

# Salivary

# glands

# introduction



# types

- There are four types:

## Major:

1. Two sublingual salivary glands.
2. Two submandibular salivary glands.
3. Two parotid salivary glands.

## Minor:

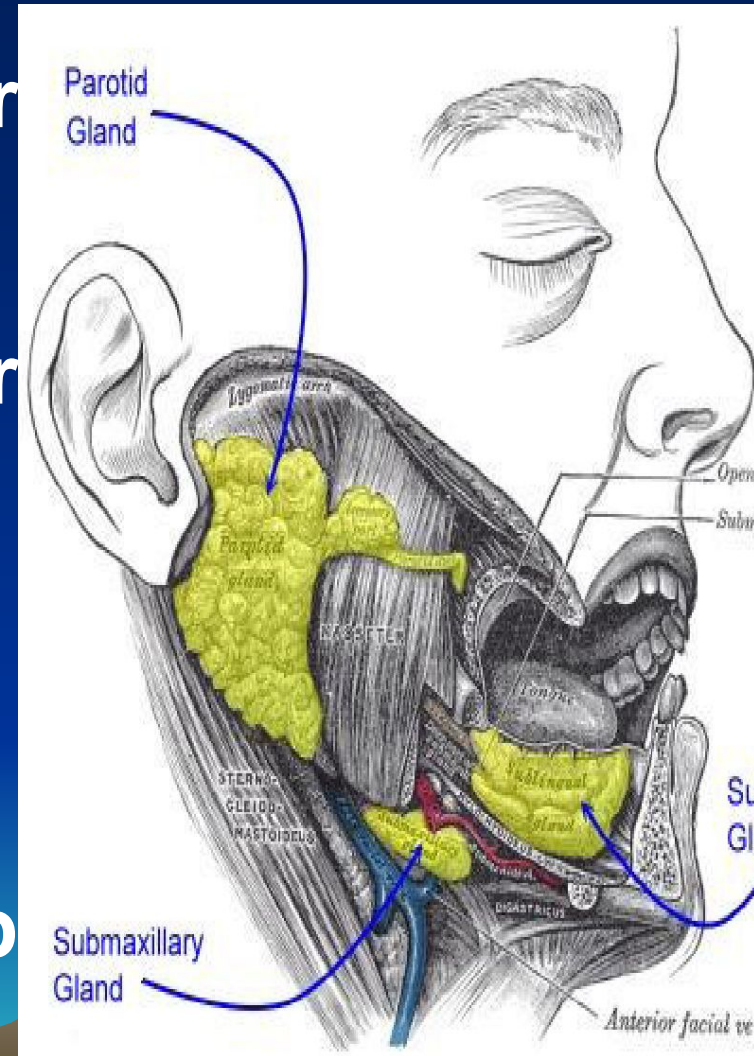
1. Multiple minor salivary glands through out the upper RT



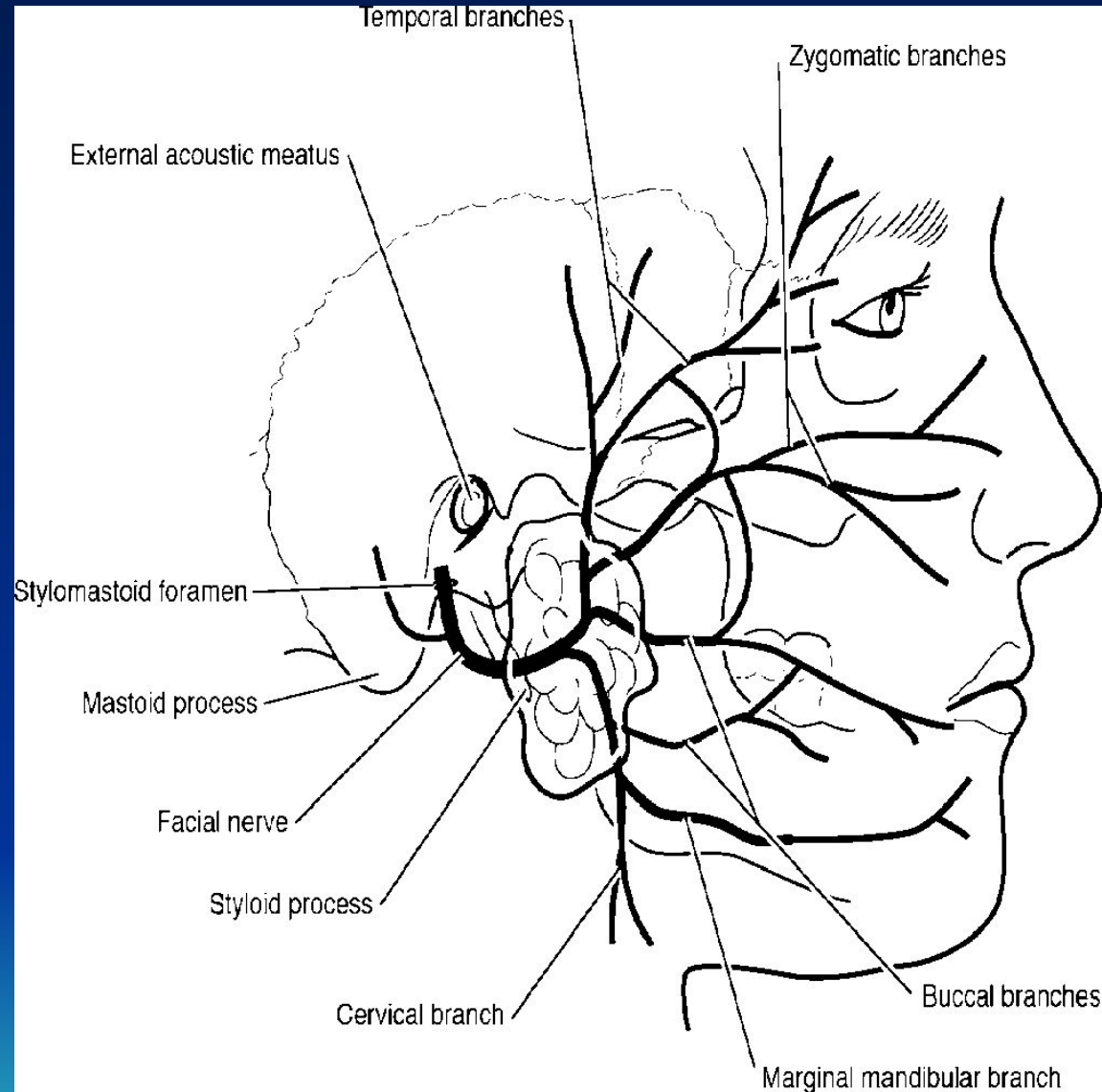
# anatomy

- Parotid gland

The paired parotid glands are the largest of the major salivary glands and weigh, on average, 15–30 g. Located in the preauricular region and along the posterior surface of the mandible, each parotid gland is divided by the facial nerve into a superficial lobe and a deep lobe .



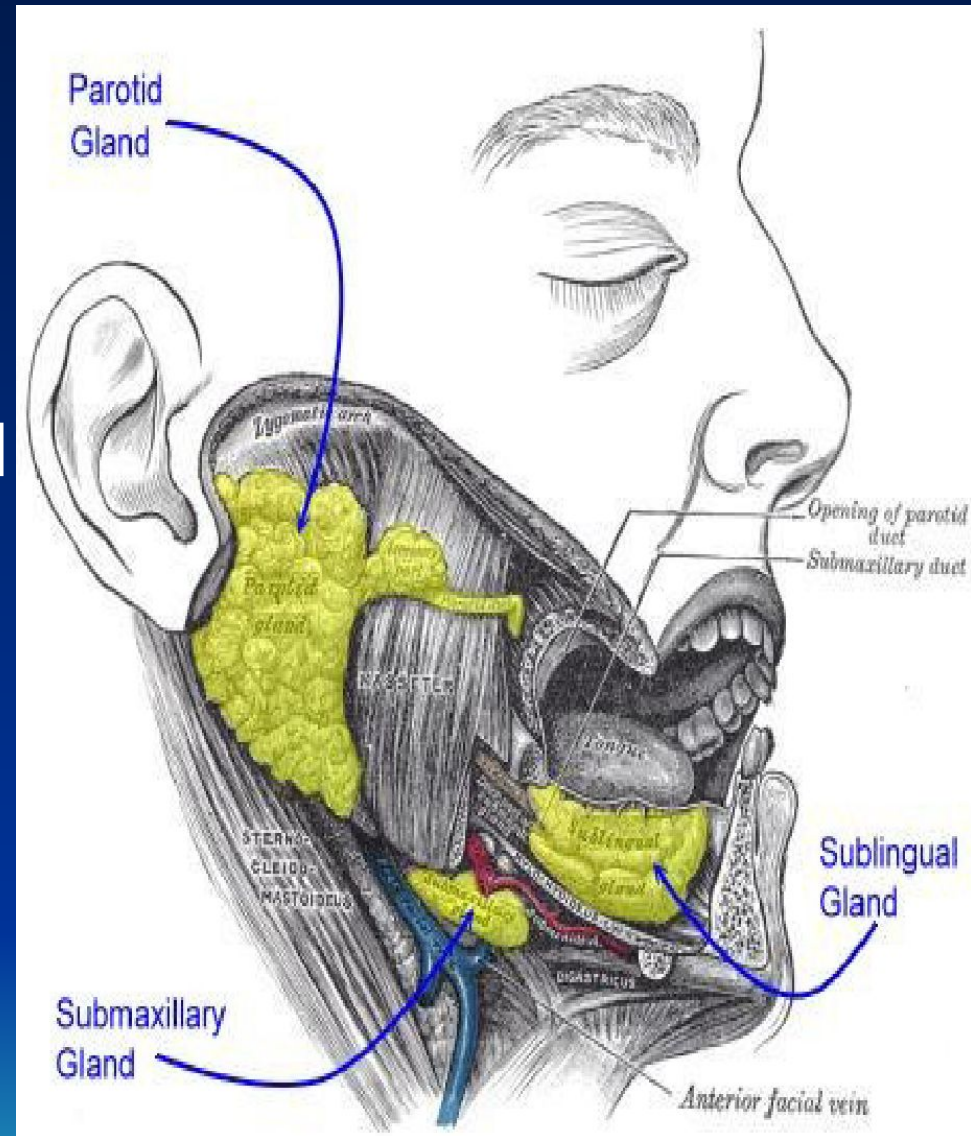
**The *superficial lobe*, overlying the lateral surface of the masseter, is defined as the part of the gland lateral to the facial nerve.**



