Lesson Plan #1 Treating Patients with Endocrine Disorders and Treating Diabetic Patients

Course: Dental Hygiene Special Topics

Topic: Treating Patients with Endocrine Disorders and Treating Diabetic Patients

Audience: Junior Dental Hygiene Students

Time: 60 minutes

Materials: Computer, Projector, Power Point, Pictures

Instructional Objectives:

Upon completion of the lesson, the patient should be able to:

1. Identify the major endocrine glands.
2. Describe the functions of the major endocrine glands.
3. Explain signs, symptoms and potential oral manifestations of each endocrine gland disorders.
4. Discuss the hormonal effects and oral health risk factors commonly associated with puberty, menses, contraceptives, and menopause.
5. Initiate lifestyle changes that will support oral health in relation to endocrine gland disorders and diabetes.

References:

Boyd, L. (2024). *Wilkins' clinical practice of the dental hygienist* (14th ed.). Jones & Bartlett Learning.

Păunică I, Giurgiu M, Dumitriu AS, Păunică S, Pantea Stoian AM, Martu MA, Serafinceanu C. The Bidirectional Relationship between Periodontal Disease and Diabetes Mellitus-A Review. Diagnostics (Basel). 2023 Feb 11;13(4):681. doi: 10.3390/diagnostics13040681. PMID: 36832168; PMCID: PMC9954907.

Kalhan AC, Wong ML, Allen F, Gao X. Periodontal disease and systemic health: An update for medical practitioners. Ann Acad Med Singap. 2022 Sep;51(9):567-574. doi: 10.47102/annals-acadmedsg.2021503. PMID: 36189701.

Thomas DC, Shah SK, Chawla J, Sangalli L. Medications Affecting Outcomes and Prognosis of Dental Treatment: Part 1. Dent Clin North Am. 2024 Oct;68(4):767-783. doi: 10.1016/j.cden.2024.07.006. Epub 2024 Aug 8. PMID: 39244256.

Fukuda T. Special Issue "Clinical Epidemiology of Diabetes and Its Complications". J Clin Med. 2022 Aug 2;11(15):4510. doi: 10.3390/jcm11154510. PMID: 35956125; PMCID: PMC9369457.

TIME	LESSON CONTENT	NOTES-MEDIA-Q/A
3 Minutes	I. **Anticipatory Set** **<u>A. Introduction</u>** Those with endocrine disorders and diabetes are both two types of patients that you will encounter daily in both clinical practice here at school and in private practice on a daily basis. Specifically, diabetic patients have a greater propensity for the development of periodontal disease and dental root caries. (Paunica et al. and Kalhan et al.) Endocrine disorders may evolve from problems with the adrenal gland, pituitary gland, gonads or pancreas (Fukuda et al). Dental considerations need to be considered regarding the use of home fluoride trays, use of antifungals and regular recall visits. Medications that these patients may be taking can greatly affect the occurrence of xerostomia and burning mouth syndromes (Thomas et al).	**Slide#1:** Endocrine and Diabetes title slide **Q:** Patients with both endocrine disorder and diabetes have higher incidences of developing periodontal and gum issues, what are some reasons? **A:** Multiple answers, like inflammation throughout the body, higher A1C, poor oral hygiene, medication side effects. **Slide #2:** Picture of the human body with endocrine glands pictured and pointed out with labels **Q:** In your opinion, how do untreated dental conditions, including periodontal disease affect endocrine disorders and diabetes progression? **A:** If left untreated, both tooth decay and periodontal disease can lead to infection and inflammation not only in the mouth, but throughout the entire body that is floating around in the blood stream.

