LESSON PLAN & TEST QUESTIONS

Course: DEH 214 Dental Anatomy

Topic: The permanent maxillary and mandibular molars

Audience: Adult Learners (3th level dental hygiene students)

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

1. Describe anatomical and morphological characteristics of maxillary molars.
2. Identify anatomical and morphological characteristics of mandibular molars.
3. Determine the tooth number by its anatomical and morphological characteristics.
4. Distinguish the anatomical differences between maxillary and mandibular.
5. Recognize the ethical importance of identifying anatomical landmarks of molars.

Materials: PowerPoint
Primal's 3D Human Anatomy for dental hygiene (From the ODU library).
Interactive quiz (quizizz.com)

References:

Nelson, Ash, Ash, Major M., & ProQuest. (2010). Wheeler's dental anatomy, physiology, and occlusion (9th ed., ProQuest Ebook Central PDA). St. Louis, Mo.: Saunders/Elsevier.

Scheid, Weiss, Woelfel, Weiss, Gabriela, & Woelfel, Julian B. (2012). Woelfel's dental anatomy (8th ed.). Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins.

Zhang, W. (2016). Third molar eruption mechanisms and patterns. *Dentistry 3000*. Vol 4, No 1 (2016) DOI 10.5195/d3000.2016.49

Primal's 3D Human Anatomy for dental hygiene. Retrieved from https://www.anatomy.tv/titles

American Dental Hygiene Association (2016). ADHA standards for clinical dental hygiene practice. Retrieved from https://www.adha.org/

Shah, P., Velani, P. R., Lakade, L., & Dukle, S. (2019). Teeth in forensics: A review. *Indian journal of dental research: official publication of Indian Society for Dental Research*. 30(2), 291–299. https://doi.org/10.4103/ijdr.IJDR_9_17

Personnel: None needed
Time: 50 minutes

TIME	LESSON CONTENT	NOTES
	I. INSTRUCTIONAL SET	
2 minutes	A. Introduction Identifying anatomical and morphological landmarks of permanent molars is one of the essential building blocks of becoming a competent dental professional. The maxillary and mandibular primary molars have multiple unique morphological and anatomical landmarks that separate them from any of the previously learned teeth. B. Established Mood By attending today's lecture, you are taking the initiative to learn more about the anatomy of permanent molars. Today we will learn about the morphology of maxillary and mandibular permanent molars by introducing their key anatomical characteristics and comparing and contrasting them from all aspects (buccal, lingual, mesial, distal, and occlusal). C. Gain Attention/Motivate This tooth is different from any other teeth that we have learned about so far due to it having so many unique anatomical and morphological landmarks. It is a step further into completing this course and building you as a dental professional. D. Established Rational By understanding the permanent molars, you will gain valuable knowledge required from you to practice dental hygiene. Therefore, it is considered essential knowledge that you need to acquire in order to complete your program, in addition to fulfilling your professional obligation to perform sufficient clinical documentations.	**Slide #1** The permanent molars title **Note:** anatomical characteristics and morphological landmarks of teeth are essential knowledge for an dental professional. **Slide #2** Ice-breaker A picture of moods with th question "which mood are you today?" **Q:** If you have taken a look into your assigned readings, what did you see about this tooth that is different from the previously learned teeth? A: Answers will vary, but the students will learn in detail the anatomy of permanent molars.

TIME	LESSON CONTENT	NOTES
2 minutes	E. Established Knowledge Base What do you know about permanent molar? How many molars do we have? They serve the same function as the premolars, which have been previously learned. However, they do differ in their anatomical characteristics, and that is what we will learn today. F. Instructional Objective After today's lecture, you should be able to describe anatomical and morphological characteristics of maxillary molars. Identify anatomical and morphological characteristics of mandibular molars. Determine the tooth number by its anatomical and morphological characteristics. Distinguish the anatomical differences between maxillary and mandibular. Recognize the ethical importance of identifying anatomical landmarks of molars.	**Slide #3** Objectives **Slide #4** title of the first section (the permanent maxillary molars)

