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Operative vaginal delivery Extraction methods

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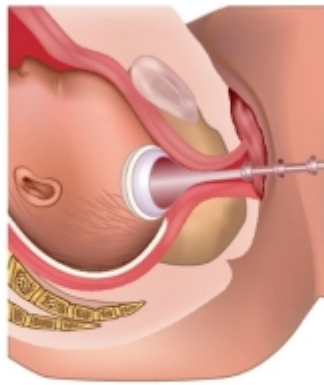


Operative vaginal delivery

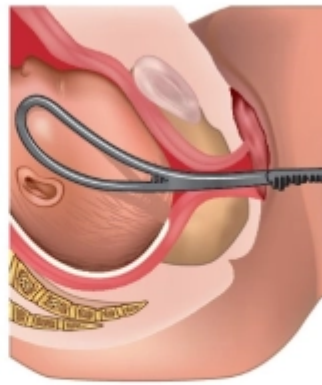


Operative vaginal delivery (OVD) is delivery with the help of forceps or vacuum extraction. After placing them on the head of the fetus, extraction creates forces that enhance the mother's powers to deliver the fetus.

Vacuum-assisted birth



Forceps-assisted birth



Operative vaginal delivery, extraction
= strengthening or replacing the missing repulsive powers of the mother

OVD



Vacuum extraction and forceps have the same indications.
There are no circumstances under which an operative vaginal delivery would be clearly indicated.
Alternatives should always be considered, including allowing the patient to labour longer, increasing uterine activity with oxytocin, or Caesarean delivery.

Vacuum extraction



- **Indication for termination of labour by extraction (OVD):**
- from the mother's perspective
- from the perspective of the fetus
- mixed

Forceps

Indication for termination of labour by extraction (OVD):

- **From the mother's perspective:**
 - bleeding during labour
 - weak uterine activity
 - illness of the mother making it impossible to use the abdominal press
- **From the perspective of the fetus:**
 - imminent fetal hypoxia in II. stage of labour
- **Mixed**

The most common indication:

- prolonged II. stage of labour
- the impossibility of using the abdominal press
- imminent fetal hypoxia in II. stage of labour

Conditions for using OVD:

- live fetus
- spacious pelvis (**no cephalopelvic disproportion**)
- free soft birth canal
- ruptured sac of membranes

- dilated cervix (around the entire circumference of the head)
- the head must be engaged and fixed at least at pelvic width

The choice of extraction instrument (vacuum extractor or forceps) depends on the experience and skill of the operator.

The conditions for use are the same for both instruments:

- Full dilation
- Regular uterine contractions
- Head engaged
- Accurate diagnosis of the head position
- Amniotic sac ruptured

Bladder empty



If the extraction is performed by an experienced doctor/obstetrician, then the extraction vaginal delivery is effective and safe for both mother and child, with a slightly higher success rate of forceps.

Forceps delivery is more successful than vacuum extractor delivery (91% vs. 86%). Complication rates vary between forceps and vacuum, with the predominant differences being that grade III and IV perineal injuries (14% vs. 7.5%) and vaginal walls (26% vs. 8%) are more common in forceps delivery.

OVD



OVD



Facial injury to the newborn is rare in operative delivery, 1.7% in forceps delivery and 0.2% in VEX.

The choice of instrument is decided by consultation and depends on the experience of the doctor/obstetrician.

OVD

OVD



If one extraction method fails, another should not be used. There is an increased risk of injury to the fetal head.

Extraction method

Contraindication of extraction methods

1. The head is not inserted into the pelvis
2. Unknown position of fetal head
3. Prematurity of the fetus, e.g. < 34 weeks of gestation
4. Fetal coagulation disorders (e.g. hemophilia, etc.)
5. Known conditions of fetal bone demineralization (e.g. osteogenesis imperfecta)

Possible complications of operative vaginal deliveries

From the mother's perspective

- The use of forceps is associated with a 6x higher increase in perineum rupture grade III and IV compared to spontaneous vaginal delivery.
- The use of VEX is associated with a 2x higher increase in perineum rupture grade III and IV compared to spontaneous vaginal delivery.
- Forceps delivery has an increased risk of anal sphincter injury compared to VEX.
- Urinary and faecal incontinence is the same after 1 year in women who had OVD, compared with women who delivered by Caesarean section in II. stage of labour.
- Pelvic floor function and sexual function do not differ 1 year postpartum compared to women who gave birth by Caesarean section.
- In the absence of anal sphincter injury, the rate of anal incontinence after 5-10 years is similar to that of women who have had a spontaneous vaginal delivery.

