

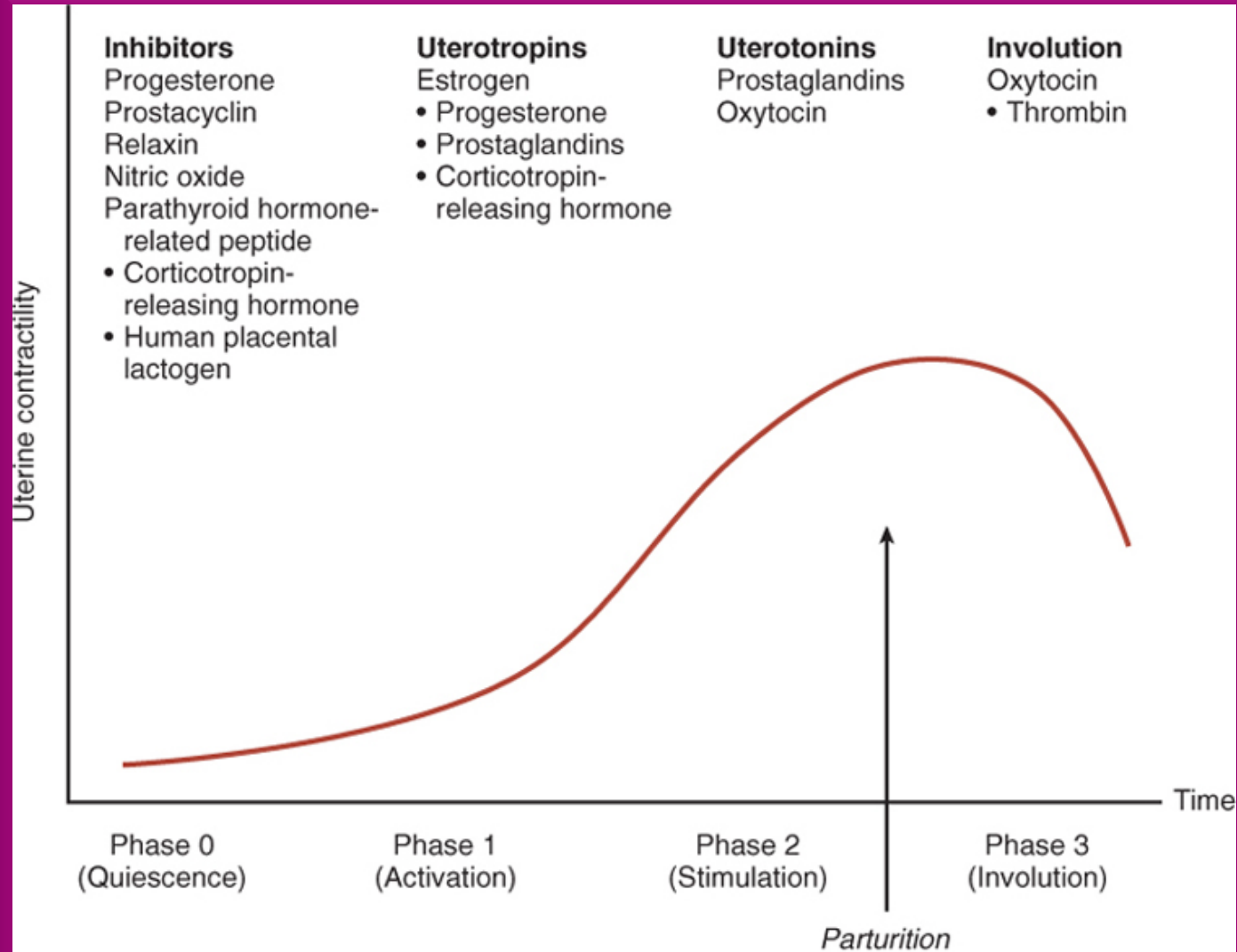
The Basic Mechanisms and Concepts of

LABOR

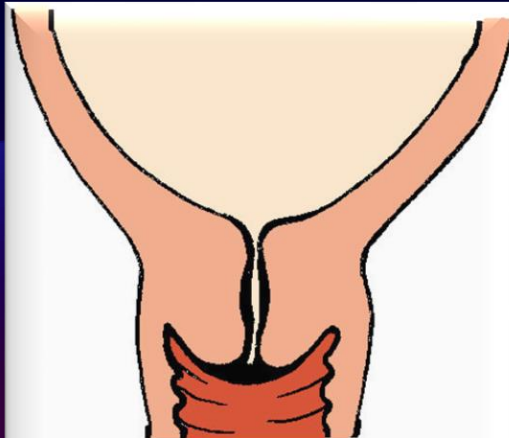
Definition

- ◆ The process by which the fetus is expelled from the uterus
- ◆ Labor requires regular, effective contractions that lead to dilation and effacement of the cervix

