LESSON PLAN 1 & TEST QUESTIONS

Course: Oral Pathology

Topic: Abnormalities of Teeth

Audience: Adult Learners (Undergrad Dental Hygiene Students)

Instructional Objectives: Upon completion of the lecture, the dental professional should be able to:

1. Define abnormalities of teeth by alterations in size, shape, numbers, and defects in enamel, dentin, and dental pulp.
2. Describe the anatomical location of different abnormalities of teeth.
3. Determine the proper margins and borders of abnormalities of teeth.
4. Compare colors and configurations of abnormalities of teeth.
5. Display an interest in giving suggestions about the most appropriate treatment for abnormalities of teeth.

Materials: Microsoft PowerPoint, Computer Equipment, Handouts

References:

Bandeira Lopes, L., Machado, V., Botelho, J., & Haubek, D. (2021). Molar-incisor hypomineralization: an umbrella review. Acta odontologica Scandinavica, 79(5), 359–369. https://doi.org/10.1080/00016357.2020.1863461

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Oeschger, E. S., Kanavakis, G., Halazonetis, D. J., & Gkantidis, N. (2020). Number of teeth is associated with facial size in humans. Scientific reports, 10(1), 1820. https://doi.org/10.1038/s41598-020-58565-8

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Rohof, E., Kerdijk, W., Jansma, J., Livas, C., & Ren, Y. (2018). Autotransplantation of teeth with incomplete root formation: a systematic review and meta-analysis. Clinical oral investigations, 22(4), 1613–1624. https://doi.org/10.1007/s00784-018-2408-z

Sarica, I., Derindag, G., Kurtuldu, E., Naralan, M. E., & Caglayan, F. (2019). A retrospective study: Do all impacted teeth cause pathology?. Nigerian journal of clinical practice, 22(4), 527–533. https://doi.org/10.4103/njcp.njcp_563_18

Personnel: N/A

Time: 50 Minutes

TIME 2 minutes	LESSON CONTENT	NOTES- MEDIA- Q&A
	I. INSTRUCTIONAL SET A. Introduction "In a forest of a hundred thousand trees, no two leaves are alike. And no two journeys along the same path are alike." — Paulo Coelho, Aleph Similarly, no two teeth will be the same; however, some differences are not "WNL (within normal limit)". Abnormalities of teeth can be defined as alterations in size, shape, numbers and as defects in enamel, dentin, and dental pulp. B. Established Mood By attending today's lecture, you will learn some abnormal conditions about teeth, such as microdontia, gemination, taurodontism, and so on. You will also get knowledge about the etiology and recommended treatments for some of those conditions. C. Gain Attention/Motivate When your patient opens his/her mouth in your dental chair, what will you pay attention to? When you see something unusual, what will you do? When your patient says his/she has a special tooth, what will you say? D. Established Rational By understanding the appearance, etiology of some abnormalities of teeth, dental providers can play a role in providing education and recommendation for treatments. In this way, a dental hygienist can help to alert the patient and arrest conditions at an early stage.	Slide # 1 Abnormalities of Teeth (Title) Q: Are all abnormalities risky? A: Not necessary. Some may just have cosmetic influence. Note: showing two pictures of abnormalities of teeth.

TIME	LESSON CONTENT	NOTES- MEDIA- Q&A
1 minute	E. Established Knowledge Base Do you think all teeth look like "teeth"? Why do you think that? Do you think all teeth should look normal to be "normal"? Do you have any tooth that looks quite different? Knowledge of abnormalities of teeth is an important part of clinical practice for a dental hygienist.	
2 minutes	F. Instructional Objective After today's lecture, you should be able to define abnormalities of teeth by alterations in size, shape, numbers and as defects in enamel, dentin, and dental pulp listed in chapter 16; describe the anatomical location of different abnormalities of teeth; determine the proper margins and borders of abnormalities of teeth; compare colors and configurations of abnormalities of teeth; display interest on giving suggestions about most appropriate treatment for abnormalities of teeth.	Slide #2 Objectives Note: Emphasize the importance of these objectives. Note: inform students to check the syllabus. Q: How to memorize all abnormalities? A: First memorize the five main core aspects.

