# Head and Neck Pathology

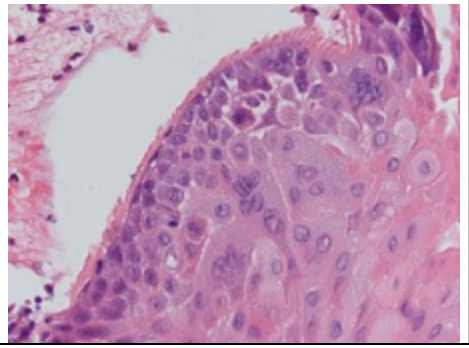
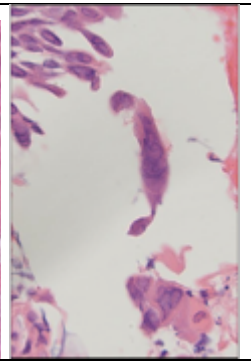
| GINGIVITIS<br>ADOLESCENCE | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | *Accumulation of dental plaque & calculus – build-up beneath gum line leads to gingivitis (reversible)*<br>**PAINLESS** inflammation of the oral mucosa surrounding the teeth – *Gingival erythema, edema, bleeding, loss of soft tissue adaptation to the teeth*<br>**Treatment:** aimed at reducing accumulation of plaque & calculus (tartar) with regular brushing, flossing, & dental visits | |
| **PATHOGENESIS** | **Poor oral hygiene** | |
| **COMPLICATIONS** | Contributes to the **development of dental caries** (cavities) | |
| **PATHOGENESIS** | **Sticky, colorless biofilm** between & on surface of the teeth – *mixture of bacteria, salivary proteins, & desquamated epithelial cells* |  |

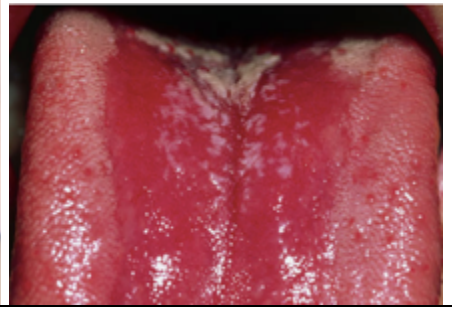
| PERIODONTITIS<br>Can be component of systemic disease: **AIDs, Leukemia, Crohn's Disease, Diabetes, Down Syndrome, Sarcoidosis** | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | *Inflammatory process that affects the supporting structures of the teeth (periodontal ligaments, alveolar bone, cementum)* | |
| **PATHOGENESIS** | **Poor oral hygiene & change in oral flora**<br>Anaerobic & microaerophilic gram-negative flora: *Aggregatibacter/Actinobacillus actinomycetemcomitans, Porphyromonas gingivalis, Prevotella intermedia* | |
| **COMPLICATIONS** | Complete destruction of the periodontal ligament<br>Loosening & eventual loss of teeth<br>**INFECTIVE ENDOCARDITIS, PULMONARY & BRAIN ABSCESSES** | |
| **PATHOGENESIS** | |  |

| APHTHOUS ULCERS (AKA Canker Sores)<br>First 2 decades of life | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | Common, often **recurrent**, **EXCEEDINGLY PAINFUL** superficial oral mucosal ulcerations<br>*Lesions typically resolve **spontaneously** in 7-10 days, but they can persists for weeks in **immunocompromised*** | |
| **PATHOGENESIS** | Tend to be prevalent within **families** & also associated with immunologic disorders: **CELIAC DISEASE, IBS, BEHCET DISEASE** | |
| **COMPLICATIONS** | | |
| **PATHOLOGY** | **Shallow, hyperemic ulcerations** covered by a **thin exudate** & rimmed by a **narrow zone of erythema** |  |
| **PRACTICE QUESTION** | *A 54 year old male with a history of rare bouts of bloody diarrhea presents to his dentist complaining of worsening of recurrent sores in his mouth. Which procedure is indicated?* | **Colonoscopy –** *Associated with Celiac Disease & IBS* |

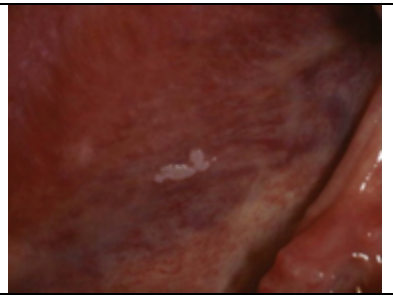
| IRRITATION FIBROMA (AKA Traumatic Fibroma) | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | **BENIGN** submucosal nodule of **fibrous** tissue<br><br>**Treatment:** surgical excision | |
| **PATHOGENESIS** | Caused by **repetitive trauma** | |
| **COMPLICATIONS** | | |
| **PATHOLOGY** | Firm, well-demarcated **nodule** on the buccal mucosa along the bite line or gingiva or tongue |  |

| PYOGENIC GRANULOMA<br>Children, Young Adults, PREGNANT WOMEN* | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | **Inflammatory reaction** of the **gingiva**; growth may be ***rapid***<br>*Can regress, mature into dense fibrous masses, or develop into a* ***peripheral ossifying fibroma (calcification)***<br><br>**Treatment:** surgical excision | |
| **PATHOGENESIS** | | |
| **PATHOGENESIS** | Surface often **ulcerated** & **red-purple** in color<br>Highly vascular proliferation of granulation tissue – 'fibrovascular' |  |

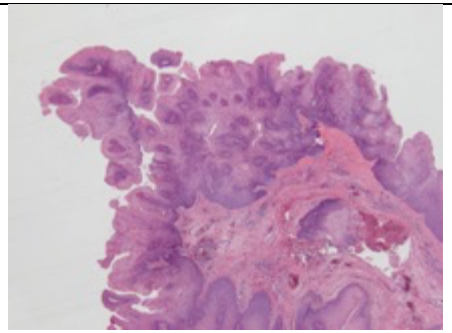
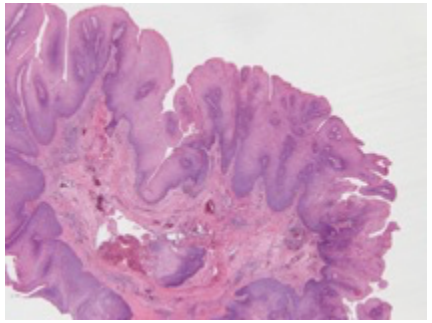
| HERPES SIMPLEX VIRUS (HSV-1) – Acute Herpetic Gingivostomatitis<br>Primary Infection: Children | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | **Abrupt onset** of vesicles & ulcerations of the oral mucosa, particularly the gingiva, with *lymphadenopathy, fever, anorexia, & irritability*<br>**Rupture of vesicles** can yield **PAINFUL**, red-rimmed, shallow ulcerations<br>*Ulcers usually spontaneously clear within 3-4 weeks, but the virus treks along the regional nerves & becomes dormant in local ganglia* | |
| **PATHOGENESIS** | | |
| **COMPLICATIONS** | **Reactivation** (**Recurrent Herpetic Stomatitis**): Trauma, allergies, UV light, URT infection, pregnancy, menstruation, immunosuppression, temperature extremes | |
| **PATHOGENESIS** | **Clear, serous fluid-filled vesicles**<br>Intracellular & intercellular edema with individual cells in the margins with **eosinophilic intranuclear viral inclusions**<br>Several cells may fuse to produce **multinucleated giant cells** |   |

| ORAL CANDIDIASIS (AKA Thrush)<br>*Most common fungal infection of the oral cavity | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | **3 Major Clinical Forms: Pseudomembranous***, Erythematous, & Hyperplastic<br>PSEUDOMEMBRANE CAN BE SCAPED OFF! | |
| **PATHOGENESIS** | *Candida albicans* is normal oral flora in 50% of the population<br>**BROAD-SPECTRUM ANTIBIOTICS** can alter the normal bacterial flora of the mouth | |
| **COMPLICATIONS** | | |
| **PATHOLOGY** | Superficial, **gray-white inflammatory membrane** composed of matted organisms enmeshed in a **fibrinosuppurative exudate**<br>SDF |   |
| **PRACTICE QUESTION** | *A 24 year old female who just completed treatment for a urinary tract infection now complains of a white tongue. The most likely etiology of this finding is which of the following?* | **Change in the oral flora** |

| HAIRY LEUKOPLAKIA<br>**Immunocompromised:** HIV, chemotherapy, transplant patients, advancing age | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | *Distinctive **BENIGN** oral lesion on the lateral border of the tongue*<br>CAN **NOT** BE SCRAPED OFF!<br>**Self-limited** | |
| **PATHOGENESIS** | Caused by **Epstein-Barr virus (EBV)** | |
| **COMPLICATIONS** | Sometimes superimposed candida infection on the surface of the lesions | |
| **PATHOLOGY** | White, confluent patchy of fluffy ("hairy"), hyperkeratotic thickenings<br>Hyperparakeratosis & acanthosis with **"balloon cells"** in the upper spinous layer |  |

| LEUKOPLAKIA<br>**Adults at any age (40-70 years old) – MALES** | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | *Thickened white patches found anywhere in the oral (mostly buccal mucosa, floor of mouth, ventral surface of tongue, palate, gingiva)*<br>CAN **NOT** BE SCRAPED OFF! | |
| **PATHOGENESIS** | **Etiology unknown. Tobacco** is the main culprit in its development. | |
| **COMPLICATIONS** | Until proven otherwise, all leukoplakias are considered **PRE-MALIGNANT** | |
| **PATHOLOGY** | Solitary OR multiple<br>Sharply demarcated white patches or plaque<br>A spectrum of epithelial changes on histology – hyperkeratosis, acanthosis to dysplastic, carcinoma in situ |  |