Possible complications of operative vaginal deliveries

From the perspective of the fetus

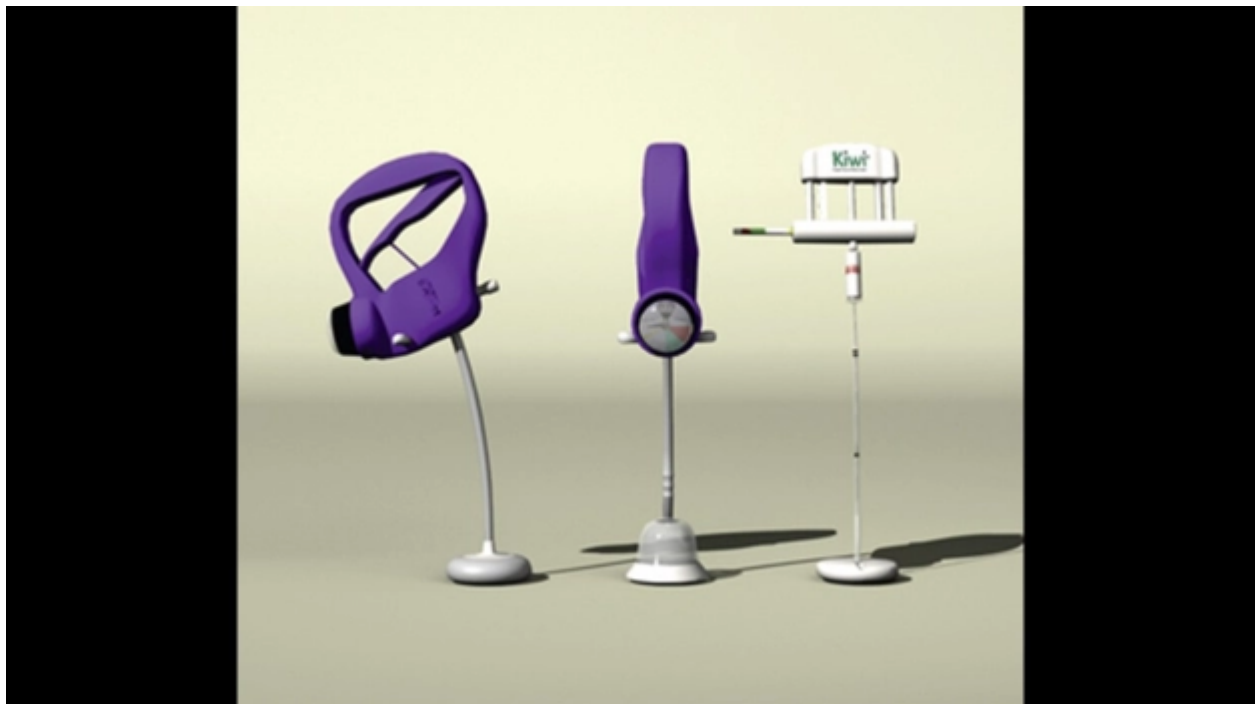
- Intracranial bleeding is increased in OVD, but the absolute risk is low.
- The rate of intracranial bleeding and neonatal encephalopathy is the same compared to women who gave birth by Caesarean section in II. stage of labour.
- Cephalohematoma, fetal scalp laceration, retinal bleeding, subgaleal hematoma, and intracranial bleeding are more common in VEX deliveries.
- Facial lacerations, facial nerve palsy, and corneal erosion are more common in forceps deliveries.
- Long-term cognitive outcomes are similar to spontaneous vaginal births.

Vacuum extractor

Flexion and traction device for facilitating delivery of the foetus.

There are various models, but all have:

- A metal, plastic or silicone suction cup, which must be sterilized between each patient
- A connection to a vacuum system controlled by a pressure gauge. The vacuum is produced by means of a manual pump or electrical device
- A handle for applying traction



Vacuum extractor

Types of vacuum extractors

Several types of hard (metal or plastic) and soft (silicone, plastic or rubber) vacuum extractors are used in clinical practice

With metal vacuum extractors, the probability of successful vaginal delivery is higher than with soft vacuum extractors (**9% vs. 17%**), scalp injury (**41% vs. 30%**) and cephalohematoma (**14% vs. 8%**) are more common.

The indisputable advantage of vacuum extraction:

- technically easier implementation
- thereby also faster education of beginning doctors

Technical improvement contributed to the more frequent use of the vacuum extractor.

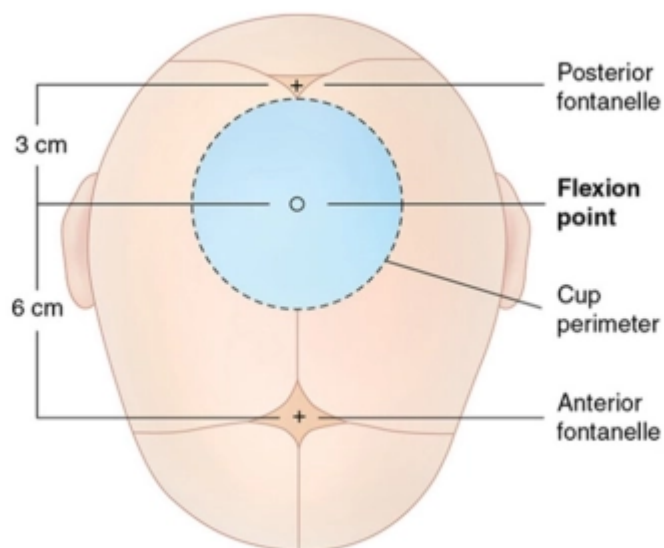


FIGURE 29-15 Drawing demonstrates correct cup placement at the flexion point. Along the sagittal suture, this spot lies 3 cm from the posterior fontanel and 6 cm from the anterior fontanel.

