Objectives for Section F-1

Pregnancy

Upon successful completion of this section the student will:

- a) Explain the role of Plaque-Induced Gingivitis modified by systemic factors
- b) Students will be able to verbalize the how pregnancy can enhance gingivitis in the presence of bacterial plaque
- c) Discuss the importance of increased nutritional and energy intake during all stages of pregnancy
- d) Students will be able to verbalize the importance of increasing vitamin and mineral intake during pregnancy in the development of the fetal oral health
- e) Students will be able to verbalize the increased energy requirement during pregnancy in minimizing the occurrence of low-birthweight infants.
- f) Discuss the common oral manifestations during pregnancy
- g) Students will be able to identify and list the oral manifestations during pregnancy

Darby, M.L., & Walsh, M.M. (2003). Dental hygiene theory and practice. (2nd ed.). St Louis, Missouri: Saunders.

Objectives for Section F-2

Heart Disease

Upon successful completion of this section the student will:

- a) Explain the relationship between cardiovascular disease and periodontal disease
- b) Students will be able to verbalize the relationship between CVD and periodontal disease
- c) List the subcategories of CVD and explain the etiology and its risk factors
- d) Students will be able to list the subcategories of CVD (i.e. Rheumatic Heart Disease, I E, HCD, Coronary Heart Disease, Congestive Heart Failure) and verbalize the etiology and its risk factors
- e) Discuss the oral manifestations associated with cardiovascular medications
- f) Students will be able to verbalize the oral manifestations associated with cardiovascular medications (i.e xerostomia, increased risk of developing caries and periodontal disease)

Darby, M.L., & Walsh, M.M. (2003). Dental hygiene theory and practice. (2nd ed.). St Louis, Missouri: Saunders.

Objectives for Section F-3

HIV & AIDS

Upon successful completion of this section the student will:

- a) Discuss the common oral manifestations associated with AIDS carriers
- b) Students will be able to identify and list the oral manifestations associated with HIV/AIDS carriers
- c) Explain the risk of HIV infection amongst health care workers
- d) Students will be able to verbalize the importance of infection control for healthcare workers and its patients (i.e chlorohexidine rinse to minimize opportunistic infection)

Isben O, Phelan J. Oral Pathology for the Dental Hygienist. 4th ed. St Louis, Missouri: Saunders

Objectives for Section F-4

Diabetes

Upon successful completion of this section the student will:

- a. Describe Diabetes and the differences between Type 1 and Type 2
- b. Describe how Diabetes can be controlled through diet, lifestyle and medication
- c. Discuss the common oral manifestations associated with Diabetes
- d. Explain the link between Diabetes and Periodontitis

Darby M, Walsh M, Dental Hygiene Theory and Practice. 2nd ed. St Louis, Missouri: Saunders

References

Darby, M.L., & Walsh, M.M. (2003). Dental hygiene theory and practice. (2nd ed.). St Louis, Missouri: Saunders.

Isben O, Phelan J. Oral Pathology for the Dental Hygienist. 4th ed. St Louis, Missouri: Saunders

Ratliff Davis J, Stegeman CA. The Dental Hygienist Guide to Nutritional care. 2nd ed. Philadelphia: Saunders; 2005

Manual for Section F-1

Pregnancy

Ref: Stegeman & Davis Ch. 12, Darby & Walsh Ch. 33

- a) Explain the role of Plaque-Induced Gingivitis modified by systemic factors
- b) Students will be able to verbalize the how pregnancy can enhance gingivitis in the presence of bacterial plaque

Pregnancy-associated gingivitis is characterized by an exaggerated response to plaque biofilm most commonly during the second trimester reaching its maximum severity during the eighth month.

Characteristics:

- $\circ \quad \text{Fiery red gingival} \\$
- o Edematous and enlarged interdental papillae
- Loss of tissue resiliency
- Increased pocket depths
- Spontaneous bleeding
- o Occurs more frequently in the anterior than posterior areas
- May progress to a pregnancy granuloma

Etiology of Pregnancy-associated gingivitis:

- \circ poor oral hygiene
- \circ local irritants
- o shifts in the types of bacterial flora
- Gingivitis is exacerbated by hormonal and vascular changes and the present of increased anaerobic bacteria that proliferate during pregnancy. The increase in Bacteroides species during pregnancy is associated with increased levels of estrogen and progesterone hormones acting as the essential growth factor. These sex steroid hormones serve as bacterial nutrients, increasing gingivitis during pregnancy.
- Progesterone causes the dilation of gingival capillaries, increasing their permeability by causing exudates, edema and accumulation of inflammatory cells.