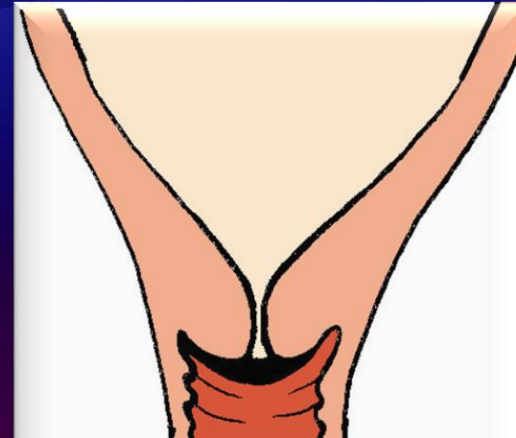
Regulation of Uterine Activity



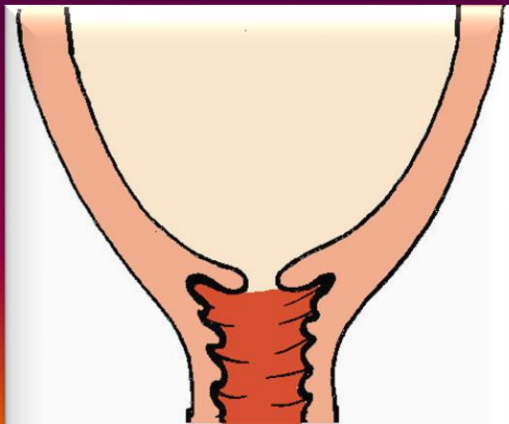
Cervical Changes During Labor



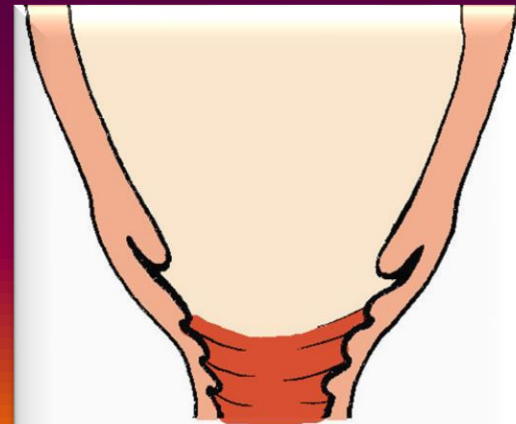
Before labor
0% effacement



Early effacement
30%



Complete effacement
100%



Complete
dilation

Labor Categorizations

◆ Stages

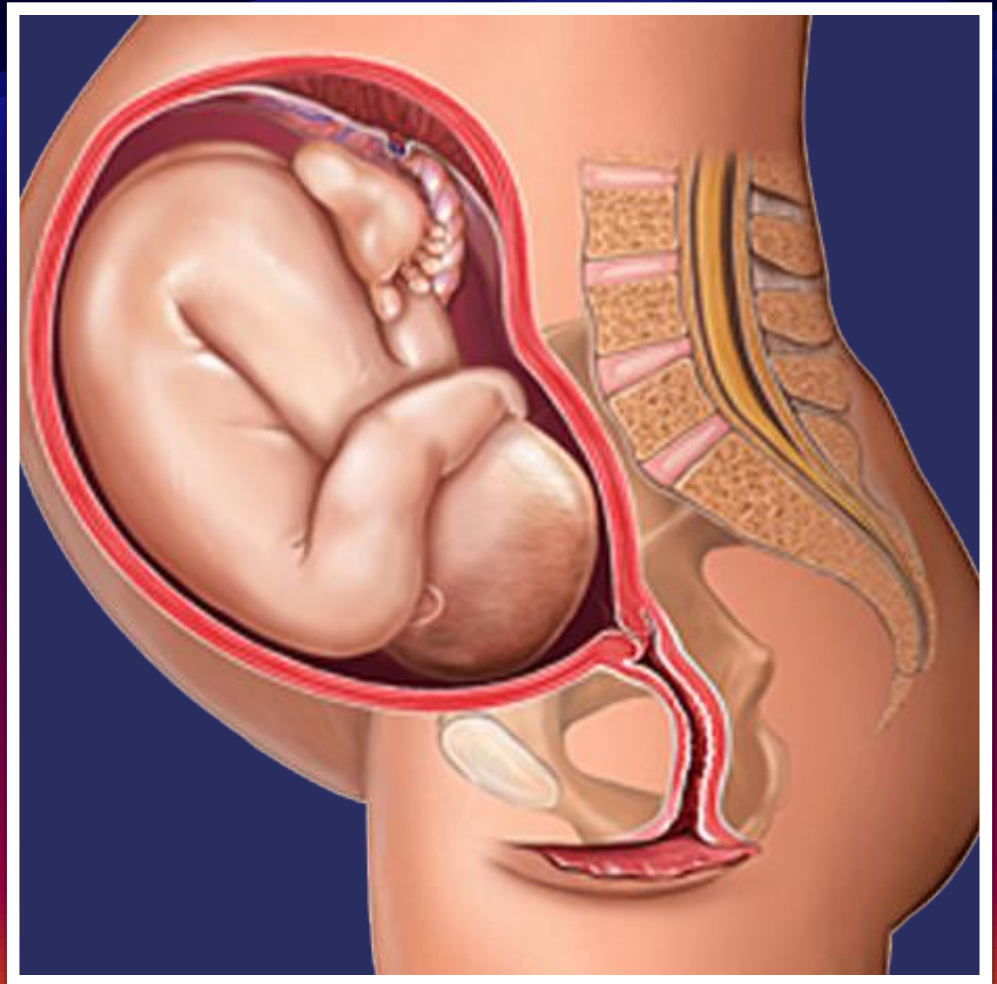
- ◆ 1st Stage - Labor onset to full dilation
- ◆ 2nd Stage - Full dilation until delivery of the baby
- ◆ 3rd Stage - Delivery of the baby until the delivery of the placenta

◆ Phases

- ◆ Latent - The period between the onset of labor and the point when labor becomes active
- ◆ Active - In general, active labor requires ≥ 80 percent effacement and ≥ 6 cm dilation of the cervix

The 3 P's

- Uterine Activity (Power)
- The fetus (Passenger)
- The maternal pelvis (Passage)