Demonstrates



Soft VEX cups are more likely to fail in vaginal delivery than hard cups, but have a lower rate of significant fetal head injury.

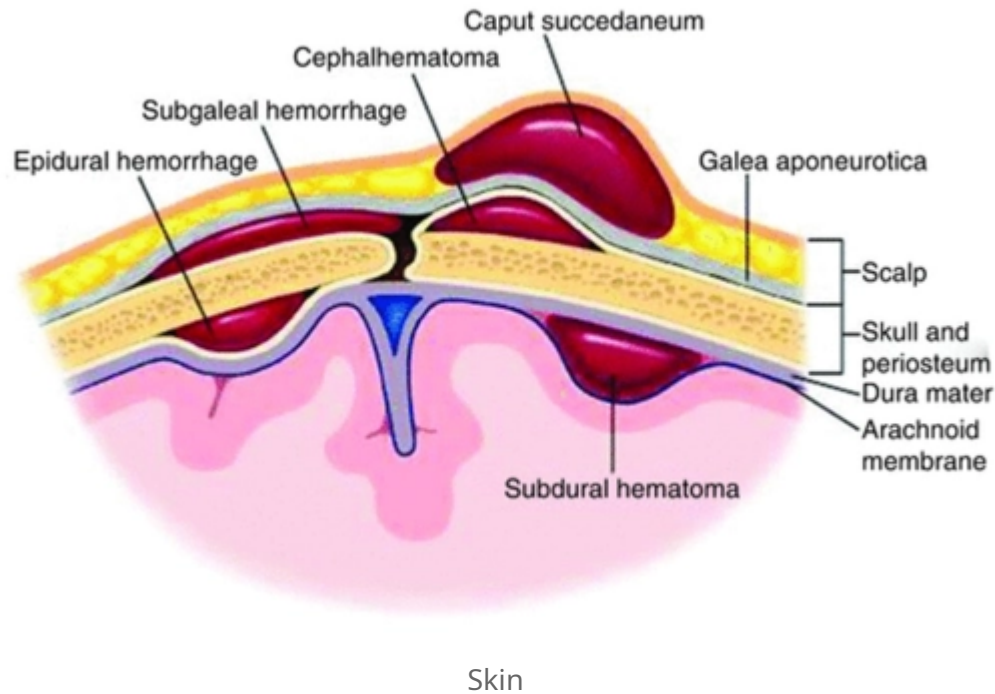
Hard VEX cups are more suitable for head births and more difficult births, while soft VEX cup are more suitable for less complicated, routine births.

VEX



Delivery with VEX should ideally be **within 5 minutes** of VEX insertion and should be aborted **if VEX slips off** the fetal head **3 times**.

VEX



Vacuum extractor

Indications

- Failure to progress due to insufficient or ineffective expulsive effort despite good uterine contractility (using oxytocin, if necessary)
- Foetal distress during delivery
- Perineum unable to stretch enough (combine with episiotomy)
- Difficulty with extraction during Caesarean section (if possible, use a Vacca Reusable OmniCup®-type vacuum extractor with built-in pump)

Contra-indications

- Breech, transverse, face or brow presentation
- Preterm neonate (< 34 weeks): the bones of the skull are too soft
- Head not engage
- Cervix not fully dilated

Technique

- Place the woman on her back with knees bent and thighs apart
- Swab the perineum and the vagina with 10% povidone iodine
- Empty the bladder (insert a sterile urinary catheter).
- Prepare the sterile part of the instrument (the cup), using sterile gloves

- Insert the cup into the vagina and apply it to the scalp, as close as possible to the posterior fontanelle, that is, anteriorly for occiput anterior presentations.
- With one hand holding the cup, circle the cup with one finger of the other hand to make sure that no vaginal or cervical tissue is caught under it. Applying traction can tear the cervix or vagina if there is vacuum extractor suction on those tissues (risk of massive haemorrhage)



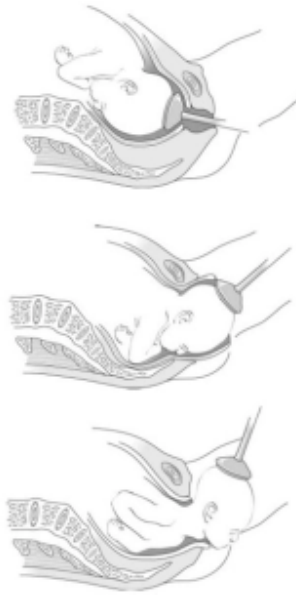
Inserting the cup into the vagina

Technique

Vacuum extractor Technique

- If required have an assistant connect the cup to the vacuum system
- Hold the cup to the foetus' head with one hand
- Pump to reach a negative pressure. Check for trapped vaginal or cervical tissue before starting traction. Sit on a small foot rest or kneel; this gives a good traction angle and helps to stay balanced. The traction, applied with the dominant hand, should be perpendicular to the plane of the cup
- Traction should be applied in sync with the uterine contractions and the pushing, which the woman should continue. Stop pulling the moment the uterine contraction stops. The direction of traction varies according to the head's

