Salivary Gland Diseases

MBCHB Year VI Lecture
1st April 2021

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Lecture Outline

- Introduction
- Learning objectives
- Anatomy of salivary glands
- Classification of salivary gland diseases
- Clinical presentation of salivary gland diseases
- Investigations of salivary gland diseases
- Management of salivary gland diseases
- Specific disease conditions

Introduction

- The **salivary glands** in mammals are exocrine glands that produce saliva through a system of ducts.
- The Saliva is produced in and secreted from salivary glands plays a significant role in lubrication, digestion, immunity, and the overall maintenance of homeostasis within the human body.
- Saliva contains various chemicals with water including mucus, salts, antibacterial substances, enzymes and chemicals that control the pH in the mouth

Introduction

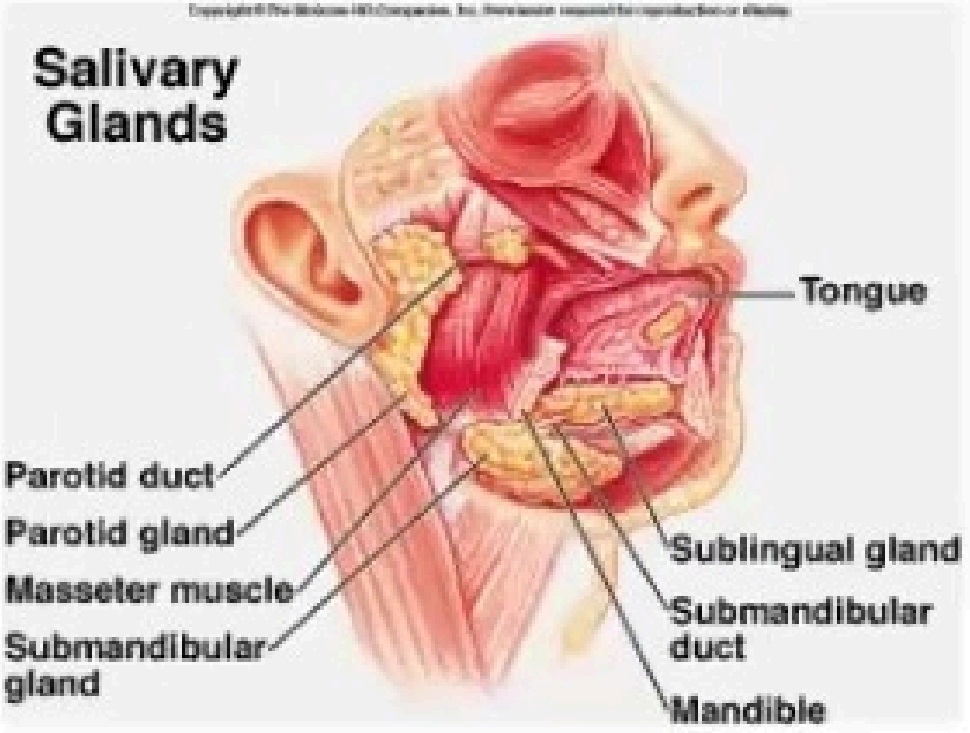
- Therefore, disease of the salivary glands can have far reaching effects on the oral as well as general health
- The purpose of this lecture is o provide an overview of the disease of the salivary glands

Learning objectives

- At the end of the lecture learners shall be able to discuss:
  - The anatomy of the salivary glands
  - The classification of salivary gland diseases
  - Clinical presentation of salivary gland diseases
  - Investigations of salivary gland diseases
  - The management of salivary gland diseases

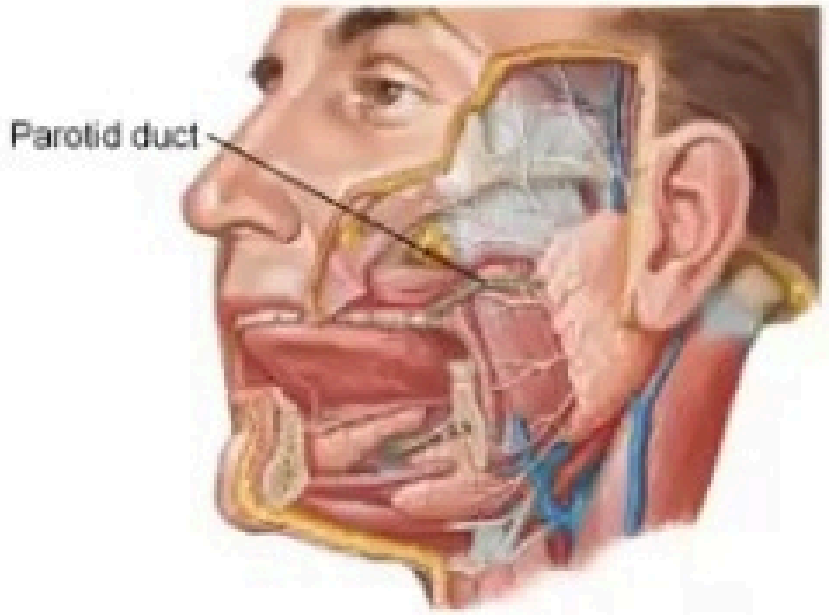
The anatomy of the salivary glands

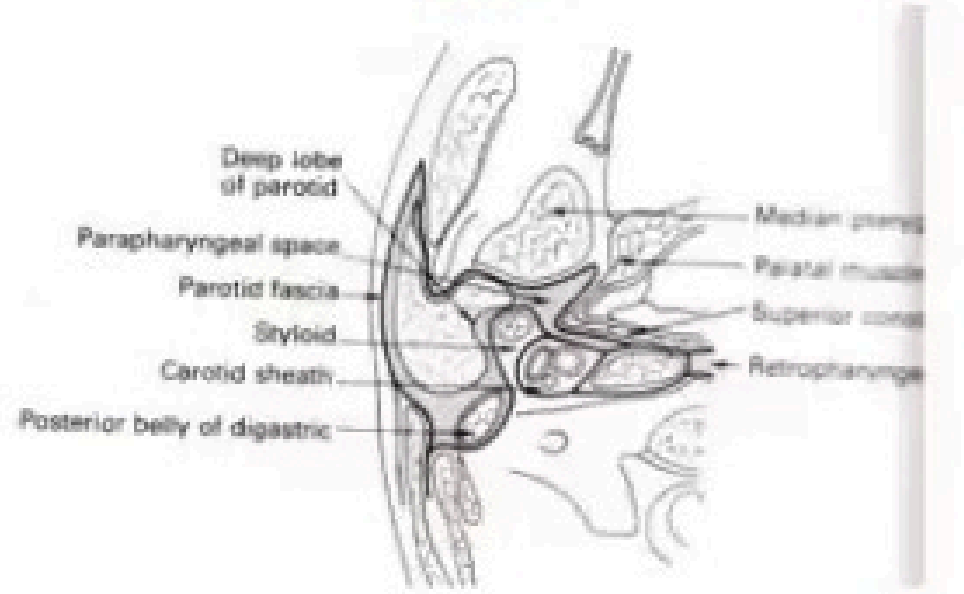
- Salivary gland system consists of:
  - three pairs of large salivary glands
    - Parotid
    - Submandibular
    - Sublingual
  - Numerous minor salivary glands scattered in the upper aerodigestive mucosa half of which occur in the palate



Parotid Gland

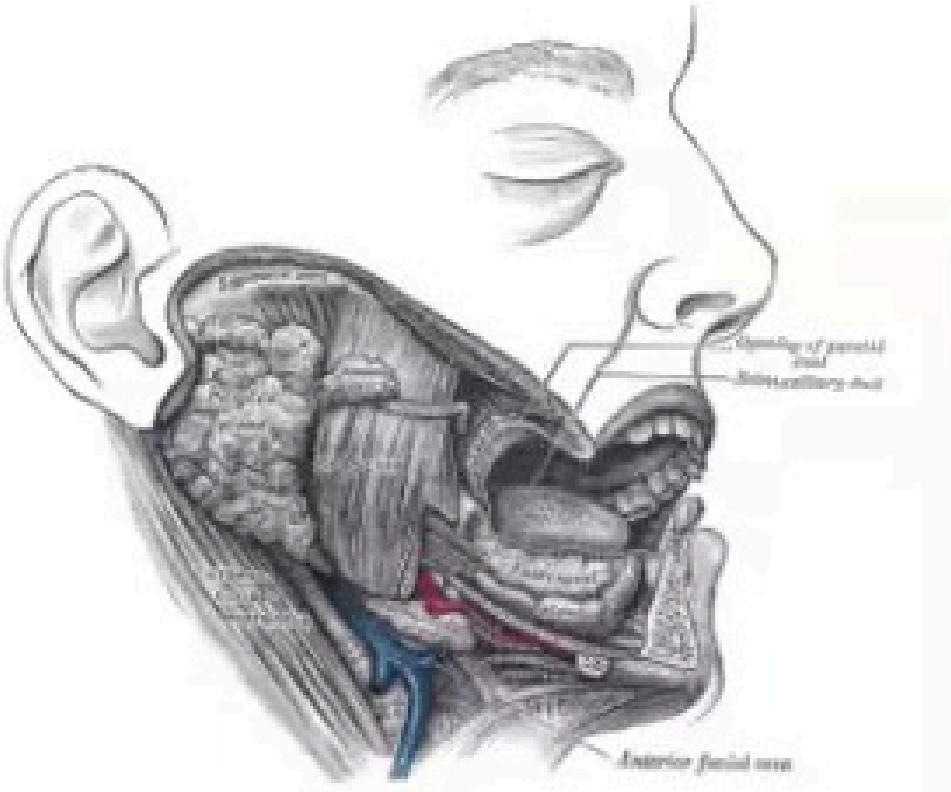
- largest salivary gland
- located in the triangle surrounded by:
  - superiorly by the zygomatic arch
  - anteriorly by the masseter
  - posteriorly by the sternocleidomastoid



