بسم الله الرحمن الرحيم

Parotid Tumors

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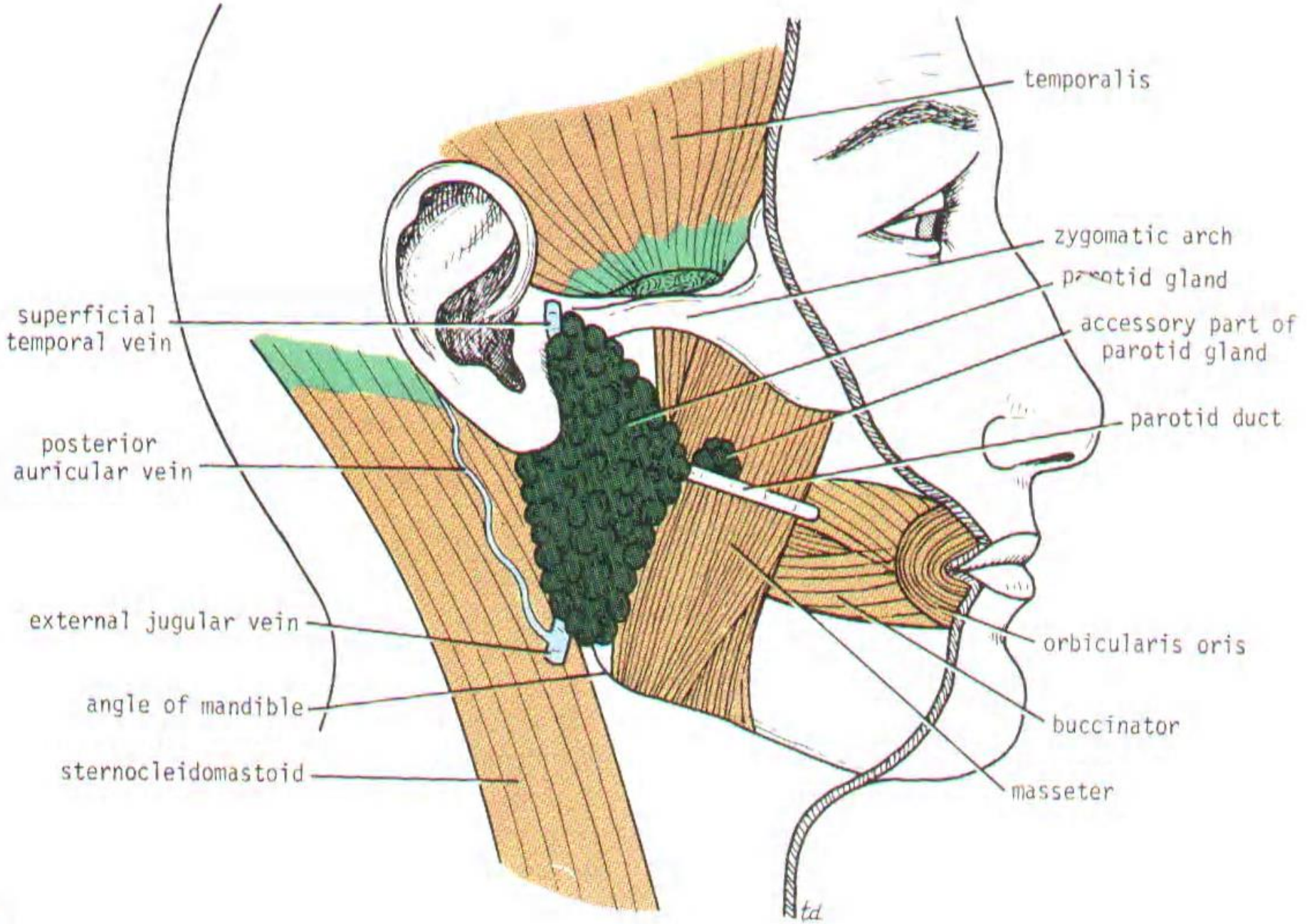
General Surgery Head & Neck Surgery