TIME	LESSON CONTENT	NOTES-MEDIA-Q/A
2 Minutes	**B. Gain Attention/Motivate** According to Paunica etl al, periodontal disease has a bidirectional relationship with diabetes. Endocrine disorders can affect the growth of dental arches, development of teeth and reaction of the gum tissue to inflammation and stressors put on the body by endocrine conditions. So, dental care is a privilege for the wealthy. In your opinion, how can diabetic patients be convinced of the oral systemic link? How can patients with endocrine disorders be cared for by dental professionals to create the best dental outcomes?	**Slide #3:** Picture of empty wallet and person holding face with toothache. **Note:** Discuss how patients with endocrine disorders may be on multiple medications to control the conditions Oral health disparities associated with endocrine disorders **Slide #4:** Pictures and examples healthy lifestyle habits to prevent dental decay Present after students answer **Note:** Discuss examples of healthy lifestyle, if not answered by students
3 Minutes	**C. Active prior Knowledge** Do any of you have a friend or family member that has a type of endocrine condition? Anyone in your family that is diabetic?	**Note:** Keep up slide #4 while establishing rationale
2 Minutes	**D. Establish Rationale** Patients with both endocrine conditions and diabetes are at risk for developing periodontal disease and having high amounts of inflammation. Attending this informational lecture allows you to recognize the importance of dental health and proves that you are willing to learn more about how you can improve your patients' overall health. Learning about endocrine conditions and diabetes will help you to promote good oral health with those patients and learn how to treat them clinically.	

TIME	LESSON CONTENT	NOTES-MEDIA-Q/A
2 Minutes	After today's lecture, you should be able to: **E. Present Learning Objectives** 1. Identify the major endocrine glands. 2. Describe the functions of the major endocrine glands. 3. Explain signs, symptoms and potential oral manifestations of each endocrine gland disorders. 4. Discuss the hormonal effects and oral health risk factors commonly associated with puberty, menses, contraceptives, and menopause. 5. Initiate lifestyle changes that will support oral health in relation to endocrine gland disorders and diabetes	**Slide #5:** Lesson Objectives, briefly discuss

TIME	LESSON CONTENT	NOTES-MEDIA-Q/A
3 Minutes	1. **Endocrine Glands** A. **Definition:** Endocrine glands secrete directly into the blood or lymph. They include the pineal, pituitary, thyroid, parathyroid, adrenal, hypothalamus, thymus, pancreas and gonads. B. Objective 2. Describe the functions of the major endocrine glands 1. **Hormones and Associated Glands** 1. Hypothalamus a. Pituitary gland 2. Pituitary a. Anterior i. Prolactin ii. Growth hormone iii. Adrenocorticotropin iv. TSH v. LH vi. FSH b. Posterior i. Oxytocin ii. Vasopressin (ADH) 3. Thyroid a. T3 and T4 4. Parathyroid a. Parathyroid hormone 5. Thymus a. Humoral factor hormones 6. Adrenals a. Adrenal cortex i.	**Slide #6:** Endocrine gland definition and examples of endocrine glands **Notes:** Discuss terms of endocrine glands such as secretion and hormones **Q**: Do you or your family or friends have any type of endocrine disorder or condition? Did they also have dental decay or periodontal disease associated with their disorder? Did it make it worse? Do you think endocrine disorders can exacerbate dental issues and periodontal issues? **A:** Yes, endocrine disorders can worsen both the rate of dental decay and progression of gingivitis into periodontal disease. **Slide #:7** Brief description of endocrine glands and associated hormones **Q:** Do you think that poor oral hygiene can also increase your caries risk and development of periodontal disease in association with different endocrine conditions?

TIME	LESSON CONTENT	NOTES-MEDIA-Q/A
3 Minutes	ii. Glucocorticoids (cortisol) iii. Mineral corticoids (aldosterone) b. Adrenal medulla i. Epinephrine (adrenaline) ii. norepinephrine 7. Pancreas a. insulin 8. Gonads a. Testes i. testosterone b. Ovaries i. Estrogen ii. Progesterone iii. inhibin **C. Hormones** 1. Affect major functions 2. Transportation 3. Act on cells 4. Indirectly 5. Affect functions c. growth and development d. energy production e. food metabolism f. reproductive processes g. stress response h. temperature response 6. Regulation i. Stimulation ii. Control iii. Hyposecretion iv. Hypersecretion	**A:** Yes, poor oral hygiene in combination with inflammatory factors can increase risk, leaving soft biofilm undisturbed for an extended period allows bacteria to colonize/ multiply, eventually causing mineral loss **Slide #8:** Discuss hormones and actions **Slide #9:** Endocrine gland disorders

