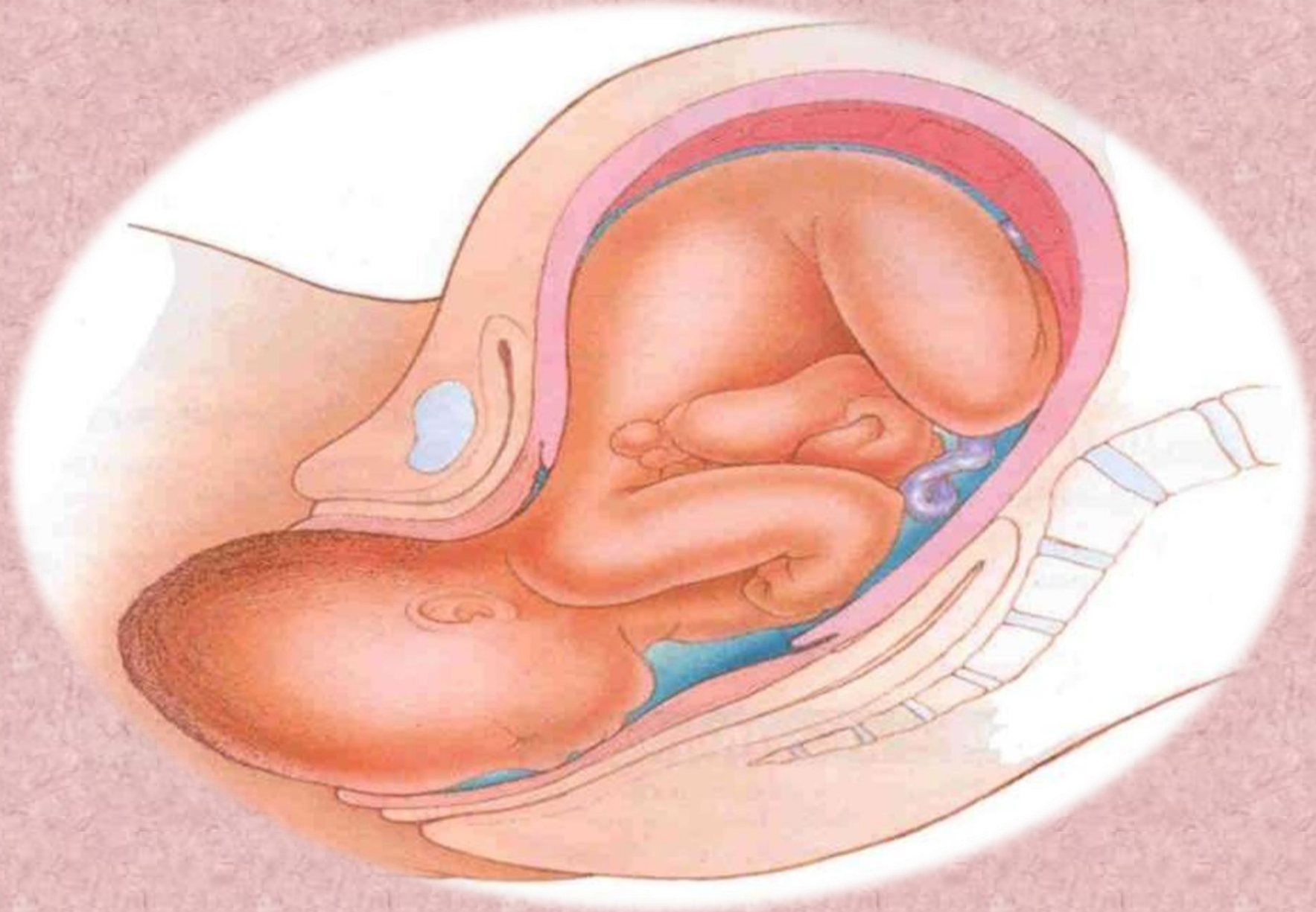
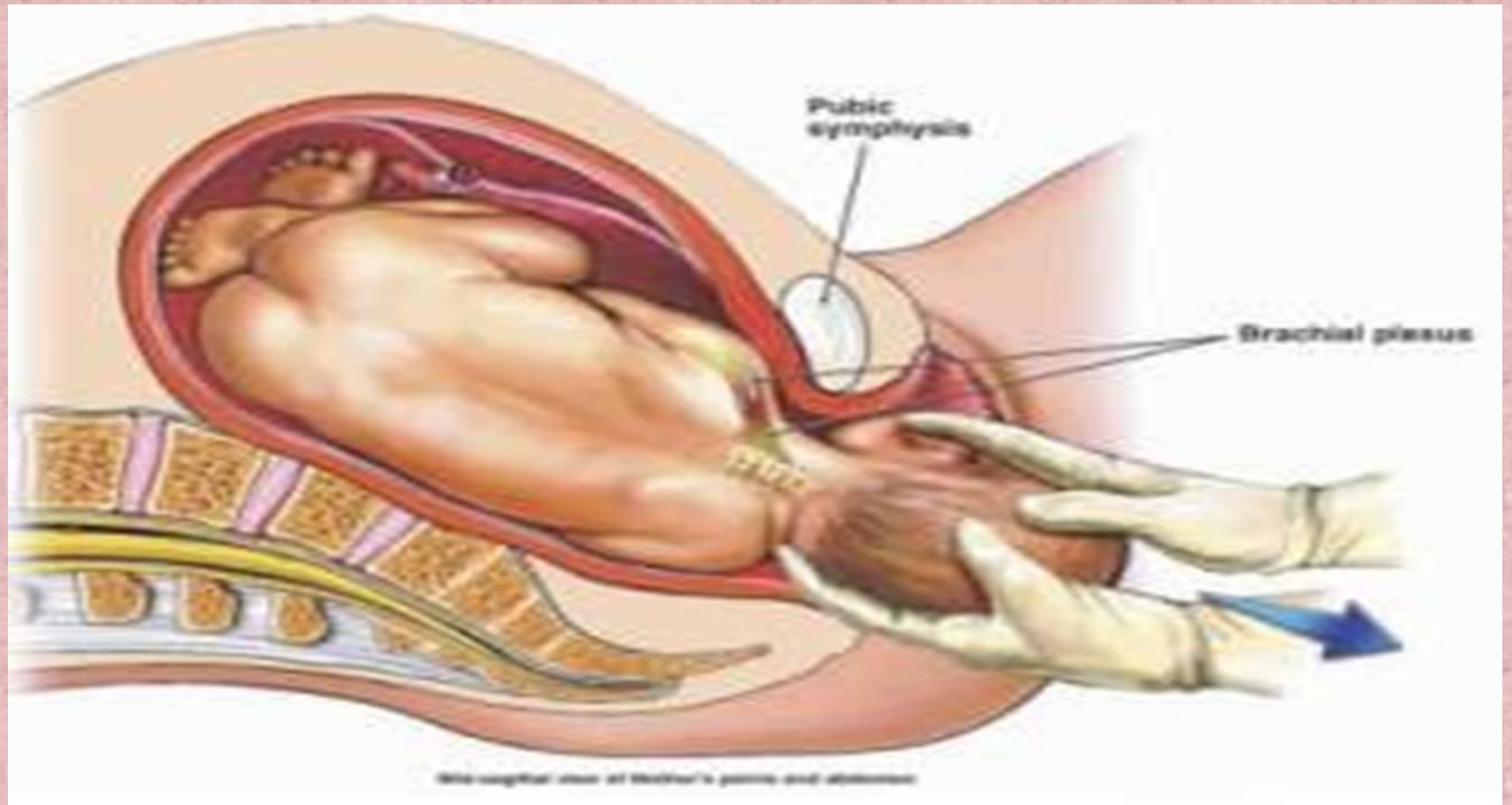
Normal Labor



P V GREESHMA
LECTURER

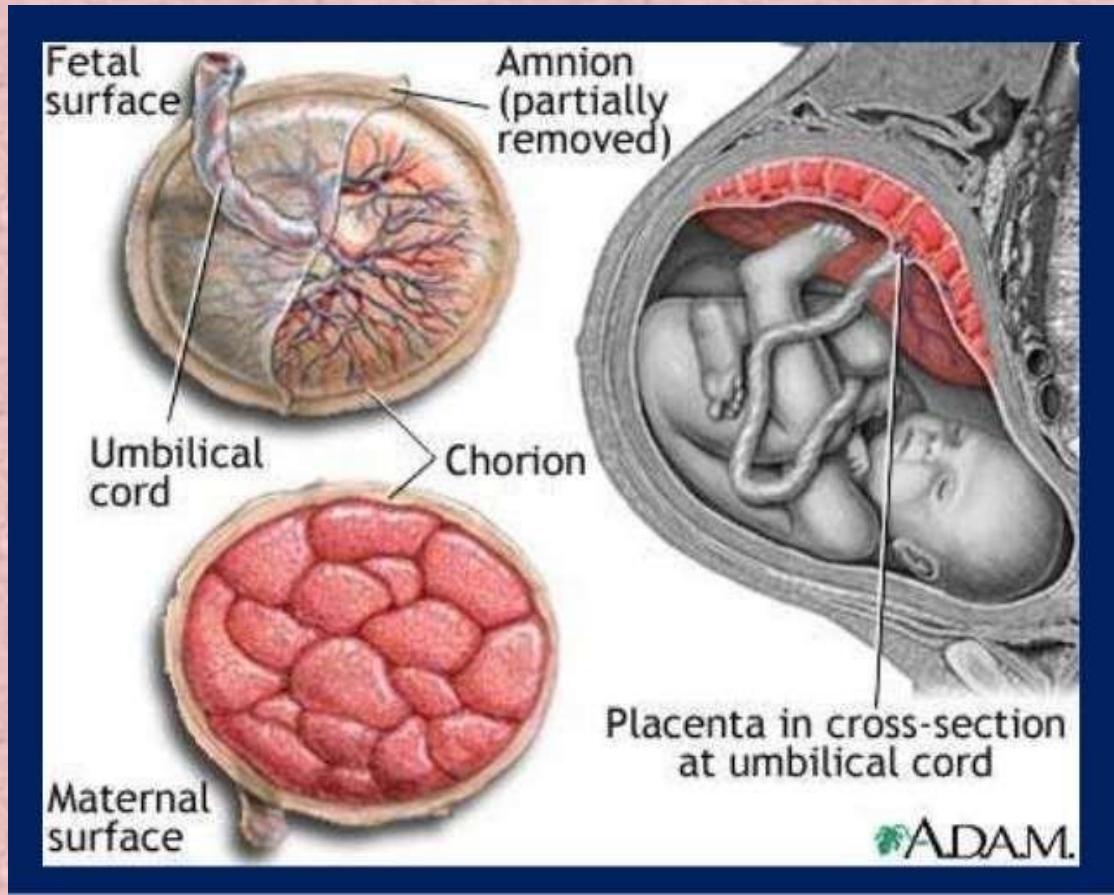
- “Labour is the physiological process by which fetus, placenta and membranes are expelled through the birth canal after viability (22nd week of pregnancy).”
- *WHO*
- Series of events that take place in the genital organs in an effort to expel the viable product of conception out of the womb through the vagina into the outer world is called labor.

