Lecture 7

Tumor-like Lesions and Tumors of Oral Cavity and Jaws

Mushfig Orujov, MD, PhD

mushfig.orujov@amu.edu.az
Plan of the Lecture

- **Odontogenic jaw cysts:**
  - Radicular cyst
  - Keratocyst
  - Follicular Cyst
- **Tumor-like formations (lesions) of jaw bones:**
  - Fibrous Dysplasia
  - Cherubism
  - Eosinophilic Granuloma
- **Odontogenic tumors of epithelial origin of the jaw bones:**
  - Ameloblastoma
  - Adenomatoid odontogenic tumor
  - Odontogenic carcinomas
- **Odontogenic tumors of mesenchymal origin:**
  - Dentinoma
  - Myxoma
  - Cementoma
- **Mixed Odontogenic Tumors:**
  - Ameloblastic fibroma
  - Odontogenic fibroma
  - Odontoameloblastoma
  - Ameloblastic fibro-odontoma
- **Non-odontogenic tumors of jaw bones**
  - Giant cell tumor of the jaw
Plan of the Lecture (cont...)

• Parodontomas (Periodontomas):
  – Epulis
  – Gingival fibromatosis

• Premalignant lesions of oral cavity:
  – Leukoplakia

• Premalignant conditions of oral cavity:
  – Lichen planus

• Epithelial tumors of the salivary glands:
  – Pleomorphic adenoma
  – Monomorphic adenoma
  – Mucoepidermoid carcinoma
  – Adenoid cystic carcinoma
Jaw Cysts

• Jaw cysts of the bones are the most common diseases and occupy the first place in all tumor and tumor-like formations of the jaws

• Cysts, which are found in all age groups, develop most often in the upper jaw

• The cyst is the oval-shaped cavity with the liquid content in different concentrations and colors and surrounded by the capsule
Jaw cysts

• The contents of the cyst are usually synthesized by epithelial cells that cover its wall from the inside.

• As this content gradually increases, the cyst also grows and pushes the surrounding soft tissues, the epithelium undergoes proliferation.

• Occasionally, cysts grow, compress not only the soft tissues around them but even the bone tissue, which can also cause jawbone destruction in this area and the cortical layer of bone becomes thinner.
Jaw Cysts

• According to the origin, jaw cysts are divided into 2 groups:
  1) Odontogenic cysts
  2) Non-odontogenic cysts

• Non-odontogenic cysts are also found in all other bones and are not only characteristic for jawbones

• *For example*, the cyst of the nasopalatine canal, lateral periodontal cyst of the upper jaw, the nasolabial cyst
Odontogenic Jaw Cysts

• Odontogenic cysts are characteristic only for the jawbones
• They are divided into 2 groups due to etiopathogenesis and histogenesis:
  1. **Inflammatory cysts**
     • These cysts develop as a result of chronic inflammation of the surrounding periapical tissues of the tooth root
     • This is called a **radicular cyst**
  2. **Dysontogenetic cysts**
     • These occur as a result of embryonic developmental defects of the odontogenic epithelium
     • *For example*, keratocyst, follicular cyst, gum cyst, etc
Radicular cyst (*Latin*: radix - “root")

- Most common of all odontogenic cysts of the jaw bones and forms most of them
- Develops very slowly, with a diameter from 0.5 cm to 3 cm
- Take their etiopathogenetic origin from the compound granuloma (*epithelial granuloma*), a type of chronic granulomatous periodontitis
- Compound granulomas are covered by a fibrous capsule
Radicular cyst

- The inner surface of the fibrous capsule is covered with the non-stratified squamous epithelium – an epithelium of Malassez rests of embryonic odontogenic origin
- These complex granulomas gradually turn into cystogranulomas, which, after they grow and develop, become radical cysts
- For this reason, radicular cysts develop most often in the upper jaw, especially in the molar and premolars area, as in chronic granulomatous periodontitis
- Fibrous tissue on the wall of the cyst is usually infiltrated with lympho-leukocytic elements
- In the period of exacerbation of chronic periodontitis, the epithelium covering the inner surface of the capsule also undergoes hyperplasia, and in the form of processes, penetrates into this fibrous tissue
- In the stage of exacerbation of chronic inflammation, the contents of the cyst can also suppurate
Radicular Cyst

https://www.slideshare.net/rajchaitanya/odontogenic-tumors200202slides
Keratocyst