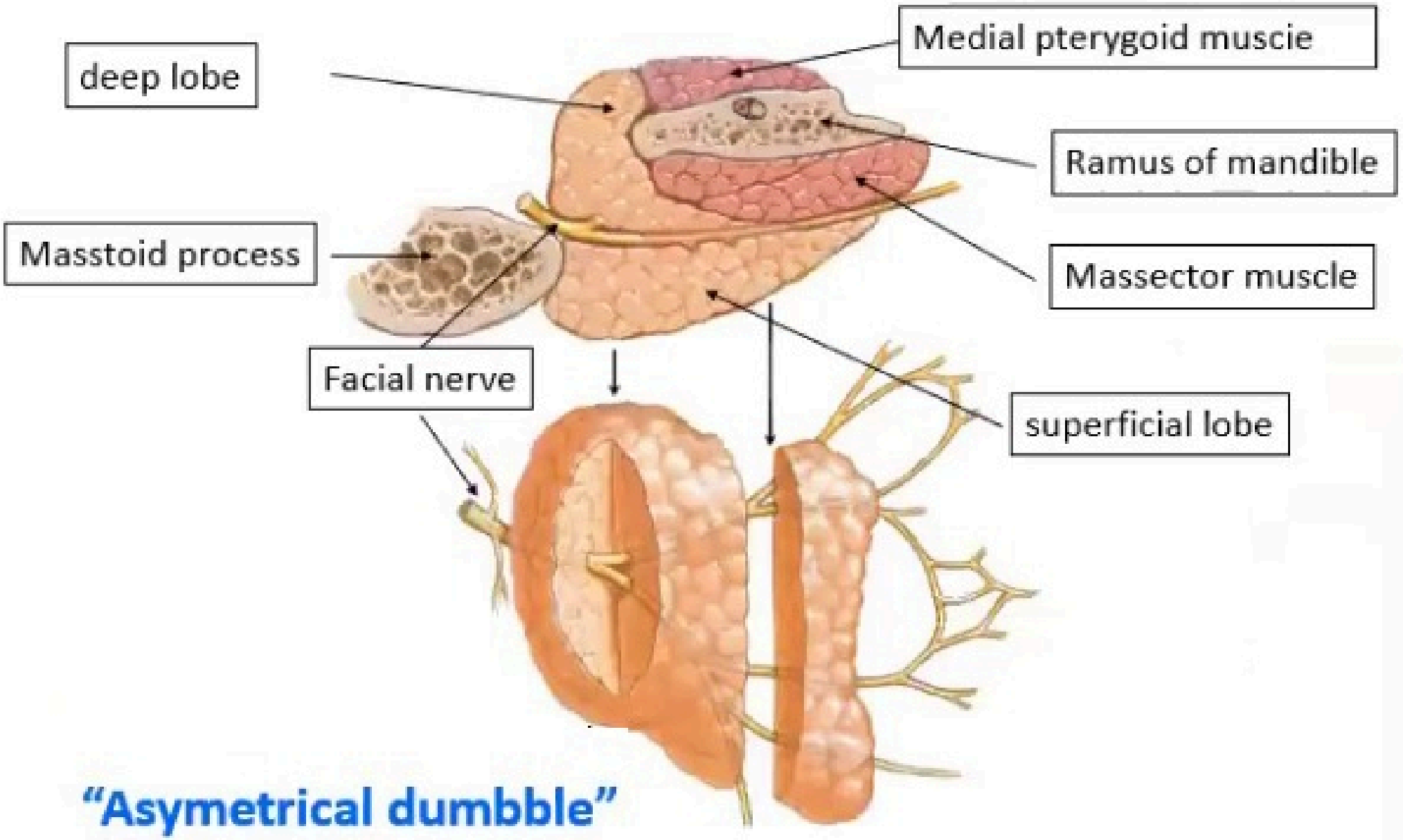


Parotid Gland

- inferior pole mostly confined to the angle of mandible.
- medial pole mostly confined to the temporomandibular joints.
- parotid duct (Stenon's duct) leaves the anterior border, passes anteriorly on the masseter, penetrates the buccinator, and opens into the buccal cavity.
- facial nerve (CN VII) penetrates the gland



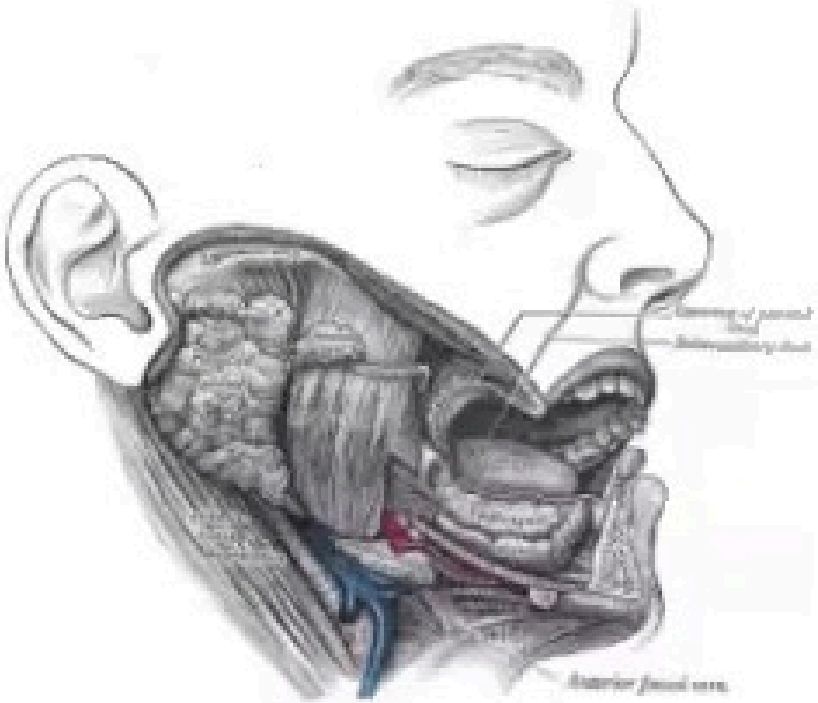
Facial Nerve Branches and Parotid Gland Sectioned

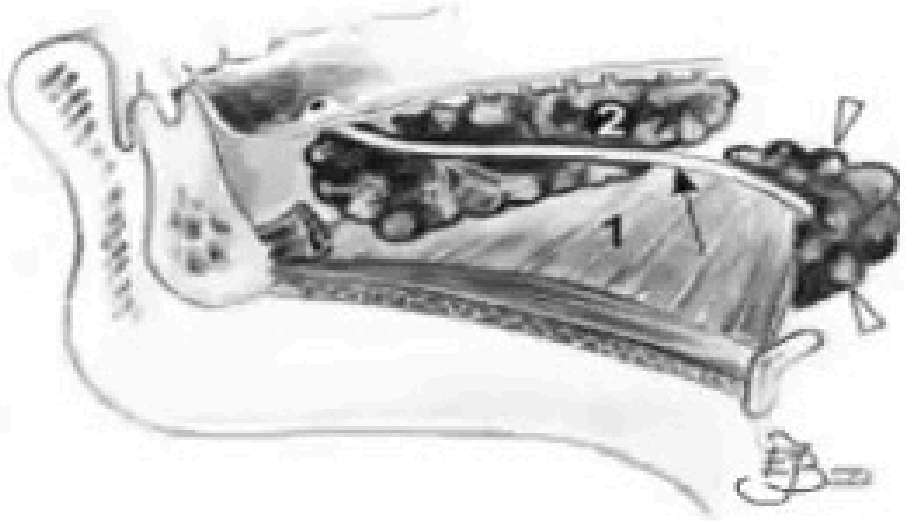


"Asymetrical dumbble"