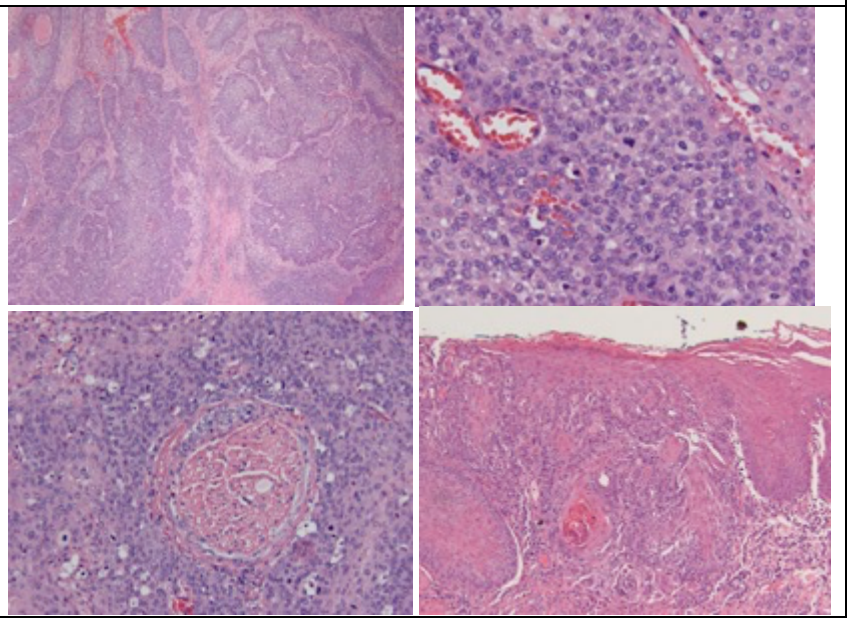
| ERYTHROPLAKIA<br>Adults at any age (40-70 years old) – MALES | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | *Red, velvety, possible eroded area within oral cavity*<br><br>Intermediate forms consists of both Leukoplakia & Erythroplakia (**Speckled Leukoerythroplakia**) | |
| **PATHOGENESIS** | **Etiology unknown.** **Tobacco** is the main culprit in its development. | |
| **COMPLICATIONS** | Risk of malignant transformation MUCH higher than leukoplakia | |
| **PATHOLOGY** | Markedly **atypical epithelium**<br>**Severe dysplasia, carcinoma in situ,** or **minimally invasive carcinoma**<br>**Intense sub-epithelial inflammatory reaction**<br>**Prominent vascular dilation** – *reddish appearance* |  |

| SQUAMOUS PAPILLOMA<br>Late 30s | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | *Common intraoral **BENIGN** epithelial neoplasm*<br>Most commonly found on the posterior hard palate, soft palata, & uvula (34%) | |
| **PATHOGENESIS** | 50% associated with **HPV 6 & 11** | |
| **COMPLICATIONS** | | |
| **PATHOLOGY** | Reactive epithelial hyperplasia<br>White-pink **cauliflower-like surface projections**<br>  |   |

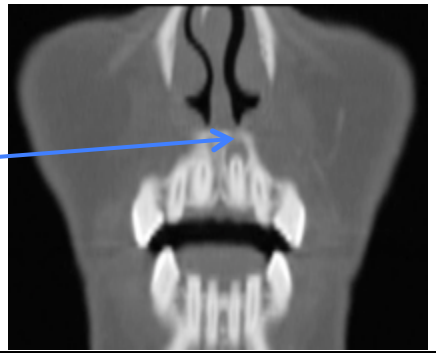
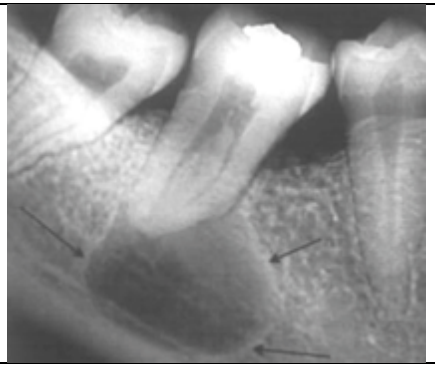
# SQUAMOUS CELL CARCINOMA

***95% of cancers of the head & neck are Squamous Cell Carcinomas**

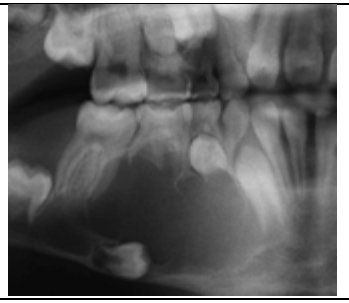
| | |
|---|---|
| **DEFINITION/ CLINICAL** | *Uncontrolled growth of abnormal cells arising in the squamous cells, which compose most of the skin's upper layers (the epidermis)* |
| **PATHOGENESIS** | Multifactorial<br>*Tobacco smokers & alcohol*<br>*India & Asia – chewing of betel quid & paan*<br><br>Actinic radiation & pipe smoking for **SCC of the lower lip**<br>**HPV-16** for **SCC in oropharynx** |
| **COMPLICATIONS** | **Favored sites of LOCAL METASTASIS:** Cervical Lymph Nodes<br>**Favored sites of DISTANT METASTASIS:** Mediastinal LN, Lung, Liver, Bone<br>**Distant metastases are often already present at the time of diagnosis* |
| **PATHOLOGY** | Frequently **MULTIPLE primary tumors** in **SCC in oropharynx**<br>**Raised, firm, pearly plaques** – ***mucosal thickening***<br>**May be superimposed on a background of Leukoplakia or Erythroplakia**<br>Ulcerated & protruding masses that have irregular/indurated borders<br>**Dysplasia**<br>Range from well-differentiated keratinizing to anaplastic<br><br>***Degree of histology differentiation is not correlated with behavior** |



| ODONTOGENIC CYSTS & TUMORS | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | Majority of odontogenic cysts are derived from remnants of odotogenic epithelium present within the **jaws**<br>INFLAMMATORY CYSTS:<br>– **Periapical cysts:** root apex<br>– Residual cysts: after tooth extraction<br>– Paradental cyst (lateral): opening of lateral accessory root canal<br><br>DEVELOPMENTAL CYSTS:<br>– **Eruption cyst, Dentigerous cysts, Odontogenic keratocyst,** Gingival cyst of newborn & adult, Lateral periodontal cyst, Glandular odontogenic cyst, Calcifying epithelial odontogenic cyst (Gorlin cyst) | |
| **PATHOGENESIS** | | |
| **COMPLICATIONS** | Large masses can lead to **remodeling of the jaw** → **radiolucent lesions on x-ray** | |
| **PATHOLOGY** | **Well-circumscribed lesions** | |

| INFLAMMATORY ODONTOGENIC CYSTS: Periapical Cyst ★ | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | Result of long-standing chronic inflammatory of the tooth – ***pulpitis***<br>Usually incidental finding on x-ray – *radiolucency at* **apex of tooth**<br><br>**Treatment:** Complete removal of offending material & appropriate restoration of the tooth or extraction | |
| **PATHOGENESIS** | Occurs when a tooth is impeded in its eruption within the soft tissues – ***advanced carious lesions*** *or trauma; improperly performed root canal*<br>Secondary to accumulation of blood or fluid between tooth crown & the overlying mucosa | |
| **COMPLICATIONS** | Inflammation may result in **necrosis** of the pulpal tisue | |
| **RADIOLOGY** | *Cystically dilated, radiolucent space with sharp, well-circumscribed borders* |   |
| **PATHOLOGY** | Over time, **granulation tissue** may develop & subsequent **epithelialization** may lead to the formation of a **RADICULAR CYST** (sharp edges w/ **ossified/hypersclerotic rim**) | |

