Mechanisms and Management of Labor

Dr Zahra Javanbakht

Definition of Labor

- Labor is the physiologic process by which the fetus is expelled from the uterus to the outside world
- Could also be described as the transition from “contractures” to “contractions”
- *Bottom line defination: Contractions with cervical change. The diagnosis is a clinical one.*

Gabbe: Obstetrics Normal and Problem pregnancies 4th edition

Full term pregnancy is 280 days (40 weeks) or 36 completed weeks.

Post term pregnancy is beyond 42 weeks

SROM is seen in about 8% of patients

Labor Physiology

Labor is contractions with cervical change

The fetus is in control of the timing of labor

The factors responsible for initiating labor are not well-defined…likely an autocrine and/or paracrine event.

We do know there is some endocrine maternal/fetal cross talk (eg horses and donkeys indicate that fetal genotype is a factor—365 vs 340 days)

Gabbe: Obstetrics Normal and Problem pregnancies 4th edition

Labor Mechanics

For a successful vaginal delivery, the fetus must negotiate the maternal pelvis.

Three factors: the power, the passage, and the passenger.

Labor Mechanics

- The passenger

  Estimating fetal size: ultrasound, leopolds, what does mom think?

  How big is too big? Definition of macrosomia is

  diabetics: 4500g non-diabetics: 5000g

Labor Mechanics

- Power

  Assessing amplitude, duration, and intensity of ctx

  internal IUPC vs external toco

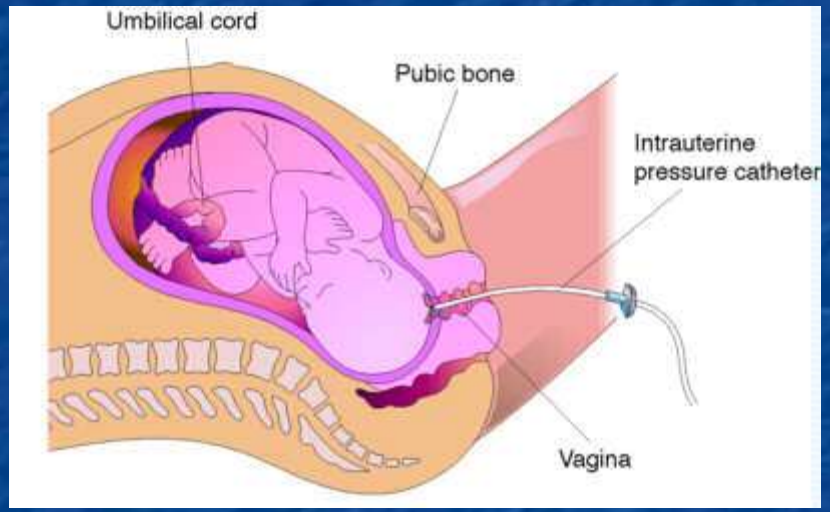
  What's adequate contractions? (ultimately it is a clinical dx)

  3-5 ctx in 10 min

  7 ctx in 15 min

  250 MVU's – the average strength of ctx in mm Hg multiplied by the number of contractions in 10 minutes. No real data support an absolute number of ctx or MVU's to be adequate…adequacy is still a clinical determination.

  If ctx are adequate either the cervix will dilate or the caput will become worse.


Umbilical cord
Pubic bone
Intrauterine
pressure catheter
Vagina

Labor Mechanics

- The most precise way of determining uterine contractions are adequate is with internal monitoring by IUPC
- External monitoring measures the change in shape of the abdominal wall relative to contractions thus is qualitative rather than quantitative. Does allow for accurate correlation between fetal heart rate and contraction pattern .

Labor Mechanics

- The passenger

Fetal lie: Fetal position relative to the maternal spine. longitudinal, oblique, transverse

Presentation: refers to the fetal part that is above the pelvic inlet. (eg a fetus can have a logitudinal lie but be breech or cephalic)

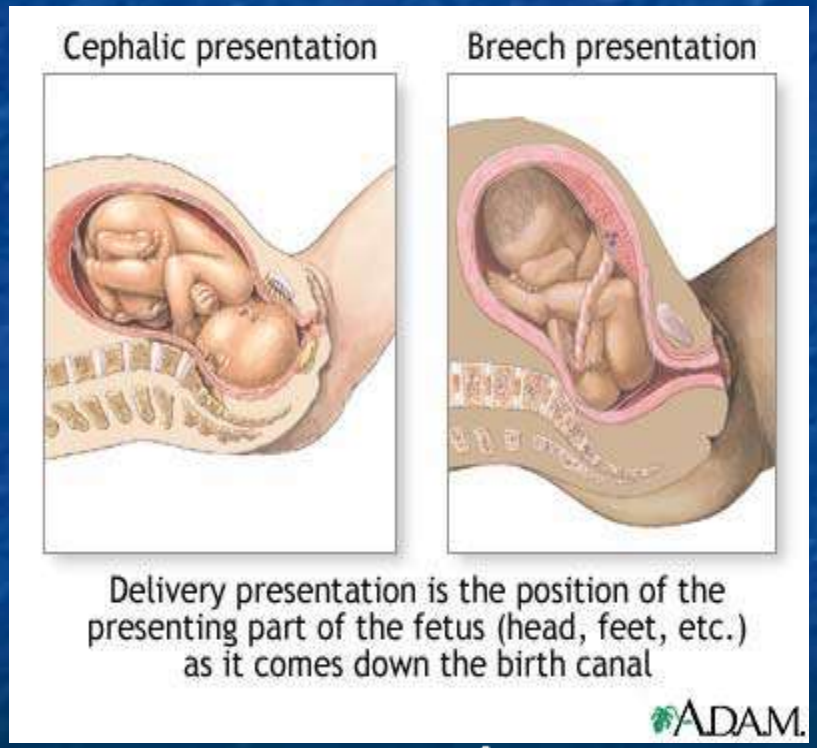
Attitude: refers to position of fetal head relative to the fetal spine

Position: referes to the relationship of a nominated site of the presenting part to a denomintating location in the internal pelvis. Eg. Occiput/sacrum ROA, RSA

Station: a measure of descent of the presenting part.

