Instrumental vaginal birth

IMPORTANT: *Consider individual clinical circumstances. Read the full disclaimer at* www.health.qld.gov.au/qcg

Classification of instrumental vaginal birth

Instrumental vaginal births are classified according to the station of the vertex and the degree of rotation of the sagittal suture from the midline[1]

Classification	Description
Mid cavity[1-3]	• Fetal head is no more than 1/5th palpable abdominally above the symphysis pubis • Leading point of the skull (not caput) is at or below the ischial spines and above station plus 2 cm • Two subdivisions: o Rotation of 45º or less from the occiput anterior (OA) position o Rotation of more than 45º including the occiput posterior (OP) position
Low cavity[1-4]	• Leading point of the skull (not caput) is at or below station plus 2 cm and above the pelvic floor • Two subdivisions: o Rotation of 45º or less from the OA position o Rotation of more than 45º including the OP position
Outlet[1-4]	• Fetal skull (not caput) has reached the pelvic floor • Fetal scalp visible without separating the labia • Sagittal suture is in the antero-posterior diameter or right or left OA or OP (rotation does not exceed 45º)
High[1,4]	• Not recommended if head is 2/5th or more palpable abdominally and presenting part above level of ischial spines (except for second twin)

Definitions and clinical standards

Aspect	Consideration
Caput succedaneum	Serosanguinous extra aponeurotic collection that may cross suture line and extend beyond the midline[5]
Cephalo-haematoma	Bleeding between the periosteum and underlying skull, with swelling not crossing the suture line[5]
Forceps birth	Assisted or expedited vaginal vertex birth through the application of obstetric forceps[6] • Non-rotational used when baby's head is in correct position (linear traction)[7] • Rotational used when baby's head requires turning to correct position (axial traction)
Subgaleal haemorrhage (SGH)	Bleeding in the space between epicranial aponeurosis and the periosteum, caused by rupture of the emissary veins with bleeding not confined by suture lines[1,5]
Vacuum	Assisted or expedited vaginal vertex birth through the application of a vacuum assisted device[6] • May have rigid (more likely to be successful[7], or flexible cups[7](fewer scalp injuries)[8] • May be connected to foot-operated or electric pump by tube or be handheld suction device[7] (no difference in rates of success or rates of third or fourth degree tears)
Woman/women	QCG recognise that individuals have diverse gender identities. In QCG documents, although the terms *woman* and *women* are used, these guidelines are inclusive of people who are pregnant or give birth and who do not identify as female. Refer to Queensland Clinical Guideline: Position statement: *Gender associated language*[9]
Standard care	Refer to Queensland Clinical Guideline: *Standard care*[10] for care considered 'usual' or 'standard' • Includes for example: privacy, consent, decision making, sensitive communication, medication administration, staff education and support, culturally appropriate care • Discuss possibility of instrumental vaginal birth antenatally • Refer to QCG consumer information *Instrumental vaginal birth*[11]

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Indications and contraindications for instrumental vaginal birth

Aspect	Consideration
Indications	• Women with a live fetus with cephalic presentation in second stage labour where[3]: o An operative vaginal birth is considered clinically safe o Inadequate progress in active second stage in the presence of adequate uterine activity [refer to Queensland Clinical Guideline*: Normal birth*[12](e.g. maternal exhaustion[1,3,4,7]) o Maternal effort is contraindicated (e.g. cardiac conditions, hypertensive crisis[1,3,4,7] o Fetal compromise is suspected[1,3,4,7] (e.g. pathological CTG, abnormal fetal blood sample, thick meconium) [refer to Queensland Clinical Guideline: *Intrapartum fetal surveillance*[13] o Maternal exhaustion and request for assistance
Contraindications	• Clinician (or supervising clinician) does not have expertise in the procedure or management of complications[1] • Head is above the ischial spines or 2/5th or more palpable abdominally above the symphysis pubis[1] • Known or suspected fetal bone demineralising conditions or bleeding disorders (e.g. fetal coagulopathy, thrombocytopenia)[1,3] • Incomplete cervical dilatation[3]
Risk factors for unsuccessful instrumental birth	• Limited and low-level evidence to identify risk factors influencing failure of the attempt—may include: o Estimated fetal weight over 4000 g or a clinically 'big baby'[1,14] o OP/OT position at the time of application[1,15] o Prolonged second stage[14] [refer to Queensland Clinical Guideline: *Normal birth*[12]] o Higher station at the time of application (compared to outlet) mid-cavity or when 1/5th of fetal head is palpable abdominally[1,15] o Higher body mass index (BMI)[1,14] • Use clinical judgement and consider individual circumstances