Submandibular Gland

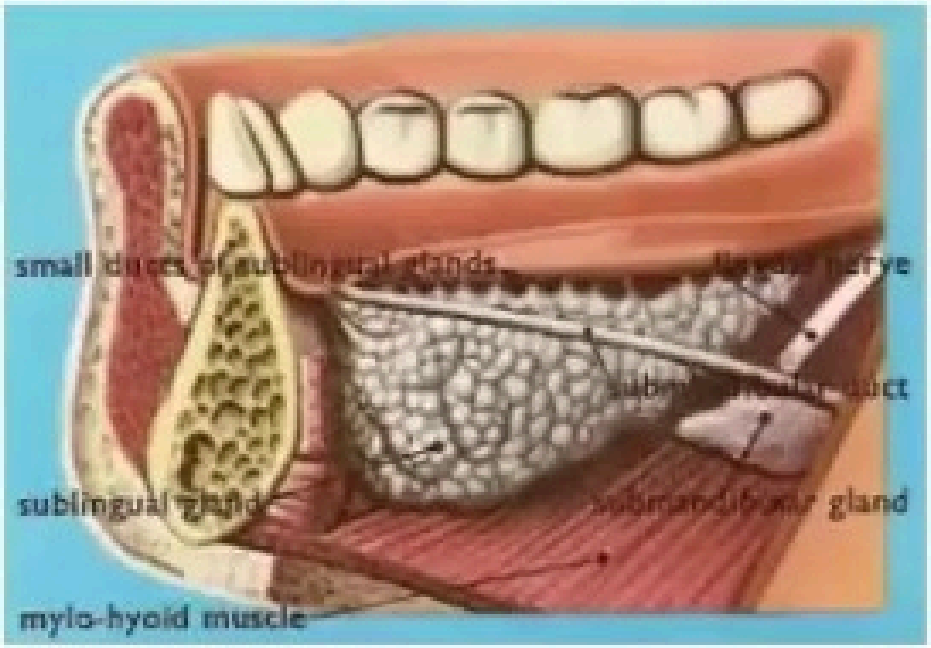
- Located in submandibular triangle
- The gland forms a **'C'** around the anterior margin of the **Mylohyoid** muscle; a superficial and deep lobe.
- submandibular duct (Wharton's duct)
  - runs forward along the lingual nerve in the sublingual space
  - opens in the sublingual caruncle





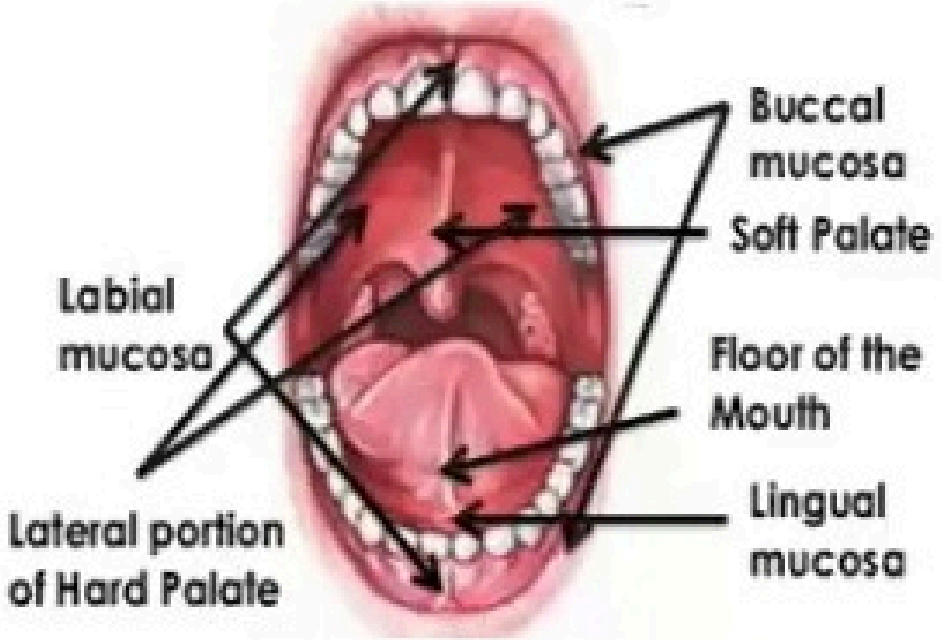
Sublingual Gland

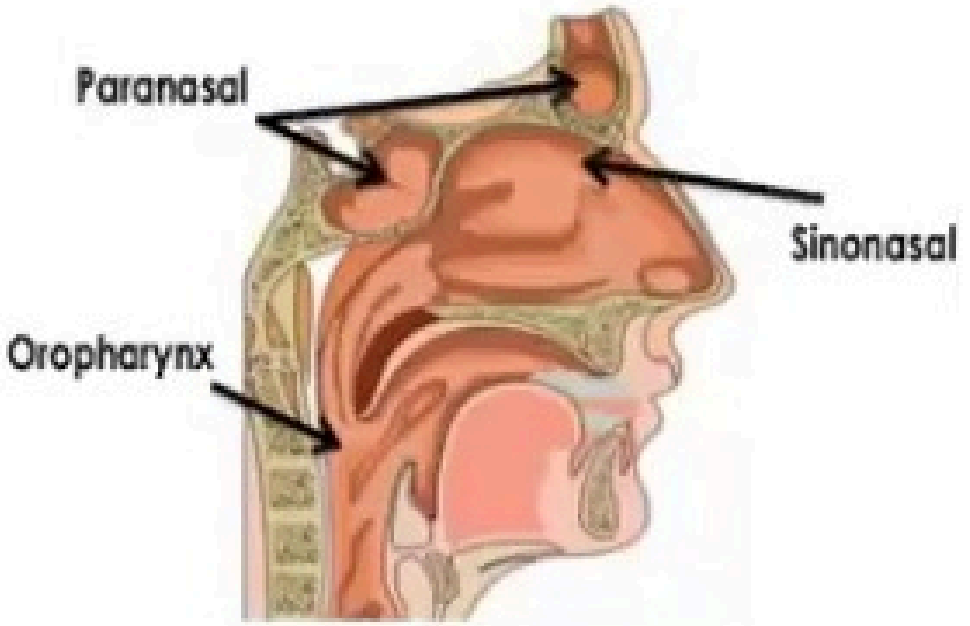
- **Smallest** of the major salivary glands
- Located in the floor of the mouth superior of the mylohyoid muscle
- superior border of sublingual gland appears as the sublingual fold in the oral floor.
- major sublingual duct (Bartholin's duct) opens in the sublingual caruncle.
- numerous minor sublingual ducts on the sublingual fold.



Minor Salivary Glands

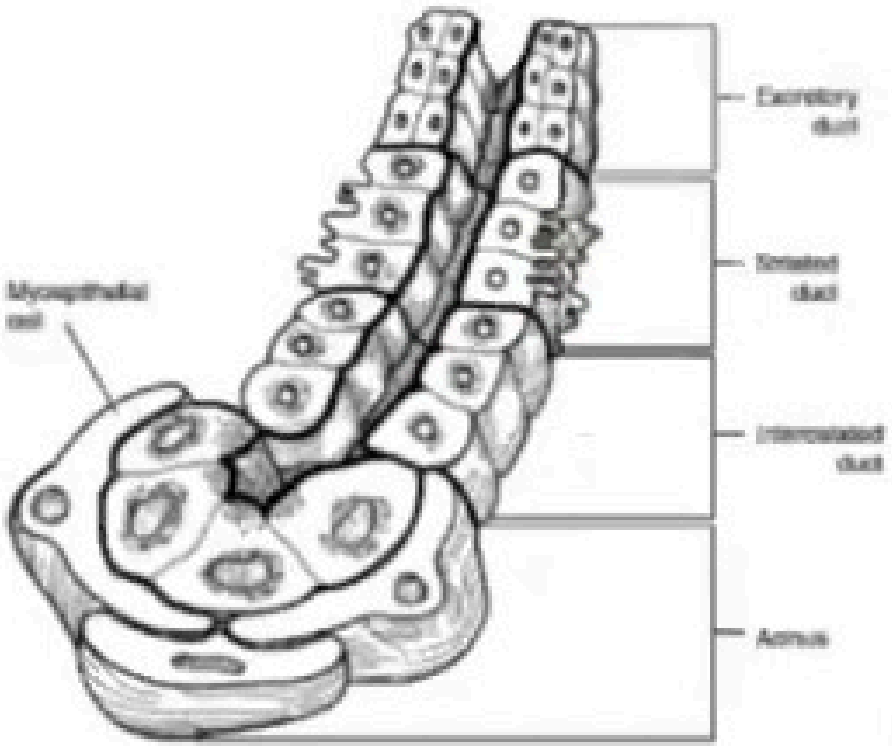
- These lie just under mucosa.
- Distributed over lips, cheeks, palate, floor of mouth & retro-molar area.
- Also appear in upper aerodigestive tract
- Contribute **10%** of total salivary volume.





