



# INDUCTION OF LABOR

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# LABOR

Uterine contractions:

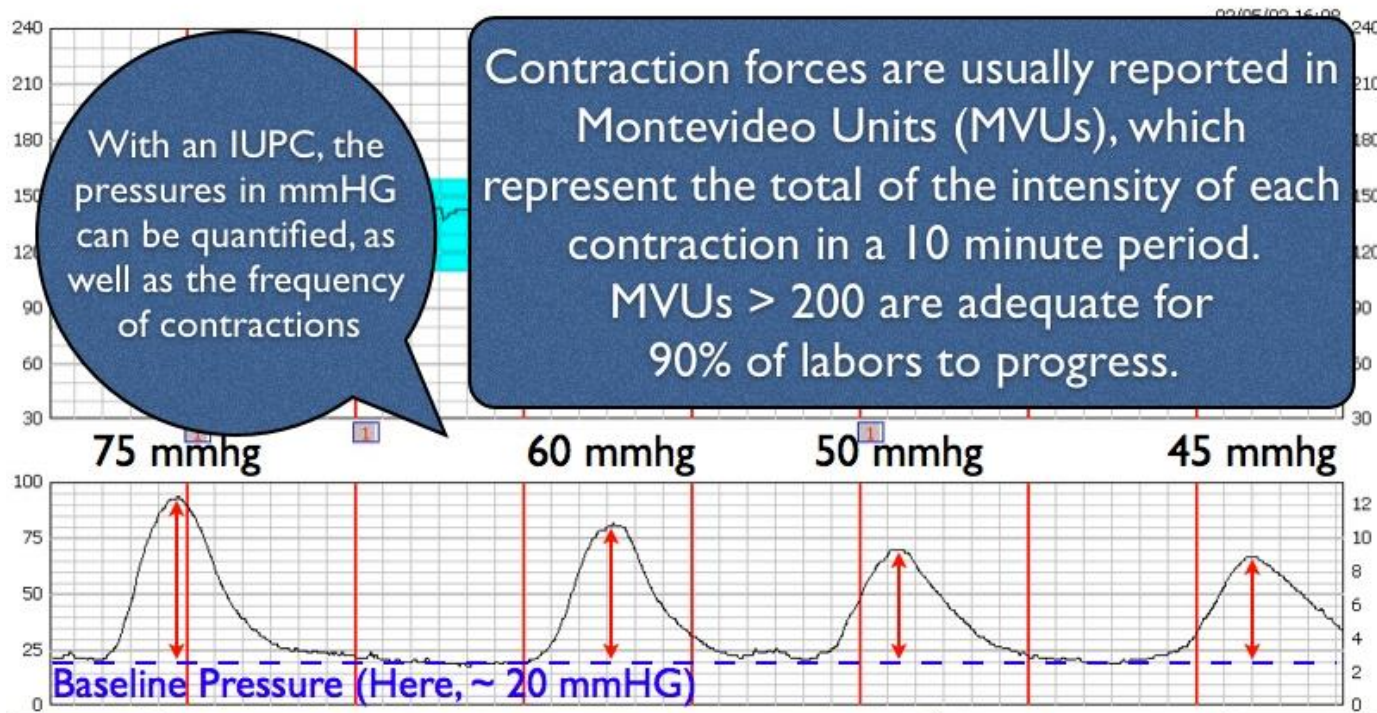
- To dilate cervix
- To push the fetus through the birth canal
- Success will depend on the three P's:
- Powers
- Passenger
- Passage

## POWER – UTERINE CONTRACTIONS

- Power refers to the force generated by the contraction of the uterine myometrium
- Activity can be assessed by the simple observation by the mother, palpation of the fundus, or external tocodynamometry.
- Contraction force can also be measured by direct measurement of intrauterine pressure catheter (IUPC) adequate when  $> 200$  MVU

# POWER

## Calculating MVUs



$$75+60+50+45=230 \text{ MVUs}$$

(Note that the baseline pressure was subtracted from each reading)

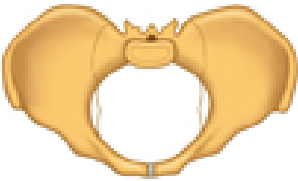
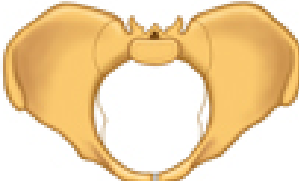
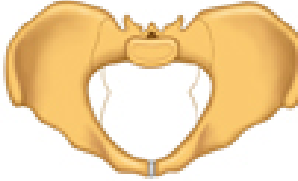
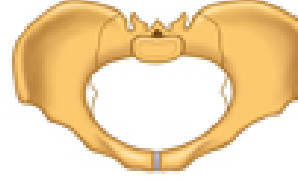
## PASSENGER – FETUS

- Fetal size
- Fetal lie – longitudinal, transverse or oblique
- Fetal presentation – vertex, breech, compound (vertex and hand), and funic (umbilical cord)
- Attitude – degree of flexion or extension of the fetal head
- Position – OA or OP
- Station – degree of descent of the presenting part based on ischial spines
- Number of fetuses

## PASSAGE – PELVIS

- Consists of the bony pelvis and soft tissues of the birth canal (cervix, pelvic floor musculature)
- Small pelvic outlet can result in cephalopelvic disproportion
- Bony pelvis can be measured by pelvimetry