- Spontaneous or induced
- Term or preterm
- *Preterm labor – Prior to 37 weeks Term – 37 to 42 weeks*
- *Post term – After 42 weeks Post dates – After 40 weeks*



NORMAL LABOR (EUTOCIA)

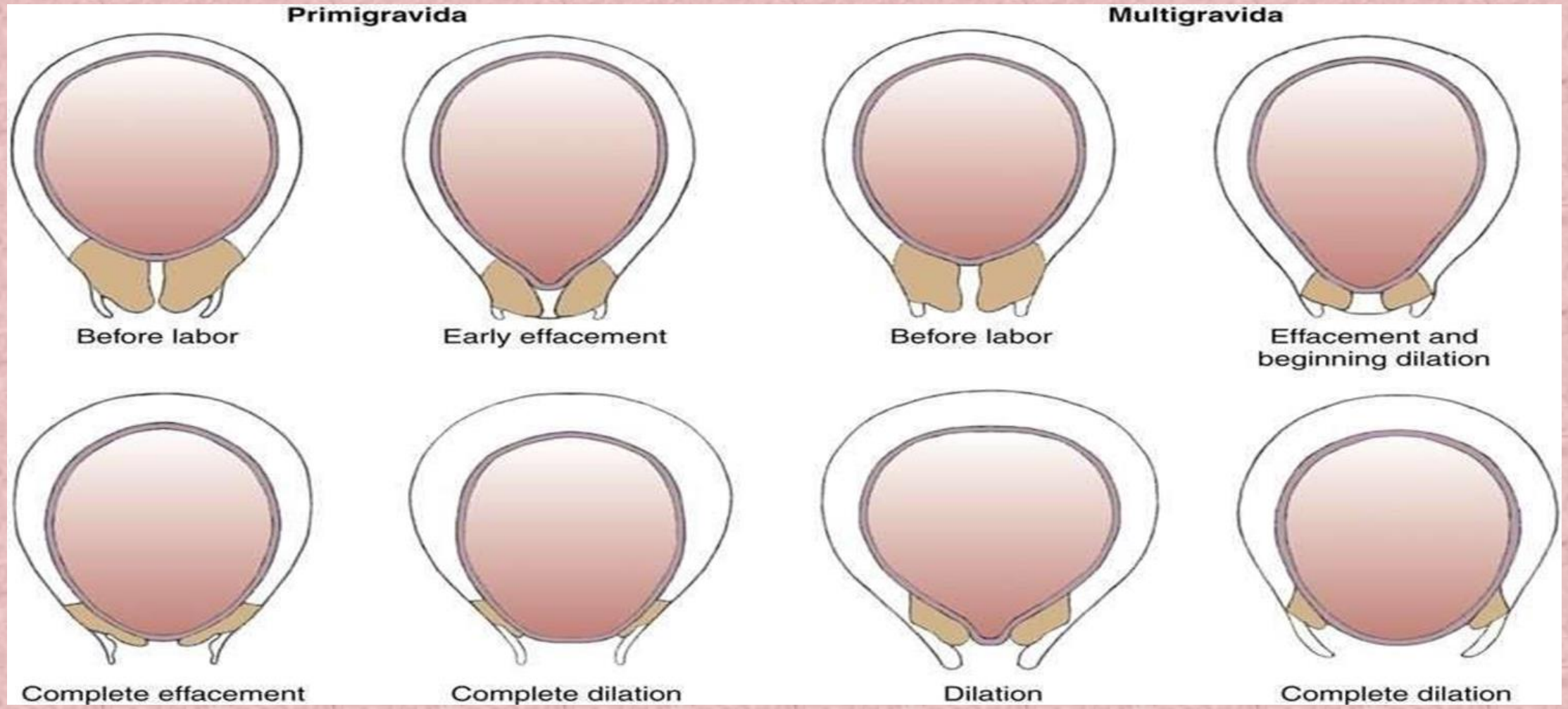
Physiological process by which the fetus, placenta and membrane are expelled through birth canal after full term of pregnancy.



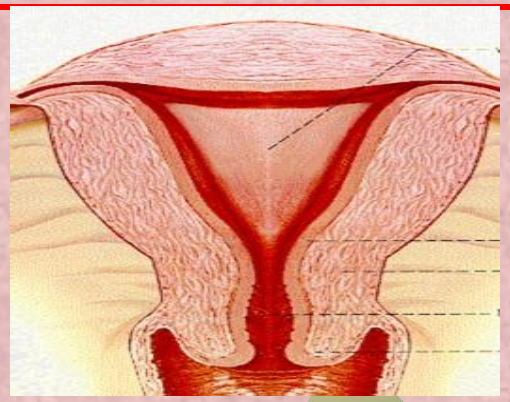
Criteria of Normal Labour

- Spontaneous expulsion, of a single,
- mature fetus (37 completed weeks – 42 weeks), presented by vertex,
- through the birth canal (i.e. vaginal delivery),
- within a reasonable time (not less than 3 hours or more than 18 hours),
- without complications to the mother, or the fetus

Labour is defined as the presence of regular uterine contractions with progressive cervical dilatation and effacement.

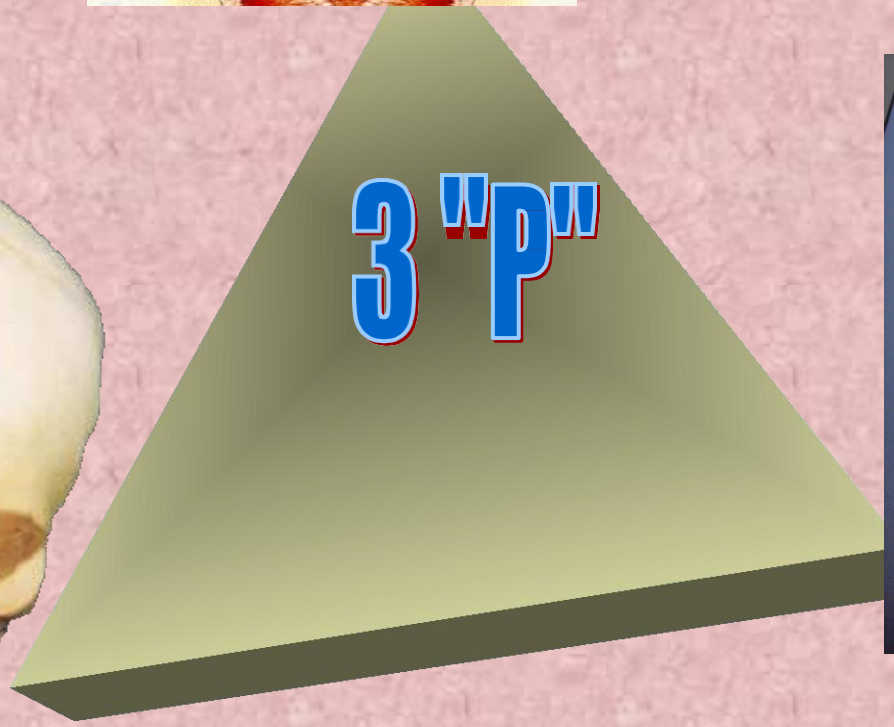


FACTORS THAT INFLUENCE PROGRESS OF LABOUR



Power

Passenger

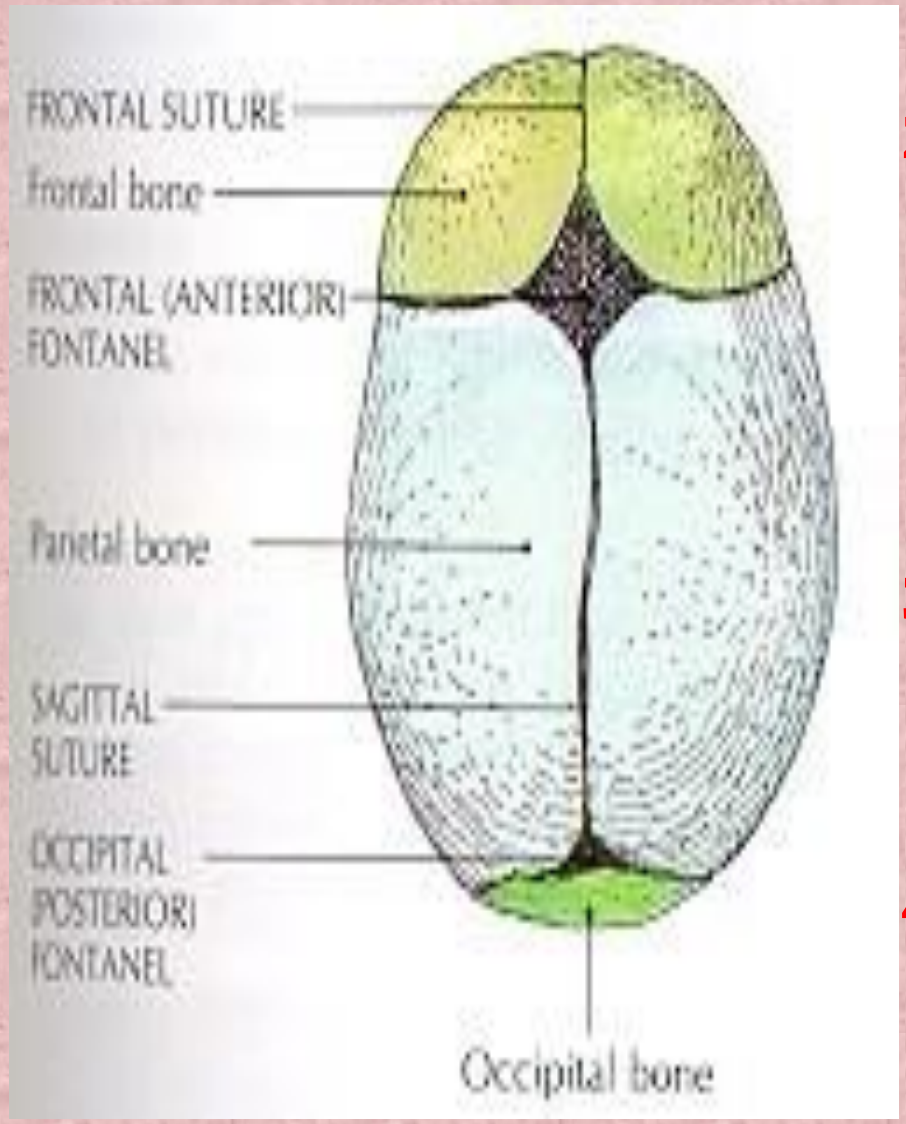


Passage

THE FETAL SKULL

THE FETAL SKULL

SUTURES



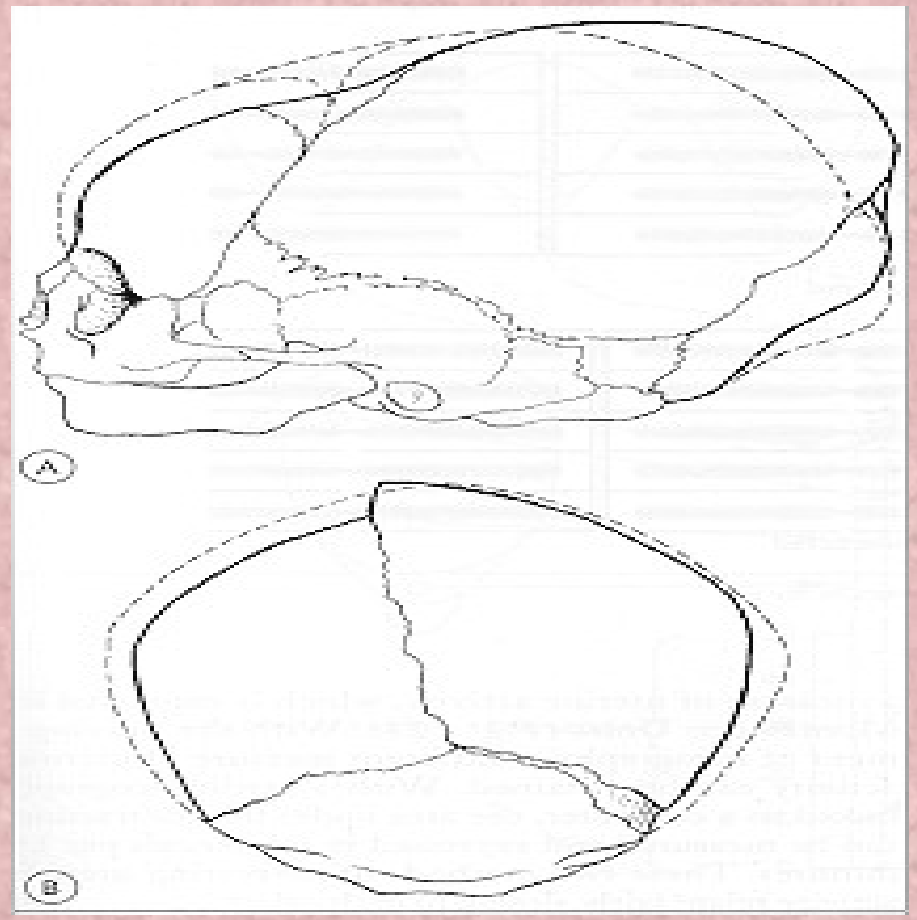
1. **Sagittal suture: -** The sagittal suture lies between the parietal bones. It runs in an anteroposterior direction between the anterior and posterior fontanelles.