TIME	LESSON CONTENT	NOTES-MEDIA-Q/A
4 Minutes	D. **Endocrine Gland Disorders** 1. Underproduction or overproduction 2. Oral structures 3. Indicators and risks 4. Affect periodontium 5. Alter tissue response **E. Pituitary Disorders** 1. Common symptoms a. Headaches b. Vision c. Mood and behavior d. Weight e. Reproductive f. Hypertension 2. Oral health risks a. Macrocephaly b. Macrognathia c. Mandibular prognathism d. Open anterior bite e. Large pulp f. Delayed eruption g. Increased periodontal disease 3. Patient management a. Referral to orthodontics b. Hypertension c. Insulin resistance d. Diabetes e. General anesthesia **F. Thyroid Gland** 1. Disorders a. Hypothyroidism i. Women than men ii. 60yr and older iii. Increased infections iv. Hashimoto's b. Hyperthyroidism i. Excess iodine ii. Grave's disease iii. Viral infection iv. Excess medication 2. Oral Risk Assessment	**Slide #10:** Pictures of prognathism, macrocephaly and macrognathia as well as anterior open bite **Notes:** Discuss how these conditions may affect the development of jaw structures and teeth. **Q:** How can thyroid disorder patients be managed in the clinic? **A:** Patients may be referred to orthodontics for jaw and occlusion relationships, patients may be referred to primary care for hypertension or development of diabetes

TIME	LESSON CONTENT	NOTES-MEDIA-Q/A
4 Minutes	a. Hypothyroidism i. Increased risk 1. Periodontal disease 2. Oral candidiasis 3. Bleeding gums 4. Poor healing ii. Levothyroxine iii. Vitals 1. Blood pressure 2. Pulse iv. Avoid aspirin v. Myxedema coma b. Hyperthyroidism i. Tooth development ii. Caution with analgesics iii. Caution with vasoconstrictors iv. checking vitals 1. blood pressure 2. pulse v. thyroid storm **G. Parathyroid Gland** 1. Disorders a. Hyperparathyroidism i. Too much hormone ii. Hypercalcemia iii. Symptoms 1. bone pain 2. depression 3. fatigue	**Slide #11**: Disorder of Thyroid Glands **Slide #12**: Pictures of goiter, exophthalmos and hashimoto's disease **Q:** Have you ever encountered a patient or friend/family member that has bulging eyes or a goiter? **A:** Yes/no **Slide #13**: Oral health risk assessment of Hypothyroidism **Slide #14**: Oral health risk assessment of Hyperthyroidism **Slide #15:** Parathyroid disorders

TIME	LESSON CONTENT	NOTES-MEDIA-Q/A
3 minutes	4. broken bone 5. kidney stones 6. nausea 7. loss of appetite b. Hypoparathyroidism i. Too little hormone ii. Calcium increase iii. Phosphorus decrease iv. Symptoms 1. Abdominal pain 2. Brittle nails 3. Dry hair 4. Muscle cramps 5. Nerve irritation 2. Oral manifestations hypoparathyroidism a. Delayed eruption b. Missing teeth c. Shortened roots d. Dental development delay e. Enamel hypoplasia f. Poorly calcified dentin g. Widened pulp h. Mandibular tori i. Candidiasis j. Parathesia k. Facial muscle spasms 3. Oral manifestation hyperparathyroidism a. Lose alveolar bone b. Mandibular fractures c. Widened pulp d. Demineralized teeth 4. Patient management – hyperparathyroidism a. Home fluoride treatments b. Increased osteoporosis 5. Patient management – hypoparathyroidism a. Home fluoride treatments b. Antifungals c. Calcium supplements **H. Adrenal Gland** 1. Cushing's Syndrome	**Slide #15 cont'd** **Slide #16:** Oral manifestations of hypoparathyroidism **Notes:** **Q:** What are commonalities with hypo and hyperparathyroidism? **A:** widened pulp chambers and demineralized teeth **Slide #17**: Oral manifestations of hyperparathyroidism **Slide #18:** Patient management of hyperparathyroidism **Slide #19:** Patient management of hypoparathyroidism **Slide #20:** Cushing's Syndrome