Abnormalilty of any of these variables can influence whether or not to proceed with a vaginal delivery.

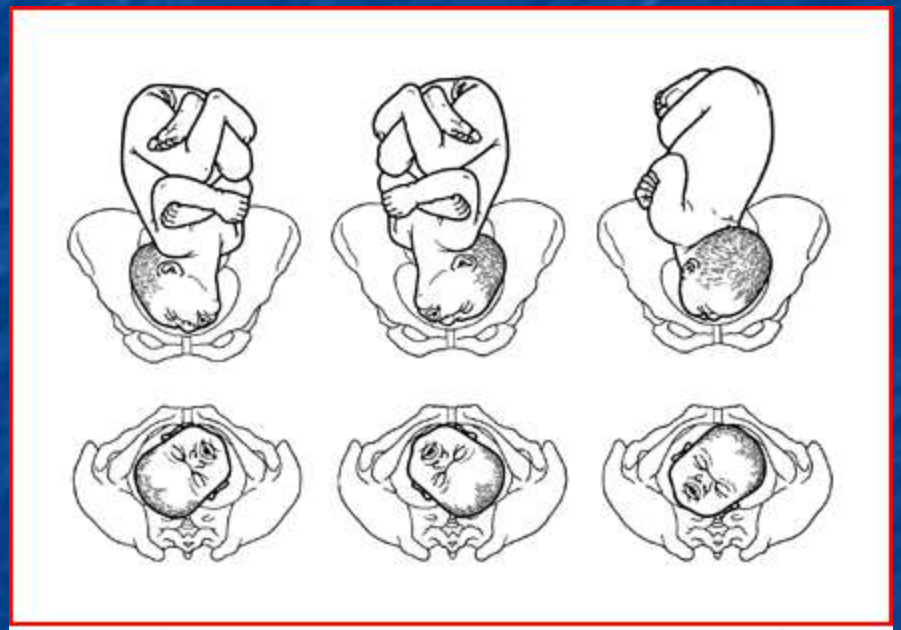
Fetal presentation: Fetal part directly over the pelvic inlet; eg breech, cephalic, compound, funic



Labor Mechanics

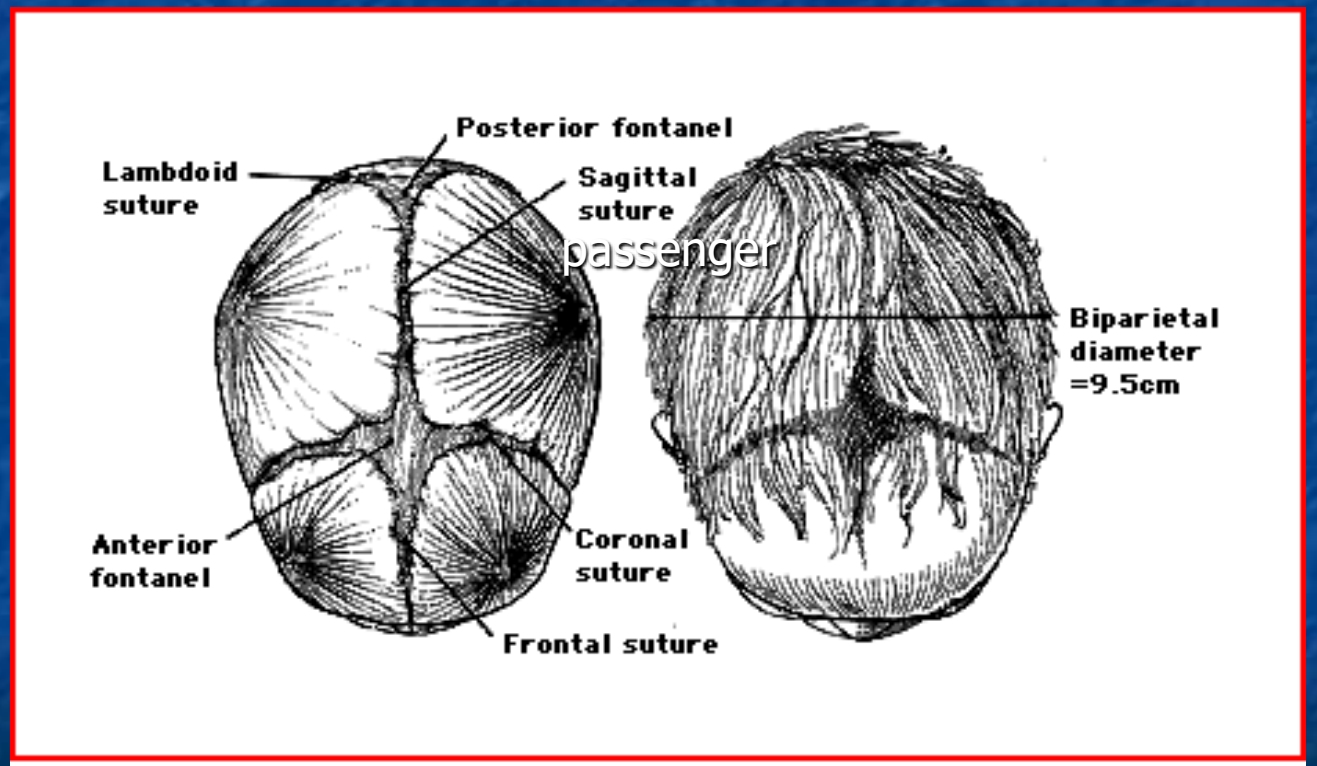
- The passenger

  Malpresentation is any presentation that is not cephalic with occiput leading. (about 5%) Multifetal pregnancies increase the risk of malpresetnation

