FORCEP DELIVERY

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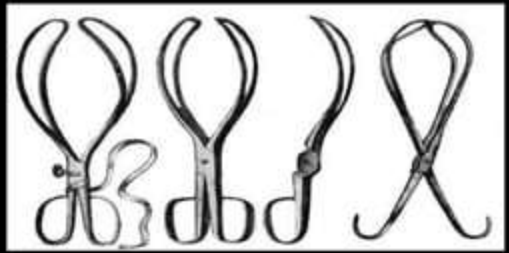
HISTORY

- The Chamberlens were innovators, opportunists and entrepreneurs of forceps.
- Dr Peter, in 1634, proposed a Sisterhood of Midwives of London, antedating the formation of the Central Midwives Board by over 250 years.



HISTORY

- The Chamberlens were French ,William Chamberlen, the patriarch of the family, was most likely a surgeon; he had two sons, both named Pierre, who became maverick surgeons that specialized in midwifery.

- He was succeeded by his nephew, Dr. Peter Chamberlen, as royal obstetrician. The success of this dynasty of obstetricians with the Royal family and high nobles was related in part to the use of this "secret" instrument allowing release of live child in difficult cases.

- In fact, the instrument was kept secret for 150 years by the Chamberlen family, although there is evidence for its presence as far back as 1634.

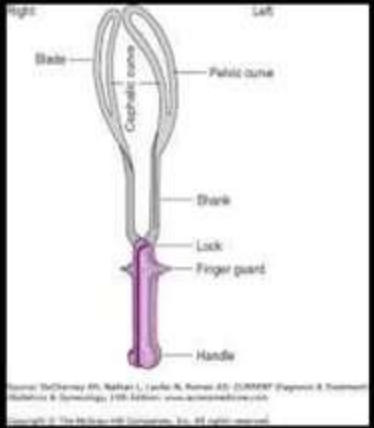
- Models derived from the Chamberlen instrument finally appeared gradually in England and Scotland in 1735. About 100 years after the invention of the forceps by Peter Chamberlen Sr. a surgeon by the name of Jean Palfyn presented his obstetric forceps to the Paris Academy of Sciences in 1723.
- They contained parallel blades and were called the Hands of Palfyn.

- Tarnier's idea was to "split" mechanically the grabbing of the fetal head (between the forceps blades) on which the operator does not intervene after their correct positioning, from a mechanical accessory set on the forceps itself, the "tractor" on which the operator exercises traction needed to pull down the fetal head in the correct axis of the pelvic excavation.

- Tarnier forceps (and its multiple derivatives under other names) remained the most widely used system in the world until the development of the cesarean section

PARTS OF FORCEPS

- Branches
- Blades- solid, fenestrated, Pseudo fenestrated
- Shanks
- Handle
- Lock – English, German, Sliding, Pivot, Hiesters



CURVES OF FORCEPS

- Cephalic Curve
- Pelvic Curve
- Perineal Curve

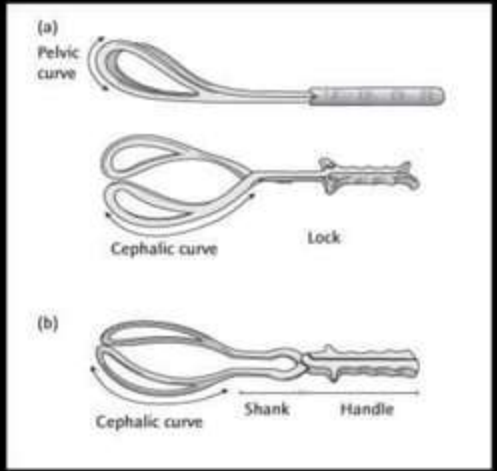


Table 1. Classification for operative vaginal delivery

Outlet	Fetal scalp visible without separating the labia
	Fetal skull has reached the pelvic floor
	Sagittal suture is in the antero-posterior diameter or right or left occiput anterior or posterior position (rotation does not exceed 45°)
	Fetal head is at or on the perineum
Low	Leading point of the skull (not caput) is at station plus 2 cm or more and not on the pelvic floor
	Two subdivisions: • rotation of 45° or less from the occipito-anterior position • rotation of more than 45° including the occipito-posterior position
Mid	Fetal head is no more than 1/5th palpable per abdomen
	Leading point of the skull is above station plus 2 cm but not above the ischial spines
	Two subdivisions: • rotation of 45° or less from the occipito-anterior position • rotation of more than 45° including the occipito-posterior position
High	Not included in the classification as operative vaginal delivery is not recommended in this situation where the head is 2/5th or more palpable abdominally and the presenting part is above the level of the ischial spines

Adapted from the American College of Obstetrics and Gynecology, 2000[23]

PREREQUISITES

- Vertex presentation
- Cervix is fully dilated and the membranes ruptured
- Head is fully engaged
- Exact position of the head can be determined so proper placement of the instrument can be achieved
- Pelvis is deemed adequate
- Informed consent must be obtained
- Appropriate analgesia is in place