TIME	LESSON CONTENT	NOTES-MEDIA-Q/A
3 minutes	a. Too much cortisol i. Tumor anterior pituitary ii. Tumor adrenal gland iii. Exogenous steroids b. Symptoms i. Weight gain ii. Buffalo hump iii. Hypertension iv. Impaired healing v. High potassium vi. Hyperglycemia vii. Glycosuria viii. Polydipsia ix. Increased fractures x. Mood swings c. Oral Health Risks i. Blue and black areas ii. Delayed healing iii. Collagen loss iv. Fragile skin and oral tissues v. Oral candidiasis d. Patient considerations i. Antifungals ii. Antivirals 2. Hypoadrenalism/Addison's Disease/Adrenal insufficiency a. Primary acute i. Adrenal crisis ii. Glands fail b. Primary chronic i. Addison's disease ii. Autoimmune iii. Adrenal insufficiency c. Secondary i. Withdrawal of steroids ii. Insufficient steroids iii. Stress 3. Oral health risks with insufficiencies a. Hyperpigmentation b. Kaposi sarcoma c. Lip cancer d. Lymphoma e. Oral candidiasis	Slide #20 cont'd **Slide #21:** Oral health risks with Cushing's Syndrome **Notes:** Refer previous slides when giving examples of changes. Link connections between healthy diet and decrease/increase caries risk and periodontal health. Reinforce consistent brushing and flossing will remove harmful bacteria and increase periodontal health and longevity **Slide #22**: Patient considerations with cushing's syndrome **Slide #23**: Hypoadrenalism/Addison's disease/adrenal insufficiency **Slide #24**: Oral health risks associated with adrenal insufficiences

TIME	LESSON CONTENT	NOTES-MEDIA-Q/A
7 minutes	4. Patient management with adrenal problems a. Monitor i. Blood pressure ii. Pulse b. Antifungals c. Pain control d. Anti-anxiety medications e. Delaying treatment **I. Pancreatic Disorders** 1. Type I diabetes a. Insulin deficiency b. Hyperglycemia c. Glycosuria d. Polydipsia e. Polyphagia f. Diabetic ketoacidosis 2. Type II diabetes a. Impaired secretion b. Insulin resistance 3. PCOS a. Insulin resistance b. Weight gain 4. Gestational diabetes a. Hormones b. Genetics c. Obesity d. Premature births e. Insulin resistance 5. Others a. Cystic fibrosis b. Post-transplantation c. Monogenic diabetes 6. Oral implication of diabetes mellitus a. Gingival inflammation b. Periodontitis c. Gingivitis d. Caries e. Xerostomia f. Oral candidiasis g. Burning mouth or tongue h. Diminished taste i. Hairy/black tongue	**Q:** What changes can be expected when implementing lifestyle habits that support oral health? **A:** Longevity and functionality of oral health, decreased risk of caries, overall healthier lifestyle due to healthy diet choices **Slide #25**: Picture of kaposi's sarcoma **Slide #26**: Patient management of adrenal problems **Slide #27**: Pancreatic disorders **Slide #28:** Oral implications of diabetes mellitus

