

**MINISTRY OF HEALTH PROTECTION OF UKRAINE  
ODESSA NATIONAL MEDICAL UNIVERSITY**

Faculty of dentistry  
Department of Obstetrics and Gynecology



**APPROVE**

Vice-rector for scientific and pedagogical work

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**METHODOLOGICAL DEVELOPMENT FOR THE LECTURE ON THE  
EDUCATIONAL DISCIPLINE**

Faculty of dentistry, course IV  
Educational discipline "Obstetrics and gynecology"  
Lecture №1. Topic: "Physiological pregnancy and childbirth"

**Approved:**

Meeting of the Department of Obstetrics and Gynecology  
Odessa National Medical University

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## Lecture №1

### Topic: "Physiology of pregnancy and childbirth"

**Objective:** The lecture material is aimed at familiarising higher education students with the impact of additional processes on the woman's body during pregnancy. Provision and possibilities for the development of the fetal egg and the possibility of further prospects when significant changes occur in the development of the embryo and fetus in the mother's body.

The knowledge and mastery of this lecture will contribute to the professional thinking of future professionals who, under any circumstances, must provide assistance to pregnant women.

**Basic concepts:** Physiological changes in a woman's body during pregnancy. Hygiene and nutrition of pregnant women. Methods of examination of a pregnant woman: diagnosis of early and late pregnancy. Topography of the fetus in the uterus. Management of physiological pregnancy. Pregravid preparation.

Precursors of labour, preliminary period. Determination of the onset of labour. Biomechanisms of childbirth in the anterior view of occipital presentation. Clinical course of labour. Management of labour. Assessment of the newborn on the Apgar scale. Primary toilet of the newborn, observance of the heat chain.

### Plan and organisational structure of the lecture:

Obstetric terminology.

Physiology of pregnancy.

Implantation, processes of organogenesis.

Changes in organs and systems during pregnancy.

Perinatal protection of the fetus.

Antenatal period.

### General material and methodological support for the lecture:

Professional algorithms, structural and logical diagrams, tables, models, videos, results of laboratory and instrumental studies, situational tasks, patients, medical histories.

### Content of the lecture:

#### Obstetric terminology

**Pregnancy.** During this period, the body of a pregnant woman undergoes significant physiological and hormonal changes that allow to ensure the proper

development of the fetus, as well as to prepare for the upcoming childbirth and feeding.

**Firstly**, all of a woman's organs and systems are subject to increased stress. If the expectant mother is healthy, the body can easily cope with pregnancy, but in case of any abnormalities, the risk of exacerbation of chronic diseases and the likelihood of complications increases. To prevent these disorders, a pregnant woman should be regularly observed not only by a gynecologist, but also by a general practitioner, and, if necessary, visit more narrow specialists.

**Secondly**, during pregnancy, new structures are formed in a woman's body - the placenta, membranes, umbilical cord, amniotic fluid - that ensure the vital activity of the fetus and its relationship with the mother. The condition of all these structures is very important, so it is regularly assessed by a doctor, primarily with the help of auxiliary diagnostic methods.

**Thirdly**, during pregnancy, blood, urine, and other data change. Therefore, you should not panic if the test results differ significantly from the usual "norms". Many changes are quite natural and correspond to the "norms" for pregnant women. A competent and attentive specialist will be able to correctly interpret the tests and distinguish between completely harmless fluctuations and serious deviations that require additional intervention.

#### **Changes in the body of a healthy woman during pregnancy**

Pregnancy is a physiological process that lasts 280 days from the day of conception. During this period, changes in all organs and systems occur to ensure the normal functioning of the embryo, growth and development of the fetus, which are adaptive and adaptive in nature. An important role in this process is played by the newly formed functional biosystem "**mother - placenta - fetus**".

The functioning of the mother-placenta-fetus biosystem is understood as the interaction of two organisms connected through extraembryonic structures, which is aimed at the growth and development of the fetus. From the moment of fertilisation, the mother's body receives information that is perceived by the relevant organs and systems. The main link between the mother and fetus during fetogenesis is the placenta, which is of both maternal and fetal origin. While in the early stages of embryogenesis, the mother and embryo can exist independently of the placenta, the placenta cannot exist outside the mother-fetus system. From the point of view of the systemic approach, the maternal body is an external environment for the fetus, and its changes can significantly affect its development.

