Episode 108 – Pregnancy and Oral Health: Part One May 10, 2024

Introduction

Pregnancy causes many physiologic changes to the body, with most disappearing after delivery. These changes cause a variety of symptoms that are considered normal. The changes are typically more dramatic in multifetal than in single pregnancies. [1] [2]

Pregnancy generally lasts 266 days from the time of conception or 280 days from the first day of the last menstrual period if periods occur regularly every 28 days. Delivery date is estimated based on the last menstrual period. Delivery up to two weeks earlier or later than the estimated date is normal. Delivery before 37 weeks gestation is considered preterm, and delivery after 42 weeks gestation is considered postterm. [3]

Conception

During each normal menstrual cycle, one ovum is usually released from one of the ovaries (i.e., ovulation) about 14 days after the last menstrual period. The ovum is swept into one of the fallopian tubes by the fimbriated end of the fallopian tube.

At ovulation, cervical mucus becomes more fluid and elastic, allowing rapid movement of sperm to the ovum. Within five minutes, sperm may move from the vagina, through the cervix into the uterus, and to a fallopian tube. The cells lining the fallopian tube facilitate fertilization. Sperm may remain alive in the vagina for about three days. Conception (fertilization) occurs when a live sperm unites with an ovum in a fallopian tube.

Blastocyst development

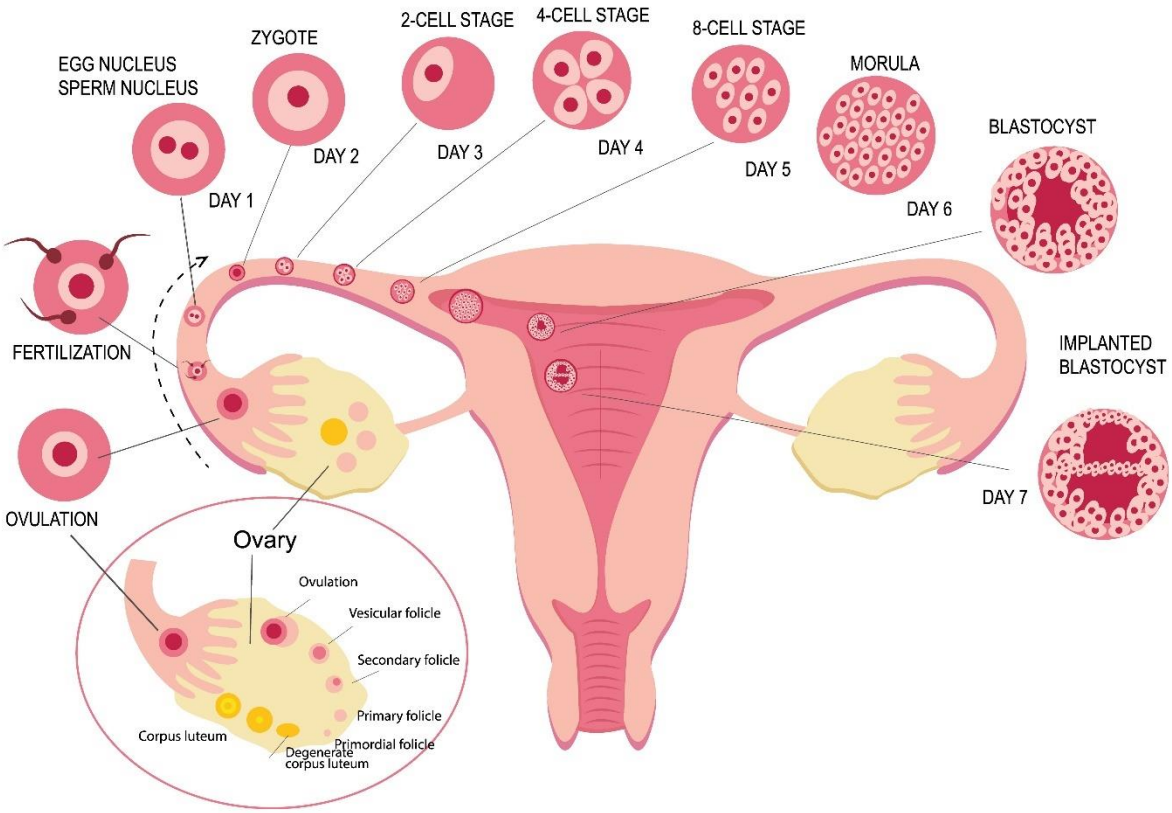
Tiny hairlike cilia lining the fallopian tube propel the zygote (i.e., fertilized egg) through the tube toward the uterus. The zygote continuously divides as it travels to the implantation site in the endometrium of the uterus. The zygote enters the uterus in three to five days. In the uterus, the cells continue dividing, becoming a blastocyst (a hollow ball of cells). The blastocyst wall is one cell thick except in one area, where it is three or four cells thick. The inner cells in the thickened area develop into the embryo, and the outer cells burrow into the uterus wall and develop into the placenta. The blastocyst implants in the uterine lining about six days after fertilization, and implantation is complete by day nine or ten.