## Pelvimetry

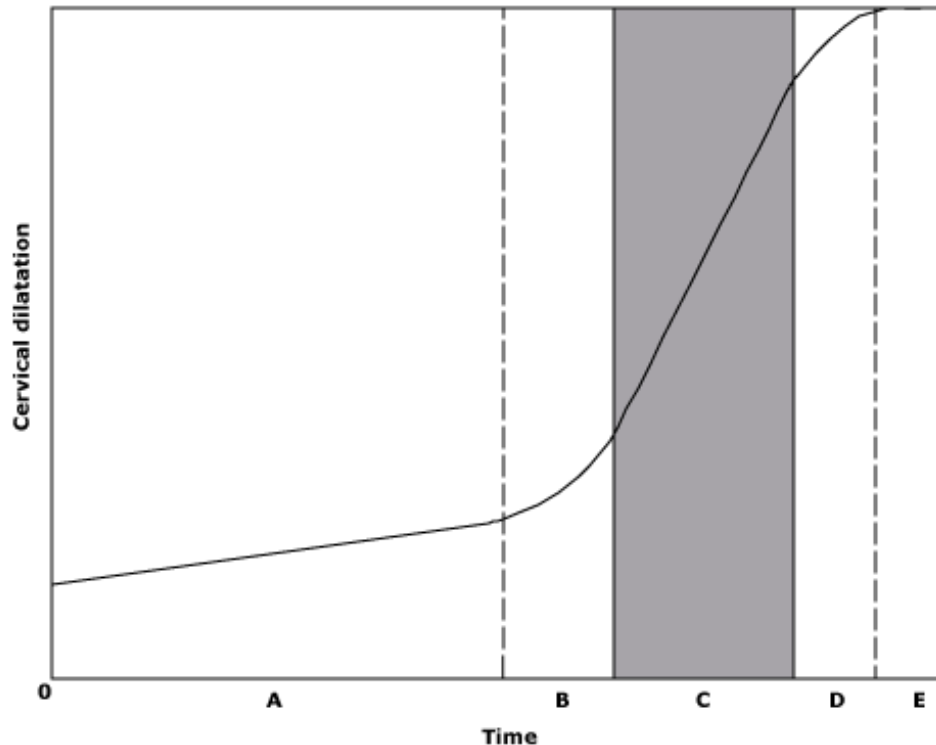
	Gynecoid	Anthropoid	Android	Platypelloid
				
Pelvic inlet Transverse diameter		Narrow		
AP diameter		Wide		Narrow
Forepelvis	Wide	Divergent	Narrow	Straight
Pelvic midcavity Side walls	Straight	Narrow	Convergent	Wide
Inclination of sacrum		Wide	Forward	Narrow
Pelvic outlet Subpubic arch	Wide		Narrow	Wide

# THE STAGES OF LABOR- FIRST STAGE

- Interval between the onset of labor and full cervical dilation
- Two phases:
- Latent phase – onset of labor with slow cervical dilation to ~6 cm
- Active phase – faster rate of cervical change, 1-1.2 cm /hour, regular uterine contractions



# THE LABOR CURVE



- First stage - A: latent phase; B + C + D: active phase E: second stage. Adapted from: Friedman. Labor: Clinical evaluation and management, 2nd ed, Appleton, New York 1978.

# THE STAGES OF LABOR- FIRST STAGE

- Definition of Arrest of Labor in the First Stage – active > 6 cm
- 4 hours or more of adequate contractions (>200 Montevideo units)
- 6 hours or more of inadequate contractions and no cervical change

## LABOR – SECOND STAGE

- Interval between full cervical dilation to delivery of the infant.
- Maximum duration is 2 hours for multips and 3 hrs for nulips.

## LABOR – THIRD STAGE

- The time from fetal delivery to delivery of the placenta
- Three signs of placental separation:
  - Lengthening of umbilical cord
  - Gush of blood
  - Fundus becomes globular and more anteverted against abdominal hand

## LABOR – THIRD STAGE

- Placenta is delivered using one hand on umbilical cord with gentle downward traction. Other hand suprapubic.
- Risk factor for aggressive traction is uterine inversion.
- Obstetrical emergency!!
- Normal duration between 0-30 minutes

## LABOR – FOURTH STAGE

- Refers to the time from delivery of the placenta to 1 hour immediately postpartum
- Blood pressure, uterine blood loss and pulse rate must be monitor closely ~ 15 minutes
- High risk for postpartum hemorrhage from:
  - Uterine atony, retained placental fragments, unrepaired lacerations of vagina, cervix or perineum.

# CARDINAL MOVEMENTS OF LABOR

- Refers to changes in the fetal head position during its passage through the canal.

- Engagement
- Descent
- Flexion
- Internal rotation
- Extension
- External rotation/restitution
- Expulsion



A Before engagement



B Engagement, flexion, descent



C Descent, rotation



D Complete rotation, early extension



E Complete extension



F Restitution



G Anterior shoulder delivery



H Posterior shoulder delivery

# CARDINAL MOVEMENTS OF LABOR

## **Engagement**

- Passage of the widest diameter fetal presenting part below the plane of the pelvic inlet
- The head is said to be engaged if the leading edge is at the level of the ischial spines.



# CARDINAL MOVEMENTS OF LABOR

## **Descent**

- Refers to the downward passage of the presenting part through the bony pelvis

# CARDINAL MOVEMENTS OF LABOR

## Flexion

- Occurs passively as the head descends due to the shape of the bony pelvis.
- Complete flexion places the fetal head in optimal smallest diameter to fit through the pelvis

# CARDINAL MOVEMENTS OF LABOR

## **Internal Rotation**

- Rotation of the fetal head from occiput transverse to occiput either in anterior or posterior position
- Occurs passively due to the shape of the bony pelvis

# CARDINAL MOVEMENTS OF LABOR

## **Extension**

- Occurs when the fetus has descended to the level of the vaginal introitus
- When occiput is just past the level of the symphysis, the angle of the birth canal changes to upward position

# CARDINAL MOVEMENTS OF LABOR

## **External Rotation/Restitution**

- As the head is delivered, it rotates back to its original position prior to internal rotation

# CARDINAL MOVEMENTS OF LABOR

## **Expulsion**

- Delivery of the fetus
- Downward traction allows release of the shoulder and the fetus is delivered.

# IN SUMMARY

- Know the different stages of labor
- Know the labor curve
- Know the cardinal movements of labor
- Know the causes of postpartum hemorrhage
- The remaining talk regarding induction of labor, indications for and contraindications, agents used for induction of labor, management of induction, fetal heart tracings.