TIME	LESSON CONTENT	NOTES-MEDIA-Q/A
4 minutes	j. Acanthosis nigricans 7. Diabetes and periodontal disease a. Inflammatory process b. 2x-4x more risk c. Higher A1C d. Non-surgical periodontal therapy i. Decreased A1C ii. 6 months iii. Additive effect 8. Caries and endodontic infections a. Teens 2x-3x higher risk b. Adults i. Root caries c. Periodontally involved teeth i. Reduced healing d. Implant failure 9. Diabetic emergencies a. Hyperinsulinemia i. Hypoglycemia 1. Mental confusion 2. Sweating 3. Irritability 4. Palpitations 5. Shakiness 6. Pallor 7. Headache 8. Seizure 9. coma b. Hyperglycemia i. Polyuria ii. Polydipsia iii. Polyphagia iv. Weight loss v. Blurred vision vi. Increased infections vii. Impaired growth viii. Ketoacidosis 10. Diabetic patient management a. A1C b. Glucometer c. Educate i. Medicines ii. Diet	**Slide #29:** Diabetes and periodontal disease **Slide #30:** Picture of gingival stomatitis **Slide #31:** Dental caries and endodontic infections **Slide #32**: Diabetic emergencies **Slide #33**: Diabetic patient management

TIME	LESSON CONTENT	NOTES-MEDIA-Q/A
	d. Social habits 11. Appointment planning a. Time i. Recent meal ii. Medication times iii. morning b. Precautions/emergencies i. Prompt ii. Mealtimes and snacks iii. Short appointments iv. Reduce stress v. Treat infections vi. Hypoglycemia vii. Prepare	**Slide #34:** Appointment planning for the diabetic patient
4 minutes	12. Patient history a. Medical history i. Signs ii. symptoms b. Primary care i. Blood sugar ii. Blood glucose control iii. Signs during questionnaire	**Slide #35:** Patient history for diabetic patients
	13. Hygiene assessment and treatment a. Extraoral/intraoral i. Acanthosis nigricans b. Dental biofilm i. Self-care ii. Disclosing tablets c. Tobacco cessation d. Instrumentation i. Short appointments ii. Stress management iii. Healing between appointments e. Fluoride treatments	**Slide #36:** Dental hygiene assessment and treatment of diabetic patients **Slide #37:** Picture of acanthosis nigricans
	14. Continuing care a. 3-6 months b. Periodontal health c. Soft tissues d. Health changes e. Primary care f. Biofilm control g. Self-care	**Slide #38:** Continuing care for diabetic patients

TIME	LESSON CONTENT	NOTES-MEDIA-Q/A
	h. A1C i. Blood sugar j. Medical history J. Gonads 1. Puberty a. Adolescence i. Early ii. Middle iii. Late b. Rapid changes i. Body size ii. Shape iii. composition c. Gonads d. Hormone secretions e. Males i. Testosterone ii. testes	**Slide #39:** Puberty
3 minutes	f. Females i. Estrogen ii. Progesterone iii. Inhibin iv. Ovaries 1. Menstruation	
	2. Hormonal influences a. Pituitary hormones i. Ovaries ii. Testes b. Secondary sex organs c. Influences i. Physical ii. Mental iii. Emotional	**Slide #40:** Hormonal influences
	3. Oral health risks a. Gingival inflammation b. Diet c. Hyperplastic gingiva d. Intraoral infections e. Periodontal infections	**Slide #41:** Oral health risks for puberty **Slide #42**: Picture of gingival hyperplasia with braces
	4. Women's health and reproduction a. Oral health risks i. Bleeding ii. Exaggerated response	**Slide #43**: Women's health and reproduction oral health risks and patient management

TIME	LESSON CONTENT	NOTES-MEDIA-Q/A
2 minutes	1. Local irritants b. Patient management i. Menstruation ii. Birth control iii. Cycles iv. Regular recalls 5. Hormonal contraceptives a. Oral b. Implantable rod c. Injections d. Patch e. Ring f. Sponge g. Estrogen and progesterone 6. Health risks with contraception a. Biofilm b. Updates to dosage 7. Menopause a. Cessation b. Menstruation c. 12 months d. End of fertility e. lowered i. estrogen ii. progesterone 8. Menopause symptoms a. Vasomotor i. Hot flashes ii. Night sweats iii. Problems sleeping iv. Heart palpitations v. chills b. Mucosa i. Decreased 1. Estrogen ii. Dryness iii. Irritation iv. Thinning v. infections c. Emotional disturbances i. Mood swings ii. Depression iii. Anxiety iv. Irritability	**Slide #44:** Hormonal contraceptives **Slide #45:** Oral health risk for patients taking birth control **Slide #46:** Patients during menopause **Slide #47:** Menopause symptoms

