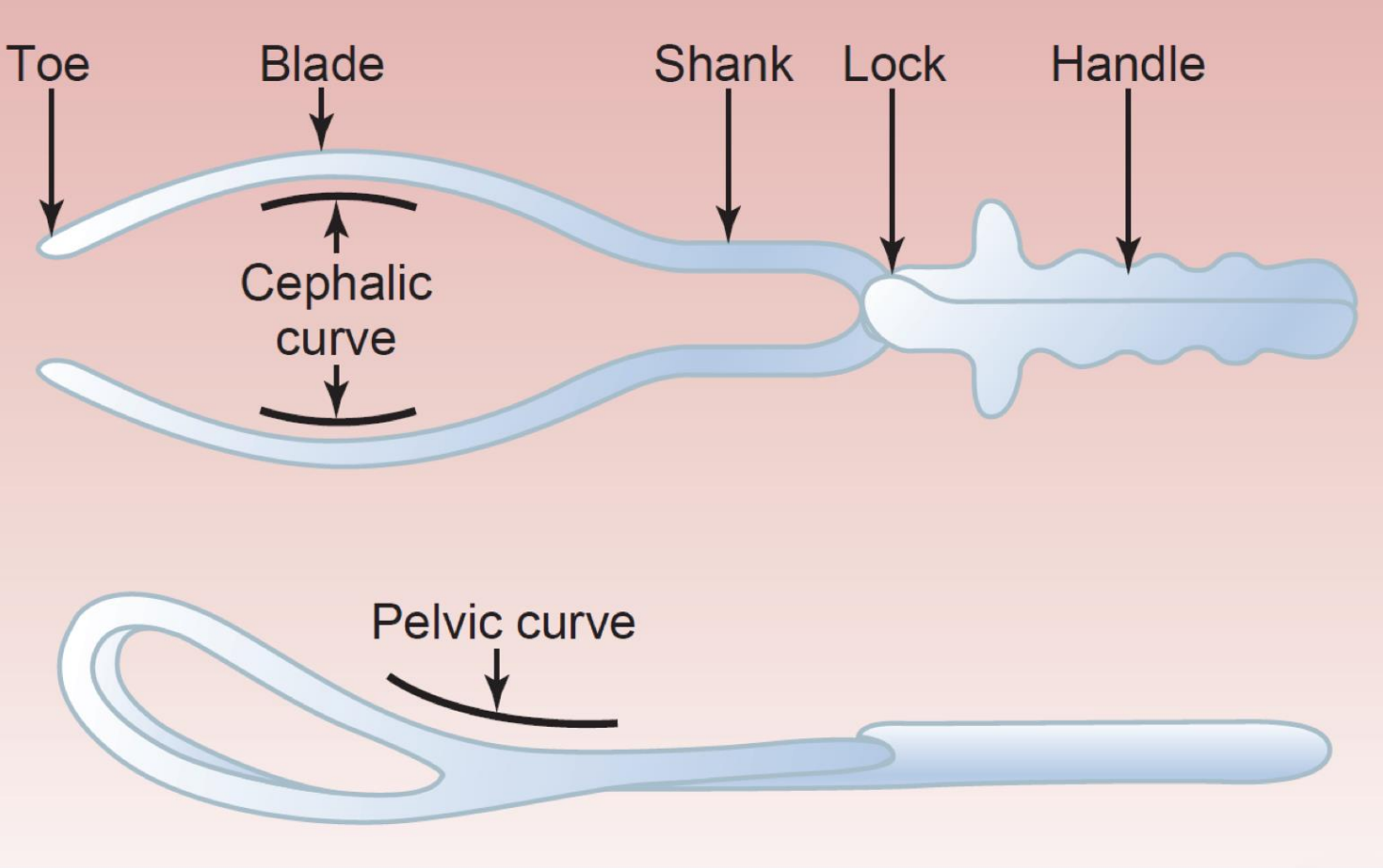
Forceps

Definition

- Forceps are instruments designed to aid in the delivery of the fetus, there are many different types of forceps have been developed.
- Consists of 2 mirror image metal instruments that are articulated and maneuvered to cradle the fetal head.



Forceps have 4 major components :



Cont...