Principles of safe instrumental vaginal birth

Aspect	Consideration
Clinician skill	• The clinician performing the instrumental birth (or the clinician's supervisor in attendance) has the knowledge, experience and skill to[1,3,16] o Safely perform the procedure o Manage complications that may arise • A clinician trained in neonatal resuscitation is required at the birth[1,4] o Refer to Queensland Clinical Guideline: *Neonatal resuscitation*[17]
If clinical uncertainty	• Contact an experienced clinician without delay if there is clinical uncertainty about: o Accuracy of fetal or maternal assessment (e.g. degree of fetal caput or moulding, fetal presentation or station) o Performance of the procedure (e.g. decision for caesarean section (CS) or selection of instrument) o Other clinical concern/uncertainty • If assessment of fetal head station/position is uncertain, ultrasound (transabdominal or transperineal) may assist[18] o Routine use not recommended[4]—follow local protocols regarding use
Communication	• Provide information about the indications for and potential risks and benefits of instrumental birth antenatally[1] (e.g. during antenatal education or during antenatal visits), including the role of neonatal vitamin K prophylaxis • When instrumental birth is contemplated, provide clear explanation to woman and partner/support person to facilitate understanding, woman's decision making and informed consent, including[19] o Risks of perineal trauma and associated morbidity (o Risks and benefits of instrumental (ventouse or forceps) versus CS o Risks and benefits to woman and baby of no intervention • Inform other members of the health care team prior to procedure (e.g. paediatrician/nurse practitioner (NP), operating room suite (ORS) team leader) • Use standard documentation formats (e.g. assisted vaginal birth clinical pathway[20]to accurately record the indications for instrumental vaginal birth and details of the procedure
Setting	• If difficulty is anticipated, perform in operating theatre to facilitate access to immediate CS
Sequential instrumentation	• Associated with increased rates of maternal[4,21,22] and neonatal morbidity[3,4,15,21] • Balance risks of sequential instrumentation with the risks of CS in second stage of labour[3] • Maintain low threshold for CS after unsuccessful forceps[3]

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Discontinuation

Aspect	Consideration
Context	• No high-level evidence on the maximum number of attempts or detachments or pulls[1,23] • In this guideline, traction applied during one contraction is considered to be the equivalent of one pull (even if there are multiple maternal 'pushes' within a contraction) • Success is dependent on operator skill[7] o Suboptimal placement associated with increased risk of neonatal trauma, use of sequential instruments and caesarean birth due to failed assisted vaginal birth[7]
Consensus recommendation	• Instrumental birth effective and safe option in appropriately selected women balanced against expectant management[1] • Maintain situational awareness that: o Abandoning the procedure may be a safer option than prolonged, repeated or excessive traction efforts[1] o The traction applied is an adjunct to the mother's expulsive effort, not the primary force to overcome resistance to descent[24] ***With a correctly applied instrument, consider discontinuation**:* • With vacuum: o After two detachments (or one if less experienced operator)[4] o Descent is inadequate (full diameter of cup not visible at the perineum with three pulls to bring fetal head onto perineum[1,4] o After three additional pulls to ease head out of perineum[4] o Duration of application of the vacuum cup reaches 20 minutes[25] • With forceps[4]: o Blades cannot be easily applied, handles do not easily approximate or rotation not easily achieved—all without undue force o Descent is inadequate or birth is not imminent following three pulls
Caesarean birth[1]	• Second stage CS (compared to first stage) associated with increased risk of maternal morbidity (e.g. tears in uterine incision, haemorrhage, blood transfusion, bladder trauma and need for intensive care) • Emergency CS at full dilation can be technically difficult o Fetal head can be deep in maternal pelvis—potential for maternal and fetal injury o Consider fetal pillow or positioning woman in low lithotomy to allow elevation of fetal head by hand o Notify anaesthetist of potential need for glyceryl trinitrate (GTN) in ORS

