

# Placenta

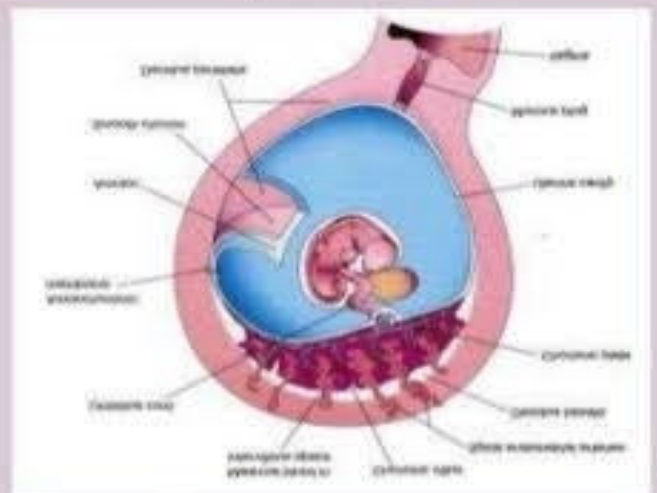
OBSTETRICS AND GYNAECOLOGY

## Objectives

1. Discuss anatomy, function and abnormalities related to placenta.
2. Explain abnormalities related to length of cord.

# PLACENTA

- This is a **fetomaternal organ**.
- It has two components:
  - **Fetal part** – develops from the chorionic sac ( chorion frondosum )
  - **Maternal part** – derived from the endometrium ( functional layer – decidua basalis )
- The placenta and the umbilical cord are a **transport system** for substances between the mother and the fetus.( vessels in umbilical cord )
- **Function Of The Placenta:**
  1. Protection
  2. Nutrition
  3. Respiration
  4. Excretion
  5. Hormone production



- Placenta is a remarkable organ
- Has a relative short life span, it undergoes rapid growth ,differentiation and maturation.
- A unique fetal –maternal communication system which creates a hormonal environment that helps initially to maintain pregnancy and eventually initiates the events leading to parturition

The human placenta is:

