Nursing Assessment of the 8 P’s

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The Eight P’s

• The P’s
• 1. Passenger (fetus)
• 2. Passageway (pelvis, pelvic floor, abdominal support)
• 3. Powers (uterine contractions and maternal effort)
• 4. Positioning (Maternal)
• 5. Pain
• 6. Psyche
• 7. Partner
• 8. People (parents, providers, hospital personnel)
• Clinical pelvimetry is used to decide what type of pelvis each woman has.

• Gynecoid and Anthropoid are best for birth

Passageway

Soft tissue:
- tumors, fibroids
- bicornuate uterus (abnormal structures)
- First time birth
- Firm perineum
- Cystocele/urethrocele

PASSENGER
Fetal-Pelvic Relationships

Fetal Lie

- The relationship of the long axis of the fetus to that of the mother
- Longitudinal lie is found in 99% of labors at term
- Predisposing factors for transverse lie/oblique lie
  ➡️ multiparty, placenta previa, polyhydramnios, & uterine anomalies
- Longitudinal lie ➡️ cephalic presentation
  ➡️ breech presentation
- Transverse lie ➡️ shoulder presentation

Presenting Part and Presentation

Presenting Part: The most dependent part of fetus closest to cervix

Cephalic: vtx, brow or face
Breech: Buttocks, feet or knees
Shoulder: Shoulder, arm or trunk

Cephalic Presentation
- Head is flexed sharply ∈ vertex / occiput presentation=
  Suboccipitobregmatic=9.5 cm
- Head is extended sharply ∈ face presentation=submentobregmatic=9.5 but
  can not birth face posterior
- Partially flexed ∈ bregma presenting [sinciput presentation/ military]=occipito frontal=11.5 cm
- Partially extended ∈ brow presentation=vertico-mental=12.5-13.5 cm

Breech Presentation
- Frank breech, Complete breech, Footling breech
Shoulder Presentation
Attitude

ATTITUDE (flexion or extension) Relationship of fetal parts to each other

- Posture of the fetus folded on itself to accommodate the shape of the uterus = Biparietal Diameter is best at 9.5 cm
- Flexed head, thighs, knees & feet
- The arms crossed over the chest
- Face presentation extended concave contour of the vertebral column

Longitudinal lie. Cephalic presentation. Differences in attitude of fetal body. Note changes in fetal attitude in relation to fetal vertex as the fetal head becomes less flexed.
DENOMINATOR and POSITION

DENOMINATOR = The relation of an arbitrary chosen point of the fetal presenting part to the Rt or Left side of the maternal birth canal: The chosen points

- Vertex presentation = Occiput (below posterior fontanelle and lamboidai sutures)
- Face presentation = Mentum (chin)
- Breech presentation = Sacrum

Position = relationship of denominator to front, back or sides of maternal pelvis

OA
ROA
ROT
ROP
LOA
LOT
ROP
LOP
Degrees of Internal Fetal Rotation

LONGITUDINAL LIE VERTEX PRESENTATION
LOA
LOP

A. Right occiput posterior (ROP) Right occiput transverse (ROT)

Longitudinal lie, Vertex presentation
Right occiput anterior (ROA).

Longitudinal lie. Face presentation. Left and right anterior and posterior positions.
Transverse lie. Right acromiodorsoposterior position (RADP). The shoulder of the fetus is to the mother’s right, and the back is posterior.

FREQUENCY OF VARIOUS PRESENTATIONS AT TERM

• Vertex 96%
  2/3 Lt
  1/3 Rt

• Breech 3.5%

• Face 0.3%

• Shoulder 0.4%

Station

• Refers to the relationship between the presenting part in imaginary lines defining the depth (in centimeters) into and through the pelvis
STATION

Fetal head at -1 station. 1 cm above the level of the ischial spines.

Station
relationship
of baby's
vertex (pres part)
to
maternal spines

Curve of Carus (Birth Canal Axis)

- The course taken by the presenting part is first down and backward from the inlet to the level of the ischial spines and the tip of sacrum and than forward and upward.
Synclitism

- At the inlet
  - Biparietal diameter of head parallel to plane of inlet
- Facilitates during labor...
  - Cardinal movements
  - Fetal descent

Asynclitism...Anterior

- Why:
  - Lax abdominal wall* 
  - Abnormal fetal positioning
- Sacral promontory
  - Impedes descent of fetal head
- Interventions

Asynclitism...Posterior

- Why?
  - Posterior presentation* 
  - Abnormal fetal positioning
- Pubis
  - Impedes descent of fetal head
- Interventions
(Synclitism/Asynclitism)

• Synclitism: When head enters the pelvis in transverse diameter the BPD 9.5 cm is parallel to the plane of the inlet and the sagittal sutures is midway between the S pubis and S promontory (normal)
• Asynclitism

The sagittal sutures of the head deflects anterior towards the symphysis pubis or posterior towards the sacrum

Posterior (Litzmann Obliquity) 8.75 cm (Normal also): Posterior parietal bone enters the pelvis first so sagittal suture is anterior and close to Symphysis (THIS is the most NORMAL!!!! And than head becomes synclitic as it moves down in pelvis)

Anterior Asynclitism (Nagele Obliquity) With lax Abd muscles, fetus falls forward and sagittal suture is close to promontory : Not Normal

Onset of Labor: LOA

Vaginal View

MECHANISM OF LABOUR WITH OCCIPUT PRESENTATIONS
THE CARDINAL MOVEMENTS OF LABOUR

1-ENGAGEMENT
The widest transverse diameter (BPD) passes through the pelvic inlet
It may occur in the last few weeks of pregnancy or only in labor especially in multipara
The fetus enters the pelvis in transverse or oblique diameter
• LOT ♦ 40%
• ROT ♦ 20%
• OP ♦ 20% ROP >LOP
• ROA / LOA ♦ 20%
Engagement