TIME	LESSON CONTENT	NOTES- MEDIA- Q&A
1 minute	I. Classification of Abnormalities of Teeth A. Size B. External morphology C. Number D. Position E. Defects	Slide #3 Abnormalities in five aspects (core). Note: Remember the 5 core aspects.
2 minutes	II. Teeth Abnormalities **A.** Detections 1. Clinically 2. Radiographically **B.** Causes 1. Environmental 2. Hereditary 3. Idiopathic	Slide #4 Detection & Causes Q: Why do we need radiographical detection? A: To examine the roots, dentin, and pulp.
2 minutes	III. Alterations in Size **A.** Microdontia: 1. Generalized a. All teeth b. One arch 2. Focal, localized a. Single tooth b. Maxillary lateral incisors 3. Peg Laterals a. Shape: peg/cone b. Autosomal-dominant c. Cosmetics influence	Slide #5 Classification of Teeth Abnormalities (details) Slide #6 Alterations in Size Slide #7 Microdontia- generalized Slide #8 Microdontia – focal, localized Slide #9 Peg Laterals Q: What are peg laterals? A: It's peg-shaped microdontia.

TIME	LESSON CONTENT	NOTES- MEDIA- Q&A
1 minute	B. Macrodontia: 1. Generalized a. All teeth b. One arch 2. Focal, localized a. Single/group of teeth	Slide #10 Macrodontia-generalized Slide #11 Macrodontia – focal, localized
2 minutes	b. Mandibular 3rd molar 3.Hemifacial Hypertrophy a. Rare b. Affect one side	 Slide #12 Hemifacial Hypertrophy Note: affect one side of the face.
	IV. Alterations in the shape A. Gemination 1. Partial cleavage a. Single tooth b. Cause: unknown 2. Complete twinning a. Two teeth one bud b. Etiology: trauma	Slide #13 Alterations in shape (Title) Slide #14 Gemination-partial cleavage Slide #15 Gemination-complete twinning
1 minute	B. Fusion 1. Two teeth gem 2. Single “tooth structure”	Slide #16 Fusion Note: fusion will lead to “missing one tooth(crown)”. Q: Can you always tell the difference between fusion and gemination? A: Sometimes may be impossible to differentiate fusion of normal and supernumerary teeth from gemination.

TIME	LESSON CONTENT	NOTES- MEDIA- Q&A
3 minutes	C. Concrescence 1. Form of fusion 2. Join by cementum 3. Maxillary 2nd and 3rd molars D. Comparison: fusion VS gemination 1. Two crowns one root 2. One crown two roots E. Dilaceration 1.Root: extraordinary curving 2.Causes: a. Trauma b.Hereditary factors F. Talon Cusp & Doak's Cusp 1. Talon Cusp a. Incisor or canine b. Arises: cingulum 2. Doak's Cusp a. Maxillary molars b.Mesial facial cusp G. Dens invaginatus/dens Evaginatus 1. Dens invaginatus a. Anterior teeth b.Exaggeration: lingual pit	Slide #17 Concrescence Slide #18 Comparison: fusion VS gemination Slide #19 Dilaceration Slide #20 Talon Cusp & Doak's Cusp Slide #21 Dens invaginatus Slide #22 Dens invaginatus (Dens in Dente) (Title) Note: show the picture of the tooth within a tooth. Q: What is another name of Dens invaginatus? A: Dens in Dente
1 minute		
2 minutes		