2. **Coronal sutures: -** The suture uniting the parietal bones to the frontal bones is called the coronal suture. It's extend transversely from the anterior fontanels and lies between the parietal and frontal bone.

3. **Frontal suture: -** The frontal suture is between the two frontal bones. It is an anterior continuation of the sagittal suture.

4. **Lambdoidal suture: -** Is between the parietal and occiptal bones.

THE FETAL SKULL



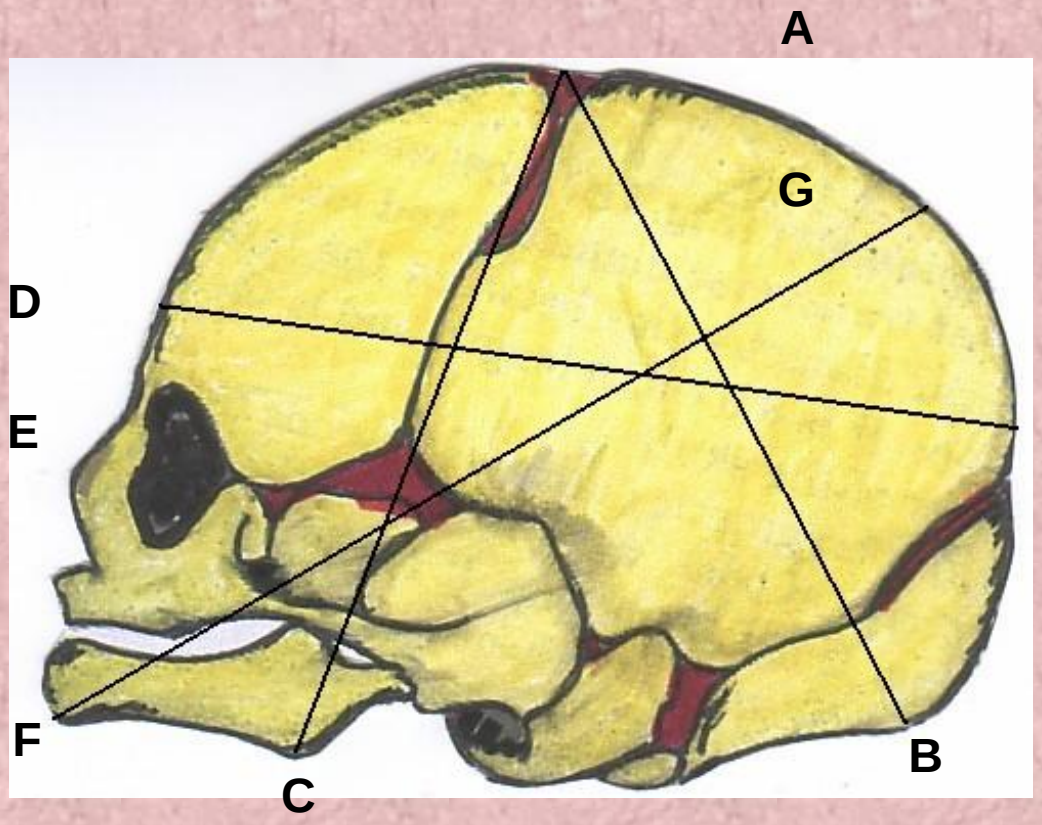
MOULDING OF THE FETAL SKULL

MOULDING’ is the ability of the fetal head to change its shape and so to adapt itself to the unyielding maternal pelvis during the progress of labour.

This property is of the greatest value in the progress of labour.

THE FETAL SKULL

Diameters of the fetal skull – anterior posterior diameters



AB ~ Suboccipto bregmatic – 9.5

AC ~ Submento bregmatic – 9.5

DE ~ Occipito frontal -- 11.0

FG ~ Mento vertical – 13.5

POWER ► Contractions + Maternal pushing

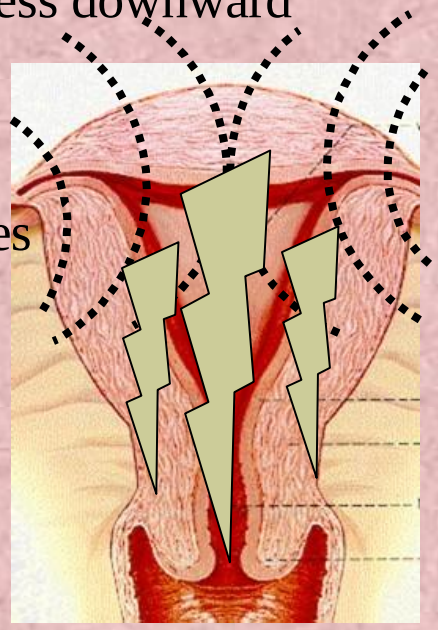
Uterine contractions:

1. Initiate by pacemakers ~ uterotubal junction
2. Contraction waves meet at the fundus
3. Contraction waves progress downward

↓

θ Shortening of muscle fibres
θ Retractions

↑ intra uterine pressure



Additional force

↓

"maternal pushing"

↓

Intra abdominal pressure

EXPULSION OF THE FETUS

Power

Primary and secondary force to expel fetus.

Primary power: Involuntary uterine contraction

•Responsible for effacement and dilation of cervix

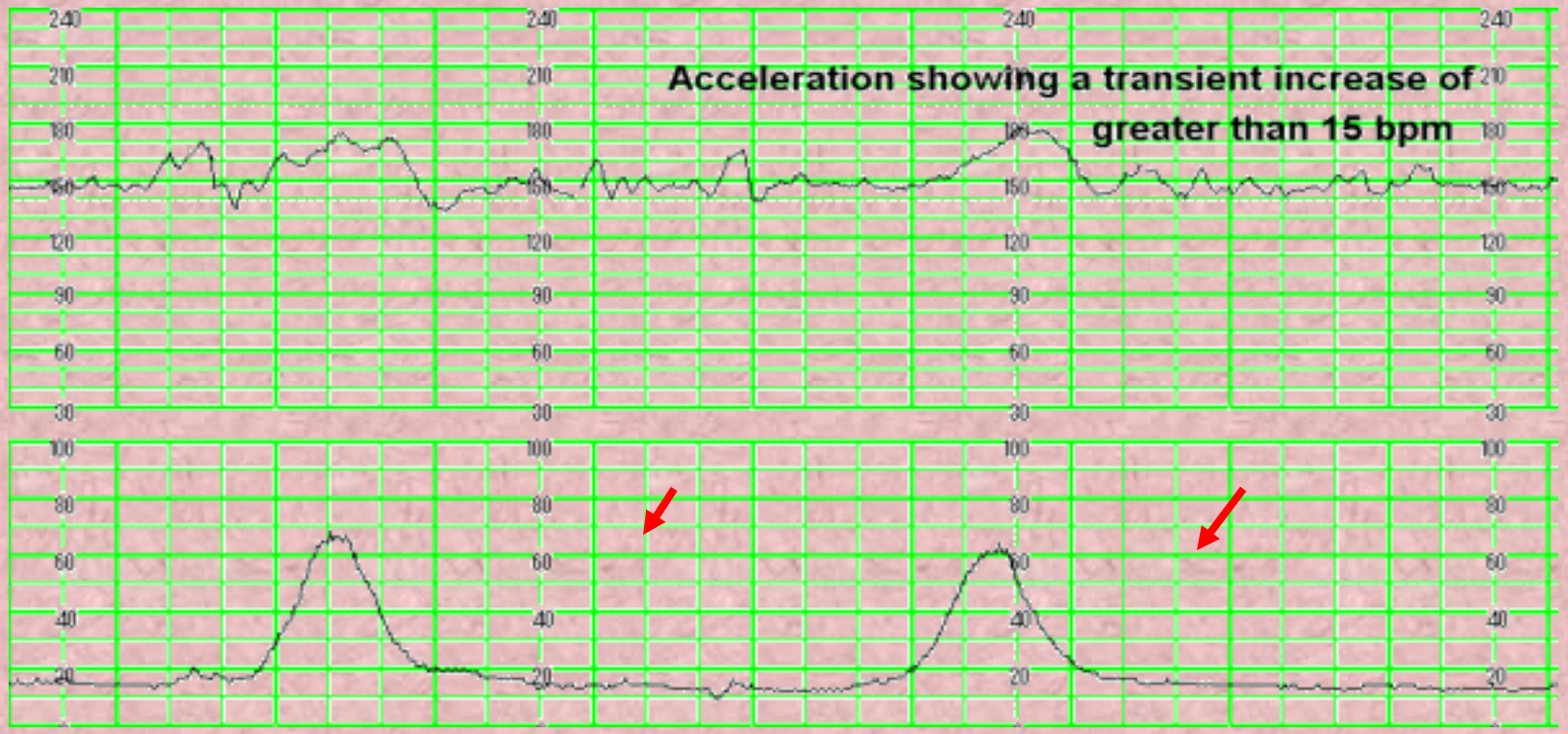
Secondary powers

Contraction changes to expulsive.

Voluntary bearing down of mothers.

No efforts in cervical dilation.