temporalis
zygomatic arch
parotid gland
accessory part of parotid gland
parotid duct
superficial temporal vein
posterior auricular vein
external jugular vein
angle of mandible
sternocleidomastoid
orbicularis oris
buccinator
masseter
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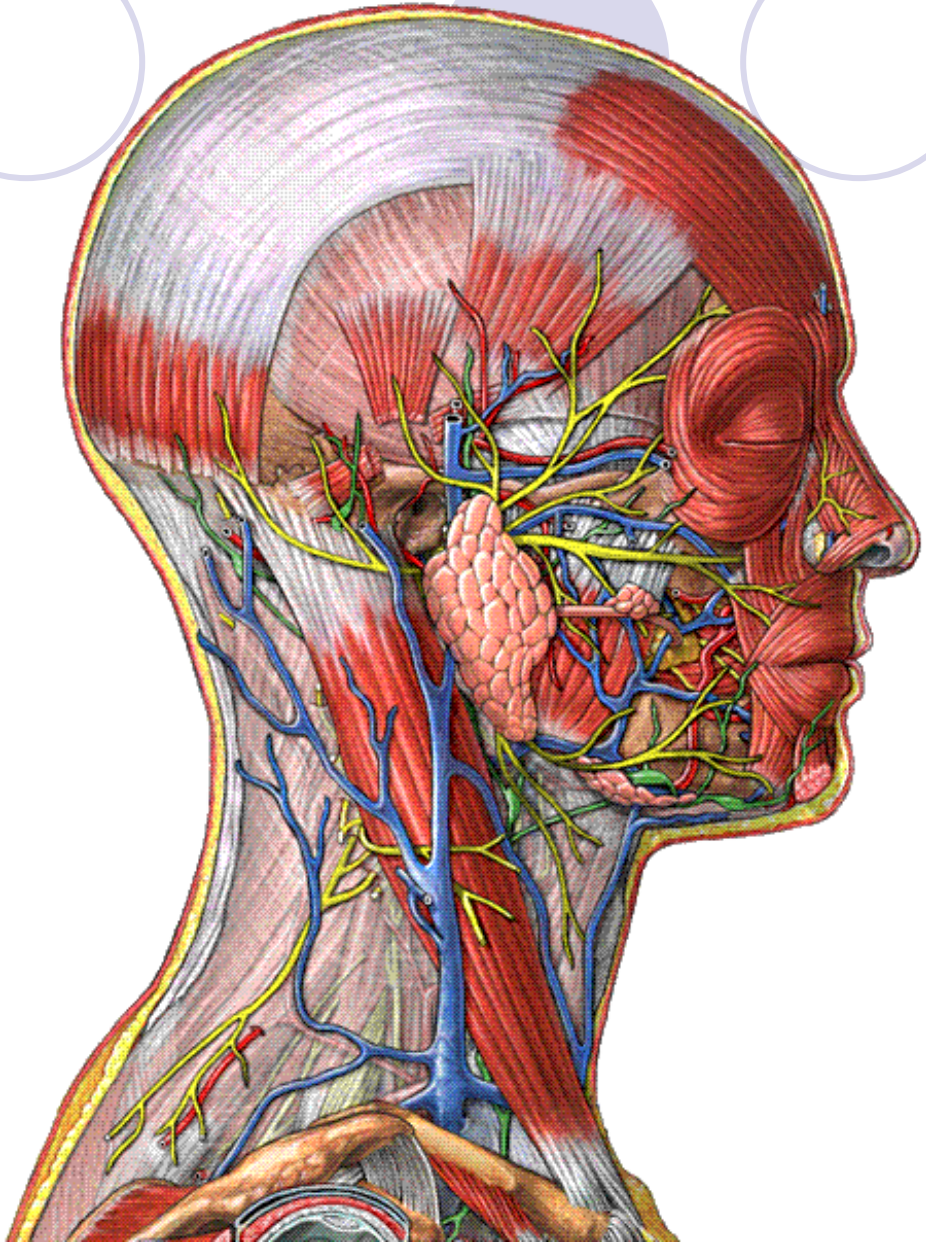
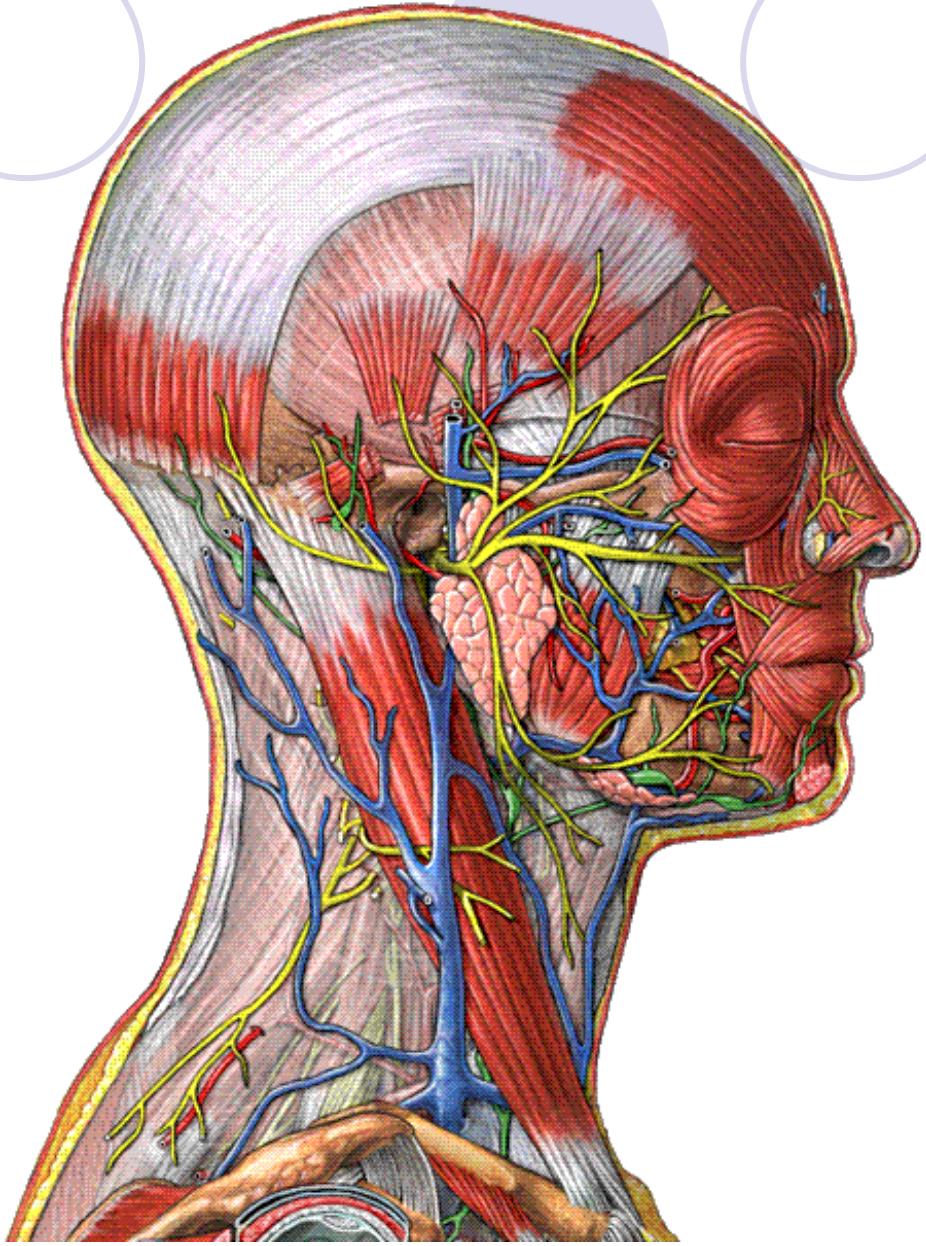
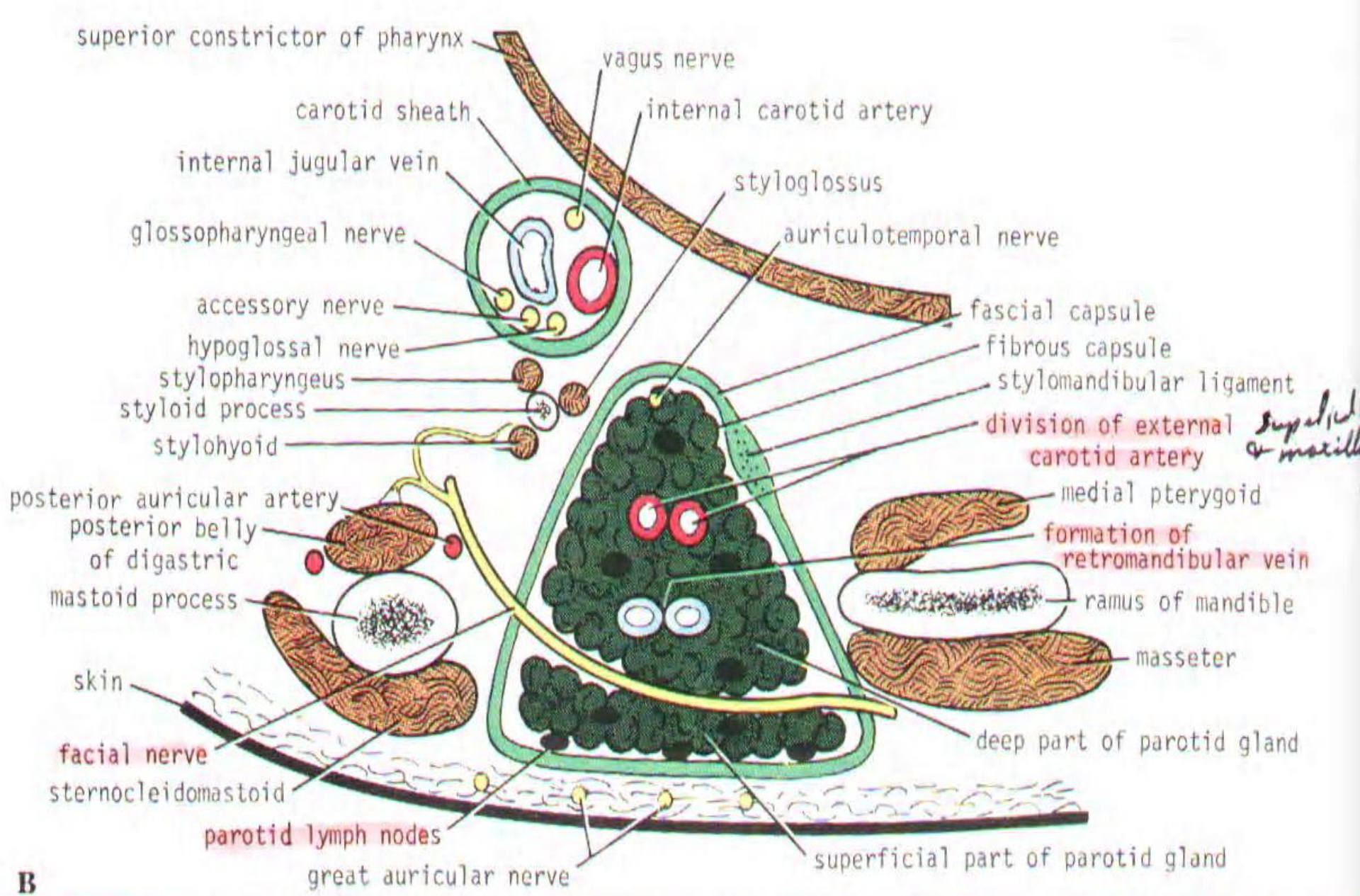