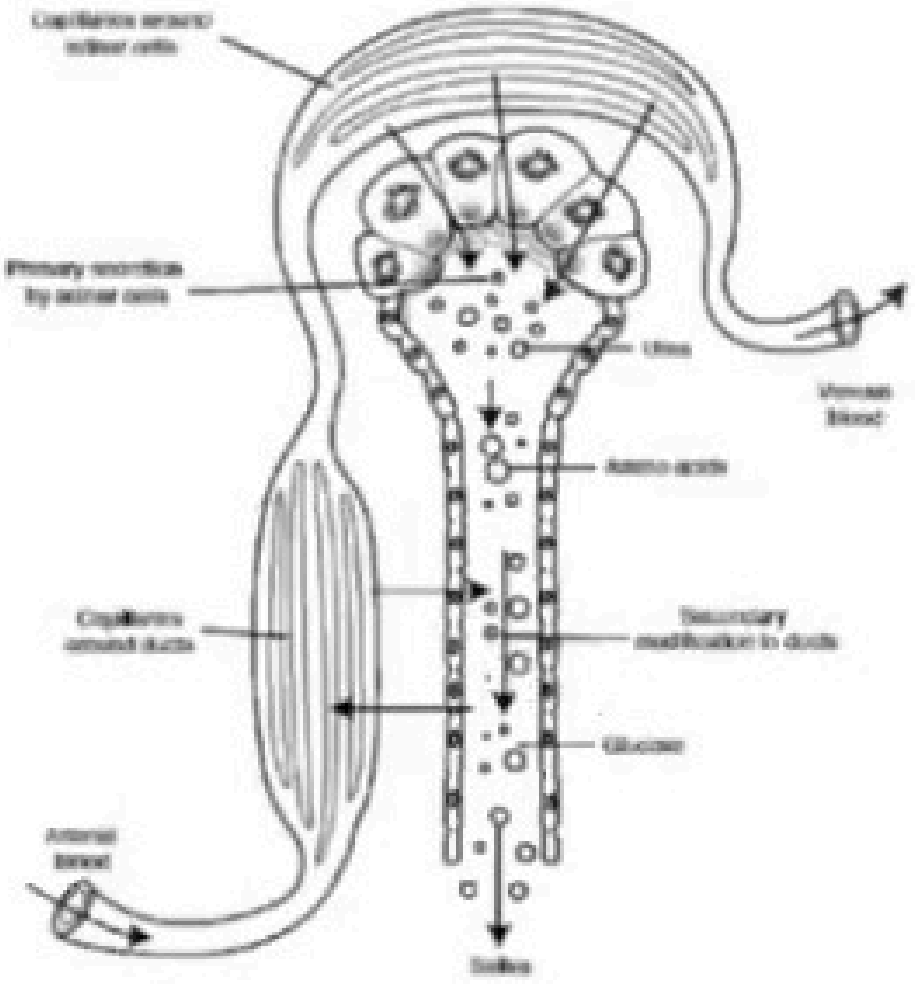
Functional histology of the Salivary glands

- The basic secretory units of salivary glands are clusters of cells called acini.
- These cells secrete a fluid that contains water, electrolytes, mucus and enzymes, all of which flow out of the acinus into collecting ducts.



Functional histology of the Salivary glands

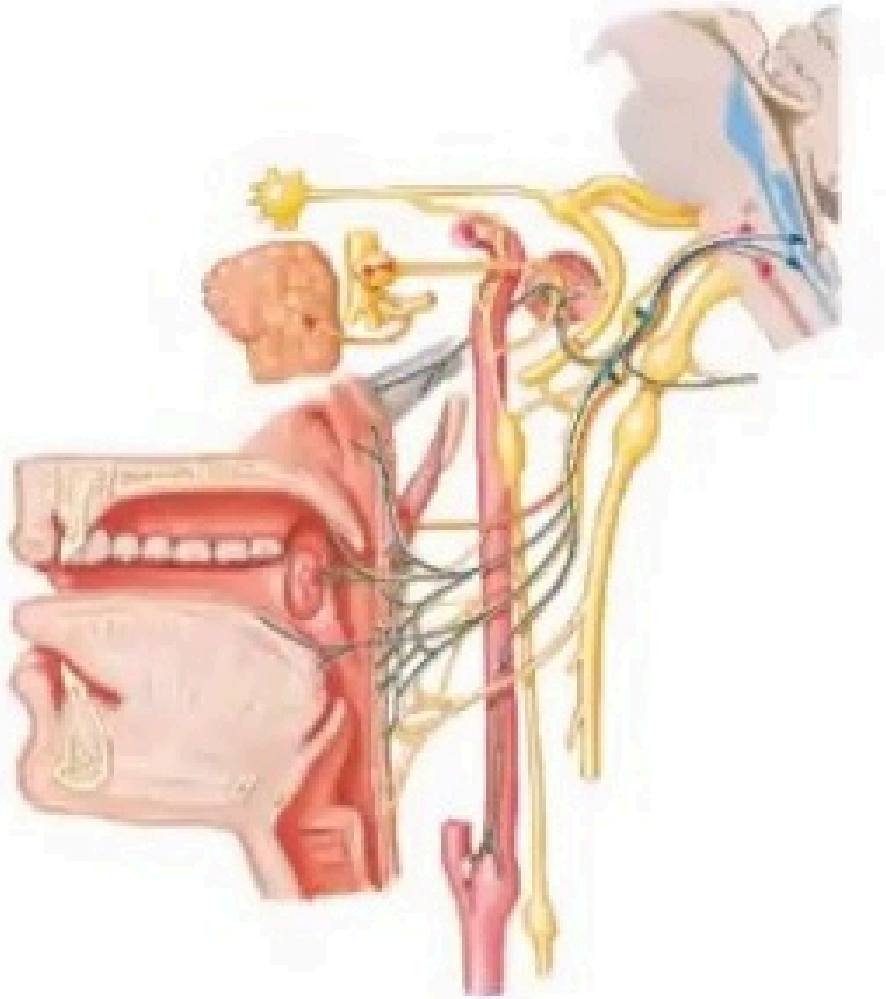
- Within the ducts, the composition of the secretion is altered.
- Much of the sodium is actively reabsorbed, potassium is secreted, and large quantities of bicarbonate ion are secreted



Electrolyte secretion by the acinar and ductal cell

Innervation

- Sympathetic innervation:
  - External carotid plexuses
- Parasympathetic innervation:
  - Glossopharyngeal n. and Facial n



Classifications of salivary gland diseases

- **None-neoplastic**
  - Congenital/Developmental
  - Acquired
- **Neoplastic**
  - Benign
  - Malignant

Symptoms of Salivary Gland Disease

- There are several symptoms of salivary gland disease, such as:
  - Dry mouth (xerostomia)
  - Excessive salivation (sialorrhoea)
  - Pain in the mouth
  - Swelling of the mouth and/or neck
  - Ulcerations

Diagnostic approaches

- Past & present medical history
- Clinical examination
- Evaluation of dry mouth
- Collection and analysis of Saliva
- Salivary gland imaging
- Salivary gland biopsy & FNA
- Serologic evaluation

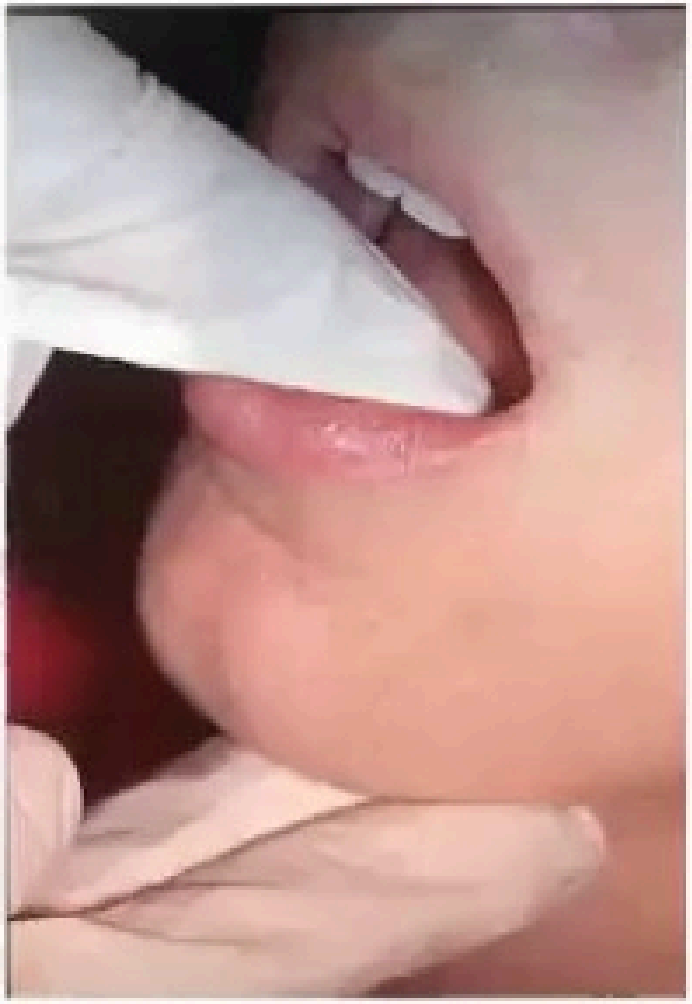
Clinical History

- History of swellings / change over time?
- Difficulty in opening the mouth (Trismus)?
- Pain?
- Variation with meals?
- Bilateral?
- Dry mouth? dry eyes?
- Recent exposure to sick contacts (mumps)?
- Radiation history?
- Current medications?