progress: first downward, then horizontal, then increasingly vertical



Vacuum extractor traction: axis varies depending on the progress of the head

VEX

Vacuum extractor Technique

- If the cup is positioned incorrectly or the traction is too sudden, the cup can detach. If this happens, reapply it (but no more than 3 times)
- When the hand is able grasp the foetus' chin, turn off the suction, remove the vacuum extractor and finish the delivery in the normal fashion.

While episiotomy is not routine, it can be useful, especially if the perineum is too resistant.

Note: when there is a significant pre-existing caput, application of the vacuum extractor can be ineffective and forceps may be necessary.

Do not apply suction for more than 20 minutes: the indication is probably incorrect, and there is a risk of scalp necrosis. Birth usually occurs in less than 15 minutes.

Make no more than 3 attempts at traction if there is no progress (the mother's pelvis is probably impassable).

In case of failure, perform a Caesarean section.

Forceps

The use of forceps requires special expertise, and forceps should be used by trained birth attendant only.

Forceps can be used even without the mother pushing.

Forceps can be used when a vacuum extractor cannot be used as in a mentum anterior face presentation.

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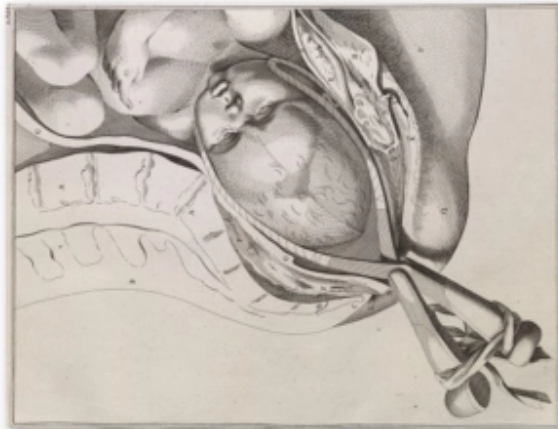
Forceps can be used when a vacuum extractor cannot be used as in a mentum anterior face presentation.

Indications

- As for vacuum extraction
- Breech presentation with retention of the aftercoming head

Contra-indications

- Transverse lie or brow presentation
- Head not engaged
- Cervix not fully dilated



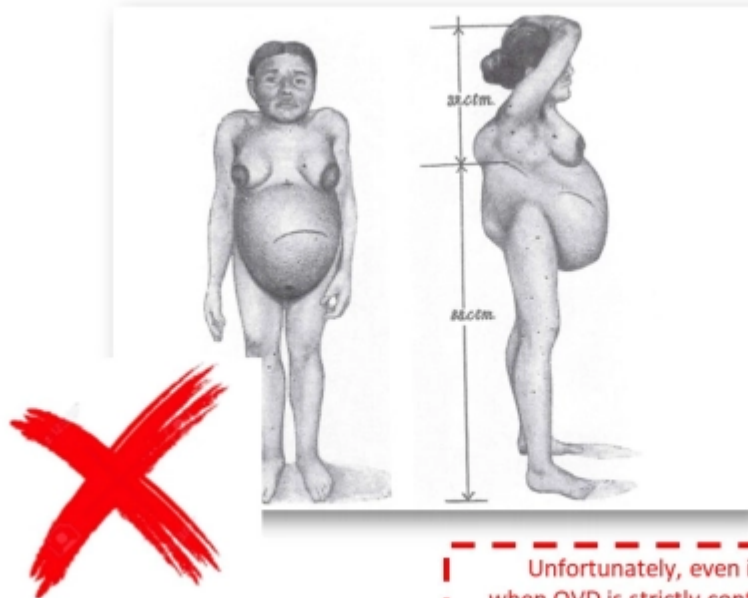
History

Forceps have been practiced for centuries. Its original function was the extraction of the fetus during a prolonged labour in an attempt to save the life of the mother. The invention of obstetric forceps dates back to the Chamberlain family in sixteenth century Europe. Vacuum extraction was first described by Dr. James Yonge in 1705.

For centuries, the use of obstetric forceps belonged to the pinnacle of obstetric art. Many even called the tool "royal", since its invention it helped solve even the most complex obstetric cases.