TIME	LESSON CONTENT	NOTES- MEDIA- Q&A
2 minutes	2.Dens Evaginatus a. Premolar teeth b. Occlusal surface c. Treatment: sealant	Slide #23 Dens Evaginatus
	3. Comparison: Dens invaginatus VS Dens evaginatus a. Pit extension: invaginatus b. Accessory cusp: evaginatus	Slide #24 Comparison: Dens invaginatus VS Dens evaginatus (Title) Note: show the picture of Dens invaginatus VS Dens evaginatus
2 minutes	H. Taurodontism 1. Elongated crowns 2. Association a.Down syndrome b. Klinefelter's syndrome	Slide #25 Taurodontism Q: What kind of treatment is needed for taurodontism? A: No treatment is required.
1 minute 2 minutes	I. Supernumerary roots 1. Molars 2. Radiographic recognitions a. Extraction b. Root canal c. Filling d. Periodontics	Slide #26 Supernumerary Roots
	J. Enamel pearls 1. Root of the teeth 2. Bifurcation or trifurcation 3. Radiographic examination	Slide #27 Enamel Pearls Q: What can be confused with calculus when doing assessment? A: Enamel pearl

TIME	LESSON CONTENT	NOTES- MEDIA- Q&A
4 minutes	K. Attrition/abrasion/erosion 1. Attrition a. Physiological wearing b. Cause i. Diet ii. Dentition iii. Jaw musculature iv. Chewing habits 2. Abrasion a. Pathological wearing b. Cause i. aggressive tooth brushing ii. pipe smoking iii. tobacco chewing iv. use of abrasive toothpaste 3.Erosion a. Non-bacterial chemical process b. Cause i. External source of acid ii.Internal source of acid V. Alterations in Number **A.** Anodontia 1. Absence of teeth 2. Complete: rare 3. Causes a. Environmental b. Genetic factors	Slide #28 Attrition Slide#29 Abrasion Note: abrasion may look like abfraction, but they are different. Slide #30 Erosion Slide #31 Comparison (Title) Note: Comparison of attrition/abrasion/erosion (show pictures of each). Slide#32 Alterations in Number (Title) Slide #33 Anodontia Q: What is false anodontia? A: Teeth have been exfoliated or extracted.

TIME 3 minutes	LESSON CONTENT	NOTES- MEDIA- Q&A
	B. Impaction 1.Common event 2.Mandibular third molars 3.Causes a.Crowding b. Abnormal eruption	Slide #34 Impaction Q: What is pseudoanodontia? A: Teeth absent clinically because of impaction or delayed eruption
	C. Supernumerary teeth 1. Extra teeth 2. Continued proliferation 3. Association a. Gardner's Syndrome b. Cleidocranial dysplasia	Slide #35 Supernumerary teeth Note: Gardner syndrome is an autosomal dominant disease characterized by GI polyps, multiple osteomas, and skin and soft tissue tumors. Note: Cleidocranial dysplasia is a condition that primarily affects the development of the bones and teeth.
	VI. Defects in Enamel A. Environmental Defects of Enamel 1. after birth & before age 6 2. Causes a. Metabolic injury b. Causative factors c. Systemic factors	Slide #36 Supernumerary teeth (Pictures) Slide #37 DEFECTS IN <u>ENAMEL</u> (Title)

TIME	LESSON CONTENT	NOTES- MEDIA- Q&A
5 minutes	B. Amelogenesis Imperfecta 1. Disorders of enamel 2. Both dentition 3. Clinical types a. Hypoplastic b. Hypocalcified c. Hypomaturation	Slide #38 Environmental Defects of Enamel Q: What are the three causes for environmental defects of enamel? A: Metabolic injury, causative factors, and systemic factors. Slide #39 Environmental Defects of Enamel Slide #40 Amelogenesis Imperfecta
	VII. Defects in Dentin **A.** Dentinogenesis Imperfecta 1. Autosomal- dominant 2. Primary and permanent dentitions 3. Types a. Type I: syndrome associated b. Type II: no bone disease c. Type III: like type II, variation	Note: Hypoplastic: the insufficient amount of enamel. Hypocalcified: normal quantity but abnormal quality (soft enamel) Slide #41 Defects in Dentin (Title)
	B. Dentin Dysplasia 1. Autosomal- dominant 2. Rare 3. Types: a. Type I: syndrome associated b. Type II: no bone disease	Slide #42 Dentinogenesis Imperfecta Note: there are three types. Slide #43 Dentin Dysplasia