- The *deep lobe* is medial to the facial nerve and located between the mastoid process of the temporal bone and the ramus of the mandible. Most benign neoplasms are found within the superficial lobe and can be removed by a superficial parotidectomy. Tumors arising in the deep lobe of the parotid gland can grow and extend laterally, displacing the overlying superficial lobe without direct involvement. These parapharyngeal tumors can grow into “dumbbell-shaped” tumors, because their growth is directed through the stylomandibular tunnel.

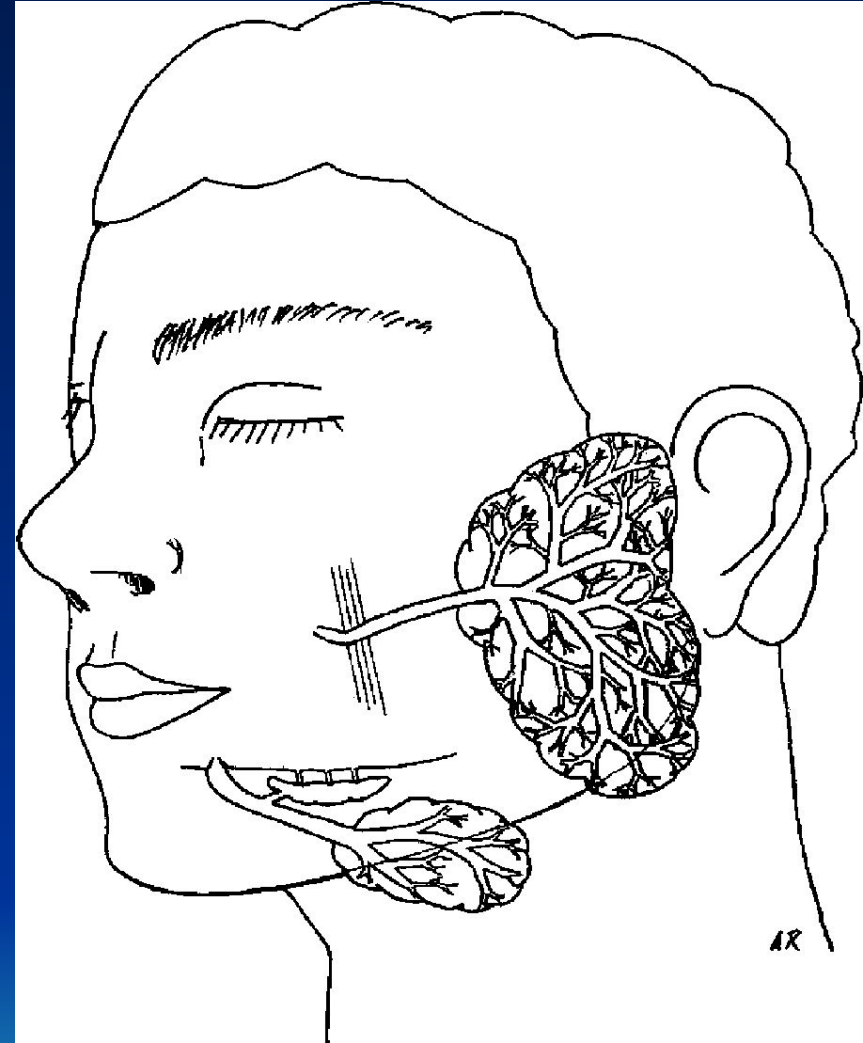


- The parotid gland is bounded superiorly by the zygomatic arch. Inferiorly, the tail of the parotid gland extends down and abuts the anteromedial margin of the sternocleidomastoid muscle. This tail of the parotid gland extends posteriorly over the superior border of the sternocleidomastoid muscle toward the mastoid tip. The deep lobe of the parotid lies within the parapharyngeal space.



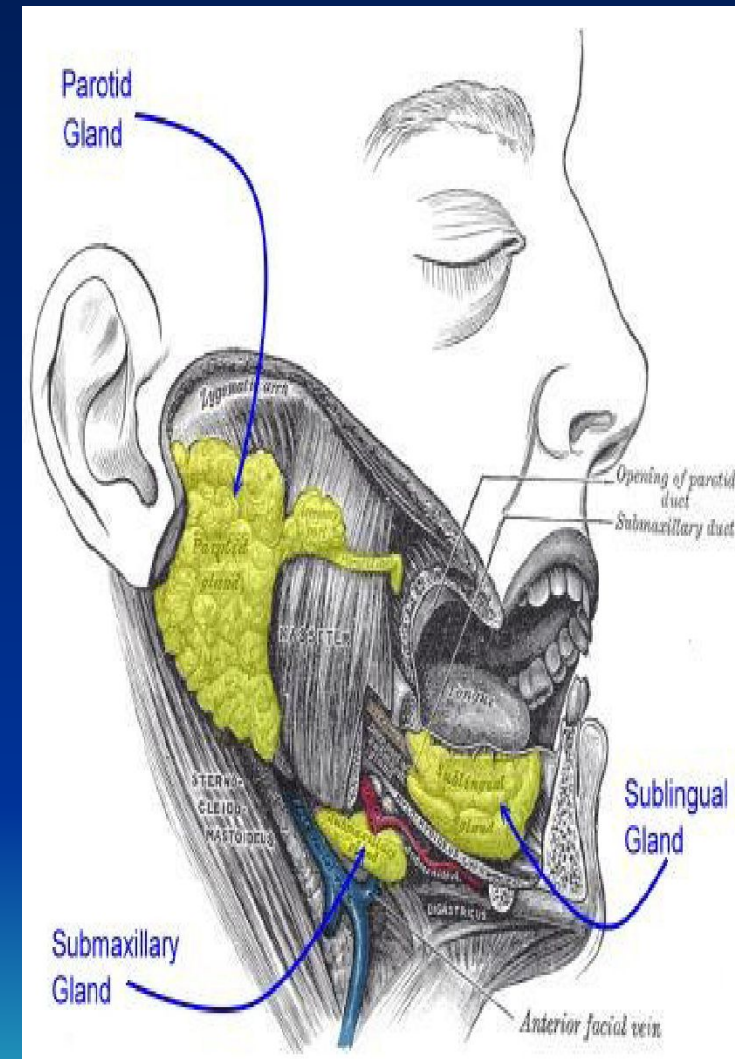
# Stensen's Duct

- The parotid duct, also known as Stensen's duct, secretes serous saliva into the vestibule of the oral cavity. From the anterior border of the gland, it travels parallel to the zygoma, approximately 1 cm below it, in an anterior direction across the masseter muscle. It then turns sharply to pierce the buccinator muscle and enters the oral cavity opposite the second upper molar tooth.



