Oral Pathology
Chapter 17

Learning Objectives
Lesson 17.1: Introduction to Oral Pathologies
1. Pronounce, define, and spell the key terms.
2. Explain why oral pathology is important for the dental assistant.
3. Describe the steps necessary to make a diagnosis.
4. Describe the difference between acute and chronic inflammation, including the classic signs of inflammation.
5. Describe the types of oral lesions.
6. Name three types of diseases of the oral soft tissues.

Introduction
- Oral pathology is the study of diseases in the oral cavity
- Only a dentist or physician may diagnose pathologic (disease) conditions
- Important for the dental assistant to be able to recognize the differences between normal and abnormal conditions that appear in the mouth
Introduction (Cont.)
- Many systemic diseases as well as infectious diseases have oral manifestations (signs and symptoms)
- The dental assistant should also understand how oral abnormalities affect the patient’s general health and planned dental treatment
- Before you can recognize abnormal conditions, you must have a solid understanding of the appearance of the normal oral conditions

Making a Diagnosis
- Historical diagnosis
- Clinical diagnosis
- Radiographic diagnosis
- Microscopic diagnosis
- Laboratory diagnosis
- Therapeutic diagnosis
- Surgical diagnosis
- Differential diagnosis

Historical Diagnosis
- Family histories are important because genetic disorders, such as dentinogenesis imperfecta, may be passed from generation to generation
- Melanin pigmentation of the gingiva is common in dark-skinned individuals
- Medical histories can provide information about medication the patient may be taking that could have an effect on the oral tissues
Dentinogenesis Imperfecta

Melanin Pigmentation

Fissured Tongue
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**Mandibular Tori**


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**Torus Palatinus**


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**Median Rhomboid Glossitis**

Radiographic Diagnosis

- Radiographic images are excellent in providing information about:
  - Periapical pathology
  - Internal resorption
  - Impacted teeth

Periapical Pathology

Internal Resorption
Third Molar Impaction

Angular Cheilitis

Microscopic Diagnosis
- When a suspicious lesion is present, tissue is removed and sent to a pathology laboratory, where it is evaluated microscopically (biopsy)
- This procedure is very often used to make the definitive (final) diagnosis
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Laboratory Diagnosis
- Blood chemistries and other laboratory tests, including urinalysis, can provide information that leads to a diagnosis
- Cultures done in the laboratory can be used to diagnose types of oral infection

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Therapeutic Diagnosis
- Made by providing a treatment (therapy), then seeing how the condition responds

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Surgical Diagnosis
- A diagnosis made on the basis of the findings of a surgical procedure
- Helps distinguish between benign and potentially harmful conditions
Static Bone Cyst

Differential Diagnosis
- When two or more possible causes of a condition are identified, a differential diagnosis must be made

Acute/Chronic Inflammation
- Inflammation is the body’s protective response to irritation or injury
- Inflammation can be acute or chronic
  - Acute inflammation occurs if injury to the tissue is minimal and short-lasting and the tissue begins to repair quickly
  - Chronic inflammation occurs when injury or irritation to the tissue continues
Oral Lesions

Lesion is a broad term for abnormal tissues in the oral cavity.

- Can be a wound, a sore, or any other tissue damage caused by injury or disease.
- Classified as to whether they:
  - Extend below or extend above the mucosal surface
  - Lie flat or even with the mucosal surface

Lesions Extending Below Mucosal Surface

- Ulcer
  - A defect or break in continuity of the mucosa that results in a punched-out area similar to a crater
- Erosion of the soft tissue
  - A shallow defect in the mucosa caused by mechanical trauma
- Abscess
  - A localized collection of pus in a circumscribed area
- Cyst
  - A closed sac or pouch that is lined with epithelium and contains fluid or semisolid material

Lesions Extending Above Mucosal Surface

- Blisters
  - Also known as vesicles; filled with a watery fluid
- Pustule
  - Similar in appearance to a blister but containing pus
- Hematoma
  - Also similar to a blister but containing blood
- Plaque
  - Any patch or flat area that is slightly raised from the surface
Lesions Even with Mucosal Surface