Clinical examination

- **Extra-Oral examination**:
  - Palpate cervical lymph nodes
  - Palpate the gland

- Slightly rubbery
- Painless unless infected/inflammed
  - Check motor function of facial nerve

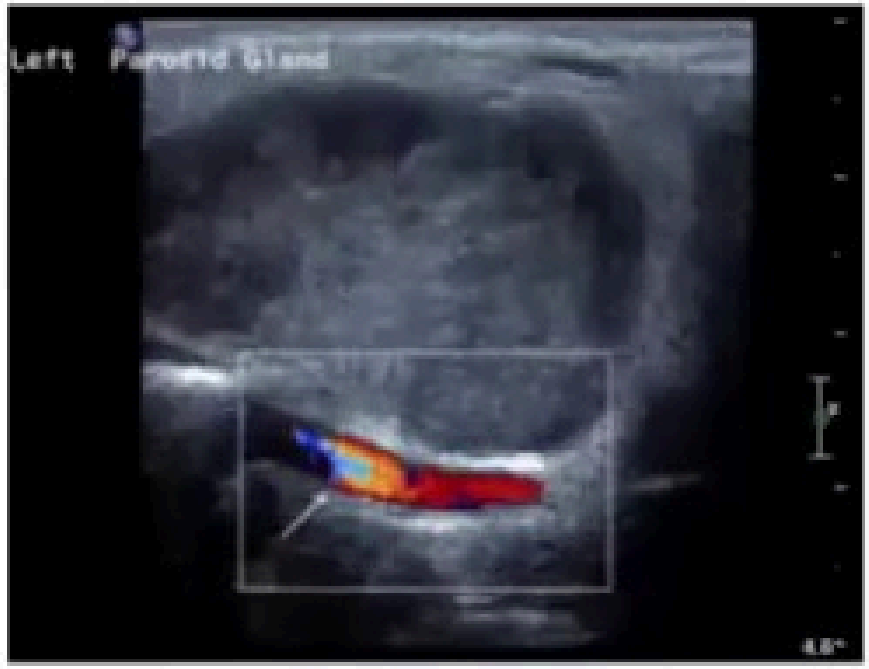


Imaging

- A variety of imaging modalities are available.
- These include:
  - Plain radiographs,
  - ultrasound sonography,
  - conventional X-ray sialography,
  - DSA sialography (digital subtraction sialography),
  - MRI and MR sialography,
  - sialendoscopy,
  - salivary gland scintigraphy.

Ultrasonography

- Longitudinal colour Doppler ultrasound image of large pleomorphic adenoma in superficial lobe of the left parotid gland.

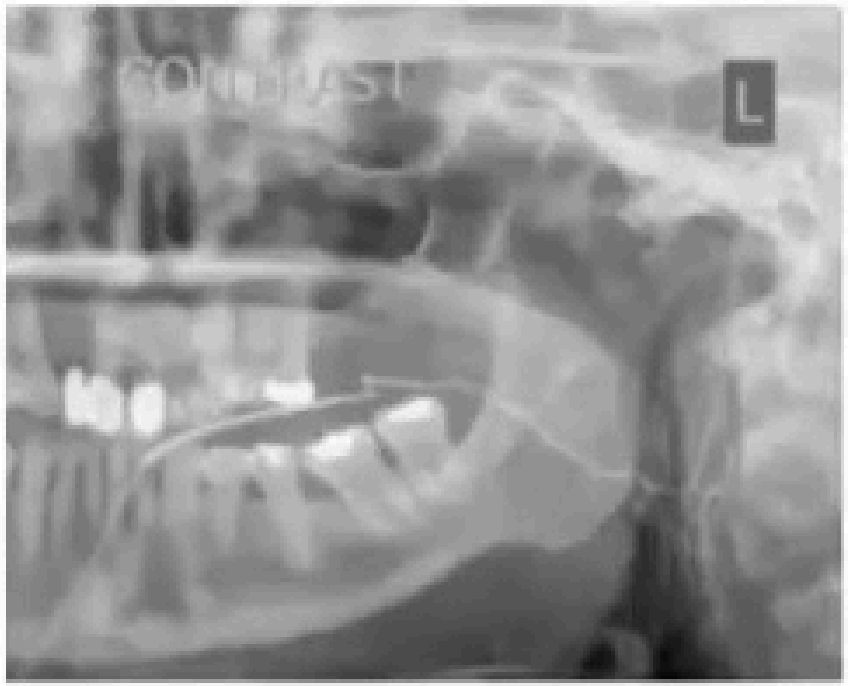


MRI

- Magnetic resonance imaging of large deep lobe component to a pleomorphic adenoma of the parotid gland (white arrow)

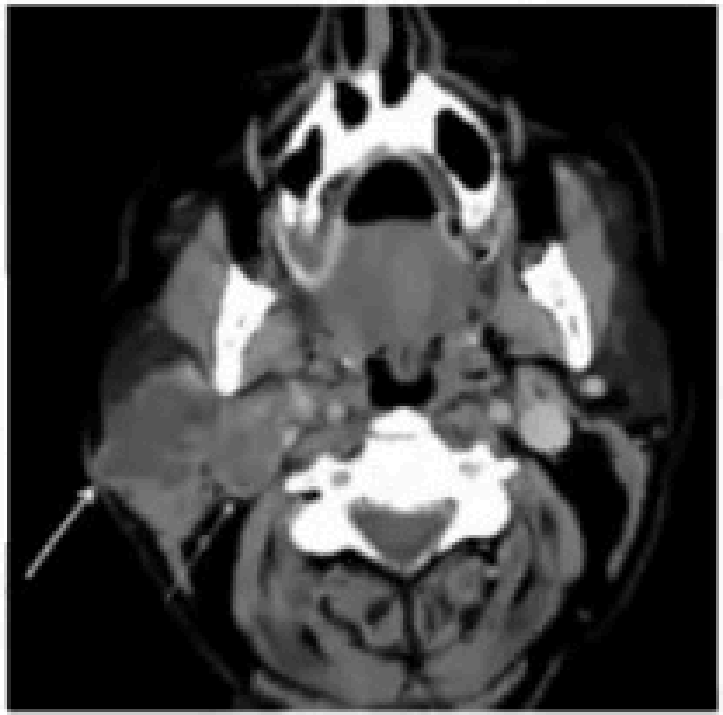
Sialogram

- Contrast sialogram of catheter in the distal duct and normal ductal appearances



CT Scan

- Axial contrast enhanced CT of male patient with a right parotid mass and facial nerve palsy.
- Image shows the right parotid mass infiltrating the subcutaneous fat (solid arrow), and regional spread to a right upper jugular chain (level 2) lymph node (dotted arrow).



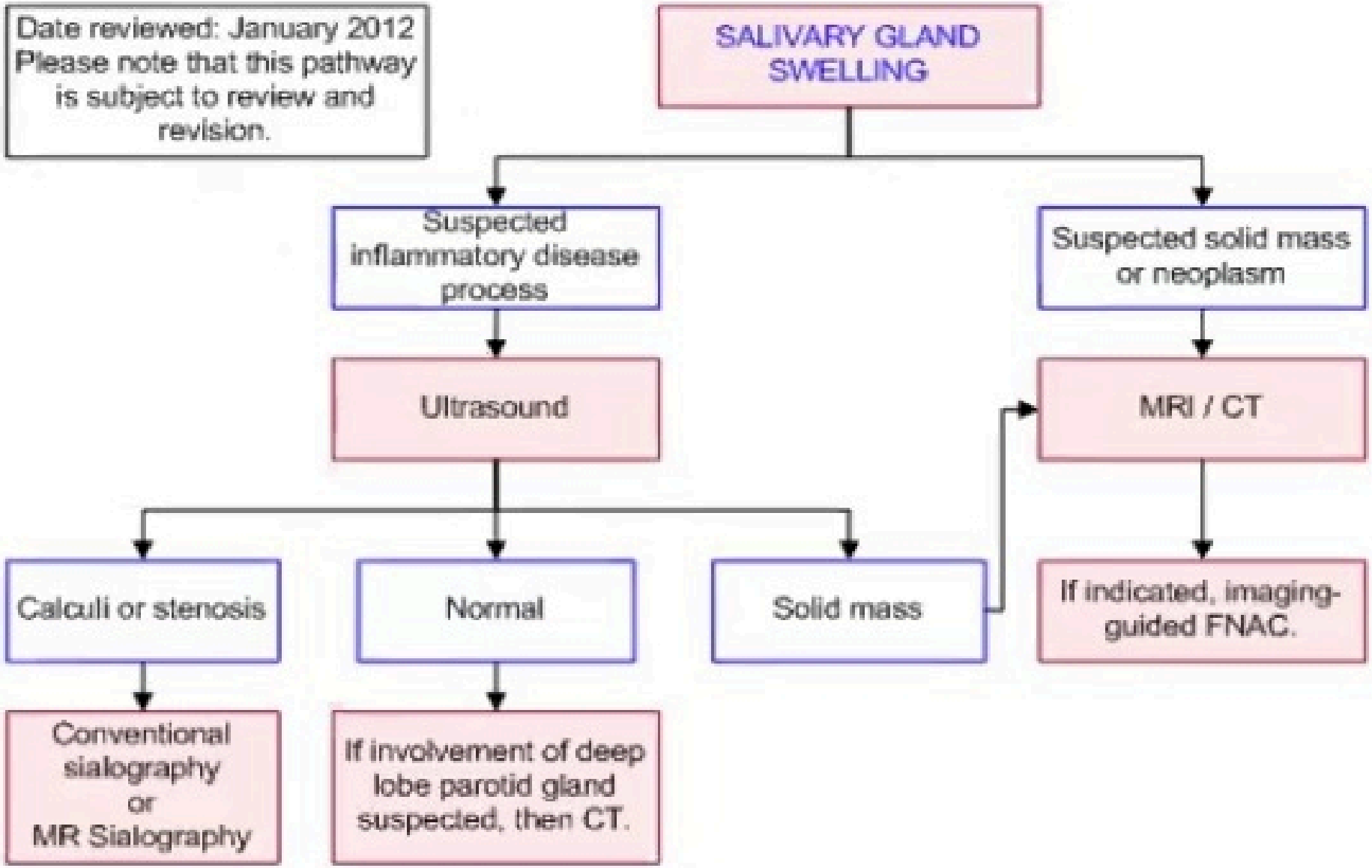
Biopsy

- **Fine Needle Aspiration Biopsy**
  - Valuable to exclude neoplasm or lymphoma
  - Accurate for diagnosis of non-neoplastic enlargement
  - Acinar size measurement may be helpful (sialadenosis)
  - Clinicopatholgical correlation important
- **Diagnostic salivary gland biopsy**
  - Lower lip minor glands – obtain multiple glands
  - Sjogren's – greater than ones focus (>50 lymphocytes in area) in 4 mm2
  - Sarcoid – noncaseating granulomas