Power

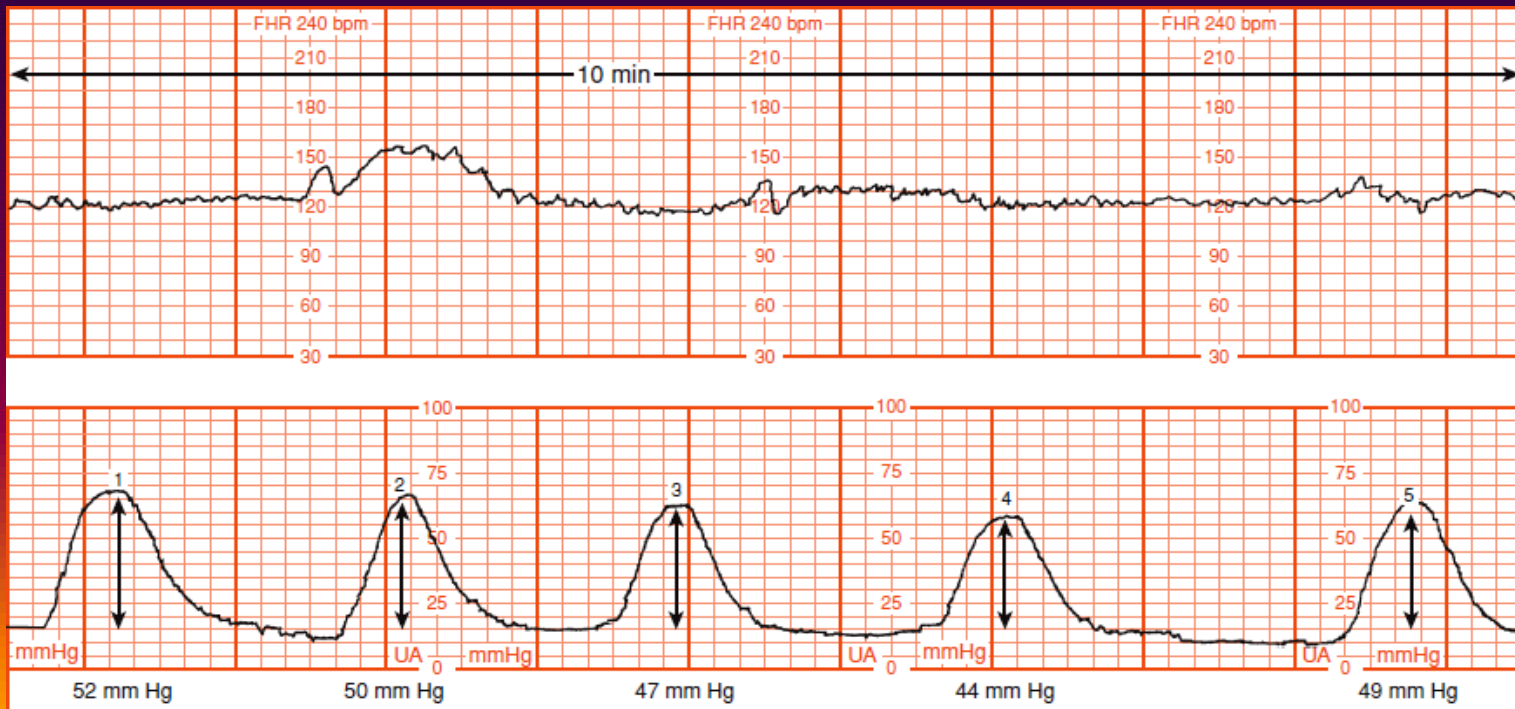
- ◆ Uterine activity
 - ◆ Frequency
 - ◆ Amplitude
 - ◆ Duration of contraction
- ◆ Assessment of uterine activity
 - ◆ Simple observation
 - ◆ Manual palpation
 - ◆ External objective assessment techniques
 - ◆ Direct measurement via intrauterine pressure catheter

Power

Montevideo Units

Calculated by summing the individual contraction intensities in a 10 minute period

Generally 200 MVUs are adequate for active phase labor



Power

- ◆ Normal

- ◆ Five contractions or less in 10 minutes, averaged over a 30-minute window

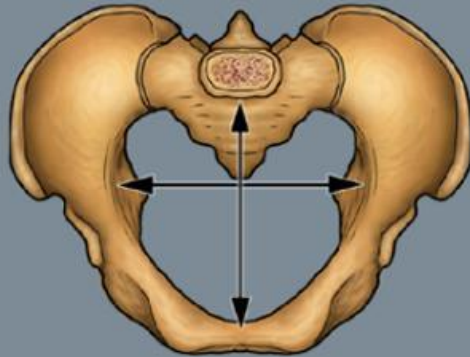
- ◆ Tachysystole

- ◆ More than five contractions in 10 minutes, averaged over a 30-minute window
- ◆ Tachysystole should always be qualified as to the presence or absence of associated FHR decelerations

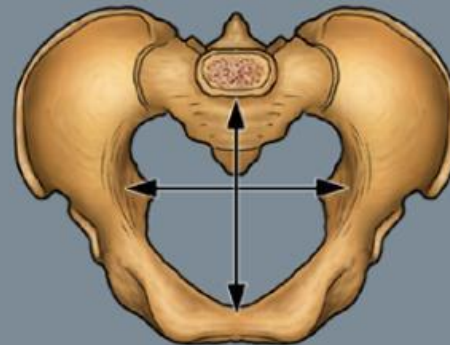
Passage

- ◆ The passage consists of the bony pelvis (composed of the sacrum, ileum, ischium, and pubis) and the resistance provided by the soft tissues

Passage



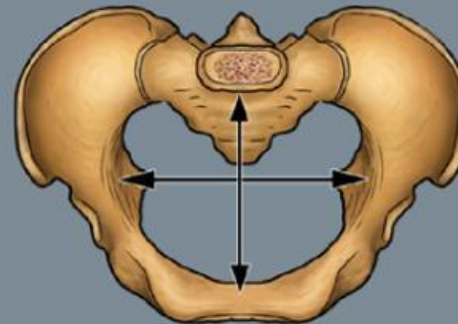
Gynecoid (Typical Female)



