

STAGES OF LABOR

Premonitory stage

First Stage

Second stage

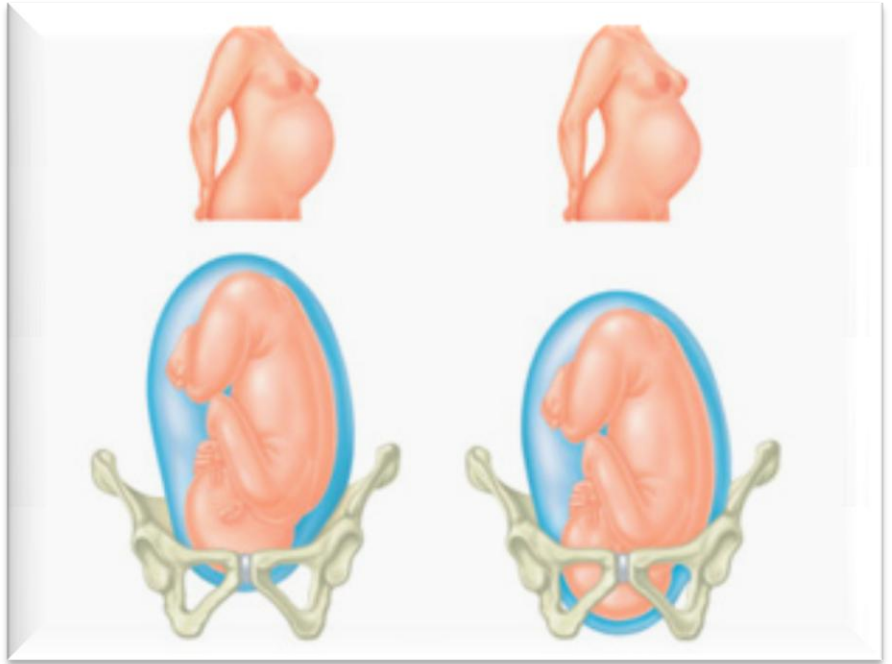
Third stage

Fourth stage

PREMONITORY STAGE

Lightening /welcome sign

1. When the largest diameter of the presenting part passes the pelvic inlet, the head is said to be engaged.
2. This is the descent/setting of the presenting part into the pelvic inlet
3. 10-14 days before labor in primigravida and 1 day before labor in a multipara.



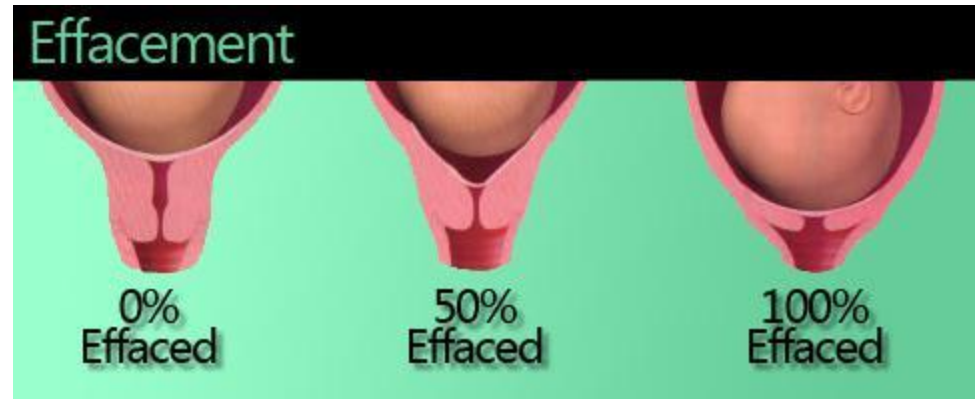
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- Increased frequency of voiding
- Increased amount of vaginal discharge
- Increased lordosis as the fetus enters the pelvis and falls further forward
- Increased varicosities
- Shooting pains down the legs because of pressure on the sciatic nerve

Contd...

Cervical changes

1. Soft
2. 80% effaced (<1.5 cm in length)
3. Admits one finger easily
4. Cervical canal is dilatable



Contd...

Appearance of false pain

Factors	True labor	False labor
Contractions timing	Regular intervals, becoming close together, usually 4-6 minutes apart, lasting 30-60 seconds.	Irregular intervals, not occurring close together
Contraction strength	Becomes stronger with time, vaginal pressure is usually felt	Frequently weak, not getting strong with time
Contraction discomfort	Start in the back and radiates around toward the front of the abdomen	Usually felt in the front of the abdomen

Contd...

Factors	True labor	False labor
Position changes	Contractions continue no matter what positional changes is made	Contraction may stop or slow down with walking or changing position
Effect of analgesia	Not terminated by sedation	Frequently abolished by sedation
Cervical change	Progressive effacement and dilation	No change

Contd...

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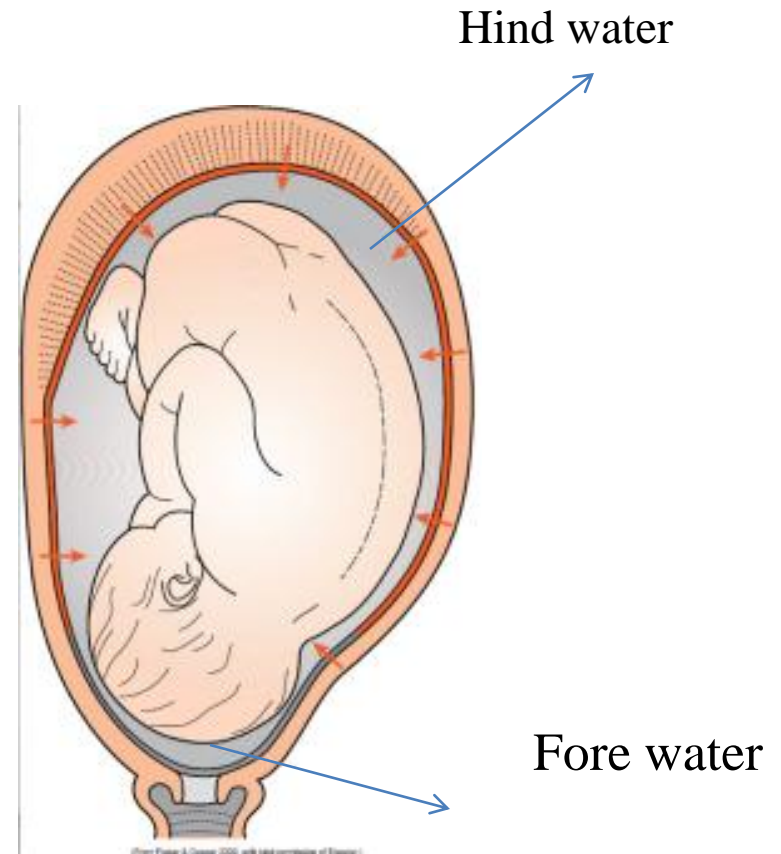
- The **mucus plug** of the cervical canal during pregnancy is expelled as a result of cervical softening and increased pressure of the presenting part.
- The exposed **cervical capillaries** release a small amount of blood that mix with the mucus, resulting in bloody show.



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Formation of bag of waters

Due to stretching of the lower uterine segment the membranes are detached easily because of its loose attachment to the poorly formed decidua.

