

# Operative Vaginal Deliveries

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## Definition

- > Operative vaginal delivery refers to emergency or elective assisted vaginal delivery using either vacuum extraction (ventouse) or forceps

## Incidence

- > In South Australia, 2008, operative vaginal delivery rates were:
  - > Ventouse 7.0 %
  - > Forceps 4.0 % (Chan et al. 2009)

## Literature review

- > There is a recognised place for forceps and all types of ventouse in clinical practice (O'Mahony et al. 2010)
- > The choice of instrument will depend upon
  - > Operator skill
  - > Choice of instruments available
  - > Clinical circumstances

## Vacuum extraction

- > When compared with forceps:
  - > There is an increased incidence of cephalhaematoma, subgaleal and retinal haemorrhage in the newborn
  - > Less likely than forceps to result in successful vaginal delivery
  - > Less use of regional and general anaesthesia
  - > Less serious maternal injury
  - > Less pain 24 hours after delivery (O'Mahony et al. 2010)

## Forceps

- > When compared with vacuum extraction
  - > Less likely to result in neonatal morbidity (e.g. cephalhaematoma, subgaleal and retinal haemorrhage)
  - > More likely to result in maternal soft tissue injury (O'Mahony et al. 2010)
  - > More likely to result in successful vaginal delivery and will occur over a shorter time frame (RANZCOG 2009b)
  - > Suitable for assisted vaginal deliveries < 36<sup>+0</sup> of gestation (RCOG 2005)

## Indications for operative delivery

### Maternal

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- > Inability to push due to
  - > Maternal distress
  - > Maternal exhaustion
- > Undue delay in second stage
- > Cardiopulmonary or vascular conditions
- > Neurological or muscular disease
- > Significant vaginal bleeding

## Fetal

- > Malposition with relative dystocia (e.g. occiput posterior or transverse)
- > Suspected or anticipated fetal compromise

## Contraindications for operative delivery

- > Operator inexperience
- > Incompletely dilated cervix
- > Unknown fetal position
- > Unengaged head
- > Malpresentation e.g. brow or face presentation
- > Suspected cephalopelvic disproportion (assess with abdominal and pelvic assessment )
- > Ventouse delivery: Gestation < 36<sup>+0</sup> weeks (risk of intracranial haemorrhage and cephalhaematoma)

## Relative contraindications

- > Baby has a predisposition to fracture (e.g. osteogenesis imperfecta)
- > Baby diagnosed with or has a suspected bleeding disorder such as haemophilia or alloimmune thrombocytopenia
- > Hepatitis B, C and HIV carry a risk of vertical transmission: use common sense measures and avoid operative vaginal delivery where possible

## Decision for operative delivery

- > Individual assessment of the risks and benefits in each case is required (see below) as no indication is absolute (RCOG 2005)
- > In nulliparous women, consider the use of oxytocin for prolonged second stage where the fetal head has not reached the pelvic floor before resorting to operative intervention
- > Vacuum extraction and forceps should not be used without senior obstetric supervision by persons who have not been adequately trained and are fully competent to do so

## Prerequisites for operative delivery

- > A detailed abdominal, vaginal and pelvic assessment should precede the decision for operative delivery
  - > Head is ≤ 1/5 palpable per abdomen

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- > Vertex presentation
- > Cervix is fully dilated and membranes are ruptured
- > Exact position of the head and any asynclitism are known (so proper placement of the instrument can be achieved)
- > Pelvis considered to be adequate (RCOG 2005)
- > Clinical assessment has excluded cephalo-pelvic disproportion
- > Consider portable ultrasound to confirm position of the fetal back

## Maternal

- > Give a clear explanation, obtain verbal informed consent and document in case notes
- > Ensure analgesia / anaesthesia is adequate for intended procedure.
  - > For mid-cavity rotational deliveries (ventouse or forceps) this will usually be a regional block
  - > A pudendal block may be appropriate if no regional block is in place (particularly if urgent delivery is required)
- > Empty maternal bladder (if indwelling catheter in place, remove or deflate balloon)