Android (Typical Male)

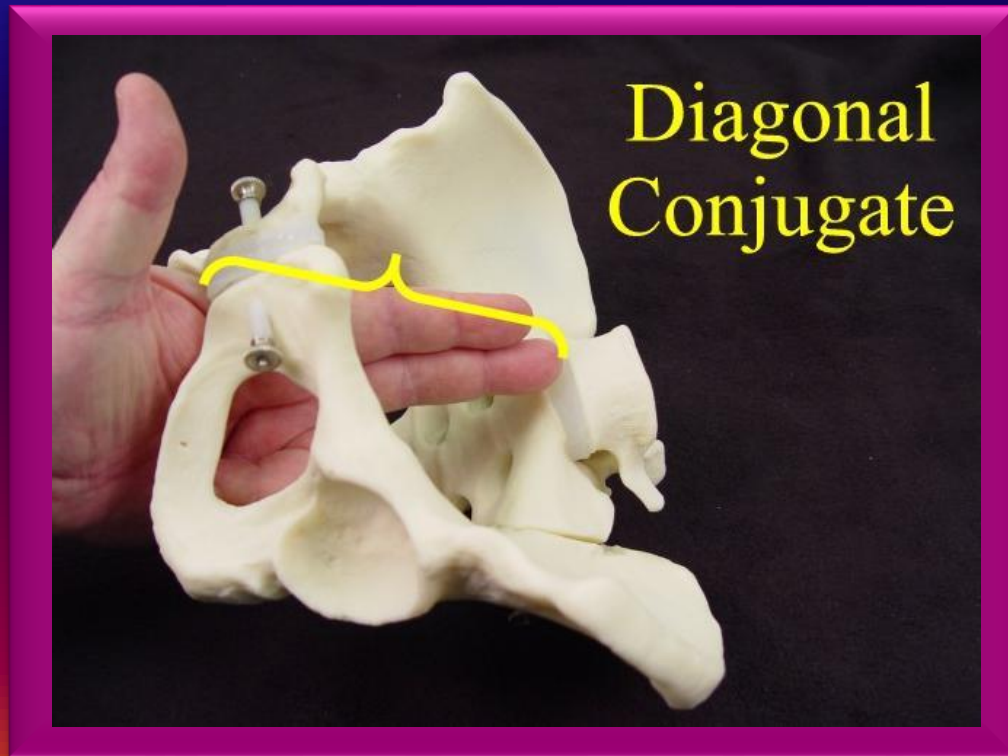


Anthropoid (Narrow)



Platypelloid (Wide)

Passage



Distance from symphysis pubis to the sacral promontory.
Approximate length from fingers to sacrum.
Adequate > 11.5 cm.