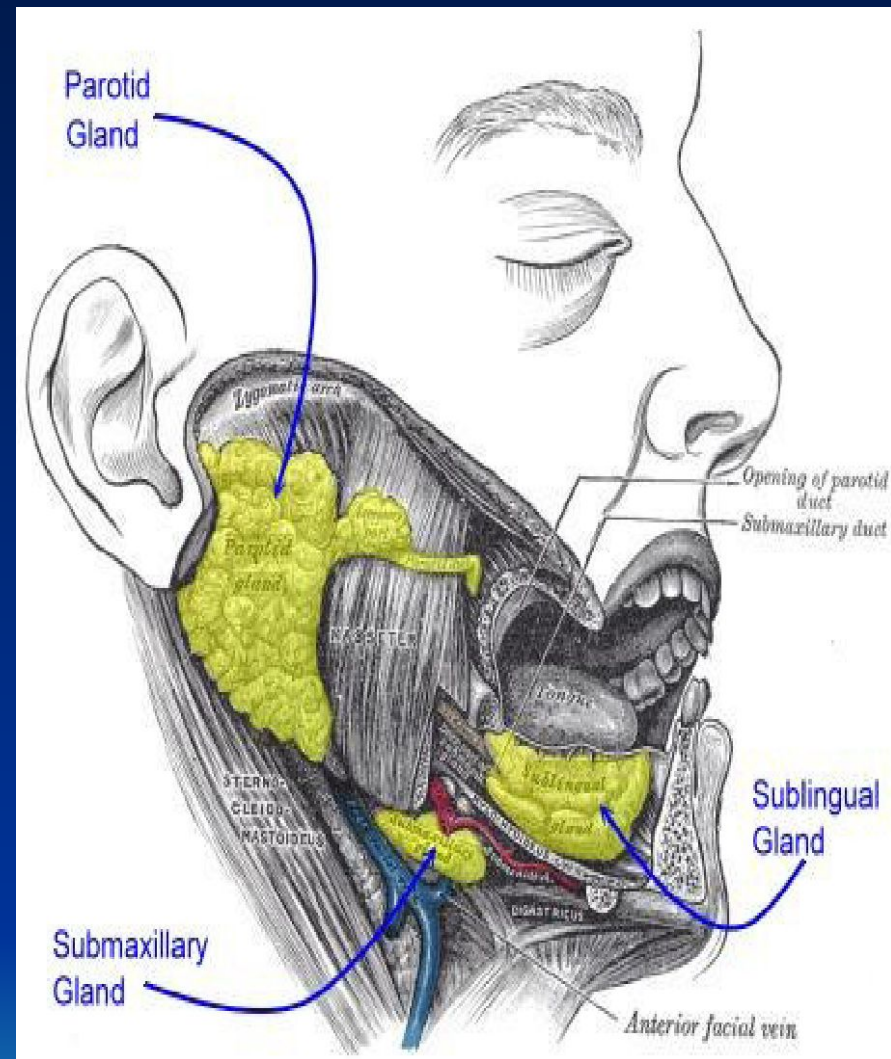
# The submandibular gland

The submandibular gland (in older texts, this gland was sometimes referred to as “the submaxillary gland”) is the second largest major salivary gland and weighs 7–16 g. The gland is located in the *submandibular triangle*, which has a superior boundary formed by the inferior edge of the mandible and inferior boundaries formed by the anterior and posterior bellies of the digastric muscle



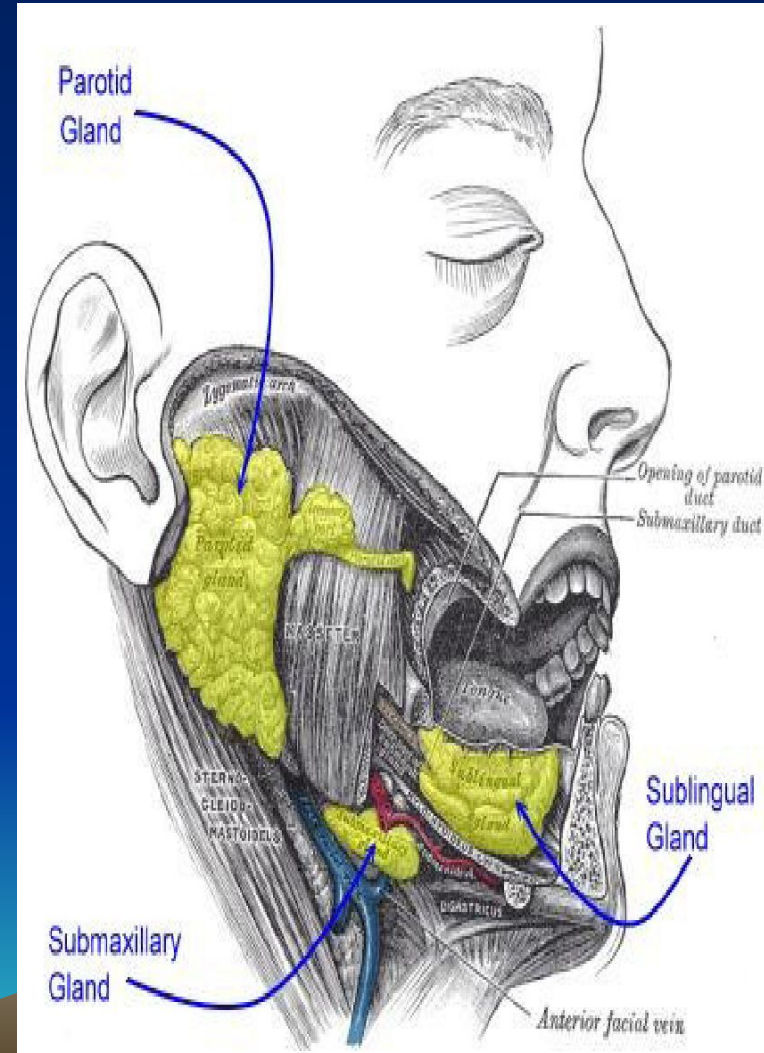


- Also lying within the triangle are the submandibular lymph nodes, facial artery and vein, mylohyoid muscle, and the lingual, hypoglossal, and mylohyoid nerves. Most of the submandibular gland lies posterolateral to the mylohyoid muscle.



# The sublingual gland

- The smallest of the major salivary glands is the sublingual gland, weighing 2–4 g. Consisting mainly of mucous acinar cells, it lies as a flat structure in a submucosal plane within the anterior floor of the mouth, superior to the mylohyoid muscle and deep to the sublingual folds opposite the lingual frenulum [11]. Lateral to it are the mandible and genioglossus muscle. There is no true fascial capsule surrounding the gland, which is instead covered by oral mucosa on its superior aspect. Several ducts (*of Rivinus*) from the superior portion of the sublingual gland either secrete directly into the floor of mouth, or empty into *Bartholin's duct* that then continues into Wharton's duct



# Non-neoplastic salivary glands diseases

## I. Congenital salivary gland diseases:

- **Ageneis:** of the salivary glands is extremely rare usually affect males twice more than females and predisposes to dental caries which is the presenting symptom and can be associated with other ectodermal abnormalities.



## :II. Pseudoparotomegaly

- The parotid gland is in direct contact with the skin, the masseter muscle, and the parapharyngeal space. It encloses the facial nerve and external carotid artery. It contains up to 20-lymph nodes within its parenchyma and 5-10 lymph nodes on its surface. Many conditions of these structures can mimic parotid and submandibular glands enlargement.



- 1. *Hypertrophy of masseter muscle:*** it occurs usually in females bilaterally resulting in square face and the diagnosis becomes obvious when the patient clench the teeth.
- 2. *Ageing:*** bulging occurs due to absorption of adipose tissue in elderly patients.
- 3. *Dental causes:*** usually due to infection spreading to the nearby parotid lymph nodes or to the floor of the mouth (Ludwigs angina), or tissue odema in the infratemporal area and between the heads of the masseter muscle causing facial swelling.



- 4. *Tumours of the parapharyngeal space and infratemporal fossa:* tumours of nerves, lymph nodes, metastatic tumours, and tuberculosis.**
- 5. *Mandibular tumours:* bone tumours.**
- 6. *Mastoiditis:* with the infection tracking to the neck.**
- 7. *Intraparotid lesions:* neuromas, aneurysms, lymph nodes enlargement, and parotid cysts.**




## **:III. Infections of the salivary glands**

- Viral and bacterial infections are the commonest salivary gland diseases (mumps, and acute suppurative sialadenitis).**

### ***1. Mumps:***

**It's an acute generalized paramyxovirus infection of children and young adults. Mumps typically affecting major salivary glands, although other structures can be affected also including the pancreas, testes, ovaries, brain, breasts, liver, joints and heart.**



- **Mumps is transmitted via the droplet route and has an incubation time of 14-18 days, it presents with initial pyrexia, facial pain, enlarged parotid glands, swelling of the submandibular glands, lymphadenopathy, and rarely sublingual swelling. Mumps salivary swelling tends to diminish after 4-5 days and serious not infrequent mumps complications include orchitis and viral meningitis**





## ***2. HIV salivary gland disease***

- **Is a distinct disorder, characterized by recurrent or persistent salivary gland enlargement, usually of the parotids, and xerostomia tend to arise late in HIV infection. Clinically it mimics Sjogren syndrome. Treatments: include antiviral therapy, repeated aspiration, tetracycline sclerosis, surgical removal of enlarged gland and external radiation.**

### ***3. Hepatitis C virus infection***

- **Unlike other types of hepatitis, hepatitis C infection frequently gives to a wide spectrum of extrahepatic manifestations that include salivary gland disease in 80% of infected patients. It usually causes xerostomia, Sjogren syndrome like symptoms, and non-Hodgkin's lymphoma**



## 4. *Suppurative sialadenitis* (*suppurative parotitis*):

- Acute suppurative sialadenitis presents with painful swelling (usually of the parotid glands), purulent discharge from the duct of the affected gland, **dysgeusia**, cervical lymphadenopathy, fever, malaise, parapharyngeal abscess, and Ludwig's angina.
- It usually affects adults, although children may rarely be affected. Diagnosis is by clinical features, U\S, and MRI. Treatment is by effective hydration, and antibiotics. Surgery is considered if there is no improvement after 3-5 days.