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Instrument by type (vacuum or forceps)

Instrument selection is dependent on the individual clinical circumstances, the woman's preference, the clinician's skill and experience, and the resources available.[1,3]

Aspect	Vacuum	Forceps
Indication	• May be preferred: o By clinician o If no indication for a specific instrument[26] • Used for OA, occiput transverse (OT) or OP position	• May be preferred o By clinician o If rotation required[27] • Used for OA, OT or OP position (straight or curved according to intention to rotate)
Contraindication	• Non-vertex presentation (e.g. face, brow)[1,26] • Less than 34+0 weeks gestation[1,2] • Inadequate analgesia[1]	• If OT position, blades that cross at the articulation midpoint[28] • Inadequate analgesia[1]
Relative contraindication	• 34+0 to 36+0 weeks gestation[1,2] • Prior scalp blood sampling[1]	
Procedural considerations	• For both vacuum and forceps o Apply steady traction only during a contraction and with maternal effort[1] o Plan for potential complications (e.g. shoulder dystocia, postpartum haemorrhage (PPH), perineal trauma)	
	• Minimise shearing forces on the scalp (i.e. avoid 'rocking')[1] • Ensure no maternal tissue trapped under cup after application of suction • Rapid application of negative pressure • RCOG recommends rapid application to reduce the duration of the procedure[4] o No difference in detachment rates[29] from stepwise application o Higher rate of perineal suture in rapid method[29] o No difference in neonatal outcomes[29]	• Perform the following ONLY between contractions[1]: o Application of instrument o Correction of asynclitism o Rotation of fetal head

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Comparison of outcome by instrument

Outcome/complication	Any vacuum type	Any forceps type
Maternal		
Failure of attempt (11 studies, n=3080, RR 0.58, 95% CI 0.39 to 0.88)[7]	Higher	Lower
	Low certainty of evidence	
Third or fourth degree tears with or without episiotomy (9 studies, n=2493, RR 1.83, 95% CI 1.32 to 2.55)[7]	Lower	Higher
	Low certainty evidence	
Any maternal trauma (perineal, vulval and vaginal) (5 studies, n=1356, OR 2.48, 95% CI 0.98 to 2.40)[7]	Lower	Higher
	Low certainty evidence	
Flatus incontinence/altered continence[7]	No appropriate data	
Levator avulsion (7 studies; n=977, OR 4.45, 95% CI 3.09 to 6.42)[30]	Lower	Higher
Postpartum haemorrhage (greater than or equal to 500 mL, (2 studies, n= 523, RR 1.71, 95% CI, 0.59 to 4.95)[7]	No evidence of difference	
	Low certainty evidence	
*Pain relief[7]	Lower	Higher
**Other maternal outcomes blood loss, pain on day four, caesarean section (CS), vulval trauma, episiotomy or perineal tear requiring suturing with or without pudendal analgesia[26]	No significant difference	
Neonatal		
Subgaleal haemorrhage (SGH) Rate per 1000 instrumental births	3 to 7.6/1000[31]	1.6/1000[32]
*Jaundice	Higher	Lower
Cephalohaematoma (10 studies, n=2729,RR 0.41, 95 CI, 0.3 to 0.56)[7]	More common	Less common
Retinal haemorrhage (10 studies, n=2923,OR 2.4, 95 CI, 1.3 to 2.2)	More common	Less common
Other neonatal outcomes: • Apgar score less than 7 at 5 minutes (7 studies, n=16440.83, 95% CI,0.46 to 1.51 (moderate certainty)[7] • Mean umbilical artery pH less than 7.2 (2 studies, n=789, RR 1.33, 95% CI0.91 to 1.93) low certainty, imprecise including both benefit and harm[7] • Scalp injury, facial injury, intracranial injury, admission to neonatal intensive care unit	No significant difference	