The placenta produces several hormones that help maintain the pregnancy. For example, the placenta produces human chorionic gonadotropin, which prevents the ovaries from releasing eggs and stimulates the ovaries to continuously produce

estrogen and progesterone. The placenta also carries oxygen and nutrients to the fetus and waste materials from the fetus.

Some of the cells from the placenta develop into an outer layer of membranes (chorion) around the developing blastocyst. Other cells develop into an inner layer of membranes (amnion), which form the amniotic sac. The blastocyst is an embryo when the sac is formed by about day ten to twelve. The amniotic sac fills with amniotic fluid and expands to envelop the developing embryo, which floats within it.

OVULATION AND FERTILIZATION PROCESS



Embryo

The embryo develops within the amniotic sac. Around day ten, three germ layers (ectoderm, mesoderm, endoderm) are usually distinct in the embryo. During the embryo stage, most internal organs and external body structures form. Most organs begin to form about three weeks after fertilization. At this time, the embryo elongates, first suggesting a human shape. Shortly after, the area that will become the brain and spinal cord (neural tube) begins to develop. By about day 16, the heart and major blood vessels start developing. The heart begins to pump fluid through blood vessels by day 20, and the first red blood cells (RBCs) appear the next day. Blood vessels continue to develop in the embryo and placenta.

Almost all organs are completely formed about ten weeks after fertilization (which equals 12 weeks of pregnancy). The exceptions are the brain and spinal cord, which continue to develop throughout pregnancy. Susceptibility to congenital malformations by teratogens (e.g., drugs, radiation, viruses) is highest when organs are forming. Therefore, a pregnant person should not be given any live attenuated vaccinations or take any drugs during this period unless they are essential to protect their health.

Fetus

The embryo is considered a fetus at the end of the eighth week after fertilization (10 weeks of pregnancy). During this stage, the structures that have already formed grow and develop. For example, at:

- 12 weeks of pregnancy, the fetus fills the uterus, moves, and swallows.
- 14 weeks, the sex can be identified.
- 16 to 20 weeks, the pregnant person can usually feel the fetus moving.
- 24 weeks, the fetus has a chance of surviving outside the uterus.

The lungs continue to mature until near the time of delivery. The brain accumulates new cells throughout pregnancy and the first year of life after birth. [4] [5] [6]

Oral development

Teeth

- Tooth buds develop between the fifth and sixth week in utero.
- Initial mineralization occurs from the fourth to fifth month in utero.

Lips and palate

- Lips form during the fourth to the seventh week in utero.
- Palate forms between the eighth and twelfth week in utero. Fusion of the palate begins in the premaxillary region and continues toward the uvula. [6]

Orofacial clefts

Cleft lip, cleft lip and palate, and isolated cleft palate are the most common congenital malformations of the head and the neck, with a total prevalence of 2.1 per 1000 live births. [7] Orofacial clefts occur when embryonic processes fail to fuse during the first trimester of pregnancy. A cleft lip and a cleft palate become apparent by the end of the eighth and twelfth week in utero, respectively. Orofacial clefts may occur in isolation or with other congenital malformations, particularly congenital heart defects.[1]

The etiology of orofacial clefts is often multifactorial and includes genetic and prenatal environmental factors. A family history of orofacial clefts increases the risk of having an infant with an orofacial cleft. Having one affected child increases the risk of having a second affected child.

[1] Refer to Episode 80 for additional information on congenital heart defects (disorders).