# ***Chronic non-specific .5 :sialadenitis***

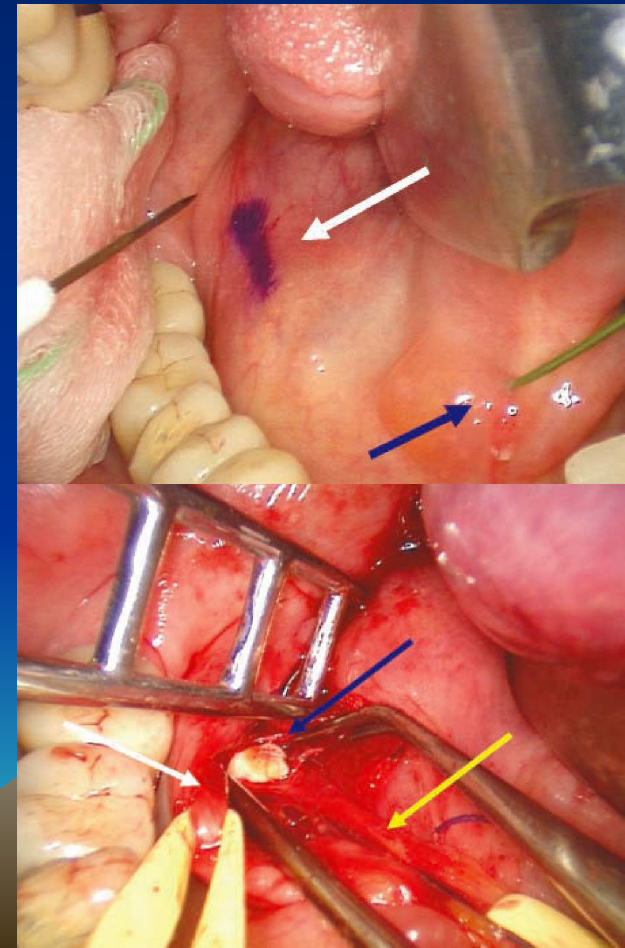
- **It's an uncommon disease affecting adults, characterized by recurrent and/or persistent enlargement of one major salivary gland usually the parotid gland with features similar to acute sialadenitis, but without constitutional symptoms. Spontaneous healing occurs in the majority of cases and 40% need surgery (subtotal or total removal).**

# ***Recurrent parotitis of .6 childhood (juvenile recurrent parotitis)***


- **Its characterized by recurrent unilateral parotid inflammation usually associated with non-obstructive sialectasis of the parotid gland, affect children of 3-6 years old with the number of attacks vary from 1-5 per year. Most of the cases resolve at puberty (90%). The patient present with localized pain and swelling that may last up to 14 days, fever and overlying erythema are common and occasionally white mucopus can be expressed from the parotid duct. Analgesia is the mainstay of therapy.**

# :IV. Sialolithiasis

- It's a common disorder due to the formation of calculi (sialoliths), usually within the ductal system of a gland and is more common in the submandibular gland (more than 80%) and females are more commonly affected.
- Clinically the patient had **recurrent swelling of the gland with eating; which is diffuse**, non-tender and resolve in few hours and usually associated with burning like local pain. Long standing Sialolithiasis may give rise to acute suppurative sialadenitis or chronic non-specific sialadenitis.
- Investigations include; plain radiographs, U/S, sialography, and CT scan. When the stone is small and in the duct (distal part) it's removed locally from the oral cavity, but when it's big in the proximal part of the duct or in the gland total removal of the gland is the usual treatment. Lithotripsy aided by fluoroscopy or sialoendoscopy is used for stones less than 7mm in diameter



# V. Drug associated salivary :gland disease

1. **Swelling**: mild transient, bilateral, painless sialadenitis may follow phenylbutazone, chlorhexidine, iodine and radioactive iodine usage.
  2. **Xerostomia**: dry mouth is a common symptom especially in elderly people; over 500 drugs can cause dry mouth, but the principle mechanism is anticholinergic and sympathomimetic. Therefore, tricyclics, benzodiazepines, atropinics, beta-blocker and antihistamines are the most common drugs involved.
  3. **Pain**: is rarely associated with guanethidine therapy and may be a side effect of bethanide, bretylium, clonidine, methyldopa and some cytotoxics.
  4. **Salivary discolouration**: associated with rifampicin and rifabutin therapy.
- 

## :VI. Sialosis

**Is an uncommon non-neoplastic non-inflammatory disorder giving rise to bilateral non-painful enlargement of the major salivary glands, and is usually associated with diabetes, hypothyroidism, malnutrition, hepatic cirrhosis, puberty, menopause and antihypertensive drugs.**





## :VII. Bulimia nervosa

- It's suggested that binge eating may result in functional hypertrophy of the salivary glands; also it can occur due to passage of fluid into the gland, autonomic neuropathy, endocrine disease or past alcohol use. The salivary gland enlargement may correlate with the frequency of bulimic symptoms.



# VIII. Pneumoparotitis (pneumosialadenitis, wind :parotitis)

- It's the presence of air within the parotid gland due to the reflux of pressurized air from the mouth into the parotid duct. It usually affect wind instrumentalists, balloon and glass blowers, usually it resolves in several days.



# IX. Radiotherapy associated :salivary gland dysfunction

- Radiotherapy of the head and neck malignancies can cause profound xerostomia and salivary acinar destruction when the radiotherapy is directed through the major salivary glands. The degree of damage is related to the dose and duration of radiotherapy. The xerostomia is irreversible and patients have oral symptoms like those of Sjogren syndrome. Treatment is by high dose topical pilocarpine or by the use of radioprotectants.

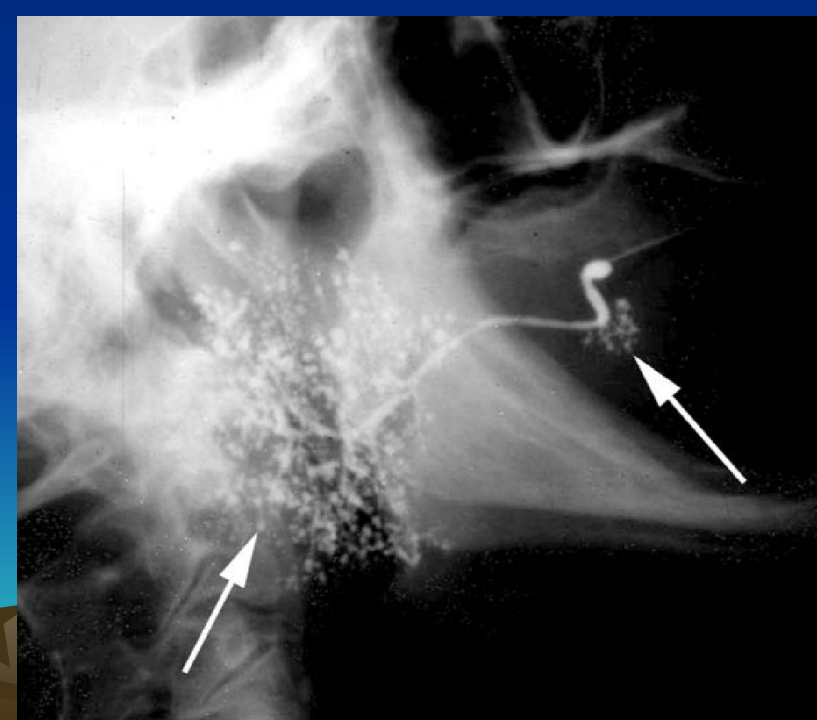
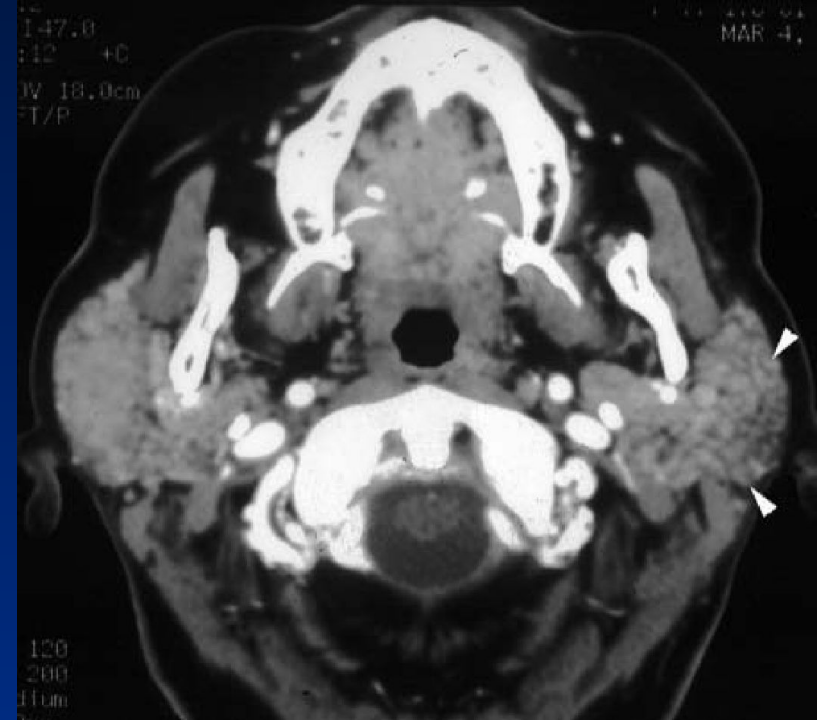


