The Royal Australian and New Zealand College of Obstetricians and Gynaecologists
Excellence in Women's Health

# Instrumental vaginal birth

This statement has been developed and reviewed by the Women's Health Committee and approved by the RANZCOG Board and Council.

A list of Women's Health Committee Members can be found in Appendix D.

Disclosure statements have been received from all members of this committee.

**Disclaimer** This information is intended to provide general advice to practitioners. This information should not be relied on as a substitute for proper assessment with respect to the particular circumstances of each case and the needs of any patient. This document reflects emerging clinical and scientific advances as of the date issued and is subject to change. The document has been prepared having regard to general circumstances.

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**Values:** The evidence was reviewed by the Women's Health Committee (RANZCOG), and applied to local factors relating to Australia and New Zealand.

**Validation:** This statement was compared with RCOG, ACOG and SOGC Guidelines on instrumental vaginal birth.

**Background:** This statement was first developed by Women's Health Committee in July 2002. During the statements review in November 2015 Rotational Forceps (C-Obs 13) was incorporated to create one statement on Instrumental Vaginal Birth.

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## Table of contents

## 1. Plain language summary

The use of instruments – a vacuum cup (ventouse) or forceps – may be required to achieve a safe vaginal birth. Using instruments to assist birth is usually recommended when the condition of either the baby or the mother makes it less safe to allow time for normal birth to occur. The choice of which instrument to use depends on the clinical situation, and every birth is different. There are different types of vacuum cup and different types of forceps, and each has different advantages and potential disadvantages. Sometimes a caesarean section will be performed instead of, or even after, an attempted instrumental delivery. However, a caesarean section when the baby's head is deep in the pelvis and the cervix is fully dilated can be very difficult and poses risks to mother and baby. Further, a caesarean section has potential implications for the mother's future pregnancies. For this reason, the benefits and risks of instrumental vaginal birth need to be weighed up in each case, and the following statement provides information for clinicians on the principles that guide instrumental vaginal births.

## 2. Summary of recommendations

| **Recommendation 1** | **Grade** |
|---|---|
| As instrumental vaginal birth may be associated with maternal and neonatal morbidity, measures which safely reduce the need for instrumental birth are recommended. | Good Practice Point |
| **Recommendation 2** | **Grade** |
| Safe instrumental vaginal birth requires a careful assessment of the clinical situation and clear communication with the woman and her support person (s). Instrumental birth should be performed by or in the presence of, an operator with expertise in the chosen procedure and the management of any complications which may arise. | Good Practice Point |
| **Recommendation 3** | |
| When there is an increased likelihood that attempted instrumental birth may not be successful, where feasible, the attempt should be conducted in a place where immediate recourse to caesarean section is possible. | Good Practice Point |
| **Recommendation 4** | |
| The evidence shows that performing an episiotomy in women having their first vaginal birth led to 24% fewer OASI when forceps were used and 16% fewer OASI when ventouse was used and therefore should be considered. | Evidence-based recommendation<br><br>Reference 31 |
| **Recommendation 5** | |
| The choice of either vacuum or forceps for instrumental vaginal delivery will depend on the judgement of the operator and the individual clinical circumstances. | Good Practice Point |

| Recommendation 6 | |
|---|---|
| Where there has been difficulty with operative vaginal birth, including recourse to Caesarean section or sequential use of instruments, the doctor responsible for the care of the baby should be advised so that appropriate surveillance and management of the baby can be instituted. | Good Practice Point |
| **Recommendation 7** | |
| For women who undergo assisted vaginal birth, consideration should be given to prophylactic antibiotics to reduce the risk of post-partum infection. | Evidence-based Recommendation<br><br>Grade A |
| **Recommendation 8** | |
| Postnatal care following instrumental vaginal birth requires attention to thromboembolic prophylaxis, analgesia, voiding function, rehabilitation of the pelvic floor, and counselling regarding the index birth and future births. | Consensus-based recommendation |

## 3. Introduction

Instrumental vaginal birth retains an important role in current obstetric practice. Vacuum and forceps assisted vaginal birth account for approximately 11% of births in Australia (1990-2012)[1] and just under 10% of births in New Zealand.[2] Rates have been reported to vary from 7.4-16% of all births across a spectrum of Australian and New Zealand hospitals.[3] A number of reviews and guidelines have been published.[4-7]

When labour has progressed to full dilation and concerns exist regarding wellbeing of the fetus, mother, or both, three options exist: (1) to allow the labour to proceed aiming for spontaneous vaginal birth; (2) to proceed to attempted instrumental vaginal birth; or, (3) to perform a caesarean section. Each of these options carries both benefits and potential risks and in each individual case there will be particular circumstances which may influence the recommendation.

Emergency caesarean sections at full dilation can be technically difficult with the head sometimes deep in the maternal pelvis, with the potential for injury to both mother and fetus. When compared with a caesarean section performed in the first stage of labour, a caesarean section performed in second stage of labour is associated with significantly increased risk of maternal morbidity including tears in relation to the uterine incision, haemorrhage, blood transfusion, bladder trauma and requirement for intensive care.[8-11] There is also potential for complications in future pregnancies relating to uterine scar rupture in labour and risks associated with repeat caesarean section, which increase with each additional caesarean section required.[12, 13] These issues are addressed in the College statement *Vaginal birth after previous caesarean section (C-Obs 38).*

In general, balanced against the risks of leaving a fetus undelivered, instrumental vaginal birth provides a safe and effective option in appropriately selected cases. Further, a vaginal birth in a first pregnancy is associated with a high (78-91%) rate of spontaneous vaginal birth in the next pregnancy.[14, 15]