(Ref: Darby and Walsh chapter 46)

- c) Discuss the importance of increased nutritional and energy intake during all stages of pregnancy
- d) Students will be able to verbalize the importance of increasing vitamin and mineral intake during pregnancy in the development of the fetal oral health
- e) Students will be able to verbalize the increased energy requirement during pregnancy in minimizing the occurrence of low-birthweight infants.
 - All stages of pregnancy require an increase in nutrients and energy intake. The first and second trimester is the most relevant to fetal oral health as the development and calcification of the

teeth occur. Bone growth mainly occurs in the second and third trimesters when most of the calcium is transferred from the mother to the child.

- Woman's energy requirement increases by approximately 300 kilocalories a day, while vitamin and mineral requirements for energy needs nearly double.
- During pregnancy, the woman may experience changes in taste, smell and food cravings that do not necessarily reflect their physiological needs. However, these experiences along with varying levels of nausea can create a potential for nutrient imbalance and erosion of the tooth enamel.
- Pica is an abnormal consumption of a specific food or non-food substance (dirt, clay, starch) affecting woman at high risk of having low birth weight infants commonly from lower socioeconomic groups.

Factors affecting fetal development:

- Maternal health and fetal growth and development after affected by nutrient intake not only during pregnancy, but prior to conception as well.
- Pregnancy that occurs less than a year from a previous pregnancy may contribute to preterm births, fetal growth retardation, increased risk of maternal morbidity and mortality as a result of inadequate nutritional reserves.
- Birth defects can occur if usual dietary habits are poor during the first trimester as rapid development of body parts and organs are being formed
- Prenatal care of a poor nutrient intake can produce low birth weight infant
- Woman with body mass indexes in the desirable range should gain one pound weekly during the second and third trimester totally to 25 to 35 pounds.
- To avoid low birth weight, it is recommended that woman weighing less than their ideal weight before pregnancy should gain 30 to 40 pounds. On the other hand, an overweight woman should gain 15 to 25 pounds during pregnancy to minimize the risk of gestational diabetes, miscarriage and stillbirth.
- During the pregnancy, an increase in kilocalorie is not needed first trimester unless significantly underweight before conception; an additional 340kcal per day during the second trimester, and 452 kcal during the third trimester is recommended
- Additional energy is needed to build new tissues and support increased metabolic expenditure.

Importance of increasing vitamin and mineral intake:

Calcification of deciduous teeth begins about the fourth month of pregnancy where the primary
and permanent teeth are at various stages of development. Nutrient supplied by the mother must
be available during the critical periods for the development of pre-eruptive teeth and soft tissues in
the proper sequence.

- Nutrient deficiency during the critical periods can reduce the tooth size, delay tooth eruption, increased susceptibility of the teeth to caries and malformations such as cleft lip, cleft palate, shortened mandible.
- The dentin and enamel of the tooth of dependent on many nutrients: vitamin C for formation of collagen matrix, and calcium, magnesium, phosphorus and vitamin D for mineralization.

Effects of nutrients on tissue

- Protein is the basic nutrient for growth: deficiency can cause delayed tooth eruption, increased caries susceptibility and dysfunctional salivary glands
 - Found in meats and milk products
- Vitamin D and calcium are responsible for the formation of skeletal tissue and teeth: deficiency can cause hypomineralization and pitting
 - Found in milk products such as cheese, yogurt, ice-cream or exposure to the sunlight
- Vitamin B and folate is required for red blood cell formation; deficiency can impair cell growth and replication causing fetal anomalies
 - Found in beef liver, beans and legumes
- Vitamin C protects oral tissue from infections caused by microorganisms; excessive amounts may cause symptoms associated with scurvy
 - Found in citrus fruits, green vegetables, cantaloupe
- Iron intake increase is needed during pregnancy for the production of RBC and the placenta; deficiency anemia, increased risk of low birth weight and preterm delivery
 - Found in meats, egg yolk, dark green vegetables
- Zinc is responsible for the formation of fetal organ: excessive amount of zinc can cause premature delivery and stillbirth
 - Found in lamb, beef and oysters

