

Orofacial Anatomy, Histology and Embryology

**Lamar Institute of
Technology**

DHYG 1401

Course Syllabus

SUMMER II, 2010

**Taught by:
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DHYG 1401: Orofacial Anatomy, Histology and Embryology
Lecture Schedule: Monday - Thursday, 8:00 – 9:45 - Room MPC 113
Lab Schedule: MW and TR, 10:00 - 1:50 - Room MPC 127

| Date | Lecture | Assignment | Lab | Assignment |
|-------------|---|---|---|---|
| Fri Jul 9 | Orientation to Dental Hygiene program Orientation to course | Read: LIT Dental Hygiene Student Handbook/ Risk Management Policy and Procedures Manual | ----- | ----- |
| Mon Jul 12 | Introduction to Orofacial Region Surface Anatomy Orofacial Structures | Read: Illustrated Dental Embryology, Histology and Anatomy (IEHA) Ch. 1, 2 Review: Illustrated Anatomy of the Head and Neck (IAHN) Ch.1,2 *Unit 1, 2 | Section 11 Skeletal System | Read: IAHN Ch. 3 *Unit 4 Lab: pg 29-35 |
| Tues Jul 13 | Glandular Tissue | Read: IAHN Ch. 7, IEHA Ch. 11, *Unit 3 | Section 12 Skeletal System | Same as above |
| Wed Jul 14 | Lymphatic System | Read: IAHN Ch. 10 Review: IEHA Ch. 11 *Unit 5 | Section 11 Skeletal System, Muscular System | Continue Bones Begin Muscles Read: IAHN Ch. 4 *Unit 6 Lab: pg. 36-47 |
| Th Jul 15 | Fascia and Spaces Spread of Dental Infection | Read: IAHN Ch. 11, 12 *Unit 5 | Section 12 Skeletal System, Muscular System | Same as above |
| Mon Jul 19 | Exam 1 | Covers: IAHN Chapters 1,2,7,10-12; IEHA Ch. 1, 2, 11 | Section 11 Muscular System | Continue muscles |

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| Date | Lecture | Assignment | Lab | Assignment |
|-------------|---|---|---|---|
| Tues Jul 20 | Muscular System | Read: IAHN Ch. 4 *Unit 6 | Section 12 Muscular System | Same as above |
| Wed Jul 21 | Vascular System | Read: IAHN Ch. 6 *Unit 7 | Section 11 Lab Exam I | Lab Exam 1: Skeletal System and Muscular System |
| Th Jul 22 | Vascular System Nervous System | Continue IAHN Ch. 6 *Unit 7 Read: IAHN Ch. 8 *Unit 8 | Section 12 Lab Exam I | Same as above |
| Mon Jul 26 | Nervous System | Continue: IAHN Ch 8 *Unit 8 | Section 11 Permanent Dentition: Anterior Teeth | Student should have completed all Anterior teeth on New Mentor CD-ROM Unit 9 IEHA ch.15 and 16 Lab: pg 42-44 Complete Anterior tooth modules |
| Tues Jul 27 | Exam 2 | Covers: IAHN Ch 4,6,8 | Section 12 Permanent Dentition: Anterior Teeth | Same as above |
| Wed July 28 | Development of the Face and Neck Development of Orofacial Structures | Read: IEHA Ch 4,5 *Unit 12 | Section 11 Permanent Dentition: Posterior Teeth | Student should have completed all posterior teeth on New Mentor CD-ROM Unit 10; IEHA ch.17 Complete Posterior Tooth modules |

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| Date | Lecture | Assignment | Lab | Assignment |
|-------------|--|---|--|--|
| Th July 29 | Tooth Development and Eruption | Read: IEHA Ch 6 *Unit 13 | Section 12 Permanent Posterior Teeth | Same as above |
| Mon Aug 2 | Continue | Continued | Section 11 Deciduous Teeth | Read IEHA: Ch 18 Unit 11 Complete Deciduous Tooth Modules |
| Tues Aug 3 | Occlusion | Read: IEHA Ch. 20, Wilkins Ch 16 * Unit 14 | Section 12 Deciduous Teeth | Same as above |
| Wed Aug 4 | Exam 3 | Covers: IEHA Ch.4,5,6,20 Wilkins ch. 16 | Section 11 Occlusion | Complete Occlusion Modules Unit 14 |
| Th Aug 5 | Oral Mucosa Gingival and Dentogingival Junctional Tissues | Read: IEHA Ch. 9, 10 Review: IEHA Ch 7, 10 *Unit 15, 16 | Section 12 Occlusion | Same as above |
| Mon Aug 9 | Enamel Dentin and Pulp Temporomandibular Joint | Read: IEHA Ch. 12, 13 *Unit 17 and 18 Read: IAHN Ch. 5, +Complete TMJ CD-ROM | Section 11 Lab Exam 2 | Covers: Permanent Dentition, Primary Dentition and Occlusion |
| Tues Aug 10 | Periodontium: Cementum, Alveolar Bone, Periodontal Ligament | Read: IEHA Ch. 14 *Unit 19, 20 | Section 12 Lab Exam 2 | Same as above |
| Wed Aug 11 | Continued | Same as above | No Lab | No Lab |
| Th Aug 12 | Exam 4 | Covers IEHA Ch 9-10, 12-14, IAHN Ch 5 | No Lab | No Lab |

+ Available in the Multi-Media Lab – MPC Rm 155

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PREREQUISITE/ CO-REQUISITE COURSES

Admittance to the dental hygiene program.