# 4. Discussion and recommendations

| Recommendation 1 | Grade |
|---|---|
| As instrumental vaginal birth has the potential for maternal and neonatal morbidity, measures which safely reduce the need for instrumental birth are recommended. | Good Practice Point |

## 4.1 Non-Operative Interventions

Several approaches to care may reduce the need for instrumental delivery. These include continuous midwifery support during labour and the use of upright or lateral positions in the second stage of labour.[16, 17] Epidural analgesia, compared with non-epidural methods of pain relief, has been previously thought to be associated with an increased incidence of instrumental vaginal birth. Some of these observed differences may be attributable to the complicated labour rather than the epidural itself. Moreover, the studies reporting on increased risk of operative delivery with epidural tend to have been older studies, and this effect has not been seen in studies since 2005, where lower dose epidural techniques, or patient controlled epidural, have been used.[18]

Judicious use of oxytocin infusion after careful assessment and with continuous fetal monitoring may reduce the need for operative birth. Commencement of an oxytocin infusion in the second stage of labour in nulliparous women who have an epidural *in situ* has been reported to reduce the need for non-rotational forceps.[19] However commencing an oxytocin infusion in the second stage of labour for parous women should be undertaken with extreme caution, and requires careful examination to exclude abnormal presentation, signs of cephalo-pelvic disproportion, and other causes of secondary arrest of labour such as uterine rupture.

A meta-analysis demonstrated that primiparous patients who received epidurals were less likely to require rotational or mid-cavity interventions when pushing was delayed for up to two hours or until they had a strong urge to push, provided there was no evidence of fetal compromise.[20]

## 4.2 Manual Rotation

The purpose of manual rotation is to turn the fetal head to the more favourable occiput anterior position. When successful it has been shown to significantly reduce the need for caesarean section and increase the rate of vaginal birth.[21, 22]

## 4.3 Indications for instrumental birth

There are few absolute indications or contraindications to instrumental birth. In every case an assessment should be made of the relative benefits and potential adverse effects, and these should be compared to the consequence of either leaving the fetus undelivered or of proceeding to caesarean section in the first instance. Typically, instrumental birth is employed to accelerate birth in the presence of:

- **Suspected or anticipated fetal compromise**
  The few hours immediately prior to birth is the time of greatest risk to the well-being of the fetus. The risk in the second stage of labour relates to; fetal descent which may precipitate cord compression, or a combination of intense uterine activity and expulsive efforts by the mother which may reduce placental blood flow to the extent that the fetus is seriously compromised. Fortunately, at full dilatation instrumental birth can often be rapidly and safely accomplished.

- **Delay in the second stage of labour**
  There is no clear demarcation as to an appropriate length of time to wait before embarking on instrumental birth for delayed progress in the second stage. The upper time limit for second stage should be a matter for the senior clinician supervising the labour and patient given the particular circumstance. The following should be noted in making the decision.

  a. There is an increased chance of fetal compromise with prolonged pushing in second stage, or when the presenting part is low on the perineum for an extended length of time. Continuous fetal monitoring (with application of a fetal scalp electrode, if external monitoring is inadequate) should be used in these circumstances to confirm fetal wellbeing, or to help with a decision to expedite delivery.
  b. Maternal exhaustion and its effect on progress during pushing should be taken into account.
  c. Pelvic floor injury including anal sphincter dysfunction becomes increasingly common with increasing duration of the second stage.[23]

- **Maternal effort contraindicated**
  Maternal bearing down effort may sometimes be contraindicated with maternal conditions such as cerebral aneurysm, where there is a risk of aortic dissection, proliferative retinopathy, severe hypertension, or cardiac failure. In these settings, women may benefit from epidural analgesia and elective instrumental birth.

### 4.4 Contraindications to instrumental vaginal birth

Fetal bleeding disorders (e.g. alloimmune thrombocytopenia) or a predisposition to fracture (e.g. osteogenesis imperfecta) are relative contraindications to instrumental vaginal birth.

Vacuum delivery should not be used for a face presentation, or at a gestation less than 34 weeks. The safety of vacuum extraction at between 34 and 36.0 weeks is uncertain and should be used with caution.

### 4.5 Conditions required for safe instrumental vaginal birth

| Recommendation 2 | Grade |
|---|---|
| Safe instrumental vaginal birth requires a careful assessment of the clinical situation and clear communication with the woman and her support person (s). Instrumental birth should be performed by, or in the presence of, an operator with expertise in the chosen procedure and the management of any complications which may arise. | Good Practice Point |

The condition of the fetus needs to be assessed. The fetus that has suffered significant hypoxic insult (either prolonged, or acute and severe) may be at greater risk of trauma during an attempted instrumental vaginal birth.[24] In these settings the fetus may be at increased risk of trauma due to reduced tone and engorgement of the cerebral vessels.[25] However, despite the potential risks of instrumental birth in this situation, it may remain the safest option in the prevailing clinical circumstances.

Because instrumental vaginal birth including possible episiotomy is such a common outcome of labour, women should be informed about instrumental vaginal birth, and when it may be required, during antenatal care. The time spent obtaining consent for instrumental birth

during labour may be determined by the urgency of the situation. Verbal consent should be obtained and the discussion documented in the clinical record. Effective communication with the patient and her support person/ persons is required to ensure that there is clear understanding of the management plan.

