

# Childbirth

**Childbirth**, partus, is the expulsion or removal of a fetus from the uterus that shows at least one vital sign (movement, cry, tone, umbilical cord pulsation) regardless of gestational age and birth weight. Stillbirth, if the fetus is over 500 g, ev. 25 cm, ev. older than 22+0.

- Preterm - until the end of the 37th week,
- at term - 38-42 weeks,
- delayed - after 42 weeks.

The actual birth is divided into:

- I. period of labor = opening;
- II. period of labor = expulsion;
- III. period of labor = to the bed, delivery of placenta and amniotic membranes.



Newborn

## The first period of labor

The **first period of labor** (or the *opening period*) begins with the **regular contractions of the uterine muscles**, which lead to the opening and closing of the cervix (this creates the *uterine gate*) and ends **disappearance of the uterine cervix** (it is no longer palpable).

The frequency of contractions initially does not exceed 1-2/10 min. In 10-15%, labor begins with the outflow of amniotic fluid (if not followed by uterine contractions within 1 hour, we speak of *premature outflow*.)

### Initiation of labor

hormones play a key role in the initiation of labor - the main ones are biochemical changes in the myometrium. During pregnancy, the myometrium is kept relaxed by a number of substances (relaxin, CRH (corticotropin-releasing h.), progesterone). During initiation, the reactivity of the myometrium to uterotonics begins to increase.

The myometrium begins to produce proteins - the so-called **CAP** (contraction-associated proteins) (they stimulate the formation of gap junctions between myocytes - accelerate the spread of depolarization, activate enzymes producing uterotonics (PG synthase ...), increase the number of uterotonic receptors).

The placenta begins to produce a higher amount of CRH before birth - it increases contractility, stimulates the synthesis of PG, stimulates the synthesis of cortisol in the fetus, progesterone during pregnancy maintains relaxation by inhibiting the formation of CAP, estrogen increases the number of gap-junctions and stimulates the degradation of collagen in cervix.

### Uterine activity

- The irritability of the myometrium is determined by the change of the resting potential of muscle cells to a critical potential.

In all three periods of labor, we can observe contractions and retractions:

- *contraction* - a reversible state, rhythmically repeating, resulting from contraction and subsequent relaxation;
- *retraction* - the relevant area is irreversibly reduced by permanent shortening and over-rotation of muscle cells.

### Description of contractions

- The basic value is **basal tone** (BT) - it expresses the amount of **intrauterine pressure**, at the beginning of the first period it is 8-12 mm Hg, it increases during labor to 12-18 mm Hg ( should not exceed 20 mm Hg);
- for contraction we describe these parts;
  - ascending part (stadium incrementi) - at the beginning of labor it is steeper, towards the end it is more gradual;
  - peak (acme);
  - descending part (stadium decrementi) - muscle repolarization;
- *intrauterine tensogram'* - we subtract the amplitudes... - see CTG;
- Montevideo units (MU) - recalculation from the sum of the amplitudes of contractions in a ten-minute interval (they should not exceed 300 for term birth);
- **external tocometry** is simpler - we mainly determine the frequency of contractions (4-5/10 min at the end of the 1st period);
- *resting phase* (length of the inter-contraction period) - should not be below 30 s;
- the entire birth is accompanied by approx. 110-150 contractions for primiparous women, 60-80 for multiparous women;
- the contraction wave propagates from the horns (the existence of certain pacemakers is assumed).

# Blood flow in the fetus during contractions

## Influence of placental flow

- intramyometrial pressure is reduced in the myometrium in the area of placenta attachment;
- a sufficient supply of oxidized blood is ensured by the different compressibility of veins and arteries;
- Under normal circumstances, the oxygen supply to the fetus is normal.

## Fluctuations intracranial pressure

- the head presses against the pelvic entrance and during contractions, **cervicocranial pressure** is applied there (it is created between the head and the barrier of the birth canal);
- the fetus reacts to a rise in intracranial pressure with bradycardia (there are early decelerations on the CTG);
- if the pressure exceeds the venous pressure – transient congestion occurs;
- if it exceeds the intra-arterial level – fetal CNS ischemia occurs!

## Throat and gate dilatation mechanism

- The muscle in the throat is practically circular;
- the course of the contraction wave causes, with each contraction, a concentrated pressure of the pressing part of the fetus on the lower uterine segment (contractiones ad partum);
- the lower uterine segment opens and allows the urgent part of the fetus to move there;
- as soon as the fetus leaves the upper part of the uterus, retraction occurs there (but it probably only occurs after the outflow of water);
- in the place of the pressure zone, stagnant edema develops on the head (birth tumor);
- Throat dilation occurs differently in primiparous women and multiparous mothers.