| DEVELOPMENTAL ODONTOGENIC CYSTS: Eruption Cyst<br>< 10 years old | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | Soft tissue cyst involving an **erupting tooth** – *Swelling that appears as a purple-bluish dome as a result of a hematoma*<br>**USUALLY ASYMPTOMATIC,** *but if inflamed, may be painful*; cysts rupture spontaneously<br>Most common in **Mandibular Central Incisors & permanent 1st molars** | |
| **PATHOGENESIS** | Occurs when a tooth is impeded in its eruption within the soft tissues<br>Secondary to accumulation of blood or fluid between tooth crown & the overlying mucosa | |
| **COMPLICATIONS** | Large masses can lead to **remodeling of the jaw** → **radiolucent lesions on x-ray** | |
| **PATHOGENESIS** | **Well-circumscribed lesion**<br>**Raised, bluish or mucosal-colored dome-shaped gingival mass,** usually <1.5cm |  |

| DEVELOPMENTAL ODONTOGENIC CYSTS: Dentigerous Cyst (AKA Follicular Cyst)<br>Teenagers & Young Adults | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | Unilocular **BENIGN** lesions most often associated with the **impacted 3rd molar (wisdom teeth)**<br>**Treatment:** Complete removal of the lesion is CURATIVE – *No recurrence!*<br>**If you have a patient who states they have a dentigerous cyst removed & now you see a radiolucent area on radiograph, know that it was a MISDIAGNOSED dentigerous cyst* | |
| **PATHOGENESIS** | Originates by separation of dental follicle from around the crown of an **unerupted tooth** – *results from fluid accumulation between the developing tooth & the dental follicle* | |
| **RADIOLOGY** | *Well-circumscribed, unerupted 3rd molar seen with cyst starting right at the crown of the tooth, leaving the root unaffected* |   |
| **PATHOGENESIS** | Lined by a thin layer of **stratified squamous epithelium**<br>**Dense, chronic inflammatory cell infiltrate in CT stroma – erosion of the mucosa** | |

## DEVELOPMENTAL ODONTOGENIC CYSTS: Odontogenic Keratocyst (AKA Keratocystic Odontogenic Tumor)

**10 & 40 years; MALES**

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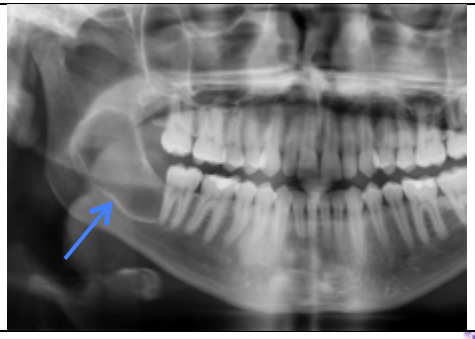
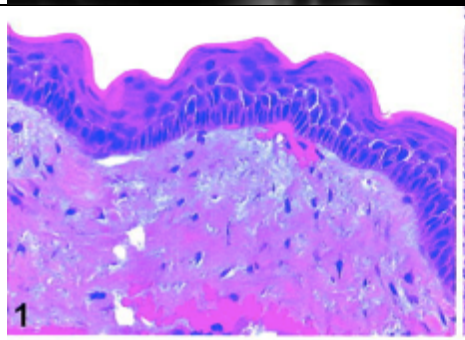
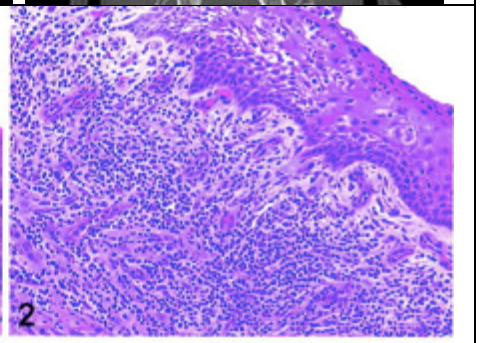
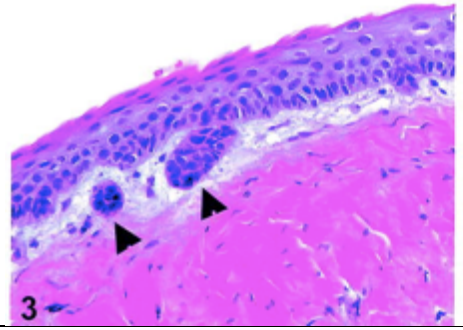
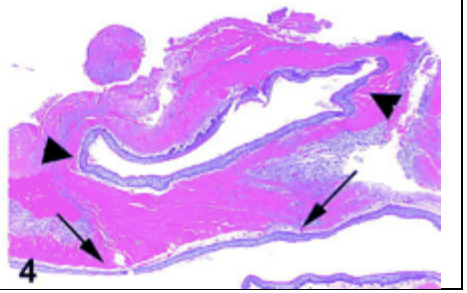
|---|---|
| **DEFINITION/ CLINICAL** | Must be differentiated from other odontogenic cysts because of the **AGGRESSIVE BEHAVIOR** & tendency to **recur**<br><br>**Treatment:** complete removal of the lesion, but recurrence rates for inadequately removed lesions can reach 60% |
| **PATHOGENESIS** | **Nevoid Basal Cell Carcinoma Syndrome (Gorlin Syndrome)** – mutations in the **TSG PTCH** (Patched) on chromosome 9q22 |
| **COMPLICATIONS** | Multiple OKCs occur in 20% of patients who should be evaluated for **NEVOID BASAL CELL CARCINOMA SYNDROME (GORLIN SYNDROME)** |
| **RADIOLOGY** | Well-defined unilocular or multilocular **radiolucencies** with **sclerotic rim**, often found within the **posterior mandible** |
| **PATHOLOGY** | Thin layer of **keratinized** stratified squamous epithelium<br>**Prominent basal cell layer**<br>**Corrugated epithelial surface (1)**<br>Inflammation may denude epithelium (2)<br>May have **daughter cysts** **explanation for recurrence* (3, 4) |





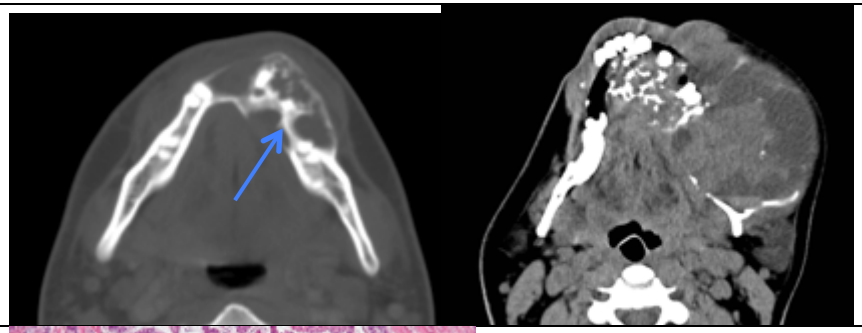
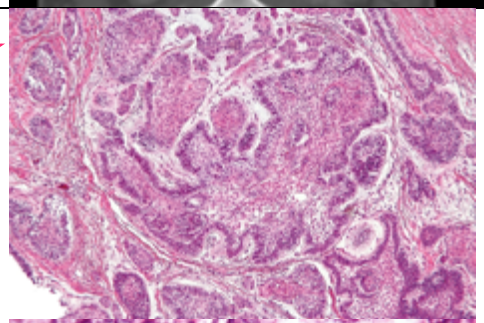
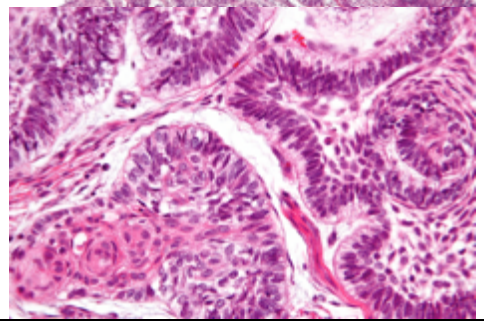