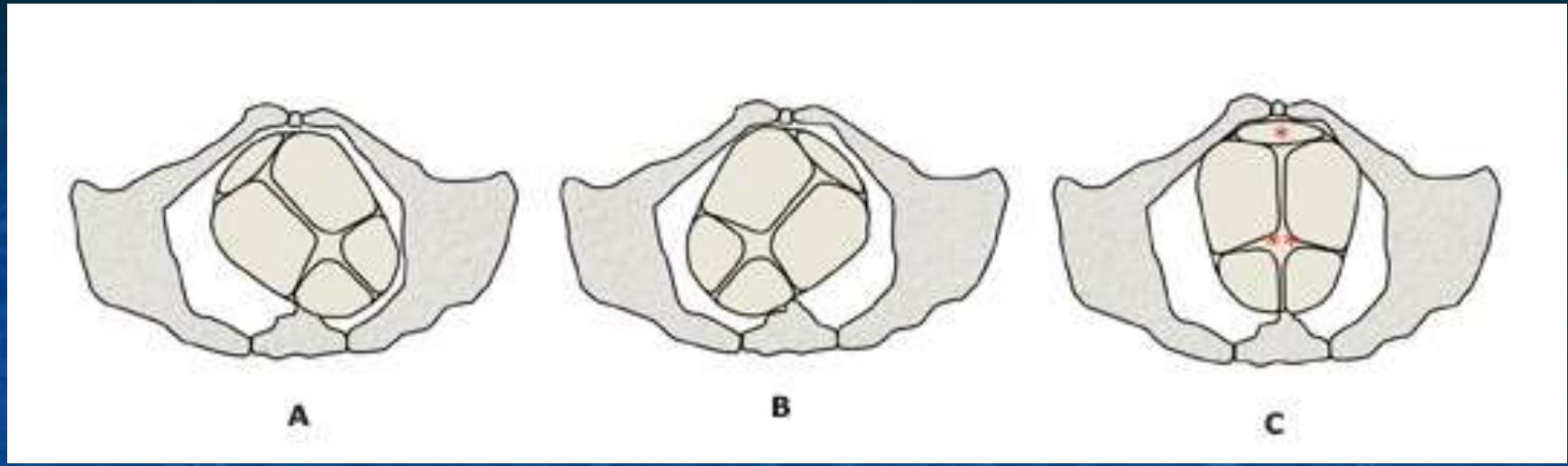


Left and right positions in face presentations Reproduced with permission from: Dystocia Caused by abnormalities in Presentation, Position, or Development of the Fetus. In: Williams Obstetrics, 16th Edition, Pritchard, JA, MacDonald, PC (Eds), Appleton-Century-Crofts, New York 1980. p.808. Copyright © 1980 McGraw Hill.

The cephalic presentation can be classified by boney landmarks of the skull; eg occiput , mentum, brow

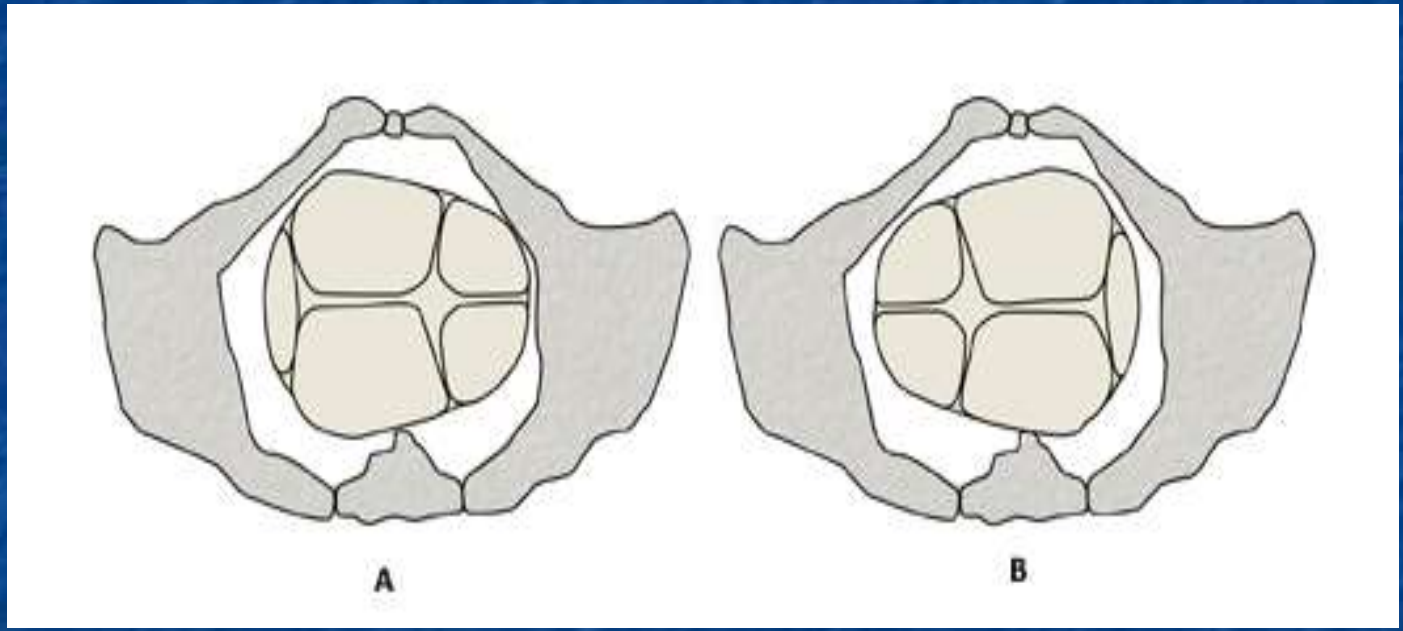


Fetal head at term showing various fontanels, sutures, and diameter Reproduced with permission: from Pritchard, JA, MacDonald, PC. Williams Obstetrics, 16th Edition, Appleton-Century-Crofts, New York 1980. Copyright ©1980 McGraw Hill. p.176.