Written consent should generally be obtained prior to an instrumental vaginal birth in an operating theatre setting, and women made aware of the possibility that attempts at instrumental delivery may need to be abandoned and caesarean section performed.
An instrumental vaginal birth should be performed or supervised by a clinician who has the knowledge, experience, and skills necessary to assess the situation, to use the instruments effectively and safely, and to manage any complications that may arise. It is recognised that exceptions to these optimal conditions will sometimes arise in the setting of acute fetal compromise where, appropriately, a decision to expedite delivery may need to be made.

Prerequisites before proceeding to an instrumental vaginal birth are shown below in **Table 1**

**Table 1. Prerequisites for instrumental vaginal birth (vertex presentation)**

| | |
|---|---|
| **Full abdominal and vaginal examination** | Less than or equal to one fifth of the head is palpable abdominally.<br>Vertex presentation.<br>Cervix is fully dilated and the membranes ruptured.<br>Exact position of the fetal head can be determined so correct placement of the instrument can be achieved.<br>Ultrasound may be helpful in determining the position of the vertex.<br><br>Assessment of caput and moulding.<br>Pelvis is clinically deemed adequate. |
| **Preparation of mother** | Clear explanation should be given and consent obtained, appropriate to the clinical situation.<br>Analgesia appropriate for the delivery is in place and effective.<br><br>For mid-cavity rotational births this will commonly be a regional block.<br>A pudendal block may be appropriate, particularly in the context of urgent birth.<br>Maternal bladder has been emptied recently. In-dwelling catheter should be removed or balloon deflated.<br>Aseptic technique |
| **Preparation of staff** | Operator must have the knowledge, experience and skill necessary, or an appropriate supervisor is present.<br>Adequate facilities are available (appropriate equipment, bed, lighting).<br>Back-up plan in place in case of failure to deliver. When conducting mid-cavity births, theatre staff should be immediately available to allow a caesarean section to be performed without delay (less than 30 minutes).<br>A senior obstetrician competent in performing mid-cavity births should be present if a clinician inexperienced as a solo operator is performing the birth.<br>Anticipation of complications that may arise (e.g. shoulder dystocia, postpartum haemorrhage)<br>Personnel present that are trained in neonatal resuscitation |

Adapted from RCOG Green-top Guideline No. 26[5]

**Instrumental vaginal births are classified according to the station of the vertex and whether rotation is required.**

**Table 2. Classification for instrumental vaginal birth [5]**

| | |
|---|---|
| **Outlet** | Fetal scalp visible without separating the labia<br>Fetal skull has reached the pelvic floor<br>Sagittal suture is in the antero-posterior diameter or right or left occiput anterior or posterior position (rotation does not exceed 45º)<br>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.<br>Two subdivisions:<br>- rotation of 45º or less from the occipito-anterior position<br>- rotation of more than 45º including the occipito-posterior position |
| **Mid** | Fetal head is no more than 1/5th palpable per abdomen<br>Leading point of the skull is above station plus 2 cm but not above the ischial spines<br>Two subdivisions:<br>- rotation of 45º or less from the occipito-anterior position<br>- rotation of more than 45º including the occipito-posterior position |
| **High** | Instrumental vaginal birth 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 (except for a second twin). |

### 4.6 Techniques of instrumental vaginal birth

| **Recommendation 3** | |
|---|---|
| When there is an increased likelihood that attempted instrumental birth may not be successful, where feasible, the attempt should be conducted in a place where immediate recourse to caesarean section is possible. | Good Practice Point |

Instrumental vaginal birth involves the use of forceps or the vacuum extractor to allow the operator to assist the natural forces along the birth canal which are created by uterine contractions and maternal bearing down effort. Appropriate positioning of forceps or vacuum is important for maternal and fetal safety and for effective traction. In some cases, rotation of the fetal head may be required to make the position of the vertex more favourable for descent.

Recognition of when it is appropriate to abandon the procedure and consider an alternative method of birth is vital. RCOG state that 'the bulk of malpractice litigation results from failure to abandon the procedure at the appropriate time, particularly the failure to eschew prolonged, repeated or excessive traction efforts in the presence of poor progress' [5].

Higher rates of failure have been associated with:

- Maternal Body Mass Index greater than 30 Kg/m$^2$

- Estimated fetal weight over 4 Kg.
- Occipito-posterior positions.
- Mid-cavity, or when 1/5 of the fetal head is palpable abdominally. [5]

When a higher risk of failure is suspected, instrumental vaginal delivery should be attempted in a setting where immediate recourse to caesarean section is available.

The role of routine episiotomy for instrumental vaginal birth remains unclear and there are no large randomised controlled trials to guide practice. In a retrospective Dutch study of 28,732 women undergoing an instrumental birth, use of right mediolateral episiotomy was effective in reducing the risk of anal sphincter tears in both vacuum and forceps births. Significant risk factors for anal sphincter tears were primiparity, occipito-posterior position, and increasing fetal weight.[26] Other smaller studies have not reported a protective benefit of episiotomy against anal sphincter injury.[27-29]

A systematic review found that in vacuum assisted births, use of mediolateral or lateral episiotomy in primiparous women may reduce the risk of Obstetric anal sphincter injuries (OASI) (OR 0.53, CI 0.37-0.77)

The meta-analysis also found that one case of OASI was prevented for every 19 episiotomies performed (NNT 18.3, 95% CI 17.7-18.9). [30]

Women's Healthcare Australasia (WHA) collaborative recommended that an episiotomy is indicated for all women having their first vaginal birth requiring a forceps or ventouse assisted delivery. Preliminary results from the collaborative show that when instrumental assistance was required in women having their first vaginal birth, performing an episiotomy led to 24% fewer OASI when forceps were used and 16% fewer OASI when ventouse was used.[31]

| **Recommendation 4** | |
|---|---|
| The evidence shows that performing an episiotomy in women having their first vaginal birth led to 24% fewer OASI when forceps were used and 16% fewer OASI when ventouse was used and therefore should be considered. | Evidence-based recommendation<br><br>Reference 31 |