Prenatal environmental factors may include:

- Tobacco and alcohol use.[2]
- Teratogenic agents, such as certain medications to treat epilepsy (e.g., phenytoin), retinoid drugs (e.g., isotretinoin), corticosteroids, and illegal drug use.
- Inadequate diet, such as folic acid deficiency.
- Diagnosis with diabetes before pregnancy may increase the risk of having an infant with a cleft lip with or without a cleft palate.
- Higher parental age. [6] [7] [8] [9] [10]

Various dental conditions associated with orofacial clefts may include:

- Natal (teeth present at birth) and neonatal teeth (teeth that erupt first 30 days of life).
- Microdontia, generally involving lateral incisors.
- Ectopic eruption of maxillary primary lateral incisors or maxillary permanent cuspids.
- Delayed eruption of permanent incisors.
- Enamel hypoplasia, especially involving maxillary central incisors.
- Delayed tooth maturation.

Other conditions associated with orofacial clefts may include:

- Feeding and swallowing difficulties.
- Chronic ear infections.
- Speech difficulties. [9] [11]

Stages of pregnancy

Pregnancy is divided into trimesters:

- First trimester: Weeks 0 to 12
- Second trimester: Weeks 13 to 24
- Third trimester: Weeks 25 to delivery

Development of the fetus [4] [6] [8]

Development	Weeks of pregnancy
First trimester	Weeks 0 to 12
Last menstrual period before fertilization occurs.	0
Fertilization occurs. Zygote (fertilized ovum) begins to develop into blastocyst (hollow ball of cells).	2
Blastocyst implants in uterine wall. Amniotic sac begins to form.	3
Lips begin to form.	4
Neural tube (area that will become brain and spinal cord) begins to develop. Tooth buds begin to develop.	5
Heart and major blood vessels are developing. Beating heart can be seen during ultrasonography. Palate begins to form	6
Beginnings of arms and legs appear.	7

[2] Refer to Episode 101 for additional information of tobacco use and cessation and Episodes 104 and 105 for discussion on alcohol use.

Development	Weeks of pregnancy
Bones and muscles form. Face and neck develop. Brain waves can be detected. Skeleton is formed. Fingers and toes are fully defined.	9
Kidneys begin to function. Almost all organs are completely formed. Fetus can move and respond to touch (when prodded through the person's abdomen).	10
Initial mineralization of teeth.	12
Second trimester	Weeks 13 to 24
Sex can be identified. Fetus can hear.	14
Fingers can grasp. Fetus moves more vigorously. Body begins to fill out as fat is deposited beneath the skin. Hair appears on the head and skin. Eyebrows and eyelashes are present.	16
Placenta is fully formed.	20
Fetus has a chance of survival outside the uterus.	24
Third trimester	Weeks 25 to delivery
Fetus is active, changing positions often. Lungs continue to mature. Head moves into position for delivery.	25
Delivery	37-42

Primary teeth development and eruption [6] [12]

Tooth	**Hard tissue formation begins** (weeks in utero)	**Enamel completed** (months after birth)	**Eruption** (months)	**Root completed** (years)
Maxillary				
Central incisor	14	1½	10 (8-12)	1½
Lateral incisor	16	2½	11 (9-13)	2
Cuspid	17	9	19 (16-22)	3¼
First molar	15½	6	16 (14-18 females) (13-19 males)	2½
Second molar	19	11	29 (25-33)	3
Mandibular				
Central incisor	14	2½	8 (6-10)	1½
Lateral incisor	16	3	13 (10-16)	1½
Cuspid	17	9	20 (17-23)	3¼
First molar	15½	5½	16 (14-18)	2¼

Tooth	Hard tissue formation begins (weeks in utero)	Enamel completed (months after birth)	Eruption (months)	Root completed (years)
Second molar	18	10	27 (24-30 females) (23-31 males)	3

Common pregnancy symptoms
Many symptoms are common in pregnancy. They are often mild and usually caused by normal pregnancy-related changes. However, if a symptom is new, severe, or persistent, the pregnant person should contact their primary care provider.