# INDUCTION OF LABOR

- 22% of all gravid women undergo induction of labor in the United States
- Goal induction of labor is to achieve vaginal delivery by stimulating uterine contractions before the spontaneous onset of labor



# INDUCTION OF LABOR - INDICATIONS

- Chorioamnionitis
- Gestational hypertension
- Preeclampsia, eclampsia
- Premature rupture of membranes
- Post term pregnancy (Post term –  $\geq 42+0$  weeks of gestation, late term –  $41+0$  to  $41+6$  weeks of gestation)
- Maternal medical conditions (diabetes mellitus, renal disease, chronic pulmonary disease, chronic hypertension, antiphospholipid syndrome)
- Fetal compromise (severe fetal growth restriction, oligohydramnios)
- Elective at 39 weeks

# INDUCTION OF LABOR - CONTRAINDICATIONS

- Vasa previa or complete placenta previa
- Malpresentation
- Umbilical cord prolapse
- Previous classical cesarean delivery
- Active genital herpes infection
- Previous myomectomy entering the endometrial cavity

# WHAT TO DO PRIOR TO STARTING INDUCTION

- Accurate gestational age
- Counsel patient - indications for induction, the agents and methods of labor stimulation, and the possible need for cesarean delivery.
- Confirm presentation
- Recent weight of infant
- Calculate bischop score

# BISHOP SCORE

- Higher score a more favorable cervix for induction
- If score is  $\leq 6$  then need cervical ripening
  - mechanical or prostaglandin method to soften cervix
  - prostaglandin E1 - PGE1 or prostaglandin E2 - PGE<sub>2</sub>
- Score  $\geq 8$  follow spontaneous labor

## Bishop scoring system

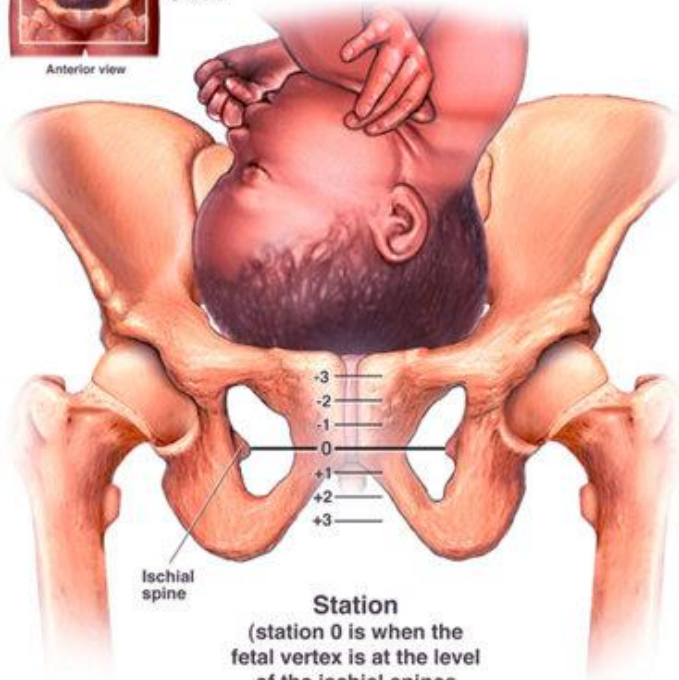
	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
Dilation, cm	Closed	1 to 2	3 to 4	≥5 to 6
Effacement, %	0 to 30	40 to 50	60 to 70	≥80
Station*	-3	-2	-1, 0	+1, +2
Cervical consistency	Firm	Medium	Soft	
Position of the cervix	Posterior	Midposition	Anterior	

\* Based on a -3 to +3 scale.



Area shown

Anterior view



Ischial spine

**Station**

(station 0 is when the fetal vertex is at the level of the ischial spines)

## Cervical Dilation

- a visual guide -

Cheerios

1 cm

Slice of Banana

3 cm

Cracker

4 cm

Soda Can

7 cm

Bagel

10 cm



**0% Effaced**



**50% Effaced**



**100% Effaced**

# METHODS OF INDUCTION

- Non medical methods
- Mechanical methods
- Pharmacological methods

# NON-MEDICAL

- Stripping membranes – releases phospholipase  $A_2$  activity and prostaglandin  $F_{2\alpha}$  ( $PGF_{2\alpha}$ )
- Sex – prostaglandins in semen
- Nipple stimulation
- Amniotomy

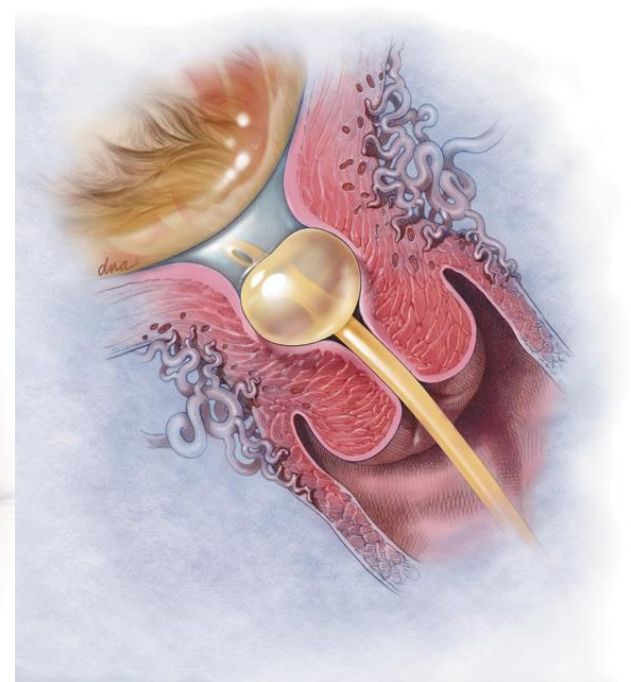


# AMNIOTOMY

- Risk of cord prolapse
- Fetal head must be well applied and know station of fetal head
- Done with small hook or spinal needle

# MECHANICAL

- Balloon placement – cook catheter or foley catheter
- Can use used with oxytocin or misoprostol
- Expelled when ~4 cm or removed after 12 hours