*12 RCT (n=3129 women). ** 32 RCT (n=6597). Not all comparisons included data on all outcomes. Outcome definitions varied among studies. Heterogeneity between some studies.

CI: confidence interval; n: number; RR: risk ratio; OR odds ratio.

Anticipated absolute effect by instrument

Outcome[7]	Anticipated absolute effects (95% CI)	
	Risk with any vacuum cup	Risk with any type of forceps
Failed birth with allocated instrument (n=3080, 11 RCT, low certainty of evidence)	137 per 1000	79 per 1000 (53 to 120)
Any maternal trauma (n=1356, 5 RCT, low certainty of evidence)	925 per 1000	950 per 1000 (924 to 968)
Any neonatal injury (0 RCT)	Not reported	Not reported
Third- or fourth-degree tear (with/without episiotomy) (n=2493, 9 RCT, low certainty of evidence)	82 per 1000	150 per 1000 (108 to 209)
PPH (> 500 mL) (n=523, 2 RCT, low certainty of evidence)	20 per 1000	35 per 1000 (12 to101)
Low Apgar score at 5 minutes (< 7) (n=1644, 7 RCT, moderate certainty of evidence)	28 per 1000	23 per 1000 (13 to 42)
Low UA pH (< 7.2) (n=789, 2 RCT, low certainty of evidence)	106 per 1000	141 per 1000 (97 to 205)

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Pre-intervention care

Aspect	Consideration
Bladder care	• Ensure bladder empty—if required catheterise (in/out)[3,4] • If indwelling catheter insitu, deflate balloon or remove[3,4]
Abdominal and vaginal assessment	• Perform an abdominal and vaginal assessment to confirm ALL of the following[1,3,4] o Vertex presentation o Head is 1/5th or less palpable abdominally o Estimated fetal weight (EFW) considered o Clinical assessment that pelvis is adequate for vaginal birth o Cervix fully dilated and membranes ruptured o Assessment of caput and moulding (for accurate assessment of station) o Head position (OA, OT, OP) is known for correct placement of instrument
Analgesia/ anaesthesia	• Provide adequate analgesia prior to procedure[1] o Insufficient evidence to support any particular analgesic agent or method of administration[33] • Considerations[34]: o More analgesia usually required for forceps than for vacuum o If analgesia required, perineal infiltration is often sufficient for vacuum births o Pudendal block effective for most low and outlet forceps births o Regional block required for some low and most mid-cavity forceps birth
Episiotomy	• Discuss the potential indications, risks and benefits including option for no episiotomy • Obtain woman's informed consent[1] • Routine episiotomy is not recommended—use clinical judgement for each birth before recommending[1-4,35] o Refer to Queensland Clinical Guideline: *Perineal care*[36] • Strongly consider episiotomy if forceps or vacuum are used[37], especially if first vaginal birth[1,38,39] • If episiotomy is indicated: o Perform mediolateral o Continue to apply warm compresses
Maternal and fetal observation	• Provide continuous one-to-one midwifery support • Monitor vital signs as per second stage of labour and according to clinical circumstances o Refer to Queensland Clinical Guideline: *Normal birth*[12] • Auscultate fetal heart rate (FHR) prior to procedure and between contractions o Refer to Queensland Clinical Guideline: *Intrapartum fetal surveillance*[13]

