

Vacuum Assisted Delivery

Vacuum assisted delivery is a form of operative vaginal birth that is also known as vacuum extraction

- Alternative to cesarean birth
 - Associated with a lower incidence of vaginal, cervical, and third- and fourth-degree lacerations compared with forceps-assisted birth
 - Causes less maternal discomfort than forceps-assisted birth because the cup doesn't occupy additional space in the birth canal
 - Requires less anesthesia
- Associated with marked caput succedaneum (bruising and swelling due to fluids crossing the suture lines) of the neonate's head, which can last as long as 7 days after birth
- Tentorial tears possible due to the extreme pressure, and renewed bleeding from scalp can occur if vacuum extraction used for fetus who has undergone fetal blood sampling
- Problematic in preterm neonates because of extreme softness of skull (risk of intraventricular hemorrhage)
- Can be used to assist delivery during cesarean birth; when applied properly, vacuum decreases volume delivered through uterine incision because delivering hand or forceps blade is no longer needed

Indications

- There are no absolute indications for operative vaginal delivery; the following indications apply when the fetal head is engaged and the cervix is fully dilated:
 - Prolonged second stage of labor
 - Suspected immediate or potential fetal compromise
 - Shortening of the second stage of labor for maternal benefit

Contraindications

- The procedure is contraindicated when the fetus is known to have a bone demineralization condition (such as osteogenesis imperfecta), a connective tissue disorder (such as Ehlers-Danlos syndrome or Marfan syndrome), or a bleeding disorder (such as alloimmune thrombocytopenia, hemophilia, or von Willebrand disease).
- The procedure is contraindicated if the fetal head is unengaged or if the position of the fetal head is unknown.
- The procedure is not recommended before 34 weeks' gestation because of the risk of intracranial and subgaleal hemorrhage, cephalohematoma, and neonatal jaundice of premature infants.
- Other possible contraindications include true cephalopelvic disproportion, nonvertex presentations, maternal coagulation problems, hydrocephalus (known or suspected), and trauma to the fetal scalp (such as from prior scalp sampling or fetal scalp electrode placement).

Procedure

- When there is no uterine contraction, the practitioner assesses the fetal scalp position and then applies the plastic vacuum cup, which is connected to a suction source, to the fetal head 2-cm anterior to the posterior fontanel.
- The practitioner exerts negative pressure to the manufacturer's recommended pressure, not to exceed 600 mm Hg, which removes the air beneath the cup and causes the cup to adhere tightly to the fetal head.
- With each contraction, the practitioner applies steady traction in line with the birth canal until the head is delivered. (See [Vacuum extractor for delivery](#).)
- Although a number of authors have offered concrete limits (two or three detachments) for a trial of vacuum extraction, data are inadequate to recommend an evidence-based guideline for the number of vacuum detachments that should be allowed before the practitioner abandons the procedure.
- After the head is delivered, the practitioner removes the vacuum cup.

• Complications

- Cephalohematoma and subgaleal hemorrhage (rare)
- Fetal scalp bruises and lacerations
- Maternal perineal and vaginal lacerations
- Urinary tract injury, which can lead to urine retention or incontinence
- Maternal short-term fecal incontinence

• Pretreatment Care

- Before a vacuum delivery is attempted, the following conditions should be met:
 - The cervix must be fully dilated.
 - The membranes must be ruptured.
 - The position of the fetal head must be known and the head engaged.
 - The fetal weight has been estimated.
 - The patient's pelvis must be determined to be adequate for a vaginal birth.
 - The patient must have adequate anesthesia.
 - The bladder has been emptied.
- If required by your facility, confirm that informed consent has been obtained and that the signed consent form is in the patient's medical record.
- Alert the pediatrician that birth is imminent so that the neonate receives proper assessment and care after birth.
- Call the anesthesia department to administer adequate anesthesia (such as a neuraxial anesthetic or local block) to reduce the pain and discomfort of a vacuum-assisted delivery.
- Place lithotomy poles on the birthing bed and help the patient into a lithotomy position to open the pelvic outlet and allow an unobstructed view of the vaginal opening.
- Have the patient void before the procedure, or perform straight-catheterization if the patient is unable to void.
- Continue to assess fetal well-being via intermittent fetal heart rate monitoring during and after contractions or using continuous monitoring, as indicated.

- Obtain maternal vital signs before and during the procedure as needed to assess maternal well-being.
- Encourage the patient to use breathing techniques to prevent pushing during vacuum application.
- Encourage the patient to push with each contraction after the vacuum has been applied, unless contraindicated.
- Monitor contractions and alert the practitioner when one occurs because vacuum traction is applied only with contractions.
- Note that the practitioner may stop using the vacuum if:
 - fetal scalp trauma occurs
 - the vacuum cup detaches (pops off) three times
 - delivery fails to progress with each contraction.
- Perform sponge counts before and after delivery.

• Posttreatment Care

- After the birth of the neonate, inspect the neonate's head for evidence of caput succedaneum, which is a common finding after vacuum extraction.
- Assess the neonate for possible complications, such as cephalohematoma, and for signs of trauma and infection.
- Monitor the neonate for signs of listlessness or poor sucking, which may indicate cerebral irritation.
- Inform neonatal caregivers and personnel that vacuum extraction was used.

• Patient Teaching

Teaching should be family-centered. Be sure to include the family or caregiver, when appropriate.

- Reinforce the practitioner's explanation of the procedure, and answer any questions to enhance cooperation and allay fears.
- Explain that the practitioner will apply pressure and traction during contractions; encourage the patient to push when directed.
- Explain that the neonate may initially have a misshapen head due to the application of suction but that this condition is temporary.