(Ref: Darby and Walsh Chapter 28, The Dental Hygienist's Guide to Nutritional Care Chapter 12)

- f) Discuss the common oral manifestations during pregnancy
- g) Students will be able to identify and list the oral manifestations during pregnancy

Oral manifestations during pregnancy:

- Perimyloysis, acid erosion of the teeth may occur when a pregnant woman vomits repeatedly with severe morning sickness. Erosion of the teeth occurs when the enamel is decalcified by the gastric acids. Subsequent mechanical erosion can occur when the tongue or toothbrush moves against the teeth.
- Pregnancy granuloma is a painless, single tumorlike tissue typically found on the interdental papilla of the maxillary anterior gingival. It is typically red to purple in color depending on the vascularity of the lesion and arrest after delivery.
- Pregnancy-associated gingivitis is characterized by an exaggerated response to plaque biofilm most commonly during the second trimester reaching its maximum severity during the eighth month.

• Tooth mobility may be present as result of the disturbance in the attachment apparatus but usually reveres after delivery

(Ref: Darby and Walsh Chapter 46)

Manual for Section F-2

Heart Disease

Ref: Darby & Walsh Ch. 42

- a) Explain the relationship between cardiovascular disease (CVD) and periodontal disease
- b) Students will be able to verbalize the relationship between CVD and periodontal disease
 - Cardiovascular disease is an alteration of the heart and/or blood vessel that impairs function.
 - People suffering from periodontal disease are at a greater risk for developing cardiovascular disease because the bacteria found within the mouth can enter the bloodstream and increase the risk of developing heart disease and stroke.
 - Bacteria from periodontal disease can enter the bloodstream and increase the risk for thrombosis leading to myocardial infarction and stroke
- c) List the subcategories of CVD and explain the etiology and its risk factors
- d) Students will be able to list the subcategories of CVD (i.e. Rheumatic Heart Disease, I E, HCD, Coronary Heart Disease, Congestive Heart Failure) and verbalize the etiology and its risk factors
 - Rheumatic Heart Disease
 - is the cardiac manifestation of rheumatic fever often having valvular heart damage.
 Rheumatic fever is characterized by attacks of fever, polyarthritis and carditis which may eventually result in permanent valvular heart damage. People who have suffered from strep throat may develop rheumatic fever after the initial infection.
 - Infective endocarditis
 - is an infection of the endocardium, heart valves or cardiac prosthesis resulting from microbial invasion. It is caused by the presence of microorganisms in the bloodstream. Risk factors for infective endocarditis include people with rheumatic heart disease, valvular heart defects, prosthetic heart valves and history of IE.
 - Valvular Heart Defects
 - result in cardiovascular damage from malfunctioning or incomplete mitral valve, aortic valve or tricuspid valve causing a backflow or regurgitation of blood. It is commonly associated with rheumatic fever, congenital abnormalities or developed after IE.
 - Hypertensive Cardiovascular Disease
 - is a sustained elevation of systolic and diastolic blood pressure at or above 140mm Hg and 90mm Hg. A persistent elevation of blood pressure can lead to heart failure, myocardial infarction, stroke and kidney failure. There are several risk factors associated with HCD including family history, race, stress, obesity, high in saturated fat diet, tobacco use, oral contraceptives, and age.
 - Coronary Heart Disease
 - is a result of insufficient blood flow from the coronary arteries into the heart. CHD occurs when the lumen of the coronary arteries is narrowed by substances containing lipids and

cholesterol, thereby reducing the volume of blood flow. It can also be caused by congenital abnormalities of the arteries, vascular changes from infection or autoimmune disorders and blood clot. The risk factors associated with CHD include: age, race, diet, lifestyle, environmental factors and gender.