## ODONTOGENIC TUMOR: Ameloblastoma ★

**3rd to 5th decades**

*Second most common odontogenic tumor

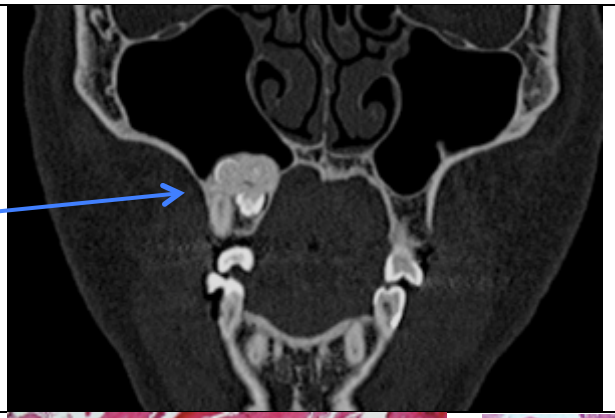
| | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | **BENIGN** tumor arising from odontogenic epithelium<br>Hard, **PAINLESS** lesion near the **angle of the mandible**<br>Commonly cystic, **slow-growing**, & ***locally invasive***<br>**Treatment:** WIDE surgical resection to prevent recurrence | |
| **PATHOGENESIS** | | |
| **COMPLICATIONS** | Although benign, it's locally aggressive with a **HIGH RATE OF RECURRENCE**<br>Can grow large enough to cause **deformation fo the mandible** | |
| **RADIOLOGY** | **Imaging** – mixed solid & cystic pattern with thick, irregular wall; often with solid structures projecting into the lesion;<br>**"soap bubble"** appearance on x-ray |  |
| **PATHOLOGY** | Columnar basal cells in **palsidating "PICKET FENCE"** ★ arrangement with **vacuolated cytoplasm** pushing **hyperchromatic nuclei** away from the basement membrane<br>**"Jigsaw pizzle at low power"*<br><br>Suprabasal cells loosely textured & non-cohesive, resembling **STELLATE RETICULUM**<br><br>**NO ENAMEL OR DENTIN FORMATION!** |  <br>  |

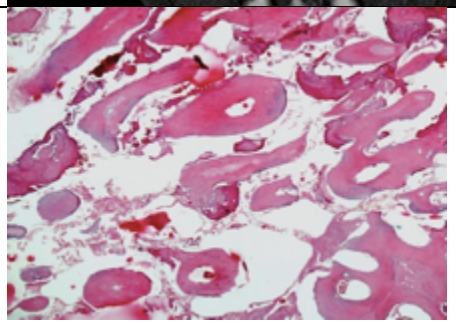
## ODONTOGENIC TUMOR: Odontoma

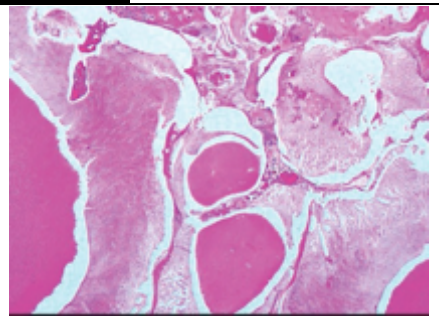
2nd decade

*Most common odontogenic tumor of the mandible

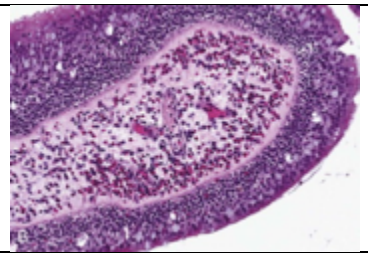
| | |
|---|---|
| **DEFINITION/ CLINICAL** | **BENIGN tumor** arising from odontogenic epithelium & shows **i**rregular formation of enamel & dentin<br>*Probably **hamartomas** rather than true neoplasms*<br><br>**Treatment:** local excision with NO recurrence |
| **PATHOGENESIS** | Half are associated with an **unerupted tooth** |
| **COMPLICATIONS** | |
| **RADIOLOGY** | Initially **radiolucent (bone resorption + cystic component)**, but with time develops small **calcifications**, which eventually coalesce to form **radiodense lesions with a lucent rim** |
| **PATHOGENESIS** | **EXTENSIVE DEPOSITION OF ENAMEL & DENTIN** – *formation of irregular masses that resemble 'little teeth'*<br><br>**Irregular contours & abnormal architecture,** *but histologically looks like adult dentin* |

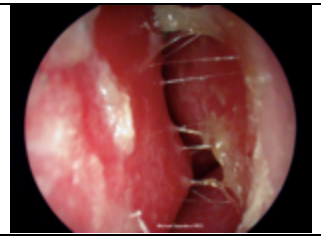


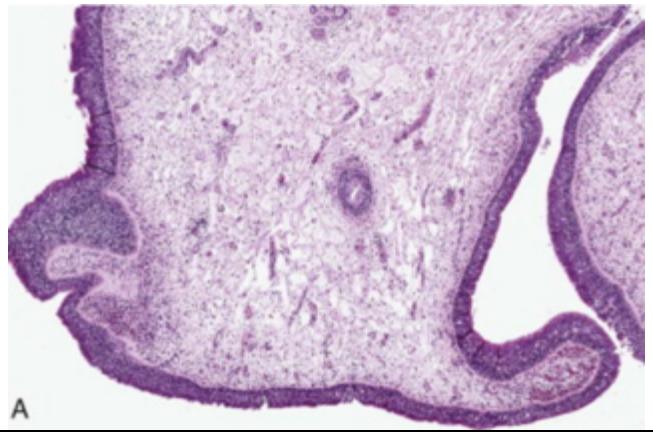
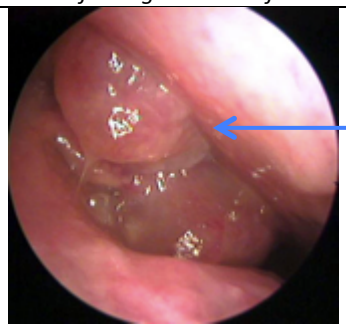




| INFECTIOUS RHINITIS: Common Cold | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | Profuse catarrhal discharge – "runny nose"<br>*Secondary bacterial infection enhances the inflammatory reaction & produced mucopurulent exudate*<br>**Self-limiting** | |
| **PATHOGENESIS** | Most common viral causes: **Adenovirus, Echovirus, Rhinovirus** | |
| **COMPLICATIONS** | May extend to pharyngotonsillitis | |
| **PATHOLOGY** | Thickened, edematous, & red nasal mucosa<br>Narrow nasal cavity<br>Enlarged turbinates | |

| ALLERGIC RHINITIS: Hay Fever | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | **IgE-mediated** immune reaction with an early-phase & late-phase response<br>*Marked mucosal edema, redness, & mucus secretion* | |
| **PATHOGENESIS** | Initiated by **hypersensitivity** reactions to allergens – *plant pollens, fungi, animal allergens, dust mites* | |
| **COMPLICATIONS** | **Chronic Rhinitis** | |
| **PATHOLOGY** | **Leukocytic infiltration w/ eosinophilia** |  |

| CHRONIC RHINITIS | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | *Result of repeated attacks of Acute Rhinitis*<br>**Treatment**: only aggressive for patients who do not respond to supportive care | |
| **PATHOGENESIS** | Microbial or allergic in origin<br>Eventual development of superimposed bacterial infection – *Deviated nasal septum or nasal polyps with impaired drainage* contribute to microbial invasion | |
| **PATHOLOGY** | **Superficial ulceration** with variable **inflammatory infiltrate of neutrophils, lymphocytes, & plasma cells** |  |

| NASAL POLYP | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | **Recurrent rhinitis** may lead to focal protrusions of the nasal mucosa → nasal polyps | |
| **PATHOGENESIS** | *Most people with nasal polyps are NOT atopic!* | |
| **COMPLICATIONS** | If large enough can become ulcerated & infected<br>If multiple or large can also encroach on the airway & impair sinus draining → bacterial overgrowth → **Chronic inflammation of mucosa**<br>Chronic irritation can lead to **squamous metaplasia** – *rarely the source of malignant transformation* | |
| **PATHOLOGY** | **Edematous mucosa with loose myxomatous stroma**<br>Often **hyperplastic** or **cystic mucous glands**<br>Inflammatory infiltrate<br>  <br> |  <br>*Shiny, pearly white polyp* |

| SINUSITIS | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | **Most commonly preceded by Acute or Chronic Rhinitis** | |
| **PATHOGENESIS** | Occasionally from extension of a **periapical tooth** | |
| **COMPLICATIONS** | *Severe forms of chronic sinusitis are caused by* ***Fungi*** **–** ***Mucomycosis***<br>– Most mucormycosis infections are life-threatening<br>– Risk factors such as **diabetes & neutropenia** are present in most cases of severe mucor infections of the facial sinuses (i.e. maxillary sinuses)<br><br>Potential of spread into the orbit or cranial vault causing **meningitis or thrombophlebitis** of dural venous sinuses<br><br>Impairment of drainage of the sinus when complete may lead to **empyema (pus) of the nasal sinus** – *most commonly seen in the frontal sinus*<br>Obstruction of the outflow may lead to **mucocele** | |
| **RADIOLOGY** | **Thickened mucosa** *(maxillary sinus)* |  |
| **PATHOLOGY** | **Red, corrugated mucosa due to inflammatory cell infiltrate & edema underneath** |  |