# :X. Sjogren syndrome

- It's the second most common autoimmune connective disorder characterized by xerostomia and xerophthalmia due to profound lymphocytic infiltration into the salivary and lacrimal glands. Head and neck manifestations of Sjogren syndrome include:
- Xerostomia which if severe it can cause dysarthria dysphagia, caries and acute gingivitis.
- Increased liability to candidal infection.
- .



- . Dysgeusia and loss of taste.
- . Intermittent swelling of the major salivary glands.
- . Solitary enlargement of a salivary gland.
- . Increased risk of non-Hodgkin's lymphoma.
- Treatment of xerostomia in Sjogren syndrome are local agents (salivary substitutes and chewing gum) and systemic agents (pilocarpine, bethanecole and interferon alpha



# :XI. Lymphoepithelial lesion

- It's an uncommon disease presented with recurrent or persistent swelling of the parotid and occasionally of the submandibular gland.



## :XII. Miculicz's disease

- It's characterized by multiple lymphoepithelial lesions of the lacrimal and salivary glands.



# XIII. Excess salivation :(sialorrhea)

- The common causes include:
- Cerebral palsy.
- Amyotrophic lateral sclerosis.
- Traumatic brain injury.
- Stroke.
- Parkinson's disease.
- Treatment: surgical relocation of the submandibular and parotid ducts, intraglandular injection of botulinum toxin and transdermal scopolamine.



# XIV. Minor salivary gland :disorders


## **1. Mucocoele:-**

- It's the most common disease of the minor salivary glands and occurs mostly on the lateral aspect of the lower lip of an extravasation type (commonly), as a single recurrent, fluctuant, painless, well-circumscribed bluish swelling which ruptures easily. It either resolves spontaneously or may need surgical removal.

## **2. Subacute necrotizing sialadenitis:**

- It's a rare non specific inflammatory disease of men occurs suddenly as rapid onset, painful, non-ulcerated swelling of minor palatal salivary glands. It usually resolves spontaneously within tow weeks.

## **3. Necrotizing sialometaplasia:**

- Its an uncommon disorder that affect mainly minor salivary glands of the palate; as a palatal swelling that breaks down to give rise to localized, irregular ulceration which may reach 5 cm in diameter and can give rise to local parasthesia and anaesthesia with occasional systemic symptoms. Bony involvement is rare and the condition heals within 4-90 days.
  - Possible causes include: direct trauma, dental local anaesthesia, cocaine use, radiotherapy, alcohol, tobacco, upper respiratory tract infections, allergic disease, oral intubation and sickle cell disease.
  - The condition is self limiting but biopsy is needed to differentiate it from oral malignancy.
- 



## ***Cheilitis glandularis (suppurative stomatitis .4 :glandularis)***

- It's a rare disorder of adults presented as labial swelling and ulceration of the lower lip, evertion of the lower lip and protrusion of the lower lip secondary to inflammation of the minor labial salivary glands. It's possibly due to syphilis, poor hygiene, tobacco smoking, actinic exposure, emotional disturbances and genetic predisposition.

Treatment is by vermilionectomy.

### ***5. inclusion of salivary gland tissue:***

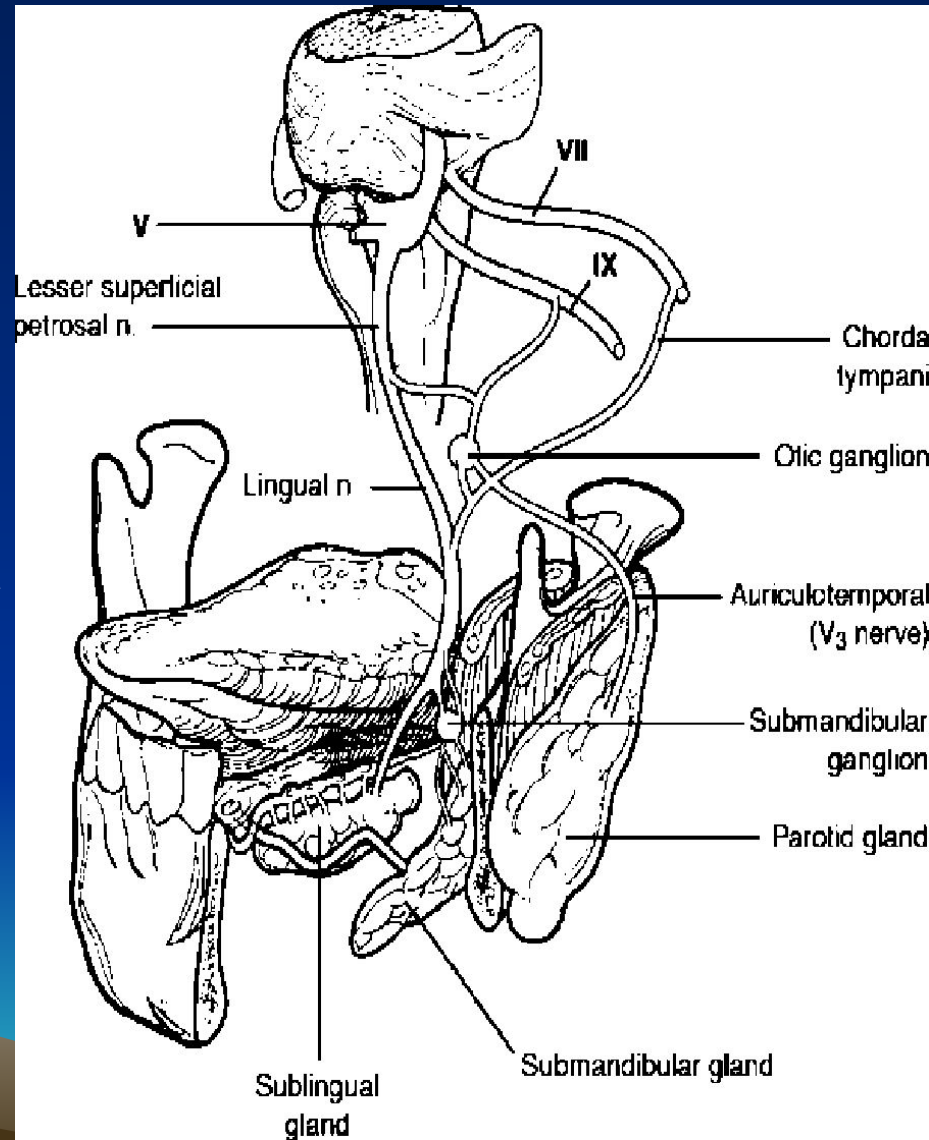
- Cystic-like areas of radiolucency are seen in the region of the angle of the mandible, they may be the origin of rare intraosseous salivary gland tumours.