A: Right occiput anterior (ROA); B: Left occiput anterior (LOA); C: Occiput anterior (OA).
* Posterior fontanel. This is the smaller of the two fontanels and is at the intersection of the three sutures: the sagittal suture and two lambdoid sutures.
** Anterior fontanel. This large fontanel is at the intersection of four sutures: the sagittal, frontal, and two coronal sutures.

Occiput transverse



From UpToDate.com

Labor Mechanics

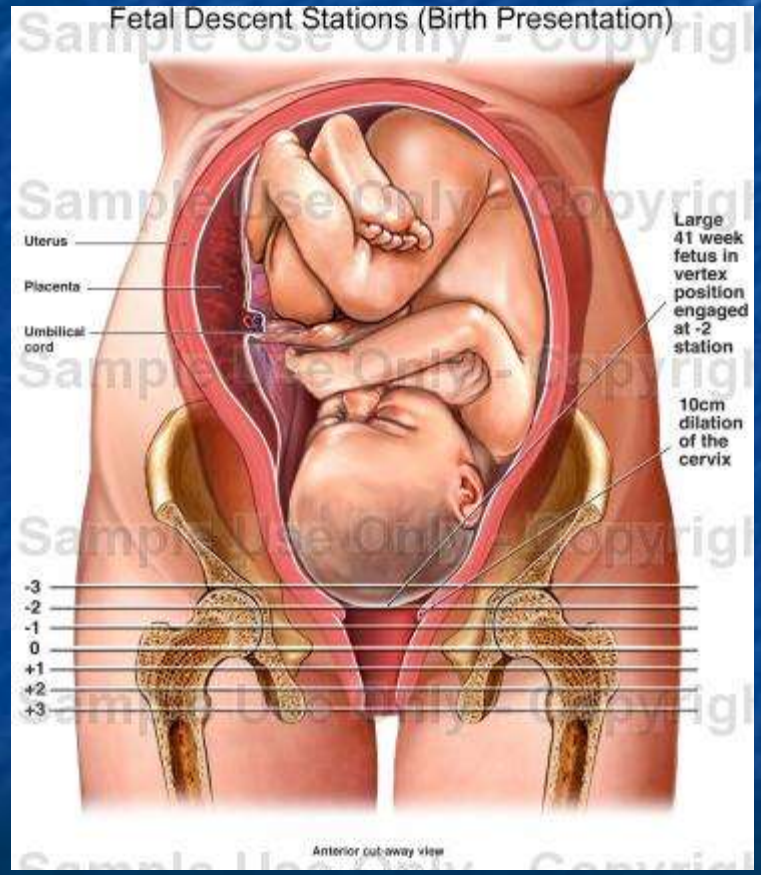
- The passenger

  Station: measure of descent of the presenting part through the birth canal relative to ischial spines

  this is the relationship between the leading bony part of fetal presenting part (skull bone NOT scalp) and the maternal ischial spines. Must take into account molding and caput succedaneum (not doing so is a common error)

  Often described as -3 to + 3

  Newer scale is -5 to +5


Fetal Descent Stations (Birth Presentation)
Uterus
Placenta
Umbilical cord
Large 41 week fetus in vertex position engaged at -2 station
10cm dilation of the cervix
-3
-2
-1
0
+1
+2
+3
Anterior cut-away view

Labor Mechanics

- The Passage

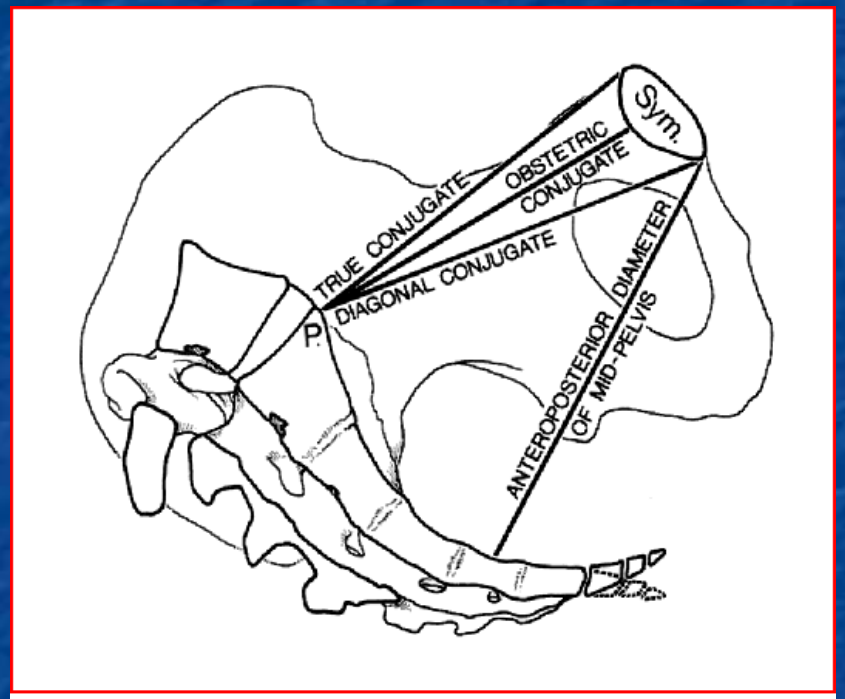
The passage consists of the bony pelvis (sacrum, ilium, ischium, pubis) and the resistance provided by the soft tissues.