UTERINE CONTRACTION



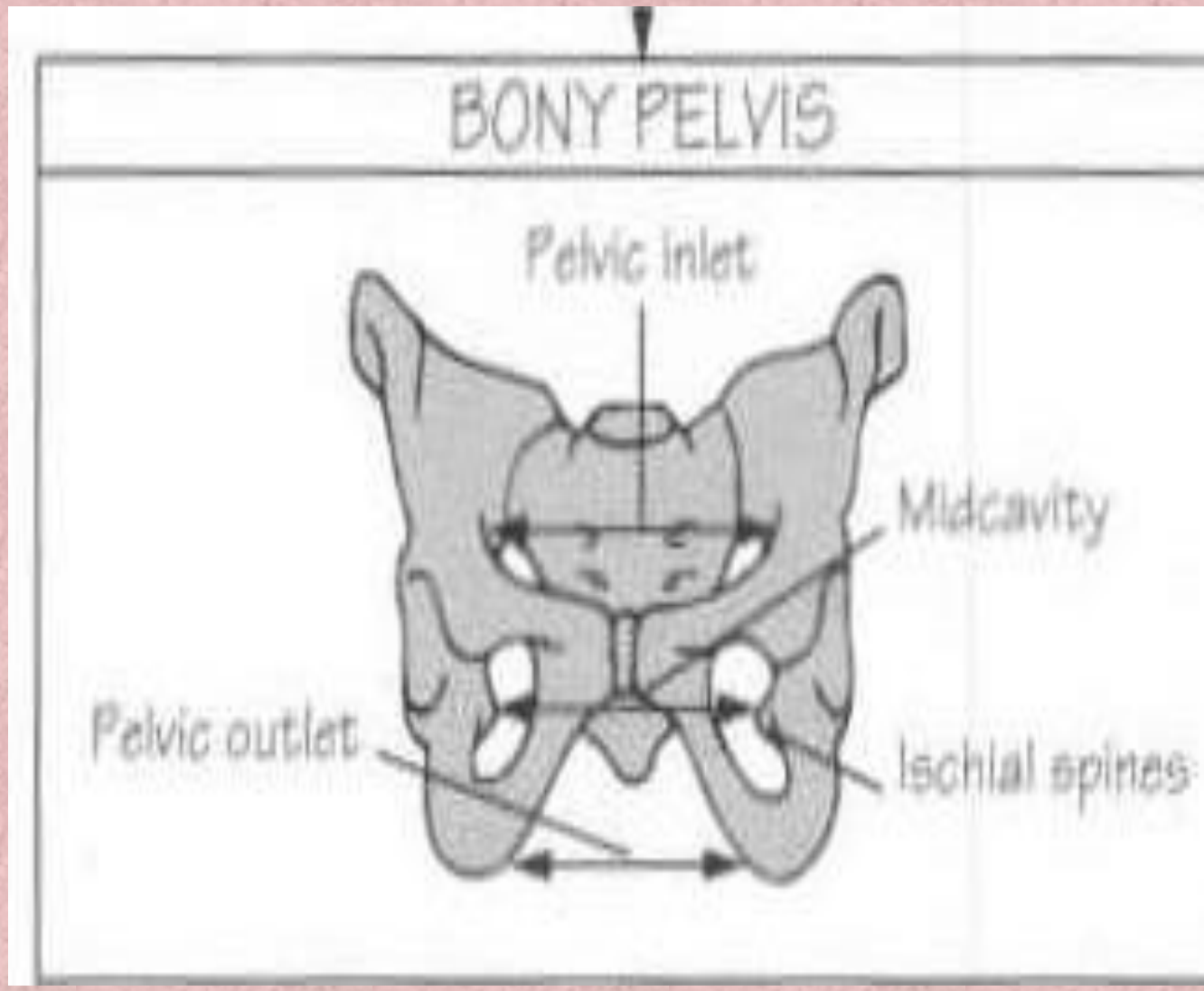
Uterine contractions

NORMAL CONTRACTION

1. Frequency ~ one in every 2 – 3 min with at least 1 minute interval
2. Intensity ~ strong (> 50 mmHg)
3. Duration ~ 45 – 60 sec

Passage

- *Soft tissue passage*: change in uterus, cervix, vagina , pelvic floor
- *Bony Passage*: true pelvis, outlet



Passanger

- Fetus, placenta, membrane, liquor amnii, cord.

- The passage of fetus is determined by various factors: the size of the fetal head, fetal presentation, fetal lie, fetal attitude

NORMAL LABOUR

Causes of Onset of Labour:

- It is unknown but the following theories were postulated:

Hormonal factors

1)Estrogen theory

2)Progesterone withdrawal theory

3)Prostaglandins theory

4)Oxytocin theory

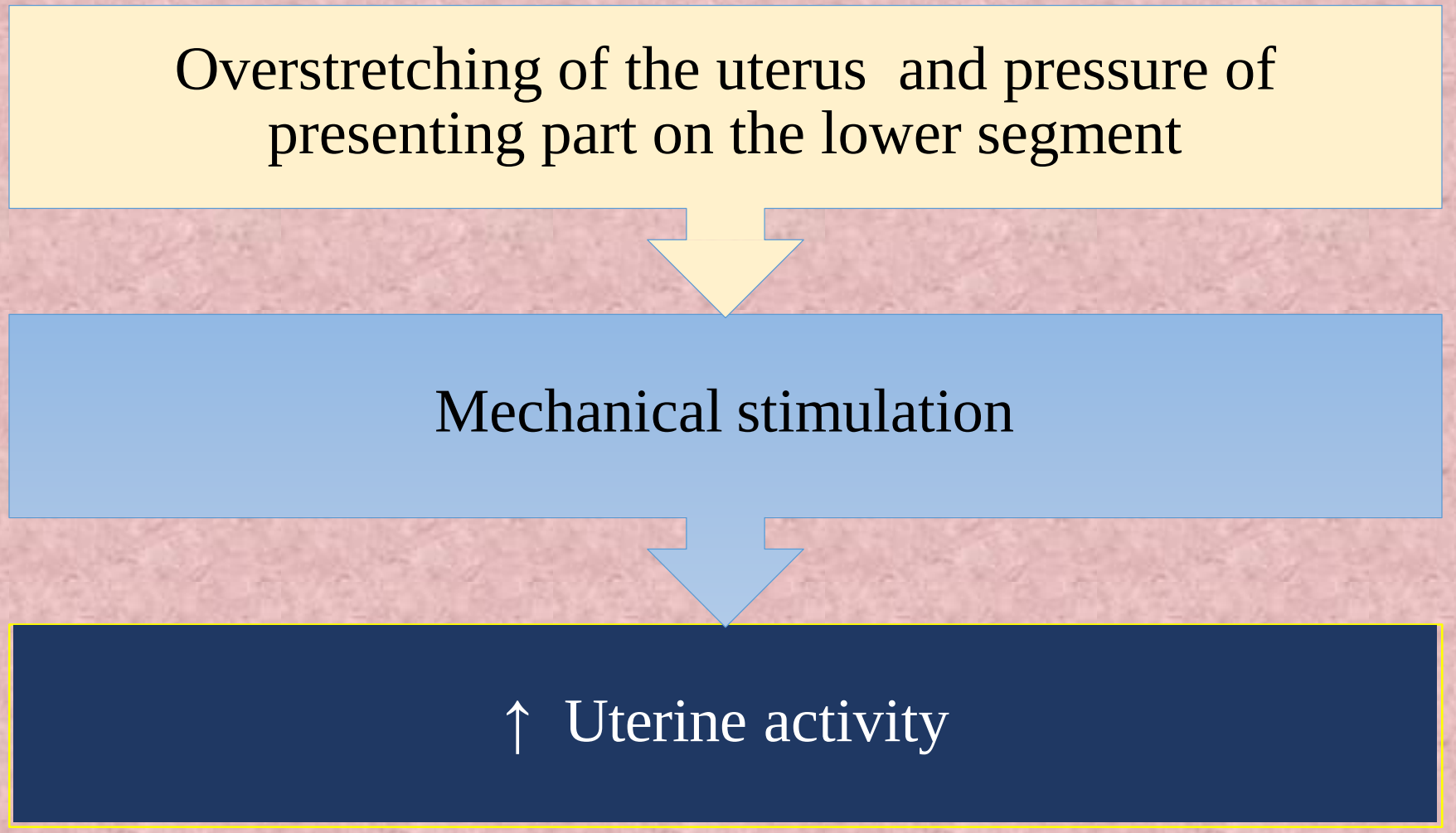
5)Fetal cortisol theory

Mechanical factors

1)Uterine distension theory

2)Stretch of the lower uterine segment by the presenting near term

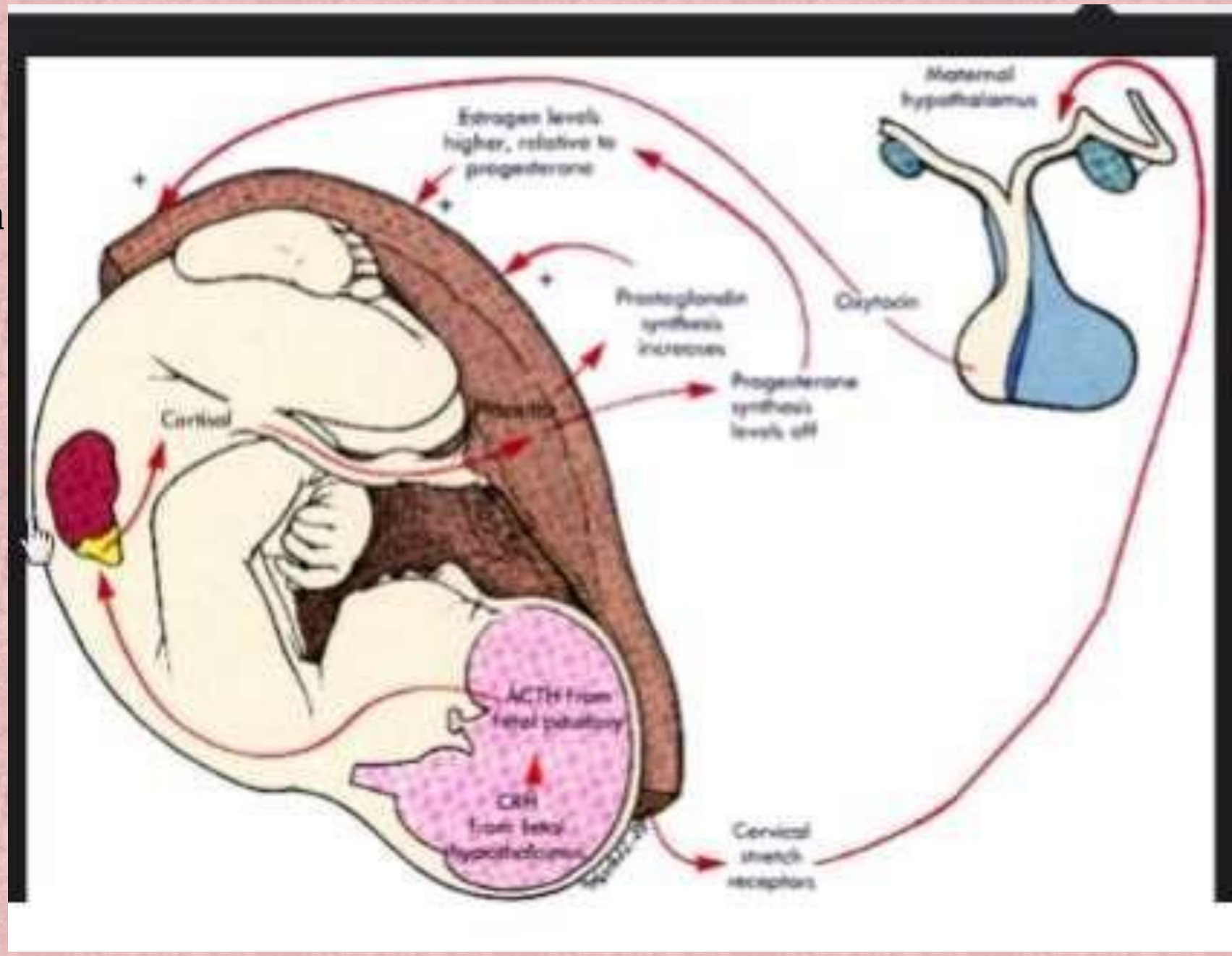
Mechanical factors



Hormonal factors

Feto-placental contribution

Cascade of events activates the fetal Hypothalamic pituitary adrenal axis prior to the onset of labour.