**Development of the embryo.** Within 6-7 days after fertilisation, the zygote moves through the fallopian tube into the uterus and begins to divide to form blastomeres, which are much smaller than the mother cell, so the embryo at the stage of division is slightly larger than its size. The embryo at this stage is called a morula. The embryoblast forms the tissues of the embryo. Around the circumference of the morula are light and small cells - trophoblast, which

provides implantation and nutrition for the embryo. The morula gradually develops into a blastocyst when fluid appears between the embryoblast and trophoblast. Once in the uterus, the blastocyst enters the functional layer of the endometrium. Within 40 hours, the fetus is completely immersed in the mucous membrane and the defect overgrows. The mucosa forms the primary membrane of the placenta. The trophoblast forms a villous membrane, or chorion, whose villi go deep into the functional layer of the endometrium. The chorionic villi gradually grow into the vessels of the embryo, which are used for metabolism. The embryo is directly surrounded by a water layer - the amnion.

Subsequently, from the 3rd week of pregnancy, **the placentation stage** begins, which ends with the establishment of fetal-placental circulation at the 13th week. The bulk of the placenta is made up of chorionic villi. They are freely washed by the mother's blood, and through their walls, nutrients and oxygen are diffused into the fetal circulatory system. The placenta is a powerful endocrine gland and releases hormones and biologically active substances into the mother's bloodstream that contribute to the normal course of pregnancy. The placenta is a component of the fetus' immunobiological defense. However, this barrier is permeable to a number of toxic substances - alcohol, drugs, nicotine, heavy metal salts, some medicines, rubella viruses, etc.

### **Fetal development.**

After implantation is completed, the fetus begins to lay down the main organs and systems.

Central nervous system.

During pregnancy, there is a change in the reactivity of many centres of the nervous system, which provide reactions of stable preservation of temporary homeostasis constants. After blastocyte nidation into the uterine mucosa from its receptor field and structural elements, the impulse flow is effectively transmitted through chemo-barro-mechanical and osmoreceptors to the central nervous system, where the information is analyzed, transformed and a source of increased excitability is formed in the cerebral cortex. This process in pregnant women is manifested by a decrease in attention, fatigue, imbalance and a predominance of thoughts related to pregnancy and the birth of a baby. Against the background of reduced cortical excitability, the activity of the subcortex, reticular formation of the brainstem, spinal cord, and uterine receptor apparatus increases dramatically, resulting in the formation of the "pregnancy dominant", which is a genetically programmed temporary integrated system for regulating all types of hemostasis.

### **Cardiovascular system**

From the moment of implantation of the blastocyst, the CVS is under increased stress due to the following reasons

- formation of a new blood circulation circle;
- increase in blood mass and formation of an additional vascular wall in the uterus and other organs and tissues;

- fluid retention in the body under the influence of estrogen and progesterone of placental origin;

- an increase in the body weight of the pregnant woman in general;

- change in the position of the heart axis, starting from the second trimester, under the influence of the pregnant uterus.

The cardiovascular system of pregnant women experiences an increased load due to the formation of the uteroplacental circulation, an increase in blood weight, due to the activation of the angiotensin-aldosterone system and the action of placental estrogens and progesterone, which leads to an increase in circulating blood volume by 40 - 50% (3500 - 5000 ml).

The increase in BCC occurs mainly due to an increase in plasma volume by 35-47%, significantly outpacing the increase in red blood cell volume by 18-25%. The resulting physiological hemodilution reduces blood viscosity, which improves microcirculation in the uteroplacental region and vital organs of the pregnant woman. Hypervolemia increases most intensively in the first and second trimesters, reaching its maximum value at 29-36 weeks of pregnancy, which leads to a decrease in hematocrit by 35-47%. The concentration of hemoglobin in the blood decreases from 13.5 - 14.0 g/l to 11.0 - 12.0 g/l.

In physiologically healthy women during pregnancy, peripheral vascular resistance decreases by 20 - 30%, but due to this, there is no significant decrease in blood pressure. The decrease in peripheral vascular resistance is due to the functioning of a "new" uteroplacental circulation with low resistance and the vasodilating effect of placental estrogen and progesterone. Systemic blood pressure by 25-28 weeks of pregnancy tends to decrease by 5-15 mm Hg.

### **Respiratory system**

During pregnancy, the respiratory system is in a state of functional stress, under the influence of the pregnant uterus with the displacement of the diaphragm dome upwards, which leads to lung compression and alveolar collapse and an increase in oxygen demand at the end of pregnancy by almost 30-40%, in childbirth up to 150-200%, contributing to the following changes

- lung excursion decreases by 10%;

- residual expiratory volume decreases by 20%;

- total lung capacity decreases by 5%;

- vital capacity of the lungs increases by 5% (100 - 200 ml);

- Pulmonary ventilation increases by 26%;

- the minute respiratory volume increases by 40% (up to 11 l/min);

- Increase in tidal capacity by 5%;

- the amount of air inhaled per minute increases by 36%;

- alveolar ventilation increases by up to 70%;

- respiratory rate increases by 15%;

- partial pressure of carbon dioxide decreases by 15 - 20%;

- proportional increase in oxygen consumption by 30-40%;

- the need for oxygen increases relative to the baseline by 15 - 33%.