- Discoid
- Hemochorial
- Deciduate

### **Development of placenta-**

Two sources

- Fetal – chorion Frondosum
- Maternal- decidua basalis

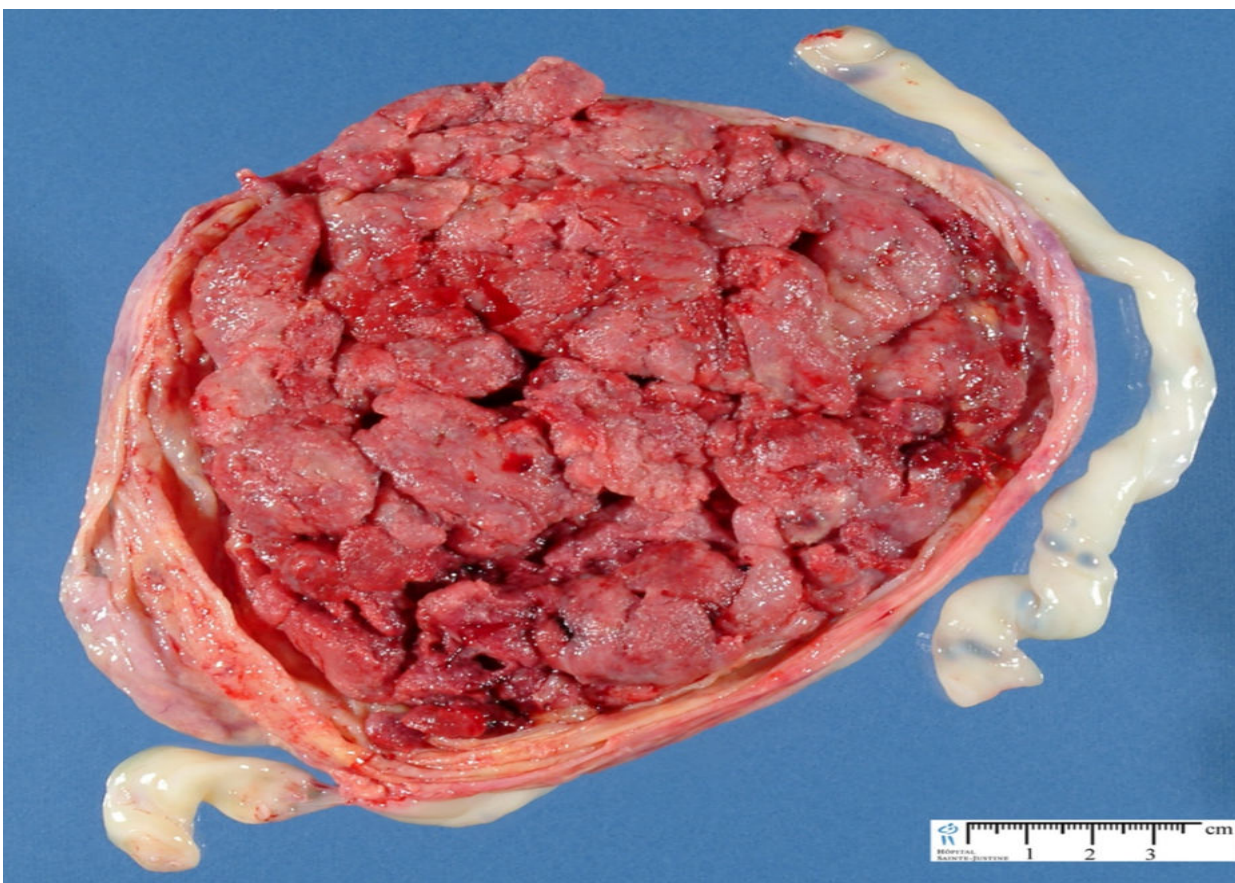
## **PLACENTA AT TERM:**

Placenta is a discoid organ

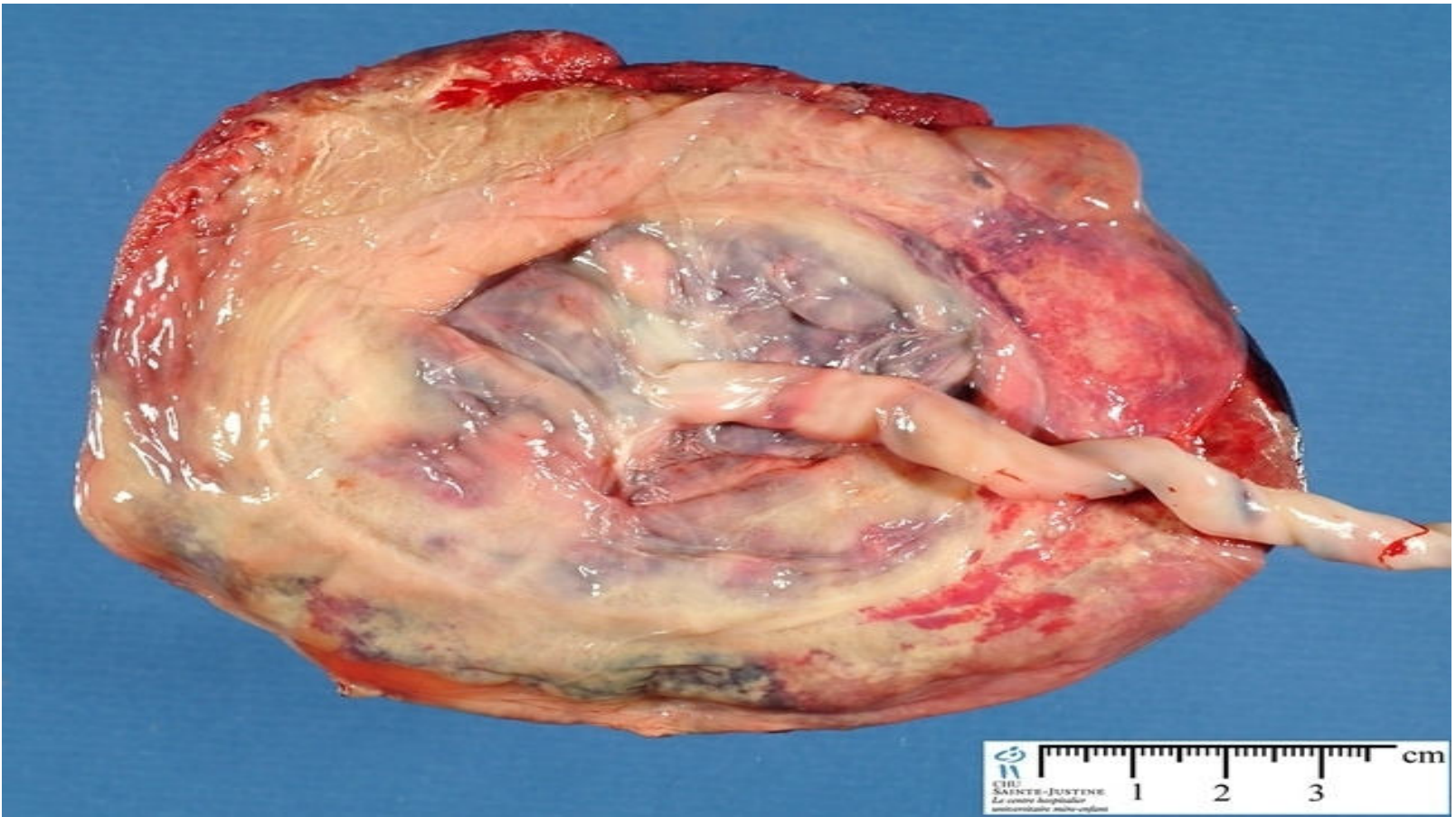
15 – 20cm in diameter

3cm Thick at center

Weighs about 500gms







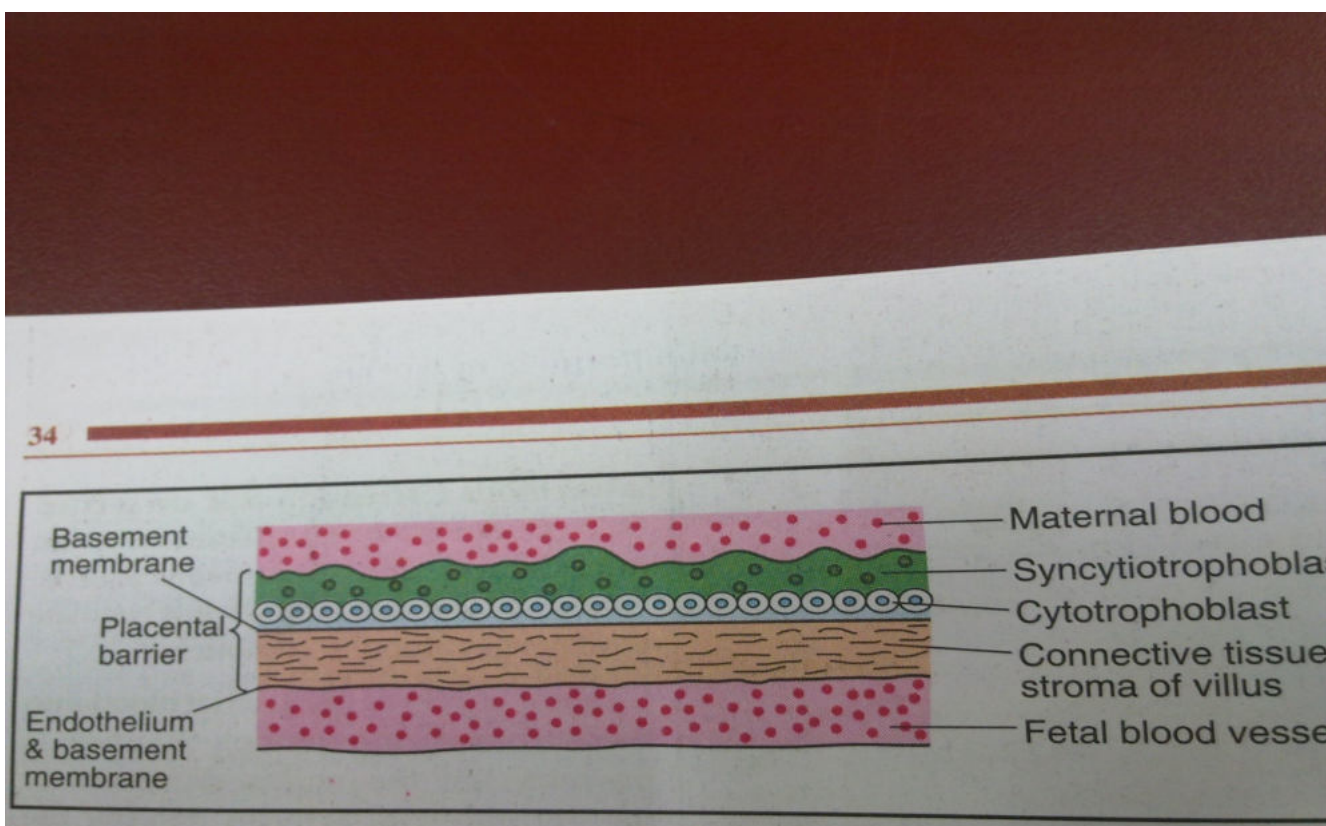
## Placental membrane

- Total area-4 to 14 sq m
- Similar to absorptive area in adult gut
- In later part of pregnancy the membrane thickness reduces from 0.025mm to 0.002mm
- Is classified as haemochorial