COURSE DESCRIPTION

A study of histology and embryology of oral tissues, gross anatomy of the head and neck, tooth morphology, and individual tooth identification.

COURSE GOALS

1. Identify landmarks of the head and neck. **(F1.5, F5.5, F10.5, F11.4)***
2. Describe in detail the development of facial structures. **(F1.5, F5.5, F10.5, F11.4, F12.4, C15.3, C16.3)***
3. Describe all aspects of early tooth development including: stages of development, components of the tooth germ, dentin and enamel formation and mineralization, root development, and cementum formation. **(F1.5, F5.5, F10.5, F11.4, F12.4, C15.3, C16.3)***
4. Describe enamel: composition, thickness, importance, CEJ relationships, density, color, and solubility. **(F1.5, F5.5, F10.5, F11.4, F12.4, C15.3, C16.3)***
5. Describe the physical and chemical properties of dentin including its unique structural components and patterns. **(F1.5, F5.5, F10.5, F11.4, C15.3, C16.3)***
6. Describe the functions, components, formation and properties of cementum. **(F1.5, F5.5, F10.5, F11.4, C15.3, C16.3)***
7. Describe the functions, components, and properties of the pulp and apical foramen. **(F1.5, F5.5, F10.5, F11.4, C15.3, C16.3)***
8. Describe the functions of the periodontal ligament, the seven principal fibers, and identify the blood, lymph and nerve supply to the periodontal ligament. **(F1.5, F5.5, F10.5, F11.4, C15.3, C16.3)***
9. Describe the functions and components of the alveolar process. **(F1.5, F5.5, F10.5, F11.4, C15.3, C16.3)***
10. Locate each salivary gland, describe the type of secretion and determine whether major or minor gland. **(F1.5, F5.5, F10.5, F11.4)***
11. Describe masticatory mucosa in terms of function, texture, and color. **(F1.5, F5.5, F10.5, F11.4, C15.3)***
12. State the function of the epithelial attachment. **(F1.5, F5.5, F10.5, F11.4)***
13. Describe lining mucosa and identify areas covered by lining mucosa. **(F1.5, F5.5, F10.5, F11.4, C15.3)***
14. Describe specialized mucosa and identify areas covered by or comprised of specialized mucosa. **(F1.5, F5.5, F10.5, F11.4, C15.3)***
15. Describe the arterial and venous blood flow through the head and neck. **(F1.5, F5.5, F10.5, F11.4, C15.3)***
16. Identify and state the functions of the muscles of the head and neck. **(F1.5, F5.5, F10.5, F11.4, C15.3)***
17. Identify the nerves that supply the head and neck region. **(F1.5, F5.5, F10.5, F11.4, C15.3)***
18. Demonstrate knowledge of dental nomenclature. **(F11.4, C15.3)***
19. Differentiate in form, function, and position all deciduous and permanent teeth in the human dentition. **(F10.5, F11.4, C15.3, C16.3)***
20. Identify any tooth correctly with any acceptable numbering system. **(F11.4, C15.3, C16.3)***
21. Determine occlusion classification and deviations from normal in the deciduous and permanent dentitions according to the Angle's classification of occlusion. **(F10.5, F11.4, C15.3, C16.3)***
22. Describe the temporomandibular joint and its movements. **(F1.5, F5.5, F10.5, F11.4, C15.3, C16.3)***

***Beginning in the late 1980's, the U.S. Department of Labor Secretary's Commission on Achieving Necessary Skills (SCANS) conducted extensive research and interviews with business owners, union leaders, supervisors, and laborers in a wide variety of work settings to determine what knowledge workers needed in order to perform well on a job. In 1991 the Commission announced its findings in *What Work Requires in Schools*. In its research, the Commission determined that "workplace know-how" consists of two elements: foundation skills and workplace competencies. The three-part foundation skills and five-part workplace competencies are further defined in the SCANS attachment.**

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CREDIT HOURS

3 credit hours

CLASS MEETING TIME:

Lecture: Monday thru Thursday 8:00 – 9:45 am MPC 113
Laboratory: Monday/Wednesday or Tuesday/Thursday 10:00 – 1:50 pm MPC 127

INSTRUCTOR:

Ruth Fearing Tornwall, RDH, MS, Associate Professor
Office 217 Multi-Purpose Center
Phone 409-880-8857.
Office hours: M, T, W, TR 2-3

COURSE POLICIES

General Policy Statements:

- Attendance Policy.** In order to ensure that the student in the dental hygiene program acquires the necessary didactic and clinical competencies outlined in the curriculum, it is necessary that the student complete all assigned lecture classes, clinical and laboratory hours.
Summer Semester: Dental hygiene students will be allowed **one absence** in any lecture or lab session. Students will be allowed to make up lab only if there is available space and time.
In the event that a student misses a lecture class beyond the allowed absences, the faculty will review the student's academic record. **If it becomes inadvisable for the student to continue in the program, the faculty will initiate an administrative drop from the course.**
Attendance is required at all lectures and labs. If any absence becomes necessary, the student should contact the instructor or the Allied Health Secretary prior to class (409-880-8857 or 409-880-8846)
 - The student is responsible for all material missed at the time of absence.
 - It is expected that students will appear to take their exams at the regular scheduled examination times. If you are absent on the day of an exam, the instructor has the option to administer the test the day you return or on any other day determined by the instructor.
- Roll will be taken daily.** Be sure to initial the roll each and every class period.
NOTE: You are NOT allowed to initial/sign roll for another student.
- Class Arrival and Departure time.** Students are also expected to arrive and leave class according to the published schedule or as instructed by the faculty member. Faculty may penalize tardiness at their discretion. Penalties may range from **grade participation deductions to dismissal from class.**
Class Arrival Time. You are expected to be in your seat, on time, when roll is taken. Do not make coming in late a **habit or noticeable pattern as this could result in a deduction on your class participation grade.** On test days, the instructor reserves the right not to administer a test to a student who arrives more than 10 minutes late. If you do find yourself in the position of arriving late due to unavoidable circumstances, enter the classroom with the **least** amount of disruption possible. This is NOT the time to greet others loudly and/or discuss why you are late. **Three tardy days will equal one absence.**
Class Departure Time. You are required to stay the entire length of each lecture/lab class unless dismissed, as a class, by the instructor. Any personal business should be taken care of prior to or after class. **Do not make leaving class during lecture a habit or noticeable pattern. A pattern of this behavior could result in a participation grade reduction.** If a medical problem exists or an emergency occurs please inform the instructor.
- Cell phones.** All cell phones must be turned off and put away. Evidence of any text messaging during class time will result in **deductions on your class participation grade. Texting during an exam will be considered academic dishonesty. The exam will be considered over and the student will receive a zero for the exam.**

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5. **Americans with Disabilities Act (ADA).** The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things this statute requires that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations of their disabilities. If you believe you have a disability requiring an accommodation, please contact Special Populations Coordinator at 409-880-1737 or visit the office located in the Cecil Beeson Building, room 116B.

TEACHING METHODS

Teaching methods will include

- Lecture
- Discussion
- Laboratory
- CD-ROM
- Reading Assignments

REQUIRED TEXT

- **LIT Dental Hygiene Student Handbook/Risk Management Policy and Procedures Manual** (current edition)
- Fahrenbach, Margaret J., and Herring, Susan W., **Illustrated Anatomy of the Head and Neck**, Elsevier Sanders, 3rd edition, 2007, ISBN-13: 978-1-4160-3403-2.
- Beth-Balogh, Mary and Fehrenbach, Margaret J., **Illustrated Dental Embryology, Histology, and Anatomy**, Elsevier Saunders, 2nd edition, 2006, ISBN: 1-4160-2499-9.

REFERENCES

- **Anatomy-Tooth Morphology**, CD-ROM New Mentor, Virginia Commonwealth University, 1998-2000.
- James Avery, Daniel Chiego, **Essentials of Oral Histology and Embryology: A Clinical Approach**, 3rd edition, Mosby/Elsevier, 2006.
- Metfi, Rudy C., and Atley, Keith A., **Permar's Oral Embryology and Microscopic Anatomy**, Lippincott, Williams & Wilkins, 10th edition, 2000.
- Wilkins, Esther, **Clinical Practice of the Dental Hygienist**, Lippincott, Williams & Wilkins, 10th edition, 2009.

COURSE REQUIREMENTS

New Mentor Anatomy-Tooth Morphology CD-ROM

The Anatomy - Tooth morphology CD-ROM should be completed prior to the scheduled Dentition Laboratory. The CD-ROM is available in the **Multi-Media Lab Rm 155**.

TMJ CD-ROM

TMJ will not be covered in class. A TMJ module will be available on the student computers located in **MPC Building Rm 155**. Please read IAHN, Ch 5 and review Unit 20. This information will be included on Exam 4.

Tooth and Occlusion Modules

A series of tooth and occlusion modules corresponding to the individual labs must be completed by the end of this course. No grade will be given for these modules. Students may complete during the lab session or on their own time. Failure to complete all modules will result in an incomplete in this course. MODULE CHECK-OFF SHEET will be distributed in class. See course schedule for completion dates.

Examinations

Class Participation

**Orofacial Anatomy, Histology and Embryology (DHYG 1401)
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EVALUATION CRITERIA

| | |
|-----------------------------|-------------------|
| Exams (6 total) | 85% |
| Lecture (4) | |
| Lab (2) | |
| Participation grade | 15% |
| CD ROMs | completion |
| Tooth and Occlusion modules | <u>completion</u> |
| | 100% |

GRADE SCALE:

| | |
|--------------|---|
| 90 - 100 | A |
| 80 - 89 | B |
| 70 - 79 | C |
| 60-69 | D |
| 59 and below | F |

**Orofacial Anatomy, Histology and Embryology (DHYG 1401)
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CONTENT OUTLINE