Bony pelvis is divided into the greater (false) and lesser(true) pelvis by the pelvic brim which is demarcated by the sacral promontory.

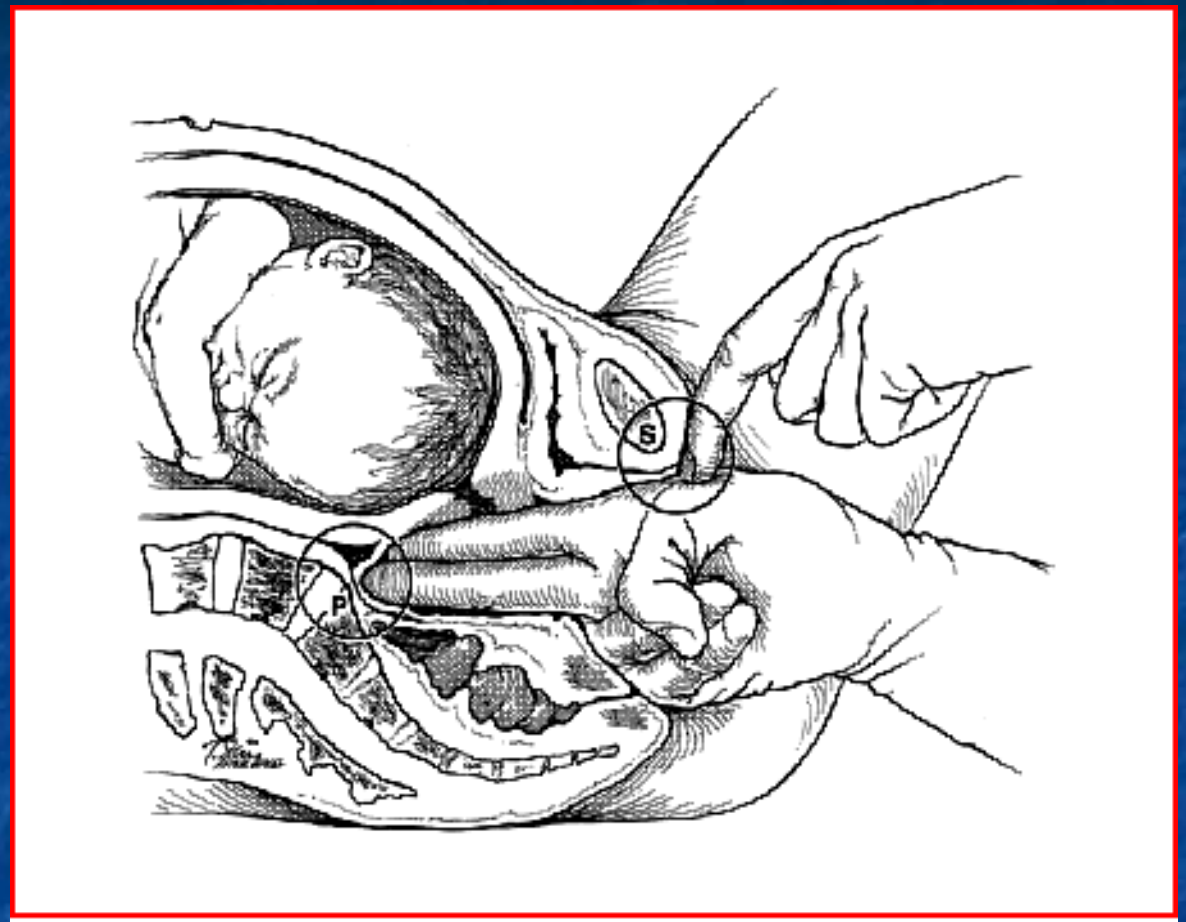
The diagonal conjugate is the distance from the sacral promontory to the inferior margin of the symphysis pubis as assessed on examination (see next slide)

Clinical pelvimetry is the only way to assess the dimensions of the pelvis in labor.

To figure out the true conjugate, measure the diagonal conjugate and subtract 1.5 – 2cm. The limiting factor is the interspinous diameter.