Parturition Cascade

Fetus

Hypothalamus
CRH

Fetal pituitary

CRH

ACTH

Cortisol

Fetal adrenal

DHEA-S

Estrogens

Fetal liver

Placenta

Placenta (see P.59)

↑ Oxytocin

↑ Prostaglandins (PGE2, PGF2α)

↑ Estrogen

↓ Progesterone

↑ Interleukins 1, 6, 8

Mother

Hypothalamus → posterior pituitary → oxytocin

- ↑ Myometrial Receptors
  - PGs
  - Oxytocin
- ↑ Gap junction
- ↑ Decidual PGF2α
- ↑ Stretch receptor number and sensitivity

Uterus

- Uterine contractions
- ↓
- Labor

Fetal hypothalamic pituitary adrenal axis stimulated prior onset of labour

↑ corticotrophic Releasing hormone

↑ release of adrenocorticotrophic hormone

↑ Fetal adrenal activity

↑ cortisol secretion from fetal adrenal

↑ Production of oestrogen and prostaglandin from placenta

Uterine contraction

MODE OF ACTION

ESTROGEN Theory

Promotes synthesis of receptors for oxytocin in the myometrium and decidua

Release of oxytocin from maternal pituitary

Increase prostaglandin synthesis

Increase myocardial contractile protein

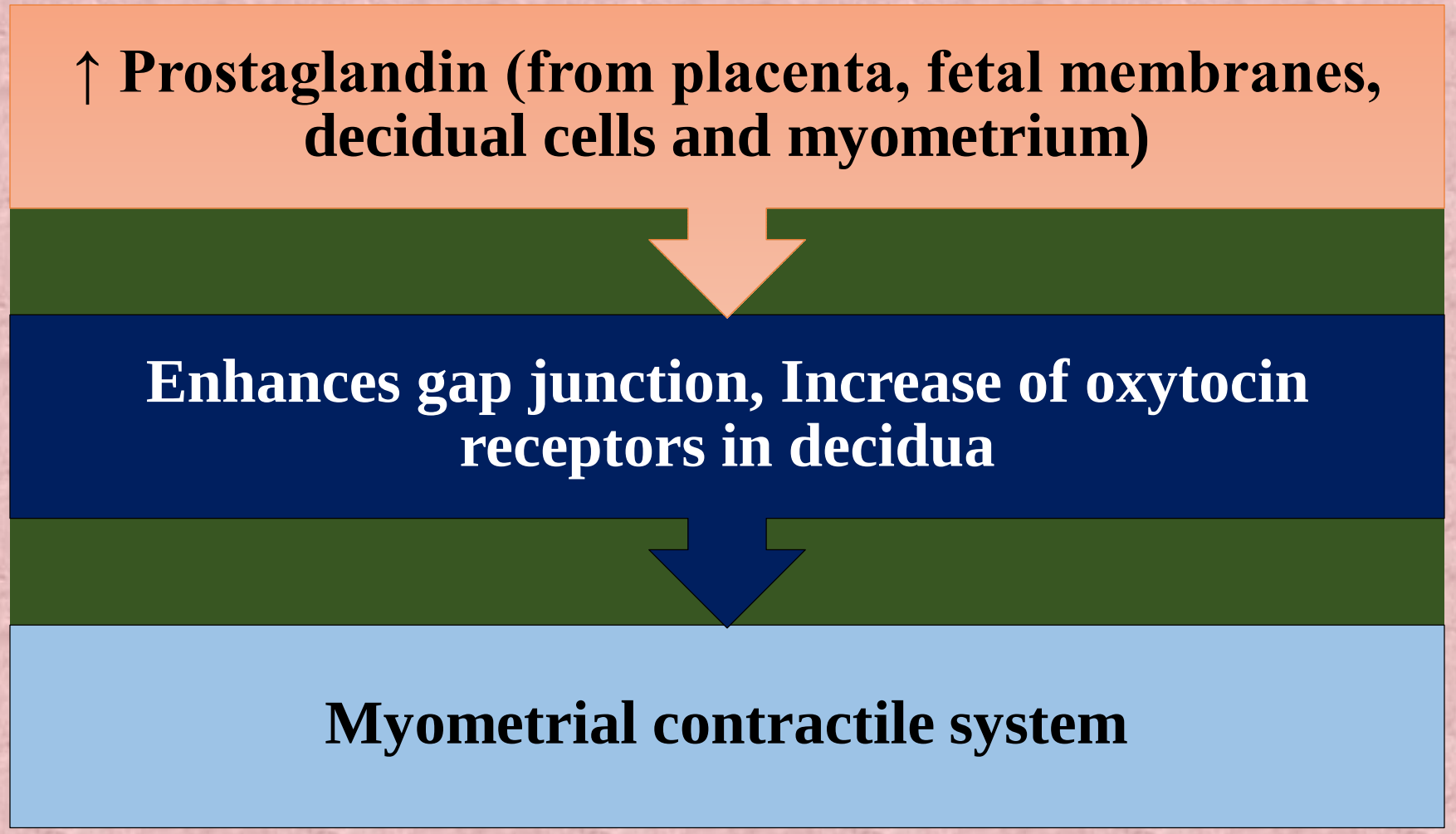
Increase excitability of myometrial cell membrane

Progesterone

During pregnancy, inhibits myometrial contraction, but in late pregnancy

- ↑ fetal production of dehydroepiandrosterone sulphate and cortisol inhibit the conversion of fetal pregnenolone to progesterone
- Decrease Progesterone synthesis
- Alteration of oestrogen, progesterone ratio
- Increase Uterine contraction

Hormonal theory cont…Prostaglandin



Oxytocin theory

- Oxytocin receptors are present in the uterus; they increase in uterus with the onset of labour.
- It promotes the release of prostaglandins from the decidua.
- Vaginal examination and amniotomy cause rise in maternal plasma oxytocin level **(Ferguson reflex).**
- Oxytocin level reach maximum at the moment of birth.

Prostaglandin synthesis is triggered by

- Rise In Oestrogn Level,
- Glucocorticoids,
- Mechanical Stretching In Late Pregnancy,
- Increase In Cyotokines,
- Infection,
- Vaginal Examination,
- Rupture of the Membrane.

3. **Neurological factors**

- Labor may also be initiated through the nerve pathways.
- α and β adrenergic receptors are present in the myometrium.
- Estrogen acts on the α and progesterone acts on the β .
- The contractile response is initiated through the α receptors of the postganglionic nerve fibers in and around the cervix and lower part of the uterus.

SYMPTOMS AND SIGNS OF LABOUR

- Before labour begins, women usually notice one or more premonitory, or
- warnings, signs that labour is about to begin.

- They are:

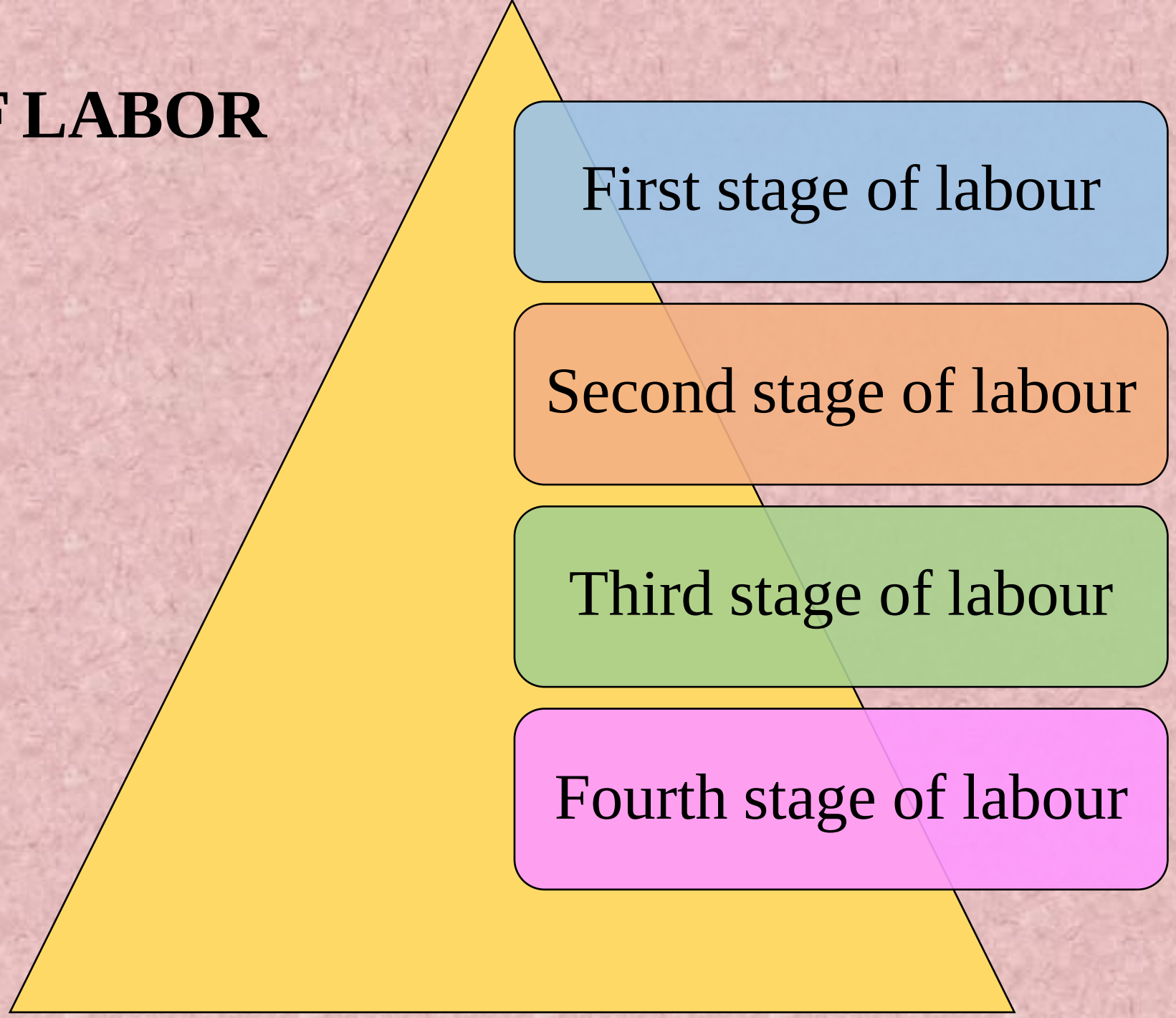
√ Painful regular uterine contractions – as evidence by contraction at least one in ten minutes

√ Show – as evidence by mucus mixed with blood

√ Rupture of membranes – as evidence by leaking liquor

√ Progressive shortening and dilatation of the cervix

STAGES OF LABOR



1st stage (cervical stage)

- Starts from the onset of true labour pain and ends with full dilatation of the cervix.

  Average duration is 12 hrs in primigravidae and 6 in multi

3 sub-stages

- **Latent phase (early)-:** mild intensity and cervix dilates from 0 to 4 cm.
- **Active phase:-** mild to moderate intensity and cervix dilates from 4 to 7 cm.
- **Transitional phase:-** moderate to strong intensity and the cervix dilates from 8 to 10 cm.

2nd stage

- From full dilatation of the cervix and ends with expulsion of the fetus from the birth canal.

  It has 2 phases:

  - **Propulsive phase**:- starts from full dilatation upto the descent of the presenting part to the pelvic floor.
  - **Expulsve phase:-** it distinguished by maternal bearing down efforts and ends with delivery of the baby.

Average duration is 2 hrs in primi and 30 minutes in multi

Third stage of labour (Placental stage)

- Is referred as **placental stage**.
- It begins after the birth of the baby and ends with the expulsion of placenta and membrane.

- Uterine contraction decreases basal blood flow, results in thickening and reduction in the surface area of the myometrium underlying the placenta with subsequent detachment of the placenta.

- The average time duration is 15-30 minutes, but could be reduced up to 5 min. by active management of third stage of labour.

DURATION OF LABOR

	1st Stage			2nd Stage		3rd Stage	4th Stage
	Latent phase	Active phase	Transitio n al phase	Propulsive phase	Expulsiv e phase		
Primi	6-8 hrs	6 hrs	1-2 hrs		1- 2 hrs	15-30 min	1 hr
Total	11-12 hrs			3/4 hr		15-30 min	1 hr
Multi		4 hrs	30min -1 hr		5- 30 min	15-30 min	1 hr
Total	6 ½ hrs			1/4 hrs		15-30 min	1 hr

Fourth stage of labour

- It is the stage of observation for at least one hour after expulsion of the placenta and membranes.

- During this period, general condition of the patient and the behavior of the uterus and bladder are to be observed carefully.

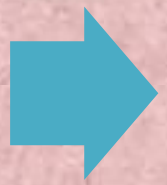
At every 10 minutes interval, assess the contractions

Contractions	Latent phase	Active Phase	Transitional Phase
Frequency	10 – 15 minutes	2 – 5 minutes	2-3 minutes
Duration	15-20 seconds	20-40 seconds	more than 40 seconds
Intensity	Begin and become moderate Mild	Begin and become strong moderate	strong
	....		

