Forceps and Vacuum Delivery
(Operative Vaginal Delivery)

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Stations

• Centimeter Method
  - 0 station is at the ischial spines
  - -1 to -5 centimeters above the spines
  - +1 to +5 centimeters below the spines

• Thirds Method
  - 0 station is at the ischial spines
  - Pelvis divided into thirds above and below the spines
    - -1 to -3 above the ischial spines
    - +1 to +3 below the ischial spines

From Intrapartum Management Modules, 2nd Ed
edited by E. Jean Martin
1996
Positions of Vertex Presentations

- Left Occiput:
  - Anterior (LOA)
  - Transverse (LOT)
  - Posterior (LOP)

- Right Occiput:
  - Anterior (ROA)
  - Transverse (ROT)
  - Posterior (ROP)
  - Direct OA, OP

Cardinal Movements

- Engagement
- Descent, Flexion
- Internal Rotation
- Extension
- Restitution (External Rotation)
Indications for Operative Vaginal Delivery

“When it is technically feasible and can be safely accomplished, termination of second-stage labor by forceps or vacuum extraction delivery is indicated in any condition threatening the mother or fetus that is likely to be relieved by delivery.”

- Williams Obstetrics 2010

Maternal Indications

- Heart Disease
- Pulmonary Injury or Compromise
- Neuromuscular Disease
- Intrapartum Infections
- Exhaustion
- Prolonged second-stage labor

etc.
Fetal Indications

- Prolapsed Cord
- Abruptio
- Category III and some Category II FHR Patterns
- Vaginal Breech Delivery
  etc.

Prolonged Second Stage

- ACOG, Guidelines for Perinatal Care, 2013
  - Nulliparous
    - More than 3 hours with regional anesthesia
    - More than 2 hours without regional anesthesia
  - Parous
    - More than 2 hours with regional anesthesia
    - More than 1 hour without regional anesthesia
  - Recommends allowing one additional hour in the setting of an epidural
    - Nulliparous 4 hrs; Parous 3 hrs

Prolonged Second Stage Causes

- Malposition/presentation, Deflexion, Asynclitism
- Macrosomia
- Excessive Analgesia/Anesthesia
- Nulliparity
- High Station at Complete Cx Dilation
  etc.
**Non-operative Management**

- Position Changes
- Assure empty bladder
- Allowing the Effects of Analgesia/Anesthesia to Subside
- Assist with pushing efforts
- Oxytocin Stimulation
- Watchful Waiting

**Contraindications**

(Relative)

- Prematurity (Vacuum)
  - < approx. 34 weeks gestation
- Non-vertex presentations (Vacuum)
- Suspected Fetal Coagulation Defect
- Unengaged Fetal Head or Unknown Position
- Fetal Bone Demineralization Condition
  - e.g., osteogenesis imperfecta

**Trial Operative Vaginal Delivery/Failed Attempt**

- Forceps or vacuum are attempted, knowing that a certain degree of CPD may exist.
- Failed attempt is used to describe abandonment of a planned trial with subsequent C/S.
- Trials are an appropriate option when the Provider thinks there is a high likelihood of success.
Combined Methods

- Use of vacuum and forceps generally not recommended.
- Failure of one instrument often indicates CPD.
- ACOG 2015:
  - “The weight of available evidence appears to be against routine use of sequential instruments at operative vaginal delivery.”

Prerequisites & Preparation

- Engaged Head
- Vertex
  - Exceptions: Forceps can also be used for face presentation and for delivery of head with breech presentation (Pipers)
- Position of Head Determined
- Completely Dilated Cervix
- ROM
- Fetal Weight & Pelvic Adequacy Estimated
- Adequate Anesthesia
- Bladder emptied
- > 34 weeks (approx.) for Vacuum

Forceps Function

- Traction
  - To assist with descent of head.
- Rotation
  - To assist with internal rotation of the head.
Classification of Forceps Delivery

- Outlet Forceps
- Low Forceps
  - Rotation less than or equal to 45 degrees.
  - Rotation greater than 45 degrees.
- Midforceps

Design of Forceps

- Components
  - Blade
    - oval to elliptical
    - fenestrated vs. solid
  - Shank
  - Lock
  - Handle
- Curves: Cephalic, Pelvic
Types of Forceps
- Elliot
- Simpson
- Tucker-McLane
- Kielland
- Barton
- Piper
  - used for delivery of head in vaginal breech deliveries etc.