TOPIC

1. Surface anatomy
 - a. Surface Anatomy
 - b. Regions of the head
 - c. Regions of the neck
2. Skeletal System
 - a. Overview of the skeletal system
 - (1) Bony prominences
 - (2) Bony depressions
 - (3) Skeletal articulations
 - b. Bones of the head and neck
 - (1) Skull
 - (2) Cranial bones
 - (3) Facial bones
 - (4) Paranasal sinuses
 - (5) Fossae of the skull
 - (6) Bones of the neck
3. Glandular tissue
 - a. Overview of the glandular tissue
 - b. Lacrimal glands
 - c. Salivary glands
 - (1) Major salivary glands
 - (2) Minor salivary glands
 - d. Thyroid gland
 - e. Parathyroid glands
 - f. Thymus glands
4. Lymphatic System
 - a. Overview of the lymphatic system
 - 1) Lymphatic vessels
 - 2) Lymph nodes
 - 3) Tonsillar tissue
 - 4) Lymphatic ducts
 - b. Lymph nodes of the head and neck
 - (1) Lymph nodes of the head
 - (2) Cervical lymph nodes
 - c. Tonsils
 - (1) Palatine and lingual tonsils
 - (2) Pharyngeal and tubal tonsils
 - d. Lymphadenopathy
 - e. Metastasis and Cancer
 - f. Salivary glands
 - (1) Histology of salivary glands
 - (2) Secretory cells and acini
 - (3) Ductal system
 - g. Histology of the thyroid gland
 - h. Histology of lymph nodes
5. Fascia and Spaces
 - a. Fascia
 - (1) Superficial fascia
 - (2) Deep fascia
 - b. Spaces
 - (1) Spaces of head and neck
6. Spread of Dental Infections

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- a. Infectious process
- b. Dental infections
 - (1) Dental infection lesions
 - (2) Medically compromised patients
- c. Spread of dental infections
 - (1) Spread to the paranasal sinuses
 - (2) Spread by blood
- 6. Muscular System
 - a. Overview of the muscular system
 - b. Muscles of the head and neck
 - (1) Cervical muscles
 - (2) Muscles of facial expression
 - (3) Muscles of mastication
 - (4) Hyoid muscles
 - (5) Muscles of the tongue
 - (6) Muscles of the pharynx
- 7. Vascular System
 - a. Overview of the vascular system
 - b. Arterial blood supply to the head and neck
 - (1) Origins to the head and neck
 - (2) Internal carotid artery
 - (3) External carotid
 - c. Venous Drainage of the head and neck
 - (1) Facial vein
 - (2) Retromandibular vein
 - (3) Venous sinuses
 - (4) Internal jugular vein
 - (5) External jugular vein
 - (6) Pathways to the heart from the head and neck
- 8. Nervous System
 - a. Overview of the nervous system
 - (1) Central nervous system
 - (2) Peripheral nervous system
 - (3) Cranial nerves
 - b. Nerves to the oral cavity and associated structures
 - (1) Trigeminal nerve
 - (2) Facial nerve
 - c. Nerve lesions of the head and neck
- 9. Development of the Face and Neck
 - a. Development of the face
 - (1) Stomodeum and oral cavity formation
 - (2) Mandibular arch and lower face formation
 - (3) Frontonasal process and upper face formation
 - (4) Maxillary process and midface formation
 - b. Development of the neck
 - (1) Primitive pharynx formation
 - (2) Branchial apparatus formation
- 10. Development of Orofacial Structures
 - a. Orofacial development
 - b. Palatal development
 - (1) Primary palate formation
 - (2) Secondary palate formation
 - (3) Completion of palate
 - c. Nasal cavity and septum development
 - d. Tongue development
 - (1) Body of the tongue formation

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- (2) Base of the tongue formation
- (3) Completion of tongue formation
- 11. Tooth Development and Eruption
 - a. Tooth development
 - (1) Initiation stage
 - (2) Bud stage
 - (3) Cap stage
 - (4) Bell stage
 - (5) Apposition and maturation stages
 - b. Root development
 - (1) Root dentin formation
 - (2) Cementum and pulp formation
 - (3) Periodontal ligament and alveolar bone development
 - (4) Multirrooted teeth
 - c. Primary tooth eruption and shedding
 - d. Permanent tooth eruption
- 12. Dental Anatomy
 - a. Permanent teeth
 - (1) Anterior Teeth
 - (i) Incisors
 - (ii) Canines
 - (2) Posterior teeth
 - (i) Premolars
 - (ii) Molars
 - b. Deciduous Teeth
 - (1) Anterior teeth
 - (i) Incisors
 - (ii) Canines
 - (2) Posterior teeth
 - (i) Molars
- 13. Occlusion
 - a. Occlusion
 - b. Normal occlusion
 - c. Centric occlusion
 - d. Malocclusion
 - (1) Classification of malocclusion
 - (i) Class I
 - (ii) Class II
 - (iii) Class III
 - (iv) Primary occlusion
 - (2) Parafunctional habits
- 10. Oral Histology
 - a. Oral Mucosa
 - (1) Classification of oral mucosa
 - (2) Epithelium of oral mucosa
 - (3) Lamina propria of oral mucosa
 - b. Regional differences in oral mucosa
 - (1) Labial mucosa and buccal mucosa
 - (2) Alveolar mucosa
 - (3) Floor of the mouth and ventral tongue surface
 - (4) Soft palate
 - (5) Attached gingival
 - (6) Hard palate
 - c. Tongue
 - d. Pigmentation of the oral mucosa
 - e. Turnover time, repair, and aging of the oral mucosa