TIME	LESSON CONTENT	NOTES
3 minutes	**I. The permanent maxillary molars** A. Description 1. Largest and strongest 2. Cornerstone 3. Trifurcated 4. Four well-developed cusps	**Slide #5** An overview of the permanent maxillary molars. **Slide #6** Picture showing the difference between bifurcated and trifurcated.
5 minutes	B. Maxillary frist molar 1. One supplemental cup (Cusp of Carabelli) 2. Largest maxillary tooth 3. Wider buccolingually 4. Shorter crown 5. Lingual fifth cusp 6. Three roots a. Two buccally b. One lingually 7. Buccal aspect a. Trapezoidal b. Wider mesiobuccally c. Sharp distobuccal cusp d. Buccal developmental groove e. Convex cervical line f. Straight mesial outline g. Convex distal outline h. All roots are seen i. Deep developmental groove j. Roots twice as long as the crown	**Slide #7** Continued description of maxillary molars. **Slide #8** Maxillary 1st molar **Note: make sure to includes** pictures of the teeth anatomy from all aspects in each slide. Found in the Wheeler's dental anatomy textbook.
2 minutes	8. Lingual aspect a. Lingual developmental groove b. Conical root c. lingual cusps i. rounded ii. fifth cusp 9. Mesial aspect a. Buccal outline i. Convex b. three cusps can be seen i. mesiobuccal ii. mesioligual (largest) iii. fifth cusp c. contact area i. middle of the occlusal third d. mesiobuccal root i. broad and flattened	**Q**: why is the maxillary 1st molar the strongest tooth in the maxillary arch? **A**: due to the presence of three roots to anchor it in the alveolar process. **Slide #9** Maxillary 1st molar **Q**: What number is the maxillary right 1st molar? **A**: #16 (previous lecture) **Slide #10** Buccal aspect

TIME	LESSON CONTENT	NOTES
	e. Mesiolingual root i. narrower 10. Distal aspect	**Slide #11** Buccal aspect **Slide #12** Lingual aspect
2 minutes	a. Similar to mesial b. No concavities c. Distal contact area i. Middle of middle third 11. Occlusal aspect	**Slide #13** Mesial aspect **Slide #14** Mesial aspect
	a. Wider mesially b. Wider lingually c. Three cusps can be seen i. Mesiolingual cusp ii. Two buccal cusps d. Distolingual cusp i. Progressively decrease in size e. Two major fossae i. Central fossa ii. Distal fossa f. Two minor fossae i. Mesial triangular fossa ii. Distal triangular fossa g. Oblique ridge h. Central pit i. Buccal developmental groove ii. Central developmental groove iii. Distal oblique groove iv. The developmental groove	**Slide #15** Distal aspect **Slide #16-20** Occlusal aspect **Note:** Make sure to point out the anatomical landmarks in the pictures. **Slide #21-22** Maxillary 2nd molar **Q**: What number is the maxillary left 2nd molar? **A**: #27 (previous lecture)
4 minutes	C. Maxillary second molar 1. Serves the same function as the 1st 2. Longer roots 3. Smaller distobuccal cusp 4. No fifth cusp 5. Shorter crown 6. Poorly developed distolingual cusp (heart shaped) 7. Buccal aspect a. Narrower mesiodistally b. Smaller distobuccal cusp c. Roots incline distally 8. Lingual aspect a. Smaller distolingual cusp b. Distobuccal cusp can be seen c. No fifth cusp	**Slide #23** Buccal aspect **Slide #24** Lingual aspect **Q**: compare between the 1st and 2nd molars' crown size? What do you see? **A**: the 2nd molar is narrower and shorter than the 1st molar.

