Second Stage Labor

- Keep the fetus safe
- Avoid perineal trauma
- Promote a vaginal birth
**Second Stage Labor**
- Keep the fetus safe
  - Careful surveillance
  - Avoid tachysystole
  - Maternal versus fetal heart rate
  - Intrauterine resuscitation as needed
- Avoid perineal trauma
  - Passive fetal descent
  - Avoid perineal stretching / massage
  - Proper maternal positioning
- Promote a vaginal birth
  - Passive fetal descent
  - Minimize active pushing phase
  - Proper maternal positioning
  - Apply recent evidence for second stage time frames WNL

**Active Pushing Phase**
- Most physiologically stressful part of labor for the fetus

**Physiology of Second Stage**
- Long Valsalva Maneuver
- Abdominal and Intrathoracic Pressure
- Intrauterine Pressure
- Uterine Blood Flow
- Maternal Blood Flow
- Vasoconstriction
- Cardiac Output
- Blood Flow in the Intervillous Space
Physiology of Second Stage

- Blood Flow in the Intervillous Space
  - pH
  - pO₂
  - Base Excess
  - pCO₂
  - Indeterminate or Abnormal FHR
  - Newborn Acidemia
  - Apgar Scores

Passive Fetal Descent
Delayed Pushing; Laboring Down

- For women with epidural analgesia/anesthesia coached, closed glottis pushing immediately at 10 cm will not result in a clinically significant decrease in length of second stage or decrease in risk of cesarean

Coached Pushing at 10 cm

- Increases risk of:
  - FHR decelerations
  - Fetal hypoxemia
  - Abnormal fetal acid-base status
  - Operative vaginal birth
  - Perineal lacerations
  - Bladder dysfunction
  - Maternal fatigue

Delayed Pushing

- Less fetal heart rate decelerations
- Less effect on fetal acid-base status (umbilical cord gases & fetal lactate)
- Less effect on fetal oxygen status

(Caldeyro-Barcia et al., 1981; Fraser et al., 2000; Hansen et al., 2002; Nordstrom et al. 2001; Piquard et al. 1989; Simpson & James, 2005; Thomson, 1993)

Second Stage Labor

- "Take a deep breath and hold it" four times with each contraction is physiologically inappropriate based on current evidence
- Counting to 10 with each push promotes prolonged breath-holding, maternal apnea and fetal compromise

Open-glottis pushing is best for mother and baby
Physiologic Pushing

- Discourage prolonged breath holding (no more than 6 - 8 sec, no more than 3 efforts per contraction)
- Instead, instruct the woman to bear down and allow her to choose whether or not to hold her breath while pushing (e.g., bear down and hold it as long as you can)
- Avoid Valsava maneuver: Increased intrathoracic pressure causes decrease in CO, BP, and placental perfusion, can lead to fetal hypoxemia (Caldeyro-Barcia, 1979; 1981)

When to Push

- Delay pushing until urge to push
- Up to 2 hrs for nulliparous women
- Up to 1 hr for multiparous women

(Hanson, Clark & Foster, 2001; AWHONN 2008)

Second Stage Arrest

No progress (descent or rotation) for:

- 4 h or more in nulliparous women with an epidural
- 3 h or more in nulliparous women without an epidural
- 3 h or more in multiparous women with an epidural
- 2 h or more in multiparous women without an epidural

Spong et al. (2012)

How Long?

- Before diagnosing arrest of labor in second stage, if maternal and fetal conditions permit, allow for following:
  - At least 3 h of pushing in nulliparous women
  - At least 2 h of pushing in multiparous women
- Longer durations may be appropriate on individualized basis (e.g., with use of epidural analgesia or with fetal malposition) as long as progress is being documented

ACOG & SMFM (2014)

How Long?

- A specific absolute maximum length of time spent in second stage of labor beyond which all women should undergo operative birth has not been identified

ACOG & SMFM (2014)

Operative Vaginal Birth

- Operative vaginal birth in second stage of labor by experienced and well-trained physicians should be considered safe, acceptable alternative to cesarean birth
- Training in, and ongoing maintenance of, practical skills related to operative vaginal birth should be encouraged

ACOG & SMFM (2014)
**Manual Rotation**

- Manual rotation of fetal occiput when there is fetal malposition in second stage labor is a reasonable intervention to consider before moving to operative vaginal birth or cesarean birth.

- To safely prevent cesarean birth when there is fetal malposition, it is important to assess fetal position in second stage labor, particularly if there is evidence of abnormal fetal descent.

ACOG & SMFM (2014)

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**Modification of Pushing Efforts If Recurrent Decelerations Occur**

- If recurrent decelerations occur, make the following modifications:
  - Push with every other contraction.
  - Maintain stable baseline rate.
  - Discontinue or decrease oxytocin based on FHR pattern.
  - Recurrent late decelerations.
  - Recurrent variable decelerations.
  - Moderate vs minimal variability.
  - Baseline rate elevated.