- Fetus usually engages with sagittal suture in transverse or oblique
- Floating: out of pelvis
- Dipping: Has passed through the inlet but not yet engaged
- Engaged: When the widest diameter of the presenting part has passed through the inlet. For most women unless a very deep pelvis this means the bony presenting part is close to or at the ischial spines
- Cephalic= BPD of 9.5
- Breech= Intertrocchanteric
- In primips=2-3 weeks before birth
- Multips often in labor

Dipping
THE CARDINAL MOVEMENTS OF LABOUR

-2 DESCENT
- In nullipara engagement takes place before the onset of labor & further descent may not occur till the 2nd stage
- In multipara descent begins with engagement
- It is gradually progressive till the fetus is born
- It is affected by the uterine contractions & thinning of the lower segment and maternal effort
THE CARDINAL MOVEMENTS OF LABOUR

- Flexion

- The descending head meets resistance of pelvic floor, walls of the pelvis and cervix (flexion)

- The shorter suboccipito-bregmatic is substituted for the longer occipito-frontal or other diameters (Military, brow)

Descent & Flexion... Engagement

**Inlet Plane**

**Vaginal View**

Lever action producing flexion of the head; conversion from occipitofrontal (military) to suboccipitobregmatic diameter typically reduces the anteroposterior diameter from nearly 12- to 9.5 cm.
Four degrees of head flexion. Indicated by the solid line the occipitomental diameter; the broken line connects the center of the anterior fontanel with posterior fontanel:

A. Flexion poor.
B. Flexion moderate.
C. Flexion advanced.
D. Flexion complete.

Note that with flexion complete the chin is on the chest, and the suboccipitobregmatic diameter, the shortest anteroposterior diameter of the fetal head, is passing through the pelvic inlet.

THE CARDINAL MOVEMENTS of LABOUR

• 4 Internal Rotation
  • Turning of the head from the LOT or LOA position anteriorly towards the symphysis pubis (OA) i.e. Occiput moves 45° from LOA to OA or 90° form LOT to OA
  • Less commonly LOA (135°) or LOT (90°) posterior towards the sacrum (OP)

• It is not accomplished till the head has reached the spine
  The levator ani muscles form a V shaped sling that tends to rotate the vertex anteriorly

• It is completed by the time the head reaches the pelvic floor 2/3 of time or shortly after (1/4th)

Internal Rotation

45° (LOA to OA)

Midplane

Vaginal View
**THE CARDINAL MOVEMENTS OF LABOUR**

- **5 Extension**
- When the flexed head reaches the vulva it undergoes extension; the base of the occiput will be in direct contact with the inferior margin of the symphysis pubis.
- **Crowning**; the largest diameter of the fetal head is encircled by the vulvar ring.
- The head is born by further extension as the occiput, bregma, forehead, nose, mouth & chin pass successively over the perineum.
- When head is born the shoulders are entering the pelvic inlet.

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**Internal Degrees of Rotation**

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**Extension** (Direct OA)

Outlet Plane

Vaginal View

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**Outlet Plane**
THE CARDINAL MOVEMENTS OF LABOUR

- Restitution:
  - After delivery of the head, it returns to the natural position relative to the shoulders (oblique position) so returns to LOA or ROA 45 degrees. Basically untwists the neck to align with the shoulders in oblique

THE CARDINAL MOVEMENTS OF LABOR

- External Rotation
  - Then the fetal body will rotate to bring one shoulder anterior behind the symphysis pubis (biacromial diameter into the A-P-D of the pelvic outlet)
  - When this occurs the occiput turns another 45 degrees to LOT or ROT
External Rotation
45° (LOA to LOT)

Vaginal View
45°

THE CARDINAL MOVEMENTS OF LABOR
• Birth of the Shoulders and Body By Lateral Flexion via the Curve of Carus
  • This occurs by lateral flexion via the curve of carus anterior shoulder first and posterior shoulder second

Eight LOA MECHANISM OF BIRTH
DESCRIPTION AND RATIONALE
• 1. Descent and Engagement:
  • VTX descends and engages Continues throughout
  • Rationale: Caused by downward pressure of uterine contractions and later by bearing down efforts and /or gravity (Powers)
• 2. Flexion:
  • Baby’s chin approaches its chest to change the presenting diameter from the occipito-frontal of 11.0 cm to the smaller rounder suboccipitobregmatic of 9.5 cm
  • Rationale:
    • Partial Flexion may exist before labor; resistance of the pelvic wall and floor to the descending vertex causes the increased flexion which promotes a better pelvic-cephalic fit.
Eight LOA MECHANISM OF BIRTH
DESCRIPTION AND RATIONALE

• Internal Rotation:
  • Upon contacting the pelvic floor the occiput rotates 45 degree from LOA to OA (note the shoulders remain in the left oblique).
  • Rationale:
    • The descending occiput is forced to turn as it passes down the transverse oval of the inlet into the anteroposterior oval of the midpelvis. This often occurs in the second stage of labor.

Eight LOA MECHANISM OF BIRTH
DESCRIPTION AND RATIONALE

• Extension:
  • The occiput in LOA position passes thru the outlet with the nape of the neck impinging and pivoting in the subpubic angle. The sinciput sweeps along the sacrum, the bregma, forehead, nose, mouth, and chin are born in succession over the perineum.
  • Rationale:
    • The continued downward pressure of the uterine contraction and the resistance of the pelvic floor causes the descending head to be born by extension.