Symptoms usually due to normal pregnancy-related changes include mild:
- Nausea and vomiting, especially if early in pregnancy
- Food cravings or food aversions
- Increased sense of smell
- Fatigue, which is common, especially in the first 12 weeks and again in late pregnancy
- Low back pain
- Foot and ankle swelling [1] [2]

Symptoms of concern related to the pregnancy
Some symptoms that occur early in pregnancy may be due to a problem with the pregnancy, which requires immediate attention by the primary care provider. Symptoms of a possible problem with the pregnancy include:
- Vaginal bleeding
- Pain or cramps in the abdomen
- Contractions
- Leakage of amniotic fluid
- Decreased movement of the fetus (after 24 weeks of pregnancy) [1]

Symptoms of concern related to disorders
Pregnant individuals can develop complications that occur only during pregnancy. They can also develop other disorders unrelated to pregnancy. These may cause symptoms that are unusual, severe, or persistent.

Pregnant individuals should contact their primary care provider or the emergency department if symptoms are concerning, such as:
- Fever
- Pain during urination or the need to urinate frequently or urgently
- Sharp or severe back or flank pain
- Severe heartburn
- Persistent nausea and vomiting, especially if unable to keep down liquids
- Chest pain
- Dizziness, light-headedness, fainting, loss of consciousness

- Rapid heart rate or palpitations
- Persistent or unusual headaches
- Vision problems (e.g., such as blurring, spots, flashes, double vision)
- Swelling of the hands or face or severe swelling of the feet
- Decreased urination
- Severe or persistent pain in the middle or upper part of the abdomen
- Any symptoms of infection or other illness [1] [13]

Physiological changes during pregnancy
Pregnancy causes various physiologic changes that affect multiple systems, including cardiovascular, respiratory, hematologic, gastrointestinal, renal, and endocrine systems. These changes are important for fetal growth and survival. These physiologic changes should not be mistaken for pathology. Thus, oral health professionals must be aware of them. [14]

Cardiovascular
The cardiovascular system undergoes significant changes during pregnancy. The heart must work harder to pump more blood to the uterus. By the end of pregnancy, the uterus receives one fifth of the prepregnancy blood supply. Blood volume increases to meet the demands of the fetus and pregnant person. The cardiac chambers enlarge and ventricular hypertrophy may occur to enhance the hearts pumping capacity in response to increased demand. Cardiac output (amount of blood pumped by the heart) increases up to 50% from the increased heart rate (from the normal 70 to up to 90 beats per minute at rest) and increased stroke volume. Cardiac output returns to prepregancy level about six weeks after delivery. The hyperdynamic circulation of pregnancy increases frequency of functional murmurs and accentuates heart sounds, including heart rhythm irregularities.

A decrease in blood pressure usually occurs in the second and third trimesters. Supine hypotension syndrome may develop when the person is in the supine position because of compression of the inferior vena cava and aorta by the enlarged uterus. Symptoms include pallor, dizziness, low blood pressure, sweating, nausea and increased heart rate. Symptoms usually occur within 3-10 minutes after lying down. These transient symptoms resolve by having the client roll onto their left side and placing a pillow or rolled towels to elevate the right hip by about 15 degrees. This positioning prevents the weight of the enlarging uterus from blocking blood flow. Scheduling short appointments, treating the client in a semi-reclining position, and ensuring frequent position changes will minimize problems.

Also, changes in the positioning of the dental chair from reclining to upright should be done slowly, as pregnant clients are susceptible to postural hypotension due to vasomotor instability. [1] [3] [14] [15] [16] [17]

Respiratory
Significant respiratory changes occur during pregnancy. The diaphragm rises 3 to 4 cm to compensate for the enlarging fetus. Also, oxygen consumption increases by 15% to 20%. The high level of progesterone signals the body to breathe faster and deeper. As

a result, a pregnant person exhales more carbon dioxide to keep the level of carbon dioxide low. The person may also breathe faster because the enlarging uterus limits how much the lungs can expand on inhalation. The chest circumference also enlarges slightly.

Research has demonstrated moderate hypoxemia occurs in 25% of pregnant people in the supine position. Therefore, adjusting the client's position in the dental chair may be necessary to avoid hypoxemia.