- Lie flat or even with the surface of the oral mucosa and are well-defined areas of discoloration
- An ecchymosis, which is the medical term for bruising, is an example of this type of lesion

Raised or Flat Lesions

- Nodules, which may appear below the surface or may be slightly elevated, are small, round, solid lesions
  - When palpated, a nodule feels like a pea beneath the surface
- Granuloma, in dentistry, is often used to describe a nodule that contains granulation tissue
- Tumors are also known as neoplasms
  - A tumor may be benign or malignant

Diseases of the Oral Soft Tissues

- Leukoplakia
  - Means white patch
  - Lesions vary in appearance and texture from a fine white transparency to a heavy, thick, warty plaque
  - Cause is unknown, but leukoplakia is commonly linked to chronic irritation or trauma
  - Very often precedes the development of a malignant tumor
Leukoplakia


Lichen Planus

- This benign, chronic disease affects the skin and oral mucosa.
- Many factors have been implicated in lichen planus; however, the cause remains unknown.
- The patchy white lesions on the oral mucosa have a characteristic pattern of circles and interconnecting lines called Wickham striae.

Lichen Planus (Cont.)
Candidiasis

- A superficial infection caused by the yeastlike fungus Candida albicans
- Occurs under conditions such as antibiotic therapy, diabetes, xerostomia (dry mouth), and weakened immunologic reactions
- Can be the initial clinical manifestation for patients with acquired immunodeficiency syndrome (AIDS)
- Diaper rash, vaginitis, and thrush are other common types of candidiasis

Types of Candidiasis

- Pseudomembranous candidiasis; also called thrush
  - Creamy white plaques form in the mouth
- Hyperplastic candidiasis
  - Appears as a white plaque that cannot be removed by scraping
- Atrophic candidiasis
  - Smooth red patches may appear on the dorsal areas of the tongue and palate

Pseudomembranous Candidiasis
Chronic Hyperplastic Candidiasis


Aphthous Ulcers
- Also known as aphthous stomatitis or canker sores
- Recurrent aphthous ulcers (RAU) is a disease that causes recurring outbreaks of blister-like sores inside the mouth and on the lips
  - Minor RAU: Episodes occur fewer than six times a year; lesions usually heal within 7 to 10 days
  - Major RAU: This form involves outbreaks of larger, deeper ulcers that take longer to heal

Minor Aphthous Ulcer

Cellulitis
- Inflammation spreads through the soft tissue or organ.
- Swelling develops rapidly, accompanied by a high fever.
- The skin becomes very red, and there is severe throbbing pain as the inflammation localizes.
- Cellulitis associated with oral infections is potentially dangerous because it can travel quickly to sensitive tissues such as the eye or brain.

Cellulitis (Cont.)

Learning Objectives
Lesson 17.2: Tongue Conditions, Oral Cancers, and HIV/AIDS
- Describe three conditions associated with the tongue.
- Discuss oral cancer, including the following:
  - Describe the warning symptoms of oral cancer.
  - Describe leukemia.
  - Describe the appearance of lesions associated with the use of smokeless tobacco.
  - Name three types of therapy for oral cancer.
- Discuss HIV/AIDS and its oral manifestations, including five lesions that are associated with HIV/AIDS.
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Glossitis

- General term used to describe inflammation and changes in the topography of the tongue

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Black Hairy Tongue

- May be caused by an imbalance of oral flora after the administration of antibiotics
- The filiform papillae are so greatly elongated that they resemble hairs
- These elongated papillae become stained by food and tobacco, hence the name

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Black Hairy Tongue (Cont.)
Geographic Tongue

- Tongue exhibits multiple areas of desquamation (loss) of the filiform papillae in several irregularly shaped but well-demarcated areas
- The smooth areas resemble a map, hence the name
- Over a period of days or weeks, the smooth areas and the whitish margins seem to migrate across the surface of the tongue by healing on one border and extending on another

Geographic Tongue (Cont.)