PHYSIOLOGY OF NORMAL LABOUR

Physiology of normal labour complete into two steps -

UTERINE CONTRACTION

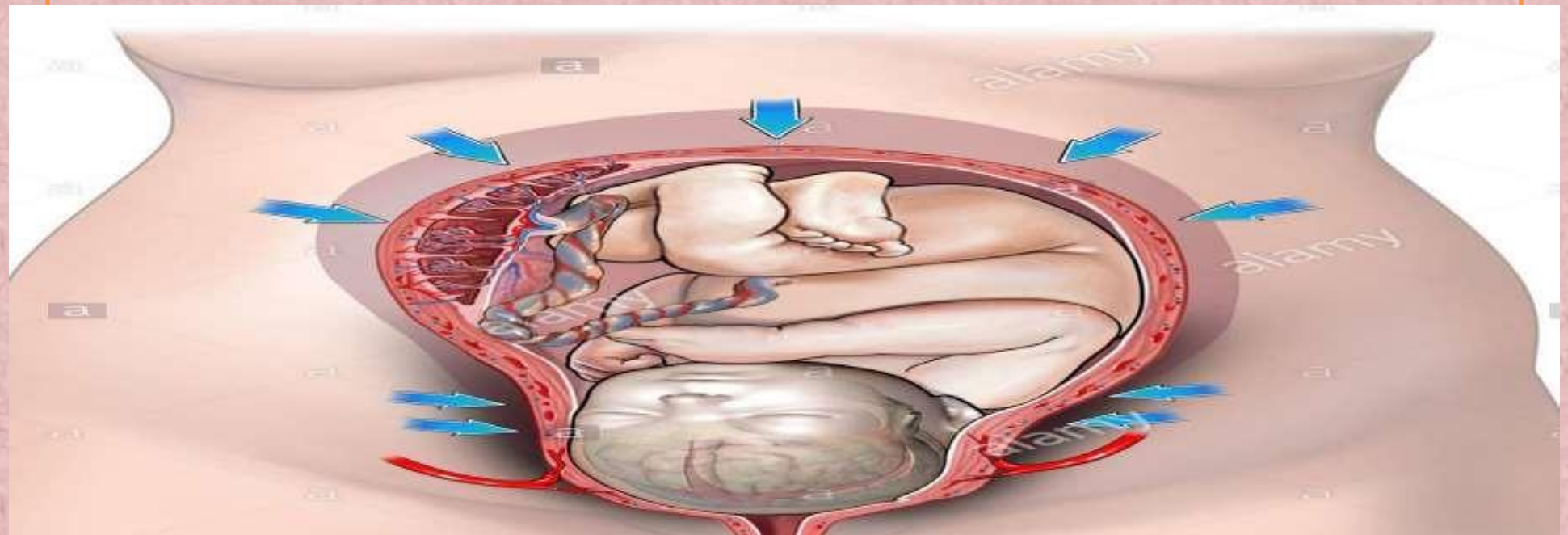


RETRACTION

PHYSIOLOGY OF NORMAL LABOUR

1. Uterine contraction :

During contraction, uterus becomes hard and somewhat pushed anteriorly to make the long axis of the uterus in the line with that of pelvic axis.



PHYSIOLOGY OF NORMAL LABOUR

1. Uterine contraction :

Simultaneously, the patient experiences pain which is situated more on the hypogastric region, often radiating to the thighs.

PHYSIOLOGY OF NORMAL LABOUR

PHYSIOLOGY OF NORMAL LABOUR

1. Uterine contraction :

Probable **cause** of pain are –

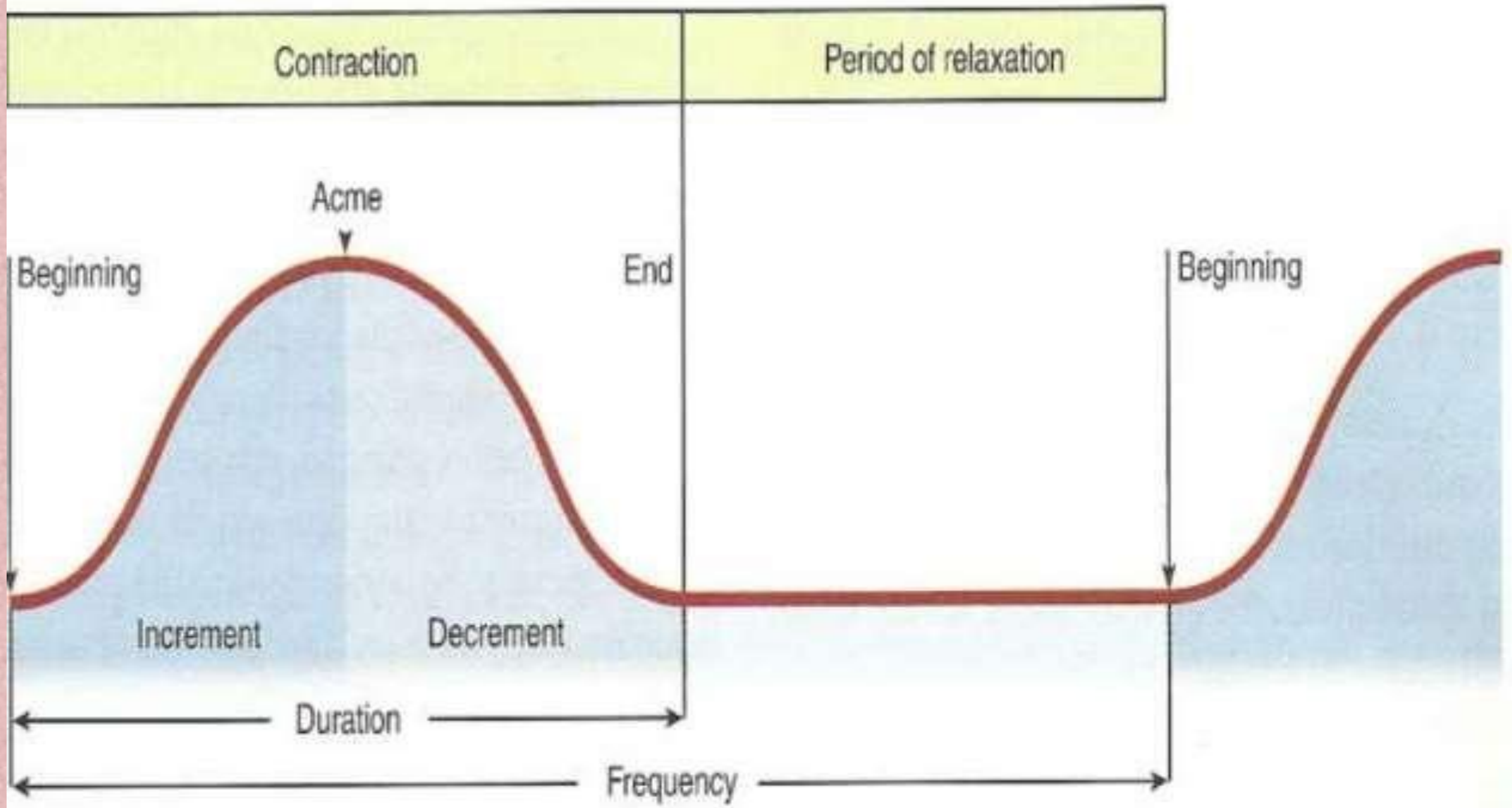
a)Myometrial hypoxia during contractions.

b)Stretching of the peritoneum over the fundus.

c)Stretching of the cervix during dilatation.

d)Compression of the nerve ganglion.

The pain of uterine contractions is distributed along the cutaneous nerve distribution of T10 to L1.


Contraction
Period of relaxation
Acme
Beginning
End
Beginning
Increment
Decrement
Duration
Frequency

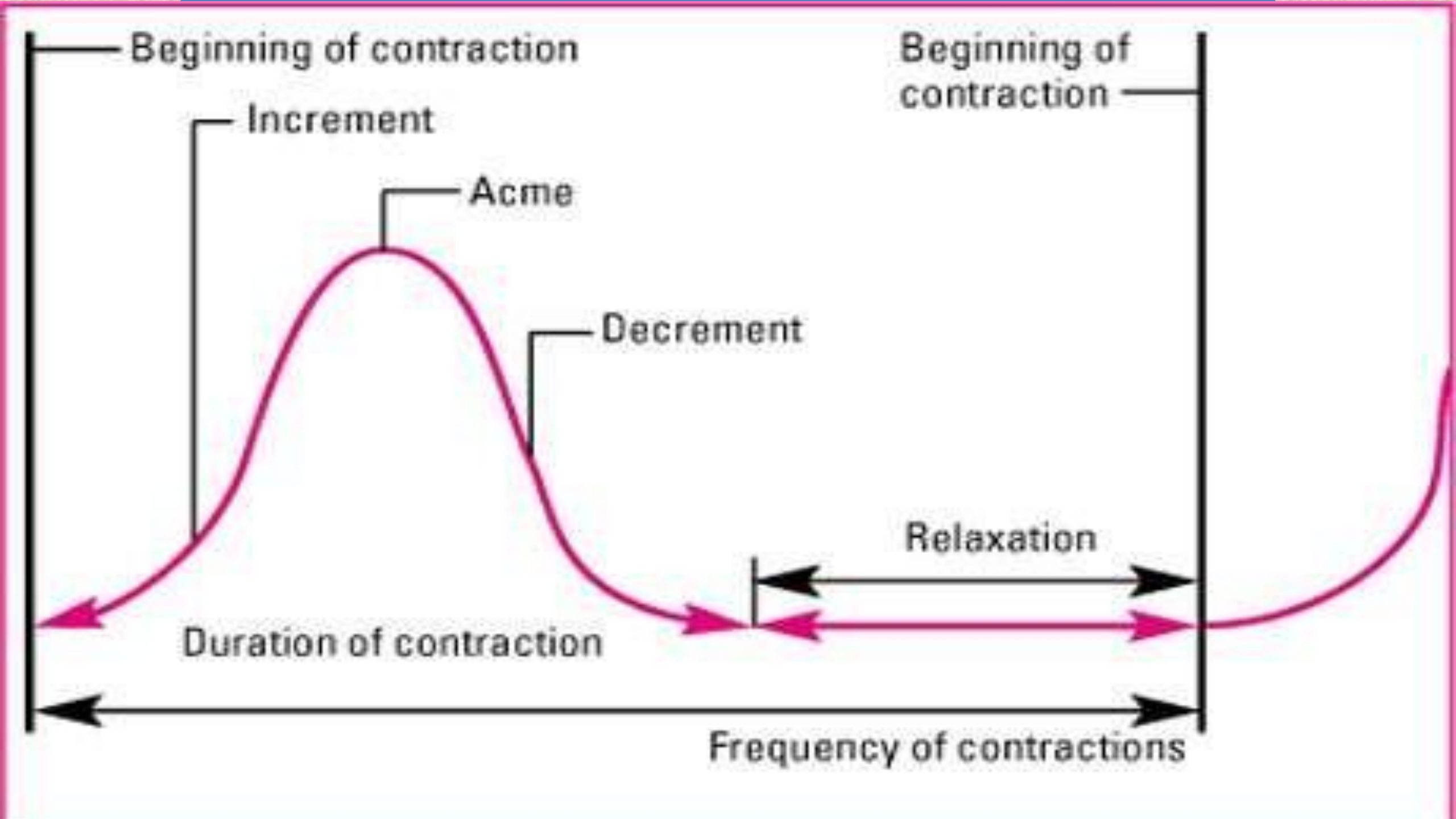
- **INTENSITY –**

❖The intensity of uterine contractions describes the degree of uterine systole.

❖The intensity gradually increases with advancement of labouruntil it

- becomes maximum in the second stage during delivery of the baby.

❖Intrauterine pressure is raised to 40-50 mm Hg during first stage and about 100-120 mm Hg in the second stage of labour during contractions.