The increase in estrogen production during pregnancy causes engorgement of nasal capillaries, which may cause nasal stuffiness, congestion, and sometimes epistaxis (nose bleeds). Nasal breathing may become difficult, leading to mouth breathing and increasing the risk of xerostomia.[3] [2] [3] [14] [17] [18]

Xerostomia can increase risk of dental caries,[4] periodontal diseases, halitosis,[5] etc. Xerostomia management includes staying hydrated, using a humidifier, using sugarless gums and mints to stimulate saliva, and avoiding caffeine, tobacco, and alcohol. [19]

Strategies to help manage halitosis include staying hydrated and good oral self-care, such as brushing, cleaning interdentally, and brushing or scraping the tongue. However, some pregnant individuals who are experiencing nausea and vomiting may find oral self-care challenging. Recommending a mild tasting fluoride toothpaste (e.g., child's toothpaste) may help. [15] [20]

Hematologic

There is an overall increase in plasma, RBCs, and total blood volume. Blood volume increases by almost 50% during pregnancy and 60% with twins. During normal pregnancy, the amount of plasma in the blood increases more than the number of RBCs, which results in dilutional anemia (physiologic anemia of pregnancy). While some degree of dilutional anemia is part of normal pregnancy, anemia can have serious adverse health consequences for the pregnant person and fetus. Thus, it is vital to distinguish physiologic anemia from iron deficiency anemia and other less common causes of anemia that may require treatment.

Anemia occurs in up to one-third of individuals during the third trimester. The most common causes are iron deficiency and folate deficiency. Early symptoms of anemia are usually nonexistent or nonspecific (e.g., fatigue, weakness, light-headedness, mild dyspnea (shortness of breath) during exertion). Other signs and symptoms may include pallor and, if anemia is severe, tachycardia, fainting, or hypotension.

Anemia increases risk of:

- Preterm delivery
- Low birth weight

[3] For additional information on xerostomia refer to Episodes 55 and 107.
[4] For additional information on dental caries refer to Episode 86 and 87.
[5] For additional information on halitosis refer to Episode 67.

- Postpartum infections

Anemia is diagnosed via blood tests. Anemia can usually be prevented or treated by taking iron and folate supplements during pregnancy. If a pregnant person has iron deficiency, their newborn is usually given iron supplements. Taking folate supplements before becoming pregnant and during pregnancy reduces the risk of the infant having a neural tube defect. However, if anemia symptoms are severe, blood transfusions may be indicated.

White blood cell (WBC)[6] count increases slightly during pregnancy and rises markedly during labour and the first few days after delivery. The higher WBC count can sometimes make a diagnosis of infection challenging. However, the increase in WBCs is not normally associated with an increase in other immature WBC forms, which can be a sign of infection. [2] [17] [21] [22] [23]

Pregnancy is associated with an increase in all coagulation factors except factors XI and XIII, which decrease. These changes may predispose to deep vein thrombosis and pulmonary embolism. Compression of the inferior vena cava in a supine position also contributes to venous stasis and thrombosis, contributing to the risk of deep vein thrombosis. However, there is no evidence of an increased incidence of deep vein thrombosis or pulmonary embolism during dental treatment. [14] [17] [18]

Gastrointestinal

The main gastrointestinal changes during pregnancy are related to nausea, vomiting, and heartburn. Nausea and vomiting, particularly in the mornings, are common, possibly caused by high levels of estrogen and human chorionic gonadotropin.

Nausea and vomiting may be relieved by changing the diet or eating patterns, for example by:

- Drinking and eating small portions frequently
- Eating before getting hungry
- Eating bland foods (e.g., bouillon, consommé, rice, pasta, bananas, apple sauce, dry toast, plain soda crackers)
- Eating plain soda crackers and sipping a carbonated beverage
- Keeping crackers by the bed and eating one or two before getting up in the morning to relieve morning sickness

However, drinking carbonated beverages can contribute to dental erosion and dental caries. Oral health advice should include using a straw positioned behind the front teeth to minimize bathing the teeth in the carbonated beverage. Rinsing the mouth out with water after drinking the beverage. Good oral hygiene is important, especially when eating refined carbohydrates.

[6] Refer to Episode 44 for additional information on white blood cells.

Ginger (available as capsules or ginger tea), acupuncture, motion sickness bands, and hypnosis may help alleviate nausea and vomiting. No drugs specifically designed to treat morning sickness are currently available.