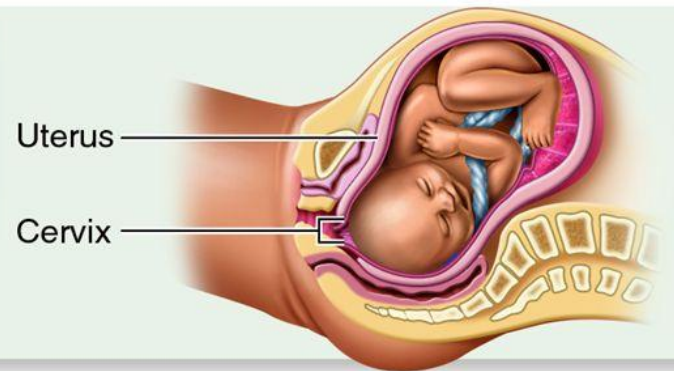


First Stage of Labor

The First stage: stage of cervical effacement and dilatation

Definition :the first stage of labor refers to the period from the onset of true uterine contractions to the full dilation of the cervix, when the diameter of the cervical os measures 10cm.

Stage 1:
The cervix relaxes,
causing it to dilate
and thin out.



Contd...

Duration:

- Primigravida = 8-12 H
- Multigravida = 6-8 H

Phases of the first stage:

- Latent phase: starts when the cervix dilate slowly and reaches to about 3cm.
 - A. In primigravida = 8h
 - B. In multigravida = 4h
- Active phase: rapid dilatation of the cervix to reach 10cm
 - A. In primigravida = 4h
 - B. In multigravida = 2h

Second Stage of Labor

II-The Second stage of labour:

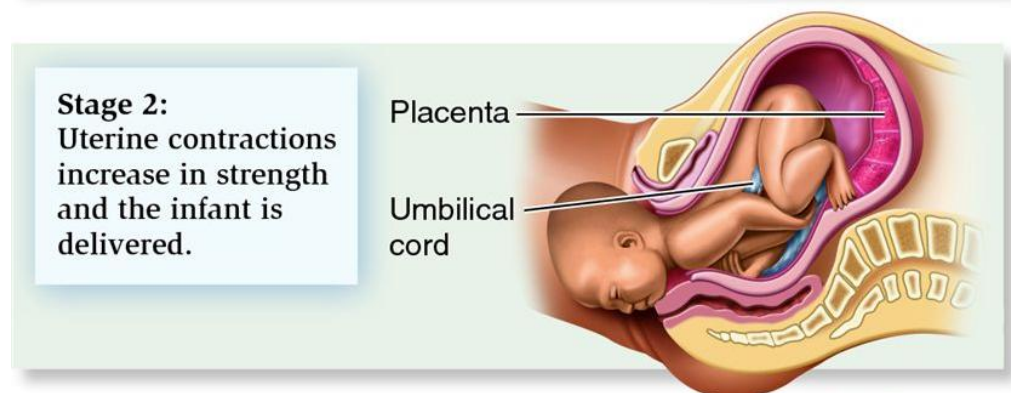
Stage of delivery of the fetus.

Definition: the second stage of labor refers to the period from complete cervical dilatation to the birth of the fetus. Viable fetus

Duration:

A. primigravida = 2 h

B. multigravida = 1/2 h



Contd...

The second stage of labor has two phases:

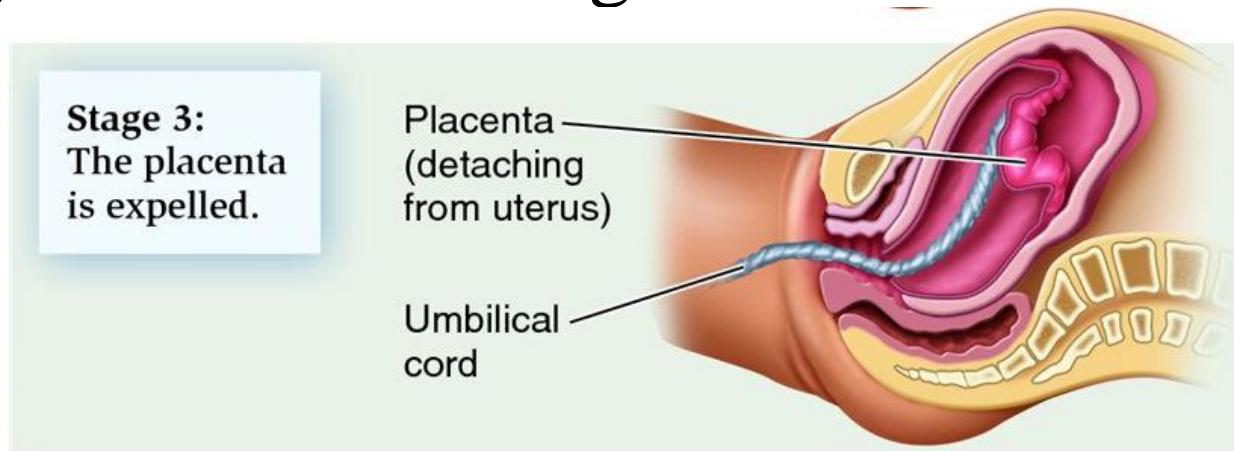
1. **Propulsive phase** – stage of descent of the presenting part and dilatation of the vagina – due to contraction and retraction of the uterine muscle.
2. **Expulsive phase** – stage of bearing down – due to contraction and retraction of the uterine muscle and voluntary efforts by diaphragm and abdominal muscles

Third Stage of labor

III-The Third stage of labor:

The stage of expulsion of the placenta and membranes.

Duration: up to 30 minutes, however the average length of the third stage of labor is 10 minutes.



Fourth stage of Labour

It is the stage of observation for at least 1 hour after the expulsion of the placenta.



Physiology of labour

Uterine contractions in labor

Characteristics

Pace makers : two cornual region

1. Regular and progressive
2. Fundal dominance
3. Synchronized
4. Intra amniotic pressure : >25 mm of Hg

First stage: 45 mm of Hg

Second stage: 90 mm of Hg

Resting tone: 6-10 mm of Hg

5. Pain

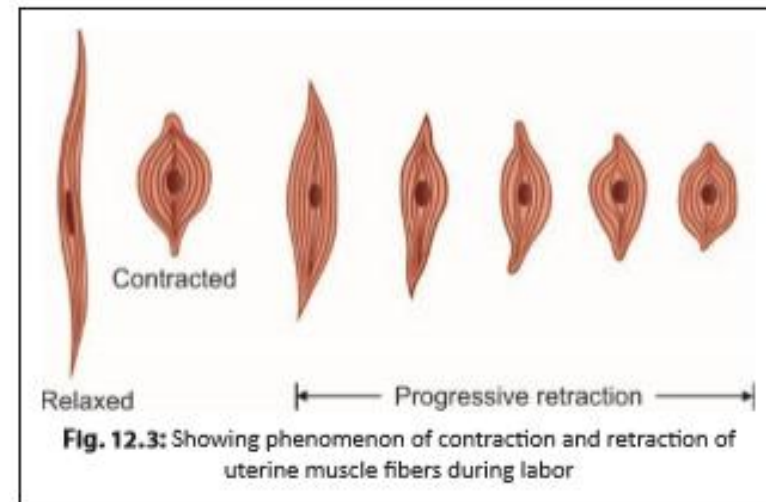
- Myometrial ischemia
- Peritoneal stretching
- Cervical stretching
- Pressure on nerve ganglions
- Early stage – T₁₀-L₁
- Late stage – S_{2,3,4}



Intensity	Frequency	Duration	Indentability of the uterus
Mild	Every 6 min	< 20 sec	Easy
Moderate	Every 4–5 min	20-40 sec	Slight
Severe	Every 2–3 min	40- 60 sec	None

Retraction

- Retraction is a unique property of the uterine muscle fibers
- Here the muscle fibers once shortened during contraction will not regain their original length even after the contraction is over.
- Permanent shortening of the muscle fibers.