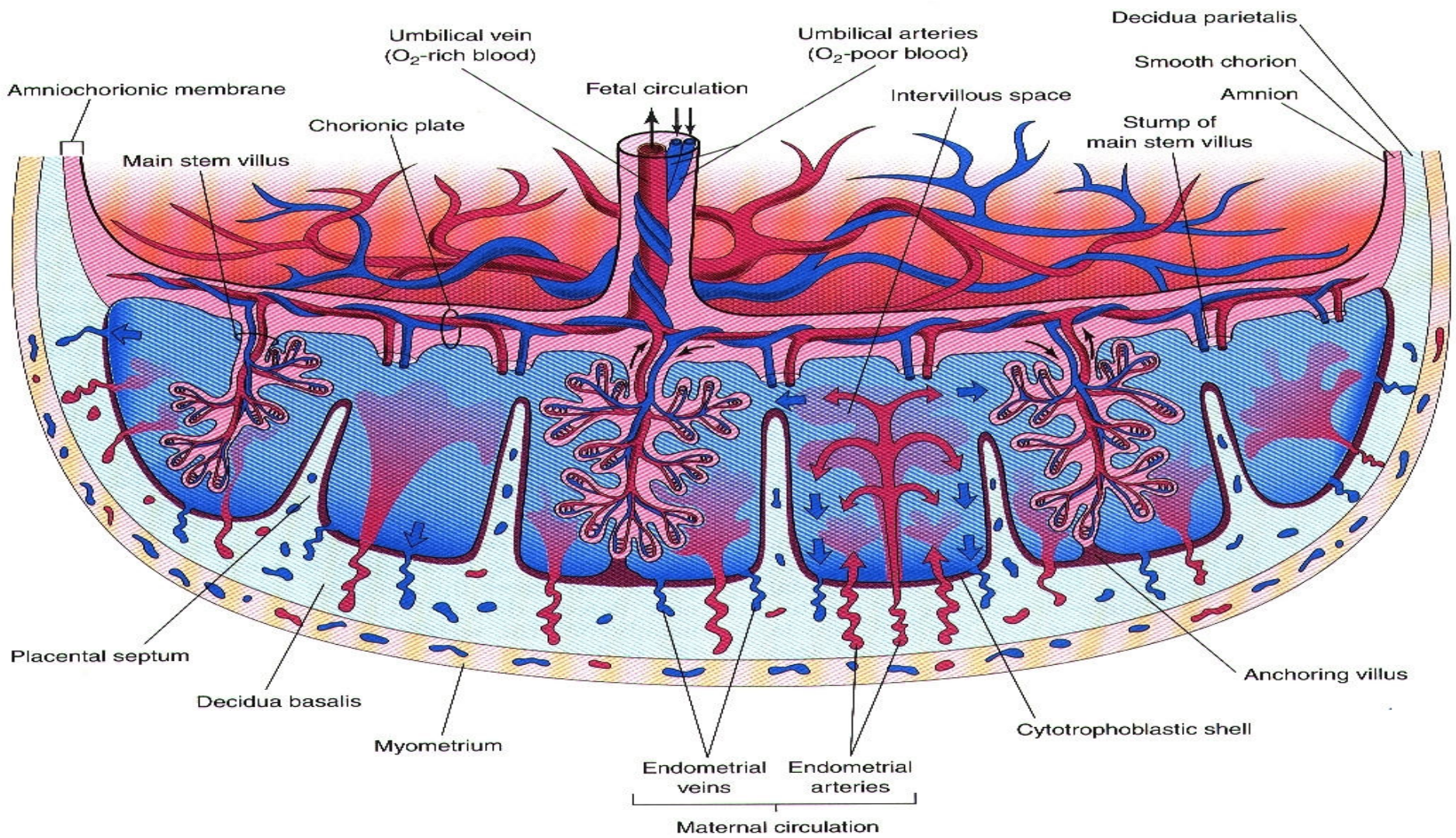
# PLACENTAL BARRIER

Inspite of close proximity , there is no mixing of the maternal and fetal blood.

They are separated by placental membranes or barrier.







## PLACENTAL CIRCULATION

UTEROPLACENTAL CIRCULATION

FETOPLACENTAL CIRCULATION

# UTEROPLACENTAL CIRCULATION

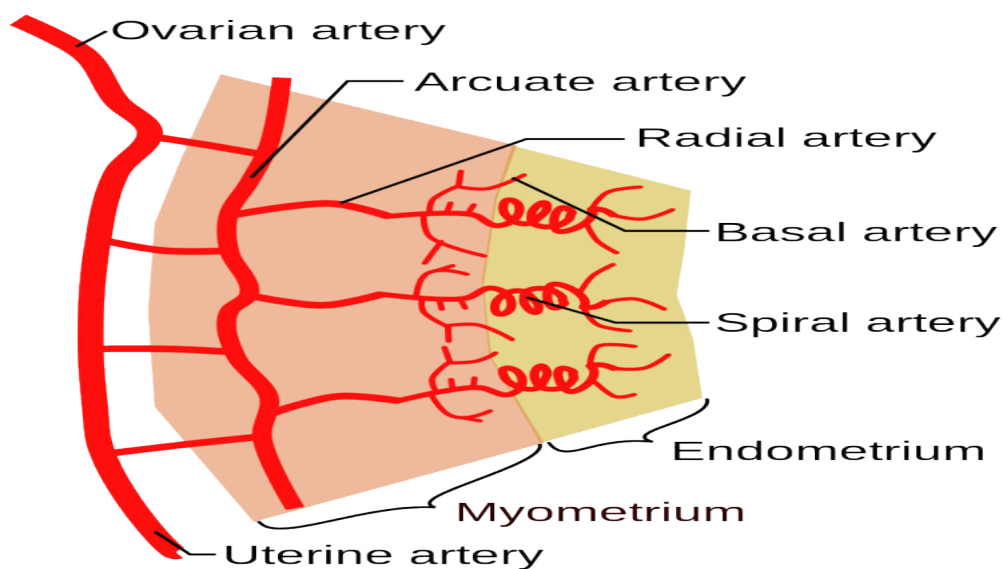
- It is concerned with the circulation of maternal blood through the intervillous space.
- Divided in 3 parts
  1. Arterial circulation
  2. Venous drainage
  3. Circulation in intervillous space

- Blood in the intervillous space is temporarily outside maternal circulatory system.
- These vessels discharge into the intervillous space through gaps in the cytotrophoblastic shell.
- Blood flowing from spiral arteries is pulsatile and is propelled in jet-like fountains by the maternal blood pressure.
- Welfare of the embryo and fetus chiefly depends on adequate bathing of branch villi with maternal blood.
- Reduction in utero-placental circulation result in fetal hypoxia and IUGR.



