Assisted Vaginal Delivery

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Objectives

- Discuss indications and pre-requisites for vacuum and forceps use
- Discuss pelvic landmarks and define instrument procedures
- Demonstrate proper use of equipment on maternal-fetal mannequin
Introduction

- Assisted vaginal delivery is an important skill for managing second stage of labor
- All maternity care providers should have knowledge and skills to use vacuum or forceps in emergency situations
Rate of Operative Vaginal Delivery

- Rate has steadily dropped in the U.S. from 9 percent of live births in 1990 to 4.5 percent of live births in 2006.
- Vacuum deliveries now comprise 3.7 percent of live births.
- Forceps assisted deliveries now comprise only 0.8 percent of live births.
- Survey of chief residents in OB/GYN residencies in the United States suggests that only 50 percent of senior trainees felt competent to use forceps.
PREVENTION

- Upright or lateral position
  - Reduced duration of second stage of labor but a small increase in second-degree perineal tears
- Support person associated with a slight reduction in length of labor and reduced likelihood of operative vaginal delivery
- Nullips with epidural may benefit from oxytocin augmentation in second stage
Instruments

- Vacuum Extractors
  - Malmstrom: historical, rigid metal cup
  - Soft plastic cup, instrument of choice in most situations
  - Rigid cup for posterior or asynclitism

- Forceps
  - Simpson: all-purpose, most suited to large, molded head
  - Piper, Elliot, Kielland: special indications
## Prolonged Second Stage

<table>
<thead>
<tr>
<th>Parity</th>
<th>Without Regional Anesthetic</th>
<th>With Regional Anesthetic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nullipara</td>
<td>two hours</td>
<td>three hours</td>
</tr>
<tr>
<td>Multipara</td>
<td>one hour</td>
<td>two hours</td>
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</tbody>
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Maternal Indications

- Maternal exhaustion
- Drug-induced analgesia
- Soft tissue resistance with failure to descend
- Maternal illness (e.g. cardio-respiratory, intracranial)
- Hemorrhage
Fetal Indications

- Fetal compromise necessitating immediate delivery in second stage
- Non-reassuring FHR tracing
Prerequisites for Instrument Use

- Vertex presentation
- Complete dilatation of cervix
- Rupture of membranes
- No known cephalopelvic disproportion
- Willingness to abandon procedure
Engagement

- Passage of the BPD through pelvic inlet
- Leading edge of fetal skull at or below ischial spines
Classification of Assisted Deliveries

- Outlet forceps or vacuum
  - Fetal skull on pelvic floor
  - Scalp visible between contractions
- Low forceps or vacuum
  - Fetal skull at, or below, +2 station
- Mid forceps or vacuum
  - Head engaged, but above +2 station
• Often instrument of preference
• Rivals forceps in safety and efficacy
• Soft cups can minimize maternal and fetal trauma
• Rigid flat cups can be used for occiput posterior or asynchlitism
Incidence of severe birth trauma with assisted deliveries has been evaluated.

- Lowest risk – NSVD
- Intermediate risk – Delivered by forceps or vacuum alone or by C-section.
- Highest risk - Delivered with combined forceps and vacuum extraction or who were delivered by cesarean following failed operative vaginal delivery
Vacuum Application

A
- Ask for help
- Address the patient
- Anesthesia adequate?

B
- Bladder empty

C
- Cervix fully dilated
**Vacuum Application**

**D**

- Determine position
  - Anterior fontanel larger, forms a cross
  - Posterior fontanel smaller, forms a Y
  - Assess for bend in ear
  - Molding makes assessment difficult

- Think shoulder **Dystocia**
Vacuum Application

E
- Equipment and Extractor ready

F
- “Flexion point” - proper application results in flexion of fetal head when traction applied
- Feel for maternal tissue before and after applying vacuum
Compression of Cup with Insertion
Vacuum Application

G

- Gentle traction at right angles to plane of cup
- Only during contractions
- Bend, rotary force, or paramedian application will cause detachment
Vacuum Delivery
Vacuum Application

**H**

- **Halt traction after contraction**
  - Reduce pressure between contractions

- **Halt procedure if**
  - Disengagement of cup three times
  - No progress in three consecutive pulls

- No more than 20 minutes for total application – fetal injuries increase > 10 minutes
Vacuum Application

I
- Evaluate for Incision (episiotomy) when head being delivered
- Not necessary for vacuum, but may be for shoulder dystocia or difficult delivery

J
- Remove vacuum when Jaw reachable
Disadvantages of Vacuum

- Higher “failure” rate than forceps
- Requires active maternal efforts and cooperation
- May take longer than forceps although evidence mixed
- Proper placement and traction necessary to avoid losing vacuum
- Small increase in cephalohematoma
FDA Warning

- May 1998
- Warned health care providers of life-threatening vacuum complications
  - Subgaleal hematoma
  - Intracranial hemorrhage
Sub-Galeal Hematoma

Cephalo-hematoma
Vacuum Contraindications

- Severe prematurity
- Breech, face, or brow presentation
- Transverse lie
- Incomplete cervical dilation
- Unengaged head
- Delivery requiring excessive traction
Cervix and vaginal exam
- Evidence of birth trauma
  - Scalp emphysema
  - Caput formation, cephalohematoma
  - Hyperbilirubinemia
  - Subgaleal hematoma
Vacuum Operative Note

- Preoperative diagnosis
- Postoperative diagnosis
- Operation
- History
- First stage
- Second stage
- Procedure
- Third stage
Forceps Application

A
- Ask for help
- Address the patient
- Anesthesia adequate?

B
- Bladder empty?

C
- Cervix completely dilated
**Forceps Application**

D
- Determine position of fetal head
- Think of shoulder dystocia

E
- Equipment ready

F
- Forceps ready
**Forceps Application**

- Articulate and hold in position
- Disarticulate, place left blade in left hand
  - Apply to left side of mother’s pelvis
  - Cephalic curve toward vulva
  - Shank vertical at start
  - Apply to left side of fetal head
  - Right hand protects maternal tissue, applies force
- Repeat for right side
- Articulate handles and lock
Position For Safety

- Posterior fontanel midway between shanks, 1cm above plane of shanks
- Fenestrations admit no more than one fingertip
- Sutures: lambdoidal above, and equidistant from, upper surface of each blade; sagittal is midline
**Gentle traction = Pajot’s Maneuver**

- Axis traction follows pelvic curve
- Initial traction downward, then sweeping in large, J-shaped arc
- Nondominant hand exerts downward traction, causing two vectors of force: *horizontal outward and vertical downward*
Gentle Traction: Pajot’s Maneuver
**Forceps Application**

**H**
- Handle elevated vertically, to follow J-shaped pelvic curve

**I**
- Evaluate for Incision (episiotomy)

**J**
- Remove forceps when Jaw is reachable
Post-Forceps Care

- Cervical and vaginal exam
- Evidence of birth trauma
  - Fractured clavicle
  - Cephalohematoma
  - Lacerations – abrasions
  - Facial nerve palsy
  - Forceps marks normal, benign
About five percent of all vaginal deliveries require operative assistance

All maternity care providers should be familiar with instruments and techniques for their use

**A → J** mnemonic provides systematic method for assisted delivery

Providers should be aware of complications and contraindications to these procedures