Changes in the respiratory system in pregnant women are aimed at meeting the increasing oxygen needs of the mother's body and the fetus.

### **Digestive system**

During pregnancy in healthy women, the digestive system undergoes topographic and functional changes:

- The pregnant uterus shifts the stomach from a horizontal position to a vertical position;
- the angle of the gastrointestinal junction changes;
- in the last weeks of pregnancy, the liver is displaced upwards and posteriorly and increases slightly in volume and blood circulation increases;
- bile duct dilation occurs;
- there is an increase or perversion of appetite, heartburn, salivation, and a tendency to constipation;
- the acidity of gastric juice and the secretory function of the digestive glands decrease;
- the processes of life and fermentation develop, which contributes to bloating and intoxication;
- relaxation of the cardiac sphincter contributes to increased heart rate and reflux esophagitis;
- Hypotension of the small intestine, as well as the colon, transverse colon and rectum develops;
- constipation, rectal edema and intoxication occur;
- the frequency of hemorrhoid recurrence increases due to stasis in the veins flowing into the inferior vena cava;
- plasma oncological pressure decreases, which contributes to the development of edema; - the concentration of globulins increases, especially due to carrier globulins, from 2.75 to 3 g/l;
- inactivation of estrogens and steroid hormones, especially those synthesized by the fetoplacental complex, is enhanced;
- the serum bilirubin level increases, especially at the end of pregnancy;
- increased production of plasma factors of the hemostatic system (fibrinogen, factors II, IV, VIII, X).

In healthy pregnant women, the digestive system is characterized by a decrease in the tone of the smooth muscles of the internal organs, which contributes to reduced evacuation of food through the intestine, and increased absorption of fluid from the large intestine.

### **Urinary system**

Almost 90% of healthy pregnant women experience morphological and functional changes in the urinary system:

- The length of the kidneys increases by an average of 1.0-2.0 cm and their size reaches 9-12 cm;

- the pelvic floor system expands and is asymmetrical;
- the diameter of the upper urinary tract increases;
- Renal blood flow rate increases by 25 - 35%;
- glomerular filtration rate increases by 35 - 50% without changes in reabsorption, which contributes to proteinuria (not more than 0.02 g/l in morning urine and not more than 0.075 g/l in daily urine);
- an increase in glomerular filtration rate by 50% leads to an increase in sodium filtration by 5000 - 10000 mmol/day;
- diuresis progressively increases up to 32 - 33 weeks of gestation (from 1200 ml to 2250 ml), followed by a decrease to 1200 ml at the end of pregnancy;
- urine acquires a persistent alkaline reaction, which is not a manifestation of a urinary tract infection, but may contribute to its development;
- due to hyperproduction of mineralocorticoids and increased tubular sodium adsorption, salt haemostasis changes;
- urine osmolarity decreases relative to plasma osmolarity;
- plasma osmolarity in physiological pregnancy, despite sodium retention, is in the range of 280 - 290 mmol/kg H<sub>2</sub>O;
- at the level of microcirculation vessels, there is a balance between the inflow and outflow of substances;
- in the case of provoking factors (physical overload, heat, water load), the equilibrium may change, resulting in physiological edema in pregnant women.

In cases when the inflow of all substances into the extracellular space exceeds the outflow, unstable edema in pregnant women is formed, which disappears in a state of physiological rest or when the pregnant woman changes her position in bed to the left.

### **Endocrine system**

Complex morphological and functional changes in the endocrine glands occur in the ovaries from the moment of egg nidation into the endometrium, formation and functioning of the corpus luteum, and cessation of ovulation.

The development of pregnancy occurs due to qualitative and quantitative changes in sex hormones and other biologically active substances. In the first half of pregnancy, the corpus luteum hormone, progesterone, prevails, which inhibits the excitability and contractile activity of the uterus. In the later stages, estrogens and hormones with myotropic action predominate, which contribute to increased uterine excitability. The production of oxytocin and vasopressin increases in the hypothalamic nuclei, especially at the end of pregnancy and before delivery. Oxytocin from the hypothalamus enters the posterior pituitary gland via the portal system vessels, where it is released into the mother's bloodstream under the action of pituitary cells. The paraventricular and supraoptic nuclei regulate the secretion of follicle-stimulating (FSH), luteinizing (LH), adrenocorticotrophic (ACTH) and thyroid-stimulating (TSH) hormones by the adenohypophysis.