TIME	LESSON CONTENT	NOTES- MEDIA- Q&A
2 minutes		Q: Which type of Dentin Dysplasia is syndrome associated? A: Type I.
	VIII. DEFECTS OF BOTH <u>ENAMEL</u> AND <u>DENTIN</u> A. Regional odontodysplasia B. Poor mineralization C. Ghost teeth	Slide #44 Dentin Dysplasia Type I (picture)
		Slide #45 Dentin Dysplasia Type II (picture)
	IX. DENTAL PULP ABNORMALITIES	Slide #46 DEFECTS OF BOTH ENAMEL AND DENTIN (Title)
	A. Pulp calcification 1. Occurs with increasing age 2. Types a. Diffuse (linear) b. Nodular (pulp stones)	Slide #47 DEFECTS OF BOTH ENAMEL AND DENTIN
2 minutes		Slide #48 Dental Pulp Abnormalities (Title)
	B. Internal resorption 1. Dentin 2. Causes a. Inflammatory response b. No apparent trigger 3. Treatment: root canal therapy	Slide #49 Pulp calcification
	C.External resorption 1. External surfaces 2. Causes a. adjacent pathological process b. trauma c. reimplantation or transplantation d. impaction	Q: What is a pulp stone? A: It's the nodular type of pulp calcification. Slide #50 Internal resorption Note: RCT= root canal therapy.

TIME	LESSON CONTENT	NOTES- MEDIA- Q&A
2 minutes	X. Alternations in Color A. intrinsic stains 1. surfaces of teeth 2. causes a. pigments b. bacteria in plaque B. Extrinsic stains 1. During tooth development 2. Causes a. Tetracycline b. Rh incompatibility c. Congenital porphyria d. Liver disease	Slide #51 External resorption Note: examples for pigments: coffee, black tea, and cigars. Slide #52 Alternations in Color (Title) Slide #53 Intrinsic Stains Slide #54 Extrinsic stains Q: If an adult takes tetracycline, will he/she develop extrinsic stains? A: No. However, if the adult is pregnant, her baby may develop extrinsic stains.

TIME	LESSON CONTENT	NOTES- MEDIA- Q&A
2 minutes	Closure A. Summary of Major Points- Relate Back to Objectives I hope that you now have a better understanding of abnormalities of teeth, and can define alterations in size, shape, numbers and as defects in enamel, dentin, and dental pulp listed in Chapter 16; describe the anatomical location of different abnormalities of teeth; determine the proper margins and borders of abnormalities of teeth; evaluate Determine the proper margins and borders of abnormalities of teeth. I encourage you to discover more and consider giving suggestions about the most appropriate treatment for abnormalities of teeth. B. Provide a Sense of Accomplishment I hope you will be more comfortable in identifying signs of abnormalities of teeth. In the clinic, you may tell patients more information about their teeth now if there were some conditions. You can always refer patients to the dentist and suggest consulting with the pathologist. C. Assignment For a better understanding of our topic today, you should: 1. Review this PowerPoint 2. Explore the website of ADA/ADHA for more information 3. Refer to magazines or journals for the latest findings	Slide #55 Summary Q: What will you do if you notice abnormalities of teeth in the clinic? A: Make documentation and refer the patient to a dentist. Slide #56 Assignment Note: Tell students that they don't need to turn in anything.