- This is also called an initial odontogenic cyst
- Most often they are localized in the angle of the lower jaw, on the level of the molars, at the site of the not developed teeth
- The wall of keratocyst is formed by the squamous stratified epithelium (with signs of parakeratosis) from inside and by a capsule formed by fibrous tissue from the outside
- The cyst can also consist of several cameras
- In some patients, multiple keratocysts may also be present in combination with other congenital developmental defects (polycystosis)
- Keratocysts usually grow slowly, accompanied by a latent course
- It causes the deformation of the jawbone
- In palpation, minor and painless swelling in that area of the jawbone is noted
- Keratocysts tend to recurrence
Odontogenic Keratocyst

https://www.slideshare.net/rajchaitanya/odontogenic-tumors200202slides
Odontogenic Keratocyst

https://www.slideshare.net/rajchaitanya/odontogenic-tumors200202slides
Follicular (Dentigerous) Cyst

- The follicular cyst develops from the enamel organ of the tooth or not erupted teeth
- Inside the cyst, there may be one or more rudimentary or mature teeth, in addition to the yellow transparent cystic content
- The follicular cyst develops most often from the third molar tooth of the lower jaw, and the third molar and canine teeth of the upper jaw
- The capsule of the cyst is covered by a thin fibrous tissue from the outside, and the squamous stratified epithelium from the inside
- The epithelium is sometimes also able to keratinized
Follicular Cyst

https://www.slideshare.net/rajchaitanya/odontogenic-tumors200202slides
Tumor-like formation (lesions) of jaw bones
Fibrous dysplasia (fibrous osteodysplasia or Liechtenstein disease)

• Fibrous dysplasia is a benign tumor-like lesion characterized by local disruption of the process of osteogenesis, replacement of bone tissue with fibrous tissue and deformation of bones, not forming capsules around them

• More common in all age groups, especially in children, and in women

• Has a slow course, it has been developing for many years

• There are 2 types of fibrous dysplasia due to its spread in the body:

  1) Monostotic fibrous dysplasia

  2) Polyostotic (multiple bone lesions) fibrous dysplasia
Fibrous dysplasia

1. **Local monostotic fibrous dysplasia** is more common, the process of which is localized only in one bone
   - Can occur in all age groups
   - Most often it occurs in the ribs, tubular bones, in the scapula, in the skull bones, in the jawbones, especially in the upper jaw

2. **Polyostotic fibrous dysplasia** is a common, usually develops in one half of the body and involves more than half of the skeletal bones
   - Begins mainly in childhood, with diffuse deformation of the skeleton
   - Often accompanied by numerous pathological fractures
Fibrous dysplasia

Monostotic

Polyostotic

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4750256/
Fibrous dysplasia

• *Microscopic examination:* diffuse and chaotically bundles of collagen fibers (fibrotic tissue), fibroblasts, primitive and fully calcined bone trabeculae appear

• Solid tissue elements of the cement-like structure are also formed in the place of primitive bone specimens in the pathology space

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4750256/
Cherubism

• Cherubism is a family (hereditary autosomal-dominant) multicentric cystosis of the jawbones, usually develops in childhood

• Pathology occurs mainly symmetrically at both angles and branches of the lower jaw, and sometimes in the lateral parts of the upper jaw

• In this regard, the face of patients gradually acquires an oval shape and becomes the face of cherubim ("cherubim" - a rounded face angel in religious literature)

• And at the puberty period, the activity of the process is weakened

• Sometimes there is complete recovery and the face of children takes its normal shape
Cherubism


https://thegraphicsfairy.com/victorian-graphic-lovely-cherub-angel/
Cherubism

• In the interstitial areas of the jaw bones, a large amount of connective tissue, rich with mesenchymal cellular elements and vessels, as well as with multicellular giant cells and oxyphilic substances is formed

• As a result, the bone trabeculae are resorbed, and in the newly formed connective tissue between them, first primitive bone trabeculae, gradually forming into mature trabeculae are formed

• In the active period of the disease, small hemorrhagic foci are also noted at the site of the injury

• Some groups of scientists consider that, cherubism a special form of fibrous dysplasia - **familial fibrous dysplasia**
Cherubism

Fig. 6. Multinucleated giant cells are scattered in vascular fibrous stroma. Osteoid and newly formed bone matrix are visible (hematoxylin and eosin stain, original magnification, ×20).