Laboratory investigations

- Laboratory investigations that may be required in diagnosing salivary gland diseases include:
  - HIV test
  - Angiotensin Converting Enzyme (sarcoid)
  - Autoantibodies (Sjogren's)
    - Rheumatoid factor
    - Antinuclear antibodies
    - Anti-SSA, anti – SSB
  - Antineutrophil Cytoplasmic Antibody; ANCA (Wegner's)
  - Hormone levels (e.g. TSH)

Investigation pathway



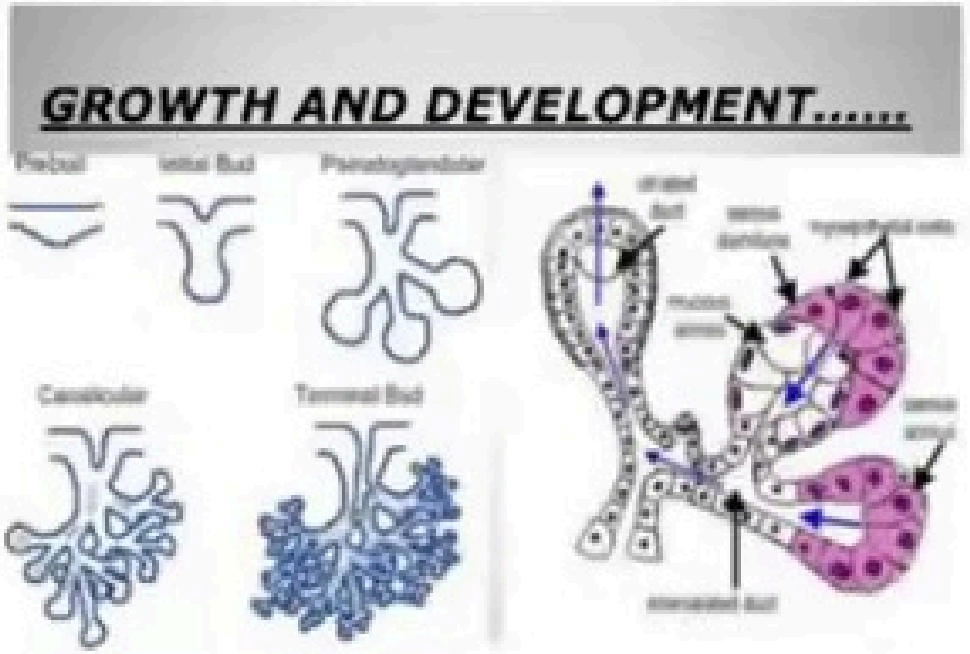
Treating Salivary Gland Disease

- Treatment options for salivary gland disease depend on the type and severity of the condition.

Specific conditions

Developmental Disorders:

- **Aplasia:** absent gland
- **Aberrancy:** abnormally located
- **Atresia:** the duct system is unopened
- **Hypoplasia:** gland underdeveloped
- **Diverticuli:** pouches in the duct wall
- **Congenital fistula:** abnormal opening to the skin surface



Acquired salivary gland diseases

- Functional Disorders
- Obstructive Disorders
- Cysts
- Infection
- Chronic granulomatous sialadenitis
- Autoimmune disorders
- Sialoadenoses

Functional Disorders

- Xerostomia
- Ptylasm (Sialorrhea)

Xerostomia (dry mouth)

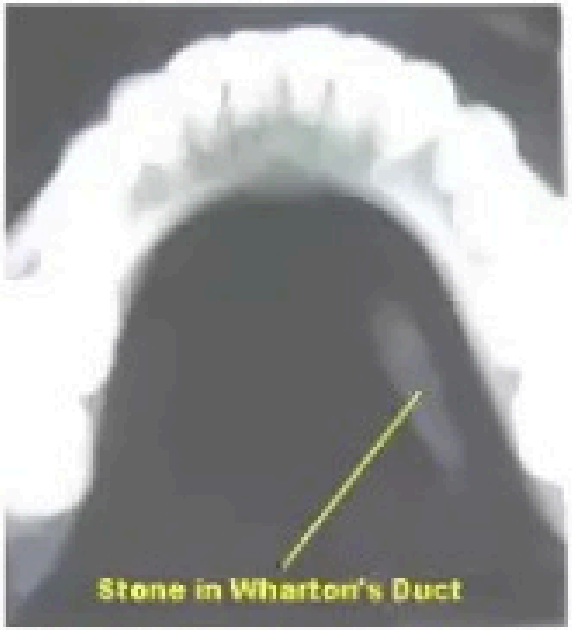
- Decrease in saliva flow
- Usually associated with other disease conditions:
  - Mumps,
  - Sarcoidosis
  - Sjoegrens syndrome
  - Lupus
  - Post-irradiation treatment

Sialorrhea (Increase in saliva flow)

- Increase in saliva flow
- Usually associated with other disease conditions:
  - Psychosis
  - Mental retardation
  - Certain neurological diseases
  - Rabies
  - Mercury poisoning

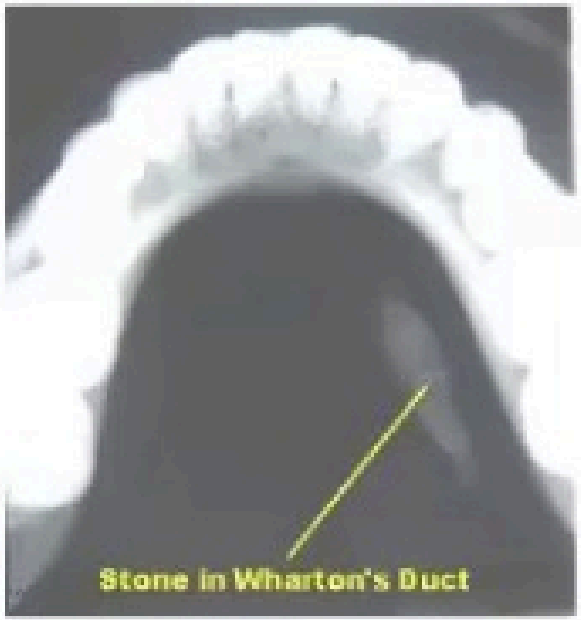
Obstructive Disorders

- Sialolithiasis
- Mucus plug
- Stricture and stenosis
- Extra ductal cause.



Sialolithiasis

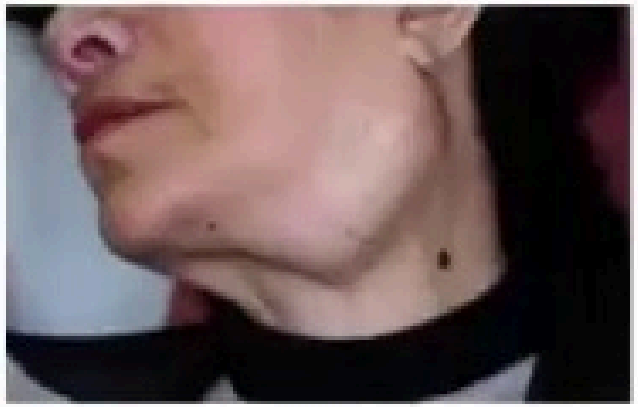
- Acute painful swelling of the gland before or after eating
- 85% occur in submandibular gland
- Usually subsides in an hour
- A stone may be palpated or demonstrated on radiographs
- 20% recurrence rate
- Can lead to acute suppurative sialadenitis, duct ectasia or stricture



Cysts

- **Mucocele**

Ranula



Infection

- Viral infection
- Bacterial infection
- Mycotic infection

Chronic Granulomatous Sialedenitis

- When granulomas are seen in a salivary gland, the following causes may have to be considered:
  - Cat-Scratch disease (Bartonella henselae)
  - Sarcoidosis (Heerfordt syndrome)
  - Actinomycosis (dental infection or trauma)
  - Wegener Granulomatosis (C-ANCA)
  - Syphilis
  - Tuberculosis

What are ANCA?

- Antineutrophil cytoplasmic antibodies (ANCA) are a family of autoantibodies directed against antigens found in the cytoplasmic granules of neutrophils and monocytes and are associated with neutrophil-mediated inflammation
- ANCA are a sensitive and specific marker for ANCA-associated systemic vasculitis.
- ANCA testing is usually performed to help diagnose or exclude Wegener's granulomatosis and microscopic polyangiitis.