# Sublingual SG

Site:

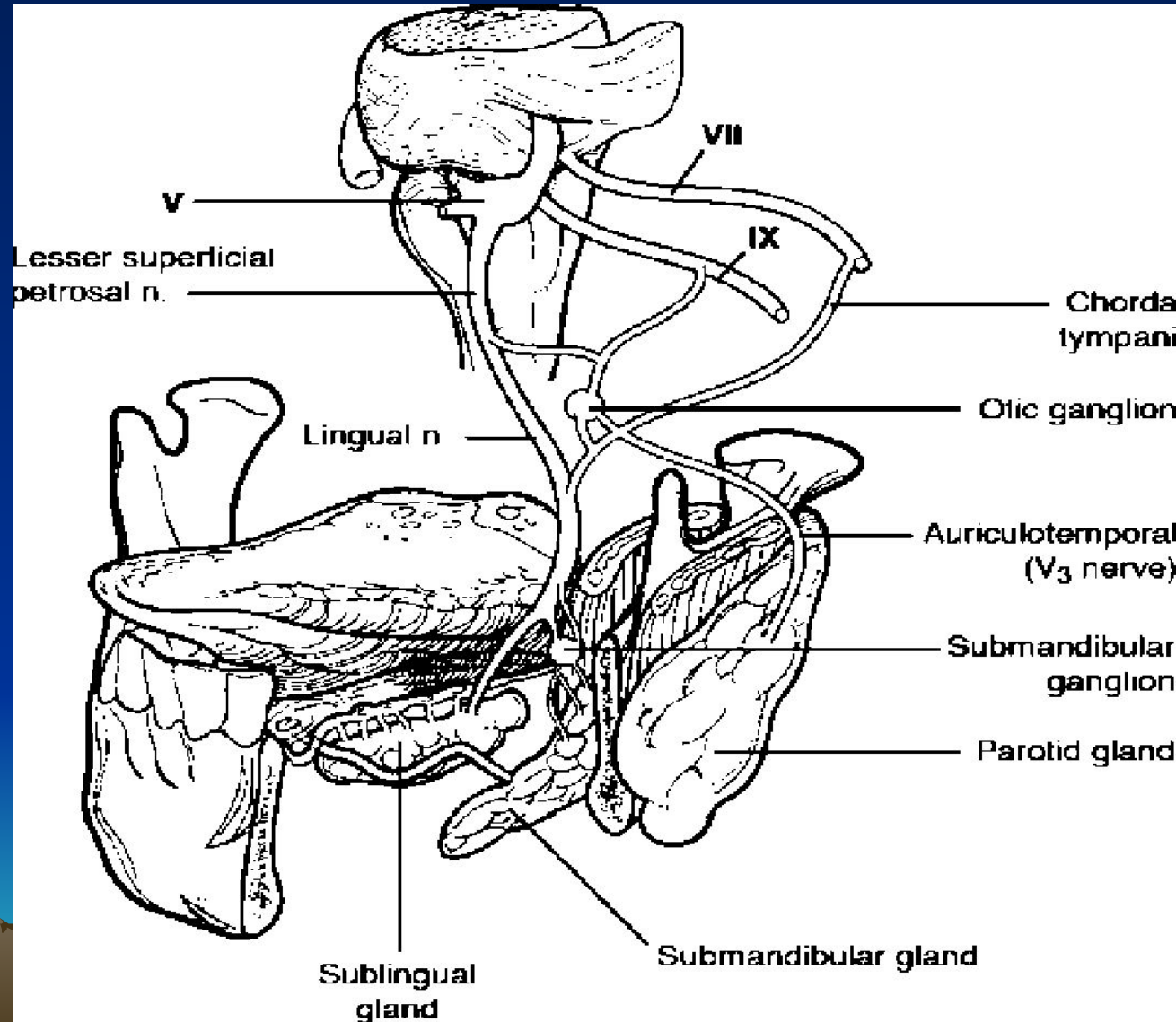
Diseases:

1. cysts: (retension)
2. ranula. (extravasation)
3. tumors: 90% malignant

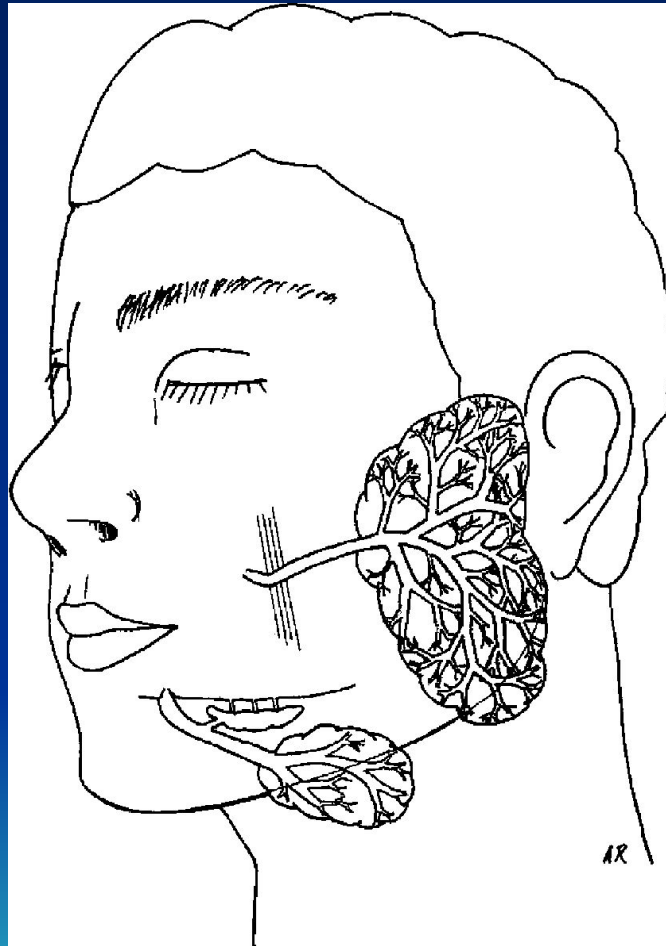


# Submandibular SG

- Site:

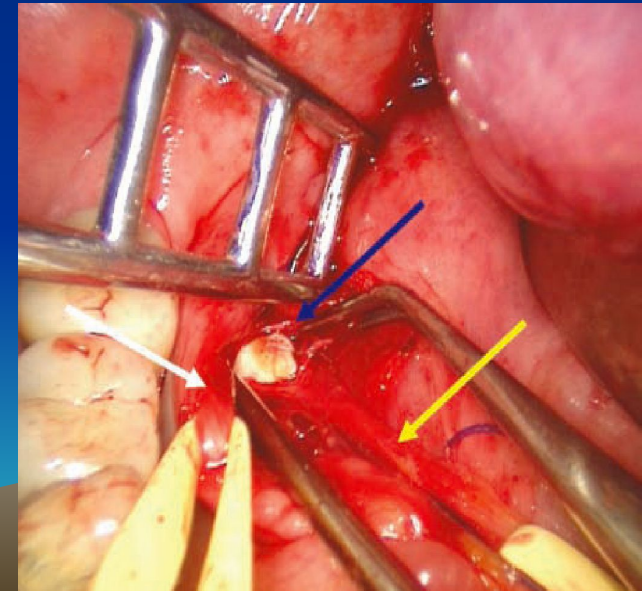
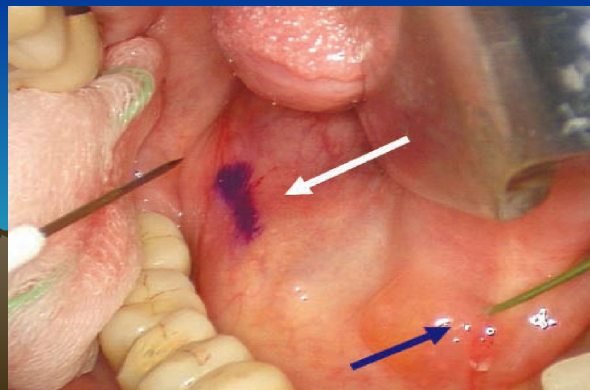
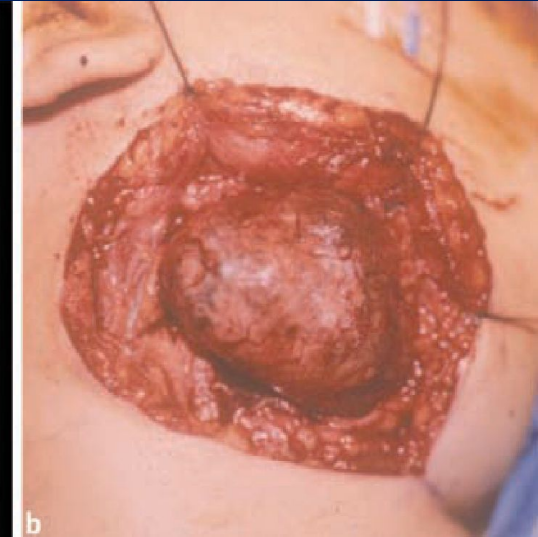
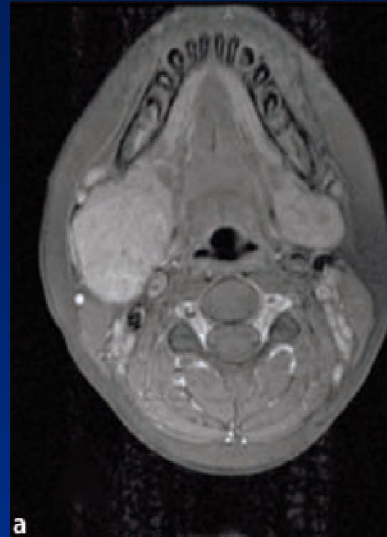