Fissured Tongue

- Fissured tongue is a variant of normal; its cause is unknown
- Theories about its cause include vitamin deficiency and chronic trauma over a long period
- The dorsal surface (top) of the tongue is marked by having deep fissures or grooves, which become irritated if food debris collects in them
- Patient with a fissured tongue is advised to brush the tongue gently with a soft toothbrush to keep the fissures clean of debris and irritants
Fissured Tongue (Cont.)

Pernicious Anemia
- A condition in which the body does not absorb vitamin B₁₂.
- People with this condition show signs of anemia, weakness, pallor, and fatigue on exertion.
- Other signs include nausea, diarrhea, abdominal pain, and loss of appetite.
- Oral manifestations of pernicious anemia include angular cheilitis (ulceration and redness at the corners of the lips), mucosal ulceration, loss of papillae on the tongue, and a painful burning sensation of the tongue.

Oral Cancer
- One of the 10 most common cancers in the world.
- The incidence, as well as the site, of the cancer varies greatly from country to country.
- Most oral cancers do not cause pain in the early stages, and the thorough dentist is most likely to be the first to detect them.
- These cancers are fatal if not detected early enough or if left untreated.
Squamous Cell Carcinoma

Types of Oral Cancer

- Carcinoma: A malignant neoplasm (growth) of the epithelium (tissue lining the mouth)
- Adenocarcinoma: A malignant tumor that arises from the submucous glands underlying the oral mucosa
- Sarcoma: A malignant neoplasm arising from supportive and connective tissue
- Osteosarcoma: A malignant tumor involving the bone
  - In the mouth, the affected bones are the bones of the jaws

Destruction of Mandible by Squamous Cell Carcinoma
Leukemia

- A cancer of the blood-forming organs
- Characterized by rapid growth of immature white blood cells
- Oral symptoms of leukemia may be some of the first indications of the disease
- Symptoms in the gingival tissues include hemorrhage, ulceration, enlargement, spongy texture, and magenta coloration of the gingiva
- Enlargement of lymph nodes, symptoms of anemia, and general bleeding tendencies are typical

Leukemia (Cont.)


Smokeless Tobacco

- Chewing tobacco or snuff presents a serious health hazard
- It is a major concern because of the high rates of precancerous leukoplakia and oral cancer among users of smokeless tobacco
- Cancers of the pharynx, larynx, and esophagus occur 400 to 500 times more frequently in users of smokeless tobacco
- Also linked to an increased incidence of tooth loss from periodontal disease
Tobacco Chewer’s Lesion


Therapy for Oral Cancer

- Oral cancers are treated with surgery, radiation therapy, or chemotherapy
- Often, a combination of these three is used

Dental Implications of Radiation Therapy

- Xerostomia
  - Lack of adequate saliva and the reduced blood supply can cause oral infections, delay healing, and make it very difficult to wear dentures
- Radiation caries
  - Caused by the lack of saliva, radiation caries usually appears first in the cervical areas of the teeth
  - The teeth also may become extremely sensitive to hot and cold stimuli
- Osteoradionecrosis
  - Bone may be subject to necrosis (death) after radiation treatment
Postradiation Effects

Dental Implications of Chemotherapy
- Chemotherapeutic agents are powerful drugs that destroy or deactivate rapidly dividing cancer cells
- Significant adverse effects of these drugs frequently involve the oral tissues

HIV and AIDS
- Oral lesions are prominent features of acquired immunodeficiency syndrome (AIDS) and human immunodeficiency virus (HIV) infection
- Oral lesions develop because of the breakdown of the immune system that occurs when the T-helper cells become depleted as a result of the disease
Acquired Immunodeficiency Syndrome

- Because the patient’s immune system is severely damaged, death is usually caused by an opportunistic infection
- Opportunistic infection: One that normally would be controlled by the immune system but cannot be controlled because the immune system is not functioning properly
- Some of the lesions that look like HIV- and AIDS-related infection may also be caused by other disorders

HIV Gingivitis

- There is often a bright red line along the border of the free gingival margin
- Also known as atypical gingivitis (ATYP)
- In some cases, there may be progression of the bright red line from the free gingival margin over the attached gingival and alveolar mucosa