### *4.6.1 Manual rotation*

Manual rotation of the fetal head to an occipito-anterior position may be used alone, with a view to increasing the chance of a normal birth, or in conjunction with forceps or vacuum extraction to affect a vaginal birth. Success rates for rotation of 89% and 76% have been reported in two retrospective trials.[21, 22] Success rates were less when performed in nulliparous patients, when performed before full dilation, or when failure to progress was evident before manual rotation was attempted. [21, 22] When successful there was a significant reduction in the caesarean section rate with an increase in both the spontaneous and instrumental vaginal birth rates.[21, 22] The complication rate of manual rotation appears to be low, although data are sparse.[22] Techniques for manual rotation are detailed in Appendix A.

### *4.6.2 Vacuum extraction*

Indications for vacuum are similar to those for forceps. Contraindications include prematurity (gestation less than 34 weeks because of the risk of fetal intracranial haemorrhage), face

presentation, fetal bleeding diatheses or thrombocytopaenia, and fetal disorders such as osteogenesis imperfecta. Relative contraindications include use between 34 and 36 weeks, (where evidence for use at these gestations is scarce) and prior scalp blood sampling.

Placement of the cup at the flexion point, which is situated 6cm from the anterior fontanelle and 3 cm from the posterior fontanelle in the midline over the sagittal suture, enables flexion of the fetal head with traction, improving the chance of rotation of the head if necessary.

Rigid cups are more likely to effect birth (9.5% failure rate versus 14.8% failure rate with a soft cup OR 1.65, 95% CI 1.19-2.29), but are associated with more scalp injuries (24% versus 13% OR 0.45, 95 % CI 0.15-0.60). [6]

To minimise the risk of subgaleal haemorrhage, shearing forces on the scalp should be minimised (eg. avoid 'rocking').

Cup placement should be:

i. Placed evenly across the sagittal suture, rather than being applied to one or other parietal bone to avoid asynclitism with traction.
ii. The edge of the cup should be placed at least 3 cm from the anterior fontanelle (ie the centre of the cup is directly over the flexion point) to avoid extension of the fetal head during traction (assuming a standard 6cm cup is being used).
iii. Appropriate cup placement may be impossible if there is significant deflexion or asynclitism of the head and a "large soft-stemmed" device is being used, because it cannot be placed sufficiently posteriorly.
iv. It is important to check there is no maternal tissue under the vacuum cup both before and after the application of suction.

Vacuum suction pressures of 500-600mm Hg are recommended, and establishment of negative pressure without delay reduces procedure time without compromising effectiveness or safety.[32]
Traction force is affected by cup size and increases with increasing cup diameter. The optimal force is not known but observational studies using an Omnicup™ found that 86% of extractions occurred with 11.5 kg or less of traction.[33]

Application of traction should be steady, applied only with contractions, and only with maternal effort.
The direction of traction should follow the axis of the pelvic curve. Adequate descent should be verified with the free hand during each pull. Traction should not be unduly prolonged. At present there is no consensus on the maximum time allowable, the number of pulls, and the number of allowable cup detachments.

i. Time

Vacca recommends an upper limit of 20 minutes from first application of the cup. [34] Where birth is not imminent after 15 minutes, operators should evaluate whether further traction is warranted, and consider recourse to caesarean section. It should be noted that where the head is deeply engaged in the maternal pelvis (and macrosomia is not anticipated) that completion of vaginal birth by vacuum extraction or forceps may still be safer than a caesarean section. [34]

ii. Number of pulls

Many experienced operators suggest a maximum of three pulls without descent of the skull (not scalp)(defined as three contractions, even if there

are multiple maternal 'pushes' within each contraction), although more pulls may be acceptable if the head has descended to the level of the pelvic floor or perineum especially if birth is attempted without episiotomy.

iii. Cup detachments
Cup detachment should not be regarded as a safety feature of the vacuum extractor, as the rapid decompression may result in vessel damage and predispose to subgaleal haemorrhage. The acceptable number of detachments will depend on whether detachment was due to equipment failure, or to poor application and/or excessive traction. Up to three detachments would generally be considered acceptable, but re-application of the cup on each occasion should only be considered where there has been definite progress with preceding pulls, or the head is on the perineum.

### *4.6.3 Rotation forceps*

Although there has been a reduction in the use of rotational forceps in the last three decades, recent reviews have repeatedly supported a place for their use.[35-41] At the discretion of the operator, manual rotation may be attempted in the first instance and proceed to the use of Kielland's forceps if unsuccessful.

In comparison to caesarean section there is an increased, but small, risk of traumatic intracranial haemorrhage and cervical spine injury. It is difficult to quantify accurately the absolute risk but it is likely to compare favourably with the added maternal risks of emergency caesarean section in the index and subsequent pregnancies. While vacuum delivery has been popularised to effect rotational delivery, it is associated with higher failure rates and an increased incidence of intracranial and subaponeurotic/ subgaleal haemorrhage.[35] Nevertheless, ventouse or rotation forceps remain a valid option in experienced hands.

### *4.7 Suggested guidelines in performing rotational forceps*

#### Adequate station

The head must be engaged as determined clinically by BOTH abdominal and vaginal examination under adequate analgesia. Allowance should be made for extensive caput and/or moulding of the fetal head.

#### Adequate analgesia

Anaesthesia for rotational forceps is best provided by an effective spinal or epidural block.