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11. Gingival and Dentogingival Junctional Tissues
 - a. Gingival tissues
 - b. Dentogingival junctional tissues
12. Enamel
 - a. Enamel
 - b. Apposition of enamel matrix
 - c. Maturation of enamel matrix
 - d. Components of mature enamel
 - e. Further microscopic features of mature enamel
13. Dentin and pulp
 - a. Dentin-pulp complex
 - b. Dentin
 - (1) Apposition of dentin matrix
 - (2) Maturation of dentin
 - (3) Components of mature dentin
 - (4) Types of dentin
 - (5) Microscopic features of mature dentin
 - (6) Age changes in dentin
 - c. Pulp
 - (1) Anatomy of pulp
 - (2) Microscopic features of pulp
 - (3) Microscopic zones in pulp
14. Periodontium: Cementum, Alveolar Bone, Periodontal Ligament
 - a. Components of the periodontium
 - (1) Cementum
 - (i) Development of cementum
 - (ii) Microscopic appearance of cementum
 - (iii) Types of cementum
 - (2) Alveolar bone
 - (i) Anatomy of the jaw bones
 - (ii) Development of the jaw bones
 - (3) Periodontal ligament
 - (i) Components of the periodontal ligament
 - (ii) Fiber groups of the periodontal ligament
15. Temporomandibular Joint
 - a. Overview of the Temporomandibular Joint
 - (1) Bones of the joint
 - (2) Joint capsule
 - (3) Disc of the joint
 - (4) Ligaments associated with the joint
 - b. Jaw movements with muscle relationships
 - c. Palpation of the joint

**LEARNER
OBJECTIVES**

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UNIT 1: Surface Anatomy of the Head and neck

Upon completion of this unit the student should be able to locate and identify the following on living subjects, models and/or pictures:

- | | |
|--------------------------------------|-------------------------------|
| 1. Supraorbital ridge (superciliary) | 13. Bridge of the nose |
| 2. Glabella | 14. Nasal septum |
| 3. Frontal eminence | 15. Ala |
| 4. Auricle | 16. Naris |
| 5. External acoustic meatus | 17. Apex of the nose |
| 6. Tragus | 18. Nasolabial sulcus |
| 7. Orbit | 19. Labiomenal groove |
| 8. Sclera | 20. Vermilion zone |
| 9. Iris | 21. Vermilion border |
| 10. Pupil | 22. Philtrum |
| 11. Medial and lateral canthi | 23. Tubercle of the upper lip |
| 12. Root of the nose | 24. Labial commissure |
| | 25. Mental protuberance |

UNIT 2: Intra Oral Anatomy

Upon completion of this unit the student should be able to locate the following on a classmate or in pictures/drawings:

- | | |
|-----------------------------------|--|
| 1. Labial frenum | 21. Foramen cecum |
| 2. Vestibules | 22. Sulcus terminalis |
| 3. Mucobuccal folds | 23. Median lingual sulcus |
| 4. Gingiva | 24. Lingual tonsil |
| 5. Attached gingiva | 25. Deep lingual veins |
| 6. Mucogingival junction | 26. Lingual frenum |
| 7. Marginal gingiva | 27. Palatine tonsil |
| 8. Gingival sulcus | 28. Plica fimbriatae |
| 9. Interdental gingiva or papilla | 29. Sublingual caruncle |
| 10. Hard palate | 30. Fauces |
| 11. Maxillary tuberosity | 31. Anterior and posterior tonsillar pillars |
| 11. Median raphe | 32. Nasopharynx |
| 13. Incisive papilla | 33. Laryngopharynx |
| 14. Rugae | 34. Larynx |
| 15. Soft palate | 35. Esophagus |
| 16. Uvula | 36. Circumvallate papillae |
| 17. Pterygomandibular fold | 37. Filiform papillae |
| 18. Retromolar pad | 38. Fungiform papillae |
| 19. Epiglottis | 39. Foliate papillae |
| 20. Tongue (apex, body, base) | |

UNIT 3: Glandular Tissue

Upon completion of this unit the student should be able to:

1. Describe the development of the salivary glands.
2. Identify the functions of salivary glands.
3. Identify two types of secretory cells and describe their secretory products.
4. State the amount of saliva produced daily.
5. Identify the two major groups of salivary glands.
6. Define exocrine, serous, mixed, and mucous.
7. Identify the major salivary glands; give the location and secretion of each; name their main ducts and give their percentage of total salivary volume.
8. Identify the minor salivary glands.
9. Describe the location of Von Ebner's glands and give its secretion.

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10. State the part of the central nervous system which controls the salivary glands.
11. Describe how the salivary glands are examples of a merocrine gland with a compound tubuloalveolar structure.
12. Identify the nerves and blood vessels that supply each salivary gland.
13. Locate the thyroid gland, parathyroid glands and the thymus gland.
14. Identify the functions of the thyroid, parathyroid and thymus glands.
15. Identify the nerves and blood vessels that supply the thyroid, parathyroid and thymus glands

UNIT 4: Bones of the Head and Neck

Upon completion of this unit the student should be able to

- I. Locate and identify the following:

CRANIAL BONES:

1. Occipital bone
 - A. Foramen magnum
 - B. Occipital condyles
 - C. Jugular notch
 - D. Hypoglossal canals
2. Frontal bone
 - A. Supraorbital ridge
 - B. Supraorbital notch
 - C. Glabella
 - D. Zygomatic process of the frontal bone
 - E. Coronal suture
3. Parietal bones
 - A. Sagittal suture
 - B. Lambdoidal suture
 - C. Squamosal suture
4. Temporal bones
 - A. Squamous Portion
 - a. Zygomatic process of the temporal bone
 - b. Articular fossa (mandibular)
 - c. Articular eminence
 - d. Postglenoid process
 - e. Temporal fossa
 - B. Tympanic Portion
 - a. External acoustic meatus
 - b. Petrotympanic fissure
 - C. Petrous Portion
 - a. Mastoid process
 - b. Mastoid notch
 - c. Styloid process
 - d. Stylomastoid foramen
 - e. Jugular foramen
 - f. Internal acoustic meatus
 - g. Carotid canal
 - h. Foramen lacerum
5. Sphenoid bone
 - A. Body of the sphenoid
 - a. Hypophyseal fossa
 - B. Lesser wing of the sphenoid
 - a. Optic canal (foramen)
 - b. Superior orbital fissure
 - C. Greater wing of the sphenoid
 - a. Inferior orbital fissure
 - b. Foramen rotundum