- Maternal bladder has been emptied
- Adequate facilities and backup personnel are available
- Operator must have the knowledge, experience, and skill necessary to use the instruments and manage complications that may arise
- Backup plan

Table 3. Prerequisites for operative vaginal delivery

Full abdominal and vaginal examination	Head is ≤1/5th palpable per abdomen
	Vertex presentation.
	Cervix is fully dilated and the membranes ruptured.
	Exact position of the head can be determined so proper placement of the instrument can be achieved.
	Assessment of caput and moulding.
	Pelvis is deemed adequate. Irreducible moulding may indicate cephalo–pelvic disproportion.
Preparation of mother	Clear explanation should be given and informed consent obtained.
	Appropriate analgesia is in place for mid-cavity rotational deliveries. This will usually be a regional block. A pudendal block may be appropriate, particularly in the context of urgent delivery.
	Maternal bladder has been emptied recently. In-dwelling catheter should be removed or balloon deflated.
	Aseptic technique.
Preparation of staff	Operator must have the knowledge, experience and skill necessary.
	Adequate facilities are available (appropriate equipment, bed, lighting).
	Back-up plan in place in case of failure to deliver. When conducting mid-cavity deliveries, theatre staff should be immediately available to allow a caesarean section to be performed without delay (less than 30 minutes). A senior obstetrician competent in performing mid-cavity deliveries should be present if a junior trainee is performing the delivery.
	Anticipation of complications that may arise (e.g. shoulder dystocia, postpartum haemorrhage)
	Personnel present that are trained in neonatal resuscitation

* Adapted from the Society of Obstetricians and Gynaecologists of Canada 2004[41] and the Royal Australian and New Zealand College of Obstetricians and Gynaecologists 2009[27,28]

Types

700+ varieties

3 categories

(1) Classical

- *(a)Parallel shanks:* Simpson, DeLee, Irving, Hawks-Dennen
- *(b)Overlapping shanks:* Elliott, Tucker-McLane

(2)Rotational : Kielland, Leff forceps

(3)Special : Piper forceps

Commonly Used Forceps

Simpson forceps

- The most commonly used types of forceps in outlet delivery.
- Has elongated cephalic curve.
- These are used when there is substantial molding of the fetal head.

Elliot forceps

- Has adjustable pin for regulating the lateral pressure on the handles.
- They are used most often when there is minimal molding.
- More suitable for outlet delivery.

Commonly Used Forceps Cont'd

Kielland forceps

- Has small pelvic curve and a sliding lock.
- Suitable for head with little molding.
- The most common forceps used for rotational delivery.
- Helps correct asynclitism.

Piper's forceps

- Distinct perineal curve.
- Allows for application to the after-coming head in breech delivery.

Table 2. Indications for operative vaginal delivery[24]

Type	Indication
Fetal	Presumed fetal compromise (see text)
Maternal	To shorten and reduce the effects of the second stage of labour on medical conditions (e.g. cardiac disease Class III or IV*, hypertensive crises, myasthenia gravis, spinal cord injury patients at risk of autonomic dysreflexia, proliferative retinopathy)
Inadequate progress	Nulliparous women – lack of continuing progress for 3 hours (total of active and passive second-stage labour)17 with regional anaesthesia, or 2 hours without regional anaesthesia
	Multiparous women – lack of continuing progress for 2 hours (total of active and passive second-stage labour)17 with regional anaesthesia, or 1 hour without regional anaesthesia
	Maternal fatigue/exhaustion

* New York Heart Association classification

No indication is absolute and each case should be considered individually

CONTRAINDICATIONS

Absolute

- non-vertex or brow
- unengaged head
- incomplete cervix dilation
- clinical evidence of cephalopelvic disproportion
- fetal coagulopathy

CONTRAINDICATIONS

Relative

- unfavourable attitude of fetal head
- rotation >45° from occiput anterior or occiput posterior (vacuum)
- mid-pelvic station
- fetal prematurity. There is a small retrospective study reviewing the outcome of deliveries of infants 1500 g to 2500 g. No difference was found in Apgar scores, umbilical pH, or intraventricular hemorrhage when comparing vacuum extraction with controls who delivered spontaneously.17