Eight LOA MECHANISM OF BIRTH
DESCRIPTION AND RATIONALE

• Restitution:
  • The head turns back 45 Degrees from OA to LOA realigning itself with the shoulders.
  • Rationale:
    • Freed from the constraint of the pelvis, the head once born is able to return to its normal anatomic alignment.
Eight LOA MECHANISM OF BIRTH
DESCRIPTION AND RATIONALE

- **External Rotation:**
  - Externally the head rotates 45 degrees from LOA to LOT position; internally the descending bisacromial diameter of the shoulders rotates from left oblique to anteroposterior diameter of the pelvis.
  - **Rationale:**
    - The long diameter of the descending shoulders moving from the pelvic inlet must rotate in order to fit through the anteroposterior oval of the mid-pelvis; the rotation of the head is an outward manifestation of the internal rotation of the shoulders.

- **Birth of the shoulders by Lateral Flexion via Curve of Carus**
  - The anterior shoulder reaches the pelvic floor first and then rotates anteriorly pivoting under the symphysis and is born. The posterior shoulder slides over the perineum by a movement of lateral flexion also.
  - **Rationale:**
    - The uterine contractions and bearing down of the mother thru the curve of carus, which is only 4-5 cm long anteriorly and 10-15 cm long posteriorly causes the birth of the shoulders by lateral flexion.
  - **Expulsion of the Trunk and Extremities**
    - No special mechanism. Rationale: Maternal forcing down and gravity easily effect the delivery of the trunk and extremities.

- **OCCIPUT POSTERIOR POSITION**
  - Mechanism of labor is identical to OT & anterior varieties
  - The occiput rotates to the symphysis pubis through 135° instead of 90° or 45° (from LOP Or ROP) Long arc to OA
  - **Persistent OP**
    - If 135° rotation does not occur instead will do a 45° rotation from LOT to OP (short arc)
  - **Difference in Cardinal Movements** is that the head is born by flexion followed by extension
Pelvic Exam Terminology

- **Cervix**:
  - **Dilatation**: In centimeters, between & during contractions.
  - **Effacement**: Percent or length in centimeters.
  - **Position**: Midline, anterior, posterior.
  - **Consistency**: Soft, firm, rigid, easily stretched, edematous.
  - **Growth**: Nabothian cysts, fibroids, polyps.
  - **Shape of os**: Round, fishmouth.
  - **Structural**: Stenosis, double vagina and/or cervix.
  - **Abnormalities**:

**AMNIOTIC MEMBRANES**:

- **Absent**: Presenting part easily felt, i.e., scalp, hair, skin, extremity,
  - Leaking fluid observed.
  - Ferning positive for characteristic NaCl crystallization.
  - Nitrazine paper positive (alkaline).
- **Present**: Slick “wet balloon” sensation - nitrazine paper and ferning negative.
- **Depth**: Close to presenting part, bulging through os.

**Function of Amniotic Membranes**

- Serves as dilating wedge
- Equalizes pressure in the uterus
- Protects fetus, cord & placenta from extreme pressure produced by fundus
- Allows fetus to conduct/transfer heat produced through its mother
- Reduces the intensity of pain experienced by mother
- Cushions cervix against the presenting part
- Provides room for fetal growth and movement
- Allows fetal breathing activity
- Reduces caput
Nursing Actions for AROM/SROM

• Monitor fetal heart rate before, during, and after contraction.
• Observe color, amount, odor, and if any blood of amniotic fluid.
• Sterile vaginal exam:
  - If abnormal fetal heart rate to check for prolapsed cord.
  - If need to check dilatation.

Remember this starts the infection clock.

Pelvic Exam Terminology

- **PRESENTING PART**:
- Consistency: Hard, soft, caput.
- Regularity: Smooth, irregular.
- Cord: Absent, present pulsating, present not pulsating.
- Sagittal suture: Felt, not felt, overlapping bones
  - Direction: anterior-posterior, transverse, right or left oblique.
  - Synclitic, asynclitic (anterior, posterior).

Pelvic Exam Terminology

- Fontanels: Felt, not felt, (Anterior/Posterior)Size, Shape Location
- Application: Well applied, or are fingers easily inserted between presenting part and cervix.
- Station: ______ centimeters above or below the spine
  - (5, -4, 0, +4, +5)
  - The presenting part at the spine = 0 station.
- Engaged/Unengaged.
- Molding?
- Caput?
Pelvic Exam Terminology

- **FINAL IMPRESSION:**
  - Data obtained in a vaginal exam and note must include:
    - fetal presentation and position
    - dilatation
    - effacement
    - station
    - cervical position and consistency
    - membrane status

Pelvic Exam Terminology

- **How to write:**

  - Example: Vtx, LOT, cervix is 4 cm dilated/1cm long (or 50% effaced)/-1 station, midline, and soft with intact membranes.

  Example can be abbreviated to "VE = vtx/LOT/4cm/1cm or 50%/-1/ML/soft,IBOW".
FACTORS THAT EFFECT THE MECHANISMS OF LABOR AND BIRTH

- The P's
- 1. Passenger (fetus)
- 2. Passageway (pelvis, pelvic floor, abdominal support)
- 3. Powers (uterine contractions and maternal effort)
- 4. Positioning (Maternal)
- 5. Pain
- 6. Psyche
- 7. Partner
- 8. People (parents and family, health care providers, hospital personnel)

The First Stage of Labor
Maternal Physiologic Changes (worksheet)