# PHARMACOLOGICAL METHODS

- Prostaglandin E1 - PGE1 (misoprostol - cytotec)
- Oral, vaginal, and sublingual
- 25 mcg every 4 hours maximum of 6 doses\*\*
- Risk of tachysystole
- Side effects fevers, chills, diarrhea
- Should not be used in patients with previous cesarean section due to risk of uterine rupture
- Do not use if having regular contraction (greater than 2 per 10 mins)

# PHARMACOLOGICAL METHODS

- Prostaglandin E2 – PGE<sub>2</sub>
- 10 mg dinoprostone (cervidil)
- Small tampon placed in vaginal fornix near cervix
- Last for 12 hours

# PHARMACOLOGICAL METHODS

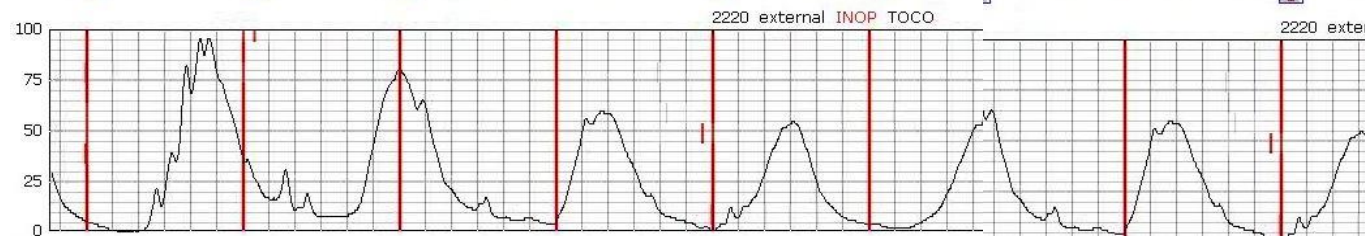
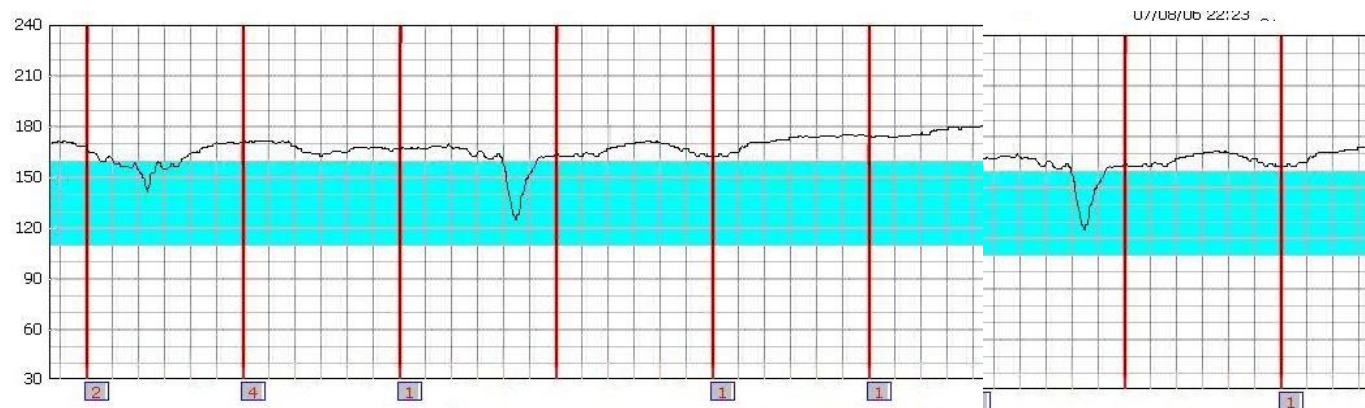
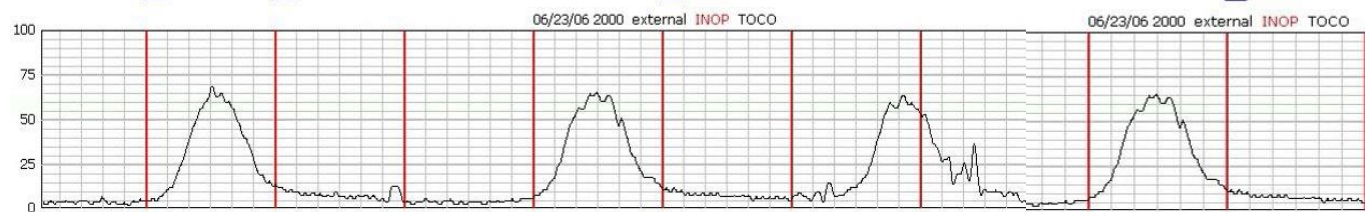
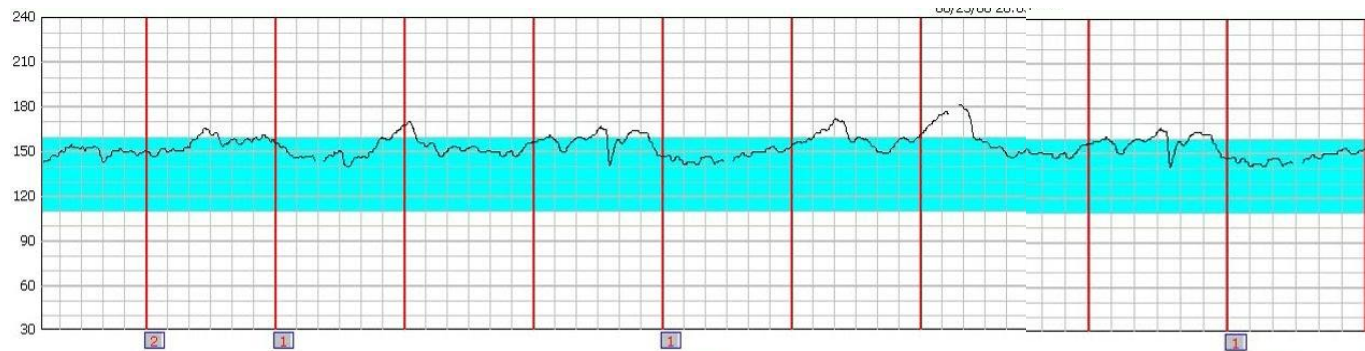
- Synthetic Oxytocin – Pitocin
- Most common agent used
- Start at 2 mU/min increase every 30 minutes to maximum of 30 mU/min

# MANAGEMENT OF INDUCTION

- Document fetal heart rate every 4 hours and uterine contractions in latent labor.
- Document fetal heart rate every 2 hours and uterine contractions in active labor.
- Irregular labor patterns or contraction patterns.