# Arterial circulation

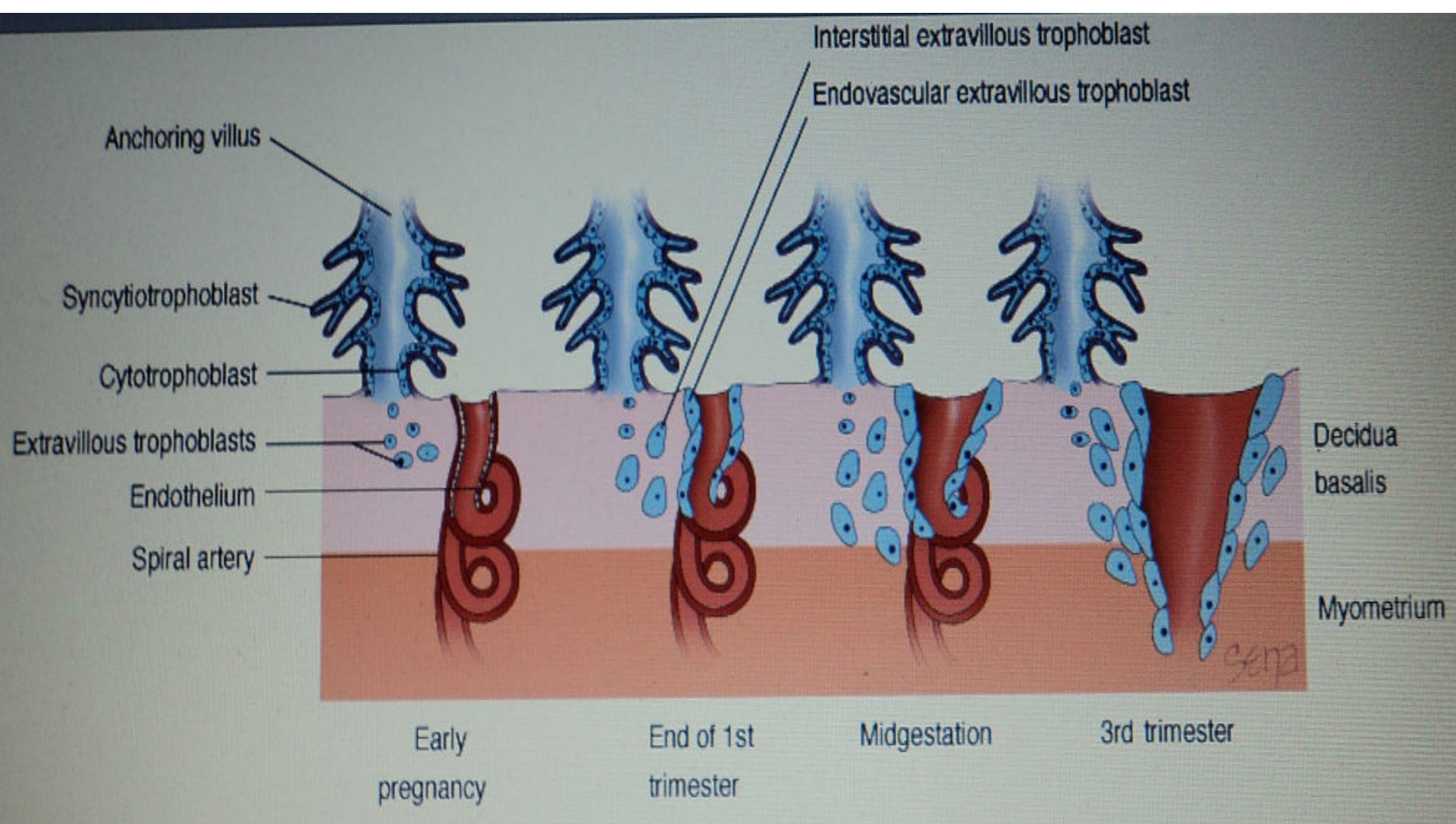
- About 120-200 spiral arteries open into intervillous space.