<table>
<thead>
<tr>
<th>Physiologic Change</th>
<th>Significance</th>
</tr>
</thead>
</table>
| Blood Pressure | • ↑ during contractions  
- normal between contractions  
- pain, fear, apprehension may influence  
- check BP well between contractions  
- consider emotion as cause of increased BP |
| Metabolism | • ↑ in temperature, pulse, respirations, cardiac output and fluid loss  
- consider dehydration |
| Temperature | • slightly elevated throughout labor - highest during & immediately after labor  
- normal = elevation not to exceed 1-2 deg F; reflects increase in metabolism  
- a slightly elevated temperature may be normal. in prolonged labor, an elevated temperature may indicate dehydration. |
| Pulse (Cardiac Rate) | • marked increase of pulse during contractions  
- slight increase in cardiac rate between contractions  
- a slightly elevated pulse may be normal. possibly rule out infection. |
| Respirations | • slight increase in respiratory rate reflects increased metabolism  
- prolonged hyperventilation is abnormal & may result in alkalosis  
- difficult to obtain accurate findings re respiration related to fear, anxiety, and utilizing breathing techniques. observe breathing and avoid hyperventilation. |
| Renal Changes | • polyuria is frequent  
- slight proteinuria (trace, 1+) is common, >2+ is abnormal  
- frequently evaluate bladder distention and empty q 2 hr.  
- proteinuria more common in primips, anemia or prolonged labor. >2+ may indicate preeclampsia. |
| Gastrointestinal Changes | • gastric motility, absorption of solids and decrease in secretion of gastric juices severely reduced  
- liquids not affected  
- nausea & vomiting not uncommon  
- a full stomach may be uncomfortable. instruct to eat small meals and continue to drink fluids to maintain energy & hydration. PO meds are ineffective during labor. |
| Hematologic Changes | • hemoglobin increases avg 1.2 gm/100 mL during labor  
- blood coagulation time decreases, fibrinogen increase  
- WBC progressively increases to avg of 15,000  
- blood sugar decreases  
- decrease the risk of postpartum hemorrhage  
- consider anemia  
- consider antihypertensive for diabetes during labor. |

The First Stage of Labor
Maternal Physiologic Changes (cont)

<table>
<thead>
<tr>
<th>Physiologic Change</th>
<th>Significance</th>
</tr>
</thead>
</table>
| Respiration | • shortness of respiratory rate reflects increased ventilation  
- peripheral cyanosis (blue) in surgery, ± in abdomen  
- difficult to obtain accurate findings re respiration related to fear, anxiety, and utilizing breathing techniques. |
| Sexual Changes | • uterine contractions frequent  
- normal 1-2 in 15-30 min.  
- sexual activity during labor |
| Obstetric Changes | • slight increase in blood pressure, respiration, cardiac output and fluid loss  
- frequently evaluated bladder distention and empty q 2 hr  
- consider dehydration during labor |
| Hematologic Changes | • hematocrit increases avg 1-1.5 units/mL during labor  
- blood pressure decreases, blood pressure decreases,  
- WBC progression increases to avg of 15,000  
- blood sugar decreases  
- consider anemia  
- consider antihypertensive for diabetes during labor. |
### Signs & Symptoms of Impending Labor

- **Lightening**
- **Cervical Changes**
- **Premature Rupture of Membranes (ROM)**
  - Prior to the start of the 3rd stage of labor
  - Occurs in approximately 12% of women
  - 80% of near term women will begin labor within 24 hrs
- **Bloody Show** ~ “tenacious” blood-tinged mucus
  - Labor will usually happen in 24-48 hrs (if no exam)
- **Energy Spurt**
  - Usually occurs 24-48 prior to the onset of labor
- **Gastrointestinal Upset**
  - May experience nausea, vomiting, diarrhea, indigestion in absence of pathology

### False vs. True Labor

**False Labor**
- Regular contractions
- Decrease in frequency & intensity, longer intervals
- Pain in low abdomen & groin
- Activity has no effect on decreases contractions
- Disappear with sleep
- No appreciable change in cervical exam
- Sedation decreases or stops contractions
- Bloody show usually not present

**True Labor**
- Regular contractions
- Progressive frequency & intensity, closer intervals
- Pain starts in back, radiates to abdomen
- Activity increases pain with contractions
- Continues when sleeping
- Progressive dilation & effacement of cervix
- Sedation does not stop contractions
- Bloody show usually present

### Powers

- Two types:
  - Involuntary: uterine contractions
  - Voluntary: maternal effort

- Two ways to measure:
  - Externally by palpation
  - Internally with an Internal uterine pressure catheter (IUPC)
POWERS: Contraction
- Involuntary
- Intermittent
- Painful
- Hypoxia of contracted muscle (like angina)
- Compression of nerve ganglia in cervix & LUS by interlocking muscle bundles
- Stretching of the cervix
- Stretching of the peritoneum overlying the fundus

Uterine Powers
- Perimetrium
  - Outer serous peritoneal layer
- Myometrium *
  - 3 sets of muscle layers
    - outer, middle**, & inner
- Endometrium *
  - 3 functional layers

Anatomy
- Myometrium
  - Consists of muscle layers separated by a vascular zone
  - Form web that supports & protects the developing fetus
  - Normally contracts spontaneously
    - Intrinsic ability that is suppressed during pregnancy and enhanced during labor
  - 2 basic properties: contractility & elasticity
    - Contractility – ability to lengthen & shorten
    - Elasticity – ability to grow & stretch to accommodate enlarging uterus
Layers of Myometrium

Myometrium Function

- **Labor** *Middle* Muscle Layer
  - Contracts & retracts
  - Expels baby, then placenta
- **Third stage** **CRITICAL**
  - Kinks & constricts blood vessels
  - Controls postpartum hemorrhage

Remember…

Myometrium*/ Endometrium

- Arterial arteries
  - CRITICAL
  - Veins
- Basal arteries
  - Coronal arteries
Normal Gradient Pattern of Contractions