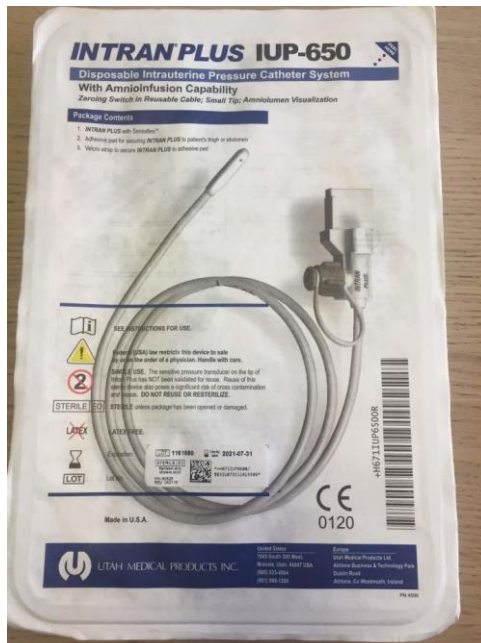
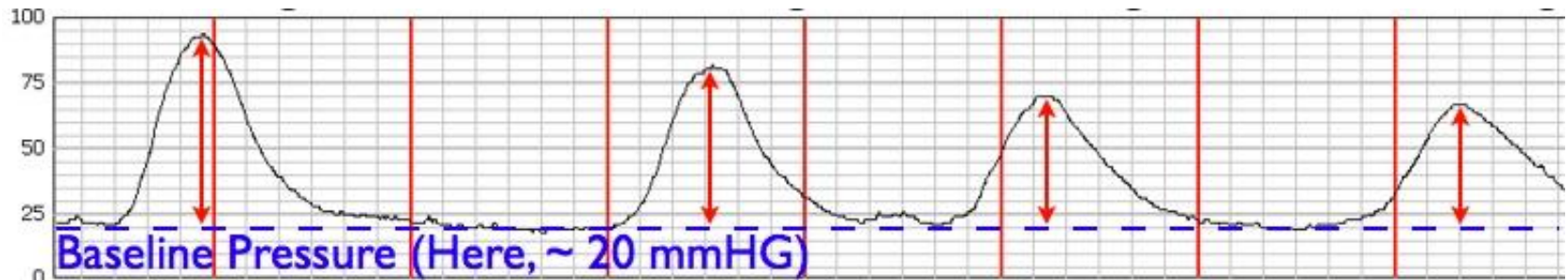
# MANAGEMENT OF CONTRACTIONS

- Normal: Five contractions or less in 10 minutes – contraction every 2-3 minutes
- *Tachysystole*: More than five contractions in 10 minutes
  - Decrease oxytocin
  - Give fluid bolus
  - Can cause category II tracing - fetal hypoxemia and acidemia
  - Rarely can cause uterine rupture





# DOCUMENT – STRENGTH OF CONTRACTIONS – ONLY WITH AN IUPC



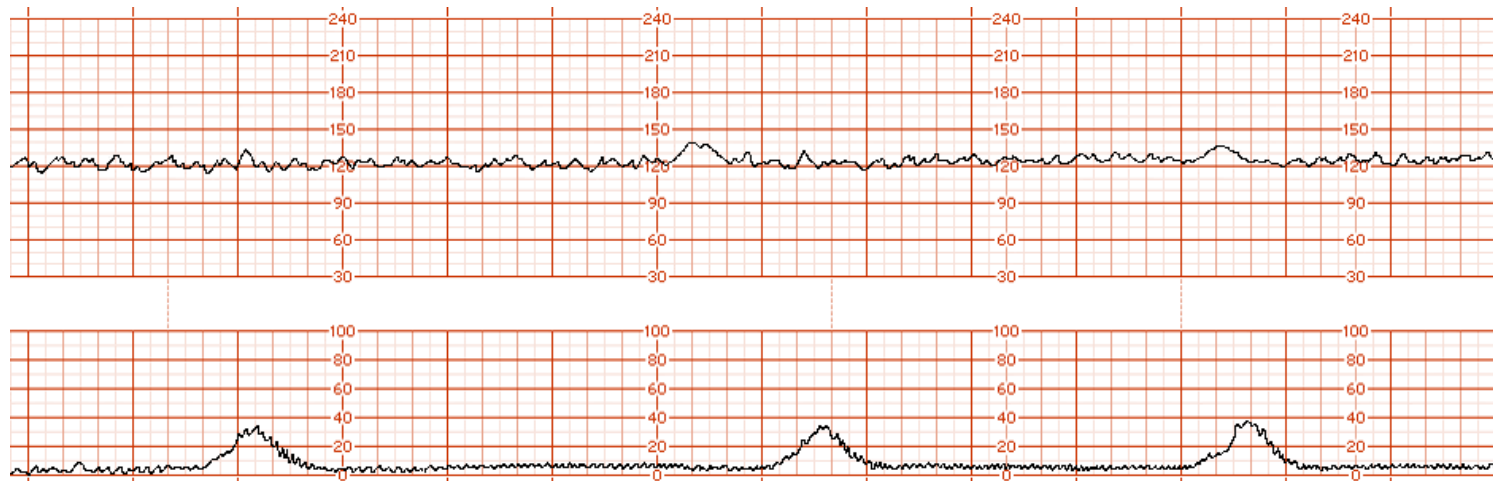
# INDUCTION OF LABOR – FETAL HEART TRACINGS

- Fetal brain modulates the fetal heart rate through an interplay of sympathetic and parasympathetic forces.
- (FHR) monitoring can be used to determine if a fetus is well oxygenated
- Looking for signs of fetal acidemia and adverse neonatal outcomes
- Can be performed externally or internally (fetal scalp electrode)