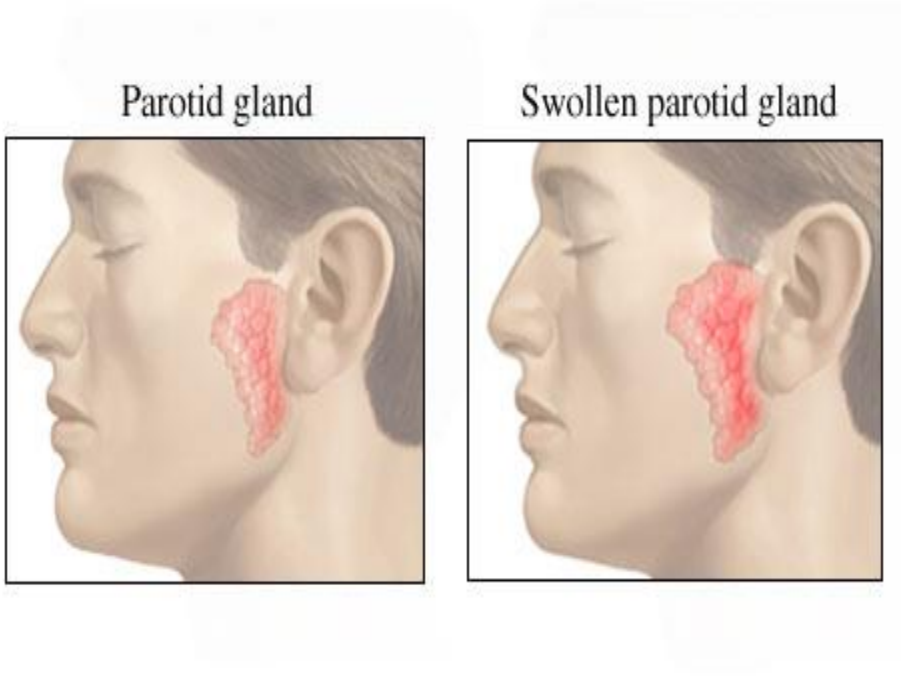




g. 11-26. Parotid gland and its relations. (A) Lateral surface of gland and urse of parotid duct. (B) Horizontal section of parotid gland.

Parotid swellings Causes

- Neoplastic 75% benign vs. malignant
- Non-neoplastic 25%
  - Parotitis
  - Obstructive enlargement
  - Haematoma
  - Metabolic And Endocrine Disorders
  - Others



SITE & DISTRIBUTION

Site	Distribution %	Malignant %
PAROTID	75-80	17-20
SUBMANDIBULAR	5-10	50
SUBLINGUAL	1-2	80
MINOR GLANDS	10-20	50

Salivary gland tumors

- The incidence is 1-2 cases per 100,000
- 6% of all head and neck tumors.
- Estimated 750 deaths related to salivary gland tumors occur annually (USA)
- Patients with malignant lesions typically present after age 60 years,
- those with benign lesions usually present after age 40 years.

- Salivary gland neoplasms are rare in children.
  - Most tumors (65%) are benign, with hemangiomas being the most common, followed by pleomorphic adenomas.
  - 35% of salivary gland neoplasms are malignant. Mucoepidermoid carcinoma is the most common

- neoplasms of the salivary glands account for fewer than 3% of all tumors and only 6% of head and neck neoplasms. They may be broadly categorized into benign neoplasms, tumor-like conditions, and malignant neoplasms. Most salivary gland tumors (SGTs) (70%) originate in the parotid gland.(1) Parotid gland tumors are benign in 75% of the reported cases. Whereas, pleomorphic adenomas (PA, benign mixed tumors) are found to be the most common benign SGTs, comprising around 85% of all salivary gland neoplasms.(

- Although the etiology of SGTs is unknown, the involvement of environmental or genetic factors has been suggested. Several genetic alterations, such as allelic loss, monosomy and polysomy, and structural rearrangement, have been studied as factors in the development of SGTs. In addition, radiation exposure and Epstein-Barr virus infection were also reported as other factors in SGT development.

History

- The most common presentation is a painless, asymptomatic mass
- Slow-growing masses of long-standing duration tend to be benign
- Pain most likely indicates perineural invasion (malignancy)
- 7-20% present with facial nerve paralysis (malignancy)
  - 80% of patients with facial nerve paralysis have nodal metastasis
  - average survival of 2.7 years
  - The most common causes are adenoid cystic carcinoma, poorly differentiated carcinoma, and SCC

Patient Demography

	N (%)	M:F	Mean age(yrs)	Peak age	Commonest lesions (%)
All	125	1.35:1	43	4^{th}	PA (44.8) Warthin(25.5) MEC (8.8) ACC(2.4)
Benign	103	1.28:1	39	4^{th} and 5^{th}	PA (54.3) Warthin(31) LE lesion (5.8)
Malignant	22	1.75:1	50	5^{th} and 6^{th}	MEC (50) ACC (13.6) Adeno CA (9)

PA= pleomorphic adenoma, MEC= mucoepidermoid carcinoma ,ACC=adenoid cystic carcinoma, LE=lymphoepithelial benign lesion , AdenoCa Nos= adenocarcinoma, M=male, F=female.