- Synchronous activity of the uterus causing contraction to be stronger/longer in fundus, decreasing in mid portion & minimal in cervix
  - ESSENTIAL for DILATATION
- Triple descending gradient
  - Propagation of the wave is from top downward (tubo-uterine junction→LUS)
  - Duration of contraction diminishes progressively as the wave from pacemaker decreases
    - Upper segment in action for longer period than lower segment
    - Intensity of contraction diminishes from top to bottom of uterus
      - Upper segment contracts more strongly than lower

Power: Frequency & Duration, Strength

- Frequency
  - From beginning of contraction to beginning of the next contraction
- Duration
  - From beginning of contraction to end of the same contraction
### Power: Strength of Contractions (Palpation)

<table>
<thead>
<tr>
<th>Quality</th>
<th>Description</th>
<th>Indentability of Uterus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>chin</td>
<td>Easily indentable</td>
</tr>
<tr>
<td>Moderate</td>
<td>nose</td>
<td>Moderately indentable</td>
</tr>
<tr>
<td>Strong</td>
<td>forehead</td>
<td>Not indentable</td>
</tr>
</tbody>
</table>

### Strength of Contractions (Internal)

- Measure via an Internal Uterine Pressure Catheter (most invasive)
- Measure via Montivedeo Units

- **** Mom and HCP can begin to feel uc’s about 15 mmHg

### Montevideo Units (MVU) with I UPC to assess effectiveness of UC’s

- Take the amplitude of the contraction minus the baseline tonus amplitude and sum the total rise of all uc’s in a ten minute time period
- 200 to 250 MVU’s is considered adequate contraction strength
Cervical Dilatation

- Enlargement of external cervical os
- Direct result of uterine contractions
  - Indirect result of membranes or presenting part exerting pressure on cervix or lower uterine segment
  - Hydrostatic action of the amniotic fluid provide the most effective dilating wedge
- Clinically evaluated by measuring the diameter of the cervical opening in centimeters
  - Closed external os = 0 cm
  - Complete dilatation = 10 cm

Cervical Effacement

- Direct result of uterine contractions
- Indirect result of membranes or presenting part exerting pressure on cervix or lower uterine segment
- Hydrostatic action of the amniotic membranes acts as a wedge to assist in cervical canal dilation
- Shortening of cervix from usual length (2-3 cm) to where the cervical canal is obliterated leaving only the external os as a circular orifice with thin edges
  - Results from lengthening of muscle fibers around internal os as they are taken up into the lower uterine segment
- Facilitated by & is cause of mucus plug expulsion
  - Clinically evaluated in terms of percentages
    - No effacement = 0%
    - Full effacement = 100%

The Stages of Labor

- Prelabor = Latent
  - Prior to the onset of labor when the uterus is preparing for true labor
- First Stage –
  - From the onset of regular uterine contractions until full dilatation of the cervical os
    - Transition = the latter part of the first stage
    - The stage of “cervical effacement & dilatation”
- Second Stage –
  - From full dilatation of the cervical os until birth of the baby
    - The stage of “expulsion of baby”
- Third Stage –
  - From the birth of the baby until the expulsion of the placenta and membranes
    - The stage of “separation and expulsion of placenta”
- Fourth Stage –
  - Early hours after birth during recovery
The First Stage of Labor
The Latent Phase

- Difficulties in Measuring Length of Phase
  1. Difficulty of differential diagnosis between latent phase and false labor
  2. The inability to objectively quantify the start of latent phase and having to rely on the woman’s perception of “regular” contractions
  3. Variations between women on cervical ripeness at the onset of labor

The First Stage of Labor
The Latent Phase

- "The period from the beginning of labor to the point when dilatation begins to progress actively"
  - Contractions
    - Become established as they increase in frequency, duration and intensity
    - Generally q 10-20 min, lasting 15-20 sec with mild intensity → q 5-7 min, lasting 30-40 sec with moderate intensity
  - Dilatation
    - Usually flat with positive effacement & only slight dilation
  - Descent
    - Little to no descent

The First Stage of Labor
Dilatation during the Active Phase

- Dilatation slope inclines steeply, ending at 10 cm and is divided into 3 phases
  - Accelerated
    - Starts the active phase of labor
  - Phase of Maximum Slope
    - Cervical dilatation occurring most rapidly & increasing from 3-4 cm to 8 cm
    - Slope of this phase inversely related to total duration of the 1st stage of labor → the greater the slope, the shorter the labor
  - Deceleration (or transitional phase)
    - Cervical dilatation slows just before 10 cm
    - Most descent occurs here – reflects feto-pelvic relationship
    - Cervix dilatation stops and begins retracting around presenting part
The First Stage of Labor
The Active Phase

- "The period from the start of active progression of dilatation to the completion of dilatation" (includes transitional phase)
  - Usually from 3-4 cm (or end of latent phase) to 10 cm dilation (or end of first stage of labor) ZHANG states 6 cm is the end of latent phase
  - Contractions
    - Become increasingly frequent, longer duration and greater intensity
    - Early active labor contractions are usually q 2-3 min lasting 40-60 sec with moderate-hard intensity
    - Late active labor contractions are usually q 2-3 min lasting 50-70 sec with hard intensity
  - Descent
    - Progressive descent occurs during the latter part of the active phase (deceleration) and during second stage
    - Descent is linear
    - Cardinal movements of labor occur here

Average & Upper Limit Length of Normal Active Labor for Nulliparas (OLD)