1. Blade: they are maneuvered to catch the fetal head, after which traction is applied to affect delivery. The blades have a **cephalic curve** designed to conform to the curvature of the fetal head and a **pelvic curve** that approximates the shape of the birth canal.
2. Shanks: connect the blades to the handles and provide the length of the device
3. Lock: the articulation between the shanks. Many different typers have been designed
4. Handles : where the operator holds the device and applies traction to the fetal head.

The four most common types of lock are:

1. **Sliding lock:** which can articulate anywhere along the shanks.
2. **English lock:** which is fixed, a double slot lock.
3. **French lock:** which is a screw lock.
4. **German lock:** which is a combination of the English and french



CLASSIFICATION OF FORCEPS

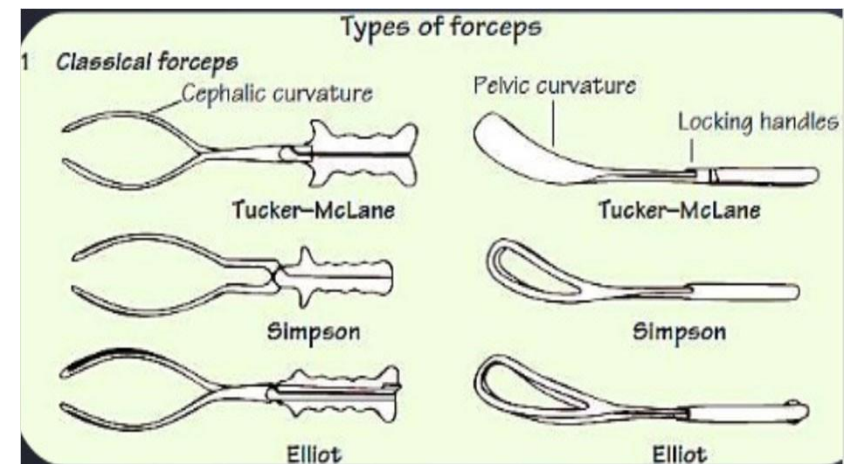
1 Non-rotational forceps: are used when the head is OA with no more than 45° deviation to the left or right (LOA, ROA).

Ex: Simpson forceps , Elliot forceps , Wrigley's Forceps

2 Rotational forceps: when the head is positioned more than 45° from the vertical, rotation must be

accomplished before traction.

Ex: Kielland forceps , piper forceps



❖ Simpson forceps:

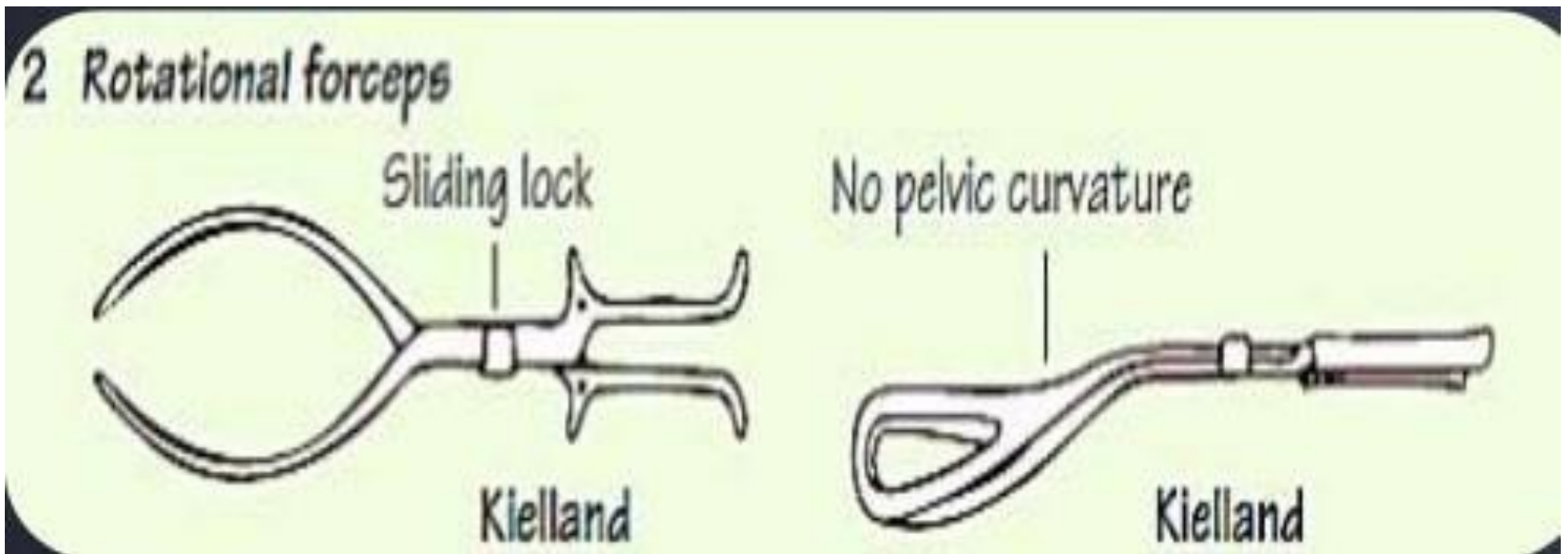
which have a pelvic curvature, a cephalic curvature, and locking handles