Eosinophilic granuloma

- Eosinophilic granuloma (EG) is a rare, benign tumor-like disorder characterized by clonal proliferation of antigen-presenting mononuclear cells of dendritic origin known as Langerhans cells.
- It is the most common variant of Langerhans-cell histiocytosis.
- EC develops in all bones including the jawbone of children, young and middle-aged people.
- Usually occurs in young and middle age, especially in individuals of the male sexes.
- It has 2 clinical forms, depending on the degree of spread: local and diffuse.
- Both of these forms form the sequential stages of the disease.
Eosinophilic granuloma

• Local eosinophilic granuloma is rare
• The process of destruction is developed on the body of the jawbone in the form of one or several small limited foci of dirty-gray color and soft consistency
• The local form gradually passes into a diffuse
• Diffuse eosinophil granuloma is characterized by damage to the entire jawbone, including alveolar bony septa
• The process progresses gradually (within 1-3 years) and spreads to the teeth, oral cavity organs, mucous membranes, and other surrounding tissues
• Microscopically, a large amount of histiocytic large cell proliferation and accumulation of eosinophilic leukocytes appear
Eosinophic granuloma of the jaw bone

https://commons.wikimedia.org/wiki/File:Eosinophic_granuloma_(1)_jaw_bone.jpg
Tumors of the Jaw Bones

- Odontogenic tumors
- Non-odontogenic tumors
Odontogenic Tumors

- Epithelial
- Mixed
- Mesodermal
Ameloblastoma

- **Ameloblastoma (epithelial odontoma)** is a benign tumor developed from ameloblasts that form tooth enamel.
- Usually found in young and middle-aged individuals, most often in the lower jaw, at the angle and branch of the jaw, at the level of the premolar and molar teeth.
- Most common tumor among all odontogenic tumors.
- Although ameloblastoma is benign, it has a local destructiveness because it grows invasive.
- Therefore, having developed, it is able to pass to nearby tissues, for example, to the base of the skull and can recur after surgical removal.
- Occasionally, it can also transform into **malignant ameloblastoma**.
- Develops very slowly and is not accompanied by any clinical signs for a long time.
Ameloblastoma

• According to the macroscopic appearance, ameloblastoma has 2 clinical-morphological types:

1) Multicystic ameloblastoma

2) Solid ameloblastoma

• **Multicystic ameloblastoma** is more common

• Tumor tissue is composed of multiple cystic cavities in the form of small cellulae with well-defined contours (radiographically it is called as “*soap bubble-like*” appearance)

• These cysts, separated from each other by bony septa, are the foci of destructions of bone tissue

• In **solid ameloblastoma**, a small granular tumor tissue, with relatively solid consistency and a whitish or grayish-pink color, appears
Histological types of ameloblastoma

1. Follicular ameloblastoma
2. Plexiform ameloblastoma
3. Acanthomatous ameloblastoma
4. Basal-cell ameloblastoma
5. Granular cell ameloblastoma
Ameloblastoma

1. **Follicular ameloblastoma** is very common and is considered a typical form
   - Tumor tissue is formed by tissue complex in the form of oval-shaped islets
   - The peripheral part of these complexes is made of the odontogenic cylindrical epithelium, the central part is composed of stellate, polygonal and other cells assemblies that form a rete (reticulation) and are filled with fluid

2. **Plexiform ameloblastoma** is also very common
   - At this time, cylindrical or cubic epithelial cells in the peripheral part form strands with irregular contours and multiple protrusions
   - These strands cross each other in the form of a network (rete)
Ameloblastoma

3. **Acanthomatous ameloblastoma**: keratin is also synthesized by epithelial cells in islets formed by tumor cells and "keratin pearls" are formed

4. **Basal cell ameloblastoma**: the cellular complex resembles the basal cell carcinoma of the skin

5. **Granular cell ameloblastoma**: large oxyphilic granules appear in the cytoplasm of epithelial cells that form the central parts of the complex in tumor tissue
Ameloblastoma

https://www.slideshare.net/rajchaitanya/odontogenic-tumors200202slides
Adenomatoid odontogenic tumor (Adenoameloblastoma)