<table>
<thead>
<tr>
<th>Author</th>
<th>Mean (hours)</th>
<th>Upper Limit* (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friedman (1956; 1967)</td>
<td>4.9</td>
<td>11.7</td>
</tr>
<tr>
<td>Kilpatrick and Lars (1989)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(measured from regular, painful contractions q 3-5 min by history to 10 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- No conduction anesthesia</td>
<td>8.1</td>
<td>15.0</td>
</tr>
<tr>
<td>- With conduction anesthesiaa</td>
<td>10.2</td>
<td>19.0</td>
</tr>
<tr>
<td>Albers, Schff, and Gorwode (1996)</td>
<td>7.7</td>
<td>19.4</td>
</tr>
<tr>
<td>Albers (1999)</td>
<td>7.7</td>
<td>17.5</td>
</tr>
</tbody>
</table>

- aMean plus two standard deviations (95th percentile)
- bConduction anesthesia: 95% epidural; 5% saddle blocks

Average & Upper Limit Length of Normal Active Labor for Multiparas (OLD)

<table>
<thead>
<tr>
<th>Author</th>
<th>Mean (hours)</th>
<th>Upper Limit* (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friedman (1956; 1967)</td>
<td>2.2</td>
<td>5.2</td>
</tr>
<tr>
<td>Kilpatrick and Lars (1989)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(measured from regular, painful contractions q 3-5 min by history to 10 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- No conduction anesthesia</td>
<td>5.7</td>
<td>12.5</td>
</tr>
<tr>
<td>- With conduction anesthesiab</td>
<td>7.4</td>
<td>14.9</td>
</tr>
<tr>
<td>Albers, Schff, and Gorwode (1996)</td>
<td>5.7</td>
<td>13.7</td>
</tr>
<tr>
<td>Albers (1999)</td>
<td>5.6</td>
<td>13.8</td>
</tr>
</tbody>
</table>

- bMean plus two standard deviations (95th percentile)
- bConduction anesthesia: 95% epidural; 5% saddle blocks
Friedman’s Length of Normal Labor Stages (WHO CARES?)

<table>
<thead>
<tr>
<th>Stage of Labor</th>
<th>Nulliparas (in hours)</th>
<th>Multiparas (in hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Stage (Latent Phase)</td>
<td>Average Length 6-8.6</td>
<td>4.8 – 5.3</td>
</tr>
<tr>
<td></td>
<td>Limit 20</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Ideal 5</td>
<td>2</td>
</tr>
<tr>
<td>First Stage (Active Phase)</td>
<td>Average Length 4.5 – 5</td>
<td>2 – 2.4</td>
</tr>
<tr>
<td></td>
<td>Limit 11</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Ideal 3.5</td>
<td>2</td>
</tr>
<tr>
<td>Second Stage</td>
<td>Average Length 1.1</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>Limit 2.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Rate of Dilation</td>
<td>Average = 3 cm/hr</td>
<td>Minimum rate = 1.2 cm/hr</td>
</tr>
<tr>
<td></td>
<td>Minimum rate = 1.5 cm/hr</td>
<td></td>
</tr>
<tr>
<td>Rate of Descent</td>
<td>Average = 5.4 cm/hr</td>
<td>Minimum rate = 2.1 cm/hr</td>
</tr>
</tbody>
</table>

The Friedman Curve

- Preparatory division
  - Latent phase
  - Acceleration phase
- Dilatational division
  - Maximum slope phase
- Pelvic division
  - Deceleration phase (transition)
  - Second stage (pushing)
  - 10 centimeters - birth
  - Composed of three phases, as well
Functional Divisions Defined

• Preparatory division
  — Maternal aspect
  — Fetal aspect

• Dilatational division (OLD data)
  — Rate is narrowly defined between 4 to 8 centimeters
    • Nullips rate = 1.2 centimeters/hour
    • Multips rate = 1.5 centimeters/hour

• Pelvic division
  — Majority of cardinal movements & descent

---

Friedman’s Functional Curve

• Based on 2 factors
  — Cervical dilation
  — Fetal descent

• Over 3 Divisions
  — Preparatory
  — Dilatational
  — Pelvic

• Progress in terms of
  — Cervical changes, fetal progress through the cardinal movements and descent

---

Friedman’s Traditional Curve

• Based on one factor
  — Cervical dilation

• Over 2 stages
  — Stage 1
    • Latent phase
    • Active phase
  — Stage 2 (pushing)

• Progress in terms of
  — Dilation: narrowly defined as:
    • Nullips 1.2/hour
    • Multips 1.5/hour
    • OLD DATA
1/25/2017

Power: Traditional Pattern Guidelines
(Stages I & II)

<table>
<thead>
<tr>
<th>Labor Stage</th>
<th>Length (hrs)</th>
<th>Cervix (cms)</th>
<th>UC Freq (min)</th>
<th>UC Durat (secs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I: early aka: latent</td>
<td>5 to 9</td>
<td>0 to 3</td>
<td>5 to 20</td>
<td>&lt; 30 to 45</td>
</tr>
<tr>
<td>I: active</td>
<td>2 to 5</td>
<td>4 to 7</td>
<td>3 to 5</td>
<td>45 to 60</td>
</tr>
<tr>
<td>I: transition</td>
<td>0.5 to 1.5</td>
<td>8 to 10</td>
<td>2 to 3</td>
<td>60 to 90</td>
</tr>
<tr>
<td>II: Pushing</td>
<td>0.5 to 3*</td>
<td>10 to birth</td>
<td>3 to 5</td>
<td>60</td>
</tr>
</tbody>
</table>

Summary
First Stage of Labor
Cheng 2008
- Modern population WILL exhibit labor characteristics different from Friedman
  - increased BMI's
  - Epidurals
  - Better studies with more accuracy and diversity
- Protracted labor: oxytocin augment
- Active labor arrest
  - extend “2 hour minimum”
  - 4 hours with adequate UCs