## Clinical considerations

- > Operator has the knowledge, experience and skills necessary for the intended procedure
- > Adequate facilities and back-up personnel are available
- > There is a back-up plan in case of failed ventouse / forceps
- > Complications are anticipated (e.g. shoulder dystocia, postpartum haemorrhage)
- > Appropriate personnel trained in neonatal resuscitation are present

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## Associated risks

- > The risks of operative delivery must be weighed against the consequences of awaiting vaginal birth or alternatively performing a caesarean section with the head deep in the pelvis (RANZCOG 2009a)
- > In cases where there is an anticipated higher risk of failed operative delivery, the procedure should be considered a trial and be conducted in the operating theatre with recourse to caesarean section if unsuccessful
- > Obtain consent for proceeding to caesarean section if unsuccessful
- > Other procedures that may become necessary during operative delivery include:
  - > Manual rotation before forceps or ventouse delivery
  - > Episiotomy
  - > Manoeuvres for shoulder dystocia
  - > Caesarean section
  - > Repair of perineal tear
- > Clinicians should separate serious from frequently occurring risks (see table I). Higher rates of failure and serious or frequent complications are associated with:
  - > Higher maternal body mass index
  - > Ultrasound estimated fetal weight > 4,000 g or clinically large baby
  - > Occipitoposterior position
  - > Mid-cavity delivery or when 1/5 fetal palpable abdominally

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Table I: Associated risks for operative delivery

Serious risks		
Maternal	> 3 <sup>rd</sup> and 4 <sup>th</sup> degree tear	> ventouse: 1-4 in 100 > forceps: 8-12 in 100 > common
	> Extensive or significant vaginal / vulval tear	> ventouse: 1 in 10 > forceps: 1 in 5 > very common
Fetal	> Subaponeurotic / subgaleal haemorrhage	> ventouse 1 in 300 > forceps: 3-6 in 1,000 > uncommon
	> *Intracranial haemorrhage / skull fracture	> 5-15 in 10,000 > uncommon
	> *Facial nerve palsy, corneal abrasion	> < 1 in 1,000 to 1 in 10,000 > rare
	> *Cervical spine injury	> < 1 in 1,000 to 1 in 10,000 > rare > rotational instrumental delivery
Frequently occurring risks		
Maternal	> Shoulder dystocia	> 1-4 in 100
	> Anticipate if delayed 2 <sup>nd</sup> stage, fetal macrosomia	> common
	> *Postpartum haemorrhage	> 1-4 in 10 > very common
	> Vaginal tear / abrasion	> ≥ 1 in 10 > very common > forceps more common
Fetal	> *Anal sphincter dysfunction / voiding dysfunction	> 1 in 100 > common > more common in forceps delivery from an OP position when compared with OA position
	> Forceps marks on face	> ≥ 1 in 10 > very common
	> Chignon / cup marking on the scalp	> practically all cases of ventouse delivery > ≥ 1 in 10 > very common
	> Cephalhaematoma	> 1-12 in 100 > common
	> Facial or scalp lacerations	> 1 in 10 > common
	> Neonatal jaundice / hyperbilirubinaemia	> 5-15 in 100 > common
	> Retinal haemorrhage	> 7-38 in 100 > very common (ventouse delivery)

\* More common with instrumental delivery

Adapted from: Royal College of Obstetricians and Gynaecologists. Consent Advice No. 11 July 2010



## Vacuum extraction

### Types

- > Two types: synthetic or metal cups

#### **Synthetic cups (soft or rigid)**

- > Hand held disposable rigid (Mityvac or Kiwi Omnicup) or conventional soft cup ventouse (silastic)
- > Higher failure rate than metal cups
- > Less neonatal scalp injuries than metal cups
- > Suitable for straightforward deliveries (no significant caput)

#### **Metal cups**

- > Preferred for delivery of occipito-posterior, transverse and difficult occipito-anterior positions (O'Mahony et al. 2010)