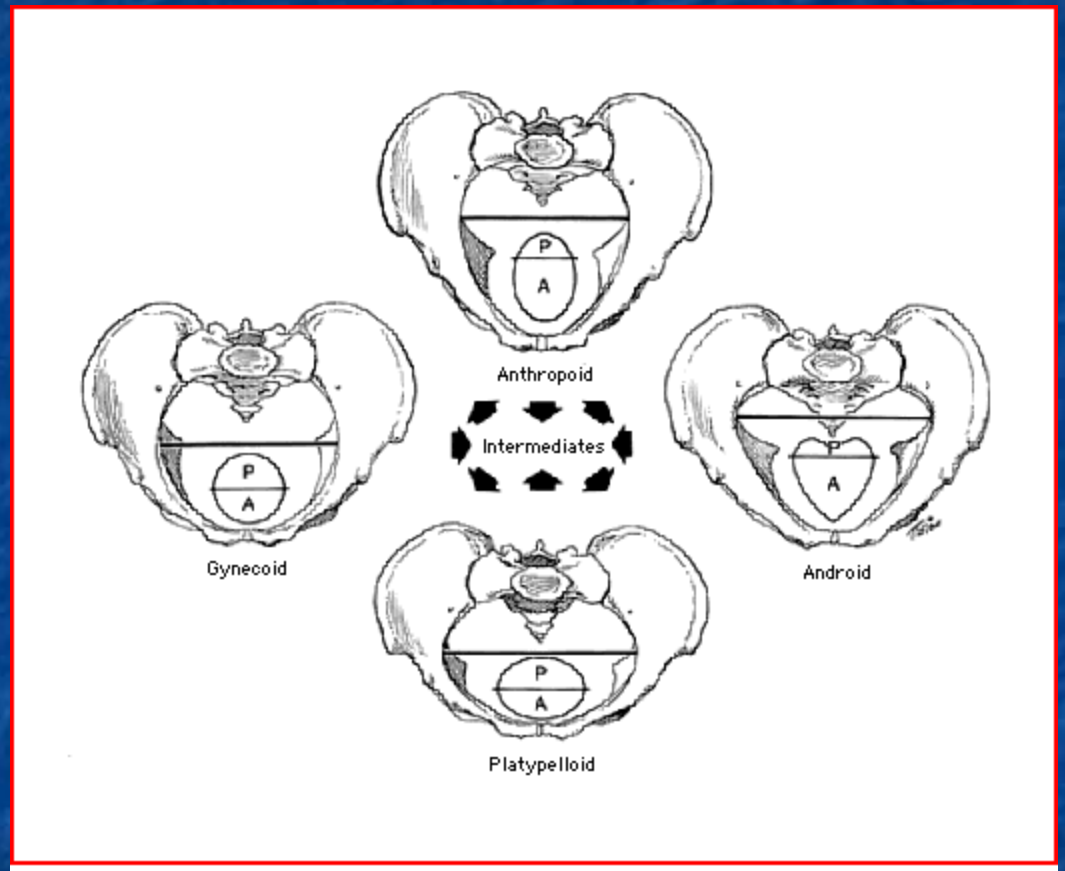


Pelvic Inlet Three anteroposterior diameters of the pelvic inlet are illustrated: the true conjugate, the obstetrically important obstetric conjugate, the obstetrically important obstetric conjugate, and the clinically measurable diagonal conjugate. The anteroposterior diameter of the mid-pelvis is also shown (P: sacral promontory; Sym: symphysis pubis). Reproduced with permission from: Pritchard, JA, MacDonald, PC. Williams Obstetrics, 16th Edition, Appleton-Century-Crofts, New York 1980. Copyright ©1980 McGraw Hill. p. 278.



Vaginal examination to determine the diagonal conjugate
P: sacral promontory; S: symphysis pubis. Reproduced with permission from: Pritchard, JA, MacDonald, PC. Williams Obstetrics, 16th Edition, Appleton-Century-Crofts, New York 1980. Copyright ©1980 McGraw Hill. p.280.

Bony pelvis—most favorable is gynecoid and antropoid



The four parent pelvic types A line passing through the widest transverse diameter divides the inlet into posterior (P) and anterior (A) segments. Reproduced with permission from: Pritchard, JA, MacDonald, PC. Williams Obstetrics, 16th Edition, Appleton-Century-Crofts, New York 1980. Copyright ©1980 McGraw Hill. p.286.

	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

Stages of Labor

- First stage: Onset of labor to full dilatation
  latent phase- onset of labor until cervix starts to make change.
  active phase-greater rate of cervical change
  1.2 cm/h for nulliparous
  1.5 cm/h for multiparous

  Second stage: full dilation to delivery
  Length of Pushing: nullip: 2h without epidural, 3 h with epidural
  multip: 1 h without epidural,
  2 h with epidural
  Third stage: delivery of placenta-can take up to 30 minutes

Cardinal movements of labor

Engagement: passage of the widest diameter of the presenting part to a level below the plane of the pelvic inlet. In cephalic fetus, the largest diameter is the biparietal diameter (9.5 cm); in a breech fetus the widest diameter is the bitrochanteric diameter. The presenting part is engaged if you can feel presenting part both abdominally and vaginally.

Descent: downward passage of the presenting part

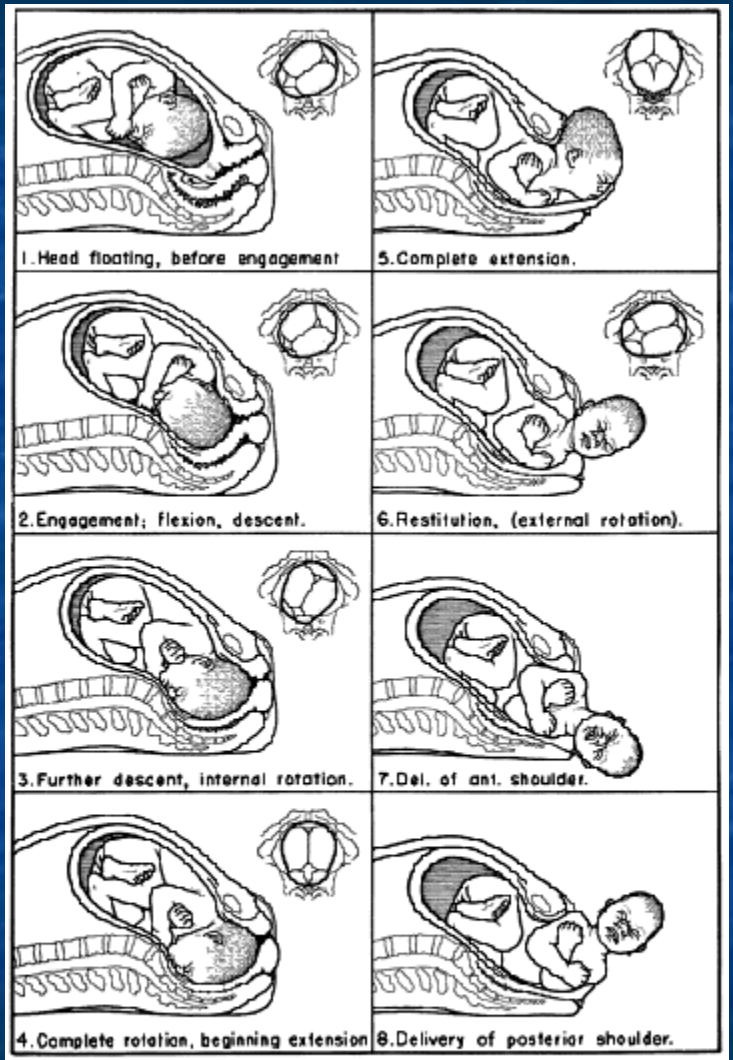
Flexion: occurs passively d/t boney maternal pelvis