TIME	LESSON CONTENT	NOTES
	9. Mesial aspect a. Similar to 1st molar b. Shorter crown 10. Distal aspect a. Similar to 1st molar b. Mesiobuccal root can be seen 11. Occlusal aspect a. Resembles 1st molar b. Shorter in mesiodistal diameter c. Similar supplemental grooves	**Slide #25** mesial aspect **Slide #26** Distal aspect **Slide #27** Occlusal aspect
3 minutes	D. Maxillary third molar 1. Developmental anomaly a. Common 2. Resembles the 2nd molar a. Function b. Anatomy 3. Shorter roots a. May be infused 4. Heart-shaped 5. Poorly developed distolingual cusp 6. Buccal aspect a. Shorter cervico-occlusally b. Narrower mesiodistally c. Roots are usually fused d. Roots inclined distally 7. Lingual aspect a. One large lingual cusp b. No lingual groove 8. Mesial aspect a. Fused roots 9. Distal aspect a. Occlusal surface can be seen b. Shorter crown length 10. Occlusal aspect a. Heart-shaped b. Large lingual cusp c. Little or no distolingual cusp d. Three functioning cusps i. Two buccal ii. One lingual e. Converges lingually	**Slide #28** Picture illustrating the morphology of the occlusal aspect of the 2nd molar **Slide #29-30** Maxillary 3rd molar **Note:** include a picture illustrating how the distolingual cusp progressively shorten from 1st to 3rd molar. **Q**: compare between the 2nd and 3rd molars' roots? **A**: the 3rd molar are more infused **Slide #31** Buccal aspect **Slide #32** Lingual aspect **Slide #33** Mesial aspect **Slide #34** Distal aspect **Slide #35** Occlusal aspect

TIME	LESSON CONTENT	NOTES
2 minutes	**II. Permanent mandibular molars** A. Discretion 1. Variation a. Cusp number b. Size c. Occlusal design 2. Two roots a. 3rd molar may have fused roots b. Shorter crows	**Slide #36-37** The permanent mandibular molars **Note:** Have a picture illustrating the three mandibular molars.
5 minutes	B. Mandibular 1st molar 1. Largest mandibular tooth 2. Five well-developed cusps a. Two buccal b. Two lingual c. One distal 3. Two well-developed roots a. Mesial b. Distal c. Developmental depressions 4. Buccal aspect a. Mesial root i. Broad ii. Curved distally b. All five cusps can be seen c. Mesiobuccal developmental groove d. Distobuccal developmental groove e. Mesiobuccal cusp i. The largest f. Distal cusp i. The smallest g. Irregular cervical line h. Concave mesial outline 5. Lingual aspect a. Two lingual cusps can be seen i. Pointed b. Wider mesiolingually c. Mesial cusp i. Higher than the distal cusp d. Lingual developmental groove e. Irregular developmental cervical line f. Bifurcation groove 6. Mesial aspect a. Two cusps can be seen i. Mesiobuccal cusp	**Q**: Is the mandibular 1st molar trifurcated or bifurcated? Why? **A**: Bifurcated, because it only has two roots. **Slide #38** Mandibular 1st molar **Q**: What number is the mandibular 1st molar? **A**: #46 (previous lecture). **Slide #39-40** Buccal aspect **Note:** **Slide #41** Lingual aspect **Slide #42-43** Mesial aspect

TIME	LESSON CONTENT	NOTES
	ii. Mesiolingual cusp	**Slide #44** Distal aspect
	b. Browder mesial portion	
	i. Cannot see the distal	
	c. No deep developmental depression	**Q**: Compare between the mandibular 2nd premolar (past knowledge) and 1st molar?
	d. Straighter cervical line	
	e. Contact area in the middle of the occlusal third	
	7. Distal aspect	
3 minutes	a. Contact area is below the distal cusp ridge	**A**: the lingual cusp is longer than the buccal cusp in the 1st molar the opposite is true for the 2nd premolar.
	b. DCA higher than MCA	
	c. Developmental groove	
	8. Occlusal aspect	
	a. Wider mesiodistally	
	b. Larger mesiolingual cusps	
	c. Smaller distal cusps	**Slide #45-46** Occlusal aspect
	d. One major fossa	
	i. Central fossa	
	e. Two minor fossae	
	i. Mesial triangular fossa	**Q**: Compare between the maxillary 1st molar and mandibular 1st molar from the occlusal aspect?
	ii. Distal triangular fossa	
	f. Central, mesial, and distal pits	
	g. Central developmental groove	
	h. Mesiobuccal developmental groove	
	i. Distobuccal developmental groove	**A**: Maxillary 1st molar has 5th cusp lingually. Mandibular 1st molar has 5th cusp distally. Maxillary 1st molar is the opposite dimension. Maxillary molars has 3 major cusps Mandibular molars has 4 major cusps
	j. Lingual developmental groove	
	k. Supplemental grooves	
4 minutes	C. Mandibular 2nd molar	
	1. Smaller than 1st molar	
	2. Four well-developed cusps	
	a. 2 buccal and 2 lingual	
	3. No fifth cusp	
	4. Two-well developed roots	
	5. Shorter roots	
	6. Buccal aspect	
	a. Shorter and narrower	
	b. One buccal developmental groove	
	c. Roots inclined distally	
	7. Lingual aspect	**Slide #47** Mandibular 2nd molar
	a. Less lingual converging	
	8. Medial aspect	
	a. Less pronounced cervical ridge	
	b. Pointed mesial root	**Slide #48** Buccal aspect
	9. Distal aspect	