TIME	LESSON CONTENT	NOTES-MEDIA-Q/A
	v. Concentration vi. Memory vii. Libido viii. Weight gain	
2 minutes	9. Postmenopausal effects a. Atrophy i. Organs b. Osteopenia c. Osteoporosis d. Fragile e. Easily injured f. Atherosclerosis g. Diabetes h. Hypothyroidism	**Slide #48:** Post-menopausal effects
	10. Oral risks with menopause a. Burning mouth b. Biofilm c. Hormonal response d. Menopausal gingivostomatitis e. Saliva f. Epithelium g. Keratinization h. Xerostomia i. Taste j. Diet k. Alveolar bone	**Slide #49:** Oral health risks associated with menopause
	11. Patient management with menopause a. Education i. Endocrine condition ii. Oral manifestation b. Self-care c. Medications d. Recalls e. Stress reduction f. Prompt g. Efficient h. Saliva i. Diet j. Fluoride	**Slide #50:** Patient management of menopausal patients

TIME	LESSON CONTENT	NOTES-MEDIA-Q/A
1 minute	**Summary:** I hope that you all were able to benefit from the information presented to you today and have a better foundation for understanding endocrine disorders and diabetes, ways to prevent and treat caries, as well as understanding the role of diet in the caries process. Utilize the information presented today and begin to form healthy oral hygiene habits and recognize healthier choices in diet. Refer to statistics presented today to be informed of the importance and impact of dental caries in systemic health. Be proactive and recognize and accept your responsibility as a patient in sustaining your dental health by committing to routine dental prophylaxis and exams every six months. Remember the urgency of untreated decay and outlying ethical contingencies. Recognize the benefits of preventive dental care treatment such as sealants. Also, decrease caries risk and strengthen enamel by fluoride use. Finally, initiate and consistently implement lifestyle changes that support overall longevity and functionality of your oral health.	**Slide #51:** Summary **Notes:** Thank you for your attention/ participation **Q:** From the lesson, what information was most important to you? **A:** Answers will vary. Clarify misconceptions.

TIME	LESSON CONTENT	
5 minutes	**Critical Thinking Activity:** **Case:** Let us consider the case of Tammy, a fifteen-year-old African American child who is currently in orthodontia, who comes in with her mother for a routine cleaning appointment. They live in the rural suburbs of New Orleans and are on Food Stamps. She presents with several cavities throughout the mouth, has plaque, bleeding and inflammation generalized with puffy gum tissues. When asked about brushing and flossing habits, she responds, "I brushed this morning and last night, but I do not brush often." When asking her mom about her diet, she responded, "Well, she likes to eat candy, don't you? She also drinks sodas and juices, and she likes to snack throughout the daytime." Now that you are aware of the proper ways to care for your teeth and prevent cavities, think about the ways that we can prevent future decay in Tammy. What strategies would you suggest for Tammy and her mom to utilize for homecare and cavities management? 1. Look at the current homecare routine that Tammy and her mom and determine which ways they could improve to help prevent decay formation? Answer: Mom and Tammy could have Tammy brush consistently twice daily, using a fluoridated toothpaste. Mom could also purchase disclosing tablets and have Tammy use them once a week to work on brushing habits and methods. Mom can spot check the teeth several times weekly	