#### Adequate experience or supervision

As with all obstetric procedures, clinicians must receive appropriate training and maintain experience if they are to perform rotational forceps. Until such training has taken place, rotational forceps should only be performed under the supervision of a trained and experienced obstetrician.

#### Rotation must only be attempted with the uterus relaxed

Rotation of the fetal head should only be attempted between contractions. Consideration may be given to using a short acting tocolytic, such as glyceryl trinitrate, to ensure adequate uterine relaxation.

### Low threshold for abandoning the procedure and resorting to caesarean section

The procedure should be abandoned if the forceps cannot be applied easily, the handles do not easily approximate, if rotation is not easily effected with gentle pressure, or if there is lack of descent with moderate traction. Under conditions where there is concern that difficulty is more likely to be encountered (e.g. fetal macrosomia, moulding of the fetal head, or the presenting part that is only just engaged), then the forceps should be performed in or in close proximity to an operating theatre equipped and staffed for caesarean section.

A technique for Rotation forceps as agreed by a panel of clinicians is described in Appendix B.

### 4.8 Complications of instrumental birth

The adverse effects of instrumental birth must be weighed against the consequences of awaiting vaginal birth or alternatively of performing a caesarean section with the head deep in the pelvis. The more serious complications are very uncommon but include:

- **Fetal complications**
  a. Shoulder dystocia and its consequences.
  The need to perform an instrumental birth for lack of progress in the presence of anticipated macrosomia should alert the clinician to the increased likelihood of shoulder dystocia as would instrumental birth in a multigravida with a delay in second stage[42]

  b. Subaponeurotic/subgaleal haemorrhage.
  A potentially life threatening complication, occurring in approximately 1 in 300 cases of vacuum delivery.[43, 44] Refer to College Statement *Prevention Detection and Management of Subgaleal Haemorrhage in the Newborn (C-Obs 28)*

  c. Facial nerve palsy, corneal abrasion, retinal haemorrhage.
  Facial nerve palsy and corneal abrasion are more common with forceps and retinal haemorrhage with vacuum birth.[6]

  d. Skull fracture and/or intracranial haemorrhage.
  A review of 583,340 live-born singleton babies of nulliparous women where the birth weight was between 2500 and 4000gm reported rates of intracranial haemorrhage with differing modes of birth: one in 664 (forceps); one in 860 (vacuum extraction); one in 907 (intrapartum caesarean section); one in 1900 (spontaneous vaginal birth); and, one in 2750 (pre-labour caesarean section).[45]

  e. Cervical spine injury.
  Injury to the fetal cervical spinal cord is rare but the absolute rate is difficult to define. In a series from Canada it was estimated the risk may be 0.7/1000 rotation forceps births.[46] This injury may occur less frequently with vacuum delivery. The risk may be minimised by ensuring uterine relaxation prior to attempting rotation.

  These complications may require admission to a neonatal unit and may be associated with feeding and b
  onding difficulties.

- **Maternal complications**
  Maternal complications which may occur include vaginal trauma, postpartum haemorrhage, urinary tract injury, and damage to pelvic floor and anal sphincter (details below).[6]

### 4.9 Factors affecting choice between vacuum and forceps delivery

| Recommendation 5 | |
|---|---|
| The choice of either vacuum or forceps for instrumental vaginal delivery will depend on the judgement of the operator and the individual clinical circumstances. | Good Practice Point |

Each instrument has a different profile of complications.[6] **Vaginal** birth is more likely to be achieved with forceps than vacuum and will occur over a shorter time interval.[47] The clinician should select the instrument based on clinical experience and the individual clinical circumstances. A Cochrane review of 32 studies including 6597 women requiring instrumental vaginal birth compared any kind of forceps birth (rotational and non-rotational) with any type of vacuum extraction (rotational or non-rotational).[6]

Compared to the vacuum extractor forceps were found to:

- be less likely to fail to achieve a vaginal birth (RR 0.65, 95% CI 0.45-0.94)
- have a trend toward fewer cases of cephalhaematoma (RR 0.64, 95% CI 0.37-1.11)
- have a trend toward fewer cases of fetal retinal haemorrhage (RR 0.6, 95% CI 0.43-1.06)
- have a trend toward fewer cases of neonatal jaundice (RR 0.79, 95% CI 0.59-1.06)
- have a trend toward fewer cases of shoulder dystocia (RR 0.4, 95% CI 0.16-1.04)

Compared to vacuum delivery, use of forceps was associated with a higher incidence of:

- third or fourth degree tears of the anal sphincter (RR 1.89, 95% CI 1.51-2.37)
- any type of vaginal trauma (RR 2.48, 95% CI 1.59-3.87)
- incontinence/altered continence (RR 1.77, 95% 1.19-2.62)

There was no significant difference between instruments in the risk of:

- any neonatal injury
- low Apgar score (<7) at 5 minutes
- low pH (<7.2) in umbilical artery at birth.