### Process

- > Vacuum extraction may be undertaken using a rapid method of suction
- > Use either mechanical or electrical suction
- > Fetal injuries increase with the duration of the procedure
- > Minimise shearing forces on the scalp to reduce the risk of subgaleal haemorrhage (ensure even placement of the cup across the sagittal suture)
- > Position woman in dorsal lithotomy
- > Insert cup
- > If the fetal head is in the posterior position, ideally, place the centre of the cup on the flexion point which is situated on the sagittal suture about 3 cm in front of the posterior fontanelle. Aim to get the cup as far back as possible
- > Check no maternal tissue is trapped beneath the cup
- > Increase scalp suction pressure to around 440 mm Hg (60 kPa)
- > In coordination with contractions and maternal expulsive effort, apply gentle traction in line with the pelvic axis (do not twist the cup)
- > Maintain pressure and moderate traction between contractions (no effect on maternal or fetal outcome)
- > Adequate descent should be verified during each pull
- > If the cup dislodges, exclude fetal scalp or maternal injury before reapplying
- > Obtain arterial and venous cord blood gases immediately after delivery (where facilities are available)
- > Assess and repair any maternal trauma

#### **Abandon the procedure if:**

- > There is no progress after 3 consecutive pulls
- > There is evidence of fetal scalp injury
- > The cup dislodges 3 times

#### **Consider abandoning the procedure if:**

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- > The cup dislodges 2 times despite good technical application and delivery is not imminent
- > Delivery is not imminent after 15 minutes (evaluate whether to continue with operative vaginal delivery or consider recourse to caesarean section)
- > Sequential use of ventouse and forceps to achieve delivery may result in increased maternal and neonatal morbidity. The decision to progress to forceps delivery should take into account the reason for ventouse failure and likely success of forceps. Where time permits (in the absence of maternal or fetal distress), and if available, request the presence of an experienced operator and consider transfer to theatre for delivery with early recourse to caesarean section if operative delivery is unsuccessful

\* Refer to relevant hospital standard

## Instrumental delivery

### Types

- > Outlet to Low forceps:
  - > Wrigley (outlet only)
  - > Simpson, Neville-Barnes, Piper and Lauffe
- > Midforceps rotational:
  - > Kjelland

### Process

- > Position woman in dorsal lithotomy
- > Non-rotational forceps: The left blade is inserted on the left side in the maternal pelvis (the operator's right hand displaces the posterior and lateral vaginal walls and guides placement of the blade)
- > The right blade is inserted on the right side of the maternal pelvis (the left hand displaces the posterior and lateral vaginal wall and guides placement of the blade)
- > Articulate and lock the blades together
- > Confirm correct application:
  - > The top of each blade is felt to be equidistant from the sagittal suture and the posterior fontanelle 1 cm above the plane of the shanks.
  - > Fenestrations (if present) should admit no more than one fingertip.
- > Gentle traction along the axis of the pelvis
- > The operator's free hand exerts vertical downward force whilst horizontal outward force is applied by the hand gripping the forceps handles
- > Apply intermittent traction during uterine contractions with maternal expulsive effort (if feasible)
- > As the head nears delivery, consider episiotomy (may not be required)
- > Remove forceps in the opposite order to application once the head is nearly delivered (jaw can be reached)
- > Obtain arterial and venous cord blood gases immediately after delivery (where facilities are available)
- > Assess and repair any maternal trauma

### Abandon the procedure if:

- > If traction with obstetric instruments fails to produce descent despite adequate force

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\* Refer to relevant hospital standard

## Documentation

- > Document details of operative delivery in case notes, including:
  - > Indication including risks and benefits of operative delivery
  - > Informed verbal consent obtained
  - > Anaesthesia used
  - > Personnel present
  - > Instruments used
  - > Examination findings
  - > Procedure
  - > Time of start and end of the procedure
  - > Any complications



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## Abbreviations

et al.	And others
RCOG	Royal College of Obstetricians and Gynaecologists
RANZCOG	Royal Australian and New Zealand College of Obstetricians and Gynaecologists
cm	Centimetre(s)
mm Hg	Millimetre(s) of mercury
kPa	Kilopascal
e.g.	For example

## Version control and change history

**PDS reference:** OCE use only

Version	Date from	Date to	Amendment
1.0	18 Feb 04	24 Dec 07	Original version
2.0	24 Dec 07	01 Nov 10	Reviewed
3.0	01 Nov 10	21 Dec 10	Reviewed
4.0	21 Dec 10	current	