Application and Delivery Forceps
- Inserted one blade at a time.
- Applied over cheek and ear.
- Horizontal Traction
- Upward traction as head emerges.
Function and Design of Vacuum Extractor

- Function
  - Traction only
  - Can assist with "autorotation"
- Design
  - Cup
  - Handle
  - Tubing (if using remote suction)
  - Filter
  - Suction Mechanism

Application & Delivery Vacuum

- Evenly Over the Sagittal Suture
  - Prevent asynclitism
- Close to Posterior Fontanelle
  - Prevent deflexion
- Assure no maternal tissue is caught between the cup and the head
- May or may not release vacuum pressure between contractions
- May or may not apply traction only with contractions
Time & Pop-off Limits With Vacuum

- Descent should be expected with traction and if there is no descent with the first several pulls, a reappraisal is necessary (ACOG 2015).
- Total peak pressure not to exceed 5-10 minutes.
- If the cup becomes detached approximately 3 times, consider abandoning the attempt.
Comparison of Forceps & Vacuum

- **Function**
  - Forceps can be used for rotation.
  - Vacuum difficult with anything other than anterior positions.
- **Success**
  - Forceps less likely to fail.
- **Application**
  - Forceps require application within vagina and knowledge of precise positioning – more difficult
  - Vacuum easier to learn

Comparison of Complications

**Forceps**

- Associated with 3rd & 4th degree perineal tears
- Fetal trauma
  - Long term sequelae is rare
  - Facial depressions or abrasions/lacerations
  - Facial nerve palsy (rare)
  - Corneal abrasions & external ocular trauma
  - Cephalohematoma (no different that with vacuum)
  - If with improper use/placement
    - Skull fracture
    - Intracranial hemorrhage (same as with vacuum, and c-section)

**Vacuum**

- Perineal lacerations/maternal hematoma occur, but less commonly that with vacuum
- Fetal trauma
  - Long term sequelae is rare
  - Scalp edema (transient)
  - Scalp lacerations
  - Cephalohematoma
  - Hyperbilirubinemia/Jaundice
  - Retinal hemorrhage
  - Intracranial hemorrhage (same as with forceps & c-section)
  - Shoulder dystocia
Nursing Considerations

Anticipation
- Effective 2nd Stage Labor Management
  - Labor down?
  - Effective pushing
  - Keep bladder empty
- Consider Maternal Health Problems and/or Chorio
- Anticipate with Fetal Compromise if Vaginal Delivery Imminent

Preparation
- Obtain forceps or vacuum
- Provide lubrication
- Assist with anesthesia

Coaching/Counseling
- Answer questions
- Coach with pushing efforts

Assistance with Vacuum
- Hook up suction if electronic suction used
- Nursing controlled hand-held pumps
  - Prior to application, check suction by pumping to approx. 40-60 cmHg
  - Once applied to head, pump to 10 cmHg to maintain cup on head
  - With contractions, 40-60 cmHg to assist with traction
  - Between contractions, decrease pressure to 10 cmHg
Aftercare of Mother, Infant

- Assess and record common side effects
  - e.g., forcep marks, scalp edema
- Assess for signs of trauma
- Notify physician

Documentation

- Forceps or physician controlled vacuum – responsibility of physician
- If nurse assisting with vacuum – unclear
- Follow hospital standard
- Consider documenting (not all agree):
  - Type of vacuum
  - Time started
  - Peak pressure
  - Time on & off
  - Resting pressure
  - Attempts