TIME	LESSON CONTENT	NOTES
	a. No distal cusp b. No distobuccal developmental groove 10. Occlusal aspect a. Central developmental groove i. Buccal developmental groove ii. Lingual developmental groove iii. Many supplemental grooves b. Central pit c. These grooves form a cross i. 4 equal parts	**Slide #49** Lingual aspect **Slide #50** Mesial aspect **Slide #51** Distal aspect **Slide #52** Occlusal aspect
3 minutes	D. Mandibular 3rd molar 1. Presents many anomalies (form, position) 2. Irregular crown development 3. Malformed and undersized roots 4. May have 5 or more cusps 5. No normal alignment 6. More likely to be impacted 7. Longer time to erupt 8. Buccal aspect a. 4 cusps b. Shout and round buccal cusps c. Poorly developed two roots i. May be separated or fused 9. Lingual aspect a. Similar to the buccal aspect 10. Mesial aspect a. Resemble mandibular 2nd molar EXCEPT in dimensions b. Short, pointed root 11. Distal aspect a. Resemble mandibular 2nd molar EXCEPT in dimensions b. Distal root is smaller than the mesial 12. Occlusal aspect a. Similar to 2nd mandibular molar b. More rounded outline c. Smaller buccolingually	**Slide #53** Figure 12-27 from the Wheeler's dental anatomy textbook **Slide #54** Mandibular 3rd molar **Q**: when do mandibular 3rd molars normally erupt? **A**: 17–21 y (previous lecture). **Slide #60** Where can we apply this information? **Q**: can you think of any reason as to why it is important? **A**: answers will very but student will explore more as they go through the readings.
2 minutes	**III. Ethical obligation behind identifying anatomical landmarks** A. identifying abnormalities B. Dental hygiene standards of care C. Forensic dentistry	**Note:** emphasize the Shah et al. article and the website for more information about forensic dentistry.

TIME	LESSON CONTENT	NOTES
	IV. CLOSURE	**Slide #61** Summary
	A. Summary of Major Points - Relate Back to Objectives	
	I hope that you now have a better understanding of the anatomical and morphological landmarks of both maxillary and mandibular molars. In today's lecture, I hope that you can compare and contrast between maxillary and mandibular molars and identify the tooth by recognizing its anatomical characteristics. Keep in mind that it is not only to complete a required course but can help fulfill your professional obligation to ensure accurate dental charting. Remember that you have a critical role in recording and documenting efficiently.	**Q**: What are some things you learned today that helps you understand the importance of your role as a dental hygienist related to having a good grasp of anatomical landmarks of the dentition?
3 minutes	Provide a Sense of Accomplishment I hope you will be more comfortable and able to recognize critical anatomical and morphological characteristics of both maxillary and mandibular molars and that you are able to differentiate between them.	
	Assignment: For a better understanding of our topic today you should: 1. Explore websites listed on our lecture 2. Search magazines for current articles in various journals 3. Research about forensic dentistry and how our lecture can be used in this filed	Note**:** Make sure to read your assigned chapter and go through the listed reading to gain more prospective.
		Slide #62 References

