

Obstetric Guideline 14

ASSISTED VAGINAL BIRTH: THE USE OF FORCEPS OR VACUUM EXTRACTOR

INTRODUCTION

The anatomy of the birth canal and the fetal head must be understood to become skilled in the safe use of the forceps or the vacuum extractor. Such details are readily available in standard texts, as are descriptions of commonly used forceps.

COMMON INDICATIONS FOR USE OF FORCEPS OR VACUUM EXTRACTOR

I. MATERNAL

Slow progress in the second stage due to:

- Poor contractions and/or maternal fatigue
- Epidurals may diminish contractions and blunt maternal pushing efforts
- A tight unyielding perineum may require an episiotomy rather than the use of forceps or vacuum extractor.

II. FETAL

Non-reassuring fetal heart surveillance, according to recognized definitions.

PRECAUTIONS

The use of forceps or the vacuum extractor may cause fetal and/or maternal injury. If a newborn is damaged and forceps have been used, then such use may feature prominently should litigation ensue. Carefully document details of the assisted delivery¹. The following precautions should be observed:

- Personnel skilled in neonatal resuscitation should be present at delivery²
- The true station must be accurately determined
- The position of the fetal head must be known not only prior to **but also after** the forcep blades have been applied
- Most often: use traction only when the mother is contracting and pushing
- Never use excessive traction
- Know when to stop (See page 5)
- Have a back up plan. When mid-cavity operative delivery is undertaken, it should take place in the operating room with immediate access to cesarean section capability.

With non-reassuring fetal heart surveillance, it may be better to use moderate traction over several contractions, rather than using a single vigorous effort (fetus may “recover” between contractions with the slower process). The use of a scalp electrode and fetal monitor should be

considered when a forceps delivery is likely to be other than an outlet delivery. This allows for close observation of the fetal response to traction and the recovery between efforts.

NOTE Shoulder Dystocia: If there is difficulty with delivery of the fetal head, there is an increased chance of shoulder dystocia. Be prepared.

DEFINITIONS

These guidelines assume, for discussion, that the presentation is vertex, which implies that the fetal head is well flexed.

I. ENGAGEMENT

Engagement means that the fetal biparietal diameter is at or below the maternal pelvic inlet. Engagement should be determined by a combination of abdominal and vaginal examination findings.

II. STATION

Station is the relationship between the leading part of the fetal **skull** (not caput) and the maternal ischial spines. Station 0 means that the leading part of the skull is at the level of the spines and indicates that the fetal biparietal diameter is just coming through the maternal pelvic inlet, in the woman with the average gynecoid pelvis.

In assessing the station, it is essential that the degree of caput, moulding, and overlapping be determined so that the degree of cephalo-pelvic disproportion (CPD) can be assessed.

III. CAPUT

Caput is edema of the fetal scalp overlying the leading part of the skull.

IV. MOULDING AND OVERLAPPING

Excessive pressure on the fetal head can produce moulding and overlapping. Overlapping occurs at the suture lines, therefore the fontanelles may be obscured.

LEVELS OF ASSISTED DELIVERY – DEFINITIONS^{3,4}

I. OUTLET

- The fetal head is at the perineum
- The scalp is visible at the introitus, between contractions
- The fetal head is OA, LOA, or ROA

II. LOW FORCEPS

- The leading part of the fetal skull is at true station +2 or lower, with the fetal head in:
OA, LOA, ROA
or
OP, ROP, LOP, LOT, ROT

III. MID FORCEPS

- Head is engaged
- True station is 0 to +2

NOTE: In general, delivery from the outlet should be easy. The delivery by low forceps may be more difficult. Delivery by mid forceps will require more skill and experience and should only be done in an operating room with cesarean section capability immediately available.

CEPHALO PELVIC DISPROPORTION (CPD)

Estimate degree of caput, moulding, overlapping, and true station. Caput, moulding, and overlapping must be recognized before the forceps or the vacuum extractor is applied. Such features will:

- Allow assessment of the true station
- Be predictive for the difficulty of the assisted vaginal delivery

I. NO SIGNIFICANT CPD

- No or minimal caput
- No or minimal moulding
- No overlapping
- Appropriate station

II. SOME CPD

- Caput < 1 cm thick
- Mild to moderate moulding
- No overlapping
- Possible inadequate descent