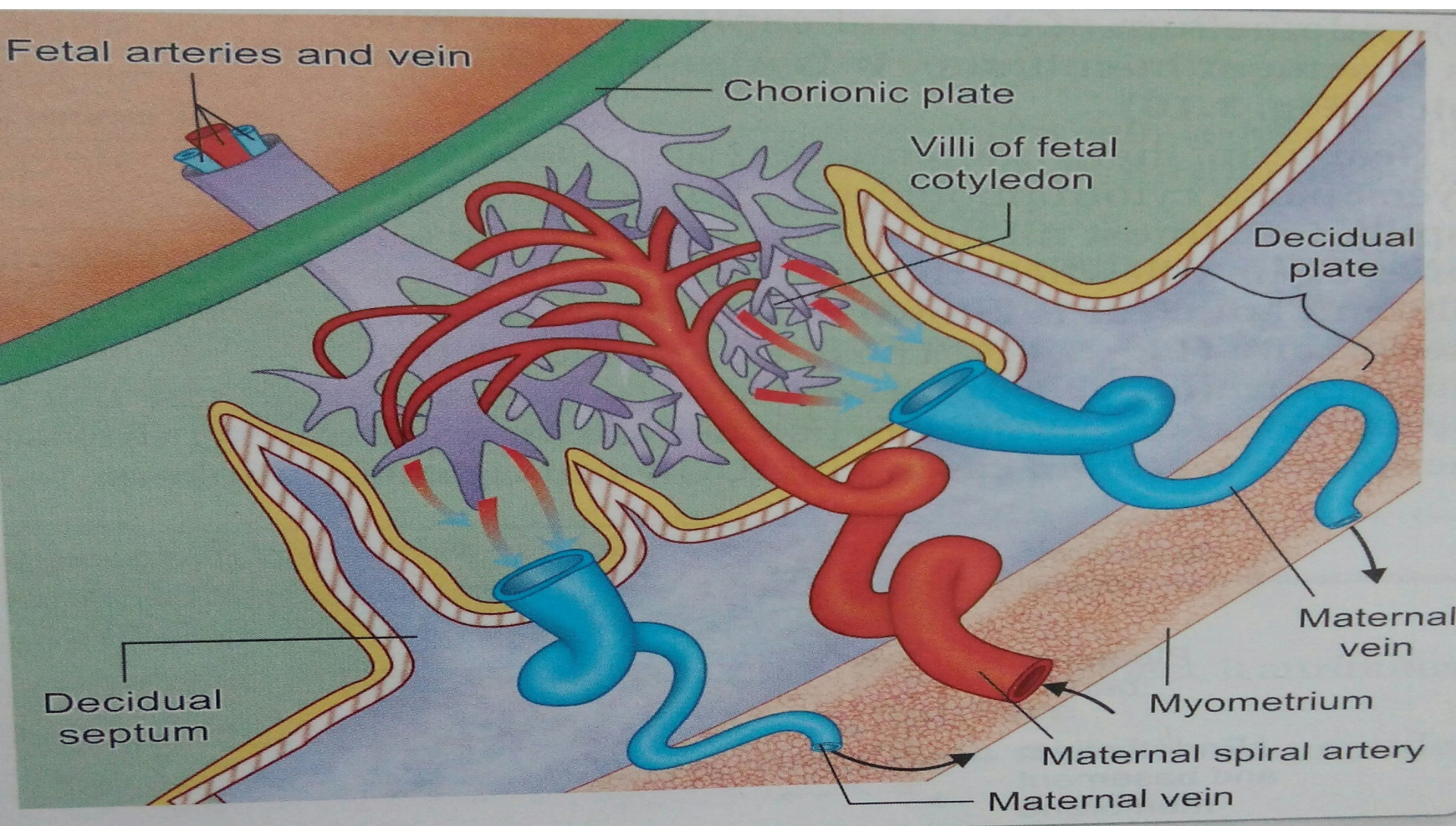
## Spiral artery remodelling

- There is cytotrophoblastic invasion into the spiral arteries upto the intradecidual portion within 12 weeks of pregnancy.
- Endothelial and muscoelastic media is destroyed and replaced by fibrinoid material

- There is secondary invasion of trophoblast between 12-16 weeks.
- It extends upto the radial arteries within the myometrium.
- SPIRAL ARTERIES are remodelled into large bore UTEROPLACENTAL ARTERIES.







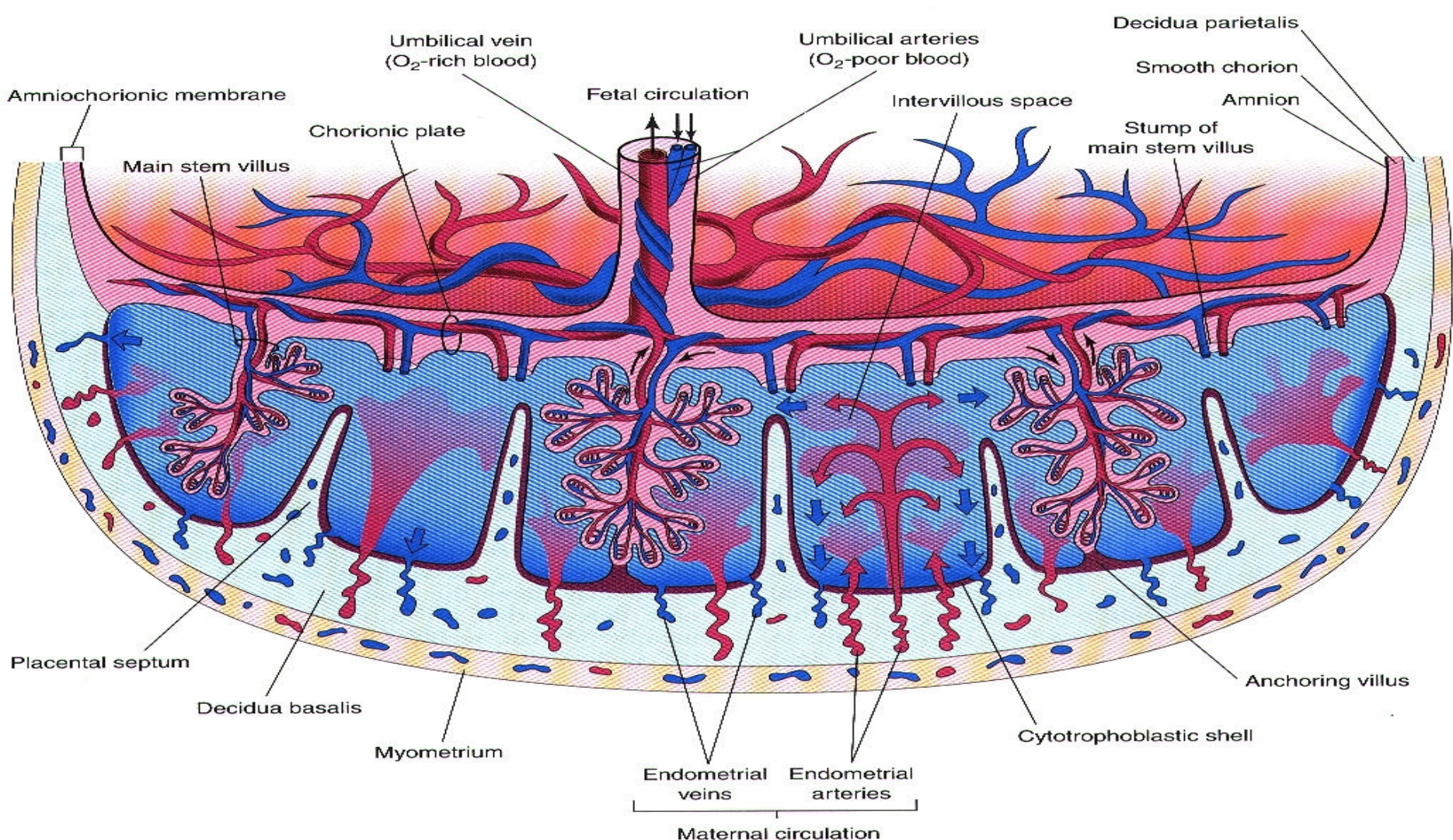
# INTERVILLOUS HEMODYNAMICS

Volume of blood in mature placenta	500ml
Volume of blood in intervillous space	150ml
Blood flow in intervillous space	150ml
Pressure in intervillous space <div>             1) During uterine contraction             2) During uterine relaxation           </div>	<div>             30-50mm Hg             10-15mm Hg           </div>
Pressure in supplying uterine artery	70-80mm Hg
Pressure in draining uterine vein	8mm Hg



# FETOPLACENTAL CIRCULATION

- Two umbilical arteries enter the chorionic plate underneath the amnion, each supplying one half of placenta.
- The arteries breakup into small branches which enter the stems of chorionic villi.
- Each in turn divides the primary, secondary and tertiary vessels of the corresponding villi.