TIME 3 minutes	LESSON CONTENT CRITICAL THINKING ACTIVITY Case study: You are reviewing the patient's health history form and notice the patient is a heavy smoker and consume soft drinks every day. When the patient opens his mouth, you notice there are brown stains located on his anterior lingual surfaces. You finish your assessment and notice that the patient has generalized recession. The patient tells you that he takes good care of his teeth and uses a hard bristle toothbrush to clean his teeth twice a day. For each time, he brushes very hard for 5 minutes, but he still can't get rid of the stain. When you check the patient's most recent x-ray, you notice there are 33 crowns but only 32 roots. 1. What could be the cause of the stain? Can you remove them by using instruments? Answer: The reason may relate to the patient's smoking habit. Those stains can be removed by instruments because it's extrinsic stains. 2. What will you say to the patient's brushing habit? Answer: I will tell the patient that it is great that he wants to take good care of his teeth. However, brushing aggressively using a hard bristle toothbrush on teeth is not a good habit. Especially, there is a generalized recession of his gum. He may brush away the root and cause abrasion. 3. Why the number of the crown doesn't match with the number of the tooth. Answer: it seems there is an "extra" tooth; however, as the number of roots is only 32, there is just an "extra" crown. Thus, maybe one of the teeth presents with gemination. 4. What are your suggestions for this patient-related brushing? Answer: I will suggest the patient use a soft bristle toothbrush at home, twice a day. He only needs to brush around 2 minutes per time. The stain can be removed by the dental hygienist; thus, he should visit the dental office every 6 months (or sooner). It will be better if he can smoke less daily and quit smoking in the future.	NOTES- MEDIA- Q&A Slide #57 Critical Thinking Activity: Case Study Note: Also in the handout. Q: If the patient is a heavy smoker, what else can we do? A: Introduce smoking cessation conversation.

Test Questions #1

1. **Objective #1**: Define abnormalities of teeth by alterations in size, shape, numbers, and defects in enamel, dentin, and dental pulp listed in Chapter 16.
   Directions: Circle the correct answer to the following question.
   Test Item: Which of the abnormalities of teeth refers to alterations in numbers?
   a. Talon Cusp
   b. Supernumerary Roots
   c. Anodontia
   d. Dentinogenesis Imperfecta

2. **Objective #2**: Identify the anatomical location of different abnormalities of teeth.
   Directions: Circle the correct answer to the following question.
   Test Item: Which anatomical location is microdontia most commonly found?
   a. Maxillary lateral incisors
   b. Maxillary central incisors
   c. Mandibular lateral incisors
   d. Mandibular central incisors

3. **Objective #3**: Determine the proper margins and borders of abnormalities of teeth.
   Directions: Circle the correct answer to the following question.
   Test Item: What of the following terms describes an abnormality when formed teeth are joined by cementum?
   a. Dilaceration
   b. Concrescence
   c. Dens invaginatus
   d. Gemination

4. **Objective #4**: Differentiate the etiology of abnormalities of teeth.
   Directions: Short Answer Question. Answer in 2-3 complete sentences.
   Test Item: You are seeing a new patient in the office, and you notice the patient presents with an abrasion on his/her teeth. What is the most likely etiology of this abnormality?

5. **Objective #5**: Display an interest in giving suggestions about the most appropriate treatment for abnormalities of teeth.
   Directions: Essay Question. Answer the essay question in 3-4 complete sentences.

Test Item: You are seeing a new patient in the office, and you notice the patient presents with an extension (towards inside) of the lingual pit of a permanent maxillary incisor. What should you suggest to the patient? Explain your answer.

ANSWER KEY:

1. C
2. A
3. B
4. Abrasion is a type of pathological wearing of teeth. The etiology of abrasion involves abnormal use of abrasive substances orally and results in removing normal tooth structure. Some common causes are aggressive tooth brushing and/or using hard bristle toothbrushes.

5. The extension (towards inside) of the lingual pit of one or more anterior teeth suggests the presence of dens invagination. The exact cause remains unknown, but genetic factors are believed to be involved in some cases. Because the defect can lead to difficulties in cleaning, caries may occur at the base of the defect with subsequent pulp exposure. As hygienists, we can suggest to our patients the usage of sealant covers on the deep groove.