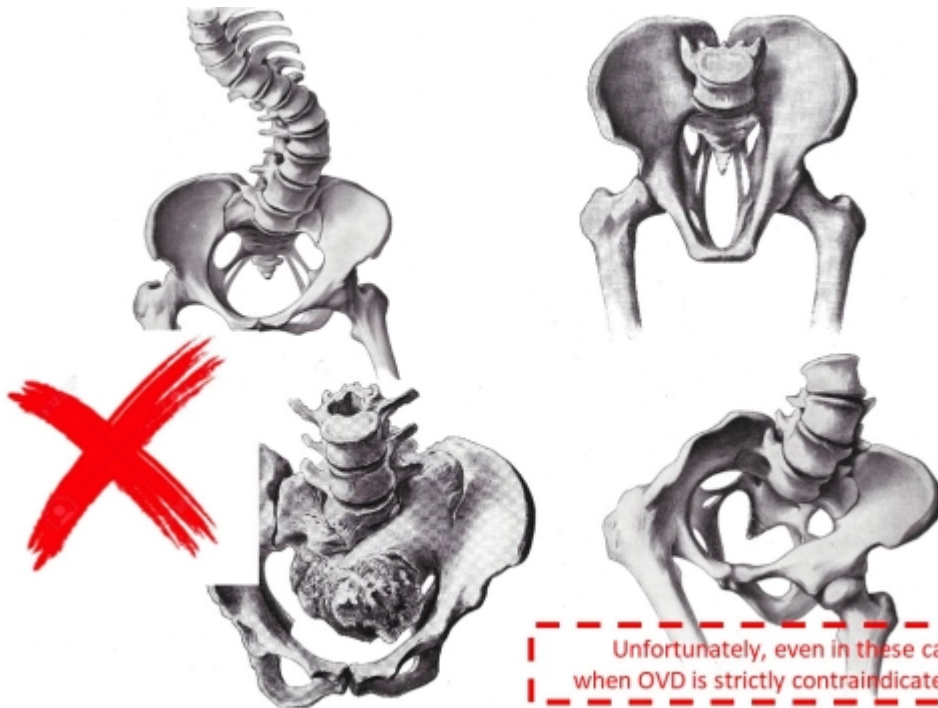
Pařízek A. Forceps delivery--an outdated obstetric technique?

Ceská Gynekol. 2010 Oct;75(5):408-16.



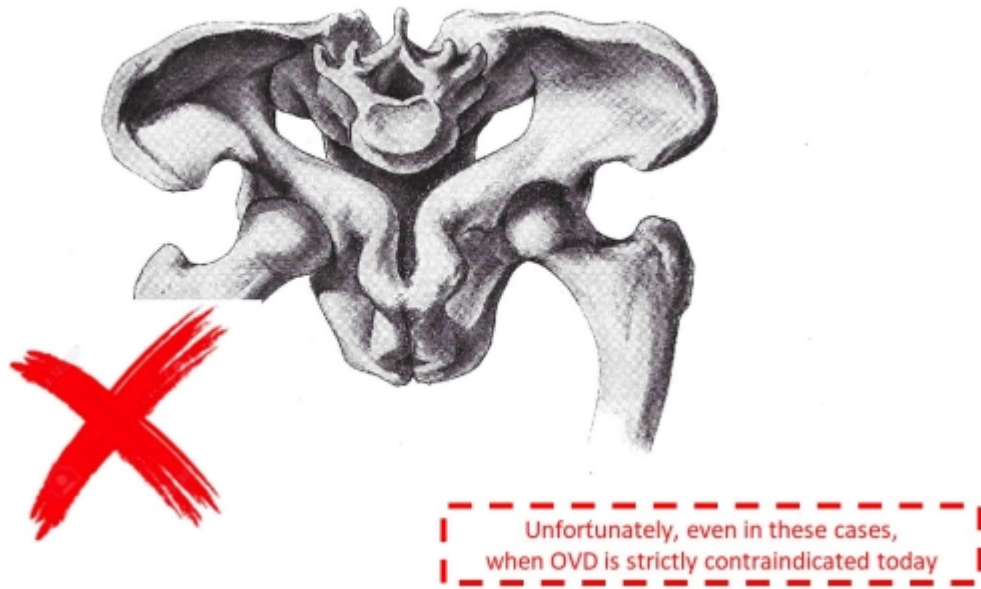
Unfortunately, even in these cases,
when OVD is strictly contraindicated today

OVD



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OVD



OVD

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- live fetus
- spacious pelvis (**no cephalopelvic disproportion**)
- free soft birth canal
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Incidence

The number of OVD (forceps and vacuum) is declining in the United States. The OVD rate decreased from 9.01% in 1992 to 3.30% in 2013. In 2013, forceps deliveries accounted for only 0.59% of live births.

Incidence

The decrease is not due to a lower number of indications, but to an **increase in the number of Caesarean sections**, which are performed **even with a very advanced vaginal finding**, with a dilated cervix and the head entering the pelvic entrance.

MARTIN JA, HAMILTON BE, SUTTON PD, VENTURA SJ, MENACKER F, KIRMEYER S.

Births: Final Data for 2004. Natl Vital Stat Rep, 2006 Sep 29; 55(1): 1-101.

In 2006, The American College of Obstetricians and Gynecologists in its "Survey on Professional Liability" reported that **37.1%** of Caesarean sections were performed with a very advanced vaginal finding.

CHERVENAK J.

Overview of Professional Liability. Clinics in Perinatology, 2007 Jun; 34(2): 227-232.