Significant morphological and functional changes occur in the pituitary gland under the influence of sex steroids (gestagens, estrogens) of the placenta. Under their influence, hypertrophy and proliferation of acidophilic cells (lactophores), called "pregnancy cells", occur in the anterior pituitary gland. With hyperplasia and hypertrophy of lactophores and the action of placental estrogens, prolactin synthesis increases more than 10 times, which contributes to the development and preparation of the mammary glands for lactation. A marked inhibition of follicle-stimulating hormone (FSH) and luteinising hormone (LH) production is observed at the onset of pregnancy, which leads to inhibition of the ovarian hormone-producing function, contributing to the cessation of follicle growth and maturation. There is an increase in the secretion of growth hormone (GH), which is associated with the growth of the uterus and other parts of the genital apparatus, as well as the appearance of acromegaly (enlargement of the limbs, lower jaw, brow bones) in some cases in pregnant women.

The sensitivity to adrenocorticotrophic hormone (ACTH) in pregnant women's blood does not increase, but the sensitivity to it increases, especially in the adrenal cortex. Somatotrophic hormone (SHBG) increases slightly at the end of gestation. Thyroid-stimulating hormone (TSH) remains at the same level as before pregnancy. However, in 20% of pregnant women in the first half of gestation, TSH levels decrease under the influence of chorionic gonadotropin (CG).

Changes in the thyroid gland are observed from the first weeks of gestation. It is characterized by an increase in its size, number of follicles, colloid content and thyroid hormone levels by 35-40%. In the case of multiple pregnancies, when the level of hCG in the blood is significantly elevated, pituitary TSH production is suppressed in 100% of cases. As the gestation period increases, the level of hCG decreases and TSH returns to normal values, while the level of thyroid hormones remains elevated until delivery and only decreases before delivery. The transient decrease in thyroid hormone levels contributes to additional stimulation of the thyroid gland by TSH, as a result of which the amount of free T4 and T3 fractions in the blood remains at normal levels, while the level of total (bound + free) T4 and T3 in all pregnant women is normally elevated.

During pregnancy, hyperplasia of the adrenal cortex occurs with no changes in the cerebral cortex. Blood flow in the adrenal glands increases, and the function of both the cortical and cerebral adrenal substance increases:

- glucocorticoids, which regulate protein and carbohydrate metabolism;
- mineralocorticoids that regulate mineral metabolism;
- the cortical substance of the adrenal glands is responsible for the synthesis of estrogens, progesterone and androgens;
- Binding of corticosteroids to transcortin reduces their utilisation by organs and tissues, which increases their levels in the mother's blood;

- increased levels of corticosteroids in the blood of pregnant women are also due to increased adrenal function in the fetus and the free passage of corticosteroids across the placenta. Increased glucocorticoid formation is also associated with the secretion of placental adrenocorticotrophic hormone and increased sensitivity of the adrenal cortex to pituitary ACTH, as well as the influence of cortisol-like substances.

Increased levels of corticosteroids in the serum of pregnant women help to provide the developing embryo with the necessary ingredients (proteins, salts, carbohydrates, hormones) that the embryo itself is unable to produce.

Due to hypertrophy of the pancreatic  $\beta$ -cells, insulin production in pregnant women increases almost 2-fold. In addition, starting from 9 to 11 weeks of gestation, the fetal pancreas produces its own insulin, and therefore the fetus is independent of maternal insulin. Changes in carbohydrate metabolism in pregnant women are associated not only with an increase in the functional state of the pancreatic function, but also with the influence of corticosteroids, hormones and enzymes of the fetoplacental complex. The main changes in the blood glucose content of pregnant women are characterized by 15 lower glucose levels and a gradual increase in its level after a glucose load. Therefore, fasting glucose levels are lower than in non-pregnant women. In the case of fasting by a pregnant woman, excessive hypoglycemia and hyperinsulinemia develop rapidly. Chorionic gonadotropin and estrogens are stimulators of pancreatic insulin secretion, and also affect the improvement of peripheral glucose uptake and are an important factor in reducing glycaemia and glucosuria, which in the first half of pregnancy can contribute to hypoglycemic states.