Hyperemesis gravidarum is severe nausea and vomiting during pregnancy that results in dehydration, weight loss, electrolyte imbalance, and ketosis. Signs of dehydration include tachycardia, dry mouth, increased thirst, decreased urination and sweating, and dizziness upon standing. Ketosis is from the body breaking down fats from inadequate food consumption. Ketosis can cause fatigue, halitosis, dizziness, and other symptoms. People with hyperemesis gravidarum may need to be treated with antiemetic drugs (drugs that relieve nausea) or to be hospitalized temporarily to receive fluids intravenously. [2] [24] [25]

Increased progesterone levels during pregnancy have been linked to delayed gastric emptying, decreased bowel motility, and relaxation of the lower esophageal sphincter, which may lead to gastroesophageal reflux and heartburn. [3]

Several measures to help relieve gastroesophageal reflux include:
- Eating smaller meals.
- Not bending or lying flat for several hours after eating.
- Avoiding caffeine, tobacco, alcohol, aspirin, and related drugs (salicylates).
- Seeking advice from their primary care provider or pharmacist on the use of antacids as some antacids are not suitable during pregnancy and can interfere with absorption of folic acid or iron supplements.

Reflux during the night can be relieved by:
- Not eating for several hours before going to bed.
- Raising the head of the bed or using pillows to raise the head and shoulders. [2] [26]

A supine position can increase the risk of gastroesophageal reflux, which can cause aspiration of gastric contents. Gastroesophageal reflux can be reduced by keeping the dental chair as upright as possible to relieve abdominal pressure and keep the client comfortable. However, if the client feels nauseous during an appointment, the procedure should be stopped, and the dental chair should be upright. [15] [18]
Both vomiting and gastroesophageal reflux increase the risk of dental erosion.[7]

Strategies to help mitigate dental erosion include:
- Rinsing the mouth with water, a sodium bicarbonate rinse, or an alcohol-free fluoride mouthrinse after vomiting.
- Brushing should be delayed for at least an hour after vomiting.
- Using tongue cleaner to remove acid residue as soon as possible after vomiting. [27] [28] [29]

[7] Refer to Episode 82 for additional information on dental erosion.

Pica,[8] a craving for strange foods or nonfoods (e.g., starch, clay, ice), may develop in pregnancy. Those who are pregnant and craving nonfood items should only be diagnosed with pica when their cravings lead to ingesting nonfood items, and the ingestion of those items poses a potential medical risk (either due to the quantity or type of item ingested). [30]

A meta-analysis by Fawcett et al. (2016) found 28% of pregnant individuals exhibit pica behaviours globally. Pica prevalence was higher in developing countries. Pica was also associated with higher rates of anemia and lower levels of education. Treating nutritional deficiency with medication or vitamins may resolve the problem. [31]

However, ingestion of nonfood items associated with pica may result in chipped and fractured teeth and soft tissue trauma. Thus, oral health professionals should advise and monitor clients with pica accordingly.

Occasionally, pregnant individuals, usually those with morning sickness, have excess saliva. [2]

Renal

Kidneys work harder throughout pregnancy to filter the increasing volume of blood. The volume of blood filtered by the kidneys (i.e., glomerular filtration rate) increases to 30-50%, reaching a maximum between 16 and 24 weeks. It remains at that level until just before delivery, when it may decrease slightly as pressure from the enlarging uterus may slightly decrease the blood supply to the kidneys.

Postural changes affect renal function. For example, renal function normally increases when lying down and decreases upon standing. This difference is amplified during pregnancy, which is one reason a pregnant person needs to urinate often when trying to sleep. Late in pregnancy, lying on the side, particularly the left side, increases renal function more than in supine. Lying on the left side relieves the pressure that the enlarged uterus puts on the vena cava. As a result, blood flow improves and renal function increases. Also, the uterus presses on the bladder, reducing its size so that it fills with urine more quickly than usual and increasing the need to urinate more often and more urgently. Scheduling shorter oral care appointments may help to minimize problems for the pregnant client. [2] [3]

Endocrine

Pregnancy makes glycemic control more difficult in preexisting type 1 and type 2 diabetes.[9] About 3%-20% of pregnant individuals develop gestational diabetes. Gestational diabetes is when blood glucose values are above normal but below values diagnostic of diabetes. Gestational diabetes develops during pregnancy and usually disappears after delivery. Gestational diabetes is diagnosed through prenatal screening, rather than through reported symptoms because often there are no signs or symptoms. [32] [33] [34]

[8] Refer to Episodes 95 and 96 for additional information on pica and other eating disorders.
[9] Refer to Episodes 91, 93, and 94 for detailed discussion on the various forms of diabetes.