• Usually develops at the age of 10-20 years, at the level of the incisor and canine teeth of the upper jaw
• It is formed in the place of the unerupted teeth, there are also remnants of calcined solid tissues of the tooth in the form of rudiments inside the tumor tissue
• The adenomatoid tumor develops from the odontogenic epithelium, previously it was considered as a type of ameloblastoma
• Tumor tissue is made up of glandular structures and ducts formed by cuboidal epithelium as in adenomas
• Inside these glandular structures, there is a mass similar to the dentin, and between them, there is a partially hyalinized connective tissue (stroma of tumor tissue)
Adenomatoid odontogenic tumor

https://www.archivesofpathology.org/action/showFullPopup?id=i1543-2165-127-3-e173-f01&doi=10.1043%2F0003-9985%282003%29127%3Ce173%3APQCAYM%3E2.0.CO%3B2
Odontogenic carcinomas

- **Odontogenic carcinomas** are tumors of epithelial origin of the jaw bones.
- There are 2 types of odontogenic carcinomas:
  1. Malignant ameloblastoma
  2. Primary intraosseus carcinoma
- The **malignant ameloblastoma** takes its histogenetic origin from ameloblastic cells of epithelial origin.
- Usually develops as a result of malignization of benign ameloblastoma.
- Its histological structure is similar to the benign follicular ameloblastoma, but unlike it, there are atypia and pleomorphism.
- It grows by destroying bone tissue, giving metastases to the bones of cranial base, and regional lymph nodes.
Histological findings of Malignant ameloblastoma

The locally recurrent tumor showed a solid/multicystic-type ameloblastoma. The tumor nests consisted of stellate cells with peripheral palisading. The stroma is fibrous. HE × 40.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4513681/figure/Fig2/
Primary intraosseous carcinoma (PIC)

• Very rare tumor
• Begins in the periodontal slit from the odontogenic epithelial remains left from the embryonic period – Malassez rests
• Therefore, it reminds epidermal cancers according to its microscopic structure
• PIC can also take its origin from dysontogenetic cysts of the jaw bones (keratocyst, follicular cyst, etc)
• *Microscopically*, the main difference of PIC from malignant ameloblastoma is that there are no follicular structures in the tumor tissue (there are islets of tissue complex in the benign follicular ameloblastoma)
Histological findings of Primary intraosseous carcinoma

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3125063/
Odontogenic tumors of mesenchymal origin

• Take their origin from the mesenchymal tissues of the tooth - odontoblasts that form dentin, cement-forming cementocytes, cells of fibrous tissues, etc

• Odontogenic tumors of the mesenchymal origin of the jaw bones are the dentinomas, myxomas, and cementomas

• **Dentinoma** is a very rare benign tumor

• *Microscopically*, strands of undifferentiated (dysplastic) dentin tissue, immature connective tissue, and odontogenic epithelium appear
Myxoma (Myxofibroma)

- Usually develops in 10-30 years, most often in the lower jaw
- Closely related to odontogenic fibroma according to its histogenesis
- Consists of a soft grayish or yellowish-white mucous tissue
- It does not have clear boundaries and capsule, it grows locally invasive
- Therefore, it always gives a recidive, it is able to destruct bone tissue and pass to soft tissues
- **Microscopically**, stellate cells anastomosed with cytoplasmic processes, odontogenic epithelial islets, mucus-like stroma, small amount of fibrous structures appear
- In the X-ray, a sign of “soap bubble-like” appears, because of the small cellular structure separated from each other by bone fragments
Odontogenic Maxillary Myxoma

a - The whitish glistening tumor mass fills a bony cavity with minimal true encapsulation.
b - Histologically, odontogenic myxoma is characterized by proliferation of spindled and stellate cells in a mucoid-rich matrix (H&E, ×100).

https://www.archivesofpathology.org/action/showFullPopup?id=i1543-2165-130-12-1799-f04&doi=10.1043%2F1543-2165%282006%29130%5B1799%3AOMACSO%5D2.0.CO%3B2
Cementoma

- Cementoma is a large group of odontogenic benign tumors
- The main characteristic morphological sign of these tumors is the deposition of mineralized cement-like substance in the tumor tissue
- All cementomas develop from odontogenic connective tissue at the root of one or more teeth at the age of 10-20 years, most often in the lower jaw at the level of premolars and incisors
- They grow slowly, often give a recurrence
- Macroscopically, small mineralized areas with varying degrees of hardness (cement-like substance) are also found in tumor tissue
Histopathology of Cementoma