Passage

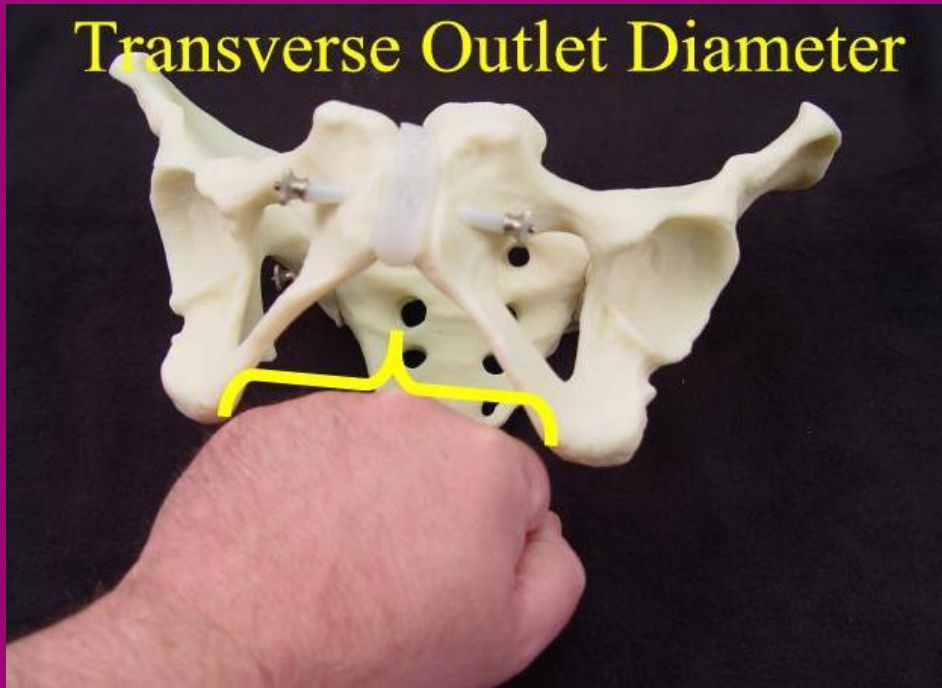
Prominence of the Spines



Spines may be prominent or blunt

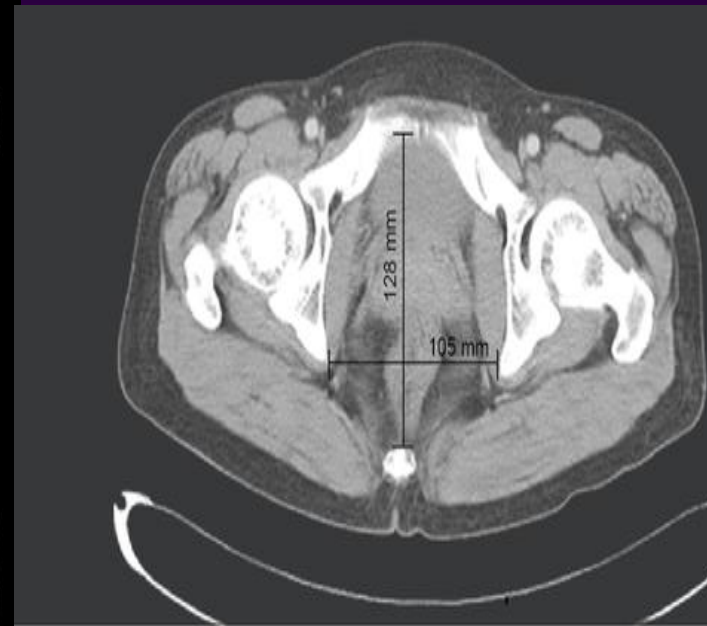
Passage

Transverse Outlet Diameter



Distance between ischial tuberosities
Approximately the width of a fist
Adequate diameter is > 10 cm

Xray and CT Pelvimetry



Passenger

- ◆ Fetal size
- ◆ Lie
- ◆ Presentation
- ◆ Attitude
- ◆ Position
- ◆ Station



Size

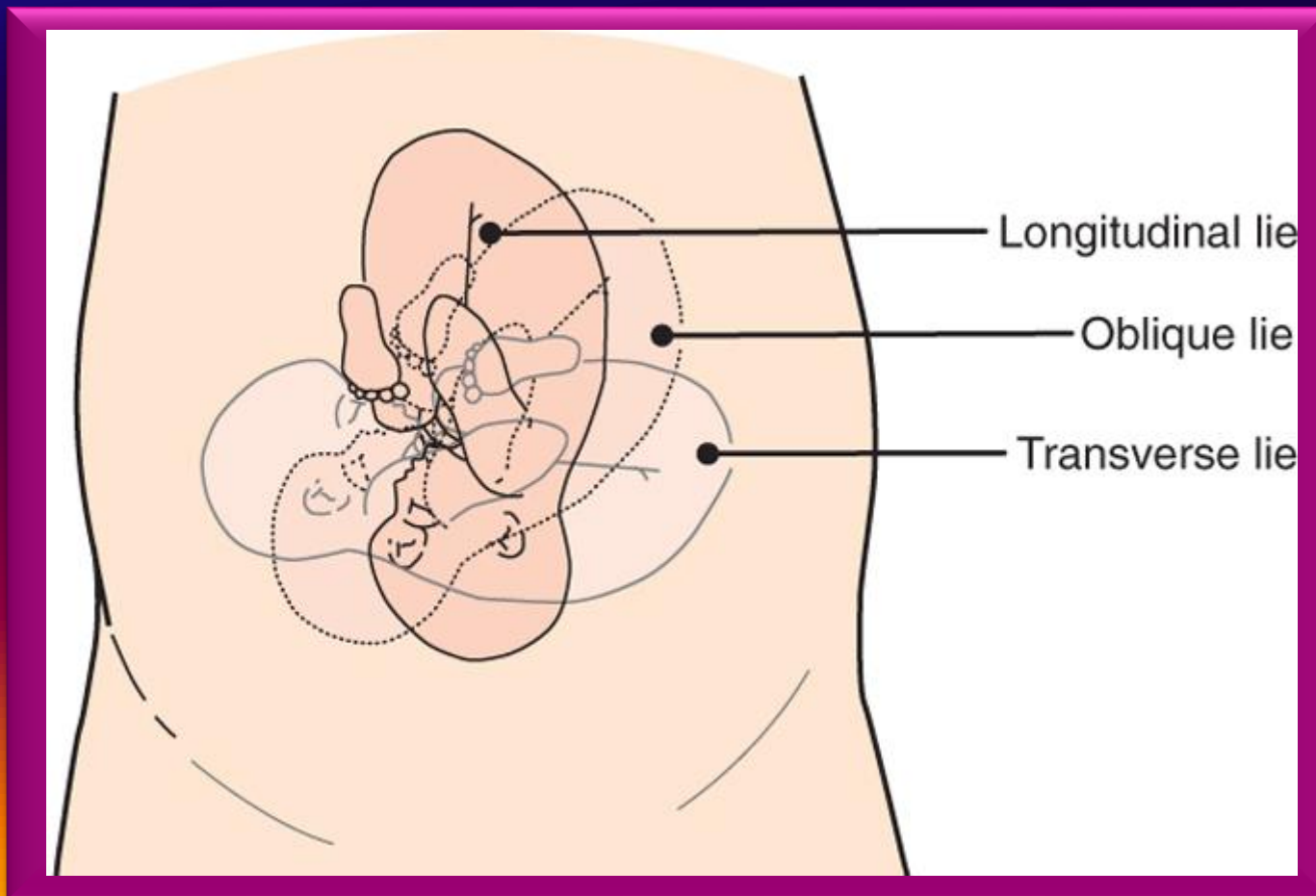
- ◆ Abdominal palpation
- ◆ Ultrasound
 - ◆ Subject to large degree of error
 - ◆ Macrosomia ≥ 4500 g – associated with increased risk of failure of trial of labor

Leopold's Maneuvers



Lie

- ◆ The longitudinal axis of the fetus relative to the longitudinal axis of the uterus



Presentation

- ◆ The fetal part that directly overlies the pelvic inlet:
 - ◆ Cephalic/Vertex
 - ◆ Occiput (vertex)
 - ◆ Chin (mentum)
 - ◆ Brow
 - ◆ Breech
 - ◆ Frank
 - ◆ Complete
 - ◆ Incomplete
 - ◆ Funic