- Congestive Heart Failure
 - can be characterized by myocardial dysfunction that lead to diminished cardiac output or abnormal circulatory congestion. Causative factors associated with CHF are hypertensive cardiovascular disease, valvular heart disease, pericarditis, circulatory overload and coronary heart disease. The risk factors associated with CHF include: Personal factors (family history) and modifiable risk factors (stress, tobacco use, obesity, HBP, diet)
- Cardiac Dysrhythmias/Arrhymias
 - are dysfunctions of the heart rate and rhythm which may develop in healthy and diseased hearts. In a healthy heart, dysrhythmias may be associated with physical or emotional stress. In a diseased heart, dysrthythmias is a direct result of the presence of a cardiovascular disease. The risk factors of associated with cardiac dysrhythmias is similar to hypertensive cardiovascular disease.
- e) Discuss the oral manifestations associated with cardiovascular medications
- f) Students will be able to verbalize the oral manifestations associated with cardiovascular medications (i.e. xerostomia, increased risk of developing caries and periodontal disease)
 - Some medications used to treat cardiovascular disease have an effect on the oral cavity. Most medications used to treat hypertension causes xerostomia, increasing the risk of developing dental caries and periodontal disease.
 - Individuals with gingival recession are at risk for developing root caries and dental hypersensitivity during the cardiovascular disease therapy with some medications. Salivary substitutes and self administered fluoride therapy can be used to prevent and treat these side effects.
 - Calcium channel blockers may alter taste perception, cause gingival enlargement and create pain in salivary gland.
 - Immunosuppressants used to stabilize heart transplants increases the individuals risk of developing periodontal disease. Also, immunosuppressants put the individual at risk for developing opportunistic infections such as NUG and candidiasis.

(Ref: Darby Chapter 40)

Manual for Section F-3

HIV & AIDS

Ref: Darby & Walsh Ch. 45, Where There is no Dentist Ch. 12

- a) Discuss the common oral manifestations associated with AIDS carriers
- *b)* Students will be able to identify and list the oral manifestations associated with HIV/AIDS carriers

- Exposure to HIV can occur through sexual contact, sharing intravenous drugs and infusion of infected blood. HIV positive mothers may transmit the virus to the fetus through blood to blood contact during the pregnancy, at birth or when breast feeding.
- Oral manifestations of HIV carriers can include erythematous round patches on the hard and soft palate, angular chelitis, exudative tonsillitis, hairy leukoplakia on the lateral border of the tongue, oral ulcers.
- Lymphadenopathy
 - characterized by the swelling of affected lymph nodes commonly found in HIV positive persons.
- Candidiasis
 - a fungal infection may be seen in HIV carriers. Two most common types are pseudomembranous candidiasis and atrophic candidiasis. Pseudomembranous candidiasis can be characterized as soft, white plaques of lesions on the oral tissue that can be removed leaving a red and bleeding patch of mucosa. Atrophic candidiasis is characterized as smooth red patches that can be found on the tongue, palate or mucosa.
- Angular cheilitis
 - can be seen as redness, cracks or fissures at the corners of the mouth that can be treated with antifungal drugs.
- Herpes simplex virus exposure is common in most individual at some time during their life.
 - However, recurrent herpes simplex virus is a common manifestation amongst HIV carriers as it is related to their body's inability to fight the virus. This can be commonly seen as blisters in the skin found on the mouth or lips
- Hairy leukoplakia
 - a collection of thick, white, finger like projections, usually found of the lateral borders of the tongue. Typically, hairy leukoplakia has no associated symptoms and can be seen unilateral or bilateral.
- Kaposi Sarcoma
 - may appear in the oral cavity initially small, flat, reddish-blue/purple lesion and gradually increasing in size to a large nodular lesion. It is often found of the gingiva associated with the teeth and its increasing size is largely due to the presence of plaque calculus. Kaposi sarcoma can arise from alterations in the immune system, environmental factors, viral infection and genetic predisposition.
- Oral warts
 - can be found in any individual exposed to the human papillomavirus however, reoccurrence in HIV infected individuals is common. HIV oral warts can be large and multifocal in the oral cavity causing functional problems.
- Necrotizing ulcerative gingivitis
 - can be characterized by the presence of a fiery red gingival margin. The redness of the gingiva can extend to the alveolar mucosa and may have red petechia-like patches.
- Necrotizing ulcerative periodontitis