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Post-intervention care

Aspect	Consideration
Maternal observations	• Routine postnatal observations as per individual clinical circumstances/local protocols
Perineal care	• Perform a comprehensive perineal assessment o Instrumental birth associated with higher rates of perineal injury[40-42] • Refer to Queensland Clinical Guideline: *Perineal care*[36] for recommendations about: o Perineal recovery, hygiene and healing o Pelvic floor muscle exercises, self-care and referral recommendations after obstetric anal sphincter injury (OASIS) • Refer to a women's health physiotherapist as per local protocol
Bladder care	• Monitor and document frequency and volume of voiding after birth o Risk of postpartum urinary retention is increased after instrumental birth[19,43,44] o If voiding has not occurred within six hours[19,44] or urinary retention is suspected, consider post-void residual and/or indwelling catheter • Refer to continence advisor/physiotherapist as required
Antibiotics	• Consider antibiotic prophylaxis against postpartum infectious morbidity[1,45] • Evidence (mainly from single study (n=3420) in a high income country found that a single dose of prophylactic antibiotic administered within six hours of birth reduced[46] o Superficial perineal wound infection (RR 0.53; 95% CI 0.4 to 0.69) o Deep perineal wound infection (RR 0.46; 95% CI 0.31 to 0.69) o Wound breakdown (RR 0.52; CI 0.43 to 0.63) • Recommended regimen for women 36+0 weeks gestation or more[46,47] (not allergic to penicillin) o Amoxicillin and clavulanic acid 1 g + 200 mg intravenous (IV) as a single dose within 6 hours of instrumental vaginal birth • If penicillin hypersensitivity, consult with an expert clinician as required and/or refer to Therapeutic Guidelines[47] • Efficacy of prophylaxis administered to women less than 36+0 weeks gestation or after 6 hours following birth is not known
Analgesia	• Offer regular rectal non-steroidal anti-inflammatory agents and paracetamol[4] • If pain not relieved by analgesia, perform a clinical assessment to exclude complications (e.g. haematoma or infection)
Venous thromboembolism (VTE) prophylaxis	• Perform a risk assessment and consider prophylactic measures for VTE o Refer to Queensland Clinical Guideline: *Venous thromboembolism prophylaxis in pregnancy and the puerperium*[19]
Psychological care	• Offer an opportunity to discuss the indications for the instrumental birth, the management of any complications and implications for future births o Instrumental birth is associated with fear of subsequent birth and post-traumatic stress[48] • Ask about psychological wellbeing in the postnatal period and offer referral if indicated

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Care and observation of baby

Aspect	Consideration
Context	• SGH is a potentially lethal medical emergency[5] • Risk factors for SGH[49,50] o Vacuum duration o Number of dislodgements o Duration of second stage of labour o Fetal head station o Caput succedaneum o Presence of meconium
Assessment	• Perform neonatal surveillance according to risk for SGH [refer to RANZCOG statement on *Subgaleal haemorrhage in the newborn*[5]] o Use Neonatal Early Warning Tool (NEWT) or similar to record observations[51] • Collect paired cord blood gas samples at birth[3,13,22,40,46,50] o If increased risk of SGH established at birth, collect cord blood for full blood count • Assess for signs and symptoms of instrument-related injury • Refer to Queensland Clinical Guideline: *Routine newborn assessment*[52]
Management	• Notify paediatric/neonatal medical officer/NP of instrumental birth (if not already notified during labour) • Administer vitamin K prophylaxis as soon as practical after birth[5] • Minimum surveillance for all babies post instrumental vaginal birth o Baseline neonatal observations o Avoid hats and bonnets so changing head shape, appearance or size can be identified o In the presence of poor feeding, pallor or other concerns, increase frequency of monitoring and seek timely medical review[5]

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