Type of tumour	N	% (Total)	%(benign , malignant)
Benign	103		
Pleomorphic adenoma	56	44.8	54.3
Warthin tumour	32	25.5	31
lymphoepithelial benign lesion	6	4.8	5.8
lipoma	5	4	4.8
Schwannoma	1	0.8	0.9
Hemangioma	2	1.6	1.9
Oncocytic cyst	1	0.8	0.9
Malignant	22		
Mucoepidermoid Ca	11	8.8	50
Adenoid cystic carcinoma	3	2.4	13.6
Adenocarcinoma	2	1.6	9
Cystadenocarcinoma	1	0.8	4.5
Acinic cell carcinoma	1	0.8	4.5
Non Hodgkin lymphoma	1	0.8	4.5
Squamous Cell Carcinoma	1	0.8	4.5
Rhabdomyosarcoma	1	0.8	4.5
Melanoma	1	0.8	4.5

Type of tumour	Temporary Palsy	Permanent Palsy	Frey's syndrome	G.A PALSY	Haematoma
Benign	12	1	17	22	1
Pleomorphic adenoma	8	1	12	13	0
Warthin tumour	4	0	3	6	1
lymphoepithelial benign lesion	0	0	0	1	0
lipoma	0	0	0	1	0
Schwannoma	0	0	1	0	0
Hemangioma	0	0	1	0	0
Oncocytic cyst	0	0	0	1	0
Malignant	4	2	6	8	1
Mucoepidermoid Ca	2	1	4	5	0
Adenoid cystic carcinoma	0	1	0	2	1
Adenocarcinoma	1	0	0	0	0
Cystadenocarcinoma	0	0	1	0	0
Acinic cell carcinoma	0	0	1	1	0
Non Hodgkin lymphoma	0	0	0	0	0
Squamous Cell Carcinoma	1	0	0	0	0
Rhabdomyosarcoma	0	0	0	0	0
Melanoma	0	0	1	0	0
Total (%)	16(12.8)	3(2.4)	23(18)	30(25.5)	2(1.6)

History cont.

- *Trismus*
  - extension into the masticatory muscles
  - invasion of the temporomandibular joint.
- *Dysphagia* indicates a tumor of the deep lobe of the gland.
- *ear pain* may indicate extension of the tumor into the auditory canal.
- *numbness* in the distribution of the second or third divisions of the trigeminal nerve often indicates neural invasion .

Physical exam

- Examination of the mass firm vs hard
- Skin fixation, ulceration,
- fixation to adjacent structures
- The external auditory canal
- Examination of the oral cavity and oropharynx
- Stenson duct and discharge
- bulging of the lateral pharyngeal wall or soft palate
- Bimanual palpation
- regional nodes
- Facial Nerve

FNA Bx

- Routine use of FNA biopsy in the evaluation of a parotid mass continues to be the golden standard.
- Not indicated in clinically benign superficial lesion (inflammatory)
- considered a good investigational tool as long as it is used in the appropriate clinical context.

Biopsy

- FNA
  - The sensitivity 86-91%
  - specificity 61-94%
- large core needle /controversial
  - potential facial nerve injury and
  - theoretical seeding of the needle tract with tumor cells.
- incisional biopsy /contraindicated.
  - high rate of local recurrence and
  - places the facial nerve at risk for injury from inadequate visualization.
- frozen section >93% accuracy

Imaging studies

- CT scan indications
  - the tumor extends beyond the superficial lobe,
  - a deep lobe tumor is suspected
  - if the patient has trismus.
- MRI is indicated
  - if facial nerve function is affected
- Benign vs. malignant
- US
  - Solid vs cystic
  - FNA Guided bx

Salivary gland tumors
Epithelial tumours

benign

- Pleomorphic adenoma (commonest)
- Warthin tumour (adenolymphoma)
- monomprphic adenomas
- Myoepithelioma
- Cystadenoma
- Ductal papillomas.
- Sialoblastoma.

malignant

- Mucoepidermoid carcinoma
- Acinic cell carcinoma
- Adenoid cystic carcinoma
- Carcinoma arising in pleomorphic adenoma
- Adenocarcinoma
- Squamous cell carcinoma