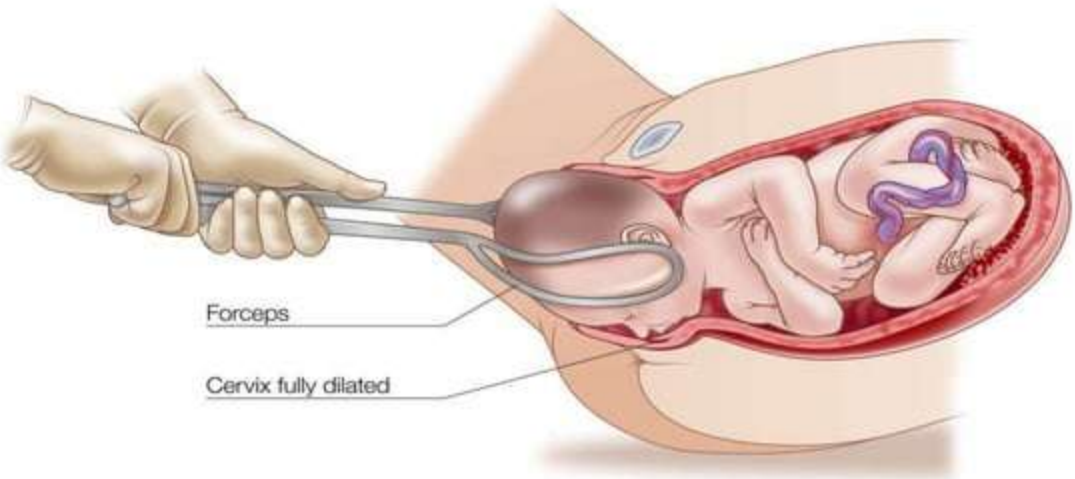
APPLICATION PRINCIPLES AND PROCEDURE

- Be familiar with the instrument being used.
- Use finger-strength pressure when applying forceps.
- Rotation within one plane can only be done with forceps without a pelvic curve.

When checking the application:

- (a) the posterior fontanelle should be located midway between the sides of the blades, with the lambdoid sutures equidistant from the forceps blades and
- (b) the sagittal suture must be perpendicular to the plane of the shanks throughout its length.
- (c) the fenestration of the blades should be barely felt and the amount of fenestration felt on each side should be equal. With a solid blade, no more than a fingertip should be able to be inserted between the blade and the fetal head one finger-breadth above the plane of the shanks.

Forceps birth



- VIDEO

FORCEP FOR AFTER COMING HEAD OF BREECH

Indications –

- Prophylactic i.e. to prevent sudden compression and decompression of after coming head
- Arrest of after coming head

Different forceps which can be used

- Long Pipers forceps
- Simpsons long forceps
- Kielland's forceps

Cardinal Principles –

- Forcep to be inserted and applied from ventral aspect of the body
- Pelvic application rather than purely Cephalic application
- Mechanism of extraction is flexion of head accompanished by elevating the handles of forceps

Prerequisites

- Nape of the neck should be seen

METHOD

- Vaginal examination is done to ensure full dilatation of cervix
- Deep episiotomy to be given
- The operator should kneel for the Pipers forcep insertion
- Assemble forceps
- Assistant holds body of fetus upwards
- Left branch is always introduced first, direct pelvic application from ventral aspect of the body

- Right branch applied similarly. Blades are locked
- Infants body is allowed to straddle he shanks and operators forearms
- Extract with assistant giving suprapubic pressure, operators other hand straddle and splint the neck

A. Orientation: Piper forceps.

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

Source: G. D. Posner, Jessica DY, A. Black, G. D. Jones: Human Labor & Birth, 6th Edition
www.obgyn.mhmedical.com

MATERNAL COMPLICATIONS

- maternal lacerations
- minor external ocular trauma
- retinal hemorrhage

FETAL COMPLICATIONS

- fetal skull fractures
- facial nerve palsies
- cephalohematomas
- subaponeurotic hemorrhages
- intracranial hemorrhages
- scalp lacerations

FAILED OPERATIVE DELIVERY

Causes

- Cannot apply the branchs
- Branches do not lock
- Branches slip after application
- While effecting rotation only blades rotate
- Extraction is not possible
- There is morbidity to motality to fetus and mother

FAILED OPERATIVE DELIVERY

- Application before full dilatation of cervix
- Gross Cephalopelvic Disproportion
- DTA
- Undiagnosed hydrocephalus
- Contraction ring grasping the fetus

- Laufe's principle of failed forcep

Forceps fail not only when vaginal extraction is not possible but also if after undue pulling there is considerable damage to maternal soft parts and the baby, which has been delivered, has suffered considerable injury with low APGAR score and meager chances of survival

FAILED OPERATIVE DELIVERY

- It is well known that a failed operative delivery resulting in a cesarean delivery is worse than an outright cesarean delivery.
- In the study performed in California by Towner et al, the rates of subdural hemorrhage, facial-nerve palsy, convulsions, and mechanical ventilation were significantly higher in infants delivered by caesarean section after a failed attempt at vacuum extraction, forceps delivery, or both.

- As such, a physician must often think about appropriate patient selection and the chances of success before attempting an operative vaginal delivery.

- However, fewer than 3% of women in whom an operative vaginal delivery has been attempted go on to deliver by cesarean. Rotational and midpelvic (0 to +1 station) forceps, however, are more difficult, with higher rates of failure, and require more skill.

Revolution, in history, is like the doctor assisting at the birth of a new life, who will not use forceps unless necessary, but who will use them unhesitatingly every time labor requires them. It is a labor bringing the hope of a better life to the enslaved and exploited masses.

(Che Guevara)


Thank
you