# Duct system



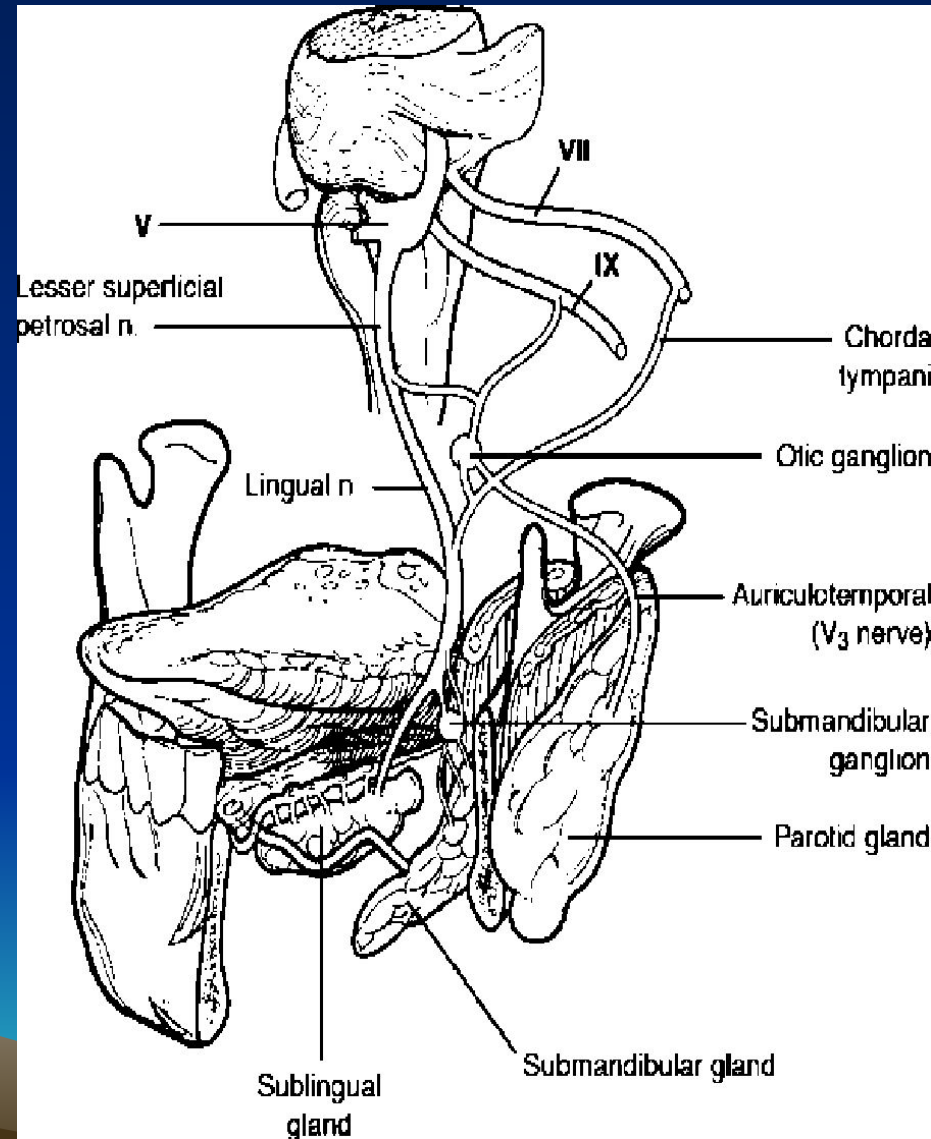
# Submandibular SG

- **Site:**
- **Diseases:**
  1. **inflammatory.**
  2. **acute sialadenitis.**
  3. **chronic sialadenitis.**
  4. **tumors: 50% benign.**



# Parotid gland

- Anatomy:
- Diseases:
  1. congenital.
  2. inflammatory:
  3. sialadenosis:  
(non-infl. Swelling).
  4. obstructive  
parotitis.





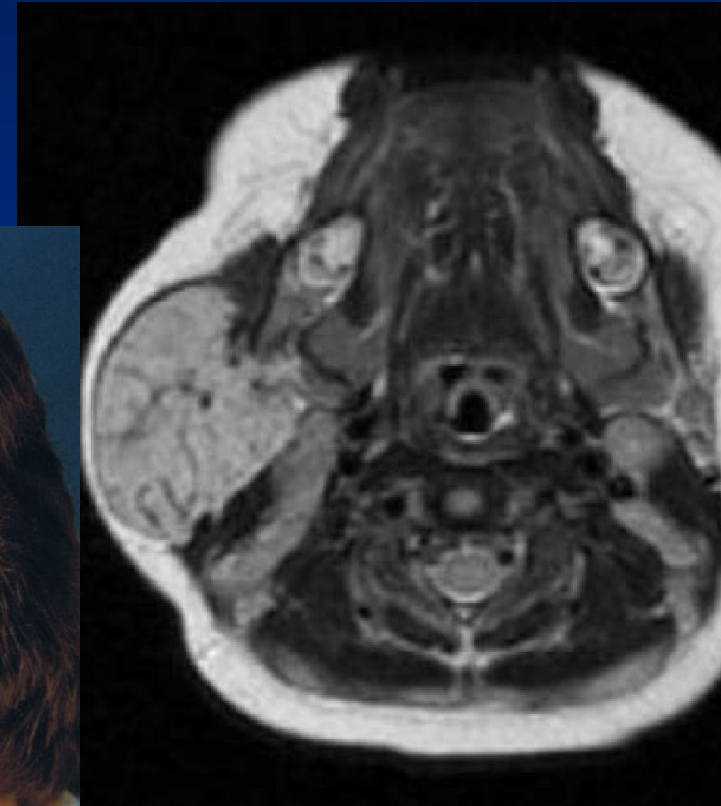
# 5. Degenerative conditions

- Sjogren syndrom:

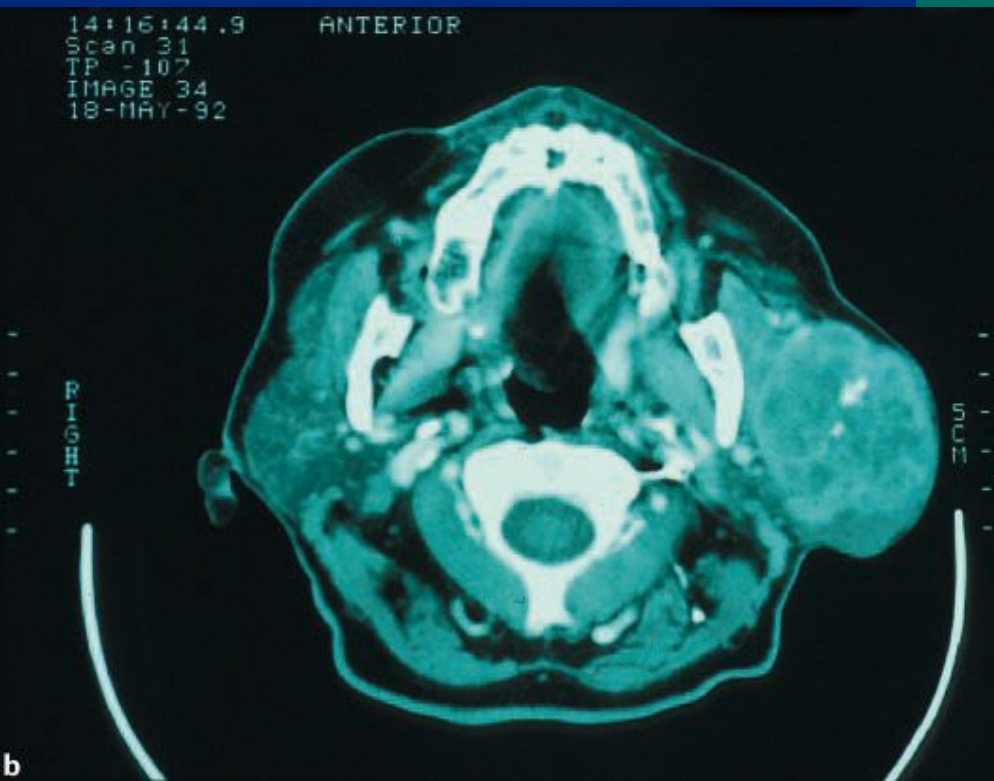


# tumors .6

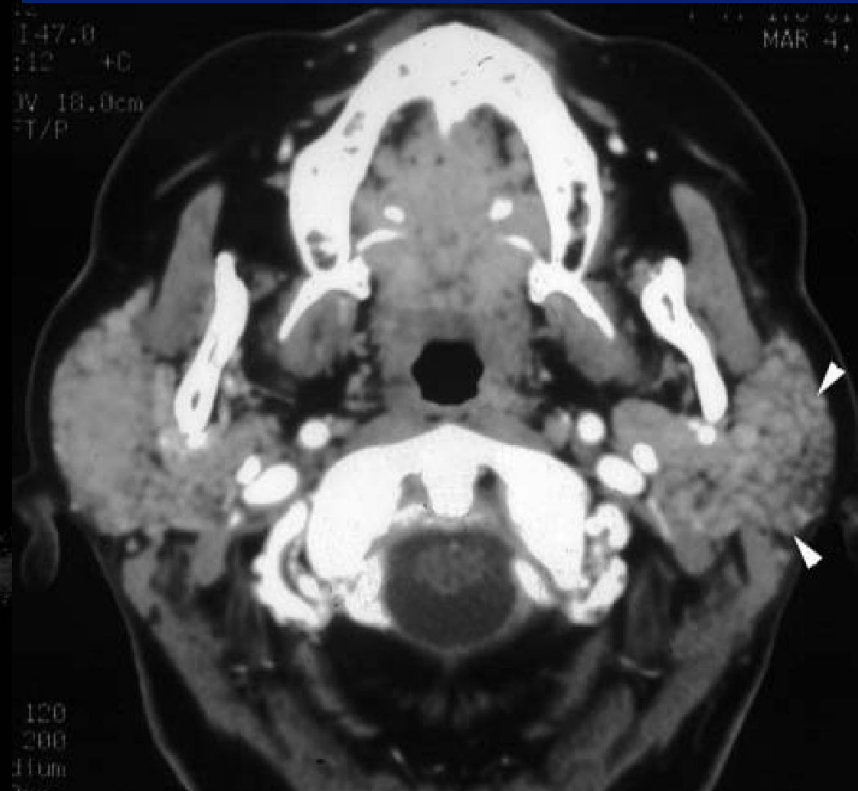
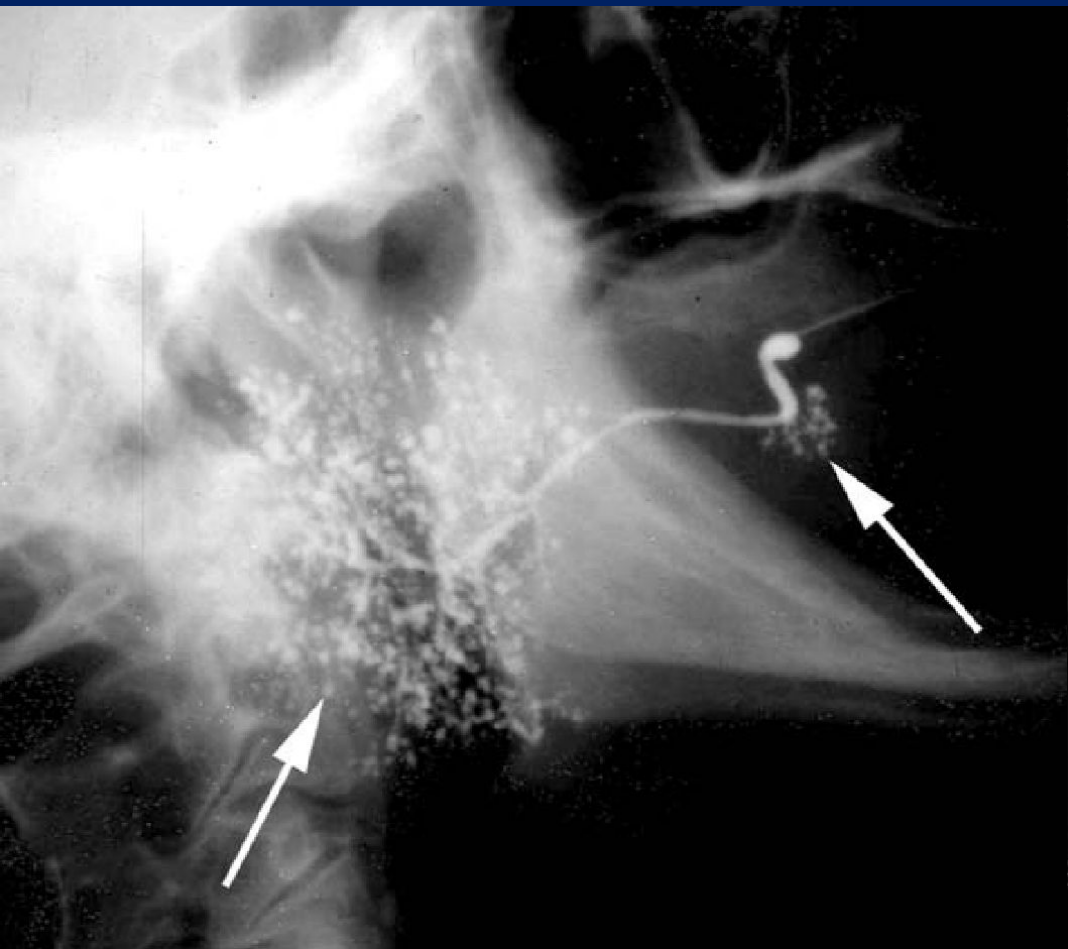
- Most common site.
- 80% benign.



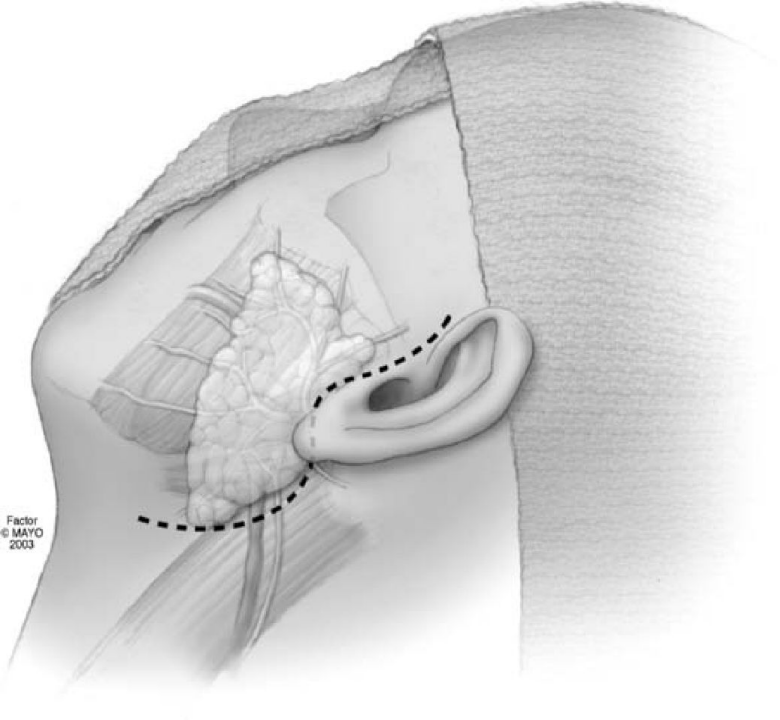
# CA parotid SG



# Sialogram CT sjogrens syndrom



# Parotid incision



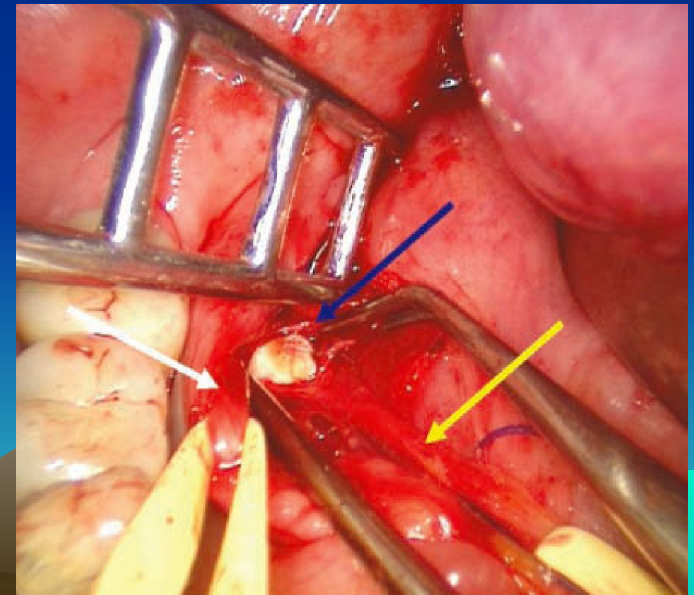
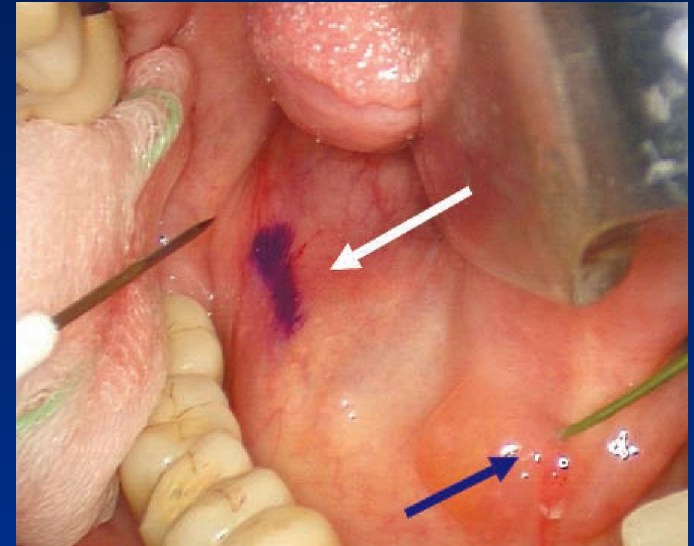
# Pleomorphic adenoma



# Muc. Extravas cyst



# CT sub mand. Gl. stone





# T2 ranula



# .Sub mandibular gl. Tum