Events in First stage of labor

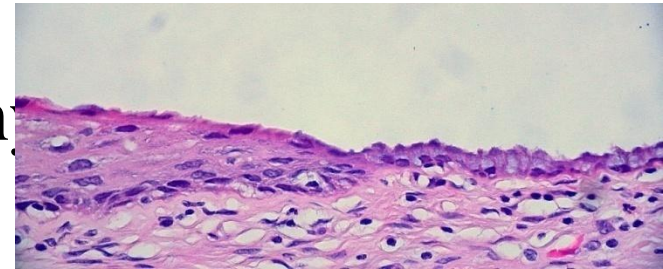
The first stage is chiefly concerned with the preparation of the birth canal so as to facilitate expulsion of the fetus in the second stage. The main events that occur in the first stage are:

- 1. Dilatation of the cervix**
- 2. Effacement of the cervix**
- 3. Full formation of lower uterine segment**

DILATATION OF THE CERVIX

Factors that influence smooth dilatation are:

1. Softening of the cervix
2. Fibromusculoglandular hypertrophy
3. Increased vascularity
4. Accumulation of fluid in between collagen fibers
5. Breaking down of collagen fibrils
6. Change in the various glycosaminoglycans

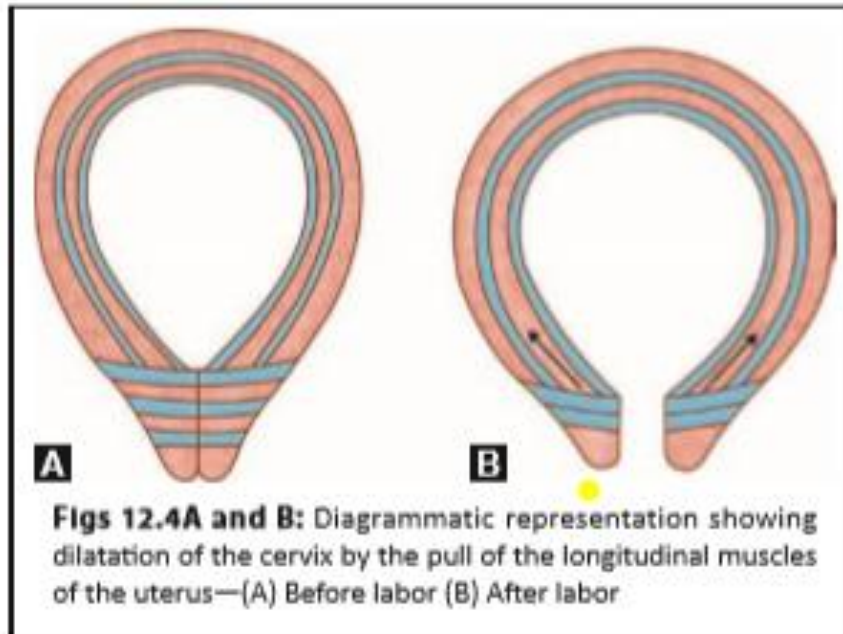


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ACTUAL FACTORS RESPONSIBLE

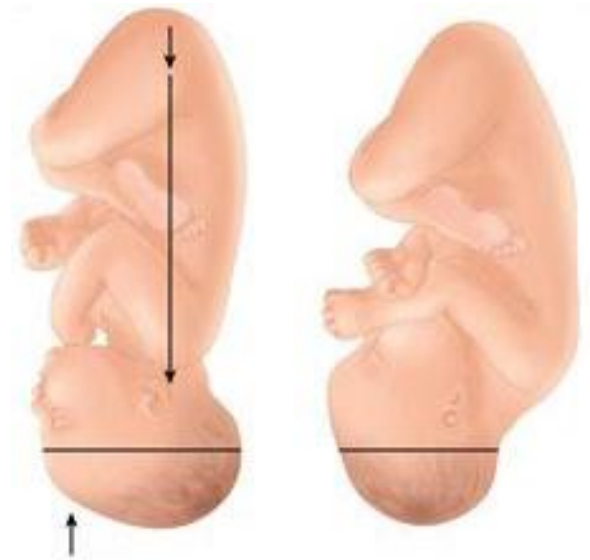
- **Uterine contraction and retraction**

polarity of the uterus: Coordination between fundal contraction and cervical dilatation



Contd...

- **Fetal axis pressure**
- Contraction of circular Myometrial fibers of the body of the uterus causes elongation and straightening of the fetus
- Down ward thrust of the presenting part of the fetus and upward pull of the cervix over the lower segment



Contd...

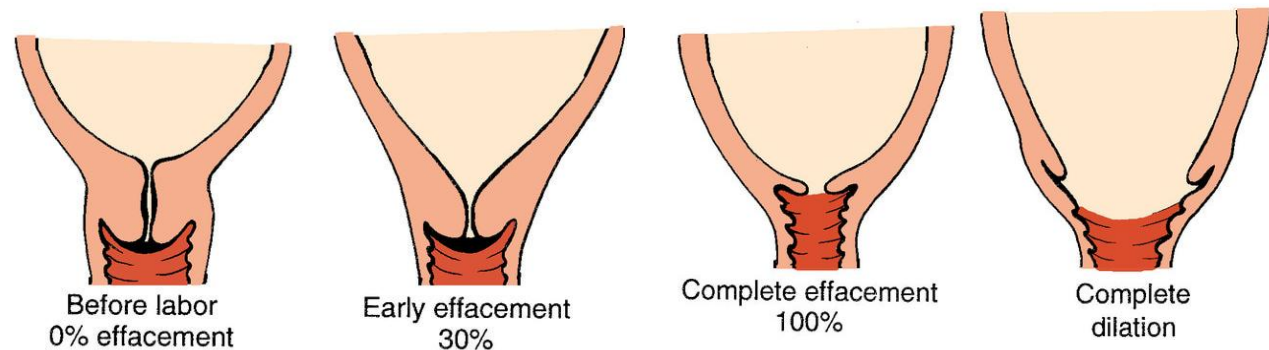
- **Bag of membranes**

Uterine contraction exerts hydrostatic pressure in the forewaters



EFFACEMENT OF CERVIX

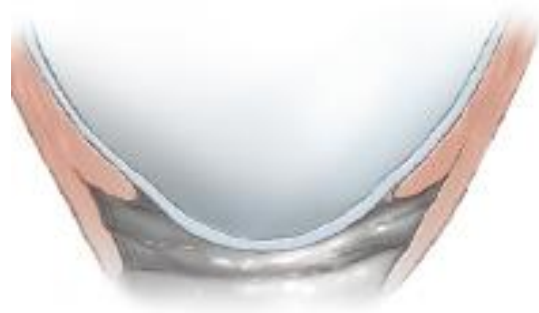
- **Muscular fibers** of the cervix are pulled upward and merges with the fibers of the lower uterine segment
- In **primigravida** effacement **precedes** dilatation of the cervix where as in **multipara** both occur **simultaneously**.
- Expulsion of the **mucus plug** is caused by effacement