Attitude

- ♦ The position of the head with regard to the fetal spine (the degree of flexion and/or extension of the fetal head)



Complete flexion
(normal)

Complete extension
(abnormal)

Fetal Attitude

Position

- ◆ The relationship of the fetal presenting part to the maternal pelvis



LOA



LOT



LOP

Vertex presentations



LSA



LST



LSP

Breech presentations



LMA



LMT

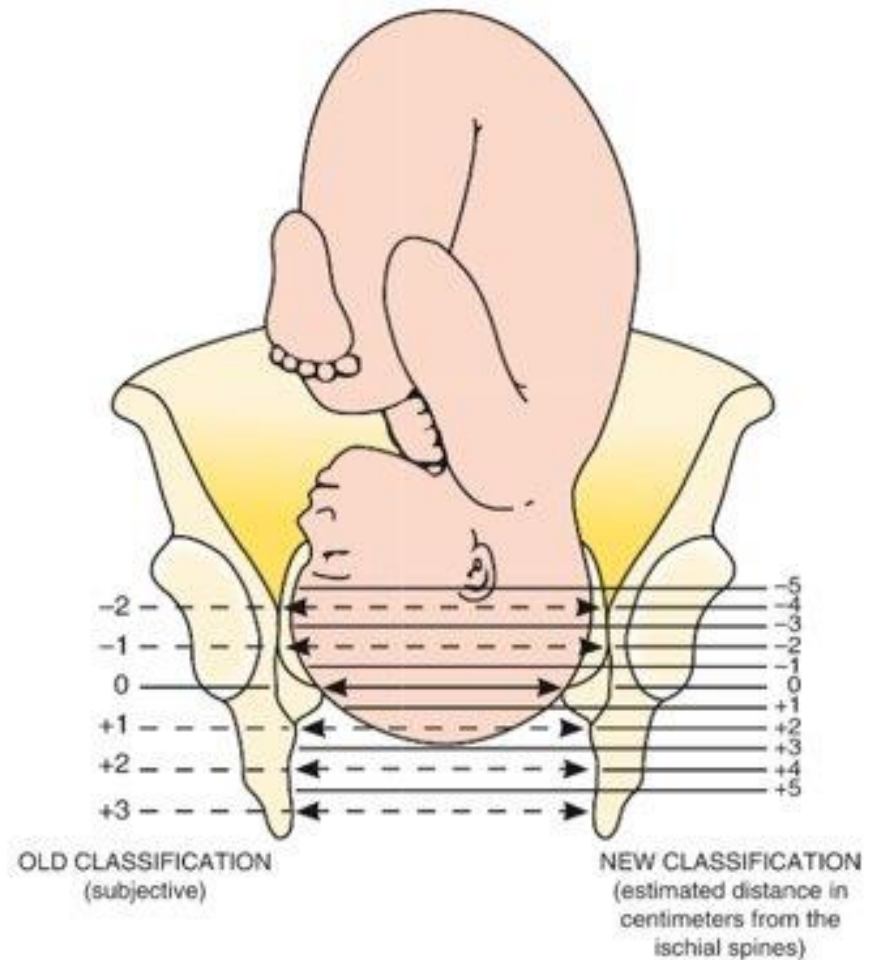


LMP

Face presentations

Station

A measure of descent of the bony presenting part of the fetus through the birth canal



Cardinal Movements in labor

- ◆ Engagement
- ◆ Descent
- ◆ Flexion
- ◆ Internal Rotation
- ◆ Extension
- ◆ External Rotation
- ◆ Expulsion

Engagement

- ♦ Passage of the widest diameter of the presenting part to a level below the plane of the pelvic inlet



With a cephalic presentation, engagement is achieved when the presenting part is at 0 station (at the level of the maternal ischial spines) on vaginal examination

Descent

- ◆ The downward passage of the presenting part through the pelvis



Descent of the fetus is not continuous; the greatest rates of descent occur during the deceleration phase of the first stage of labor and during the second stage of labor.

Flexion

- ◆ Occurs passively as the head descends owing to the shape of the bony pelvis and the resistance offered by the soft tissues of the pelvic floor



Complete flexion usually occurs only during the course of labor

Internal Rotation

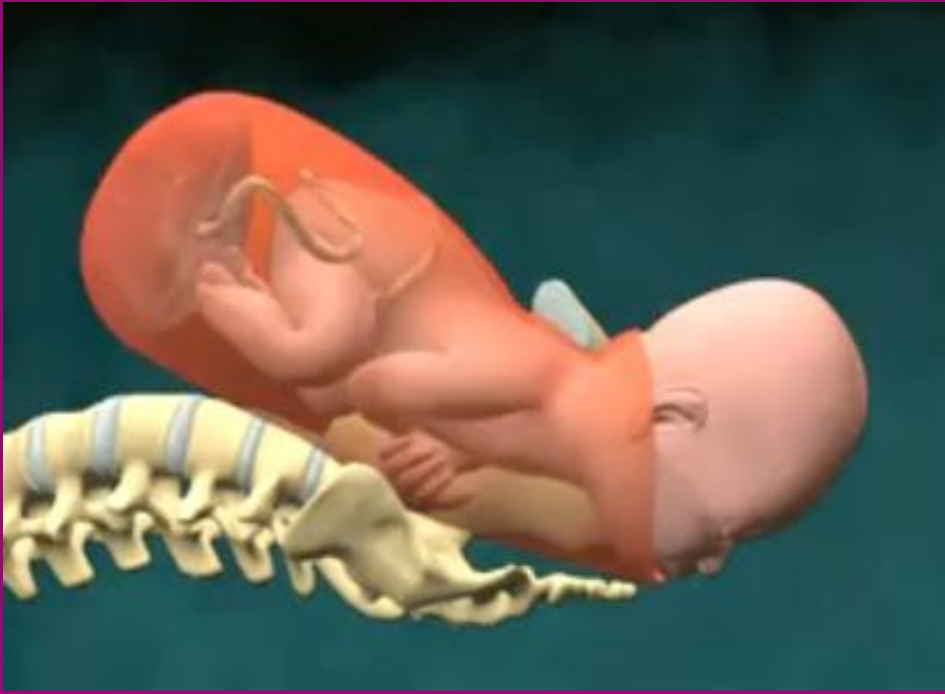
- ♦ Rotation of the presenting part from its original position as it enters the pelvic inlet (usually OT) to the anteroposterior position as it passes through the pelvis