Historical & Current Labor Curves Compared
Zhang et al 2002
Friedman Curve’s Methodological Challenges (Vahratian et al 2006)

- Statistical analysis technique primitive
- Sample unable to be generalized
- Very homogenous

Zhang vs Friedman (Vahratian et al 2006)

- Refined measurement technique
- Applied modern statistical analysis
- Examined covariant differences

Zhang’s 2002 Conclusions

- Diagnostic criteria for protraction / arrest disorders are too stringent for nullips
- Profound impact on decision for cesarean delivery
Zhang et al 2010

- N=62,415 laboring women in 19 hospitals in the U.S.
- 6 cm is the NEW 4 cm
- Labor may take more than 6 hours to progress from 4 to 5 cm
- Labor may take more than 3 hours to progress from 5 to 6 cm.
- 2nd stage with or without CLE was 3.6 for nullip and 2.8 for multip at 95th percentile

Zhang et al 2010

- Nullips and Multips appeared to progress at a similar pace up to 6 cm after 6 cm multips progress faster
- SO………....
- Progress from 4 to 6 cm is slower than previously thought
- Waiting for progress may reduce C/S rate

Maternal Pushing Overview: POWER

- Duration
  - Few minutes to 3 hours
  - Parity
  - Anesthesia
- 3 phases
  - Latent
  - Accelerated
  - Transition
- Based on descent only
The Second Stage of Labor

- **Phase I, the lull (latent)**
  - From complete dilatation until the urge to bear down or the onset of frequent, rhythmic bearing-down efforts
  - Contractions space out, then intensify up to 1 hr

- **Phase II, active bearing down (accelerated)**
  - From the onset of rhythmic bearing-down efforts or the urge to push until the presenting part no longer retreats between bearing-down efforts (crowning)
  - Contractions q 2 min lasting 60-90 sec, strong & expulsive

- **Phase III, perineal**
  - From crowning of the presenting part until the birth of the entire body

*Three Phases of Stage II: Maternal Pushing*

**Power**

- Overall time
  - Few minutes to 3 plus hours
  - Parity dependent
  - Anesthesia dependent

- **Phases**
  - Latent: up to 30 minutes
  - Accelerated & transition
    - Variable up to birth
  - Based on descent
    - Of fetal head over time

**Maternal Anatomy: Perineal Pushing (Stage II)**
Pelvic Floor Function at Birth

Control of the presenting part Crowning

Physiological Aspects of Pushing

- Maternal considerations
  - Cervix & vagina
  - Pulmonary
  - Cardiovascular
  - HOW to push
  - Maternal posture *

- Fetal considerations
  - WHEN to push
    - Descent to at least +1 station
    - Facilitates maternal reflex urge to push
      - Ferguson’s Reflex

Transverse Cervical Ligament

(*Beynon 1957)

- Premature onset of maternal pushing efforts
  - Ligament damage
  - Possible uterine prolapse
    - (Sze et al 1999)
Stress on Anterior Vaginal Wall
(*Beynon 1957)

- A
  - Pushing late in contraction only with maternal urge (reflex)

- B
  - Pushing from the onset of the contraction
  - Contributing to uterine prolapse

Maternal Consideration

Consequences of Pushing when complete and no other indicators

- Fatigue
- Lumbo sacral spine and lower extremity nerve damage
- Pelvic floor dysfunction (Incontinence)
- Perineal trauma
- Pelvic muscle denervation injury

Valsalva Fetal Problems

Hypoxia \[\rightarrow\] Acidosis
Valsalva Maternal Problems

- Reduced Venous return
- Reduced Cardiac output
- Reduced perfusion of oxygenated blood to uterus
- Reduced oxygenated blood to fetus

Valsalva Fetal problems

- Reduced flow of oxygenated blood
- Late decels or variables with prolonged return to baseline
- Reduced oxygenation
- Acidosis at birth
- Apgar less than 7 at birth
It is more than just 10 centimeters

- Consider:
  - Dilatation
  - Position
  - Stage
  - Station
How NOT to Push
Closed Glottis

“Take a deep breath, hold it...PUSH!!!!”

Increased maternal thoracic pressure causes increased abdominal pressures leading to...

FETAL
ACIDOSIS

How TO Push
Open Glottis

— When: during peak of contraction

— How:
- From resting pulmonary level, not deep breath
  - Remember: less thoracic pressure >>>>>>less abdominal pressure >>>GOOD
- Duration: no more than 5 to 6 seconds at a time
- Frequency: up to three attempts

Utilizes physiological maternal bearing down efforts

Caldeyro-Barcia
1975
When to Push?

- After latent phase of traditional Stage II
  - Complete cervical dilation
  - At least +1 station of fetal head
    - May take up to 30 minutes
  - Provides for establishment of maternal reflex urge (Ferguson’s reflex)

- During peak of uterine contraction

The Ferguson reflex is the name given to the neuroendocrine reflex comprising the self-sustaining cycle of uterine contractions initiated by pressure at the cervix or vaginal walls. It is an example of positive feedback in biology.
Labor and Birth Hormones!!!!! The Good Stuff!!!!!

- Beta endorphins: pleasure and pain relief, opiate like feelings
- Catecholamines: excitement
- NATURAL Oxytocin: labor and love, increases Beta endorphin release, involution, increases mom’s skin temperature to keep baby warm, skin to skin contact increases oxytocin release
- Prolactin: mother instinct and milk. Decreases stress, increases milk production, epidurals decrease release

Psyche

- Dependent on:
- Fears or positive attitudes based on:
- Beliefs passed down from female relatives
- Childbirth media issues
- Belief in self
- Prior childbirth experiences good or PTSD or?
- Childbirth preparation (none, Bradley, Lamaze, hypno-birthing, birthing from within etc.)
Pysche

• Also dependent on:
  • Partner/significant other
  • People (people) like who, Nurse, MD, CNM, Doula, Family, admit clerk etc.