The second trimester of pregnancy is characterized by the presence of hypoglycemic states and may be associated with the action of counter insulin hormones (cortisol, glucagon, placental lactogen, prolactin). Other factors that contribute to the development of insulin resistance in the third trimester of pregnancy include renal breakdown of insulin, activation of placental insulins, and increased synthesis and secretion of placental lactogen, especially after 34 weeks of gestation, which is a peripheral antagonist of the metabolic effects of insulin. Changes in carbohydrate metabolism during pregnancy may contribute to the onset of diabetes-like conditions:

- decreased glucose tolerance;
- increased insulin resistance;
- increased levels of circulating free fatty acids in the blood serum;
- significant decrease in fasting blood glucose levels;
- reduced use of glucose by peripheral tissues.

In early physiological pregnancy, the metabolic requirements of the fetus contribute to metabolic changes in the mother's body, which are characterized by the following

- development of fasting hypoglycemia with a subsequent decrease in blood insulin levels;

- a decrease in the content of amino acids in the blood;
- accelerated breakdown of fats from severe to ketoacidosis.

In later pregnancy, insufficient insulin supply to the pregnant woman's body leads to the development of

- hyperglycemia
- hyperosmolarity;
- metabolic acidosis.

During pregnancy, a woman's body undergoes significant physiological changes that ensure the proper development of the fetus and prepare the body for future childbirth and feeding.

### **Hygiene and nutrition of a pregnant woman**

The changes that occur during pregnancy have a positive effect on the body of a healthy woman, contributing to the full development of important functional systems. Under the circumstances, pregnancy is usually easily tolerated. However, poor hygiene, unhealthy diet, excessive physical and mental stress can cause physiological disorders and contribute to pregnancy complications.

It is necessary to follow personal hygiene rules that contribute to maintaining health, normal fetal development, and preventing complications of pregnancy and childbirth. Healthy pregnant women can perform their usual physical and intellectual work, which is a need for every person. Work contributes to the proper functioning of the nervous, cardiovascular, muscular, endocrine and other systems. Work, especially work that involves physical activity, is essential for normal metabolism. Pregnant women's physical inactivity contributes to obesity, decreased muscle tone, constipation, and increases the risk of various complications of pregnancy and childbirth. Instead, a pregnant woman should avoid excessive exercise that causes physical and mental fatigue. Pregnant women are prohibited from riding bicycles and other means of transport that involve vibration and full-body shaking, as well as sports involving running, jumping, sudden movements and emotional overload.

Pregnant women working at enterprises where there is exposure to radiation, high temperatures, chemical and physical factors, night work, etc. should consult a doctor at a women's health clinic to exclude these factors and switch to lighter work.

The pace and duration of walking should be selected according to the degree of fitness, age and health of the pregnant woman. It is important to have sufficient rest, especially sleep for at least 8 hours a day. In case of sleep disturbances, hygiene measures are taken. The issue of sexual hygiene deserves attention. Sexual intercourse is dangerous for women with signs of infantilism, inflammatory diseases of the genital organs, and previous menstrual disorders, as it can lead to the threat of pregnancy termination at various stages. However, it is practically impossible to completely prohibit sexual activity, so it should be

limited during the first 2-3 months of pregnancy and stopped in the last months of pregnancy.

Smoking and alcohol consumption, which have a harmful effect on the body of the pregnant woman and the fetus, are prohibited. A pregnant woman should avoid contact with people with general and local infectious diseases.

Skin care during pregnancy is of great importance, as the human skin performs a number of important functions: protective, respiratory, absorption, excretory and thermoregulatory. Therefore, a pregnant woman should constantly take care of herself by taking showers, baths, and wet wipes.

Air and sun baths are recommended for 5-10 minutes at first, and then, as you get hardened, for 15-20 minutes. It is not advisable for a pregnant woman to stay in the open sun for a long time, especially in summer. In winter, ultraviolet radiation.

Pregnant women should prevent nipple cracks and mastitis by washing their breasts daily with room temperature water and baby soap, followed by drying with a stiff towel. Air baths for the mammary glands are performed for 10-15 minutes several times a day. In case of flat and retracted nipples, massage them after consulting a doctor or midwife. To prevent stagnation, the mammary glands should be in an elevated position. You should wear comfortable bras (preferably cotton) that do not compress the chest.

### **Methods of examination of a pregnant woman**

An objective examination of a pregnant woman begins with a general examination, which is carried out according to generally accepted rules, starting with an assessment of the general condition, temperature measurement, examination of the skin and mucous membranes. Then the cardiovascular, respiratory, digestive, urinary, nervous and endocrine systems are examined. It is necessary to emphasize the necessity of measuring blood pressure in both arms, as significant asymmetry is possible in gestation.