## Throat and pharynx dilatation in primiparous women

- They have a conical throat with a pitted outer gate;
- the throat opens cup-like from the inner gate (orificium cervicis uteri internum) to the outer gate;
- a mucus plug is pushed into the vagina;
- the average duration of the first stage of labor in first-time mothers is 6–7 hours.

## Dilation in multiparous women

- They have a cylindrical throat, the outer gate is yawning (circular fibers are broken by a previous birth);
- along with the dilation of the inner gate, the entire throat opens up as a whole;
- gradually moving the lower segment shortens;
- the average duration of the first stage of labor in women with multiple births is 3–4 hours.

# The second period of labor - mechanism of delivery by header

The **second period of labor** (or *the period of expulsion*) begins **with the disappearance of the cervix** and ends **with the birth of the child**.

## Factors that determine the course of II. times

- uterine contractions, their intensity peaks;
- Abdominal pressure – is caused reflexively by the pressure of the head on the presacral receptors (the same as the defecation reflex – if the intestine is not emptied with an enema, there is a risk of passing stool);
- mutual differences pelvic planes and the specific topic of the pelvis;
- concavity of the birth canal (see below for the shape of the fetal head).

Birth parameters in the head position:

- penetrating circuit – **suboccipitobregmatic**;
- leading point – small fontanelle;
- **hypomochlion** - subocciput;
- head configuration - dolichocephalic.

We can divide the birth of the head into five stages:

## Initial flexion and entry into the entrance plane

When entering the plane of the pelvic entrance, the head initially flexes so that it lowers the occiput and the lowest point is the small fontanelle.

The head first enters through a small section and, after passing through the biparietal diameter, is fixed by its large section in this plane.

Header position – is in the transverse or **I position. oblique** (when standing normally) or **II. oblique** (in less common positions).

## Header progression to width and height

The head enters the spacious width and then the isthmus where it meets the pelvic floor resistance. At this moment, the mother begins to engage the abdominal press (reflexively), the mother feels the active involvement in the expulsion as a psychological relief, but it is quite *exhausting* for her physically, especially for a first-time mother.

### Normal and Abnormal Head Internal Rotation

In the region of the strait (or between the strait and the exit) the head rotates internally.

The following rule applies to all positions of the fetal head - during normal rotation, the leading point rotates forward behind the clip, regardless of where it was previously located - for example, in dorsoposterior positions, the rotating small fontanelle describes an arc of up to 135°.

Duration - tends to be longer in dorsoposterior positions (there are also more disorders of the mechanism of the second stage of labor, such as abnormal rotation or a deep transverse position).

*Abnormal rotation* - on the contrary, the leading point rotates towards the coccyx.

### Rotation of the head around the lower edge of the symphysis

After the internal rotation was completed, the head entered the pelvic outlet with a sagittal suture in a straight diameter.

The head rests with the occiput on the lower edge of the symphysis.

The concavity of the birth canal forces the head to lean back (but it is not a change in the deflection position), thereby first cutting the area of the small fontanel (head of the head), then the forehead, the forehead, the face and finally the chin. The point of contact that rests on the symphysis is described as the *hypomochlion* - it is usually located at one pole of the penetrating circumference of the head. Birth "after abnormal rotation" - the hypomochlion is the bregma, the baby is born facing the symphysis (the head must first be maximally flexed before the head is born at the back, but then it deflects sharply in the front when the areas around the bregma are released - but that's should be avoided as sudden deflection may cause intracranial haemorrhage!).

- A wider biparietal diameter is born in the area of the perineum, so a larger injury to the perineum occurs more often.

### External rotation

The head, which was born with an arrow seam in the direct diameter of the pelvic outlet, turns according to the position of its body.

This rotation is conditioned by the mechanism of the birth of the hangers.

### Braces delivery mechanism

Even before the head exits the pelvic outlet, the branches enter the pelvic inlet.

- At entry, the biacromial suture is usually in the opposite oblique diameter to where the sagittal suture of the head was.

The shoulder placed more in front becomes the leader, placed below.

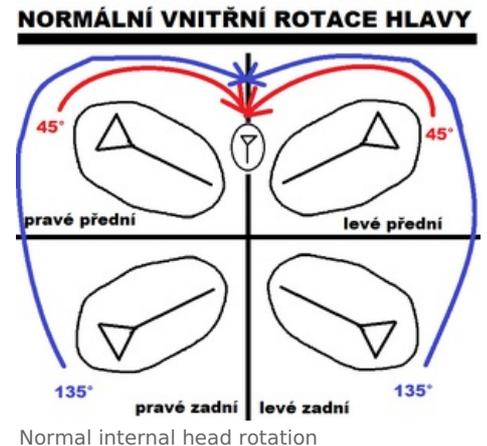
The brachii progress through the neck to the isthmus, where after birth the head internally rotates so that the leading brachii twists forward beyond the lower edge of the symphysis.