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**Second Stage Labor: MHR and FHR**

(Screenshot showing fetal monitoring charts during the second stage of labor.)
Second Stage Labor: MHR and FHR

Confirm Maternal HR and FHR as Distinctly Different Tracings

- Coincidence alerts may indicate maternal rather than fetal HR is being recorded
- FSE can record maternal HR if the fetus is dead

Clinical Implications

- Confirm fetal heart rate in presence of maternal tachycardia
- Tachycardia, minimal variability unlikely to spontaneously resolve to normal baseline rate and moderate variability
- Maternal HR increases during pushing efforts
- Accelerations during pushing are often maternal heart rate tracing

Tachysystole

- Adverse fetal outcomes following tachysystole are a significant source of professional liability
- 43% of claims involving neurologically impaired baby are related to oxytocin management (tachysystole)

(ACOG, 2004)
Second Stage Labor

- 129 closed claims involving vaginal birth of a neurologically damaged baby
- 82% included at least 1 hour of inappropriate second stage care
  - Continued coached pushing despite indeterminate / abnormal FHR pattern (recurrent decelerations, minimal variability, tachycardia)
  - Tachysystole
Keeping the Fetus Safe

- Avoid tachysystole
- Consider discontinuing pushing temporarily if FHR does not recover between pushes/contractions

Physiologic Reserve

- Fetus less likely to tolerate continued pushing with recurrent decelerations if
  - Minimal variability
  - Rising FHR baseline into abnormal range
  - First stage decelerations
  - Infectious process

Upright Positioning

- Less pain
- Less parental pain medication
- Less perineal trauma
- Less oxytocin
- Shorter labor
- Fewer episiotomies
- Fewer operative assisted births
- Fewer FHR abnormalities
**Same Pelvic Relationship**  
**Avoiding Negative Maternal Hemodynamic Consequences**

**Effects of Maternal Position**  
**Lumbosacral Spine and Lower Extremity Nerve Injuries**

- Hyperflexion of knees (<90° angle)
- Prolonged pushing
- Lithotomy position
- Use of stirrups during pushing
- Provider assisting pushing legs back
- Compression of peroneal, lateral femoral cutaneous, and femoral nerves
- Transient to permanent nerve damage  
  (Tubridy & Redmond, 1996; Wong et al., 2003)

**Effects of Maternal Position**  
**Lumbosacral Spine and Lower Extremity Nerve Injuries**

- Harm can occur by several mechanisms including transection, stretch, compression and/or vascular injury
- Compression and stretch may result in decreased perineural blood flow and ischemia
- Focal demyelination and conduction block or axon loss with nerve conduction failure
- Average time for resolution is 2 months, with a range of 72 hours to 1 year  
  (Wong et al., 2003)

**Forcing Legs Back Against the Abdomen**

- The lithotomy position, particularly with the thighs flexed at an angle less than 90°, increases the risk of lumbosacral spine and lower extremity nerve injuries and should be avoided during pushing  
  (Wong et al., 2003)

**Forcing Legs Back Against the Abdomen**

- Pulling the legs back and open results in stretching of the perineum and risk of perineal tearing and lacerations; should be avoided during pushing  
  (de Jong et al., 1997; Gardosi et al., 1989; Golay et al., 1993; Sampselle & Hines, 1999; Simpson & James, 2005)

**Perineal Massage**

- *Antepartum* perineal massage may be beneficial for nulliparous women
- During labor perineal massage may be harmful
- Use of warm compresses, oils and lubricants for perineal massage are associated with an increased incidence of perineal irritation, genital tract trauma, and a non-intact perineum at birth  
  (Aikens-Murphy & Feinlan, 1998; Albers et al., 1996; Albers et al., 2005; Stamp et al., 2001)
Perineal Massage

- No evidence that perineal massage during labor, especially second stage labor is beneficial
- Some women find the technique uncomfortable
- Absent data to support benefits, perineal massage during labor should be avoided

(Aikens-Murphy & Feinlan, 1998; Albers et al., 1996; Albers et al., 2005; Stamp et al., 2001)

Epidural Anesthesia

- Turning down the rate or turning off the infusion significantly increases pain, risk of fetal malposition and operative vaginal birth; does not shorten the duration of second stage

(Phillips & Thomas, 1983; Torvaldsen et al., 2004)

Epidural Anesthesia

- Advocate for an appropriate level of block with which pain is relieved but the woman can still move her legs, assist with positioning and feel the urge to push when conditions are favorable for pushing

(Phillips & Thomas, 1983; Torvaldsen et al., 2004; Abenhaim & Fraser, 2008)

Safe Second Stage Care

**Appropriate**

- Timing
- Pushing techniques
- Support / Encouragement / (If needed, coaching)
- Positioning
- Contraction frequency
- Coordination of pushing efforts with fetal response
- Patience