# READING A FETAL HEART TRACING BASELINE

- Baseline normal: between 110 and 160 bpm
- Tachycardia:  $> 160$  bpm
- Bradycardia:  $< 110$  bpm



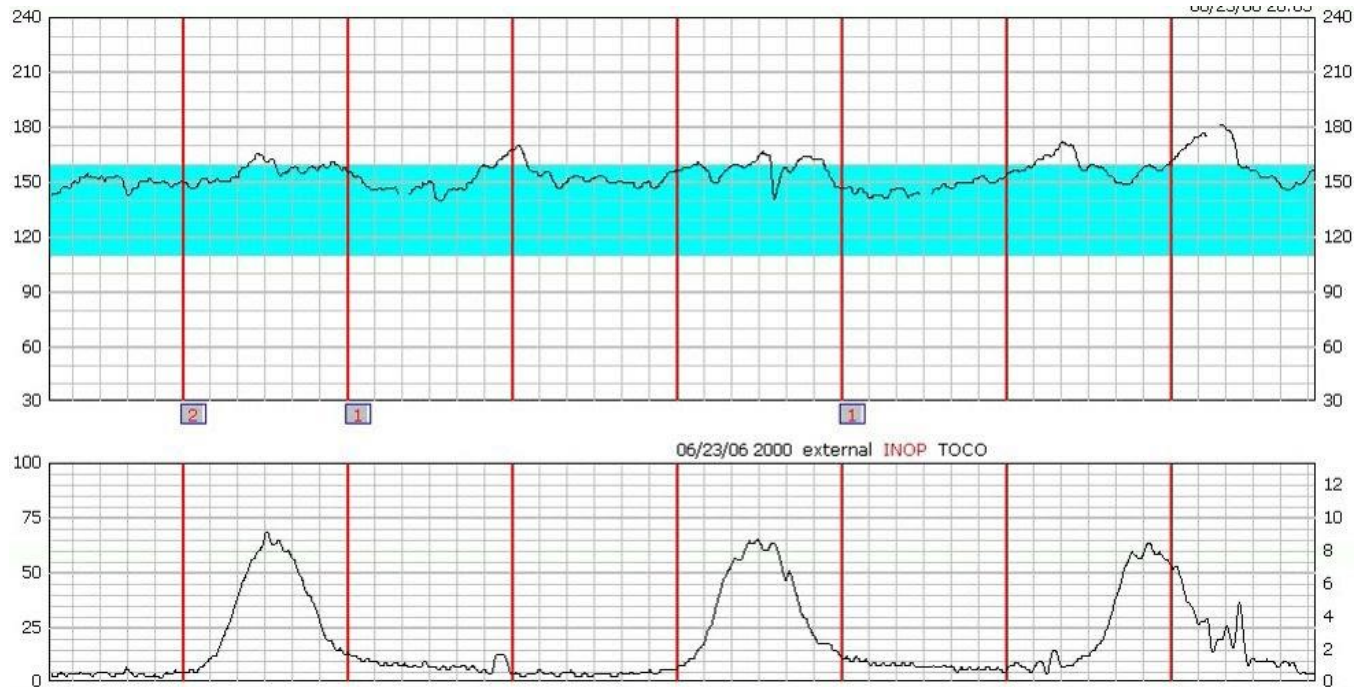
# VARIABILITY

- Counted as the peak to trough amplitude in bpm
- Absent: no amplitude. Tracing looks “flat”
- Minimal: amplitude < 5 bpm
- Moderate: amplitude is 6-25 bpm
- Marked: amplitude > 25 bpm



# ACCELERATIONS

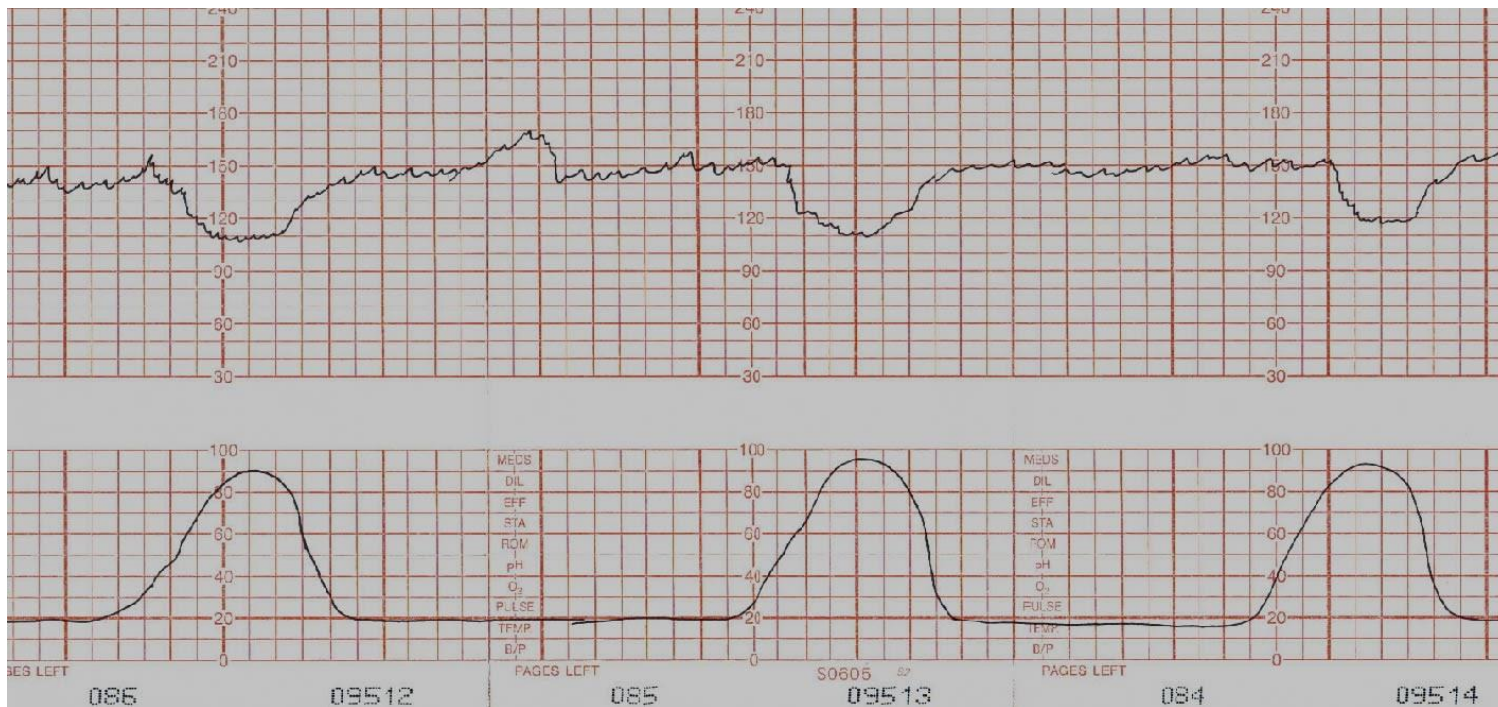
- These are GOOD!! Healthy variations in HR and are reassuring
- < 32 weeks: 10 x10 rule
- > 32 weeks: 15 x 15 rule