- This system provides a very large area for exchange of metabolic and gaseous products between maternal and fetal blood streams.
- Well-oxygenated fetal blood in fetal capillaries passes into thin walled veins.
- This follow chorionic arteries to site of attachment of the umbilical cord, where they converge to form umbilical vein.
- This large vessel carries oxygen-rich blood to the fetus.



# Placenta Succenturiata

One (usual) or more small lobes of placenta, size of cotyledon, may be placed at varying distances from the placental margin.

In cases of absence of communicating blood vessels, it is called placenta spuria.

Incidence: 3%



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# Clinical significance

If the succenturiate lobe is retained, following birth of the placenta, it may lead to:

1. Postpartum haemorrhage
2. Subinvolution
3. Uterine sepsis
4. Polyp formation

Whenever the diagnosis of missing lobe is made, exploration of the uterus and removal of the lobe under general anaesthesia is to be done.



## Circumvallate placenta

The fetal surface is divided into a central depressed zone surrounded by a thickened white ring which is usually complete.

Vessels radiate from the cord insertion as far as the ring and then disappear from view.

The peripheral zone outside the ring is thicker and the edge is elevated and rounded.

Retained placenta or membranes

[www.FirstRanker.com](http://www.FirstRanker.com)



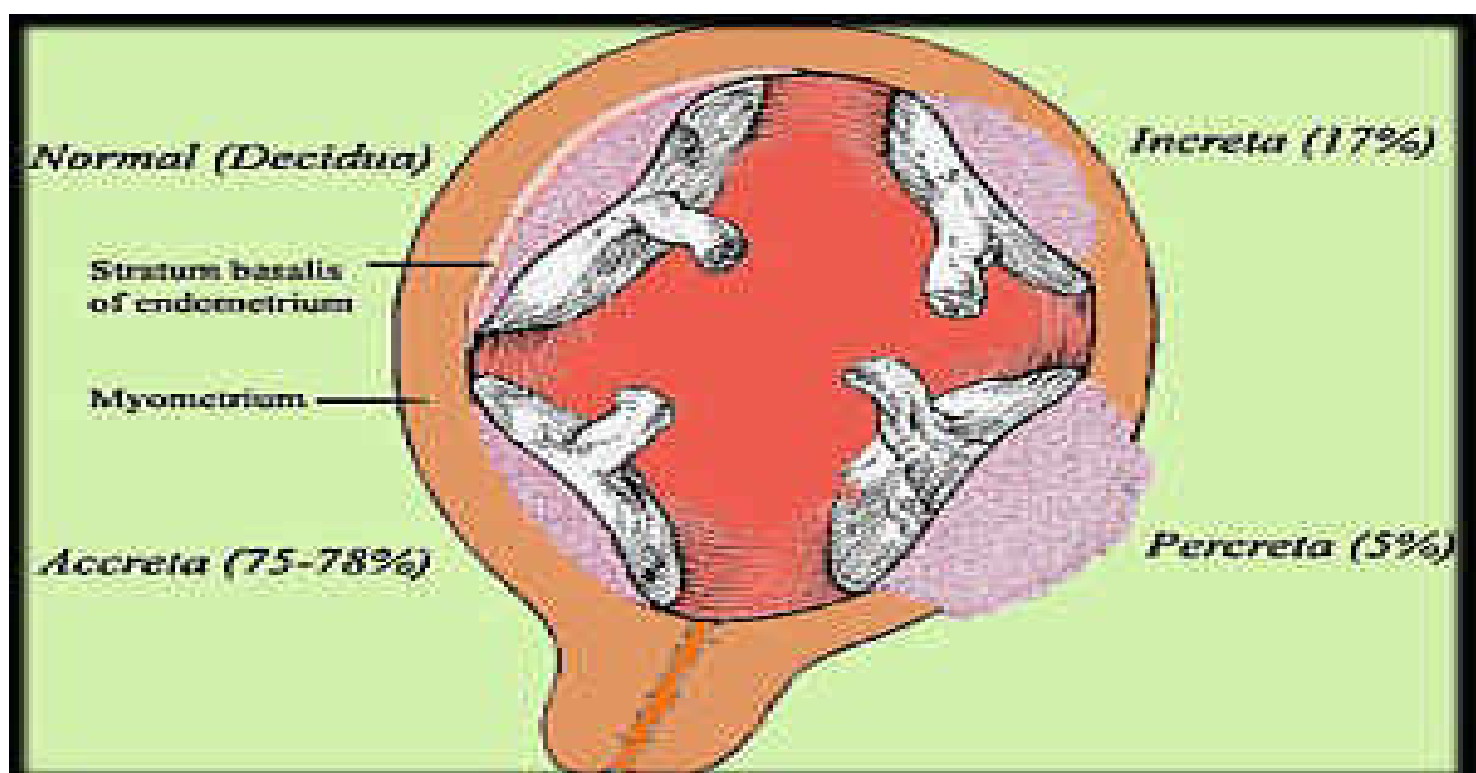
## Clinical significance

- Encroachment of some part over the lower segment.
- Imperfect separation in the third stage.
- Chance of retained placenta is more and manual removal becomes difficult.

# Placenta accreta, increta and perceta

- These abnormalities are serious variations in which trophoblastic tissues invade the myometrium to varying depths.
- They are much more likely with placenta previa or with implantation over a prior uterine incision or perforation.

## Placenta accreta, increta and perceta



# Placenta accreta

The condition is usually associated

- when the placenta is implanted in lower segment (Placenta praevia)

or over the previously injured sites as in caesarean section

- dilatation and curettage operation
- manual removal
- myomectomy

## Diagnosis

The diagnosis is only made

- during attempted manual removal when the plane of cleavage between the placenta and uterine wall cannot be made out.
- Ultrasound imaging, colour Doppler and MRI have all been valuable in the diagnosis.