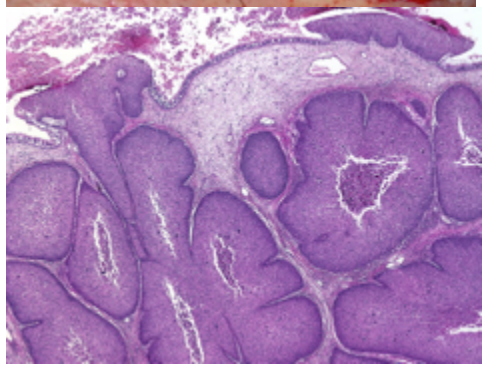
| PHARYNGITIS | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | Presents with common features of viral URI<br>*May have frank petechiae from excessive coughing* | |
| **PATHOGENESIS** | **Most commonly caused by Rhinovirus, Echovirus, & Adenovirus**<br>May have superimposed bacterial infection – β-hemolytic streptococci or *Staph aureus* | |
| **COMPLICATIONS** | Streptococcal pharyngitis may lead to Rheumatic Fever & Glomerulonephritis | |
| **PATHOGENESIS** | **Reddening & edema of the nasopharyngeal mucosa with reactive enlargement of tonsils & lymph nodes**<br><br>**Mucosa may be covered by pseudomembrane** |   |

| TONSILLITIS | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | Acute process by viral or bacterial pathogens<br>Presents with *sore throat & pain with swallowing* +/- fever & coughing<br>Most recover without therapy | |
| **PATHOGENESIS** | | |
| **PATHOGENESIS** | Tonsils enlarged, red, covered in exudate |  |

## SINONASAL (SCHNEIDERIAN) PAPILLOMA

**Adult Males 30 & 60 years old**

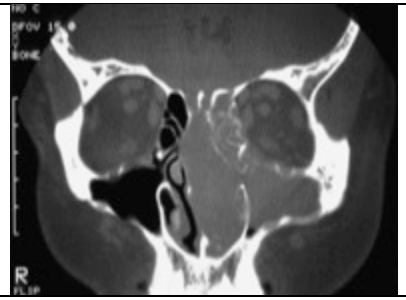
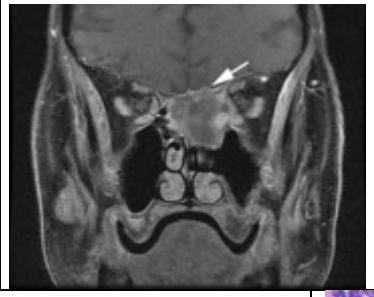
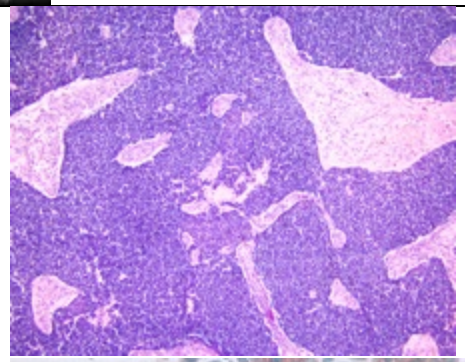
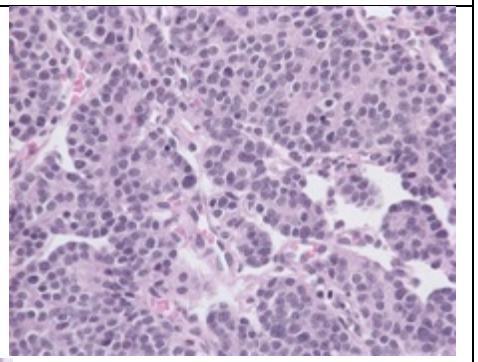
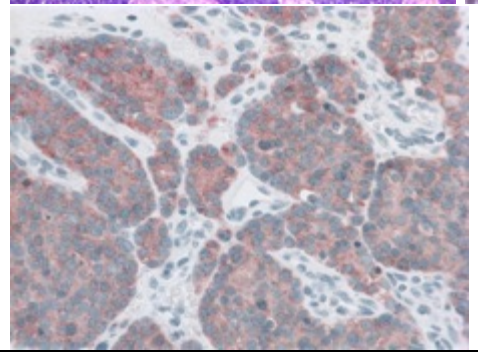
| | |
|---|---|
| **DEFINITION/ CLINICAL** | **BENIGN** firm lesion arising from respiratory or Schneiderian mucosa lining the nasal cavity & paranasal sinuses<br>*Patients often c/o "sinus pressure"* |
| **PATHOGENESIS** | **HPV 6 & 11** cause papillomas |
| **COMPLICATIONS** | *Aggressive local behavior*<br>**High rate of recurrence** if not adequately excised (particular **Inverted form**)<br>Potential of invasion of orbit or cranial vault<br>Malignant transformation in 5% |
| **PATHOGENESIS** | **Columnar or squamous epithelium + mucin**<br>*Epithelial nests protruding into the submucosa*<br>**Numerous MICROCYSTS**<br>**May have MICROABSCESSES with reactive epithelial changes** |



**Inverted Form**

## OLFACTORY NEUROBLASTOMA (ESTHESIONEUROBLASTOMA)

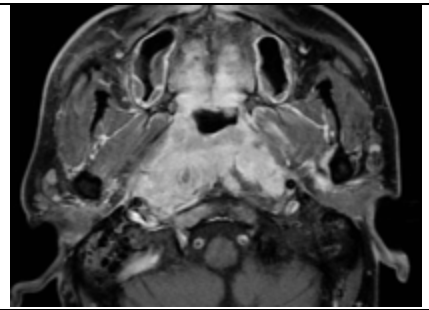
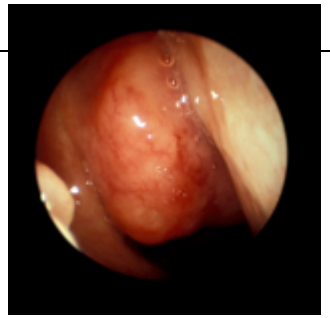
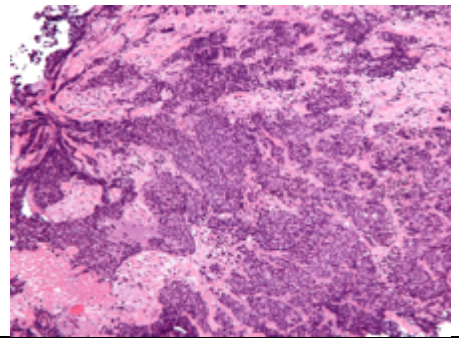
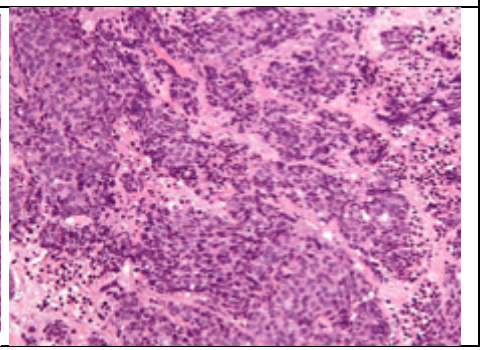
**Bimodal distribution – Age 15 & 50***

| | |
|---|---|
| **DEFINITION/ CLINICAL** | **Not very common, but very characteristic*<br>Arises from neuroectodermal olfactory cells present within mucosa & found in superior aspect of the nasal cavity<br>Present with *nasal obstruction (fullness in nose & sinuses) + epistaxis*<br>**Treatment:** surgery + radiation + chemotherapy (5-year survival rate 40-90%) |
| **PATHOGENESIS** | |
| **RADIOLOGY** |   |
| **PATHOLOGY** | **Small, round blue cell neoplasm**<br>**NESTS** of well-circumscribed cells separated by fibrovascular stroma – **ROSETTES**<br>**EM:** Fibrillary matrix (neuropil) – *tangles of neuronal cell processes* & contains neurosecretory granules<br>**SYNAPTOPHYSIN+, CHROMOGRANIN+**    |

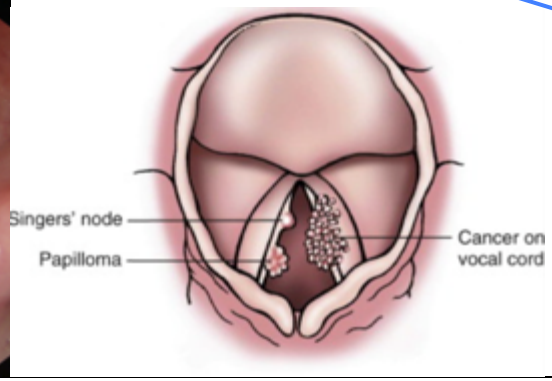
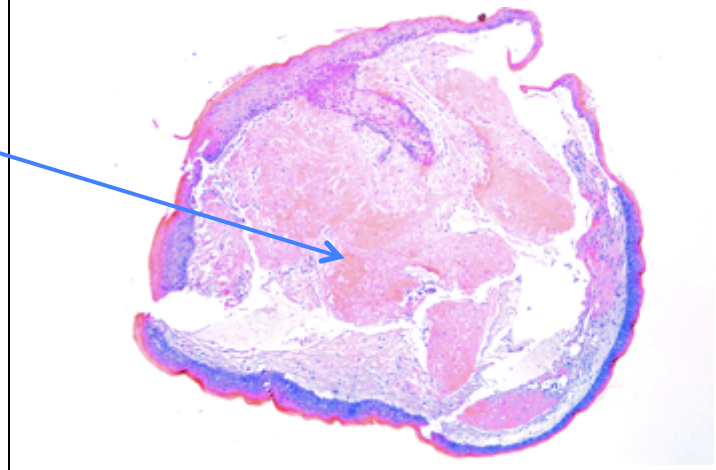
# NASOPHARYNGEAL CARCINOMA