**The special obstetric examination** consists of an external obstetric examination, an internal obstetric examination and additional methods.

**The external obstetric examination and fetal topography in the uterus includes:**

1. Determination of the abdominal circumference and the height of the uterine floor.

The abdominal circumference is measured with a centimeter tape at the level of the navel. The height of the uterine floor is measured from the upper edge of the symphysis to the uterine floor.

The bottom of the uterus at the level of the symphysis	12 weeks
Midway between the womb and navel	16 weeks
At the level of the navel	24 weeks
In the middle of the distance between the navel and the xiphoid process	30-32 weeks
Reaches the sword-shaped process	36 weeks

The product of the abdominal circumference and the height of the uterine floor gives an indication of the expected weight of the fetus.

2. Palpation of the abdomen of pregnant women is carried out sequentially, using four methods of external examination (**Leopold's methods**).

To determine the position of the fetus, the following concepts are used in obstetrics:

*Fetal position* is the ratio of the longitudinal axis of the fetus to the longitudinal axis of the uterus. There are the following fetal positions:

- **longitudinal - the longitudinal axis of the fetus and the longitudinal axis of the uterus coincide;**

- **transverse - the longitudinal axis of the fetus crosses the longitudinal axis of the uterus at a right angle;**

- **oblique - the longitudinal axis of the fetus forms an acute angle with the longitudinal axis of the uterus.**

The longitudinal position of the fetus is normal, it occurs in 99.5% of all births, the transverse and oblique position is pathological (0.5% of births).

*The fetal position* is the ratio of the fetal back to the right and left sides of the uterus. There are two positions: the first and the second. In the first position, the back is turned to the left (2/3 of cases), and in the second position - to the right (1/3 of cases). In the transverse and oblique positions, the position is determined by the position of the head: the head on the left is the first position, on the right - the second.

*The type of position* is the relation of the fetal back to the anterior or posterior wall of the uterus. If the back is turned forward, it is an anterior position, if it is turned backwards, it is a posterior position.

*Fetal breech position* is the relationship of the fetal limbs and head to the fetal trunk. The normal position is flexed, namely: the head is bent and pressed against the body, the arms are bent at the elbow, crossed and pressed against the chest, the legs are bent at the knee and hip joints, crossed and pressed against the abdomen.

*Fetal presentation* is the relation to the plane of the pelvic entrance of the part of the fetus that descends first into the pelvis during labor (the anterior part). If the head of the fetus is above the pelvic entrance, the presentation is breech, if the pelvic end is above, it is called cephalic. The breech presentation occurs in 96% of births, and the cephalic presentation in 3.5%. If the head is slightly bent towards the chest (i.e. the back of the fetus is the frontal part) and is inserted into the pelvis by the area of the small parietal region, this is occipital presentation. Depending on the different degrees of extension of the fetal head, extensor breech presentation is formed - anterior, frontal and facial.

External pelvimetry.

### 3. Fetal auscultation.

The obstetric stethoscope determines the fetal heart rate from the beginning of the second half of pregnancy. The stethoscope is placed in the place where the fetal heartbeat is most clearly heard perpendicular to the anterior abdominal wall. The heartbeat is most clearly heard from the back of the fetus, in the breech position - below the navel, in the cephalic position - above the navel, on the left - in the first position, on the right - in the second position.

The normal fetal heart rate is 120-160 beats per minute. The heart sounds are double, rhythmic, and do not coincide with the pregnant woman's pulse.

### **Internal obstetric examination is performed during normal physical delivery**

Vaginal examination of a pregnant woman is mandatory in case of

**Normal (physiological) labor** is labor with spontaneous onset and progression of labor activity in a pregnant woman at 37-42 weeks' gestation, occipital presentation of the fetus, with satisfactory condition of the mother and newborn after delivery. With the onset of labor, a pregnant woman is called a woman in labor.

#### **1. Precursors of labor:**

- 1.1. prolapse of the uterine floor,
- 1.2. increased reaction of the uterus to mechanical stimuli,

- 1.3. discharge of mucous plug from the cervical canal,
- 1.4. weight loss by 1-1.5 kg,
- 1.5. reduction in the amount of amniotic fluid,
- 1.6. insertion of the head in first-time mothers.

**2. The preliminary period** is a rare, mild cramping pain in the lower abdomen and lower back that occurs against the background of normal uterine tone lasting up to 6-8 hours, leading to softening, smoothing and opening of the cervix, deployment of the lower uterine segment, and lowering of the fetal anterior part.

### **Determining the onset of labor.**

Contractions are spontaneous contractions of the uterine muscles. The intervals between contractions are called a pause.