A meta-analysis of 23 studies of rotational assisted instrumental births reported that Kielland's forceps were less likely to fail (RR 0.32, 95% CI 0.14-0.76) and less likely to cause neonatal trauma (RR 0.62, 95% CI 0.46-0.85) when compared to rotational ventouse birth. [35]

A study of 3753 women who were contacted at 12 years after their first birth found that symptoms of faecal incontinence were reported by 11.5% of respondents who had only unassisted vaginal births, 10.5% following only planned caesarean sections with no vaginal births, 16.7% with any forceps birth and 10.9% following any vacuum assisted (but no forceps) birth. Urinary incontinence rates reported by the same groups of women defined by mode of birth were 54.7%, 38.7%. 51.4% and 56% respectively.[48]

### 4.10 Unsuccessful instrumental vaginal birth

| Recommendation 6 | |
|---|---|
| Where there has been difficulty with operative vaginal birth, including recourse to Caesarean section or sequential use of instruments, the doctor responsible for the care of the baby should | Good Practice Point |

| | |
|---|---|
| be advised so that appropriate surveillance and management of the baby can be instituted. | |

Unsuccessful attempts at instrumental birth may be associated with adverse outcome.[49] If an initial attempt does not effect delivery, or there is lack of progress of rotation and/or descent of the vertex, then assessment should be made as to whether alternate instrumental birth should be attempted (ie sequential use of instruments) or a caesarean section performed without further attempt at instrumental birth.

### *Sequential Use of Instruments*

The use of sequential instruments has been associated with an increased risk of trauma to the fetus and mother when compared to the use of forceps or vacuum alone.[50] Nevertheless, these findings need to be interpreted cautiously, given the increasing use of ventouse as the primary instrument in contemporary obstetrics. This change in practice has followed increasing evidence suggesting that ventouse (compared to forceps) reduces maternal obstetric anal sphincter injury [51], levator ani muscle avulsion,[52] urinary incontinence and pelvic organ prolapse. Yet ventouse is also associated with an increased risk of non-completion of delivery with cohort studies suggesting a 30% chance that vacuum devices such as the kiwi cup will fail, requiring completion of delivery by forceps, increasing to 40% for rotational delivery. [53] Hence, the use of sequential instruments may be considered an inevitable consequence of the increasing use of the ventouse.

### *Caesarean section following attempted instrumental delivery*

The alternative to sequential use of instruments is caesarean section following an attempted instrumental birth. These complex caesarean sections, with the fetal head deep within the pelvis, are associated with an increase in maternal morbidity (major postpartum haemorrhage,[8] transfusion, lower segment tear, cystotomy, hysterectomy, ICU admission) and fetal morbidity (neonatal acidosis, intracranial haemorrhage, need for resuscitation). [8, 54]

In some cases, the adverse outcomes associated with difficult instrumental birth may reflect the indication for which instrumental birth was being attempted (e.g. severe fetal compromise) rather than a direct effect of attempts at instrumental birth. The threshold for abandoning an attempted instrumental birth as well as the decision between either choosing an alternative instrument or performing a caesarean section will differ according to the clinician's training, experience, and the clinical setting.

## 4.11 Postnatal care

| **Recommendation 7** | |
|---|---|
| For women who undergo assisted vaginal birth, consideration should be given to prophylactic antibiotics to reduce the risk of post-partum infection. | Evidence-based Recommendation<br><br>Grade A |

### *Antibiotic prophylaxis.*

Antibiotics should be considered after birth to those women who have had an instrumental delivery, and particularly where an episiotomy or perineal injury has occurred. This is in light of

new findings from the ANODE trial, where the administration of intravenous Augmentin within 6 hours of delivery was associated with a reduction in the primary outcome - suspected or confirmed maternal infection within 6 weeks of delivery. Significantly fewer women allocated to amoxicillin and clavulanic acid had a confirmed or suspected infection (180 [11%] of 1619) than women allocated to placebo (306 [19%] of 1606; risk ratio 0·58, 95% CI 0·49-0·69; p<0·0001; absolute risk reduction 8%; NNT 13). Infection was defined by a new prescription of antibiotics for specific indications, confirmed systemic infection on culture, or endometritis. Many of these outcomes related to perineal tear infection or pain. These outcomes are most likely in those who have undergone episiotomy or sustained a perineal tear. This study provides Level 2 evidence for administering antibiotics to women following operative vaginal delivery. [55]

The recommended regime is Amoxicillin-Clavulanate iv 1000mg+200mg. The trial did not address alternative antibiotic regimens, but for women without iv access, oral antibiotics (Amoxicillin-Clavulanate 875/125 oral tablet) may be considered. For women allergic to Penicillin, Cephazolin 2g IV or Clindamycin 600mg IV are reasonable alternatives.

| **Recommendation 8** | |
|---|---|
| Postnatal care following instrumental vaginal birth requires attention to thromboembolic prophylaxis, analgesia, voiding function, rehabilitation of the pelvic floor, and counselling regarding the index birth and future births. | Consensus-based recommendation |

### *Thromboprohylaxis*

Following an instrumental vaginal birth, women should be assessed for their risk profile for venous thromboembolism and, if appropriate, thromboprophylaxis measures should be employed. Instrumental vaginal birth is associated with risk factors for venous thromboembolism such as prolonged labour, BMI>30, pre-eclampsia and postpartum haemorrhage of greater than 1000ml. Consideration of local hospital or published guidelines is appropriate. [56]

### *Analgesia*

Regular paracetamol and nonsteroidal anti-inflammatory agents should be offered when there is no contraindication. Pain not relieved by these measures should prompt clinical assessment to exclude complications such as haematoma formation or infection.

### *Voiding function*

The risk of urinary retention after birth is increased after instrumental vaginal birth, particularly if spinal or epidural anaesthesia has been employed for the birth. RCOG recommends an indwelling catheter for 12 hours following instrumental vaginal birth if a spinal or epidural top up has been used for anaesthesia and a trial of instrumental vaginal birth has been planned. [5] Careful observation of postpartum voiding function and the insertion of an indwelling catheter may be required to prevent bladder over-distention and long term bladder dysfunction. It is appropriate for obstetric units to have protocols aimed to prevent this complication.