Was commonly used.

- Used for aid in delivery a baby in an ideal **occiput anterior position**.



Rotational forceps (such as Kielland forceps), which lack a pelvic curvature and have sliding shanks.



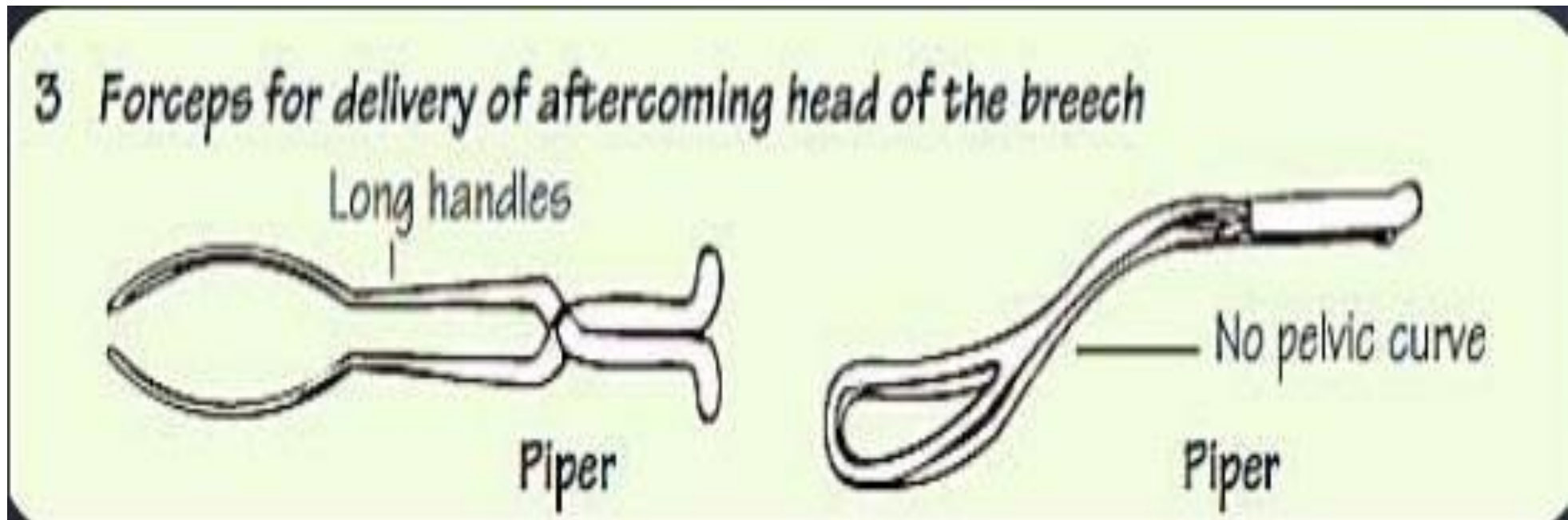
❖ Kielland's forceps:

- **Not used** nowadays .
- Sliding lock, minimal pelvic curvature.
- Used for **rotation** and extraction of the head which is arrested in the **deep transverse** or **occipito-posterior position**.