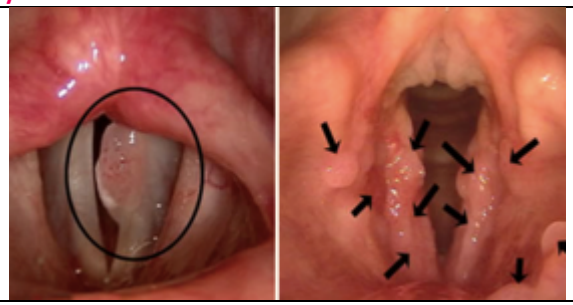
**AFRICAN Children & Older age group in ASIANS**

**Extremely RARE in the United States*

| | |
|---|---|
| **DEFINITION/ CLINICAL** | **Keratinizing & non-keratinizing** squamous cell carcinoma & **undifferentiated/basaloid** carcinoma<br>Often clinical occult for a long time until LARGE<br>*Nasal obstruction, epistaxis, & often metastasis to Cervical Lymph Nodes at presentation*<br><br>**Therapy (UNDIFFERENTIATED):** radiation |
| **PATHOGENESIS** | **EBV infection** – *most patients with **non-keratinizing** form have anti-ABV antibodies against early Ag or viral capsid Ag*<br>**Diets high in Nitrosamines (fermented food & salted fish)**<br>**Smoking & chemical fumes** |
| **COMPLICATIONS** | |
| **RADIOLOGY** |   |
| **PATHOLOGY** | **UNDIFFERENTIATED –** large epithelial cells with oval or round vesicular nuclei, prominent nucleoli, & indistinct cell borders disposed in a syncytium-like array; **apoptotic + mitotic figures**   |

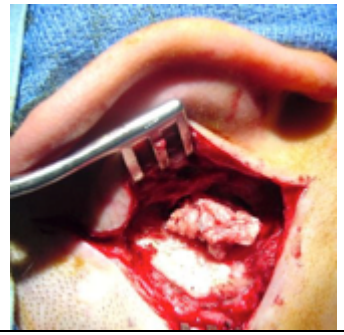
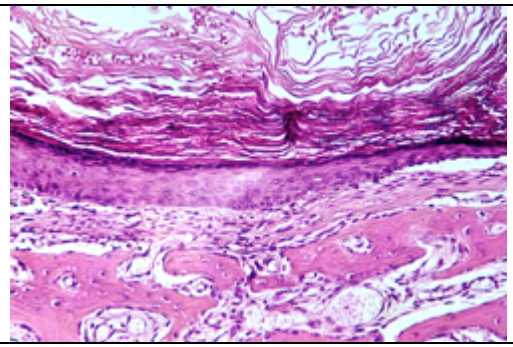
| LARYNGITIS<br>Heavy Smokers | |
|---|---|
| **DEFINITION/ CLINICAL** | Sole manifestation of allergic, **viral**, bacterial, or chemical insult; or more commonly, **part of generalized URT infection**<br>*May be a manifestation of GERD – obese patients aspiration of gastric content in sleep*<br>**Most self-limited** |
| **PATHOGENESIS** | |
| **COMPLICATIONS** | In some children, *edema* may result in **laryngeal obstruction**<br>– **CROUP/LARYNGOTRACHEOBRONCITIS:** narrowing of airway with *inspiratory stridor*; *barking cough*<br><br>Predisposition to squamous epithelial metaplasia & carcinoma in Heavy Smokers |
| **RADIOLOGY** | |
| **PATHOGENESIS** | |

| VOCAL CORD NODULES/POLYPS (Singer's Nodules)<br>Heavy Smokers & Singers | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | *Change in character of voice + hoarseness*<br>When on opposing vocal cords & impinging on each other, the mucosa may undergo **ulceration** & cause **hemoptysis** | |
| **PATHOGENESIS** | | |
| **COMPLICATIONS** | **Virtually NEVER gives rise to cancer.** | |
| **PATHOGENESIS** | **Nodules – bilateral & Polyps – unilateral**<br>**Pearly, dome-shaped nodule** with smooth surface<br>Covered by squamous epithelium +/- hyperkeratosis, hyperplasia<br>Core of nodule – **loose myxoid CT *diagnostic finding**<br>Variably **fibrotic** + numerous vascular channels<br>  <br>  <br> |  |

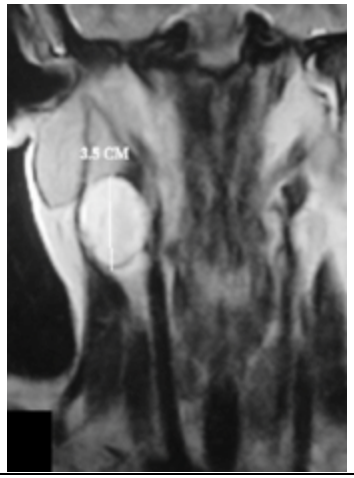
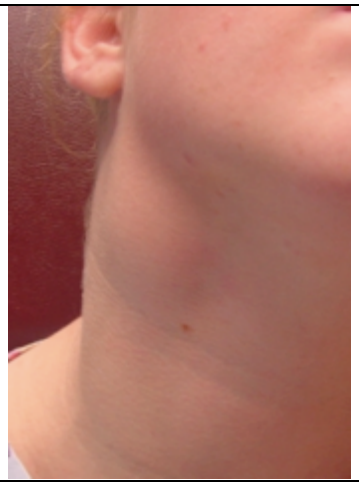
| SQUAMOUS PAPILLOMAS/PAPILLOMATOSIS | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | **BENIGN** neoplasms usually found on the **true vocal cords**<br>Usually **single** in Adults & **multiple** in Children (**Juvenile Laryngeal Papillomatosis**)<br>*Often spontaneously regress at puberty* | |
| **PATHOGENESIS** | **Caused by HPV 6 & 11**<br>**indication of sexual abuse in children* | |
| **COMPLICATIONS** | **Frequently RECUR**<br>When on the free edge of vocal cord, **TRAUMA** may lead to **ulceration & hemoptysis** | |
| **PATHOGENESIS** | Multiple slender, finger-like projections supposed by **central fibrovascular cores** covered by **stratified squamous epithelium** |  |

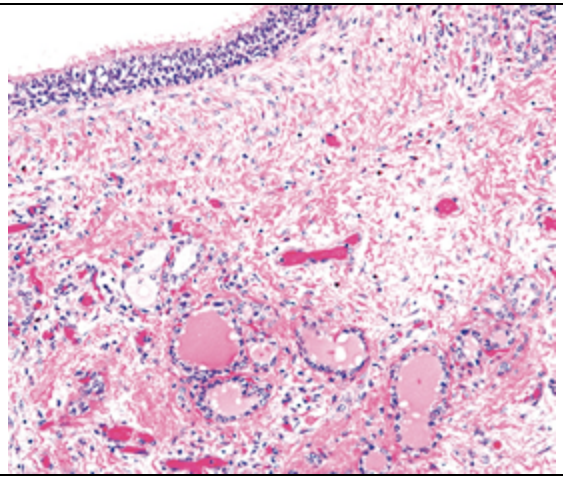
| CARCINOMA OF THE LARYNX<br>MALES in the 6th decade | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | Carcinoma usually found on the **vocal cords** – *Persistent hoarseness, dysphagia, & dysphonia*<br>Prognosis highly dependent on **stage** | |
| **PATHOGENESIS** | Most often related to tobacco **smoking & alcohol**<br>**HPV & radiation** also associated | |
| **COMPLICATIONS** | | |
| **PATHOGENESIS** | White or reddened focal thickenings<br>***Dysplastic changes after regress after cessation of smoking***<br>**Fungating mass with satellite nodules** |  |

| OTITIS MEDIA<br>Infants & Children | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | Inflammation of the middle ear<br>*Sensation of 'fullness' with decreased hearing in affected ear* | |
| **PATHOGENESIS** | Typically viral or due to collapse of Eustachian tube that ***disrupts drainage of fluid to nasopharynx***<br>**Most common causative agents of Acute OM: *S. pneumo, H influenza, Moraxella catarrhalis***<br>**Most common causative agents of Chronic OM: *Pseudomonas aeruginosa, S. aureus,* fungal** | |
| **COMPLICATIONS** | **Bacterial OM can cause MASTOIDITIS, Acute Osteomyelitis**<br>Recurrent bouts of Acute OM may lead to **chronic** disease & ***hearing loss***<br>*Chronic infection has potential to **perforate the eardrum**, spread into mastoid spaces, & penetrate into cranial vault* | |
| **RADIOLOGY** | | |
| **PATHOLOGY** | | |