### *Pelvic floor rehabilitation.*

Appropriately conducted pelvic floor exercises in the postnatal period should be encouraged. There is evidence that physiotherapist-led intervention reduces urinary

incontinence in women who had had an instrumental vaginal birth and/or a baby over 4000g.[57]

***Postnatal discussion regarding birth.***

Women should be given the opportunity to discuss the reason for operative birth, the management of any complications, and the prognosis for future pregnancies. This discussion should occur in the early postnatal period if possible, and ideally should be led by the clinician who performed the birth.

Instrumental vaginal delivery has been associated with a fear of subsequent birth, and in a severe form has manifested as post-traumatic stress-type syndrome.[58-61] A cohort study of women who had begun labour but were delivered in the second stage of labour in an operating theatre (either instrumental vaginal birth or caesarean section) and were questioned three years after their birth, reported that 32% wished to avoid further pregnancy, and for almost half of these women fear of childbirth was the main reason for this wish.[62]

After an instrumental vaginal birth in a first labour the success rates for achieving a spontaneous vaginal birth in the next pregnancy have been reported between 78% and 91%.[14, 62]

Women who have sustained a third or fourth degree tear will need individual counselling with regard to their outcome and plans for future delivery based on evaluation of anal sphincter, their symptoms, and preferences.[63]

## 5. Conclusion

Instrumental vaginal birth has an important place in obstetric practice. In many cases, the decision to perform an instrumental delivery will represent a balance between potential risks of leaving the fetus undelivered and the additional risks of performing a caesarean section in the second stage. Each instrument has both advantages and disadvantages. Before instrumental delivery is attempted careful assessment of the whole clinical situation must be undertaken, and discussion with the woman carried out. Those performing instrumental delivery must have appropriate training and experience, or be supervised closely by somebody who does have these skills. Attention to techniques specific for the type of instrument will minimise risks and maximise the chance of successful delivery. Care in the postnatal period is important to minimise the risk of adverse outcomes in the short and long term.

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## 8. Links to other College statements

Breech deliveries at term (C-Obs 11)
https://www.ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG-MEDIA/Women%27s%20Health/Statement%20and%20guidelines/Clinical-Obstetrics/Management-of-breech-presentation-at-term-(C-Obs-11)-Review-July-2016.pdf?ext=.pdf

Prevention, detection and management of Subgaleal Haemorrhage in the newborn (C-Obs 28)
https://ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG-MEDIA/Women%27s%20Health/Statement%20and%20guidelines/Clinical-Obstetrics/Prevention-detection-and-management-of-Subgaleal-Haemorrhage-(C-Obs-28)-Review-November-2015_1.pdf?ext=.pdf

Birth after previous caesarean section (C-Obs 38)
https://ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG-MEDIA/Women%27s%20Health/Statement%20and%20guidelines/Clinical-Obstetrics/Birth-after-previous-Caesarean-Section-(C-Obs-38)Review-March-2019.pdf?ext=.pdf

Consent and provision of information to patients in Australia regarding proposed treatment (C-Gen 02a)
https://www.ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG-MEDIA/Women%27s%20Health/Statement%20and%20guidelines/Clinical%20-%20General/Consent-and-provision-of-information-to-patients-in-Australia-(C-Gen-2a)-Review-July-2016.pdf?ext=.pdf

Consent and provision of information to patients in New Zealand regarding proposed treatment (C-Gen 2b)
https://ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG-MEDIA/Women%27s%20Health/Statement%20and%20guidelines/Clinical%20-%20General/Consent-and-provision-of-information-NZ-(C-Gen-2b).pdf?ext=.pdf

Evidence-based Medicine, Obstetrics and Gynaecology (C-Gen 15)
https://www.ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG-MEDIA/Women%27s%20Health/Statement%20and%20guidelines/Clinical%20-%20General/Evidence-based-medicine,-Obstetrics-and-Gynaecology-(C-Gen-15)-Review-March-2016.pdf?ext=.pdf

RCOG The Management of Third- and Fourth-degree Perineal Tears. RCOG Greentop Guideline No 29, 2015. https://www.rcog.org.uk/globalassets/documents/guidelines/gtg-29.pdf

## 9. Patient information

A range of RANZCOG Patient Information Pamphlets can be ordered via:

https://www.ranzcog.edu.au/Womens-Health/Patient-Information-Guides/Patient-Information-Pamphlets

# Appendices

## Appendix A Techniques for Manual Rotation [7]

| | |
|---|---|
| **Technique No.1** | 1. The entire hand is placed in the woman's vagina with the palm up.<br>2. The fetal head is flexed and slightly dislodged.<br>3. The occiput is rotated anteriorly by pronation or supination of the forearm.<br>4. The fetal head may need to be held in place for a few contractions or until the application of a vacuum or forceps is completed. |

| | |
|---|---|
| **Technique No.2** | 1. The fingers may be placed along the lambdoid sutures.<br>2. Using mild pressure and a dialling motion, the fetal head can be rotated to an occiput anterior position.<br>3. The fetal head may need to be held in place for a few contractions or until the application of a vacuum or forceps is completed. |

**Appendix B Key factors in a rotational forceps birth**
**(The following is provided as an example of guidance but may not cover all circumstances)**

**Agreed technique published by a panel of clinicians (Simpson 2015) [64]**

**1.Prevention of fetal malposition**
- Early assessment and documentation of fetal position
- Judicious use of oxytocin
- Consider manual rotation
- Consider the indication for forceps-assisted birth carefully

**2. Assessment to determine suitability**
- Careful second stage assessment
- Adequate analgesia
- Empty maternal bladder
- **Red flag: assessment of position difficult due to moulding/caput**