- Depending on its microscopic characteristics, the following types of cementomas are distinguished:
  - Cementoblastoma (true cementoma)
  - Cementifying fibroma (familiar multiple cementomas)
  - Periapical cemental dysplasia (periapical fibrous dysplasia)
- Among them is a relatively common benign cementoblastoma
- It is characterized by the uneven deposition of a cement-like substance in various mineralization stages
- Tumor tissue has a yellowish-white color, a variety of consistency, small size and oval shape, clear contours, and is covered with a capsule.
- Usually it develops the lower jaw at the root of premolars or molars, firmly attached to the tooth, and when the tooth is extracted, the root is broken
- It does not give a recurrence after removing
Mixed Odontogenic Tumors

- Ameloblastic fibroma
- Odontogenic fibroma
- Odontoameloblastoma
- Ameloblastic fibro-odontoma
Ameloblastic fibroma

• More common in children and adolescents
• Usually located in the lower jaw, at the level of the premolar and molar teeth
• Tumor tissue is soft, elastic, grayish-white, with a clear boundary and in the form of a destructive foci in the X-ray
• *Microscopically*: proliferated odontogenic epithelial islets of different sizes and mesodermal tissue, resembling fetal teeth papilla, i.e. loose connective tissue with abundant cells
• The ameloblastic fibroma is tend to recurrence and malignization
• It can be malignizated to transform into *ameloblastic fibrosarcoma*
• At this time, the stroma of tumor tissue consists of low-differentiated fibrosarcoma
Ameloblastic fibroma

Odontogenic islands within immature mesenchymal stroma, 5x

http://www.pathologyoutlines.com/topic/mandiblemaxillaameloblasticfibroma.html
Odontomas

- Formed as a result of a congenital developmental defect of teeth (disontogenetic origin)
- They are also included in the group of hamartomas
- They have small sizes and a weak growth rate
- Usually occur during the formation of permanent teeth in children
- Most often are observed at the level of molar teeth of the upper jaw
- There are no teeth in this area
- These non-erupted teeth are located in the odontoma in the form of weak or tightly attached dental derivatives
- Odontomas are covered by the thick fibrous capsule
Odontomas

- Depending on the microscopic features, odontomas are divided into two groups:
  1) Simple odontomas
  2) Complex odontomas

- **Simple odontoma** is formed by the tissues of one tooth (in different proportions), has a solid consistency

- **Complex odontomas** are conditionally divided into two types:
  1) Compound mixed odontoma
  2) Compound-complex odontoma
Compound mixed odontoma

• Consists of an irregular mixture of several tooth tissues
• Consists of several (and sometimes even dozens) deformed and attached separate small teeth or dental-like derivatives
• Nevertheless, complex mixtures and compound odontomas are sometimes very difficult to differentiate from each other
Odontoma

https://www.slideshare.net/rajchaitanya/odontogenic-tumors200202slides
Non-odontogenic tumors of jaw bones

• Non-odontogenic tumors of the jaw bones are not specific localized organ-specific tumors

• They are described as benign and malignant tumors, as in all other bones

• One of the most common of these tumors is a giant cell tumor (osteoclastoma or osteoblastoclastoma)

• Accounts for about 30% of all oncological diseases of the jaw bones

• Giant cell tumor is benign and found in some skeletal bones (in the lower jaw bone, distal parts of the femur and radius, etc.)

• More common in young (15-30 years) women, especially in the lower jaw at the level of molars

• Develops inside of the jawbone
Giant cell tumor of the jaw

• At first, no clinical signs are observed, it grows very slowly, it is painless
• After a certain period of time, swelling begins in that area, the face is deformed and teeth become loose
• Depending on the X-ray picture, 3 types of non-odontogenic tumors are distinguished:
  1) Juvenile type (such as ameloblastoma)
  2) Cystic type
  3) Destructive type (such as osteosarcoma)
Giant cell tumor of the jaw