TIME	LESSON CONTENT	
	to make sure that Tammy is efficiently removing all the visible plaque from the surfaces of the teeth. Mom and Tammy could work on water flossing together nightly. Mom could purchase an electric toothbrush for use at home, and she and Tammy could work on a brushing routine of twice daily with the electric toothbrush. Mom could also purchase a separate manual brush and proxabrushes for Tammy to use at school after lunchtime. 2. How can Tammy and her mom modify his diet? Answer: Mom can eliminate candy and juices from being purchased at the store and kept in the house. She can encourage healthy snacks such as apples, hard cheeses, carrots and celery. They can cut up the hard cheeses and vegetables to make them easier to consume with brackets. They can limit snacking to only right after meals and have Tammy only drink milk and sodas at meals. She will drink primarily water during the daytime hours. Juices and sodas will be kept at a minimum and only as a treat once or twice weekly. 3. What dental prevention methods can be utilized by the dental hygienist to help the patient avoid future dental decay? Answer: The dental hygienist can recommend placing dental sealants on the non-decayed permanent molars. She can prescribe a prescription toothpaste such as Prevident 5000 for the patient to use nightly to help prevent decay. She can also suggest an electric toothbrush and demonstrate proper flossing and proper waterpik and electric toothbrush usage to	

TIME	LESSON CONTENT	
	Tammy and mom. The last thing is to stress the fluoride application at each six-month visit. 4. Based on the socioeconomic status of Tammy and her mom, how could Tammy be currently developing decay so rampantly? Answer: Tammy's mom may not be able to afford food on a regular basis. They may be living paycheck to paycheck and using FoodStamps to pay for their groceries weekly. Her mom may not have had the education as a child to know about healthy snacks and about primarily drinking water instead of sodas. Because she may lack the education on proper oral hygiene and proper diet for preventing cavities, she is potentially intermittently passing along unhealthy oral hygiene and diet habits to Tammy. Oral hygiene education for brackets may never have been provided to Tammy and her mom before.	

Test Items:

Objective #1: Identify the major endocrine glands.
Test Item #1: Which of the following are endocrine glands?
a. pituitary, pancreas, thyroid, gonads
b. heart, lungs, brain, stomach
c. veins, arteries, capillaries
d. head, toes, fingers

Objective #2: Describe the functions of the major endocrine glands
Test Item #2: Which endocrine glands function to control blood sugar and insulin production?
a. thyroid
b. pituitary
c. pancreas
d. gonads

Objective #3: Explain signs, symptoms and potential oral manifestations of each endocrine gland disorders.
Test Item #3: Which of the following is the **BEST** habit to lower the risk of caries in relation to endocrine gland disorders?
a. Drinking juice or soda all at once rather than over an extended period.
b. Avoiding artificially sweetened food and beverages.
c. Using fluoridated toothpaste, mouthwash and home fluoride trays.
d. Chewing sugar-free gum that has xylitol as an active ingredient.

Objective #4 – Short Answer. Discuss the hormonal effects and oral health risk factors commonly associated with puberty, menses, contraceptives, and menopause.
Test Item #4: Formulate an oral hygiene care plan that will decrease the risk of caries. Answers should be 4-5 sentences in length and follow APA style.

Objective #5 – Short Answer. Initiate lifestyle changes that will support oral health in relation to endocrine gland disorders and diabetes.
Test Item #5: Based on the information presented today, describe lifestyle changes you'll make to support the longevity of your oral health if you develop diabetes. Answers should be 4-5 sentences in length and follow APA style.

Answer Key:
1. A
2. B
3. C

4. Brushing two times a day with an electric toothbrush for two minutes at a 45-degree angle using soft pressure. Consistent daily / nightly flossing using ‘c’ wrap technique with string floss. Routine use of fluoridated toothpaste as well as fluoridated mouthwash without alcohol. Prescription fluoride trays to use every night. Regular recall visits depending on the periodontal status of the patient.

5. Diet control exemplifying infrequent snacking and lessened intake of sugars and starches and an increased ingestion of fluoridated water. Committing to routine dental examinations, radiographs, fluoride applications, periodontal charts, and professional oral hygiene instructions every six months. Advocating preventative measures such as sealants.