Internal rotation: refers to rotation of presenting part from its original position (usually transverse) to the AP position

Extension: Occurs once the fetus has descended to the introitus

External rotation (aka restitution) return of the fetal head to the correct anatomic position in relation to the fetal torso.

Expulsion: delivery of the rest of the fetus.



Principal movements in the mechanism of labor and delivery, left occiput anterior position

Reproduced with permission from: Pritchard, JA, MacDonald, PC. Williams Obstetrics, 16th Edition, Appleton-Century-Crofts, New York 1980. Copyright ©1980 McGraw Hill. p. 397.

Management of Normal Labor and Delivery

- All women need adequate surveillance throughout labor and delivery.
  - Okay to let women walk (doesn't shorten course of labor, the need for augmentation, the use of analgesia, or the rate of C/S)
  - Record FHT's q 30 minutes (minimum)
  - During second stage, FHT's should be recorded q 15 and after each contraction

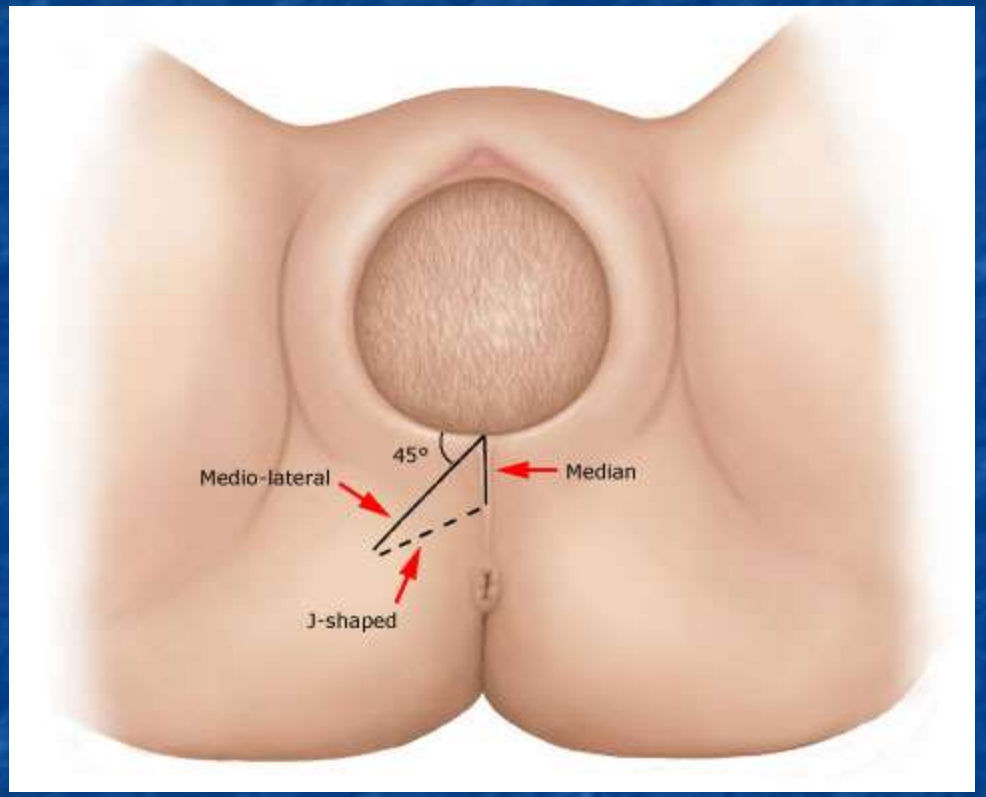
Do you really want to do that episiotomy??

- Episiotomy– the incision in the perineal body during the second stage of labor.

Indicated in 1) cases of arrested or protracted descent
2) expedite delivery in NRFHT's

Median: performed when the fetal head is on the perineum. Associated with occasional extensions to 3rd or 4th degree

Mediolateral: 45 degree angle from the hymenal ring. Does not increase risk of 3rd or 4th degree extension. Procedure of choice in patients with inflammatory bowel disease. More pain post partum.


45°
Medio-lateral
Median
J-shaped

Episiotomy

Fewer episiotomies are being performed…most repairs after a vaginal delivery are a result of tears.