- There are 2 types of cells in the parenchyma of tumor tissue - a large amount of small **mononuclear cells** of osteoblast type and between them equally scattered osteoclast-type **multinuclear cells**
- There are bone trabeculae among the small cells of the osteoblast type in some places
- Stroma of the tumor consists of connective tissue rich with the hyperemic vessels
- Collagen fibers and inflammatory cell response in the tumor stroma are also noted
- Due to small foci of hemorrhage, which often occurs in the central parts of the tumor tissue, rust-colored hemosiderosis foci are formed, and therefore, earlier this tumor was called a "gray tumor"
Parodontomas (Periodontomas)

- Parodontomas are tumor-like lesions and true tumors that develop from periodontal tissues
- Tumor-like lesions of the periodontium are more common than its true tumors
- Most common of them are epulis, gingival fibromatosis and periodontal cysts
- **Epulis** is caused by irritation of long-term local mechanical factors (poorly corrected artificial tooth cover, dental stones, caries, the roots of the broken teeth remaining, etc)
- Usually develops from the labial gingival surface of incisor, canine and premolar teeth of the lower jaw
Epulis

- Oval or mushroom-shaped, pedunculated
- Most often it occurs in middle-aged individuals, especially in pregnant women
- After pregnancy, its dimensions decrease
- Epulis grows for a long time and at a very slowly
- The dimensions are usually from 0.5 cm to 2.0 cm, and it can be reddish, grayish color
- Although it does not metastases, it tends to recur
- It is painless, but easily bleeding (when the consistency is soft) structure
- Since they are often subjected to mechanical trauma in the oral cavity, ulcers on them are also formed, and they are also able to become inflamed as a secondary change
Epulis

According to the microscopic appearance (histological structure), there are 3 types of epulises:

1. Fibrous epulis
2. Angiomatous epulis
3. Giant cell epulis

- **Fibrous epulis** consists mainly of granulation tissue and rough fibrous connective tissue
- Its consistency is hard
- **Angiomatous epulis** is a tumor-like structure, similar to capillary hemangioma
- Consistency is soft, often bleeding, multiple small-sized hemorrhage foci in the tissue and hemosiderin assemblies are also detected
Giant cell epulis
(Osteoclastoma, or Peripheral giant cell granuloma)

• Located on the lingual surface of teeth of the lower jaw
• Made by the multinuclear giant cells of different intensity similar to osteoclasts, loose fibrous connective tissue, and capillaries with thin walls
• The swelling is round, soft and commonly maroon or purplish in color
• Children are typically mainly affected, females being affected more than males
Peripheral giant cell granuloma

Gingival fibromatosis

• Although gingival fibromatosis is a tumor-like formation, it is very similar to hypertrophic gingivitis due to its appearance.

• Unlike hypertrophic gingivitis, during fibromatosis, the color of the gingiva does not change, in addition to interdental gingiva, the gingiva are deformed in the alveolar, lingual and vestibular surfaces.

• Etiopathogenesis gingival fibromatosis has not been clearly clarified until now.

• However, the role of hereditary predisposition and endocrine disorder in its development is not excluded.

• Microscopically, a large amount of rough fibrous connective tissue appears.

• Cellular elements and blood vessels are less noticeable.
Premalignant lesions of oral cavity
Leukoplakia

- **Leukoplakia** is a whitish patch or plaque that cannot be characterized clinically or pathologically as any other disease
- It is not associated with any physical or chemical causative agent, except the use of tobacco
- Between 5% and 25% of these lesions are premalignant
Leukoplakia: Etiology

• No etiologic factor can be identified for most persistent oral leukoplakias (idiopathic leukoplakia)

• Known causes of leukoplakia include the following:
  – Trauma (e.g., chronic trauma from a sharp or broken tooth or from mastication may cause keratosis)
  – Tobacco use: Chewing tobacco is probably worse than smoking
  – Alcohol
  – Infections (e.g., candidosis, syphilis, EBV infection): EBV infection causes a separate and distinct non–premalignant lesion termed hairy leukoplakia
  – Chemicals (e.g., sanguinaria)
  – Immune defects: Leukoplakias appear to be more common in transplant patients
Homogeneous Leukoplakia

Erythroplakia

References for Oral Premalignant Diseases
E-Medicine Article: Leukoplakia
http://www.emedicine.com/derm/topic227.htm
Leukoplakia: Histopathology

- Features highly variable
- Ranging from hyperkeratosis and hyperplasia to atrophy and severe dysplasia
- Significant intrapathologist and interpathologist variation in diagnosing dysplasia
- Molecular studies indicated