Forceps delivery (partus per forcipem)

mistakenly nowadays considered an outdated, obsolete operative obstetric procedure.

Forceps delivery is **not a "competing"** obstetric operation in relation to Caesarean section.

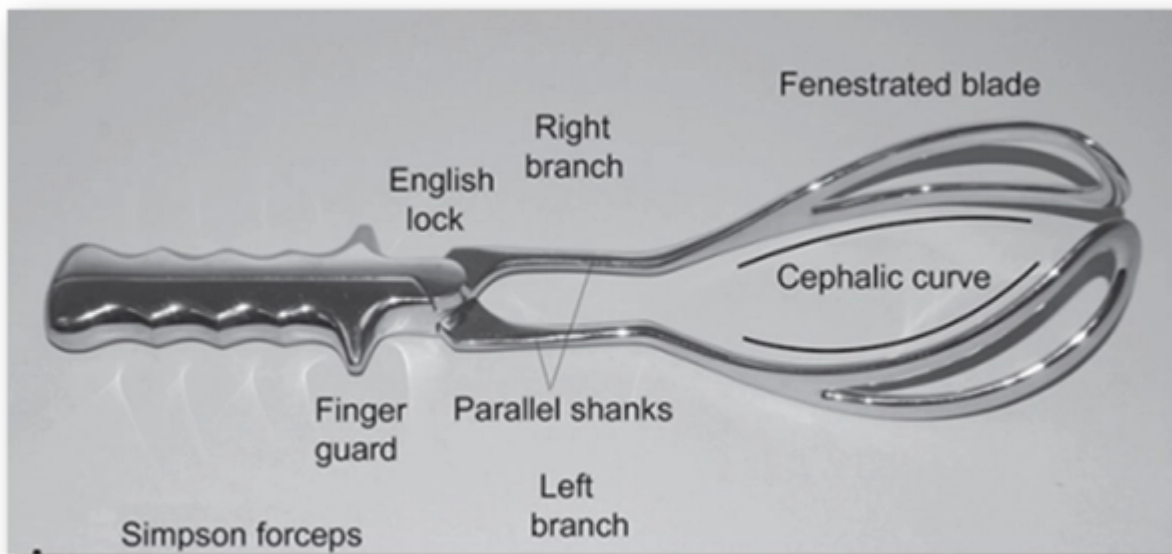
Both of these obstetric operations have their **obstetric indications and conditions**, which are **different from each other**.

Types of obstetric forceps

There are many different designs of forceps, but they all consist of two branches that have the same **four basic components: branches, blades, lock and the handles.**

There is insufficient evidence to compare different types of forceps and it is recognized that choice is often subjective.

The choice of forceps depends on the doctor/obstetrician (his experience)•according to the pelvic plane

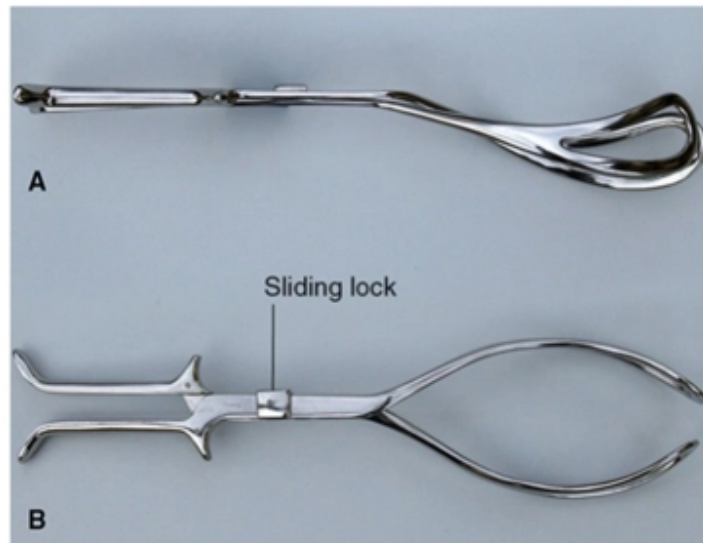


Forceps

We divide obstetric forceps:

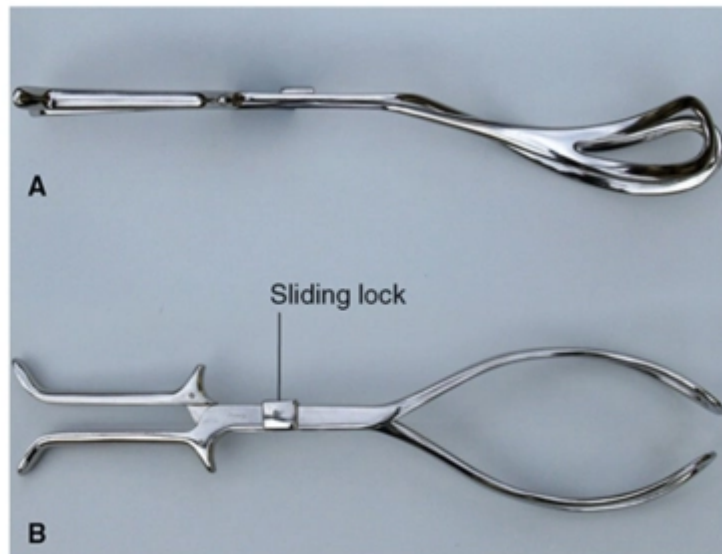
- according to the pelvic plane
- by construction
- according to the possibility of rotation

- according to the nationality of the authors of individual forceps



Kielland forceps. The characteristic features are minimal pelvic curvature (A), sliding lock (B), and light weight.