Regular labor activity is the presence of 1-2 or more uterine contractions within 10 minutes, lasting 20 seconds or more, which leads to structural changes in the cervix - its smoothing and opening.

### **The biological readiness of the body for childbirth is determined by the degree of cervical maturity:**

Assessment of the degree of cervical "maturity" according to the Bishop scale

Feature	Degree of "maturity" – 0 score	Degree of "maturity" – 1 score	Degree of "maturity" – 2 score
Cervical position	At the back	At the ahead	Middle
Consistency cervix of the uterus	Dense	Softened	Soft
Length cervix of the uterus (cm)	>2	1-2	<1
Condition of the outer sphincter (cm)	Close	Open on 1 cm	Open on 2 cm
Location of the anterior part of the fetus	Moving above the entrance to the pelvis	Pressed against the entrance to the pelvis	Pressed or fixed at the entrance to the pelvis

0-2 points - the neck is "immature"

3-5 points - cervix "not mature enough" > 6 points - cervix "mature"

### **Management of physiological pregnancy**

**The biomechanism of labor** is a complex of translational, rotational, bending and extensor movements that the fetus makes while passing through the birth canal.

The biomechanism of labor in the anterior presentation consists of four moments.

The first moment is the flexion of the head and its lowering into the plane of entry into the pelvis.

The second moment is the internal rotation of the head.

The third moment is extension of the glans in the plane of exit.

The fourth stage is internal rotation of the shoulders and external rotation of the head.

The biomechanism of labor in the posterior view of the occipital presentation consists of four moments.

The first moment is the flexion of the head and its lowering into the plane of entry into the pelvis.

The second moment is the internal rotation of the head.

The third stage is additional flexion of the fetal head.

The fourth stage is head extension.

The fifth stage is internal rotation of the shoulders and external rotation of the head.

### **Regulation of labor activity**

The onset of labor is the result of a gradual integration of morphological, hormonal, biochemical and biophysical states.

### **Clinical course of labor**

Labor is divided into three periods:

*The first period is cervical dilatation.*

*The second is the expulsion of the fetus.*

*The third is the subsequent one.*

With the onset of labor, a pregnant woman is called a laboring woman.

**The biomechanism of labor** is a complex of translational, rotational, bending and extensor movements that the fetus makes as it passes through the birth canal.

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The biomechanism of labor in the posterior view of the occipital presentation consists of four moments.

The first moment is the flexion of the head and its lowering into the plane of entry into the pelvis.

The second point is the internal rotation of the head.

The third moment is additional flexion of the fetal head.

The fourth moment is head extension.

The fifth moment is internal rotation of the shoulders and external rotation of the head.

### **Management of labor:**

- assessment of the degree of predicted risk of maternal and perinatal pathology in order to determine the required level of assistance in labor;
- determination of the labor management plan and its mandatory informed agreement with the woman;
- providing emotional support to the woman in labor during childbirth (organization of partner childbirth);
- control over the condition of the mother and fetus in labor with the maintenance of a portogram;
- free position of the woman in labor during childbirth;
- anesthesia of labor according to indications;
- assessment of the child's condition at birth, primary toilet training of the newborn and early breastfeeding, implementation of the principles of the "heat chain".

### **Before gravida preparation includes:**

- Cessation of harmful effects:
  1. Smoking cessation.
  2. Refusal to drink alcohol.
  3. Exclusion of exposure to harmful industrial production factors.
  4. Avoidance of psycho-emotional overload and stress.
- Women's health improvement and treatment of chronic diseases:
  1. Normalisation of work and rest regime.
  2. Creation of favorable psycho-emotional conditions at work and in the family (home).
  3. Rational nutrition.
  4. Regular physical activity (morning exercises, swimming, walking, etc.).
  5. Sanitation of extragenital foci of chronic infection (tonsillitis, sinusitis, pyelonephritis, etc.).
  6. Normalisation of body weight.
  7. Rubella vaccination of immune negative women to prevent congenital rubella.

8. Vaccination against hepatitis B in women of reproductive age at risk, which prevents vertical transmission of infection, reduces the risk of liver failure and cirrhosis in the mother.