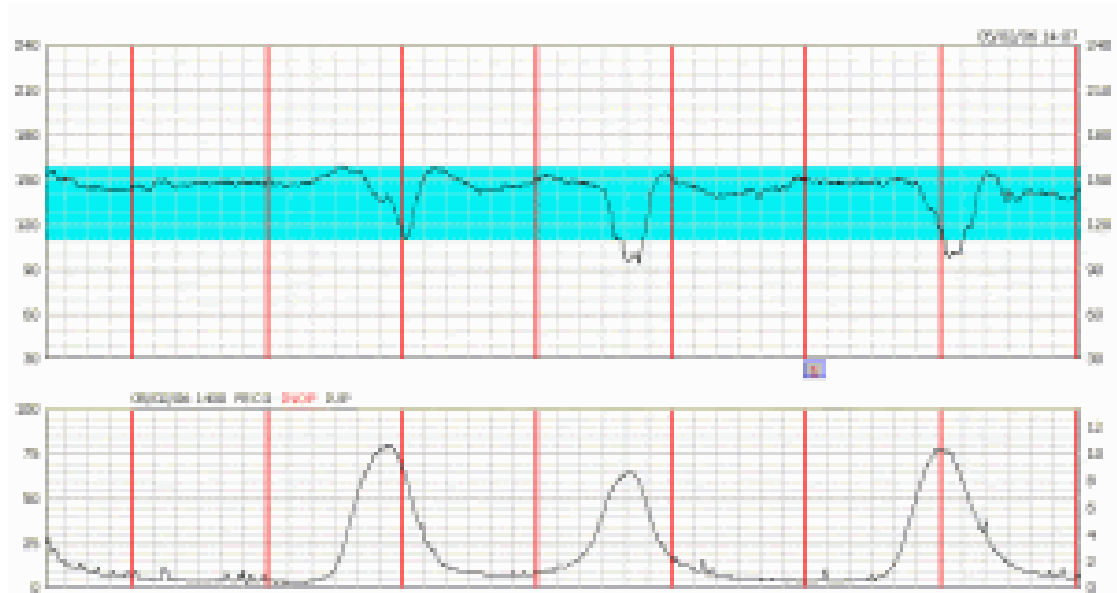
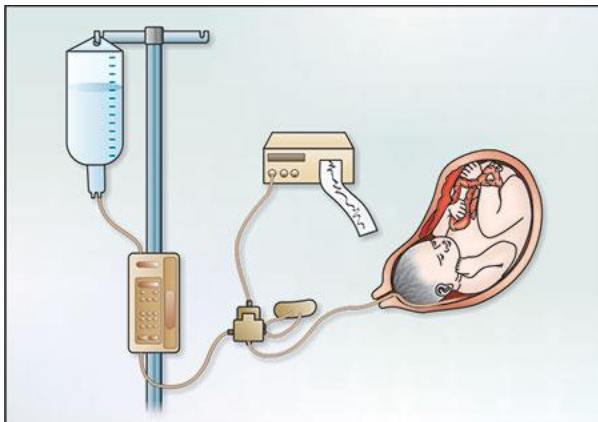
# EARLY DECELERATIONS

- Gradual decrease in FHR, from onset to nadir that is more than 30 seconds
- The decrease in FHR mirrors the rise and fall of the ongoing contraction
- Head compression



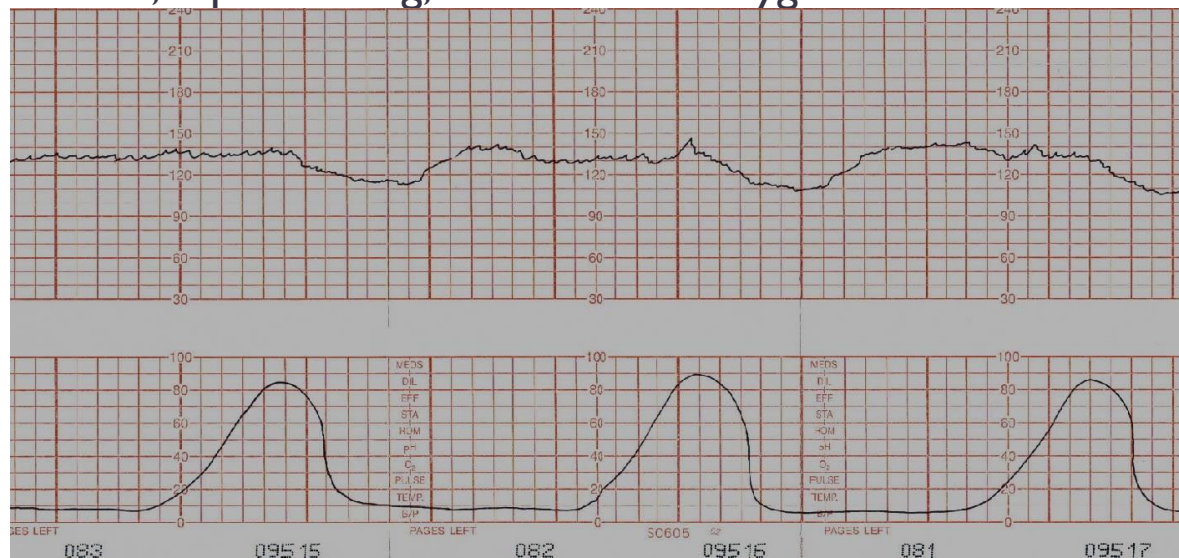
# VARIABLE DECELERATIONS

- Characterized by abrupt, sharp drop in FHR
- From start to nadir <30 seconds
- 15 bpm or more, for > 15 seconds but less than 2 minutes
- Cord compression
- TREAT AMNIOINFUSION