Beginning of contraction
Beginning of contraction
Increment
Acme
Decrement
Relaxation
Duration of contraction
Frequency of contractions

• **DURATION**

❖In the first stage, the contractions last for about 30 second initially but

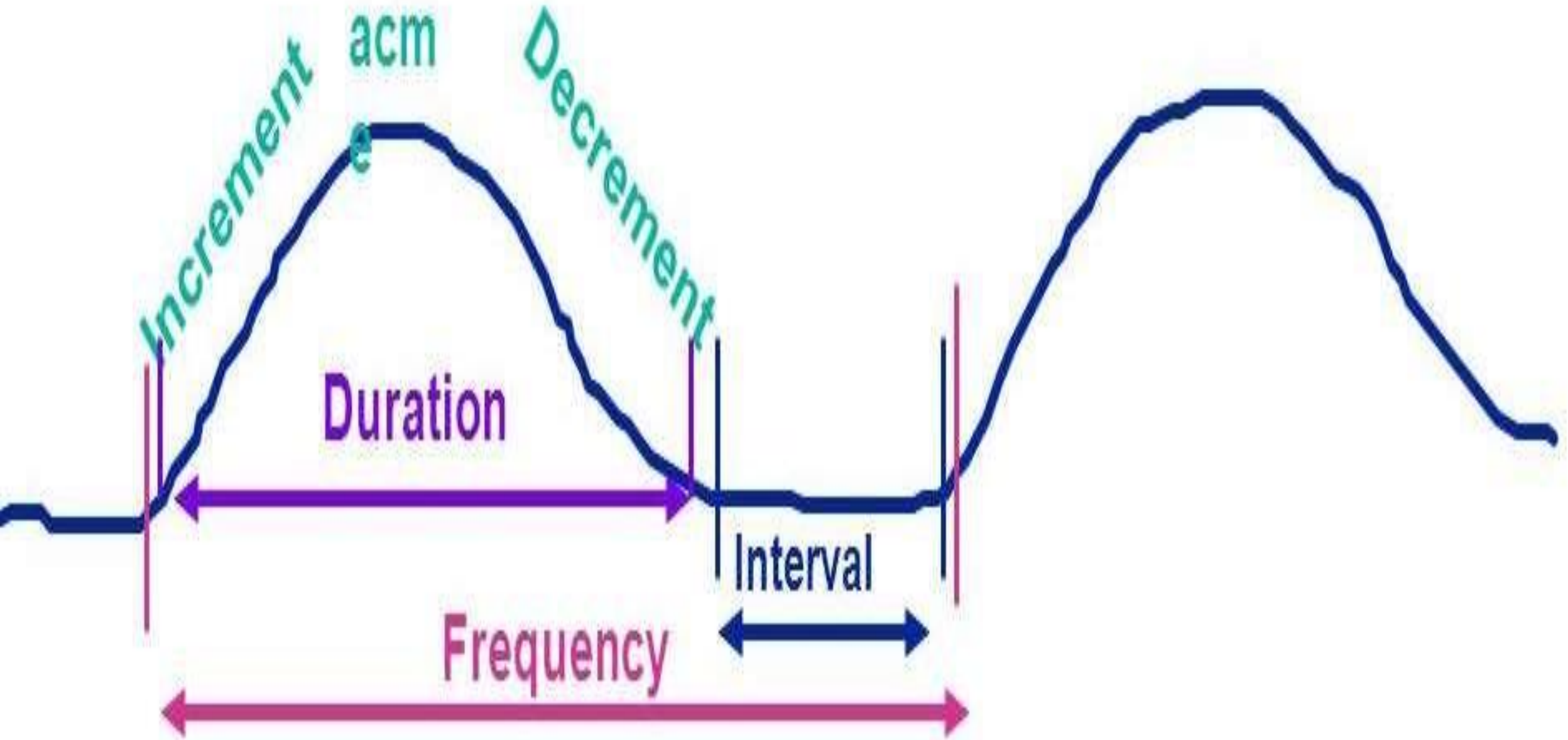
• gradually increases in duration with the progress of labour.

❖Thus in the second stage, the contractions last longer than in the first stage

• **FREQUENCY**

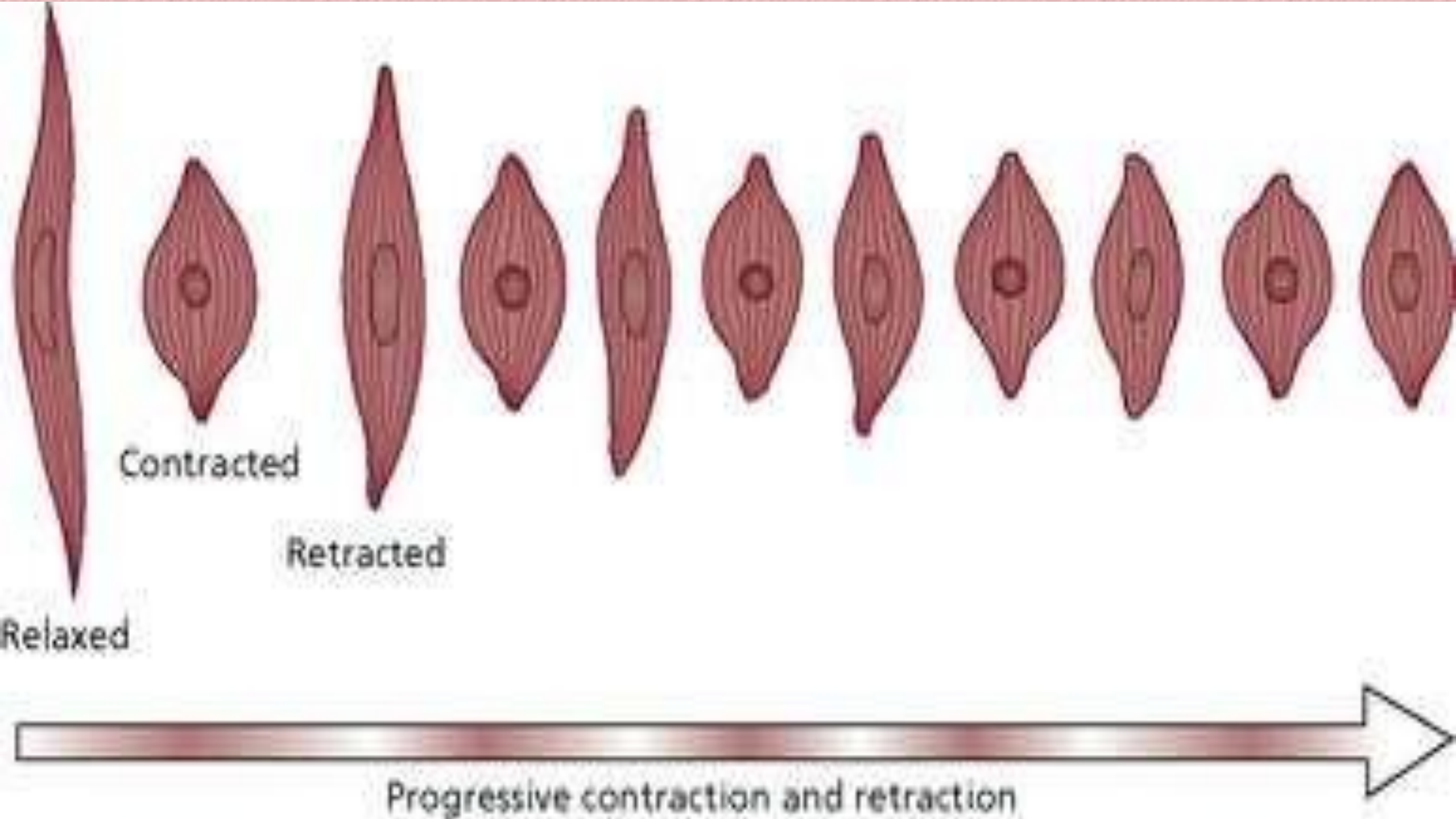
❖In the early stage of labour, the contractions come at intervals of **ten to fifteen minutes.**

❖The intervals gradually shorten with advancement of labour until in the second stage, when it comes every two or three minutes.


Increment
acm
e
Decrement
Duration
Interval
Frequency

Retraction

- Retraction is a phenomenon of the uterus in labour in which the muscle fibres are permanently shortened


Contracted
Retracted
Relaxed
Progressive contraction and retraction

- ❖ Contraction is a temporary reduction in length of the fibers, which attain their full length during relaxation.

- ❖ In contrast,
- retraction results in permanent shortening and the fibers are shortened once and for all.

- PROGRESS OF FIRST STAGE OF LABOUR
- Findings suggestive of satisfactory progress in first stage of labour are:

- regular contractions of progressively increasing frequency and duration;
- rate of cervical dilatation at least 1 cm per hour during the active phase of labour (cervical dilatation on or to the left of alert line);

- Findings suggestive of unsatisfactory progress in first stage of labour are:

- irregular and infrequent contractions after the latent phase;
- OR rate of cervical dilatation slower than 1 cm per hour during the active phase of labour (cervical dilatation to the right of alert line);