Multipara

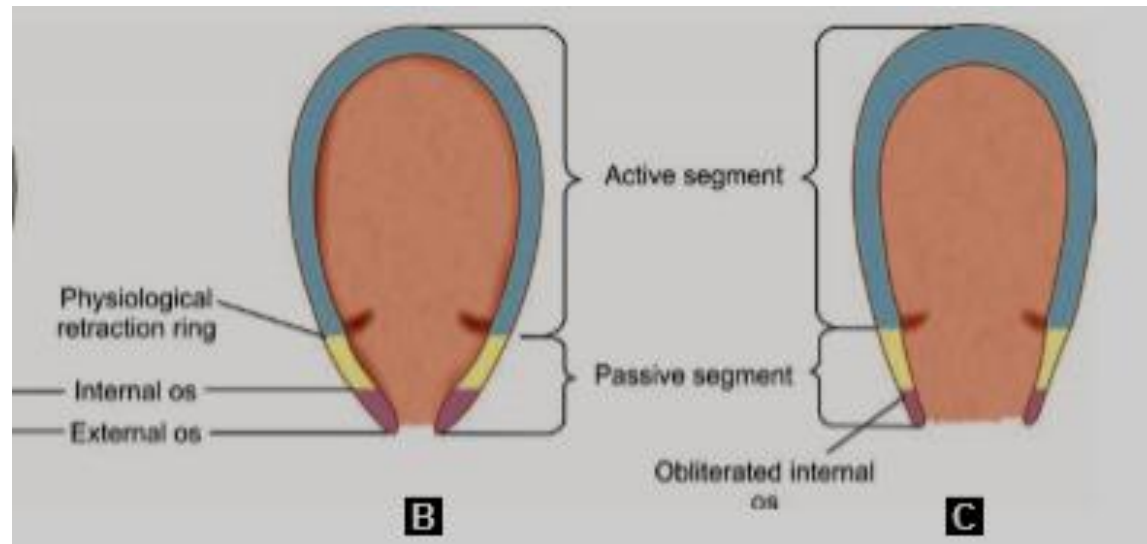


Primigravida



Lower Uterine Segment

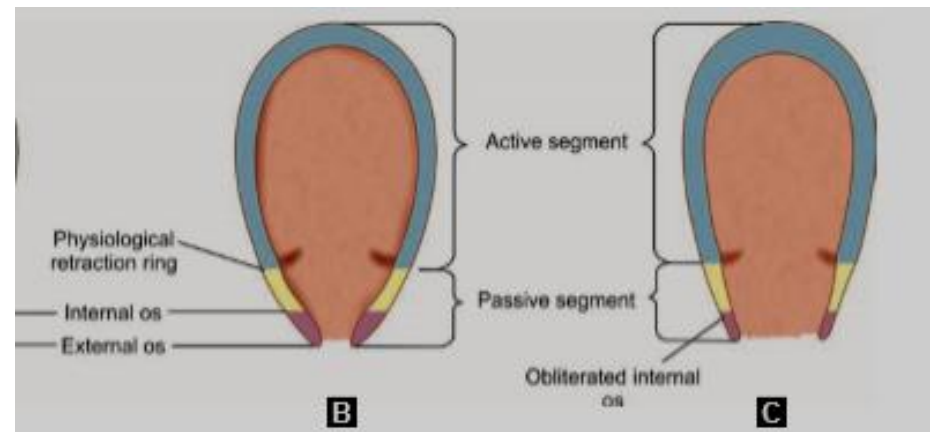
- Before the onset of labor no anatomical or functional division of the uterus.
- Wall of upper segment – **thick**
Lower segment – **thin** } prominent after ROM+II stage
- **Physiological retraction ring**



Contd...

Anatomical features

1. Formed from the isthmus
2. In labour bounded above by the physiological retraction ring and fibromuscular junction of the cervix and uterus
3. Measures 7.5-10 cm and becomes cylindrical in 2nd stage



Contd...

4. The wall becomes gradually thin
 - Relaxation of muscle fibers
 - Contraction and retraction
 - Descent of the presenting part
5. Poor retractile property

Contd...

Clinical significance

1. Receptive relaxation – expulsion of the fetus
2. Placenta implantation – placenta praevia
3. Caesarean section
4. Poor decidual reaction – morbid adherent placenta
5. Obstructed labor – very much stretched and thinned

CLINICAL FEATURES OF FIRST STAGE OF LABOR

PAIN

DILATATION AND EFFACEMENT OF THE CERVIX

STATUS OF THE MEMBRANES

MATERNAL SYSTEM

FETAL EFFECT

Pain

- Felt more anteriorly with simultaneous hardening of the uterus.
- Initial pains: 15–30 minutes with duration of about 20 seconds.
- End of first stage: Intervals of 3–5 minutes and lasts for about 45 seconds.
- At the height of contraction the uterine wall cannot be indented by the fingers.

Dilatation and effacement of cervix

Effacement : Percentage

Percentage		
25%	¼ effaced	2 cm
50%	½ effaced	1.5 cm
100%	Fully effaced	1 cm

Cervical dilatation

1 finger – 1.5 cm

1 finger loose – 2 cm

2 fingers - 4 cm

Formation of bag of membranes and their rupture

- Membranes usually remain intact until full dilatation of the cervix or sometimes even beyond, in the second stage.
- However, it may rupture any time after the onset of labor but before full dilatation of cervix

Maternal system

- General condition remains unaffected
- Fatigue after strong contraction.
- Pulse rate (10–15 beats) and systolic blood pressure (10 mm Hg) are increased during contractions.
- Temperature remains unchanged.

Fetal condition and descent

- There is minimal descent of the fetal head in the latent and early active phases.
- General condition remain fine in first stage especially if membranes are intact.
- Slight bradycardia is observed during the time of contraction

EVENTS IN II STAGE OF LABOUR

- Descent and delivery of the fetus through birth canal
- Rupture of membranes
- Reduction in volume of uterine cavity
- Contraction and retraction become stronger
- Uterus become elongated
- Primary and secondary forces

Clinical features of second stage of labour

PAIN

MEMBRANE
STATUS

BEARING
DOWN
EFFORTS

DESCENT
OF HEAD

MATERNAL
AND FETAL
EFFECTS

PAIN

The intensity of the pains increases.

- Interval : 2–3 minutes
- Duration : 1–1½ minutes

MEMBRANE STATUS:

Membranes may rupture with a gush of liquor
per vagina

BEARING DOWN EFFORTS

- It is the additional voluntary expulsive efforts by the mother.
- It is initiated by nerve reflex (Ferguson Reflex) set up due to stretching of the vagina by the presenting part.
- Premature bearing down efforts may suggest uterine dysfunction.

DESCENT OF THE FETUS

- Internal examination reveals descent of the head in

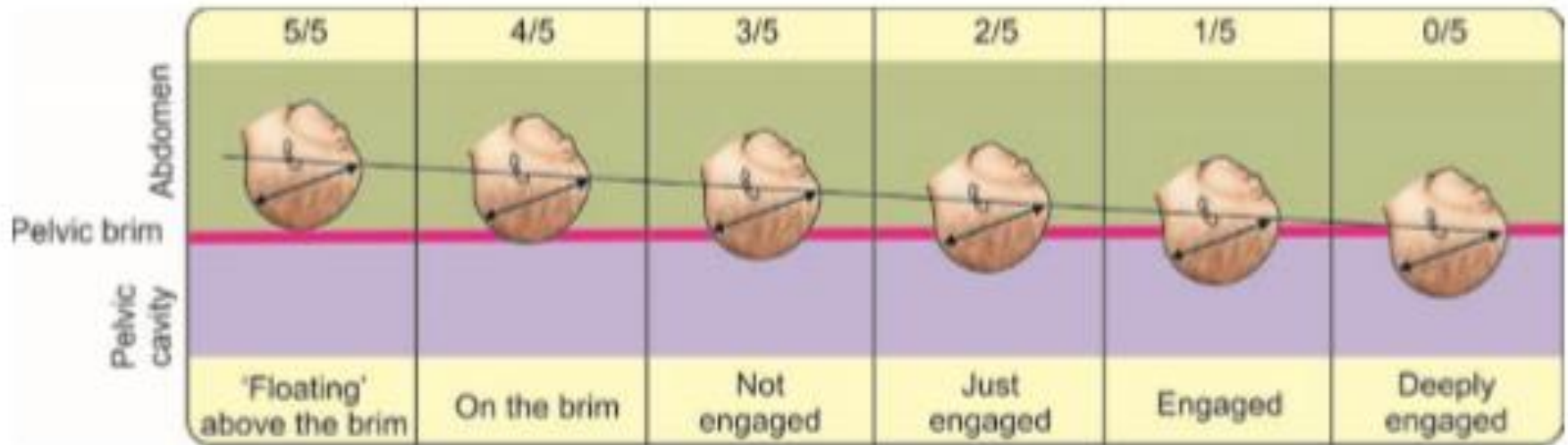


Fig. 12.20: Progressive descent of the head, assessed 'in fifths' palpable above the brim (see also Figs 12.18B and C)



MATERNAL SIGNS:

- Exhaustion
- Slowed respiration
- Increased perspiration.