In the east, the biacromial diameter (as well as the sagittal arrow of the head) is in a straight diameter.

We deliver the front arm approximately to the level of the attachment of the deltoid to the humerus.

- There, the hypomochlion is formed, around which we flex laterally, and thus give birth through the perineum and the posterior shoulder.

Duration II. delivery time - 15-20 min for a primiparous mother, 5-10 min for a multiparous mother.





## The third period of labor

**The third period of labor** (or *time to bed*) begins **with the birth of the child** and ends **with the delivery of the placenta**.

After childbirth, the uterus retracts, the fundus is rounded, the uterus is spherical;

- retraction occurs everywhere except the area of placental insertion;
- after a certain resting phase, contractions occur again - **contractiones ad secundinas** - these are also at the place of the placenta;
- a tissue shift occurs between the placenta and the uterus, the uteroplacental septa and vessels are ruptured, a **retroplacental hematoma** is formed ;
- the placenta separates in the spongy layer of the decidual mucosa (the pars compacta deciduae remains on the placenta, the fundus of the glands and the open lumina of the vessels remain on the uterus).

### Mechanism

According to the localization and method of separation, we distinguish 3 types of mechanism:

- **Mechanism according to Baudelocque-Schultze :**
  - a retroplacental hematoma is formed and *the placenta separates from the center to the periphery* (no bleeding);
  - then the placenta is born with the fetal part first, dragging the envelopes with it.
- **Mechanism according to Duncan :**
  - the placenta separates *from one periphery through the center to the other periphery* (there is slight bleeding);
  - the placenta is born on its maternal side.
- **Mechanism according to Gessner :**
  - it also separates *from the periphery, but before separation it collapses like a cone* and comes out on its fetal side (bleeding also occurs).

The third period lasts about 5-10 minutes.

### Management III. birth period

- In the case of obvious obstruction or signs of aspiration (turbid amniotic fluid), we suck the newborn's mucus, or amniotic fluid from HCD – all newborns have already stopped suctioning, irritation of the airways can cause laryngospasm;
- tie the umbilical cord (about 6 cm from the belly), cut it under the protection of the hand, place the placental stump on a sterile cloth in the area of the left groin (I assume the mother's...);
- after direct contact with the mother, we transfer the child to neonatal care;
- we cut about 10 cm from the ligated umbilical cord and send it for gas analysis and ABR , then a test for syphilis , possibly. bilirubin and anti D ;
- to facilitate uterine retraction, we strictly aseptically catheterize the bladder ( urine will be examined for protein, sugar);
- active leadership III has been promoted in the Czech Republic since the 1960s. delivery time - to limit postpartum blood loss → we administer immediately after birth (sometimes even after delivery of the head) - also in uterotonics and uterokinetics and we wait for the spontaneous separation of the placenta → then we wait for the placenta to leave (it often requires considerable patience);
- when the placenta is separated, we feel the flattened uterus, the fundus rises above the navel, acquires a roof-like appearance;
  - **Küstner's maneuver** - when pushed above the symphysis, the stretched umbilical cord is pulled into the vagina (non-separated placenta), if it is separated, the umbilical cord , on the other hand, climbs out;

- we try to limit maneuvers to accelerate exit (they increase the risk of retention of the cotyledon or retention of the entire placenta);
  - these maneuvers include, for example, **Credé's touch** - we push out the placenta by pressing the front and back uterine walls across the abdomen or by pulling on the umbilical cord;
- the woman gives birth to the separated placenta (max. we can gently help towards the end with pressure on the fundus);
- after the birth of the placenta, we end the delivery of the amniotic membranes - **touch according to Jacobs** - we grasp the delivered placenta with both hands and turn it several times and at the same time pull it out slightly → the membranes are rolled into a cord and are better equipped;
- we examine the integrity of the membranes (they should be delivered by at least 2/3), we look to see if there are any blood vessels running in the membranes that would be broken (this would indicate an additional placenta);
- then we examine the placenta - we look for infarctions, then we observe the integrity of the cotyledons;
  - if we suspect the retention of cotyledons or a larger part of the envelopes, we perform a manual revision of the uterine cavity in the CA ;
  - in newborns with a high risk of perinatal death, we take a piece of the placenta and fix it in formaldehyde and send it for histological examination;
- in LA , we carry out revision and remediation of birth injuries, we suture the injury with vicryl;
- we place the woman in a resting position and measure BP , pulse , body temperature ,...

## Links

### related articles

- Birth
- The first period of labor
- The second period of labor

### References

- BENEŠ, Jiří. *Studijní materiály* [online]. [cit. 2009]. <<http://jirben.wz.cz>>.

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## Links

### Related articles

- Main statistical indicators in obstetrics

### External reference

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### Reference

- BENEŠ, Jiří. *Study materials* [online]. ©2009. [cit. 2010]. <<http://jirben.wz.cz>>.