Kielland Forceps

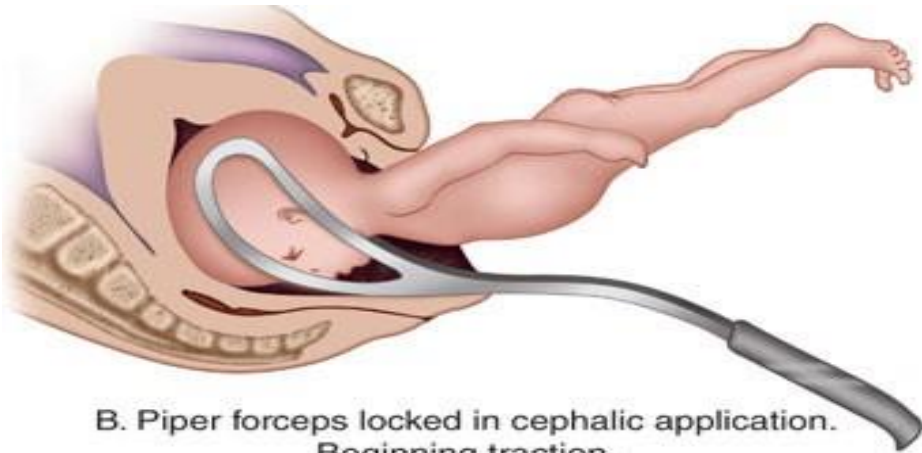


Forceps designed to assist breech deliveries (such as Piper forceps), which lack a pelvic curve and have long handles on which to place the body of the breech while delivering the head.



❖ Piper forceps:

- Allows for application to the after coming head in **breech deliveries.**



B. Piper forceps locked in cephalic application.
Beginning traction.

PIPER Forceps



FUNCTION

1) **Traction:** the most important function.

- Should be steady (not rocking) and in the line of the birth canal.
- Should be exerted with each contraction and in conjunction with maternal expulsive efforts.
- Forceps can be relaxed between contractions to reduce fetal cranial compression.

2) **Rotation of head:** (Kielland's forceps) never done now .

3) **Protective cage:** When applied on a **premature** baby it protects from the pressure of the birth canal, and when applied on the **after-coming head** it reduces the sudden decompression effect.

CONTRAINDICATIONS :

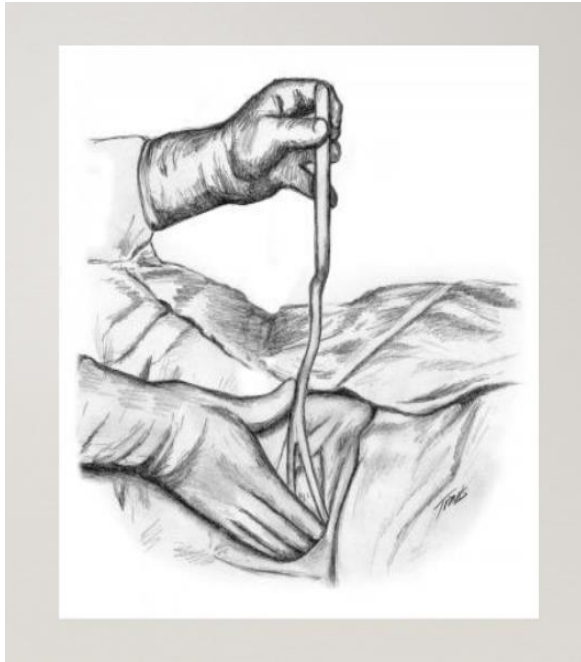
The following are contraindications to forceps-assisted vaginal deliveries:

- Any contraindication to vaginal delivery
- Inability to obtain adequate verbal consent
- A cervix that is not fully dilated or retracted
- Inability to determine the presentation and fetal head position
- Inadequate pelvic size
- Confirmed cephalopelvic disproportion
- Unsuccessful trial of vacuum extraction (relative contraindication)
- Absence of adequate anesthesia or analgesia (relative contraindication)
- Inadequate facilities and support staff
- An insufficiently experienced operator

TECHNIQUE OF FORCEPS VAGINAL DELIVERY

- Application technique for **occiput anterior** position.
- After proper **anesthesia** is achieved and an **empty bladder** ensured, the **fetal position** is checked again.
- The presence of the sagittal suture in the anteroposterior diameter of the pelvic outlet is confirmed.

- The left handle of the Simpson forceps is held in the left hand.
- The blade is introduced into the left side of the pelvis between the fetal head and fingers of the operator's right hand.