- an extension of NUG the presence of attachment and bone loss. In extreme cases, the exposure to bone and slough of tissue can be found in the oral cavity.
- Aphthlous ulcer
 - can be characterized as a well circumscribed erythematous margin similar to a break in the mucosa membrane often causing pain in the mouth. In a HIV infected individual, persistent aphthlous ulcers occur more frequently as an opportunistic infection.
- c) Explain the risk of HIV infection amongst health care workers
- *d)* Students will be able to verbalize the importance of infection control for healthcare workers and its patients (i.e chlorohexidine rinse to minimize opportunistic infection)
 - In treating the common oral manifestations commonly found among HIV infected individuals several antiviral and antifungal therapies can be used. The removal of plaque biofilm and calculus through simple mechanical toothbrushing, flossing and routine dental visits is important. Chemotherapeutic agents can be used simultaneously to control the pathogens that cause the infection such as chlorohexidine rinse or by diluting 3% hydrogen perioxide to minimize an opportunistic infection.
 - Exposure to the HIV virus amongst healthcare workers is more commonly experienced through percutaneous blood exposure (penetration through unbroken skin). Since some HIV infected individuals do not reveal their status to the healthcare workers because the condition may be undiagnosed or because of privacy concerns. It is imperative to use adequate sterilization and barrier infection control procedures minimizing the risk of contracting the HIV virus.

(Ref: Isben O, Phelan J. Oral Pathology for the Dental Hygienist. 4th ed. St Louis, Missouri: Saunders, Darby chapter 44)

Manual for Section F-4

Diabetes

a. Describe Diabetes Mellitus and the differences between Type 1 and Type 2

Diabetes is a complex group of disorders characterized by:

- Lack or inadequate functioning of insulin
- o Inability to metabolize carbohydrates, fats, and protein

There are four main types of diabetes:

- 1. Type 1 diabetes mellitus:
 - Pancreas unable to produce insulin
 - An autoimmune response destruction to Beta cells from the pancreas
- 2. Type 2 diabetes mellitus:
 - Insulin resistance and insulin secretion defect
 - Pancreas does not produce enough insulin or body does not use it effectively
 - Highest number of cases
- 3. Gestational diabetes mellitus:
 - Insulin resistant
 - Temporary condition that occurs during pregnancy
- 4. Other specific types correlated with different conditions and syndromes

b. Describe how Diabetes Mellitus can be controlled through lifestyle, diet and medication

There is no cure for diabetes but it can be managed and properly controlled.

Disease management:

- Diet
- Appropriate amount of food at regular times
- Fulfill caloric requirements
- Reduce fat intake
- Glucose monitoring
- Insulin therapy
- Weight loss

- Exercise
- Medications:

Used to treat type II diabetes in conjunction with diet, exercise and possibly insulin injections

- Sulfonylureas Glyburide
- Metformin
- Acarbose
- Thiazolidinediones
- Repaglinide

c. Discuss common oral manifestations associated with Diabetes

Salivary and Oral Changes

- Xerostomia
- Enlarged salivary glands
- Increased dental caries due to increased salivary glucose levels
- Numbness, burning and pain in oral tissue

Periodontal Changes

- Higher incidence of Gingivitis and Periodontitis
- Tooth mobility
- Pocket formation
- Increased production of calculus
- Subgingival polyps

Opportunistic infections

- Candidiasis
- Mucormycosis

Lichen planus

Poor/delayed wound healing

- May be due to a number of different contributing factors including:
- Hyperglycemia reduces phagocytic activity
- Ketoacidosis may delay chemotaxis
- decreased blood flow
- abnormal collagen production
- Microangiopathies, and neuropathy

Tongue changes

- Glossodynia
- Median rhomboid glossitis

d. Explain the link between Diabetes and Periodontitis

Periodontal disease

A two way relationship may exists with diabetes and periodontitis.

- Periodontal disease may alter blood glucose levels making it more difficult to control in diabetes.
- People with diabetes have a greater incidence of periodontitis especially when they have uncontrolled diabetes.
- Contributing factors may be:
 - formation of advanced glycation end products (AGE) from hypergylcemia that stimulates phagocytes to release cytokines
 - Cytokines activate monocytes that produce oxygen free radicals that in turn cause damage to the tissue