Forceps



Kielland forceps. The characteristic features are minimal pelvic curvature (A), sliding lock (B), and light weight.

Forceps

Fo

Obstetric forceps according to the pelvic plane:

- **exit** (head in pelvic exit)
- **medium** (head in pelvic isthmus or width)
- **high** (head at the level of the pelvic inlet)

High forceps are no longer used nowadays, the alternative is Caesarean section.

The choice of forceps depends on the doctor/obstetrician

Classic forceps

These forceps have cephalic and pelvic curvature. They are usually indicated if rotation of the fetal head is not necessary before delivery.

These types include: **Simpson forceps**

Rotary forceps

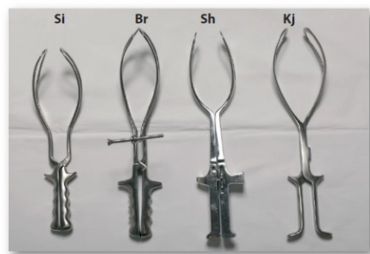
These forceps have a curved head but no curved pelvis.

These types include: **Kielland forceps**

Forceps for breech delivery

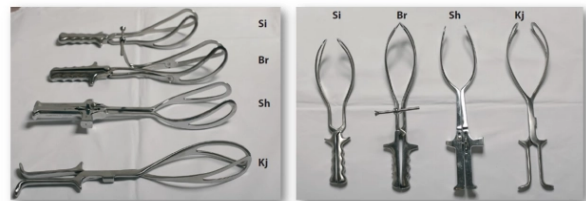
They are indicated to help with the aftercoming head during breech delivery.

Types include: **Piper forceps**



Obstetric forceps by construction:
Parallel Rotary
Crossed Non-rotating

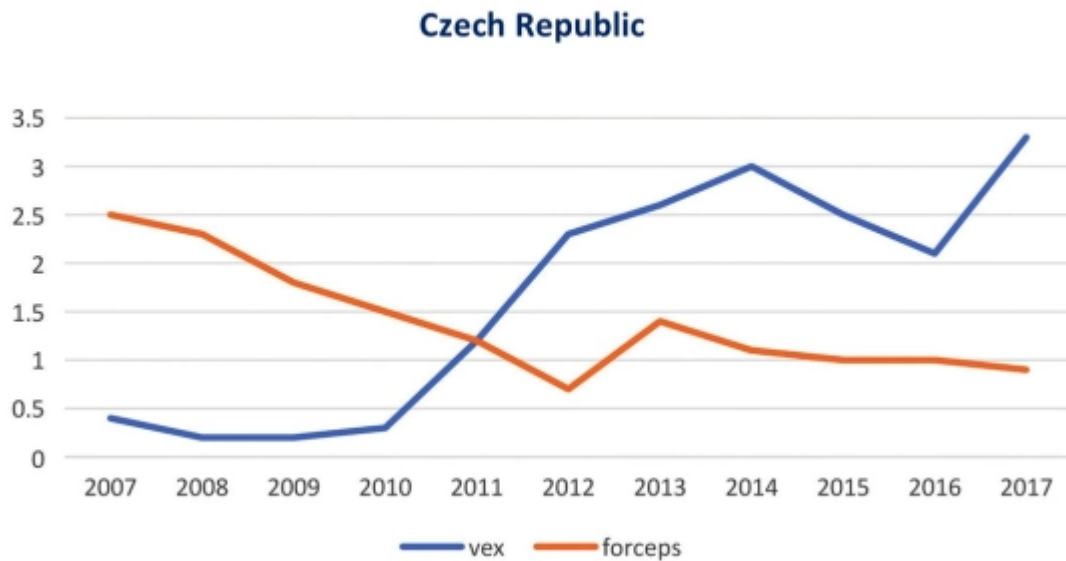
Forceps



Comparison of different types of
forceps

Forceps

Czech Republic for decades, there has been an unchanging trend in the very low representation of traction methods for operative vaginal deliveries, around **2 - 3%**.



Change in trends in the representation of both traction methods.