As the head descends, the occiput of the fetus rotates towards the symphysis pubis allowing the widest portion of the fetus to negotiate the pelvis at its widest dimension

Extension

- ◆ The fetal head is delivered by extension and rotates around the symphysis pubis



The forces responsible for this motion are the downward force exerted on the fetus by the uterine contractions along with the upward forces exerted by the muscles of the pelvic floor

External Rotation

- ◆ The return of the fetal head to the correct anatomic position in relation to the fetal torso



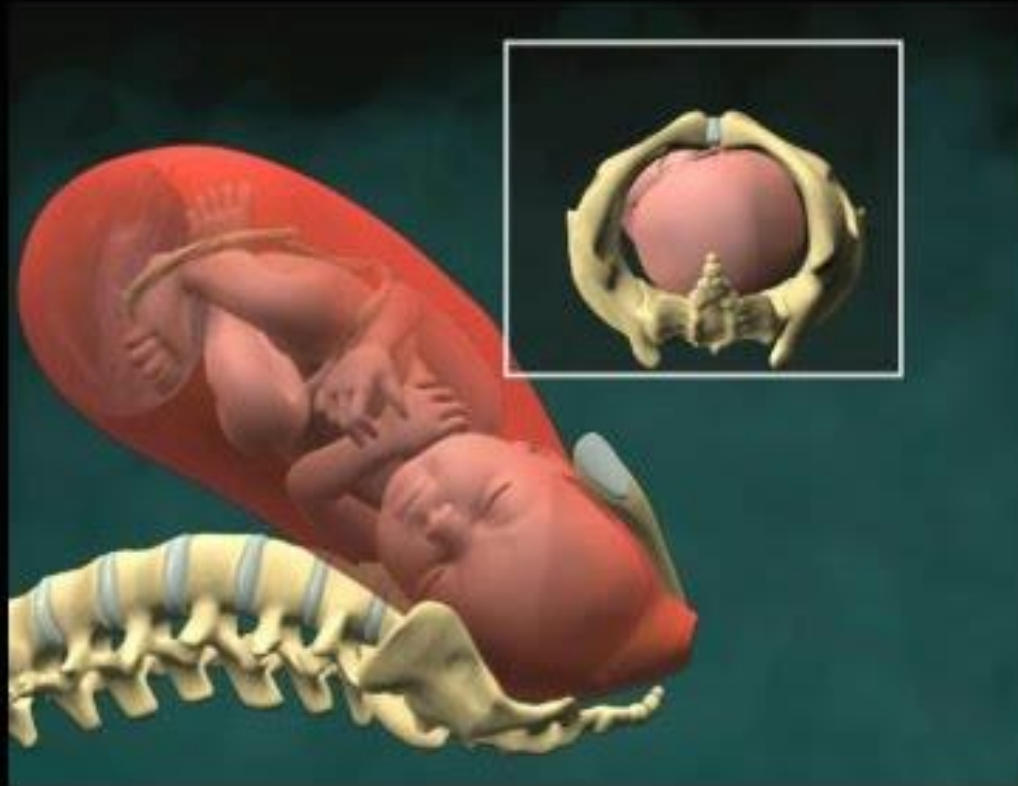
This is a passive movement resulting from a release of the forces exerted on the fetal head by the maternal bony pelvis and its musculature

Expulsion

- ◆ Delivery of the rest of the fetus



The anterior shoulder is delivered in much the same manner as the head, with rotation of the shoulder under the symphysis pubis. After the shoulder, the rest of the body is usually delivered without difficulty.