FETAL EFFECTS:

- Slowing of FHR during contractions

EVENTS IN III STAGE OF LABOUR

Placental separation

First stage of labour – placental attachment 20 cm in diameter

II stage progressive diminution of diameter

After birth of the baby uterus become discoid in shape

Contd...

Separation of the placenta

Separation of the membranes

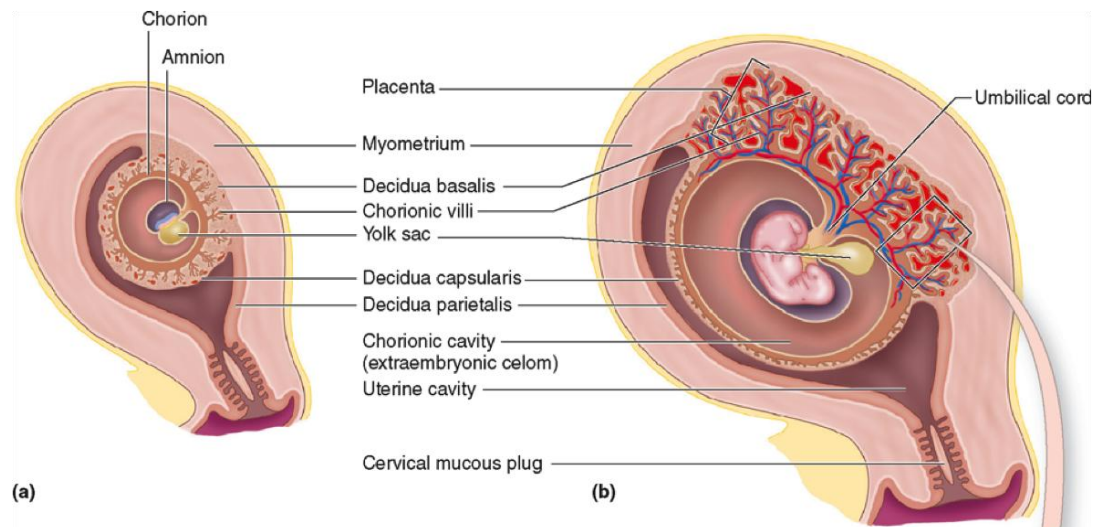
Expulsion of the placenta

Control of bleeding

Separation of the placenta

MECHANISM OF SEPARATION

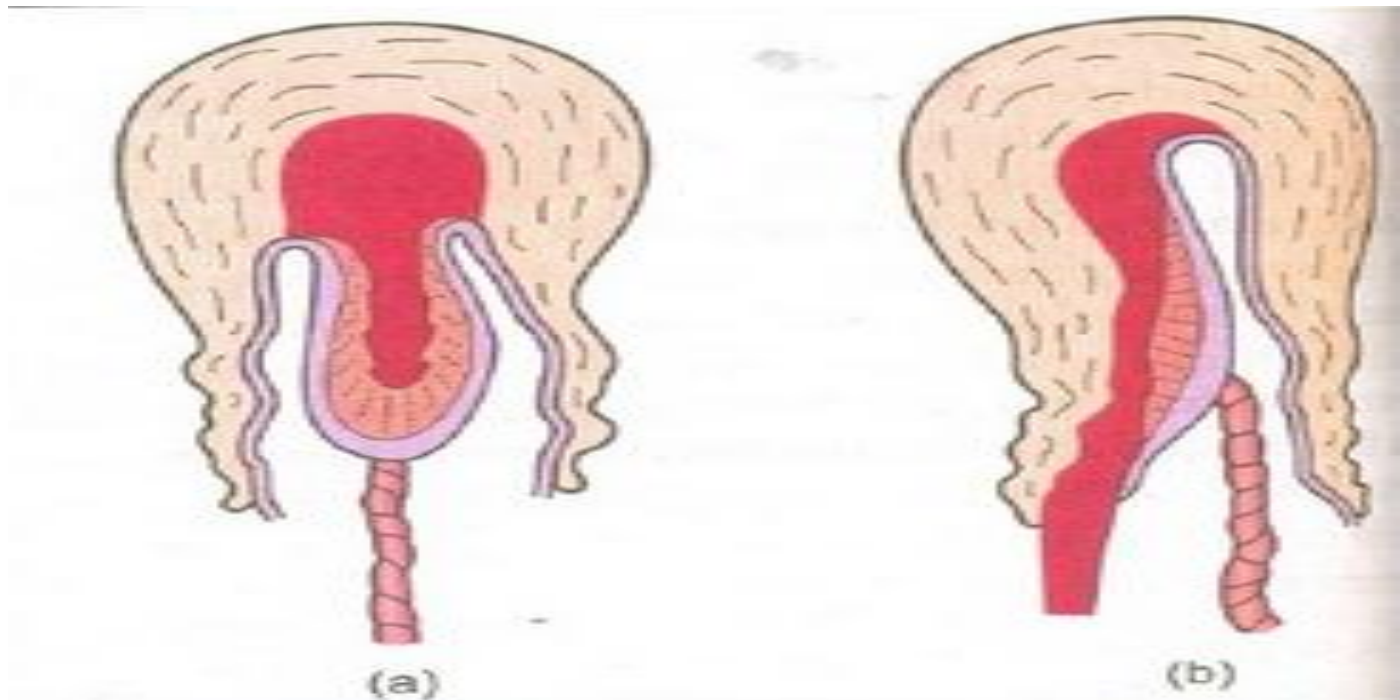
- Retraction reduces the surface area of the placenta
- The plane of separation runs through deep spongy layer of decidua basalis



Contd...

Central separation (Schultze)

Marginal separation (Mathews-Duncan)



PLACENTAL SEPERATION

CENTRAL

- Starts at the centre of the placenta
- Common 80%
- Shining fetal surface appears first in vulva
(Shiny Schultze)
- **Cause:** Retroplacental hematoma formation

MARGINAL

- Begins at lower edge of the placenta
- Not common 20%
- Rough maternal surface appears first in vulva
(Dirty Duncan)
- No retroplacental clot
- Takes longer time

SIGNS OF PLACENTAL SEPERATION

ABDOMINAL SIGNS

- Uterus-hard, globular and movable
- **Shroeder sign:** the increase in the height of the uterus due to passage of the seperated placenta