Uncontrolled blood glucose levels during pregnancy can cause complications for the pregnant individual and infant.

Complications of uncontrolled blood glucose in the pregnant person include:
- Developing preeclampsia. Symptoms include hypertension, proteinuria (too much protein in the urine), and edema of the legs and feet. Left untreated, preeclampsia can lead to serious, even fatal, complications for the pregnant individual and infant.
- Developing gestational diabetes in subsequent pregnancies.
- Increased risk of developing prediabetes or type 2 diabetes.
- Increased risk of developing oral complications, such as periodontal disease.

Complications of uncontrolled blood glucose in the infant include:
- Excess growth. Extra glucose crosses the placenta, triggering the infant's pancreas to make extra insulin, which can cause the infant to grow too large. It can lead to a difficult birth and sometimes the need for a C-section.
- Hypoglycemia. Infants may develop hypoglycemia shortly after birth because their own insulin production is high.
- Type 2 diabetes later in life. Infants born to someone with gestational diabetes have a higher risk of developing obesity and type 2 diabetes later in life.
- Death, which can occur either before or shortly after birth. [35] [36]

Risks factors for gestational diabetes

Having any of the following conditions increases risk of developing gestational diabetes:
- Prediabetes
- 35 years of age or older
- History of gestational diabetes
- Gave birth to an infant who weighed >4 kg
- High BMI or overweight before pregnancy
- Parent or sibling with type 2 diabetes
- Polycystic ovary syndrome
- Being of African, Arab, Asian, Hispanic, Indigenous, or South Asian descent
- Use of corticosteroid medication
- Acanthosis nigricans[10]
- Periodontitis [34] [37] [38]

A systematic review and meta-analysis by Abariga and Whitcomb (2016) found an association between periodontitis and the development of gestational diabetes. The mechanism by which periodontal disease causes gestational diabetes is not yet fully determined. Evidence of elevated inflammatory mediators such as leucocytes and C reactive proteins in systemic circulation of individuals with gestational diabetes suggests chronic infection may play a role. It is proposed that periodontitis-associated local and systemic host immune responses lead to both transient bacteremia and the release of

[10] Acanthosis nigricans is a dark patch of velvety skin (e.g., on neck, armpits, groin); often a sign of prediabetes.

inflammatory mediators (e.g., interleukins, tumor necrosis factors), which may then impact insulin, or lead to the destruction of the insulin-producing pancreatic beta cells. This process could lead to insulin resistance and glucose metabolism impairment and, if not reversed, gestational diabetes. [38]

Oral complications of diabetes

Chronic hyperglycemia leads to various complications in the oral cavity. The degree of glycemic control appears to be a significant factor in the severity and likelihood of oral complications. [39] [40] [41]

Oral complications of diabetes include:

- Periodontal disease
- Xerostomia
- Dental caries
- Periapical lesions
- Tooth loss
- Burning mouth sensation[11]
- Impaired wound healing
- Increased incidence and severity of infections
- Taste dysfunction
- Coated, fissured, or geographic tongue
- Recurrent aphthous stomatitis
- Oral lichen planus
- Halitosis [4] [7] [8]

Hypertension in pregnancy

Hypertension[12] during pregnancy is classified as chronic or gestational hypertension:

- Chronic hypertension is blood pressure that was high before the pregnancy or before the 20th week of pregnancy.
- Gestational hypertension is blood pressure that becomes high after the 20th week of pregnancy (most cases usually occur after 37 weeks). This type of hypertension typically resolves within 6 weeks postpartum. [42] [43]

Antihypertensive medication may be needed by those with chronic or gestational hypertension as hypertension increases risk of mortality and morbidity for both the fetus and pregnant person. Risk to the fetus increases because of decreased uteroplacental blood flow which can cause:

- Decreased growth
- Placenta abruption (i.e., premature placenta detachment)
- Hypoxia
- Stillbirth

[11] Refer to Episode 106 for detailed discussion on burning mouth syndrome.
[12] Refer to Episodes 79, 80, and 81 for additional information on hypertension.