**References for Oral Premalignant Diseases**

- E-Medicine Article: Leukoplakia
Premalignant conditions of oral cavity
Lichen Planus

• Variable and present as white striations (*Wickham striae*), white papules, white plaques, erythema (mucosal atrophy), erosions (shallow ulcers), or blisters
• The lesions predominantly affect the buccal mucosa, tongue, and gingivae, although other oral sites are occasionally involved
• T-cell–mediated autoimmune disease in which autocyttotoxic CD8+ T cells trigger the apoptosis of oral epithelial cells
• Slightly increased risk of oral SCC
Lichen Planus

- Spider web
- The buccal mucosa involved most often
- Reticular form most common

- View of the dermoepidermal junction
- Civatte bodies (arrows)
- Keratinocyte enlargement and coarse collagen bundles
Tumors of the Salivary Glands

• Account for only 2-6% of tumors of human body and about 20% of all tumors in dental oncology
• Benign tumors develop most often in large salivary glands
• Malignant tumors usually in the tongue and small salivary glands
• According to histogenetic features, tumors of epithelial origin are most often
MAJOR FEATURES OF SALIVARY GLANDS

► Parotid gland:
  • Largest major salivary gland
  • Stensen's duct
  • Serous
  • Facial nerve

► Submandibular gland
  • Wharton's duct
  • Mucous-Serous

► Sublingual gland
  • Bartholin's duct, Rivinus ducts
  • Mucous-Serous

► Small salivary glands
  • Mucous
Submandibular gland - mucinous and serous
Tumors of Salivary Gland

A. Epithelial Tumors

- **Adenomas:**
  - Pleomorphic adenoma
  - Monomorphic adenoma:
    - Adenolymphoma or Warthin’s tumor
    - Oxyphil adenoma (Oncocytoma)
    - other monomorphic adenomas

- **Mucoepidermoid carcinoma**

- **Carcinomas:**
  - Adenoid cystic carcinoma
  - Epidermoid cancer
  - Undifferentiated cancer
  - Pleomorphic adenoma cancer (Mixed cancer)

- **Acinic cell tumor**

B. Non-epithelial tumors (hemangiomas, neurofibromas, etc)

C. Not classified tumors

D. Tumor-like lesions (benign lymphoepithelial sarcoidosis, cysts, etc)
Pleomorphic adenoma (mixed adenoma)

- Very common benign tumor
- Accounts for about 50% of all tumors of the salivary glands
- Most often (90%) develops in the parotid gland, sometimes in the glands of the palatal mucosa (small salivary glands), and in other large and small salivary glands
- Mostly found in middle-aged and elderly people, especially in women
- Develops very slowly for many years
Gross view of Pleomorphic adenoma

- well defined borders
- usually oval-shaped
- elastic or solid consistency
- homogeneous tan to white cut surface
- covered with a thin capsule
- can reach about 5-6 cm in diameter

http://www.pathologyoutlines.com/topic/salivaryglandspleomorphicadenoma.html
Pleomorphic adenoma

**Microscopy:**

- Tumor tissue is made up of both epithelial and mesenchymal elements
- Cells of epithelial origin form glandular and cystic structures of different sizes, ducts, cell assemblies, bundles, etc.
- Epithelial cells also differ from each other
- Mesenchymal component consists of:
  - **stellate cells**, located in the edematous ground substance (myxoid area),
  - **single oval cells**, located in the hyaline-like or cartilaginous solid ground substance (chondroid area), as well as fibroblast-like cells
- These components of mesenchymal origin (myxochoondroid areas) are located in close contact with epithelial components
Histopathology of Pleomorphic adenoma

Pleomorphic adenoma can be encapsulated / well circumscribed

Pleomorphic adenoma is a triphasic tumor with ductal (epithelial), myoepithelial and stromal components; the stromal component is typically chondromyxoid or myxoid

http://www.pathologyoutlines.com/topic/salivaryglandspleomorphicanenoma.html
Histopathology of Pleomorphic adenoma

Myoepithelial cells with clear cytoplasm

Pleomorphic adenoma can show squamous metaplasia with keratinization (blue arrow) and mucinous metaplasia with mucocytes (red arrow)

http://www.pathologyoutlines.com/topic/salivaryglandspleomorphicadenoma.html
Monomorphic adenoma