9. Preparation of patients with chronic extragenital diseases:

- diabetes mellitus: stable compensation of carbohydrate metabolism for three months before insemination and administration of folic acid 800 mcg per day 3 months before conception;

- arterial hypertension (maintenance of normotension, switching to antihypertensive drugs, additional use during pregnancy is permitted);

- hypothyroidism (correction of L-thyroxine replacement therapy to achieve euthyroid state);

- epilepsy (switching to anticonvulsants with less negative effect on the fetus, increasing the dose of folic acid to 800 mcg per day 3 months before conception);

- heart defects (radical surgical treatment if indicated);

- diseases requiring permanent anticoagulant therapy (cancellation of teratogenic coumarin derivatives, prescription of heparin)

- other extragenital diseases (surgical treatment, correction of therapy, achievement of disease remission).

### **Questions:**

1. The structure of germ cells. Implantation.
2. Placenta, its structure and functions.
3. Critical periods of embryo and fetal development.
4. Influence of harmful factors on the embryo and fetus.
5. Physiological changes in the body of a woman during pregnancy.
6. Hygiene and nutrition of pregnant women.
7. Methods of examination of pregnant women. External and internal obstetric examination of pregnant women.
8. Topography of the fetus in the uterus.
9. Determination of early and late pregnancy.
10. Management of physiological pregnancy.
11. Determination of the degree of cervical maturity.
12. Biomechanism of labor in anterior and posterior types of occipital presentation.
13. Periods of labor.
14. The period of expulsion of the fetus. Clinic, management.
15. The sequential period. Signs of placental abruption. Clinic, management of the postpartum period (active management, expectant management).
16. Conservative methods of manure removal.
17. Determination of the integrity of the litter.

### **Literature used by the lecturer to prepare the lecture**

#### **Main:**

1. Obstetrics and gynecology: in 2 books. - Book 1: Obstetrics: textbook (III-IV year of study) / V.I. Grishchenko, M.O. Shcherbyna et al. - K.: Medicine, 2020. - 424 p.
2. Obstetrics and gynecology: national textbook for medical universities of IV accreditation levels in 4 volumes // National textbook in 4 volumes / Zaporozhan VM, Tatarchuk TF, Gladchuk IZ, Podolsky VV, Rozhkovska NM, Marichereda VG, Volyanska AG - K.: VSV "Medicine", 2017. - 696 p.
3. Textbook of obstetrics (ed. I.B. Ventskivska, V.P. Lakatosh, V.M. Kushch) - K., 2018 - RA-HARMONY - 210 p.
4. Emergency conditions in obstetric practice: a practical guide / A.Y. Senchuk, V.G. Ginzburg, I.I. Chermak et al.
5. Preterm birth: a textbook / G.S. Manasova, K.O. Nitochko, M.V. Shapoval - Ternopil: Krok. 2023. - 186 c.
6. Clinical Obstetrics and Gynecology: 4th edition / Brian A. Magowan, Philip Owen, Andrew Thomson. 2021. - 454 p.
7. Oats, Jeremy Fundamentals of Obstetrics and Gynaecology [Text]: Liewellyn-Jones Fundamentals of Obstetrics and Gynaecology / J.Oats, S.Abraham. - 10th ed: Elsevier, 2017. - VII, 375 p.

#### **Additional:**

1. Simulation medicine. Experience. Achievements. Prospects: practical guide / V.M. Zaporozhan, O.O. Tarabrin - Sumy: University. Book, 2018. 240 p.
2. Intra-abdominal bleeding in gynecology: a monograph / I.Z. Gladchuk I.Z., Nazarenko O.Y., Tkachenko R.O. - Odesa: ONMedU, 2021. - 112 p.
3. Situational tasks in obstetrics: a textbook / V.M. Zaporozhan, A.G. Volyanska, H.L. Lavrynenko and others; edited by Academician of the National Academy of Medical Sciences of Ukraine, Professor V.M. Zaporozhan - Odesa: ONMedU, 2014. - 140 p.
4. The model of screening for preeclampsia in the second and third trimesters of gestation / L. Berlinska, V. Marichereda, O. Rohachevskyi, A. Volyanska, G. Lavrynenko // Electronic Journal of General Medicine. - 2023 - 20(3), em473, <https://www.ejgm.co.uk/>.
5. Current Clinical Protocols approved by the Order of the Ministry of Health of Ukraine on Obstetrics and Gynecology.

### **Electronic information resources**

1. <https://www.cochrane.org/>
2. <https://www.ebcog.org/>
3. <https://www.acog.org/>
4. <https://www.uptodate.com>
5. <https://online.lexi.com/>

6. <https://www.ncbi.nlm.nih.gov/>
7. <https://pubmed.ncbi.nlm.nih.gov/>
8. <https://www.thelancet.com/>
9. <https://www.rcog.org.uk/>
10. <https://www.npwh.org/>
11. <http://www.aagu.com.ua/> Association of Obstetricians and gynecologists of Ukraine