-1-

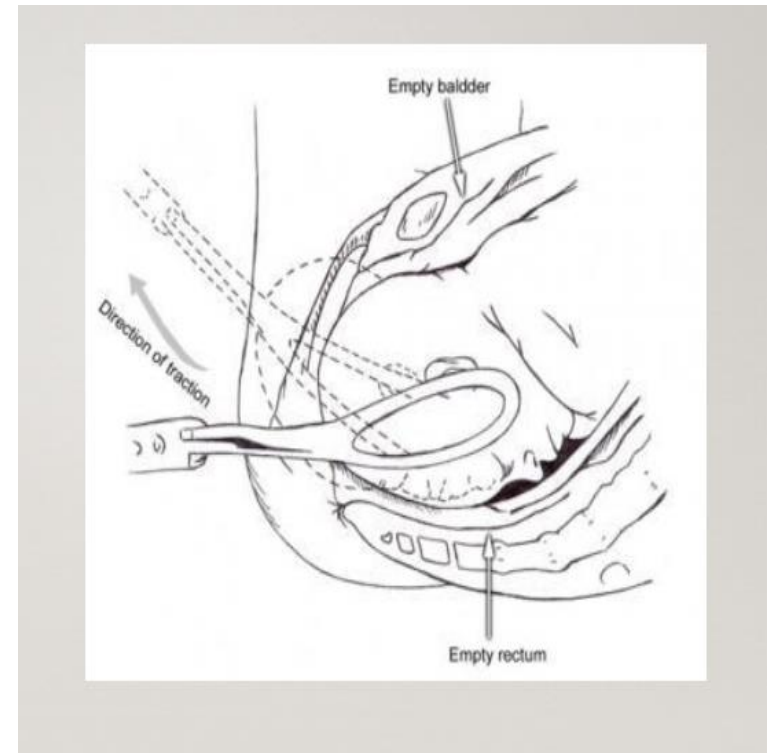
- Next, the right blade is introduced into the right side of the pelvis in the same fashion.



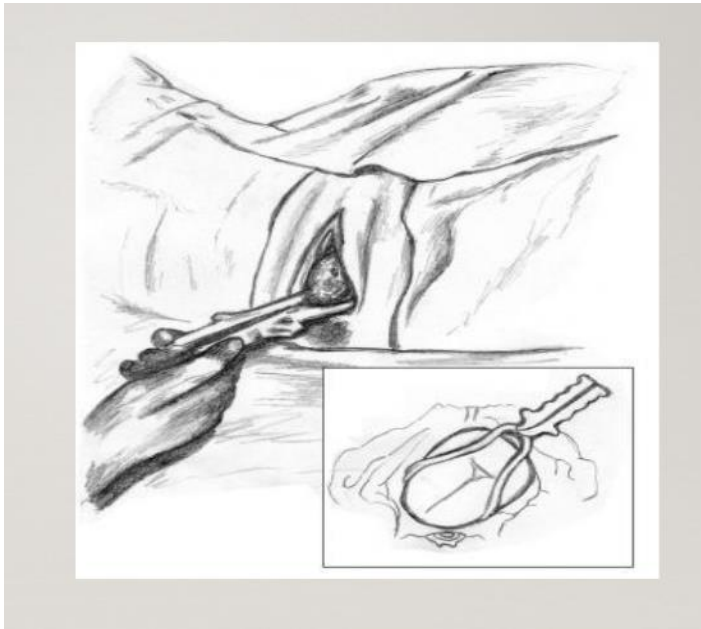
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-3-

- a proper cephalic application, the long axis of the blades corresponds to the occipitomeatal diameter.
- With the ends of the blades lying over the posterior cheeks the blades should lie symmetrically on either side of the head.



- The forceps should lock easily with minimal force and stand parallel to the plane of the floor, depending on fetal station.



- Traction should be applied intermittently coordinated with uterine contractions and maternal expulsive efforts. The axis of traction changes during the delivery
- and is guided along the 'J'-shaped curve of the pelvis .