Additional risks to the pregnant person include:
- Preeclampsia
- Eclampsia (seizures)
- Stroke
- Kidney failure
- Heart failure
- HELLP syndrome[13]

During pregnancy, hypertension is monitored closely to make sure blood pressure is well-controlled, kidneys are functioning normally, and the fetus is growing normally. If antihypertensive medications are prescribed, the pregnant person is closely monitored since these medications can reduce blood flow to the placenta if they lower blood pressure too rapidly. [42] [43] [44]

Preeclampsia

Preeclampsia is either new hypertension or worsening of chronic hypertension that develops after the 20th week of pregnancy (although most cases occur after 34 weeks of pregnancy) and is accompanied by proteinuria (excess protein in the urine). Preeclampsia is diagnosed and treated differently from other types of hypertension. Diagnosis is by measuring blood pressure and urine protein and evaluating for end-organ damage (e.g., pulmonary edema, impaired liver or kidney function). Preeclampsia can suddenly cause eclampsia. If not treated promptly, eclampsia is usually fatal. Some cases of preeclampsia develop after delivery (i.e., postpartum preeclampsia), most often within the first 4 days but sometimes up to 6 weeks after delivery. [43] [45] [46]

<u>Symptoms of preeclampsia</u>

Some people with preeclampsia have no symptoms. In others, preeclampsia causes edema, particularly in the hands, fingers, ankles, feet, and face. Some people may gain weight quickly (e.g., more than 5 pounds [2.2kg] a week). Severe preeclampsia can damage the brain, kidneys, lungs, heart, liver, or other organs.

Symptoms of severe preeclampsia may include:
- Severe headaches
- Distorted vision
- Confusion
- Overactive reflexes
- Pain in the upper right part of the abdomen (over the liver)
- Nausea or vomiting
- Dyspnea (difficulty breathing)
- Decreased urination
- Very high blood pressure
- Stroke (rarely)

[13] HELLP syndrome consists of hemolysis, elevated liver enzymes, and low platelets. Hemolysis is the breakdown of RBCs, elevated liver enzymes indicate liver damage, and a low platelet count increases the risk of bleeding before or after labour.

Sudden swelling of the hands or face, or a headache that does not resolve requires immediate medical attention. [45] [46]

Risk factors for preeclampsia

Etiology of preeclampsia is unknown. Risk factors for preeclampsia may include:

- Preeclampsia in a previous pregnancy
- Multiple pregnancies in current pregnancy
- Diabetes before pregnancy or gestational diabetes
- Chronic hypertension or a blood vessel disorder before pregnancy
- First pregnancy
- Age ≥35 years
- Obesity
- Family history of preeclampsia in a first-degree relative
- Kidney disorders
- Autoimmune disorders[14]
- Use of in vitro fertilization
- Periodontal disease [45] [46] [47] [48]

An umbrella review of 23 systematic reviews by Daalderop et al. (2017) found that periodontitis during pregnancy contributed to an increased risk of preeclampsia, preterm birth, and low birthweight infants. [48]

Treatment of preeclampsia

Treatment of preeclampsia may include:

- Usually hospitalization and antihypertensive medications to lower blood pressure
- Immediate delivery, depending on the severity of preeclampsia, well-being of the pregnant person and fetus, and weeks of pregnancy
- Corticosteroids to promote development of the infant's lungs before delivery
- Anticonvulsant medication (e.g., magnesium sulfate) to prevent or stop seizures (i.e., eclampsia) [45] [46] [49]

After delivery

Blood pressure is monitored closely until it normalizes after delivery. The person should see their healthcare provider for blood pressure measurement at least every one to two weeks after delivery. Blood pressure that remains high six weeks after delivery may indicate chronic hypertension that will need medical management. [46]

Take home messages

- Oral health professionals have a role in promoting good preconception and prenatal care. For example, by recommending healthy eating, avoiding tobacco, vaping, alcohol, and other substance use; maintaining good oral health; and attending regular medical and oral health appointments.
- It is essential to ask clients if they are pregnant, their expected delivery date, and if they are being monitored or treated for conditions related to the pregnancy or

[14] Refer to Episodes 45, 47, 62 and 107 for discussion on autoimmune disorders.

otherwise to be able to provide the appropriate guidance and education (e.g., protecting teeth from gastric acids).
- Screening blood pressure during oral health appointments is vital to help detect hypertension in pregnant clients and those who recently gave birth and provide referrals to appropriate medical providers.
- Oral health appointments may need to be modified, including shorter appointments and adjusting client position in the dental chair, especially in the third trimester.

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