## Pathological confirmation

- Absence of decidua basalis
- Absence of Nitabuch's fibrinoid layer
- Varying degree of penetration of the villi into the muscle bundle (increta) or upto the
- serosal layer(percreta).
- The risk includes hemorrhage, shock, infection and rarely inversion of the uterus.

## Cord abnormalities

Abnormal length of cord

Short cord

Less than 20cm



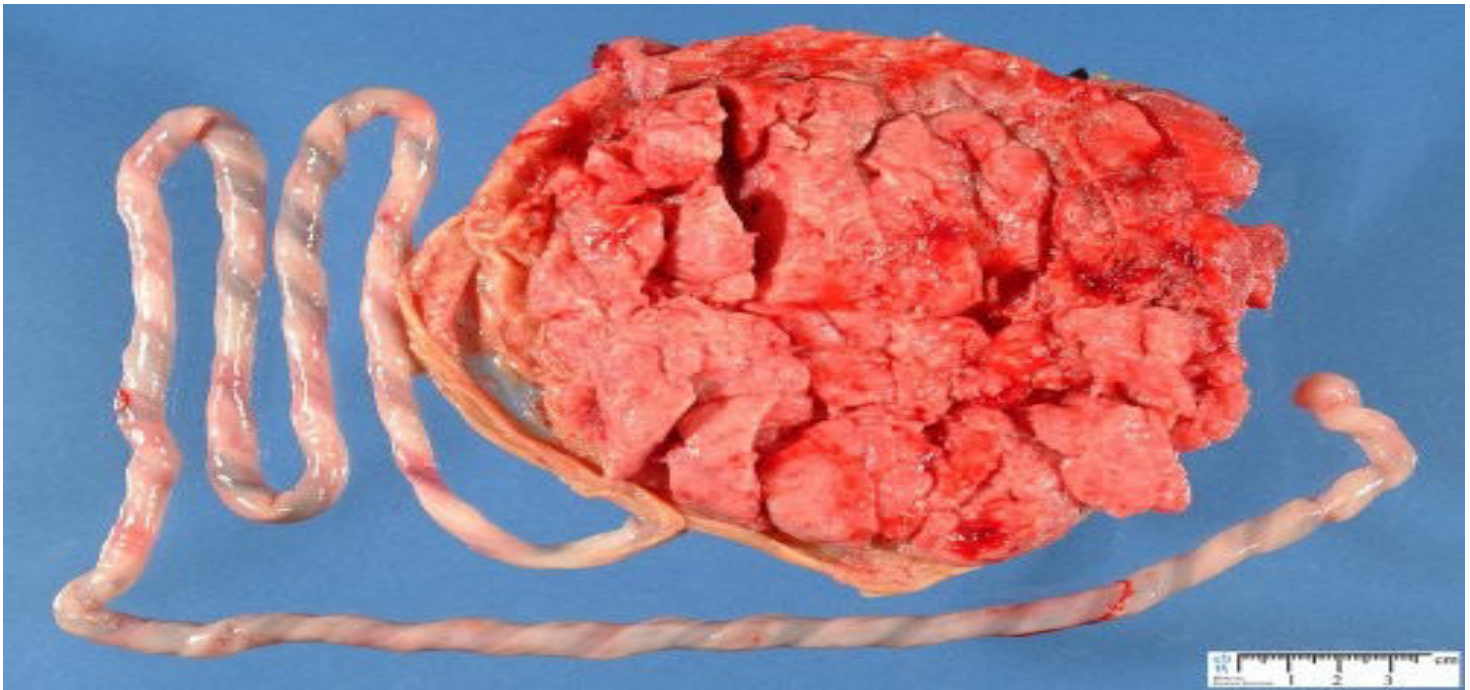
# Clinical significance:

1. Prevent descent of the presenting part specially during labour
2. Separation of normally situated placenta
3. Favour malpresentation
4. Acute inversion
5. Fetal growth restriction
6. Intrapartum distress
7. Failure of external version
8. Two fold risk of fetal death

## Long cord

### Clinical Significance

- cord prolapse
- cord entanglement round the neck or the body
- True knot
- False knots



## Battledore placenta

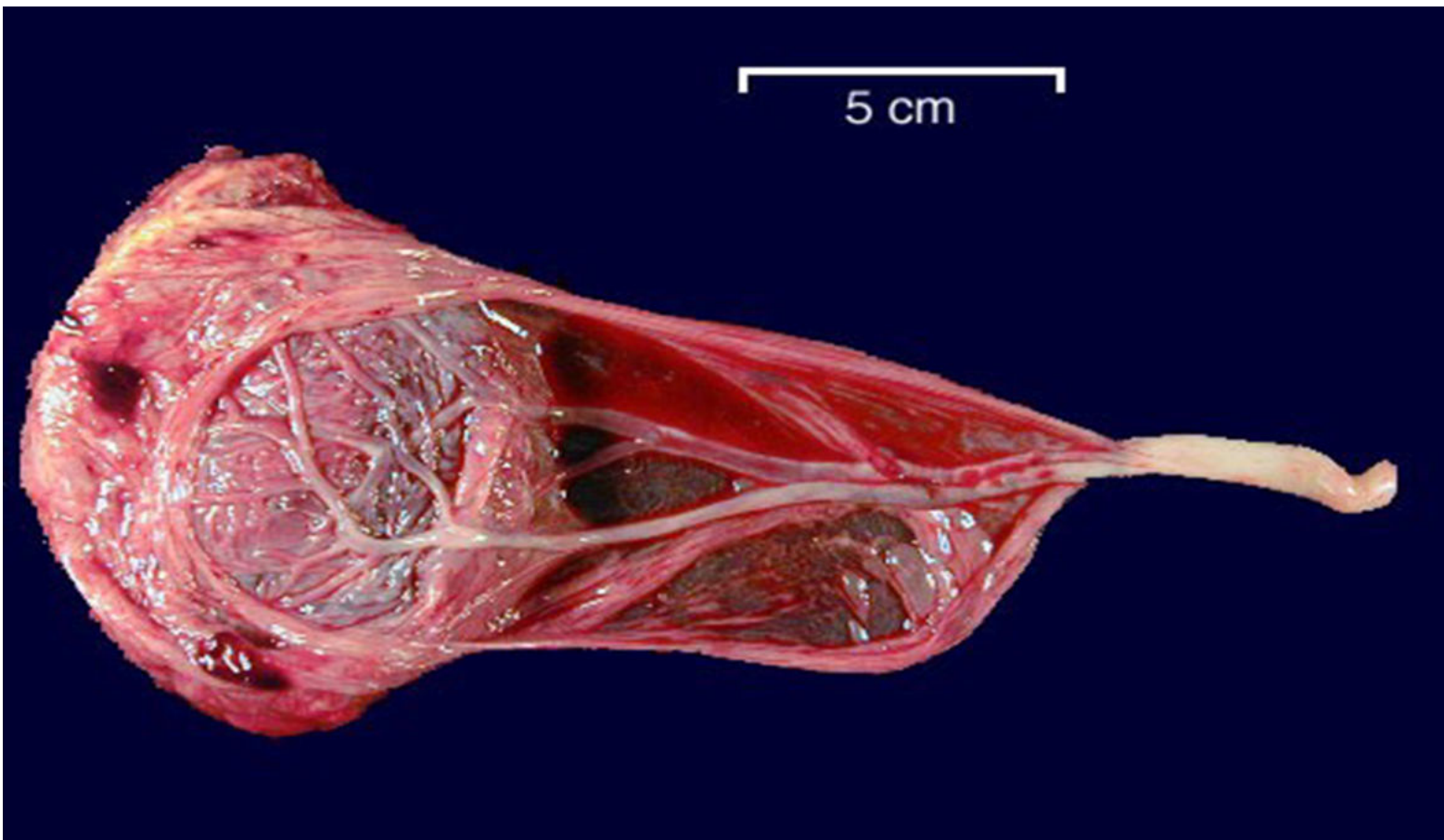
- The cord is attached to the margin of the placenta.
- If associated with low implantation of the placenta, there is chance of cord compression in vaginal delivery leading to fetal anoxia or even death; otherwise, it has got little clinical significance.