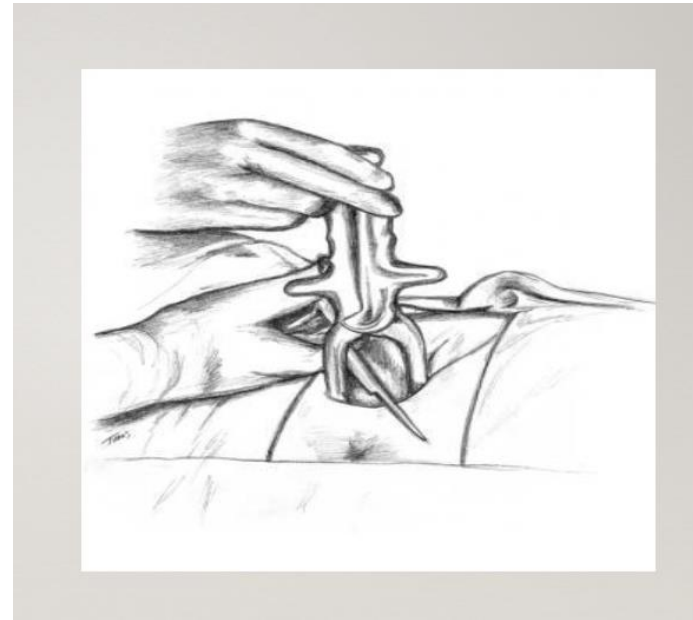


- Then, elevated to an almost vertical direction as the fetal head extends.



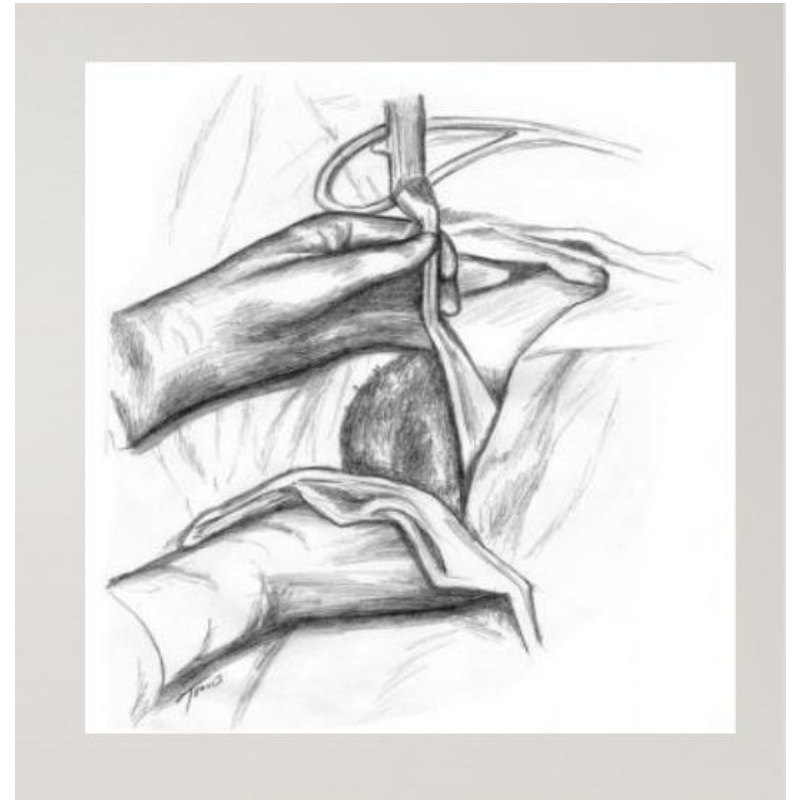
-6-

- Episiotomy **may be performed**.
- Left mediolateral episiotomy is shown here.



-7-

- As the fetal head crowns, the forceps blades are disarticulated and removed and the remainder of the delivery proceeds as for a spontaneous vaginal delivery.



FAILURE

1. When a deliberate attempt in vaginal delivery has failed to expedite delivery
2. Fetal head does not advance with each pull
3. Fetus is not delivered after 3 pulls
4. Fetus is not delivered after 30 minutes

Complications

- Mostly due to faulty technique rather than the instrument.
- **Maternal:**
 1. **Injury:**
 - Extension of the episiotomy involving anus & rectum or vaginal vault.
 - Vaginal lacerations and cervical tear if cervix was not fully dilated.
 2. **Post partum haemorrhage:** Due to trauma or Atonic uterus.
 3. **Shock,** due to blood loss, dehydration or prolonged labour.
 4. **incontinence** has been reported in up to 24% of women within 6 months of a forceps delivery.
 5. **Decrease in pelvic muscle strength.**

▪ **Fetal complications:**

- **Asphyxia** , Cerebral palsy, mental retardation, and behavioral problems.
- **Trauma:**
 - Intracranial haemorrhage.
 - Cephalic haematoma.
 - Facial / Brachial palsy.
 - Injury to the soft tissues of face & forehead.
 - Skull fractures.
- The risk for serious morbidity is 1.5% and the risk of fetal or neonatal death is 0.05%.