# LATE DECELERATIONS

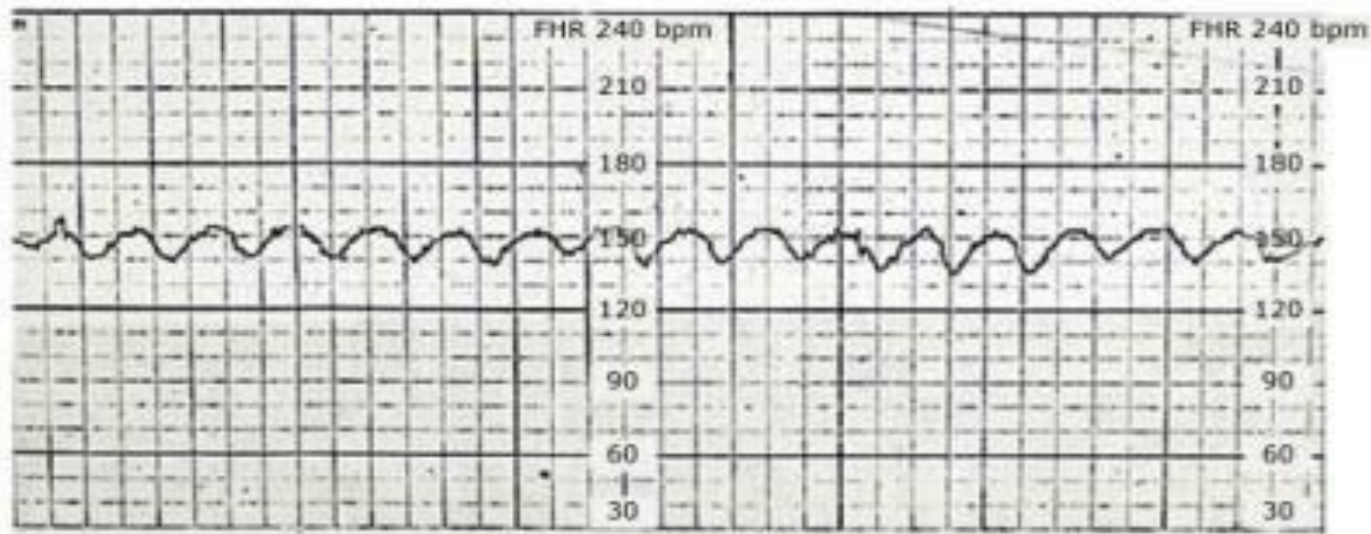
- Gradual decrease in FHR, from onset to nadir that is more than 30 seconds
- Decrease in FHR is delayed and the nadir occurs after the peak of the contraction
- Uteroplacental insufficiency
  - Causes include maternal hypotension (post-epidural), uterine tachysystole, maternal hypoxia
- TREAT – fluids, repositioning, and maternal oxygen





# SINUSODAL

- Fetal anemia, hypoxia, or acidosis
- VERY ominous



## CATEGORY II TRACING DURING INDUCTION OF LABOR

- Decrease or turn off oxytocin
- Maternal repositioning – to improve fetal placenta flow
- Fluid bolus- increase intravascular maternal volume and improve maternal BP
- Oxygen supplementation
- If persistent then consider cesarean section due to concern for fetal oxygenation

# REVIEW

- Know why we do induction of labors
- BISHOP score and when cervical ripening is needed
- Mechanical and pharmacological methods
- How to read a FHT and uterine frequency and strength
- When fetal heart tracing is worrisome and what to do

# CASE

- 31 yo G3P2002 is 39w3d here for elective IOL
- Cervical exam is 4/60/-2, soft, and mid position
- What is her bishop score?
- What method should we pick for her IOL?

# CASE

- 4 = 2 points
- 60 = 2 points
- -2 = 1 point
- Medium = 1 point
- Mid-position = 1 point

**Bishop scoring system**

	0	1	2	3
Dilation, cm	Closed	1 to 2	3 to 4	≥5 to 6
Effacement, %	0 to 30	40 to 50	60 to 70	≥80
Station*	-3	-2	-1, 0	+1, +2
Cervical consistency	Firm	Medium	Soft	
Position of the cervix	Posterior	Midposition	Anterior	

\* Based on a -3 to +3 scale.

- Total – 7 points
- She does not need cervical ripening can start IOL with Pitocin
  - Remember only need cervical ripening if bishop score is < 6

## CASE

- 24 yo G1P0 with gestational hypertension here for IOL at 37w0. Her cervix is 1/50/-3, posterior, and medium.
- What is her BISHOP score?
- What should we use for her IOL?

# CASE

- 1 = 1 points
- 50 = 1 point
- -3 = 0 point
- Medium = 1 point
- Posterior = 0 point

Bishop score = 3 points

Needs cervical ripening:

Foley + Pitocin

Foley + misoprostol

Misoprostol alone

Cervidil

## Bishop scoring system

	0	1	2	3
Dilation, cm	Closed	1 to 2	3 to 4	≥5 to 6
Effacement, %	0 to 30	40 to 50	60 to 70	≥80
Station*	-3	-2	-1, 0	+1, +2
Cervical consistency	Firm	Medium	Soft	
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\* Based on a -3 to +3 scale.



ANY QUESTIONS?