HIV Periodontitis

- Resembles acute necrotizing ulcerative gingivitis superimposed on rapidly progressive periodontitis
- Other symptoms include:
  - Interproximal necrosis and cratering
  - Marked swelling
  - Intense erythema over the free and attached gingiva
  - Intense pain
  - Spontaneous bleeding and bad breath
Atypical Periodontal Disease

HIV Cervical Lymphadenopathy
- Enlargement of the cervical (neck) nodes
- Lymphadenopathy is frequently seen in association with AIDS

Lymphadenopathy
Candidiasis

- Candidiasis is often the initial oral sign of progression from HIV-positive status to AIDS
- In a patient with a compromised immune system, candidiasis can be a very debilitating and serious disorder

HIV Lymphoma

- Lymphoma is the general term used to describe malignant disorders of the lymphoid tissue
- In the immunocompromised individual, it may occur as a solitary lump or nodule, a swelling, or a nonhealing ulcer that occurs anywhere in the oral cavity
- The swelling may be ulcerated or may be covered with intact, normal-appearing mucosa
- Usually painful, the lesion grows rapidly and may be the first evidence of lymphoma

Intraoral Lymphoma

- Intraoral lymphoma refers to the occurrence of lymphoma within the oral cavity.
Hairy Leukoplakia

- Can be an important early manifestation of AIDS status
- A filamentous white plaque usually found unilaterally or bilaterally on the lateral borders (sides) on the anterior portion of the tongue
- May spread to cover the entire dorsal surface of the tongue
- Can also appear on the buccal mucosa, where it generally has a flat appearance

Hairy Leukoplakia (Cont.)


Kaposi Sarcoma

- One of the opportunistic infections that occurs in patients with HIV infection
- Lesions may appear as multiple bluish, blackish, or reddish blotches that are usually flat in the early stages
- Kaposi sarcoma is one of the intraoral lesions that is used to diagnose AIDS
Kaposi Sarcoma (Cont.)


Herpes Simplex

- Herpes simplex lesions usually occur on the lip
- In immunocompromised patients, the lesions may occur throughout the mouth
- An ulcer caused by the herpes virus that persists for longer than 1 month may be an indicator of AIDS
- Patients who do not have HIV or AIDS may also suffer from herpes

Herpes Simplex Ulceration
Herpes Zoster

- In the immunocompromised patient, the latent herpes zoster virus, also known as shingles, may cause intraoral manifestations in the form of blisters
- These blisters break and form ulcers
- The lesions are very painful

Human Papillomavirus

- Human papillomavirus appears most commonly in immunocompromised individuals
- Diagnosis is made on the basis of history, clinical appearance, and biopsy findings
- Lesions are a common finding in patients with early HIV infection
- These warts appear spiky, and some have a raised, cauliflower-like appearance

Papillary Lesion

Learning Objectives
Lesson 17.3: Developmental and Other Disorders

10. Recognize developmental disorders of the jaws and dentition, including the following:
   • List and define three anomalies that affect jaw development.
   • List and define an anomaly that affects lip, palate, and tongue development.
   • List and define three anomalies that affect the number of teeth.
   • List and define five anomalies related to the shape of the teeth.
   • Explain the conditions associated with abnormal eruption of the teeth.

11. Discuss other types of disorders that can occur, including the following:
   • Identify two oral conditions related to nutritional factors.
   • Describe bruxism.
   • Describe the oral conditions of a patient with bulimia.
   • Describe the dental complications of oral piercings.
   • Identify the oral effects of methamphetamine use.

Developmental Disorders

• Can result when there is a disturbance of the cells during the period when the cells divide
• The result is usually a deformity of part of the body
Types of Developmental Disorders
- Inherited disorders are different from developmental disorders because they are caused by an abnormal gene
  - A congenital disorder is one that is present at birth
  - Either inherited or developmental; however, exact cause of most congenital abnormalities is unknown
- Genetic factors
  - Malformations that are often the result of genetic factors such as chromosomal abnormalities
- Environmental factors
  - Called teratogens; include infections, drugs, and exposure to radiation