**3. Communication and consent**
- Maternal complications: perineal/cervical trauma (similar to other operative births)
- Fetal complications: intracranial haemorrhage, cervical spine injury, entrapment of umbilical cord (similar to other operative births)
- Discuss reason for prolonged labour
- Discuss timing of procedure
- Recommend episiotomy

**4. Assemble the multidisciplinary team**
- Nurse/midwife to palpate contractions
- Paediatrician/respiratory technician/anaesthetist
- Birth in operating room
- Position patient, check equipment

**5. Phantom application**
- Reconfirm fetal position

**6. Application by the "wandering technique"**
- Apply between contractions
- Correct asynclitism between contractions
- **Red flag: difficult application**

**7. Rotation**
-Between contractions
-Force of one hand only; other hand on maternal abdomen
-Ensure OA position after rotation
**-Red flag: difficult rotation**

**8. Application of traction**
-During a contraction
-Force of one hand only
-Episiotomy
**-Red flag: force of more than one hand required**

**9. Birth of fetus**
- Remove blades after birth of head
- Prepare for shoulder dystocia and/or postpartum haemorrhage

**10. Debrief and document**
- Examine cervix/vagina/perineum
- Examine the baby
- Document indications, discussion, timing

## Appendix C Women's Health Committee Membership

| Name | Position on Committee |
|---|---|
| Professor Yee Leung | Chair and Board Member |
| Dr Gillian Gibson | Deputy Chair, Gynaecology |
| Dr Scott White | Deputy Chair, Obstetrics and Subspecialties Representative |
| Associate Professor Ian Pettigrew | Member and EAC Representative |
| Dr Kristy Milward | Member and Councillor |
| Dr Will Milford | Member and Councillor |
| Dr Frank O'Keeffe | Member and Councillor |
| Professor Sue Walker | Member |
| Dr Roy Watson | Member and Councillor |
| Dr Susan Fleming | Member and Councillor |
| Dr Sue Belgrave | Member and Councillor |
| Dr Marilyn Clarke | ATSI Representative |
| Associate Professor Kirsten Black | Member |
| Dr Thangeswaran Rudra | Member |
| Prof Steve Robson | Member |
| Dr Nisha Khot | Member and SIMG Representative |
| Dr Judith Gardiner | Diplomate Representative |
| Dr Angela Brown | Midwifery Representative, Australia |
| Ms Adrienne Priday | Midwifery Representative, New Zealand |
| Ms Ann Jorgensen | Community Representative |
| Dr Rebecca Mackenzie-Proctor | Trainee Representative |
| Prof Caroline De Costa | Co-opted member (ANZJOG member) |
| Dr Christine Sammartino | Observer |

## Appendix D Overview of the development and review process for this statement

*i. Steps in developing and updating this statement*

This statement was originally developed in July 2002 and was most recently reviewed in November 2019. The Women's Health Committee carried out the following steps in reviewing this statement:

- Declarations of interest were sought from all members prior to reviewing this statement.
- Structured clinical questions were developed and agreed upon.
- An updated literature search to answer the clinical questions was undertaken.
- At the October 2019 teleconference, the existing consensus-based recommendations were reviewed and updated (where appropriate) based on the available body of evidence and clinical expertise. Recommendations were graded as set out below in Appendix B part iii)

*ii. Declaration of interest process and management*

Declaring interests is essential in order to prevent any potential conflict between the private interests of members, and their duties as part of the Women's Health Committee.

A declaration of interest form specific to guidelines and statements was developed by RANZCOG and approved by the RANZCOG Board in September 2012. The Women's Health Committee members were required to declare their relevant interests in writing on this form prior to participating in the review of this statement.

Members were required to update their information as soon as they become aware of any changes to their interests and there was also a standing agenda item at each meeting where declarations of interest were called for and recorded as part of the meeting minutes.

There were no significant real or perceived conflicts of interest that required management during the process of updating this statement.

*iii. Grading of recommendations*

Each recommendation in this College statement is given an overall grade as per the table below, based on the National Health and Medical Research Council (NHMRC) Levels of Evidence and Grades of Recommendations for Developers of Guidelines. Where no robust evidence was available but there was sufficient consensus within the Women's Health Committee, consensus-based recommendations were developed or existing ones updated and are identifiable as such. Consensus-based recommendations were agreed to by the entire committee. Good Practice Notes are highlighted throughout and provide practical guidance to facilitate implementation. These were also developed through consensus of the entire committee.

| Recommendation category | | Description |
|---|---|---|
| Evidence-based | A | Body of evidence can be trusted to guide practice |
| | B | Body of evidence can be trusted to guide practice in most situations |
| | C | Body of evidence provides some support for recommendation(s) but care should be taken in its application |
| | D | The body of evidence is weak and the recommendation must be applied with caution |
| Consensus-based | | Recommendation based on clinical opinion and expertise as insufficient evidence available |
| Good Practice Note | | Practical advice and information based on clinical opinion and expertise |

## Appendix E Full Disclaimer

This information is intended to provide general advice to practitioners, and should not be relied on as a substitute for proper assessment with respect to the particular circumstances of each case and the needs of any patient.

This information has been prepared having regard to general circumstances. It is the responsibility of each practitioner to have regard to the particular circumstances of each case. Clinical management should be responsive to the needs of the individual patient and the particular circumstances of each case.

This information has been prepared having regard to the information available at the time of its preparation, and each practitioner should have regard to relevant information, research or material which may have been published or become available subsequently.

Whilst the College endeavours to ensure that information is accurate and current at the time of preparation, it takes no responsibility for matters arising from changed circumstances or information or material that may have become subsequently available.