• Very common benign tumor
• Usually develops in the parotid gland in older people
• Composed of cells of relatively homogeneous and epithelial origin, has no tumor cells of mesenchymal origin, has a simple structure
• Located inside a thin capsule, oval-shaped, and 1-2 cm in diameter
• Consistency is soft or solid, its color is usually whitish, sometimes brown
• Depending on their histological features, following types of the monomorphic adenomas are distinguished: adenolymphoma, oxyphil adenoma, etc
Adenolymphoma or Warthin’s tumor

- More common type of monomorphic adenomas, accounting for about 10% of all tumors of the salivary glands
- Usually is found in parotid gland
- More common in males (26:1)
- Double layer of epithelial cells resting on dense lymphoid stroma with variable germinal centers
- Cystic spaces narrowed by polypoid projections of lymphoepithelial elements
- Surface palisading of oncocytic columnar cells with underlying discontinuous basal cells
- No myoepithelial component
Warthin’s tumor

Gross view

Fine Needle Aspiration shows cohesive sheets and clusters of epithelial cells with oncocytic features and background of lymphocytes

https://www.webpathology.com/image.asp?case=966&n=68
Histopathology of Warthin’s tumor

https://www.webpathology.com/image.asp?case=966&n=68
Oxyphil adenoma (Oncocytoma)

- Rare benign tumor
- Formed by the large eosinophilic epithelial cells
- Tumor tissue is brown in color and located inside the capsule

A solid sheet of proliferating oncocytic epithelium abutting against non-neoplastic serous-type salivary gland tissue (top of field).

http://pathology.jhu.edu/cytopath_tut/Considerations/ShowImage.cfm?ModuleID=9&CaseInfoID=12&ImageID=251&ConsiderID=48
Mucoepidermoid carcinoma

• Common tumor of the salivary glands
• Found in all age groups, is more prevalent in women, mainly in the parotid gland
• Main characteristic sign is that the tumor is made up of 2 types of epithelial cells: mucous-forming and epidermoid cells
• Can also be found high or low-differentiated small and dark cells, which sometimes occupy an intermediate position
• When these cells predominate, the tumor grows by the invasive way during 2-3 years and begins to metastasize the lymphogenic way
• According to the latest statistics, mucoepidermoid carcinoma accounts for 10-15% of all tumors of the salivary glands
Mucoepidermoid carcinoma

H&E

Mucicarmine immunostain

http://www.pathologyoutlines.com/topic/salivaryglandsMEC.html
Adenoid cystic carcinoma

- About 10% of all tumors of the salivary glands
- Usually develops from the small salivary glands, especially from the epithelium of the hard and soft palatal mucosa
- Found in all age groups, especially in middle-aged and elderly people
- Due to its appearance, it has nodular and diffuse types
- Grows by the invasive way, destroying the palate, passing into the maxillary sinus
- Metastasizes mainly by the hematogenous way especially to the lungs, and sometimes to the regional lymph nodes by the lymphogenic way
Adenoid cystic carcinoma

- Biphasic salivary gland tumor, composed of ductal and myoepithelial cells
- *Microscopically,* the parenchyma of the tumor consists of the small cuboidal atypical epithelium
- Myoepithelial cells have dark angulated nuclei and scanty cytoplasm, giving a basaloid appearance
- It has tubular, cribriform and solid architecture
- Perineural invasion is frequent
- There is an oxyphilic or basophilic intercellular substance in the form of hyaline-like strands and cylinders
- Therefore, adenoid cystic carcinoma was previously called a *cylindroma*
Adenoid cystic carcinoma

Infiltrative ill defined mass involving the parotid gland.

Tubular pattern is composed of inner ductal and outer myoepithelial cells. The ductal cells are cuboidal with eosinophilic cytoplasm. The myoepithelial cells are angulated and basaloid.

http://www.pathologyoutlines.com/topic/salivaryglandsadenoidcystic.html
Adenoid cystic carcinoma

Tumor cells forming solid sheets and nests.

Cribriform pattern is composed predominantly of myoepithelial cells admixed with hyalinized or myxoid globules. Scattered ductal elements (arrows) may also been present.

http://www.pathologyoutlines.com/topic/salivaryglandsadenoidcystic.html
Adenoid cystic carcinoma

Perineural and even intraneuronal invasion is common.

http://www.pathologyoutlines.com/topic/salivaryglandsadenoidcystic.html