Conti....

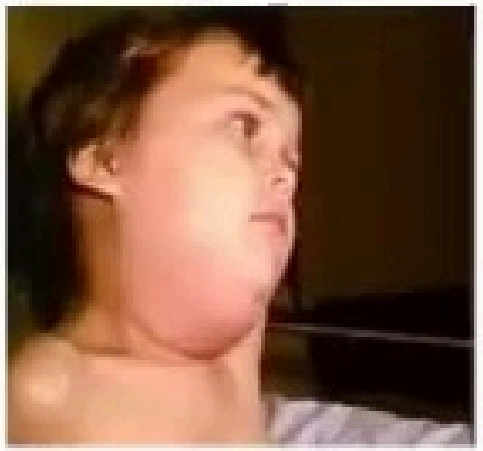
- The presence of ANCA is determined by indirect immunofluorescence (IIF) from fixed neutrophils on glass slides
- There are two main patterns of fluorescence depending on the purpose of the ANCA:
  - The cytoplasmic pattern (cANCA)
  - The perinuclear pattern (pANCA)
- **c-ANCA** (cytoplasmic ANCA) is highly specific 95 to 99% of Wegener's granulomatosis

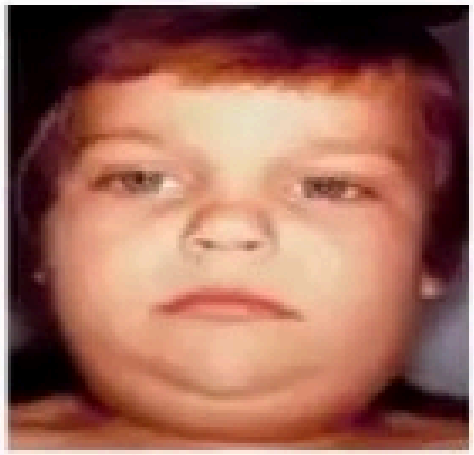
Viral sialadenitis

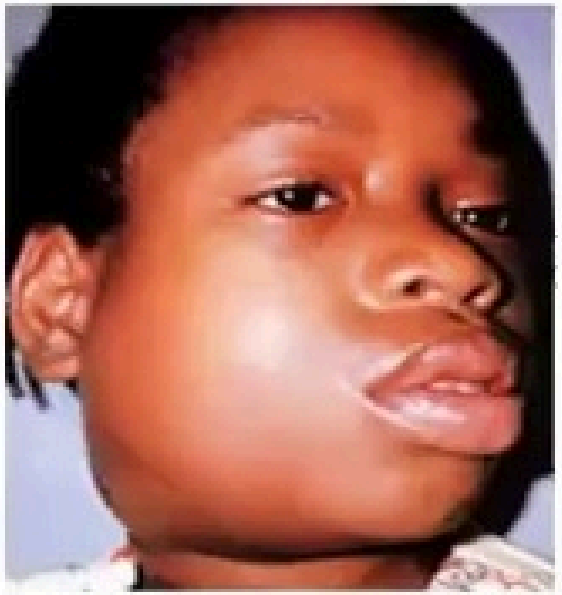
- Viral infections such as HIV, Herpes, cytomegalovirus, or Mumps may give rise to sudden salivary gland inflammation.
- Unlike bacterial sialadenitis which is localised to the gland viral sialadenitis is part of a systemic disease

Viral sialadenitis

- Mumps (epidemic parotitis)
- Caused by the mumps virus (MuV), (*Paramyxoviridae family*)
- Children are mainly affected
  - Acute painful parotitis
  - Fever, headache, fatigue, trismus
  - Condition is self limiting
- May be more severe in adults

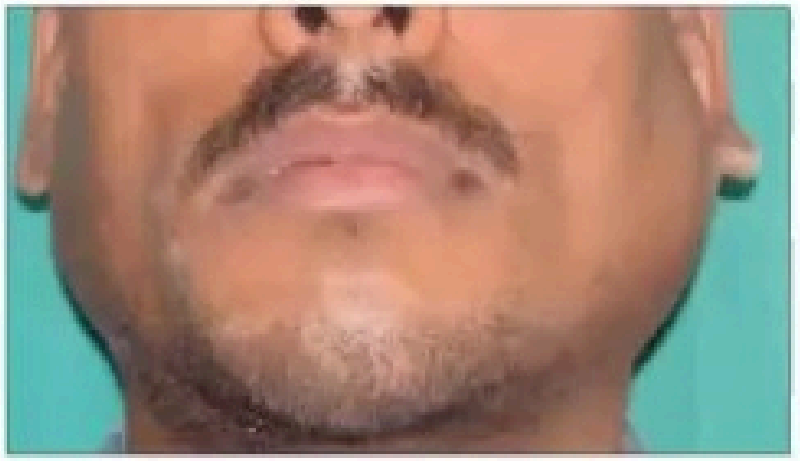






HIV-associated salivary gland disease (HIV-SGD)

- Seen in 5- 10% of HIV pts
- It encompasses multitude of pathologies
  - Diffuse infiltrative lymphocytosis syndrome (DILS)
  - benign lymphoepithelial cyst formation
  - Sjögren's syndrome-like conditions
  - etc
- Presents as Xerostomia and/or swelling of the major salivary glands



Acute suppurative sialoadenitis

- Swelling, xerostomia, failure of secretion with ascending infection
- Most common infective organisms: Staph aureus, Strep pyogenes
- Typically involve the parotid and submandibular glands.
- Various predisposing factors: include rates of salivary flow, the composition of the saliva, and variations in or damage to the duct systems

Bacterial - Chronic Sialadenitis

- Chronic recurrent parotitis
- Also known as juvenile recurrent parotitis
- is defined as recurrent parotid inflammation, generally associated with non-obstructive sialectasis of the parotid gland.
- Occurs commonly in patients of 3-6 Years age
- Caused by Strep viridans
- May spontaneously heal during puberty

Chronic granulomatous sialadenitis

- Infectious
  - Tuberculosis:
  - Syphilis
  - Actinomycosis
  - Cat-scratch disease
- Non-infectious
  - Sarcoidosis

Tuberculous Sialadenitis

- Mycobacterium tuberculosis
- slow growing mass , painless
- Acute -diffuse swelling of gland
- Chronic -asymptomatic
- Most common in parotid gland
- Dx - AFB from duct aspiration or saliva
  - FNA
- Tx: Anti TB drug

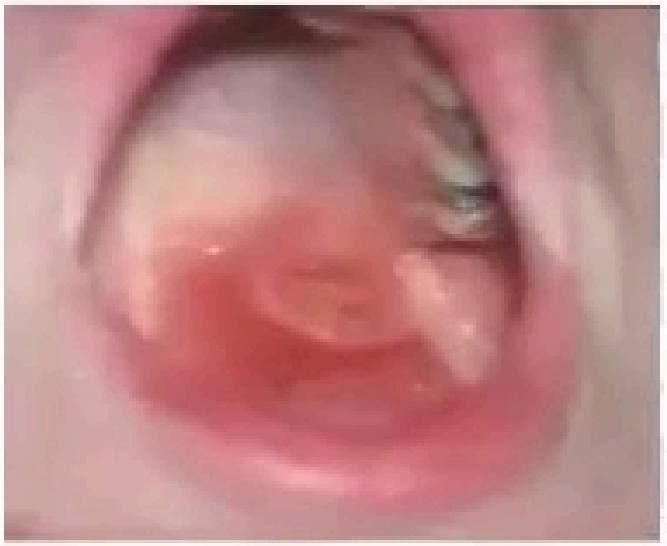
Necrotizing Sialometaplasia (NSM)

- NSM is a benign, self-healing lesion of salivary glands
- may arise in any area containing salivary gland tissue.
- Classically, it involves the mucoserous glands of the hard palate.
- Other sites include nasal cavity, trachea, parotid gland, sublingual gland, submandibular gland, larynx, buccal mucosa, maxillary sinus, tongue, tonsil, and retromolar trigone

Necrotizing Sialometaplasia (NSM)

- Clinically presents as a rapidly-growing swelling, which may (or may not) ulcerate, usually in the palate.
- **Aetiology:** aeschaemia?
- **NB:** the lesion may be mistaken for a malignancy and lead to inappropriate radical surgery.