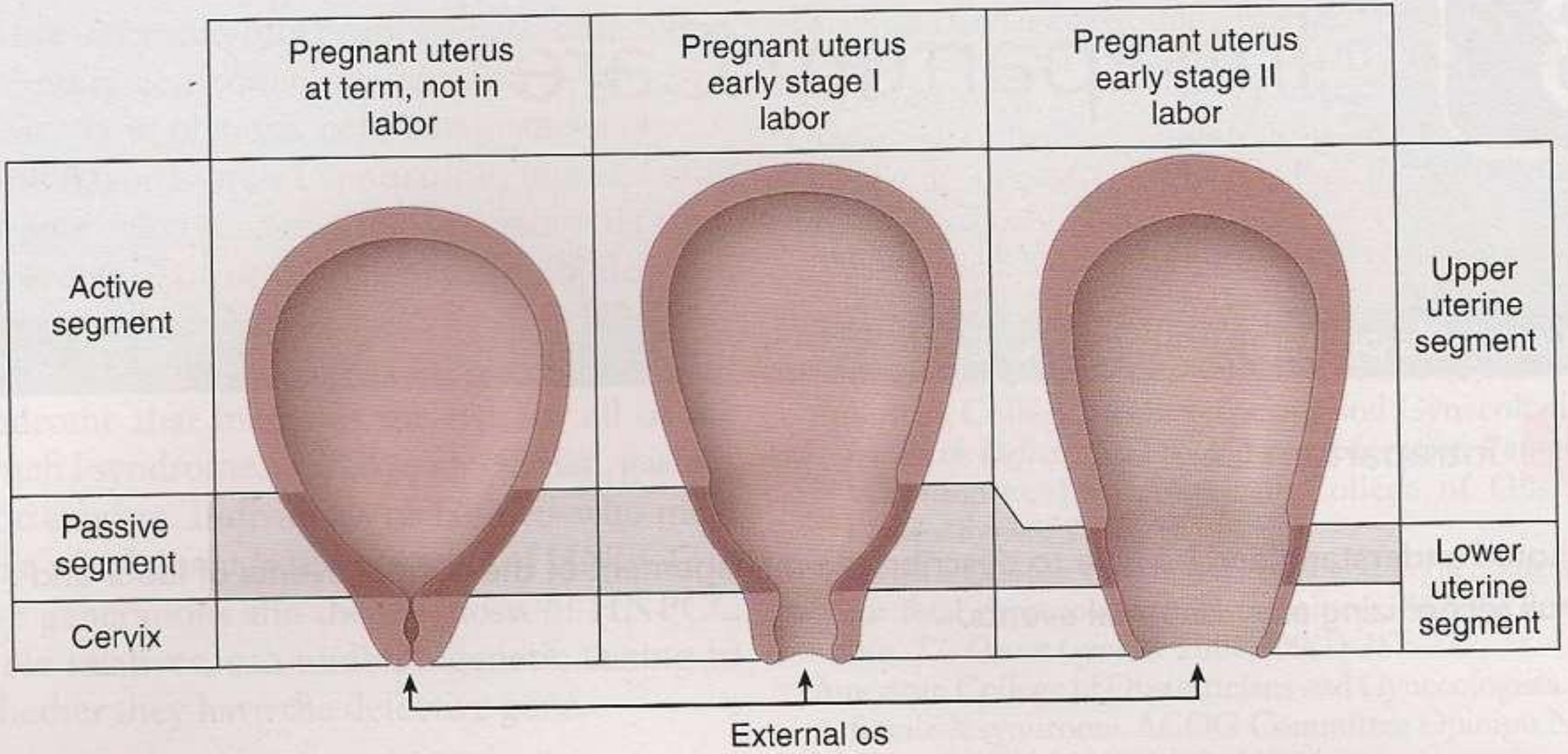
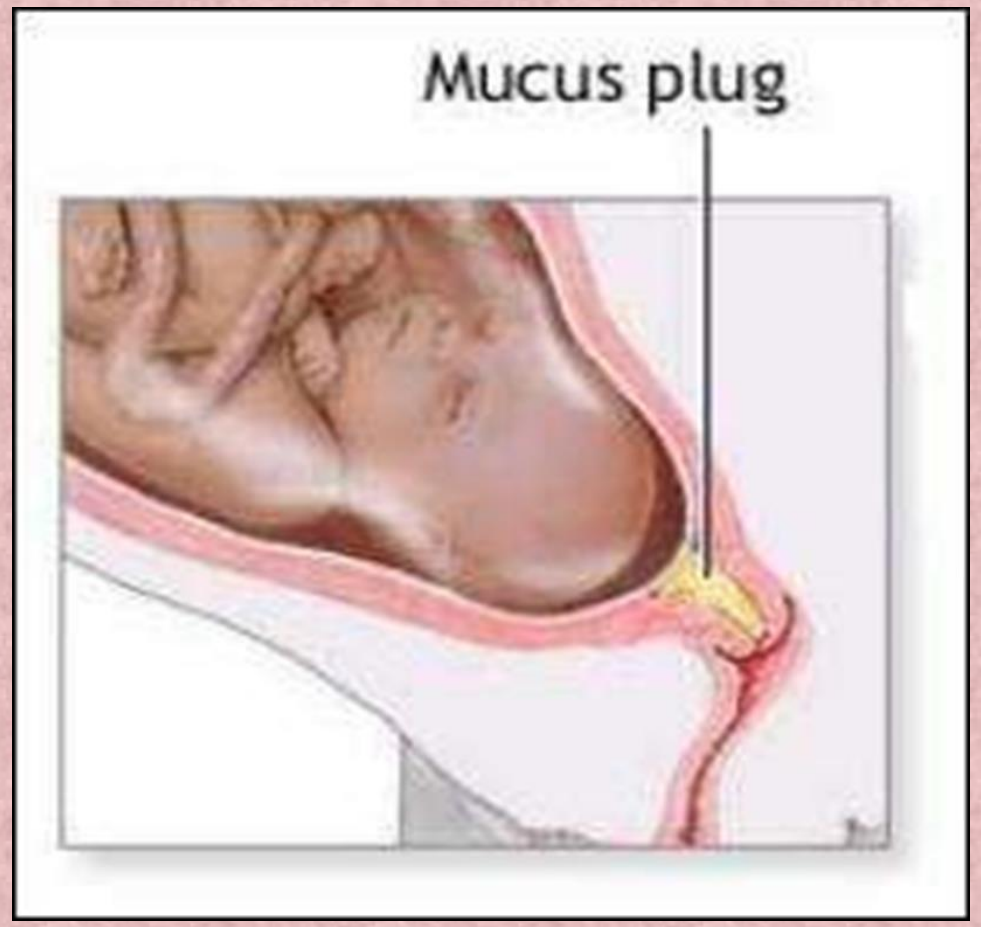
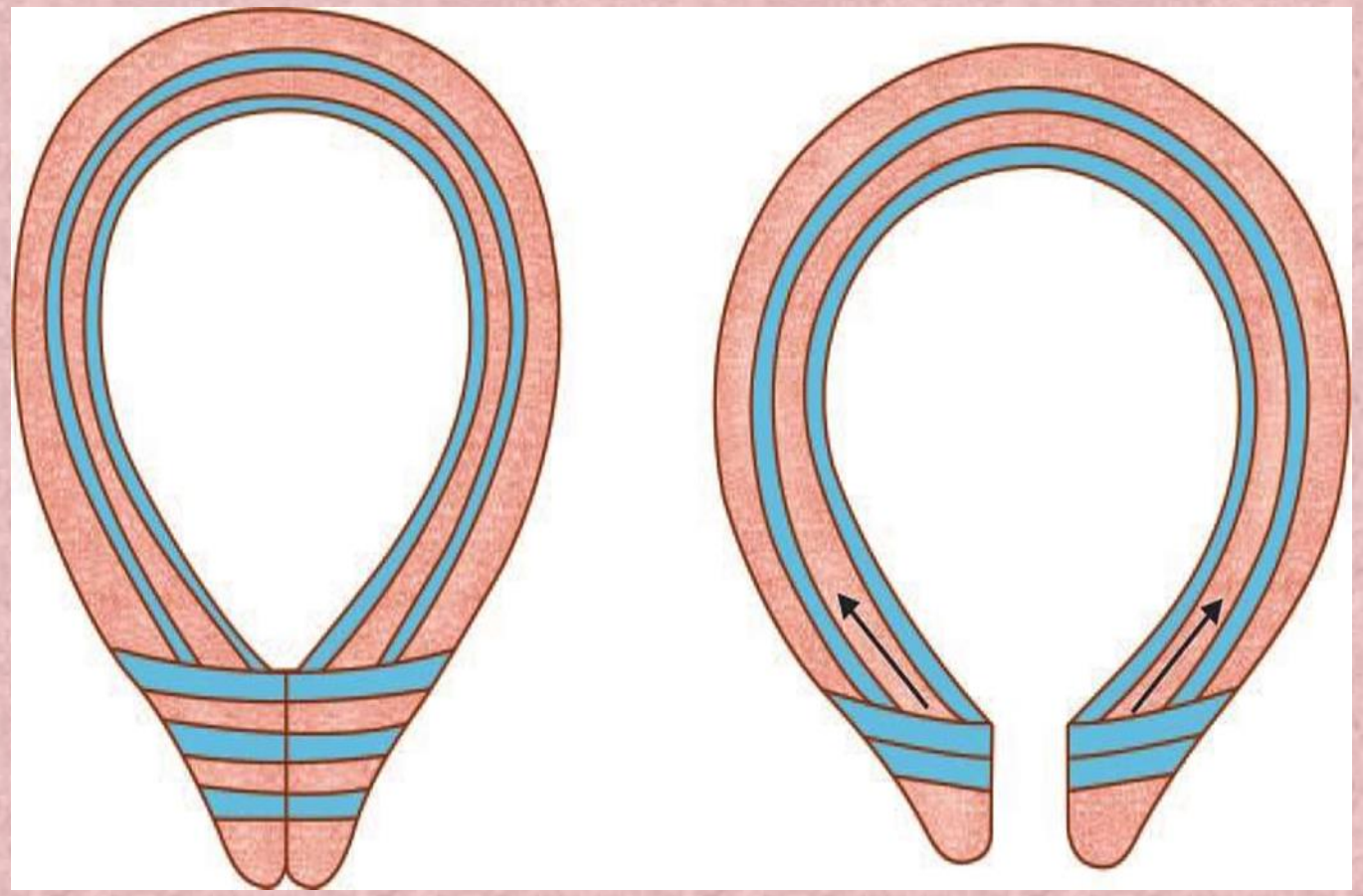


FIGURE 8.1. Mechanism of effacement, dilation, and labor. With continuing uterine contractions, the upper uterus (active segment) thickens, the lower uterine segment (passive segment) thins, and the cervix dilates. In this way, the fetus is moved downward, into and through the vaginal canal.

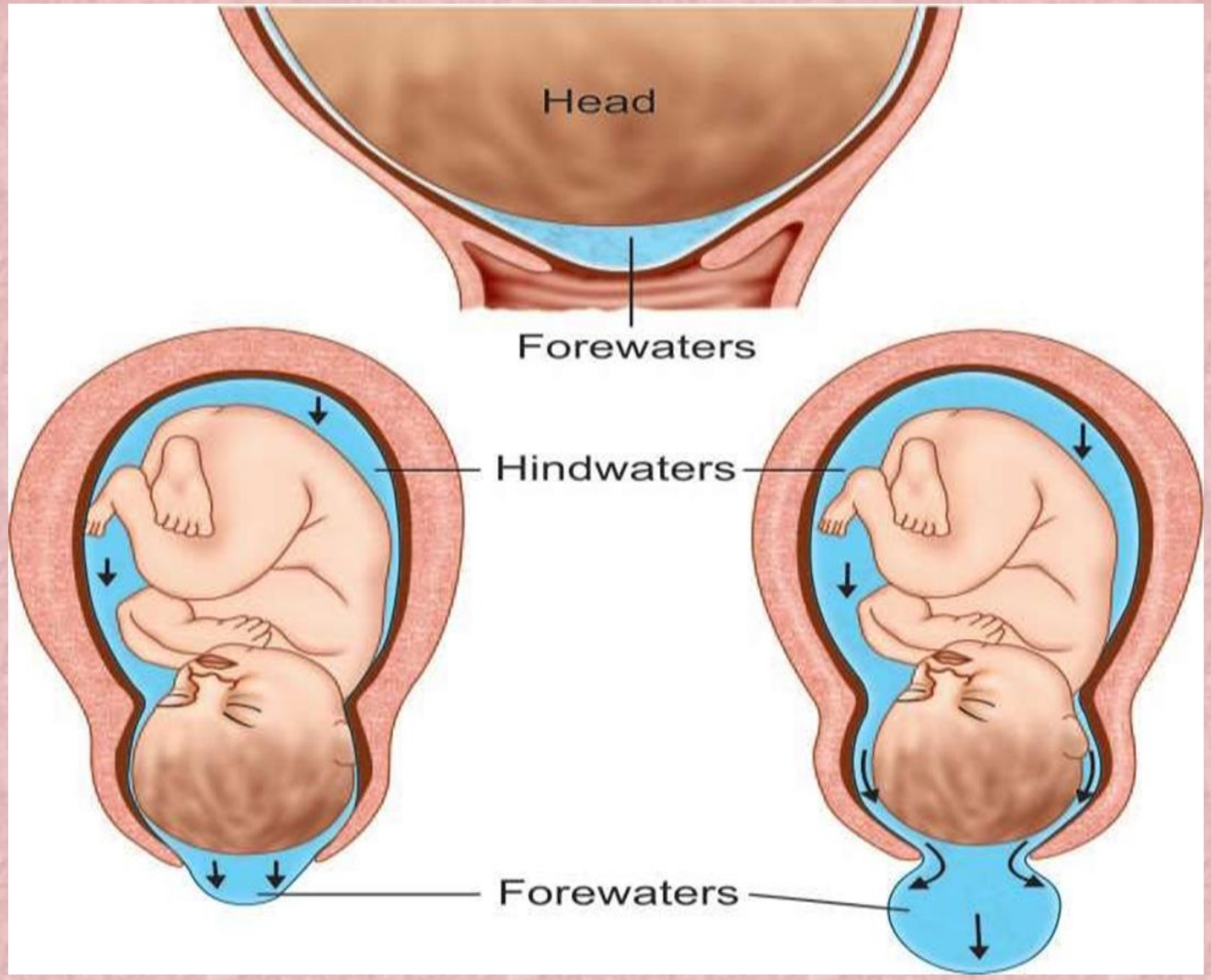
Appearance of show

Dilatation of internal os





Formation of bag of water



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Thank you