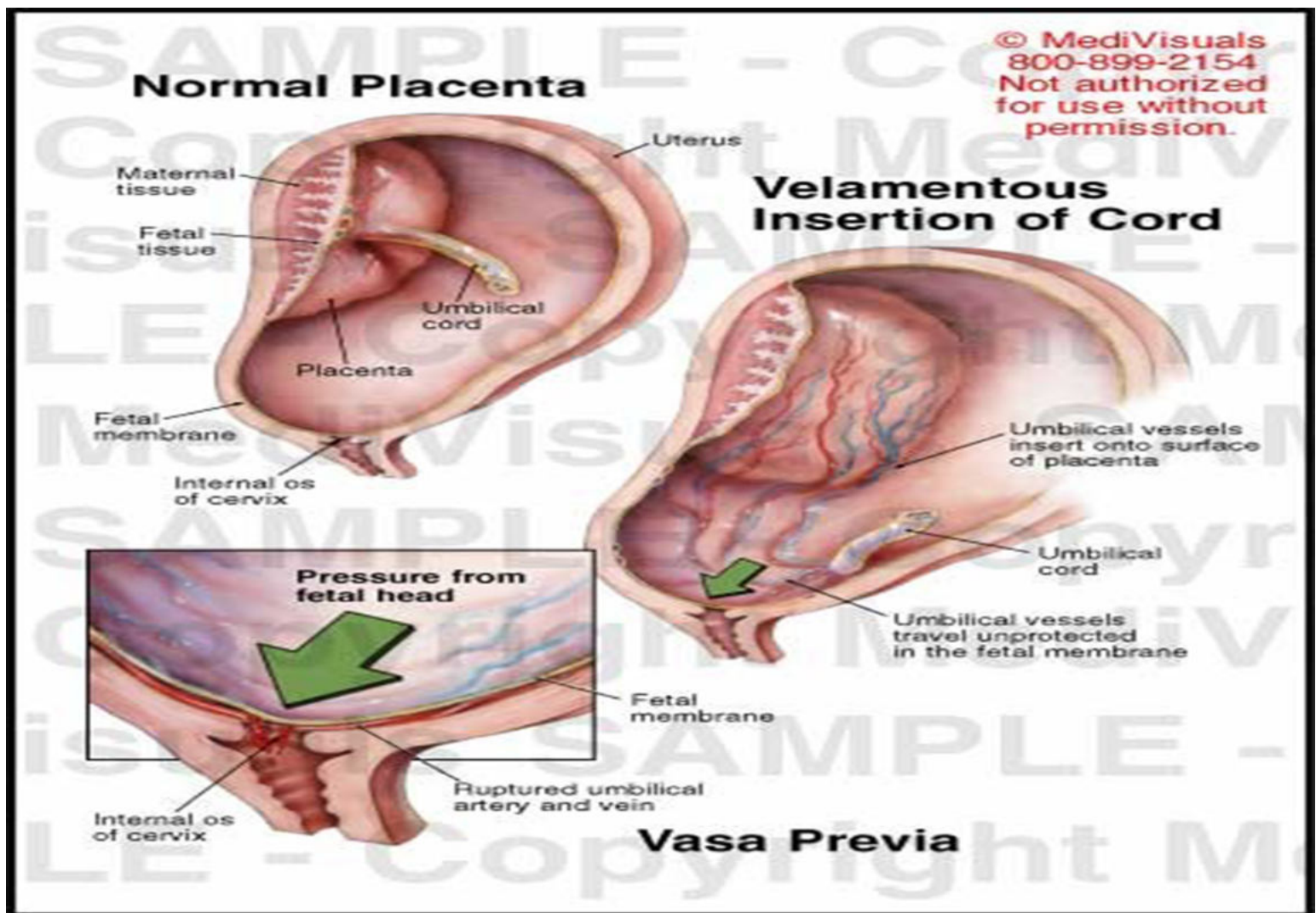
## Velamentous placenta

- The umbilical vessels spread within the membranes at a distance from the placental margin, which they reach surrounded only by a fold of amnion.
- Although their incidence is approximately 1 percent, velamentous insertion develops more commonly with placenta previa and multifetal gestations.





If the leash of blood vessels happen to traverse through the membranes overlying the internal os, in front of the presenting part, the condition is called vasa praevia.



- In the presence of fetal bleeding, urgent delivery is essential either vaginally or by caesarean section.
- The newborn's haemoglobin is estimated and if necessary, blood transfusion be carried out.
- If the baby is dead, vaginal delivery is awaited.

## Knots

### False Knots

False knots appear as knobs protruding from the cord surface and are focal redundancies of a vessel or Wharton jelly, with no clinical significance.