VAGINAL SIGNS

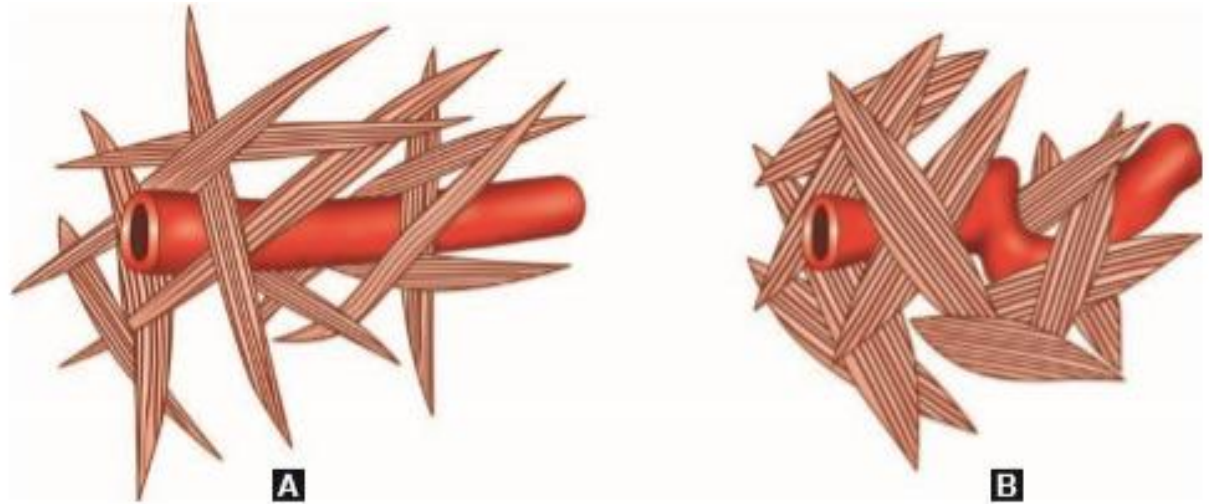
- Sudden gush blood
- Lengthening of the cord
- **Kustner sign:** No receding of the umbilical cord on pushing the uetrus upward with abdominal hand

Expulsion of placenta

- Voluntary contraction
- Manual procedure

Control of bleeding

1. Retraction
2. Living ligatures
3. Thrombosis
4. Myotamponade



Mechanism of labor

The series of movements that occur on the head in the process of adaptation during its journey through the pelvis is called mechanism of labor

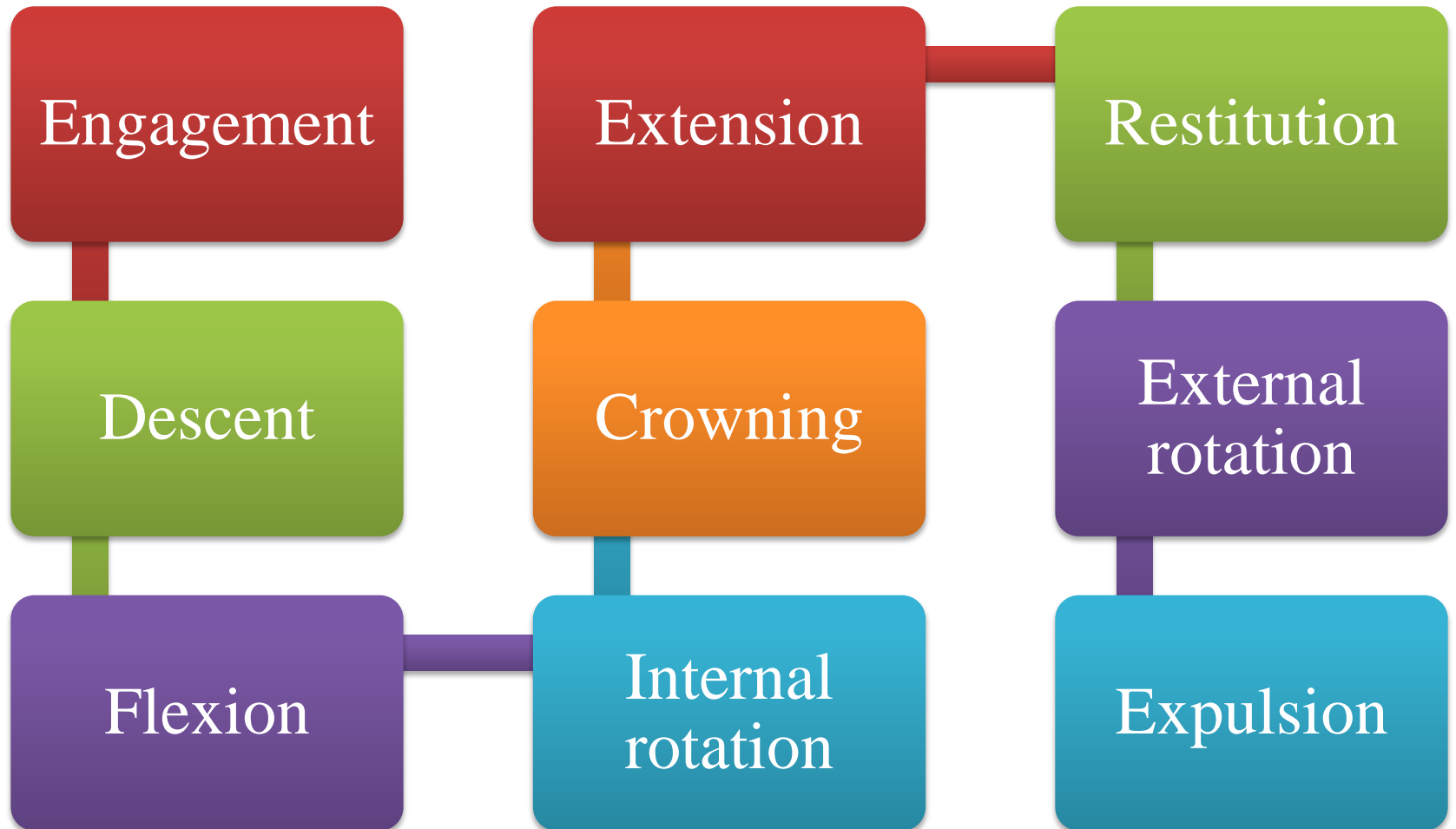
Principles

1. Descent takes place throughout labour
2. Whichever part leads and first meets the resistance of the pelvic floor will rotate forward until it comes under the symphysis pubis.
3. Whatever emerges from the pelvis will pivot around the pubic bone.

CRITERIA

- Lie : Longitudinal
- Presentation : Cephalic
- Position : LOA/ROA
- Attitude : Good flexion
- Denominator : Occiput
- Presenting part : Posterior part of the anterior parietal bone

Principal movements



Engagement

The engaging AP diameter of the head

- Suboccipito-bregmatic 9.5cm
- Suboccipito-frontal 10 cm (slight deflexion).
- The engaging transverse diameter is biparietal 9.5cm.

Engagement

- During engagement
- Occiput → Left iliopectineal eminence
- Sinciput → Right sacroiliac joint
- Sagittal suture → Right oblique diameter
- Biparietal diameter → Left oblique diameter.

Descent

- Descent takes place throughout labor as a result of primary (uterine contraction) and secondary (maternal bearing down efforts) forces of labour.

Flexion

- This increases throughout labour. Due to increased flexion the Suboccipito-frontal 10 cm will reduce to suboccipito-bregmatic 9.5cm.

Internal rotation

- Here the occiput leads and meets the pelvic floor resistance first and rotates anteriorly through $1/8^{\text{th}}$ of the circle and now the sagittal suture will be in the antero-posterior diameter of the pelvic outlet. Further descent occurs and occiput slips under the subpubic arch.



Crowning

- During crowning the widest transverse diameter of the fetal head (biparietal) is born and the head no longer recedes between contractions.

Extension of the head

- During extension the sinciput, face and chin sweeps the perineum and head is born by extension.