NSM palate



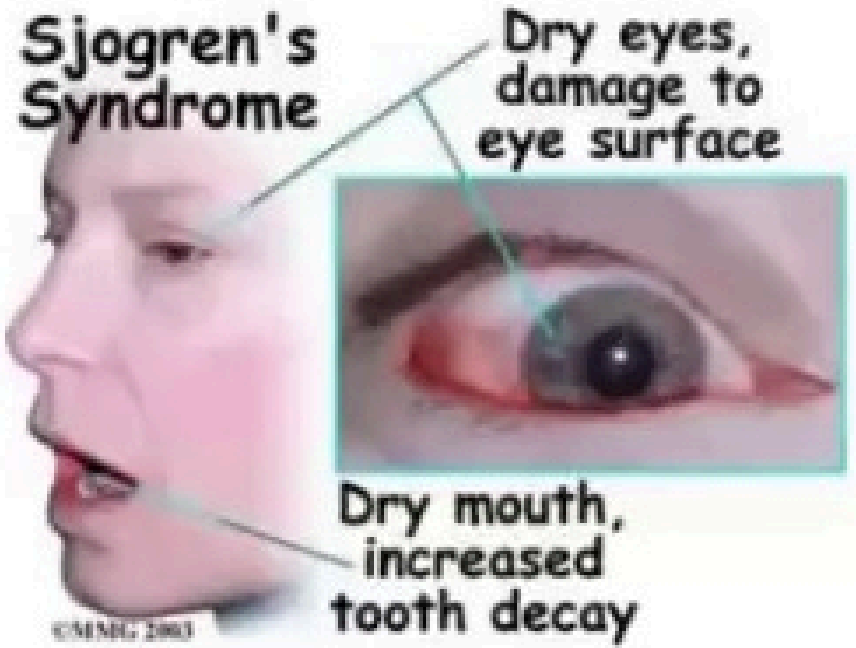
SCC palate

Autoimmune disorders

- Sjogren's syndrome
- Mikulicz's disease

Sjogren's syndrome

- Sjögren's *(**show-grin**)* syndrome – a syndrome describing xerophthalmia (dry eyes) and xerostomia (dry mouth)- due to immune-mediated destruction of exocrine glands, predominately of lacrimal and salivary.
- Described by Henrick Sjögren 1899-1987 - Sweden 1930



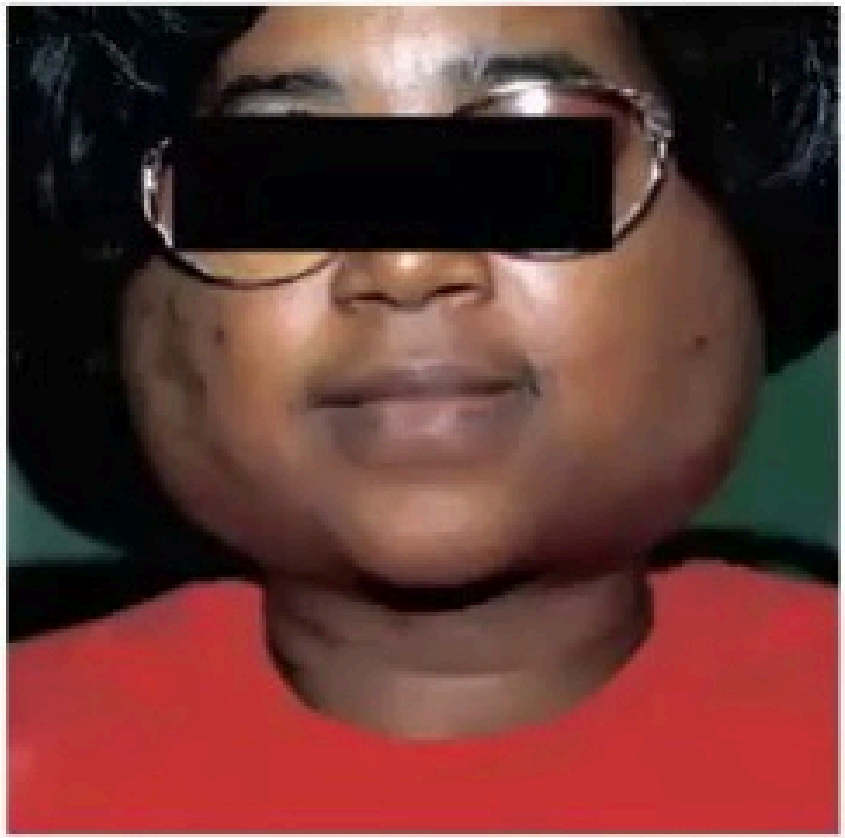
Sicca complex

Sjogren's syndrome

- Affects 1–3% of the general population
- F>M: Most common fourth and fifth decades of life

Etiology

- Autoimmune disorder
- Risk factors
  - Viral infection
  - Genetic factors
  - Sex hormone



Bilateral Sjögren's syndrome

Sjogren's syndrome

- Systemic extraglandular features include arthritis, renal, hematopoietic, and pulmonary involvement, and vasculitis.
- **Neurologic manifestations**: peripheral neuropathy, myelopathy, and cognitive disturbances.
- increased risk of lymphoma in comparison with other autoimmune disorders

Sjogren's syndrome

- May occur alone (primary SS) or in association with connective tissue disorder disorders (secondary SS)
- **Primary** Sjögren's syndrome - characterized by Sicca complex and extra-glandular symptoms without any additional connective tissue disorder.
- **Secondary** Sjögren's syndrome occurs in association with another autoimmune disorder such as SLE, RA, or scleroderma

Mikulicz's disease

- Condition characterized by an abnormal enlargement of the SG and lachrymal glands and few autoimmune reactions
- Johan Mikuliczs in 1888

Etiology

  - Autoimmune
  - Viral
  - Genetic

- Now considered to be primary Sjogren's syndrome

Sialadenosis

- Non-neoplastic, noninflammatory enlargement of the salivary glands (usually the parotid) associated with systemic disorders.
- The salivary gland enlargement is usually asymptomatic.
- is common in obesity (affecting bilateral parotids), malnutrition (Pellagra, diabetes, Beri Beri, anorexia nervosa), alcoholic cirrhosis (rarely does sialadenosis occur in nonalcoholic cirrhosis), and any disease resulting in malabsorption or poor nutrition.

Salivary Gland Neoplasms

- Primary
  - Epithelial
  - Mesenchymal
- Secondary
  - Metastatic

Salivary Gland Neoplasms

- Epithelial primary tumours
  - Benign
  - Malignant

Salivary Gland Neoplasms

- Of salivary gland tumours:
  - 80% occur in the parotid glands - 75% benign
  - 15% occur in the submandibular glands - 50% benign
  - 1% occur in the sublingual glands - 25% benign
  - 4% occur in the minor salivary glands - 35% benign

Benign Salivary Gland Tumours

- Pleomorphic adenoma
- Warthin's tumour
- Oncocytoma
- Monomorphic adenoma

Clinical features of Benign Salivary Gland Tumours

- Long duration
- Slow growth
- Non-painful, non-tender swelling
- No ulceration of the skin or mucosa
- No neurological signs and symptoms – no facial palsy

Treatment of Benign salivary gland tumours

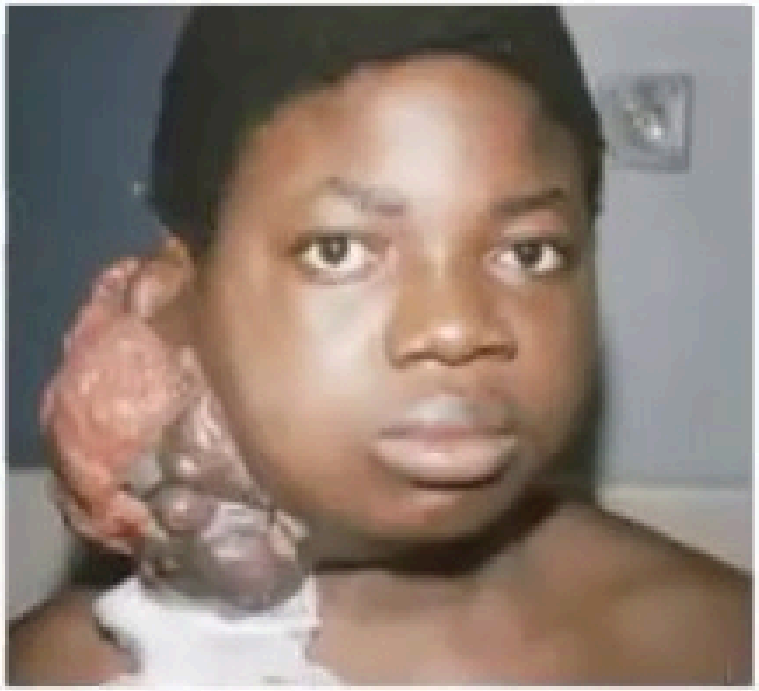
- Excision with a negative margin

Malignant Salivary Gland Tumours

- Mucoepidermoid carcinoma
- Adenoid cystic carcinoma
- Acinic cell tumour
- Squamous Carcinoma

Feature Suggestive of Malignancy

- Short duration
- Rapid growth; growth spurt
- Induration
- Pain, often severe
- Facial nerve palsy
- Fixed overlying skin or mucosa
- Ulceration of skin or mucosa



Treatment of malignant salivary gland tumours

- Surgical excision+/- neck dissection
- Radiotherapy
- ?chemotherapy

Recap

Learning objectives

- At the end of the lecture learners should be able to discuss:
  - The anatomy of the salivary glands
  - The classification of salivary gland diseases
  - Clinical presentation of salivary gland diseases
  - Investigations of salivary gland diseases
  - The management of salivary gland diseases

References

- Salivary gland Pathlogy. Irving Dardick
- Surgical Pathology of salivary glands. Gary L. Ellis
- Textbook of Oral Pathology. Shafer 6th edition
- Oral and Maxillofacial pathology. Neville, 3rd edition
- Essentials of oral medicine and oral pathology. Cawson, 7th edition.