III. SIGNIFICANT CPD

- Excess caput
- Excess moulding
- Overlapping
- Inappropriate station

CONDITIONS FOR FORCEPS USE

- A. ANALGESIA & ASSISTANCE (Neonatal Support).** Analgesia options include:
 - Nitrous oxide
 - Local perineal
 - Pudendal block
 - Epidural

- B. BLADDER EMPTY:** (“In and Out” catheter)

- C. CERVIX FULLY DILATED:** membranes ruptured

- D. DETERMINE:**
 - Fetal head position
 - Caput, moulding, overlapping
 - True station

DYSTOCIA - consider shoulder dystocia

- E. EQUIPMENT and personnel ready for:**
 - Neonatal resuscitation
 - Possible caesarian section

- F. FORCEPS:**
 - Type
 - Accurate application

- G. GENTLE TRACTION**

- H. HANDLE ELEVATED**
 - Traction in axis of birth canal
 - Do not elevate handle too early

- I. INCISION**
 - Consider episiotomy

- J. JAW**
 - Remove forceps when jaw is reachable or delivery assured

For other than outlet forceps, consider a trial of forceps in operating theater with caesarian section as the back up plan. If assessment indicates that vaginal delivery will be difficult, prepare for caesarian section. While waiting:

- Apply oxygen per mask
- Position mother on side
- Start IV prior to assisted deliveries

- Insert Foley catheter
- Consider vaginal digital pressure to decrease pressure on fetal head
- Monitor fetus closely; consider use of scalp electrode

VACUUM EXTRACTOR

The indicators and assessment necessary for use of the vacuum extractor are similar to forceps use. The vacuum extractor may cause less maternal trauma and less need for analgesia.

However, the vacuum extractor should not be regarded as an easier alternative to forceps.⁵ Despite the reduced requirements for training for use of the vacuum extractor, significant morbidity can occur. The data on neonatal morbidity suggests similar potential significant neonatal morbidity as compared to forceps.⁶ According to the literature, there has generally been a greater reported incidence of fetal injury associated with high vacuum pressures (0.8 kg/cm² [600 mm Hg] or higher), longer cup application times (greater than 15 minutes), paramedian cup placement, the use of metal cups, and deliveries from high stations.^{7,8,9}

I. HAZARDS

- **Never use the vacuum extractor to expedite rotation.** The vacuum extractor is designed to produce traction, not expedite rotation.
- **The use of metal cups is not recommended.** Soft cup extractors are clearly shown to cause less fetal trauma than metal cups. “Although the Malmstrom-Bird [metal] vacuum is widely used in other parts of the world, this equipment has not been formally reviewed by the Canadian Health Protection Branch, and is not licensed for sale or use in Canada. According to the Health Protection Branch unlicensed equipment that was already in use at the time of new legislation in 1999 may continue to be used at the discretion of hospital and practitioner, unless the Health Protection Branch specifically indicates otherwise. Since February 1999, any replacement parts and all new medical equipment coming into Canada must be licensed for use here.”¹⁰

II. TECHNIQUE¹¹

- Apply the cup to or over the posterior fontanelle, ensuring that no maternal tissue is between the fetal head and the vacuum cup.
- Increase cup pressure to the indicated pressure on the dial to between 500-600 mmHg to a **maximum of 600 mmHg**. Conventional wall suction can exceed the safe maximum pressure and should not be used.
- Apply traction with the vacuum extractor when the mother is contracting and pushing. Apply only moderate traction.
- The vacuum pressure may be released between contractions, to resting pressure settings of between 100-200 mmHg. There is no difference in neonatal outcome if the vacuum is maintained, without continuous traction, or released between contractions.
- **STOP** when any of the following occur: (Vacuum failures - Rules of Threes)
 - 3 pulls, over 3 contractions, no progress
 - 3 pop-offs, without obvious cause
 - 30 minutes elapsed time

III. NEONTAL COMPLICATIONS ¹²

- All infants delivered with vacuum assisted delivery will have a caput succedaneum (chignon) and this will resolve spontaneously with no ill effects on the child.
- Subgaleal haematoma (subaponeurotic haematoma) is a life-threatening complication which is estimated to occur in 4 of 10,000 spontaneous vaginal deliveries and in 59 of 10,000 vacuum assisted deliveries. The neonate must be monitored for signs of subgaleal haemorrhage within the first 48 hours of delivery.
- Fetal/neonatal death can occur related to profound hypovolemic damage from subgaleal haematoma.

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SUGESTED READING

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