Episiotomies (and lacerations) are graded on a scale of 1 to 4

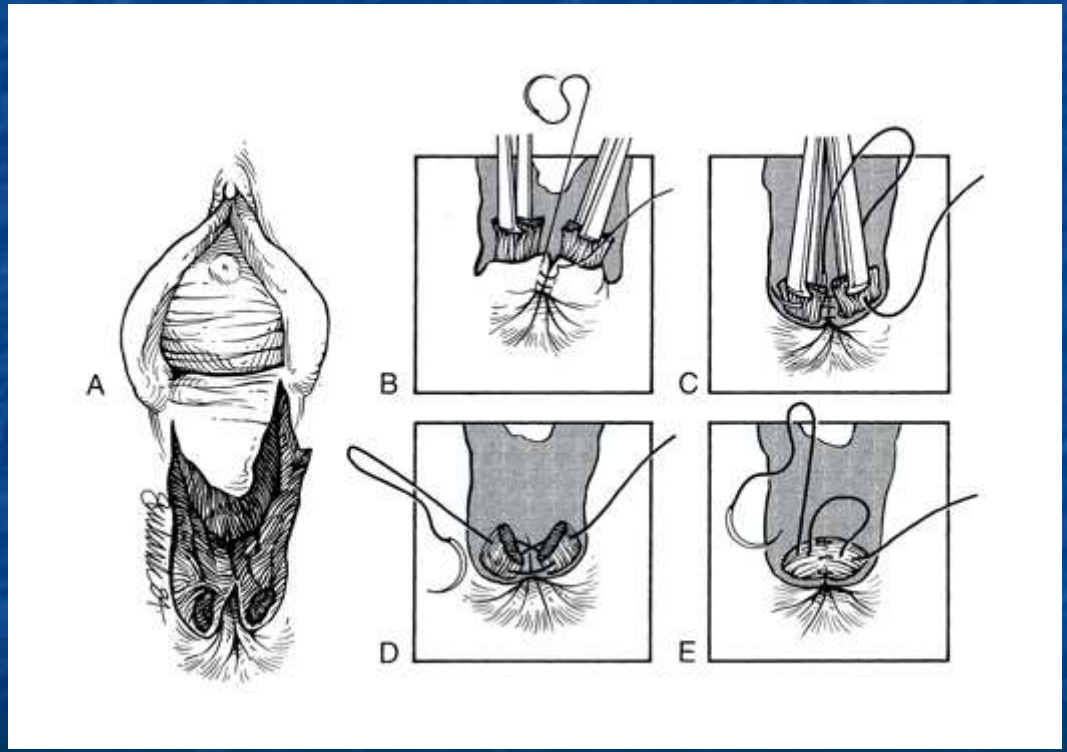
Episiotomy/Lacerations

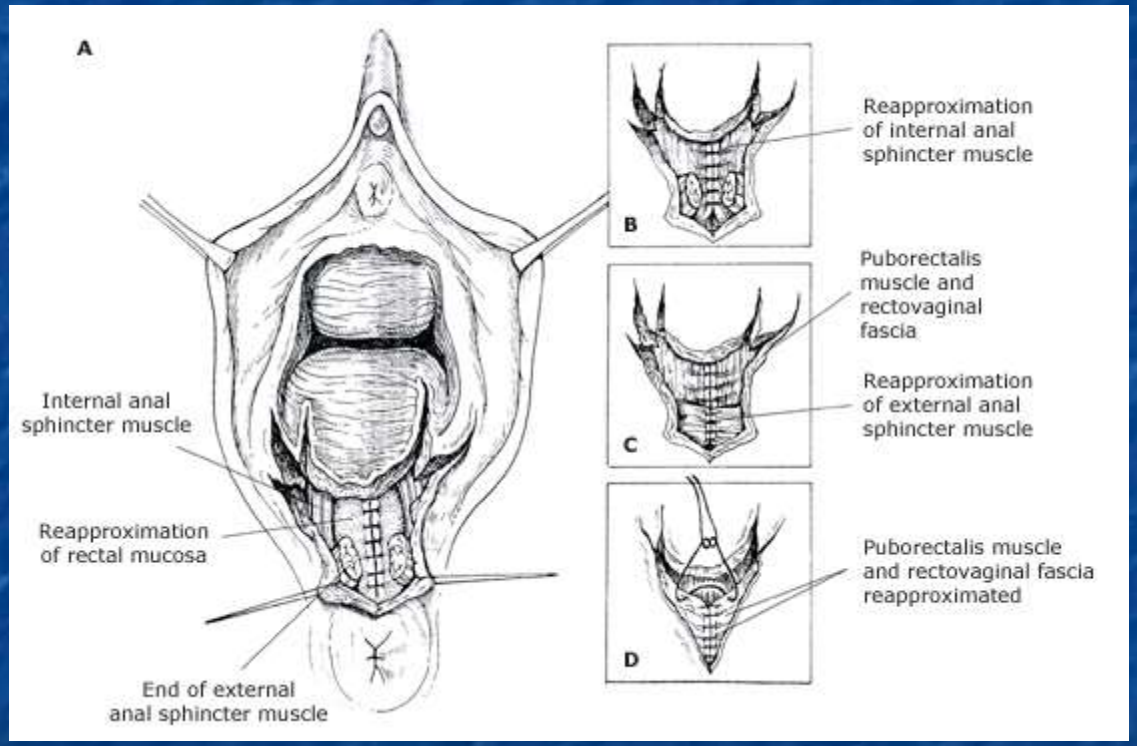
1st degree lacerations: involve the forchette, perineal skin, and vaginal mucosa

2nd degree lacerations: above plus extend to the fascia and muscles of the perineal body but not to the anal sphincter

3rd degree lacerations: skin, mucosa, perineal body and anal sphincter

4th degree: exposed lumen of the rectum


A
B
C
D
E


A
Internal anal sphincter muscle
Reapproximation of rectal mucosa
End of external anal sphincter muscle
B
Reapproximation of internal anal sphincter muscle
C
Puborectalis muscle and rectovaginal fascia
Reapproximation of external anal sphincter muscle
D
Puborectalis muscle and rectovaginal fascia reapproximated