Position and Posture

• Can decrease pain/increase comfort
• Facilitate gravity
• Change pelvic diameters
• Help in cardinal movements
• Facilitate descent

Positions and CHANGES
Position
• www.mayoclinic.com/health/labor/PR00141
• Slide show: Labor positions - MayoClinic.com
• www.mayoclinic.com/health/labor/PR00141

• PAIN
Coping Measures

- Some women want to experience childbirth as a natural process and without the use of medication. Other women may use natural methods to ease discomfort early in labor and then add epidural, narcotic pain relievers or nitrous oxide in the later stages of labor.

Nitrous Oxide

- 50% O2 and 50% nitrous
- Mother must self administer
- Need to start right at the beginning of a contraction as it has a 15 second lag time
- No known fetal side effects
- Quick and short acting
There are many drug-free methods for reducing the pain and stress of labor and delivery. These methods may:

- Help your body release its own natural pain relievers (such as endorphins, which are proteins that help relieve pain)
- Distract you from the pain of childbirth
- Sooth and relax you as you go into labor
Breathing Techniques

- This is one of the most familiar techniques for natural pain relief during childbirth. It involves steady, rhythmic breathing to help your body relax while distracting you from labor pain. Breathing techniques can also:
  - Lower feelings of nausea or dizziness during childbirth
  - Bring more oxygen to your body and baby
  - These techniques work best if they’re practiced before childbirth. Some breathing techniques, such as Lamaze, are taught during childbirth education classes. You can also use breathing techniques alongside other kinds of natural pain relief.

Hot or Cold Therapy

- Using heat or cold may be another helpful way to cope with labor pain. You can choose to use one or the other, or use heat and cold in combination. Using a hot compress can help you relax and ease muscle tension. A warm blanket can also be helpful if you find yourself having chills or shakiness. A cold washcloth on your forehead may help you to cool down and ease some tension. Sucking on ice chips can also help cool you off. Placing ice packs on your lower back can help ease your back pain.

Water Therapy

- For some women, a warm bath or shower temporarily reduces labor discomfort. Many hospitals have showers in their labor rooms, and others may offer soaking tubs for women in labor. The feeling of warm water on your skin can help you relax and soothe some of the discomforts of labor. It’s important to keep the water temperature around body temperature (98-100 degrees F) to prevent fever in the mother and the baby.
• **Relaxation Techniques**
These methods help you to release the tension and pain you may feel in areas of your body. By relaxing, you give your body the opportunity to work naturally while saving your energy for when you need it most. Instead of fighting the pain, which may create more tension, relaxation techniques help you to deal with labor pain by letting it come and go naturally.

• There are two kinds of relaxation techniques:
  - **Progressive relaxation:** You relax groups of muscles one at a time during labor.
  - **Touch relaxation:** Your labor coach touches or massages a certain group of muscles, helping you to focus your relaxation.

• Using relaxation techniques takes some practice. Try these helpful tips as you learn to use relaxation techniques:

**Relaxation techniques**

• Pick a quiet space.
• Stand, sit or lie in a comfortable position.
• Breathe slowly and deeply.
• Focus on the areas of your body where you feel the most tension and try to relax them.
Massage

- Massages can be particularly helpful in easing pain during labor. You can do some massages yourself by gently rubbing your belly during contractions. You can also have your partner or labor coach give you a massage to stimulate your body’s natural release of pain relief. Massages can help soothe your muscles and block pain. Some women find that using counter-pressure (having a partner push hard on a tense muscle) on an area like the lower back can relieve tension for a good amount of time.

Guided Imagery

- Also called daydreaming with a purpose, guided imagery involves picturing yourself in a comfortable, relaxing setting. This imaginary place can be your favorite park, the beach or a fantasy land. The point is to let your mind wander to that relaxing place as you feel labor pain. Some helpful tips for using guided imagery include:
  - Focusing on the details of this comfortable setting (the air, the smell, the sound, etc.)
  - Letting your body relax as your mind takes you to your imaginary place
  - Playing some soft music or other sounds that can help you feel like you’re really there

Meditation

- This technique helps you to manage pain by focusing on a certain object, picture or sound. You can even meditate with your eyes closed. By concentrating on a focal point you can help your mind think about something other than the pain.

  Try these helpful tips for meditation:
  - Use a picture or image in your mind to focus on.
  - You can also try focusing on a certain word and repeating it over and over to yourself.
  - Don’t worry if you become distracted. Just try bringing your mind back to that focal point.
Positioning

• Changing positions during labor may give you comfort by helping to improve your circulation. Sitting in an upright position may increase comfort and speed contractions in early labor. Squatting may help you later on. Some women find sitting on a birthing ball (a large rubber ball) to be helpful. Women who have a backache may find that getting on their hands and knees can ease discomfort. Others might find rocking back and forth to be soothing.

A Support Person

• A support person or doula
  A support person who stays with you throughout labor and delivery can improve your level of comfort. Many women count on their partners for emotional support and for help with breathing and relaxation techniques they learned in childbirth education classes.

Partner

• Are they prepared?
• How much do they want to participate in labor and birth?
• Do HCP’s let them make decisions together
• Do you let them work together or are YOU the nurse in control??
People/Personnel

• What is your attitude about childbirth?
• Who is in control of the birth?
• What is your attitude about pain?
• Hospital procedures and policies vs patient...how do you make everyone happy??