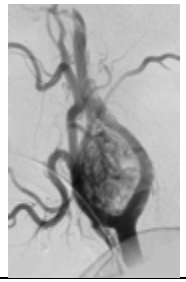
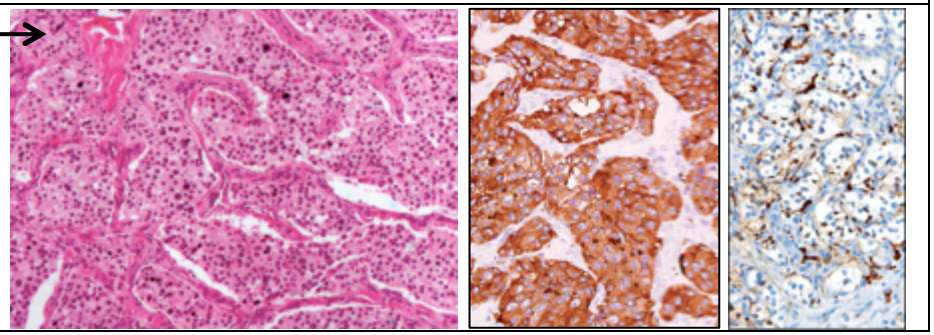
| CHOLESTEATOMA<br>MALES 20-30 years old | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | Non-neoplastic cystic lesions<br>**PAINLESS** destruction of the mastoid bone overtime<br>Sometimes visible neck masses<br>**Treatment**: surgical excision if large enough | |
| **PATHOGENESIS** | Associated with **Chronic OM**<br>**Chronic inflammation & perforation of the eardrum with ingrowth of squamous epithelium in the middle** | |
| **COMPLICATIONS** | Cysts progressively enlarge & can erode ossicles, labyrinth, & adjacent bone<br>Recurrence possible with incomplete excision | |
| **RADIOLOGY** | | |
| **PATHOLOGY** | Keratinizing squamous epithelium or **metaplastic, mucus-secreting epithelium**<br>Cysts filled with desquamated squamous cells |   |

| OTOSCLEROSIS<br>Early decades of life | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | *Abnormal bone deposition in the middle ear around footplate of* ***stapes (oval window)***<br>Slowly **progressive** over decades<br>**Treatment:** stapedectomy | |
| **PATHOGENESIS** | **Familial (AD) with variable penetrance** | |
| **COMPLICATIONS** | **Hearing loss (bilateral) –** degree of immobilization determines severity of hearing loss | |
| **PATHOLOGY** | **Fibrous ankylosis** followed by bony overgrowth | |

| BRANCHIAL CYST<br>Young Adults > Children | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | Well-circumscribed cyst (2-5 cm) usually found on **upper lateral aspect of the neck along the SCM**<br>Enlarge *slowly*<br>**Treatment:** excision is curative | |
| **PATHOGENESIS** | Vast majority arise from remnants of **second branchial arch** | |
| **COMPLICATIONS** | RARE malignant transformation | |
| **RADIOLOGY** |   | |
| **PATHOLOGY** | Lined by stratified squamous or pseudostratified columnar<br>Surrounded by **reactive lymphoid tissues** | |

| THYROGLOSSAL DUCT CYST<br>Children | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | **PAINLESS** cyst or mass that arises from embryological remnants along tract of gland migration – ***midline*** ***at base of tongue to anterior neck***<br>**Treatment:** surgical excision | |
| **PATHOGENESIS** | | |
| **COMPLICATIONS** | Malignant transform is rare (papillary thyroid cancer) | |
| |  | |
| **PATHOLOGY** | Lined by stratified squamous mucosa or pseudostratified columnar<br>Wall of cysts has **lymphoid aggregates** or **remnants of thyroid gland** |  |

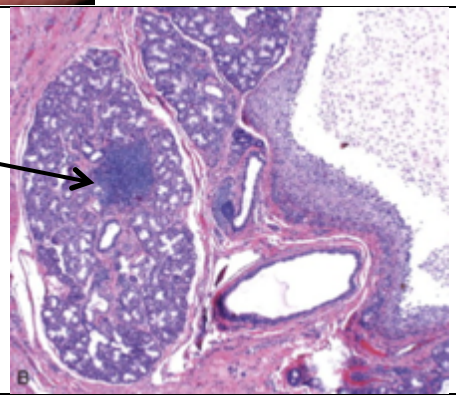
| PARAGANGLIOMA | |
|---|---|
| **DEFINITION/ CLINICAL** | Typically develop in 2 locations:<br>– Paravertegral paraganglia<br>– Great vessels of head & neck (carotid & aortic bodies, jugulotympanic ganglia)<br><br>*Pheochromocytoma-like tumors outside of the adrenals – 70% of extra-adrenal paragangliomas occur in head & neck region; often **angle of jaw***<br>*Present with **unexplained HTN, redness of skin, flushing*** |

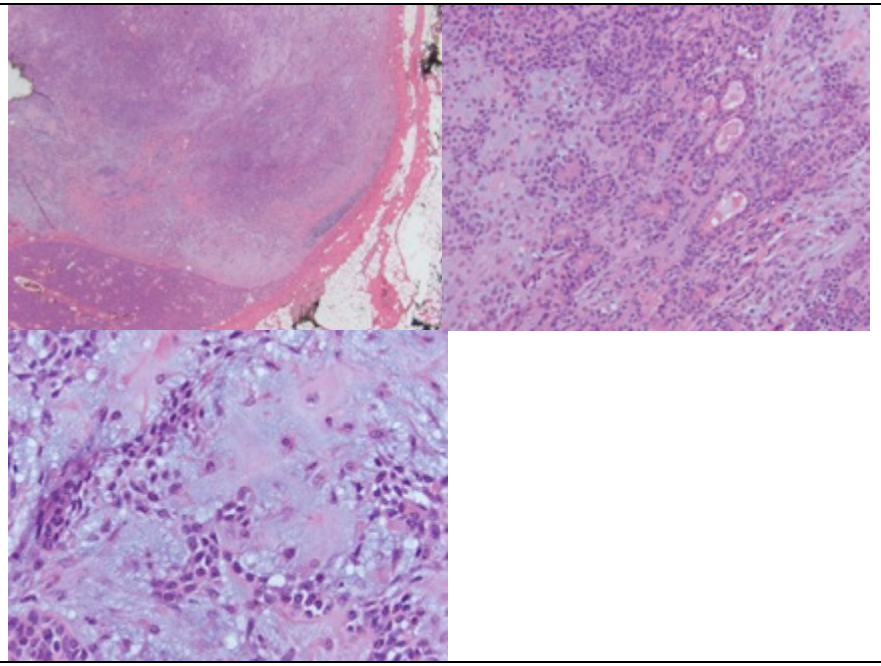
| ★ CAROTID BODY TUMOR<br>5th & 6th decades | |
|---|---|
| **DEFINITION/ CLINICAL** | Typically **BENIGN PARAGANGLIOMA –** RARE, **slow-growing, PAINLESS** mass around **bifurcation of the common carotid artery**<br>Presents with *hoarseness, difficulty swallowing, +/- HTN & palpitations (if it releases catecholamines)*<br>May **pulsate on palpitation & elicit a BRUIT** *(whooshing sound of blood pushing past an obstruction)* |
| **PATHOGENESIS** | Incidence is greater in people living at high altitudes<br>Associated with **familial MEN2 syndrome** (bilateral) |
| **COMPLICATIONS** | Frequently RECUR after incomplete resection<br>May **metastasize** to Regional Lymph Nodes & distant sites – *impossible to predict chance of metastasis* |
| **RADIOLOGY** |   |
| **PATHOLOGY** | **NESTS (Zellballen) of round blue cells**<br>Abundant, clear, or granular, **eosinophilic cytoplasm** with **uniform, round nuclei**<br><br>**EM:** **well-demarcated neurosecretory granules**<br><br>Chief cells are **CHROMOGRANIN + & SYNAPTOPHYSIN +**<br>Sustentacular cells are **S100 +**  |