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- c. Foramen ovale
- d. Foramen spinosum
- e. Spine of the sphenoid bone
- f. Infratemporal crest
- D. Pterygoid process of the sphenoid
 - a. Lateral pterygoid plate
 - b. Medial pterygoid plate
 - c. Pterygoid fossa
 - d. Hamulus
- 6. Ethmoid Bone
 - A. Perpendicular plate
 - B. Superior nasal conchae
 - C. Middle nasal conchae
 - D. Orbital plate
 - E. Cribriform plate
 - F. Crista galli

FACIAL BONES:

- 1. Vomer
 - A. Nasal septum
- 2. Lacrimal bones (2)
 - A. Nasolacrimal duct
- 3. Nasal bones (2)
- 4. Inferior nasal conchae (2)
- 5. Zygomatic bones
 - A. Frontal process
 - B. Temporal process
 - C. Maxillary process
 - a. Infraorbital rim
 - D. Zygomatic arch
 - a. Zygomatic process of the temporal bone
 - b. Temporal process of the zygomatic bone
- 6. Palatine bones
 - A. Horizontal plate
 - a. Median palatine suture
 - b. Transverse palatine suture
 - c. Greater palatine foramen
 - d. Lesser palatine foramen
 - e. Posterior nasal apertures
 - B. Vertical plate
 - a. Orbital process
- 7. Maxillary bones
 - A. Body of the maxillae
 - a. Maxillary tuberosity
 - b. Posterior superior alveolar foramina
 - c. Inferior and superior orbital fissure
 - d. Infraorbital foramen
 - e. Infraorbital sulcus
 - f. Infraorbital canal
 - g. Canine fossa
 - h. Nasal aperture (piriform aperture)
 - B. Frontal process of the maxilla
 - a. Medial orbital rim
 - C. Alveolar process
 - a. Canine eminence
 - D. Zygomatic process

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- a. Infraorbital rim
- E. Palatine process
 - a. Median palatine suture
 - b. Incisive foramen
- 8. Mandible
 - A. Body of the mandible
 - B. Mental protuberance
 - C. Symphysis
 - D. Ramus
 - E. Angle of the mandible
 - F. Mental foramen
 - G. External oblique line
 - H. Coronoid notch
 - I. Mandibular notch
 - J. Coronoid process
 - K. Condyle
 - L. Articulating surface of the condyle
 - M. Genial tubercles (mental spines)
 - N. Mylohyoid line (ridge)
 - O. Mylohyoid groove
 - P. Sublingual fossa
 - Q. Submandibular fossa
 - R. Mandibular foramen
 - S. Lingula
 - T. Pterygoid fovea
 - U. Retromolar triangle
- II. Describe the hyoid bone and identify the body and greater and lesser cornu.
- III. Discuss how the hyoid bone functions and what unique characteristic enables it to be mobile.
- IV. Identify the paranasal sinuses and discuss their functions.
- V. State the number of bones in the skull.
- VI. Identify bones as either cranial or facial bones.
- VII. Describe the function/purpose of foramina, canals, fissures and other bony openings.
- VIII. Define articulation.
- IX. List and define the words used to describe bony prominences.
- X. List and define the words used to describe bony depressions.
- XI. Identify the paranasal sinuses, their locations and functions.

Unit 5: Lymphatics Fascia and Spaces Spread of Dental Infections

Upon completion of this unit the student should be able to:

1. State the function of the lymphatic system.
2. List the components of the lymphatic system.
3. Discuss the drainage pattern of the lymph system in the head and neck region.
4. Identify on a classmate and on a diagram the major groups of lymph nodes that drain the head and neck and specify the areas that they drain.
5. Define "primary", secondary", and "tertiary" nodes.
6. Locate the tonsillar tissues on a diagram.
7. Define lymphadenopathy.
8. Discuss the role of the lymphatic system in the metastasis of cancer.
9. Define superficial and deep fascia.
10. Identify the significance of fascia.
11. Identify the major spaces in the head and neck.
12. Discuss the significance of the spaces in the spread of dental infections.
13. Define terms used to describe dental infection and the spread of dental infection.
14. Discuss the different ways that dental infections can be spread.
15. Discuss the lesions and complications that can occur with the spread of dental infection in the head and

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neck region.

UNIT 6: Muscles

Upon completion of this unit the student should be able to:

1. Identify the muscles of facial expression and state the origin, insertion, and action of the muscle.
2. Identify the muscles of mastication, their origin, insertion, action, blood supply, and nerve supply.
3. Identify the cervical muscles, their origin and insertion, action, blood supply and nerve supply.
4. Identify the hyoid muscles, their origin and insertion, action, blood supply and nerve supply.
5. Identify the muscles of the tongue, their origin and insertion, action, blood supply and nerve supply.

UNIT 7: Blood Supply

Upon completion of this unit the student should be able to:

1. Identify and locate the arteries and veins of the head and neck and state the areas supplied or drained by each.
2. Trace the blood flow through the head and neck region.
3. Identify the significance of the routes of blood flow and the location of vessels as it relates to local anesthesia injections or the spread of dental infections.