Restitution

- The twist in the neck of the fetus that resulted from internal rotation is now corrected by slight untwisting movement. This movement takes place opposite to the direction of internal rotation

Internal rotation of the shoulders

- The shoulders meet the resistance of the pelvic floor and rotate anteriorly $1/8^{\text{th}}$ of the circle and occupies the anteroposterior diameter of the pelvic outlet. At the same time there will be external rotation of the fetal head in the same direction of restitution.

Lateral flexion

- After the shoulders are positioned in anteroposterior diameter of the outlet, further descent takes place until the anterior shoulder escapes below the symphysis pubis first. By a movement of lateral flexion of the spine, the posterior shoulder sweeps over the perineum. Rest of the trunk is then expelled out by lateral flexion.

Management of Normal Labor

Management of Normal Labour

Aims

1. To achieve delivery of a normal healthy child with minimal physical and psychological maternal effects.
2. Early anticipation, recognition and management of any abnormalities during labour course

I STAGE OF LABOUR

PRINCIPLES

1. Non-interference with watchful expectancy so as to prepare the patient for natural birth.
2. To monitor carefully the progress of labor, maternal conditions and fetal behavior so as to detect any intrapartum complication early.

First Stage of Labor

HISTORY

EXAMINATION

INVESTIGATIONS

PROCEDURES

First Stage of Labor

History:

1. Complete obstetric history
2. History of present pregnancy
3. History of present labor

First Stage of Labor

Examination

- a. General examination
- b. Abdominal examination
- c. Pelvic examination/ Vaginal examination

First Stage of Labor

Investigations:

If not done before or if indicated:

- Blood group-Rh typing.
- Urine for albumin and sugar.
- Hb%.
- Ultrasonography

First stage of Labor Procedures

General

Bowel

Rest and ambulation

Diet

Bladder care

Relief of pain

Assessment of mother and fetus and
Partograph recording

Management of first stage

GENERAL

- Antiseptic dressing are as described before
- Encouragement, emotional support and assurance
- Constant supervision is ensured.

Management of first stage

BOWEL

An enema with soap and water or glycerine suppository is traditionally given in early stage.

Management of first stage

BLADDER CARE

- Patient is encouraged to pass urine
- Full bladder often inhibits **uterine contraction** and may lead to **infection**.
- If cannot go to the toilet, give bed pan.
- If the patient fails to pass urine, catheterization is to be done.

Management of first stage

DIET

- Food withheld during active labor

(There is delayed emptying of the stomach in labor. Low pH of the gastric contents is a real danger if aspirated following general anesthesia)

- Fluids in the form of plain water, ice chips or fruit juice may be given in early labor.
- Intravenous fluid with ringer solution is started where any intervention is anticipated

Management of first stage

REST AND AMBULATION

- Patient is allowed to walk during the early first stage particularly with intact membranes.
- If rest is needed the patient lies on her left lateral position.

Management of first stage

RELIEF OF PAIN

Pharmacological and non pharmacological
measures

Management of first stage

ASSESSMENT OF MOTHER AND FETUS AND PARTOGRAPH RECORDING

THE MOTHER:

1. General

- Pulse every 30 minutes
- Blood pressure every 1 hours
- Temperature every 2 hours.
- Urine output - volume, protein or acetone.
- Any drug (oxytocin or other)

Management of first stage

2. Abdominal palpation

- a) **Uterine contractions**: The number of contractions in 10 minutes and duration of each contraction in seconds are recorded in the partograph
- b) **Pelvic grip**: Gradual disappearance of poles of the head (sinciput and occiput) which were felt previously
- c) Shifting of the maximal intensity of the **fetal heart beat** downwards and medially.

Management of first stage

3. Vaginal examination

- a) Dilatation of the cervix
- b) Position of the head and degree of flexion
- c) Station of the head
- d) Color of the liquor
- e) Degree of moulding of the head

Management of first stage

THE FOETUS

- FHR every 15 minutes
- Continuous electronic fetal monitoring

II STAGE OF LABOUR

Management of second stage

The transition from the first stage to the second stage is evidenced by the following features:

- a) Increasing intensity of uterine contractions
- b) Appearance of bearing down efforts
- c) Urge to defecate with descent of the presenting part
- d) Complete dilatation of the cervix

Management of second stage

PRINCIPLES

1. To assist in the natural expulsion of the fetus slowly and steadily
2. To prevent perineal injuries.

Management of Second Stage of Labor

Preparation for delivery

1. The patient is transferred on a wheel or trolley to the delivery room.
2. Put her in the lithotomy position.
3. The lower abdomen, upper parts of the thighs, vulva and perineum are swabbed with antiseptic lotion.
4. Sterile legs and towels are applied.

Management of Second Stage of Labor

Conduction of delivery

Delivery of the head

Delivery of the shoulders

Delivery of the trunk

Immediate care of newborn

Management of Second Stage of Labor

DELIVERY OF THE HEAD

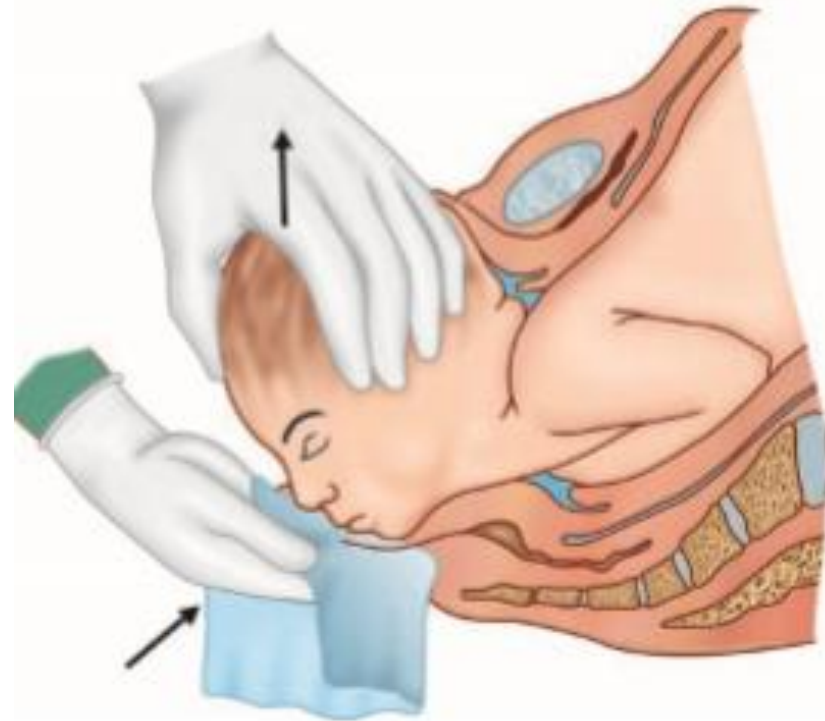
The principles to be followed are to maintain flexion of the head, to prevent its early extension and to regulate its slow escape out of the vulval outlet.


Management of Second Stage of Labor

- The patient is encouraged for the **bearing down** efforts during uterine contractions.
- When the scalp is visible for about 5 cm in diameter, **flexion of the head** is maintained during contractions.

Management of Second Stage of Labor

- The flexion of the head is maintained by pushing the chin with the right hand placed over the anococcygeal region while the left hand exerts pressure on the occiput (Ritzen maneuver)



- 
- Flexion of the head should be maintained till **crowning**
 - The purpose of increasing the flexion of the head is to ensure that the small **suboccipito-frontal diameter 10 cm** distends the vulval outlet instead of larger **occipitofrontal diameter 11.5 cm**

Management of Second Stage of Labor

- When the perineum is fully stretched and threatens to tear specially in primigravidae, **episiotomy** is done at this stage after prior infiltration with 10 mL of 1% lignocaine.