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	CRITICAL THINKING ACTIVITY Students will hop into the Quizizz website (https://quizizz.com) and go to "Enter code," where they will enter the code to the prepared quiz. This quiz is made of 10 questions that aim to capture some of the critical information that was mentioned during today's lecture. This quiz consists of Four multiple choices, two open-ended and two identifying questions.	**Slide #63** Critical thinking activity: interactive retrieval quiz using Quizizz website.
5 minutes	1 Q. The maxillary 1st molar has a unique fifth/supplemental cusp, also known as the cusp or tubercle of Carabelli, located in which aspect? •Buccal •Lingual •Mesial •Distal 2 Q. The largest mandibular 1st molar cusp is? •Mesiobuccal •Mesiolingual •Distobuccal •Distolingual 3 Q. The largest & longest cusp on the maxillary 1st molar is the…… cusp. •Mesiobuccal •Mesiolingual •Distolingual •Distobuccal 4 Q. The permanent mandibular molar has one major fossa? •Distal fossa •Central fossa •Mesial triangular fossa •Distal triangular fossa 5 Q. One reason why it is vital to identify anatomical landmarks? 6 Q. What is the difference between bifurcated and trifurcated teeth?	**Slide #64** Instructions for the activity **Note:** Make sure that all students have access to the quiz.

7 Q. The arrow points at what anatomical landmark?
•Central pip
•Distolingual cusp
•Oblique ridge
•Mesiolingual cusp

8 Q. The illustration shows the mandibular 1st molar from ..... aspect.
•Buccal
•Lingual
•Mesial
•Distal

Slide #65 "Great job everyone! Thank you" slide

Answers Key:

1Q. Lingual
2Q. Mesiobuccal
3Q. Mesiolingual
4Q. Central fossa
5Q. The anatomical landmarks provide a sound basis for identifying abnormal conditions. In addition, they will ensure the following of the dental hygiene standards of care by taking accurate dental charts. Also, in forensic dentistry, teeth are like your fingerprints, so they are a valuable tool to help identify victims
6Q. This refers to the area where the roots are separated. Bifurcated exists between two roots, where trifurcated exists in three rooted teeth.
7Q. Oblique ridge
8Q. Buccal

Test Questions

1. **Objective #1:** Describe anatomical and morphological characteristics of maxillary molars.

Test Item: The maxillary 1st molar has a unique fifth/supplemental cusp located in which aspect?

a. Mesial
b. Distal
c. Lingual
d. Buccal

2. **Objective #2:** Identify anatomical and morphological characteristics of mandibular molars.

Test Item: All of the following cusps are present in the 1st mandibular molar **EXCEPT** one. Which one is the **EXCEPTION**?

a. Two buccal
b. Two lingual
c. One distal
d. One lingual

3. **Objective #3:** Determine the tooth number by its anatomical and morphological characteristics.

Test Item: Which of the following molars is a trifurcated tooth?

a. #16
b. #36
c. #38
d. #47

4. **Objective #4:** Distinguish the anatomical differences between maxillary and mandibular molars.

Test Item: In 2-3 sentences, compare between maxillary and mandibular 1st molar by naming 2 anatomical landmarks for each.

5. **Objective #5:** Recognize the ethical impotence of identifying anatomical landmarks of molars.

Test Item: In 2-3 sentences, describe how can identifying anatomical landmarks be an ethical obligation.

Correct Answers:

1. C
2. D
3. A
4. Maxillary 1st molar has three roots, trifurcated. While the mandibular 1st molar has two well-developed roots, mesial and distal. The maxillary 1st molar has four well-formed cusps, the crown wider buccolingually, one supplemental cusp (non-functioning) Cusp of carabelli on the lingual aspect. While the mandibular 1st molar has the 5th cusp on the distal aspect. The_Maxillary 1st molar is the opposite dimension. The_Maxillary molars have 3 major cusps, while the mandibular molars have 4 major cusps.
5. The anatomical landmarks provide a sound basis for identifying abnormal conditions. In addition, they will ensure the following of the dental hygiene standards of care by taking accurate dental charts. Also, in forensic dentistry, teeth are like your fingerprints, so they are a valuable tool to help identify victims.