UNIT 8: Nerves

Upon completion of this unit the student should be able to:

1. Identify the two major divisions of the nervous system.
2. Identify the three components of the peripheral nervous system.
3. Identify the twelve cranial nerves, their general functions and areas that they innervate.
4. For each of the following nerves, describe the tissues innervated and whether the nerve is afferent(sensory) or efferent(motor):
 - A. Trigeminal (all divisions and branches)
 - B. Facial
 - C. Glossopharyngeal
 - D. Vagus
5. Discuss facial paralysis, Bell's palsy and Trigeminal neuralgia.

UNIT 9: Permanent Anterior Teeth

Upon completion of this unit the student should be able to:

1. List or select from a list, the appropriate age(s) concerning the developmental chronology of incisors, found in the various developmental tables, when given a certain developmental feature.
2. Demonstrate a knowledge of the morphology of each surface or the crown and root of the incisors and canines by:
 - a. describing
 - b. selecting
 - c. or using a drawing, photograph or specimen to identify or label any of the following features:
 1. contours of any surface or margin of a surface
 2. structural entities such as:
 - a. cingulum
 - b. developmental lines (depressions)
 - c. fossae
 - d. imbrication lines
 - e. incisal edge
 - f. linguogingival fissure
 - g. linguogingival groove
 - h. marginal ridges
 - i. root grooves

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3. Relative dimensions and shape
3. Describe or select the correct response from a list, the various comparisons between the incisors and canines.
4. Describe the general characteristics of any given incisor and canine including function, arch position, and distinguishing features.
5. Determine from a diagram, description, photograph or specimen whether a given incisor or canine is maxillary or mandibular, left or right, and central or lateral. F9
6. Determine the correct designation for a given incisor or canine diagram, description, photograph or specimen using any numbering system previously covered.
7. Recognize the developmental anomaly present when given a specimen or photograph of any incisor or canine.
8. Identify on a diagram or model, define or describe all the italicized terminology used in naming landmarks of the oral cavity.

UNIT 10: Permanent Posterior Teeth

Upon completion of this unit the student should be able to:

1. List or select from a list, the appropriate age(s) concerning the developmental chronology of premolars, found in the various developmental tables, when given a certain developmental features.
2. Demonstrate a knowledge of the morphology of each surface or the crown and root of the premolars and molars by
 - a. describing:
 - b. selecting
 - c. or using a drawing, photograph or specimen to identify or label any of the following features:
 1. contours of any surface or margin of a surface
 2. structural entities such as:
 - a. cusps
 - b. cusp ridges
 - c. developmental grooves (lines/depressions)
 - d. fossae
 - e. longitudinal root grooves
 - f. marginal ridges
 - g. pits
 - h. roots or central groove
 3. relative dimensions and shape
3. Describe or select the correct response from a list, the various comparisons between the premolars and molars
4. Describe the general characteristics of any given premolar and molar including function, arch position, and distinguishing features.
5. Determine from a diagram, description, photograph or specimen whether a given premolar or molar is maxillary or mandibular, left or right, and first and second.
6. Determine the correct designation for a given premolar or molar diagram, description, photograph or specimen using any numbering system previously covered.
7. Recognize the developmental anomaly present when given a specimen or photograph of any premolar or molar.
8. Identify on a diagram or model, define or describe all the italicized terminology used in naming landmarks of the oral cavity.

UNIT 11: Deciduous Anterior and Posterior Teeth

Upon completion of this unit the student should be able to:

1. Demonstrate knowledge of the general differences between the permanent and deciduous teeth, by describing, or selecting the correct response from a list, when given one or more differences, or any appropriate implications of these differences.
2. Demonstrate knowledge of the morphology of each surface of the crown and root of all deciduous teeth by:
 - a. describing
 - b. selecting

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- c. or identifying from a diagram or specimen, any of the following features:
 - 1) contours of any surface, or margin of any surface
 - 2) structural entities such as grooves, pits, ridges cusps, fossae, etc.
 - 3) relative dimensions and shapes
 - 4) root numbers, location, and contours
 - 5) any other surface features
3. Describe or select the correct response from a list, the various comparisons between specific deciduous teeth, and their permanent counterparts, where appropriate.
4. Identify from a diagram, specimen or description which deciduous tooth is being described, or illustrated, as to classification, arch, or right or left quadrant.
5. Determine the correct number for a given diagram, description, or specimen using any numbering system previously covered.
6. List or select from a list the eruption dates of deciduous teeth.
7. Discuss the importance and functions of deciduous teeth.

UNIT 12: Development of the Face, Neck and Orofacial Structures

Upon completion of this unit the student should be able to:

1. Define key terms in chapters.
2. Integrate knowledge of the development of the face, neck and orofacial structures into understanding the observed structures and any developmental disturbances of these structures.
3. Discuss the development of the face including time of formation and the embryonic layers involved.
4. Explain the development of the following including formation sequence, time origin and tissues.
 - a. stomodeum and oral cavity
 - b. mandibular arch and lower face
 - c. maxillary process and midface
 - d. front to nasal process and upper face
5. Explain the development of the neck including formation sequence, time, origin and tissue involved.
 - a. primitive pharynx
 - b. bronchial apparatus
6. Describe the development of the palate including sources, fusion, role of tongue development, development of the nasal septum, and abnormalities associated with the fusion of the palate.
7. Describe possible areas of clefts with the fusing of the upper lip.
8. Describe the portions of the tongue and which bronchial arches are involved in its development.
9. State the time fusion of the palate should be complete.
10. Define tuberculum impar and copula.