| XEROSTOMIA<br>> 70 years old | |
|---|---|
| **DEFINITION/ CLINICAL** | ***Dry mouth*** *resulting from decreased production of saliva*<br>May present as **dry mucosa** and/or **atrophy of the papillae of the tongue w/ fissuring & ulcerations** |
| **PATHOGENESIS** | Frequent **side effect** of many commonly prescribed medications – *anticholinergic, antidepressant/antipsychotic, diuretics, antiHTN, sedative, muscle relaxants, antihistamine*<br>Complication of **radiation therapy**<br>**Sjogren Syndrome** – usually + dry eyes (keratoconjunctivitis sicca) |
| **COMPLICATIONS** | **DENTAL CARIES**<br>Candidiasis<br>Difficulty swallowing (dysphagia) |
| **PATHOGENESIS** | |

| SIALADENITIS | |
|---|---|
| **DEFINITION/ CLINICAL** | *Inflammation/infection of the salivary gland; usually unilateral, yet* ***PAINFUL*** *enlargement* |
| **PATHOGENESIS** | Induced by **trauma**, viral/bacterial **infections**, or **autoimmune (Sjogren)**<br>– Most common form of viral sialadenitis is **MUMPS**<br>– Bacterial sialadenitis is most often in the **MAJOR salivary glands**<br><br>**USUALLY secondary to ductal obstruction by stones (*sialolithiasis*)** |
| **PATHOGENESIS** | **Non-specific inflammation**<br>Suppurative w/ abscess formation + purulent ductal discharge in bacterial sialadenitis |

| SIALOLITHIASIS | |
|---|---|
| **DEFINITION/ CLINICAL** | *Calculi/salivary stones that can form in the salivary gland ducts – Most commonly* ***submandibular gland***<br>**PAINFUL** swelling of the gland due to **partial or complete obstruction of the duct** – *Increased pain & swelling upon eating* |
| **PATHOGENESIS** | |
| **COMPLICATIONS** | |
| **RADIOLOGY** | **Radioopaque**<br>*Mucus plugs do not appear on radiographs* |
| **PATHOGENESIS** | |

| MUCOCELE<br>Toddles, Young Adults, Elderly<br>*Most common lesion of the salivary gland | |
|---|---|
| **DEFINITION/ CLINICAL** | *Blockage or rupture of gland duct with leakage of saliva into surrounding stroma*<br>**FLUCTUANT** swellings of the **lower lip** secondary to **trauma; *rapid onset***<br>**Treatment:** complete excision of cysts & its accompanying minor salivary gland lobule is require |
| **PATHOGENESIS** | |
| **COMPLICATIONS** | Recurrent with incomplete excision |
| |   |
| **PATHOLOGY** | **Blue-translucent colored dome-shaped lesion**<br>**Pseudocysts lined by granulation tissue/fibrous tissue**<br>Filled with **mucin & inflammatory cells**  |

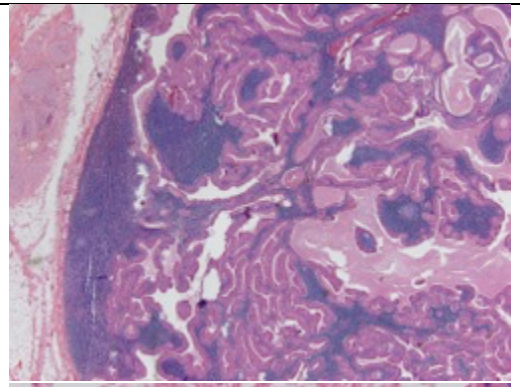
| SALIVARY GLAND TUMORS: Pleomorphic Adenoma (AKA Mixed Tumor) | | |
|---|---|---|
| **DEFINITION/ CLINICAL** | *Common,* ***BENIGN*** *tumor in* ***parotid*** *or* ***submandibular gland*** **PAINLESS,** ***slow-growing***, MOBILE, well-demarcated mass |  |
| **PATHOGENESIS** | High fraction associated with chromosomal rearrangements involving **PLAG 1** **(overexpressed TF)** **Radiation exposure increases the risk** | |
| **COMPLICATIONS** | **Recurrence** rate ~4% but with simple enucleation approached 25% | |
| **PATHOLOGY** | Gray-white, **myxoid** & translucent areas of **chondroid matrix** **Mixture of ductal (epithelial) & myoepithelial cells** |  |

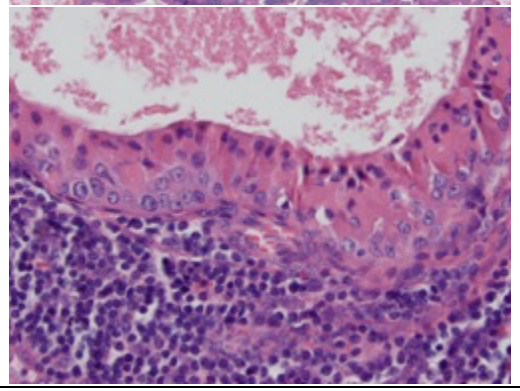
## SALIVARY GLAND TUMORS: Warthin Tumor

**MALE SMOKERS, 5th to 7th decades of life**

***Second most common salivary gland neoplasm**

| | |
|---|---|
| **DEFINITION/ CLINICAL** | **BENIGN** round, **encapsulated** lesion almost exclusively in **superficial parotid gland**<br>***PAINLESS**, slow-growing cystic lesion found below the ear* |
| **PATHOGENESIS** | |
| **COMPLICATIONS** | |
| **RADIOLOGY** |  |
| **PATHOLOGY** | **Cystic or cleft-like spaces** filled with mucinous/serous secretions<br>**DOUBLE LAYER of epithelial cells** resting on dense lymphoid cell infiltrate with germinal centers<br>**Palsidating columnar cells** with **abdundant**, finely **granular**, **eosinophilic cytoplasm**<br>Granular appearance – numerous mitochondria (**oncocytic cells**)<br><br>***Look for oncocytic cells lining cysts & surrounded by lymphoid tissue*** |





## SALIVARY GLAND TUMORS: Adenoid Cystic Carcinoma

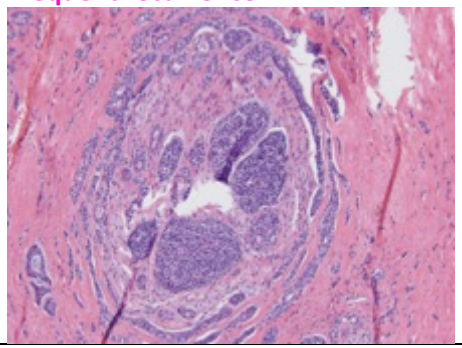
**DEFINITION/ CLINICAL**

*Relatively umcommon small, **slow-growing**, **PAINFUL** mass of the **minor salivary glands***
*Unpredictable behavior*

**PATHOGENESIS**

**COMPLICATIONS**

Tendency to invade **PERINEURAL SPACES**
**Frequent recurrence**

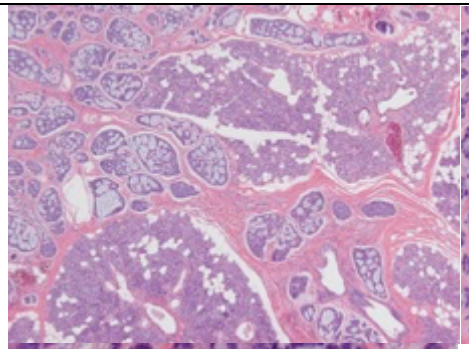


*Invasion into soft tissue & perineural invasion surrounding the parotid gland*

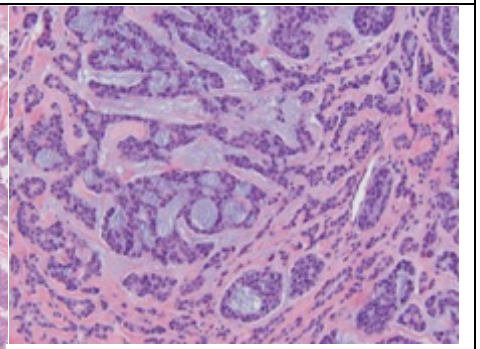
**RADIOLOGY**

**PATHOGENESIS**

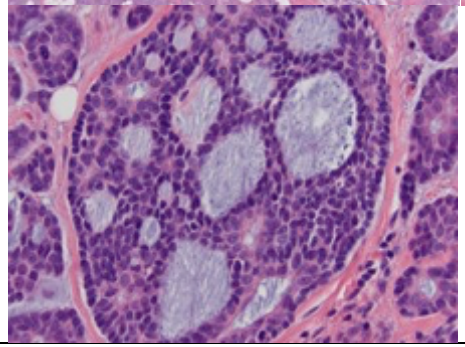
**Poorly encapsulated**, **infiltrative**
**Small cells, compact nuclei + SCANT CYTOPLASM**
**HYALINE MATERIAL** in-between tumor cells



*Cribiform pattern "swiss cheese"*



*Tubular & cribiform patterns*



*Dual luminal & abluminal differentiation (2 cell types)*

**Look for tumor cells forming glands surrounded by eosinophilic material & excess basement membrane*