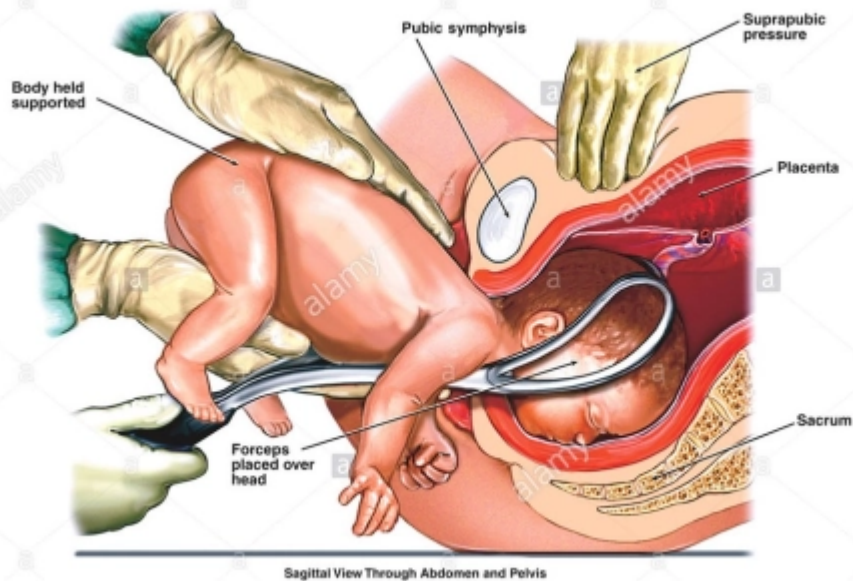
On a global scale, the originally dominant use of **obstetric forceps** has a **downward trend**, and the **vacuum extractor**, on the contrary, **is on the rise**.

The shift away from the use of obstetric forceps **to the vacuum extractor** began in Scandinavia (especially Sweden and Denmark) in the 1970s (almost exclusive use).



Use of forceps on the aftercoming head during breech delivery

Forceps



Forceps

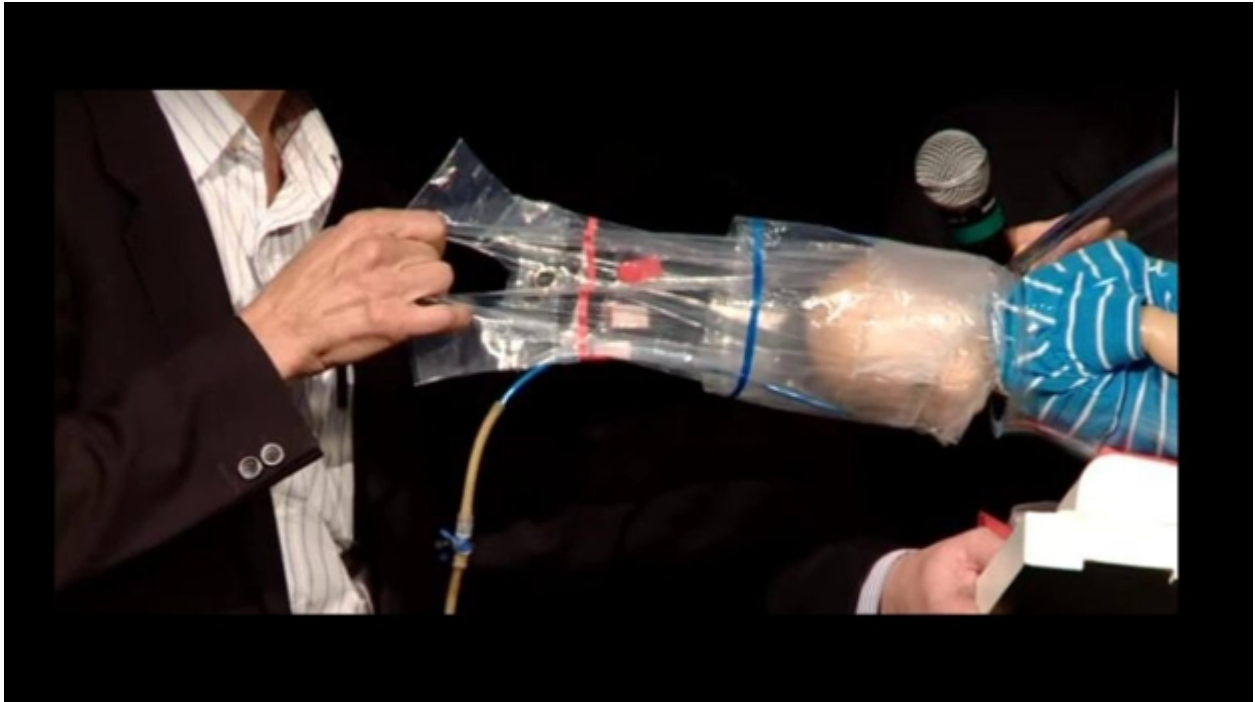
The basic prerequisite for the safe use of obstetric forceps is their correct selection for a specific birth.

Each obstetrician/operator should only use types which he learned to master best from his teachers.

Obstetric forceps are not a dangerous tool.

Only an operator who **does not master their use** is dangerous.

In the future, with the greatest probability, new possibilities will appear in the diagnosis of the anatomical conditions of the head passing through the small pelvis, and there will definitely be a technical improvement in their construction.



Construction