UNIT 13: Tooth Development and Eruption

Upon completion of this unit the student should be able to:

1. Define key terms in this chapter.
2. Describe the stages of tooth development including the stay, time span, microscopic appearance, main processes involved, and its description.
3. Identify the cell layers of the tooth during the Bell Stage, a description of the layers and its role in tooth formation.
4. Describe the opposition and maturation stages of tooth development including formation of preameloblasts, odontoblasts and dental matrix, ameloblasts, dentinoenamel function and enamel matrix.
5. Explain the process of root development including root dentin, cementum, and pulp formation.
6. Describe the development of the periodontal ligament and alveolar bone development.
7. Explain the differences in root formation for multirooted teeth.
8. Explain the tooth eruption process and the shedding of the primary teeth.
9. Explain the process for permanent tooth eruption.

UNIT 14: Occlusion

Upon completion of this unit the student should be able to:

1. Correlate the relationship between the eruption schedule, growths, and ultimate alignment of the teeth.
2. Describe the affect which muscle forces have on the alignment of the teeth.
3. Define the terms:
 - a. occlusion
 - b. static occlusion
 - c. centric occlusion
 - d. centric relation
 - e. centric relation

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- c. functional occlusion
- f. malocclusion
4. Discuss the rationale for observing a patient's occlusion.
5. Describe and recognize the three types of facial profiles.
6. Describe and recognize the mal-relations of groups of teeth and individual teeth.
7. Describe angle's classification of malocclusion for permanent and deciduous dentitions.
8. Describe and recognize normal (ideal occlusion (canine and molar relationships)).
9. Discuss parafunctional habits, myofunctional and skeletal considerations, and occlusal trauma and their relation to occlusion.

UNIT 15: Orofacial Structures

Upon completion of this unit the student should be able to:

1. Describe the general histological features of oral mucosa.
2. Name the 3 categories of oral mucosa. Describe their characteristics.
3. Describe the 3 types of stratified squamous epithelium.
4. Name the main fiber of the lamina propria.
5. Describe the 2 layers of lamina propria.
6. Define submucosa.
7. Describe the regional differences of the oral mucosa by clinical features and histological features.
8. Describe the 4 types of lingual papillae in clinical appearance and histological features.
9. Name the four tastes and locate areas of the mouth where each taste sensation can be found.
10. Identify and state the functions of Langerhan's cells, Merkel's cells and melanocytes.
11. Discuss the renewal rates for different tissues in the oral cavity and their clinical correlations.

UNIT 16: Gingival and Dentogingival Functional Tissues

Upon completion of this unit the student should be able to:

1. Define key terms in chapters.
2. List and describe each of the types of gingival tissues.
3. Describe the histological features of the different types of gingival tissues.
4. Describe the composition and development of the dentogingival functional tissues.
5. Discuss cell renewal for the tissues of the dentogingival function.

UNIT 17: Enamel

Upon completion of this unit the student should be able to:

1. Define key terms in the chapter.
2. Describe the formation and location and physical characteristics of enamel, including the following:
 - a. hardness
 - b. thickness
 - c. color
 - d. permeability
 - e. solubility
 - f. surface enamel
3. Describe:
 - a. Ameloblasts
 - b. Lines of Retzius
 - c. Tome's processes
 - d. Enamel rods
 - e. Interprismatic region
 - f. Nasmyth's membrane
 - g. Reduced enamel epithelium
4. List the chemical composition of enamel including percentages of each component.
5. Describe perikymata.
6. Describe the microscopic structure of enamel including the rods, rod sheaths, and interrod substance.
7. Describe and give the clinical significance of the following formations in the enamel.
 - a. Neonatal line
 - b. Enamel lamellae
 - c. Enamel tufts
 - d. enamel spindles
 - e. DEJ
 - f. Imbrication lines
8. Discuss the apposition and maturation of enamel.

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UNIT 18: Dentin and Pulp

Upon completion of this unit the student should be able to:

1. Define all terms in the chapter.
2. Discuss the dentin-pulp complex and describe the properties of dentin and pulp.
3. Discuss the apposition and maturation of dentin.
4. Outline the types of dentin.
5. Label the anatomical components of pulp.
6. Discuss the microscopic features of dentin and pulp.
7. Identify the microscopic zones in the pulp and describe the zone.
8. Describe the age changes in pulp and dentin.
9. List and describe the four main functions of the pulp.

Unit 19: Periodontium: Cementum, Alveolar Bone, Periodontal Ligament

Upon completion of this unit the student should be able to:

1. Define all terms in this chapter.
2. Discuss the periodontium and describe the properties of the cementum, alveolar bone, and periodontal ligament
3. Discuss the development of the periodontium.
4. Outline the types of cementum and alveolar bone.
5. Label the fiber groups of the periodontal ligament and discuss their functions.
6. Demonstrate and discuss the microscopic features of cementum, alveolar bone, and periodontal ligament.
7. Describe age changes in the periodontium.

UNIT 20: Temporomandibular Joint

At the end of this unit the student should be able to:

1. Locate and identify the specific, anatomical landmarks of the temporomandibular joint (TMJ) on a diagram, skull, and a patient.
2. Describe the histology of each component of the TMJ.
3. Describe the movements of the TMJ.
4. Integrate the knowledge of the anatomy and histology.