Management of Second Stage of Labor

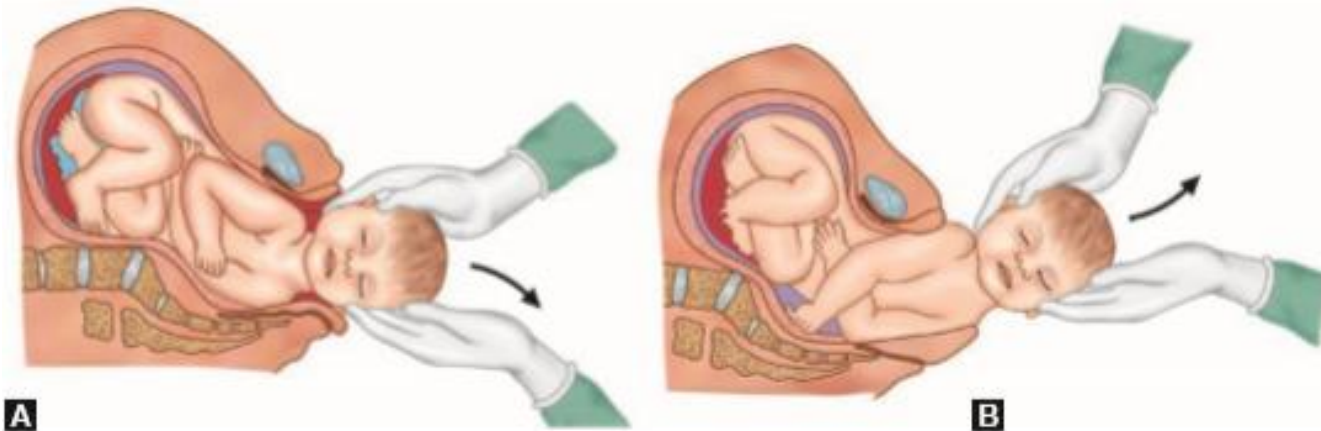
Care following delivery of the head

- The mucus and blood in the mouth and pharynx are to be wiped with sterile gauze piece or a mucous sucker
- The eyelids are then wiped with sterile dry cotton swabs
- The neck is then palpated to exclude the presence of any loop of cord

Management of Second Stage of Labor

DELIVERY OF THE SHOULDERS

Gentle downward traction is applied to the head till the anterior shoulder slips under the symphysis pubis. The head is lifted upwards to deliver the posterior shoulder first then downwards to deliver the anterior shoulder.



Management of second Stage of Labor

DELIVERY OF THE TRUNK

Usually slips without difficulty otherwise gentle traction is applied to complete delivery.

Management of second Stage of Labor

IMMEDIATE CARE OF NEWBORN

1. Baby should be placed on a **tray covered with clean dry linen** with the head slightly downwards.
2. Air passage (oropharynx) should be cleared of mucus and liquor by gentle suction.
3. Apgar rating at 1 minute and at 5 minutes is to be recorded.

Management of second Stage of Labor

4. Clamping and ligature of the cord
 - The cord is clamped by two Kocher's forceps, the near one is placed **5 cm** away from the umbilicus and is cut in between
 - Delay in clamping for **2–3 minutes** or till cessation of the cord pulsation facilitates transfer of **80-100 mL** blood from the compressed placenta to a baby when placed below the level of uterus.

Management of second Stage of Labor

Delayed clamping is contraindicated in

a) Pre-term or a low birth weight baby

Hypervolemia

b) Rh-incompatibility

To prevent antibody transfer from the mother to the baby

a) Babies born asphyxiated or one of a diabetic mother.

5. Put an identification band

III STAGE OF LABOUR

Management of III stage of labour

EXPECTANT MANAGEMENT

ACTIVE MANAGEMENT

Management of III stage of labour

Expectant management

Clamp the umbilical cord

Catheterize the bladder

Guard the fundus

Wait for spontaneous
separation of the placenta

Placenta is separated

Wait for spontaneous
expulsion

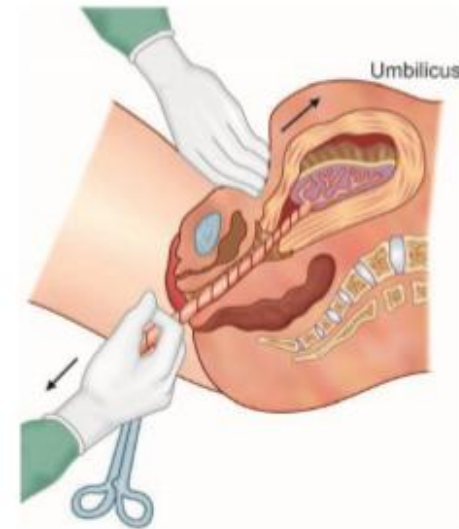
Management of III stage of labour

Expectant management continued...

If not expelled

Expulsion is done by
Modified Brandt Andrew's
method (controlled cord
traction method)

Inj Oxytocin 10 units IM
Examine the placenta
Examine the genitalia



Management of III stage of labour

Active Management

Inj. Oxytoin 10 units IM

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graph TD; A[Inj. Oxytoin 10 units IM] --> B[Clamp the umbilical cord]; B --> C["Expulsion is done by Modified Brandt Andrew's method (controlled cord traction method)"]; C --> D[Fail];
```

Clamp the umbilical cord

Expulsion is done by Modified
Brandt Andrew's method
(controlled cord traction method)

Fail

Management of III stage of labour

Active Management continued

Repeat after 2-3 minutes

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graph TD; A[Repeat after 2-3 minutes] --> B[Fail]; B --> C[Wait for 10 minutes and repeat]; C --> D[Fail]; D --> E[Manual removal of placenta];
```

Fail

Wait for 10 minutes and repeat

Fail

Manual removal of placenta

IV STAGE OF LABOUR

Fourth Stage of Labour

- Observation for the patient particularly atony of the uterus and vaginal bleeding.

Mother

1. Transfer the mother from the delivery table to the recovery room
2. Provide perineal care
3. Ensure emergency equipments are available
4. Check the fundus
 - ❖ 1st hour- every 15 minutes
 - ❖ 2nd hour- every 30 minutes
 - ❖ Thereafter hourly

Mother

6. Document lochia

- ❖ 1st hour- every 15 minutes
- ❖ 2nd hour- every 30 minutes
- ❖ Thereafter hourly

7. Observe the mother for chills

8. Monitor vital signs and general condition

Mother

9. Observe urinary bladder for distension

Characteristics

- Bulging of the lower abdomen
- Spongy feeling mass between the fundus and the pubis
- Displaced uterus
- Increased lochia
- Full bladder can cause PPH
- Nerve blocks may alter the sensation
- If possible ambulate the patient to bathroom

Mother

10. evaluate the perineal area for signs of developing edema or hematoma

Causes

- Prolonged second stage
- Delivery of a large infant
- Rapid delivery
- Forceps delivery
- Fourth degree lacerations

Mother

Edema

- Apply ice pack
- Advice sitz bath
- Bladder distension

Hematoma

- Discolouration
- Severe pain
- Edema
- Feeling to defecate due to pressure over rectal muscles
- Check sensitivity to the area



Mother

- Small hematomas (< 3 cm) are left to resolve on their own—ice packs may be applied
- Large hematomas (> 3 cm) may require evacuation of the blood and ligation of the bleeding vessel
- Analgesics and broad-spectrum antibiotics may be ordered due to increased chance of infection

Mother

11. Observe for signs of hemorrhage
12. Assess for ambulatory stability
13. Nutrition management
14. Initiate breastfeeding