Disturbances in Jaw Development
- Macrognathia
- Micrognathia
- Exostoses
  - A benign bony growth projecting outward from the surface of a bone
- Torus palatinus
  - A bony overgrowth at the midline of the hard palate
- Torus mandibularis
  - A bony overgrowth on the lingual surface of the mandible

Disturbances in Lip, Palate, and Tongue Development
- Cleft lip
  - Results when maxillary and medial nasal processes fail to fuse
- Cleft palate
  - Results when palatal shelves fail to fuse with primary palate
  - Cleft palate, with or without cleft lip, occurs in 1 per 2500 live births
- Cleft uvula
  - The mildest form of cleft palate
- Ankyloglossia
  - Often called tongue-tie; results in a short lingual frenum that extends to the apex of the tongue
Bilateral Complete Cleft Lip and Palate

Ankyloglossia

Disturbances in Tooth Development and Eruption

- Ameloblastoma
  - A tumor composed of remnants of the dental lamina
- Anodontia
  - Congenital absence of teeth
- Supernumerary teeth
  - Teeth in excess of the normal number
- Macroodontia and microdontia
  - Abnormally large or small teeth
- Dens in dente (tooth within a tooth)
  - Formation of a small toothlike mass within the pulp
Disturbances in Tooth Development and Eruption (Cont.)

- Most common variations are peg-shaped teeth
- Hutchinson incisors are a variety of peg-shaped teeth, usually associated with maternal syphilis
- Fusion is the joining of the dentin and enamel of two or more separate developing teeth
- Gemination is an attempt by the tooth bud to divide; an unsuccessful attempt is indicated by an incisal notch

Partial Anodontia


Unerupted Supernumerary Teeth

Courtesy Dr. George Blozis.
Disturbances in Enamel Formation

- Amelogenesis imperfecta is a hereditary abnormality in which there are hypoplasia-type defects in the enamel formation
- Hypocalcification is the incomplete calcification or hardening of the enamel
- Hereditary enamel hypoplasia is a type of amelogenesis imperfecta that is characterized by teeth with crowns that are hard and glossy, yellow, and cone-shaped or cylindrical

Enamel Loss


Disturbances in Dentin Formation

- Dentinogenesis imperfecta is a hereditary condition that affects the formation of dentin
- Teeth that have dentinogenesis imperfecta are opalescent and have an almost amber color
- The enamel tends to chip away from the dentin, and the weakened teeth become worn down
Abnormal Eruption of the Teeth

- Premature eruption
  - In premature eruption, teeth are present at birth (natal teeth).
  - Neonatal teeth are those that erupt within the first 30 days of life.
- Ankylosis
  - In deciduous teeth affected by ankylosis, bone has fused to cementum and dentin, preventing exfoliation.
- Impaction
  - Occurs when any tooth remains unerupted in the jaw beyond the time at which it should normally erupt.

Ankylosis


Impactions in Mixed Dentition
Miscellaneous Disorders

- **Abrasion**
  - Abnormal wearing away of tooth structure caused by a repetitive mechanical habit such as improper toothbrushing

- **Attrition**
  - Normal wearing away of tooth structure during mastication (chewing)

- **Bruxism**
  - Oral habit consisting of involuntary gnashing, grinding, and clenching of the teeth in movements other than chewing
  - Usually occurs during sleep and is commonly associated with stress or tension

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**Abrasion**


**Attrition**

Courtesy Margaret J. Fehrenbach, RDH, MS.
Attrition (Cont.)


Additional Disorders

- Bulimia: Eating disorder characterized by food binges followed by self-induced vomiting
  - The dental professional is often the first healthcare professional to identify a patient with bulimia
- Orofacial piercings
  - Have become popular among some segments of the population
  - Dental complications include chipped and broken teeth and serious infections at the sites of piercings
  - Infection can spread throughout the head and neck area, with serious results

Meth Mouth

- The oral effects of methamphetamine use, which are devastating, are referred to as meth mouth
- Drug-related xerostomia (dry mouth), poor oral hygiene, frequent consumption of highly sugared soft drinks, and clenching and grinding of the teeth all contribute to rampant caries
Meth Mouth (Cont.)

Questions?