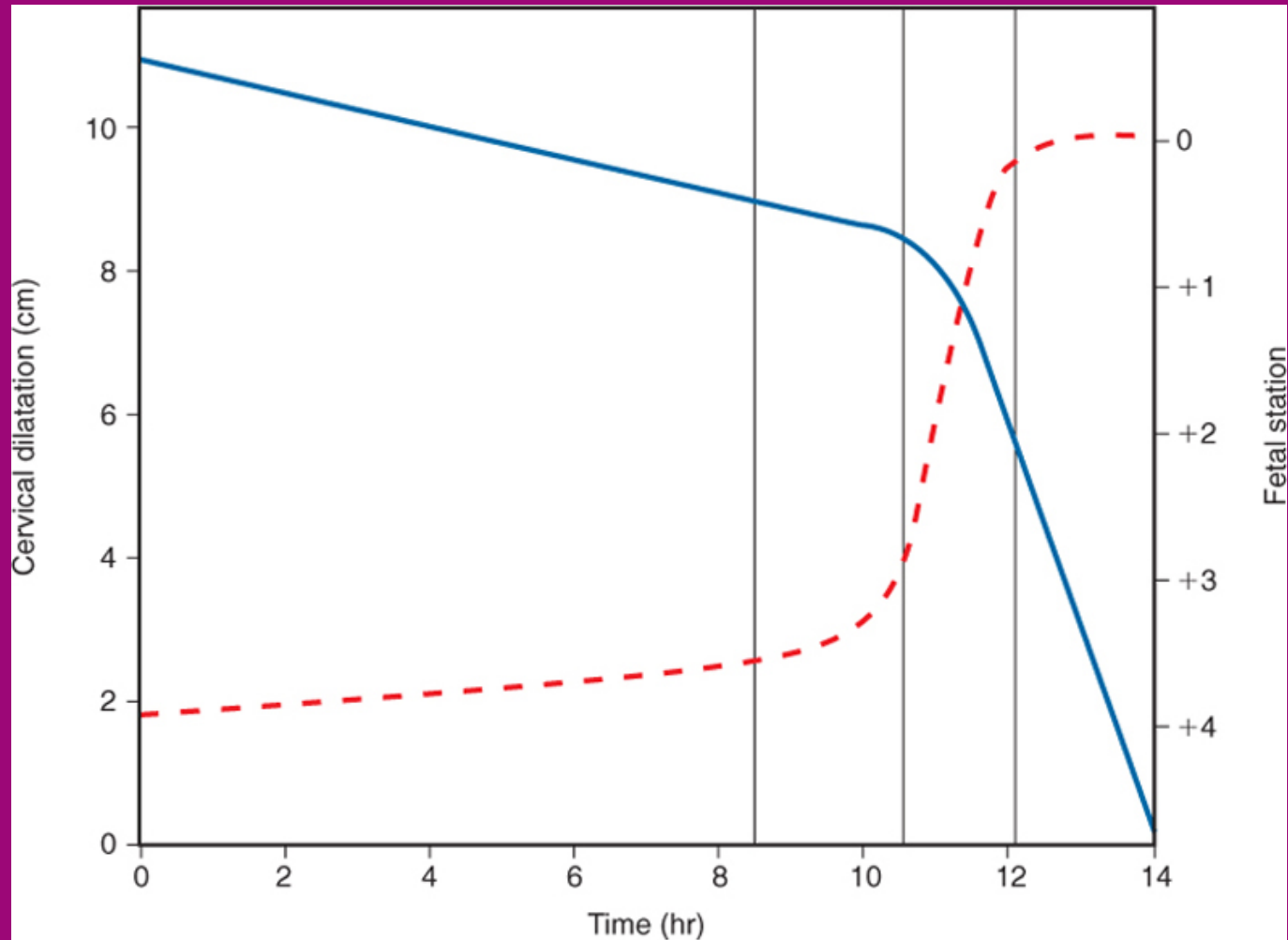




SUMMARY OF MEANS AND 95TH PERCENTILES FOR DURATION OF FIRST- AND SECOND-STAGE LABOR

PARAMETER	MEAN	95TH PERCENTILE
Nulliparas		
Latent labor	8 hr	20 hr
Active labor		1.2 cm/hr
Second stage	45 min	2 hr
Second stage, epidural	80 min	3 hr
Multiparas		
Latent labor	5 hr	14 hr
Active labor		1.5 cm/hr
Second stage	18 min	1 hr
Second stage, epidural	45 min	2 hr

Freidman Curve (classic/historical)



Copyright © 2007 by Churchill Livingstone, an imprint of Elsevier Inc.

RECOMMENDATIONS FOR 95TH PERCENTILE DURATION FOR THE SECOND STAGE OF LABOR

	95TH PERCENTILE
Multiparas	
Second stage without an epidural	2 hours
Second stage with an epidural	3 hours
Nulliparas	
Second stage without an epidural	3 hours
Second stage with an epidural	4 hours

Labor Protraction and Arrest

- ◆ Protracted Labor
- ◆ Arrest of labor

Duration of Pushing and Outcomes

Obstetric Outcome	Duration of Active Pushing (min)					P*
	Nulliparous					
	Less Than 60 (n=15,148)	60–119 (n=6,613)	120–179 (n=2,796)	180–239 (n=1,011)	240 or Greater (n=460)	
Maternal						
Route of delivery						<.001
Cesarean	447 (3.0)	543 (8.2)	499 (17.9)	245 (24.2)	103 (22.4)	
OVD	1,201 (7.9)	881 (13.3)	768 (27.5)	355 (35.1)	151 (32.8)	
SVD	13,500 (89.1)	5,189 (78.5)	1,528 (54.7)	411 (40.7)	206 (44.8)	
PPH	150 (1.0)	87 (1.4)	68 (2.5)	37 (3.7)	15 (3.3)	<.001
3rd- or 4th-degree laceration	752 (5.0)	563 (8.5)	391 (14.0)	154 (15.3)	75 (16.3)	<.001
Neonatal						
CAO	193 (1.3)	97 (1.5)	61 (2.2)	26 (2.6)	11 (2.4)	<.001
Mechanical ventilation 1 d or greater	80 (0.5)	43 (0.7)	21 (0.8)	4 (0.4)	3 (0.7)	.39
Confirmed sepsis	23 (0.2)	7 (0.1)	3 (0.1)	1 (0.1)	0	.25
Brachial plexus palsy	16 (0.1)	9 (0.1)	8 (0.3)	5 (0.5)	0	.009
Fracture						
Clavicular	39 (0.3)	12 (0.2)	10 (0.4)	4 (0.4)	0	.86
Skull	1 (0.0)	2 (0.0)	1 (0.0)	2 (0.2)	0	.009
Other	0	3 (0.1)	2 (0.1)	3 (0.3)	0	<.001
Seizure	18 (0.1)	12 (0.2)	13 (0.5)	3 (0.3)	5 (1.1)	<.001
HIE	51 (0.3)	25 (0.4)	15 (0.6)	8 (0.8)	5 (1.1)	.001
Death	1 (0.0)	0	0	0	0	.49

Questions?