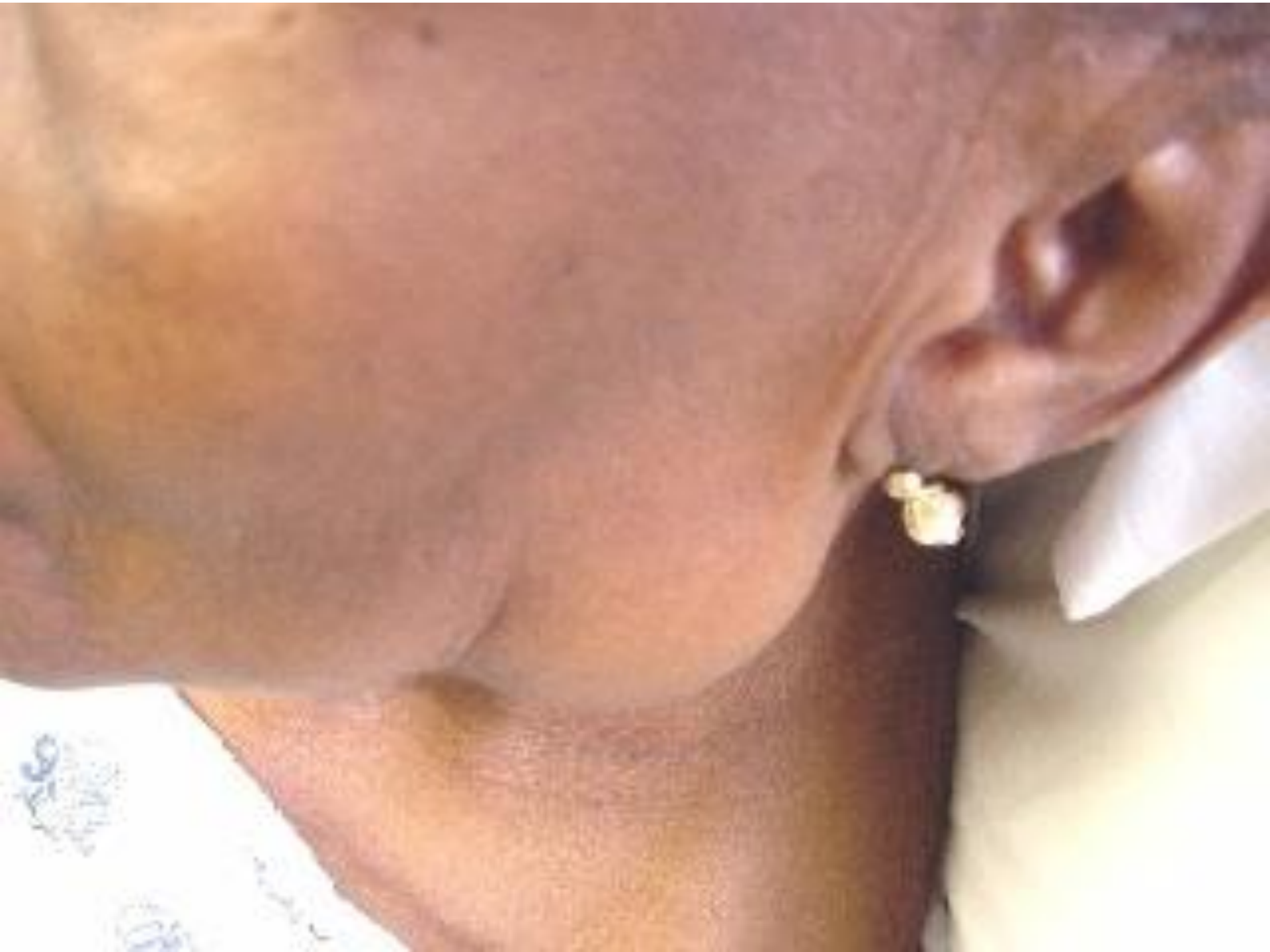
- Monomorphic adenomas :
  - Basal cell adenoma
  - Canalicular adenoma .
  - Oncocytoma
  - Sebaceous adenoma .
  - Sebaceous lymphadenoma

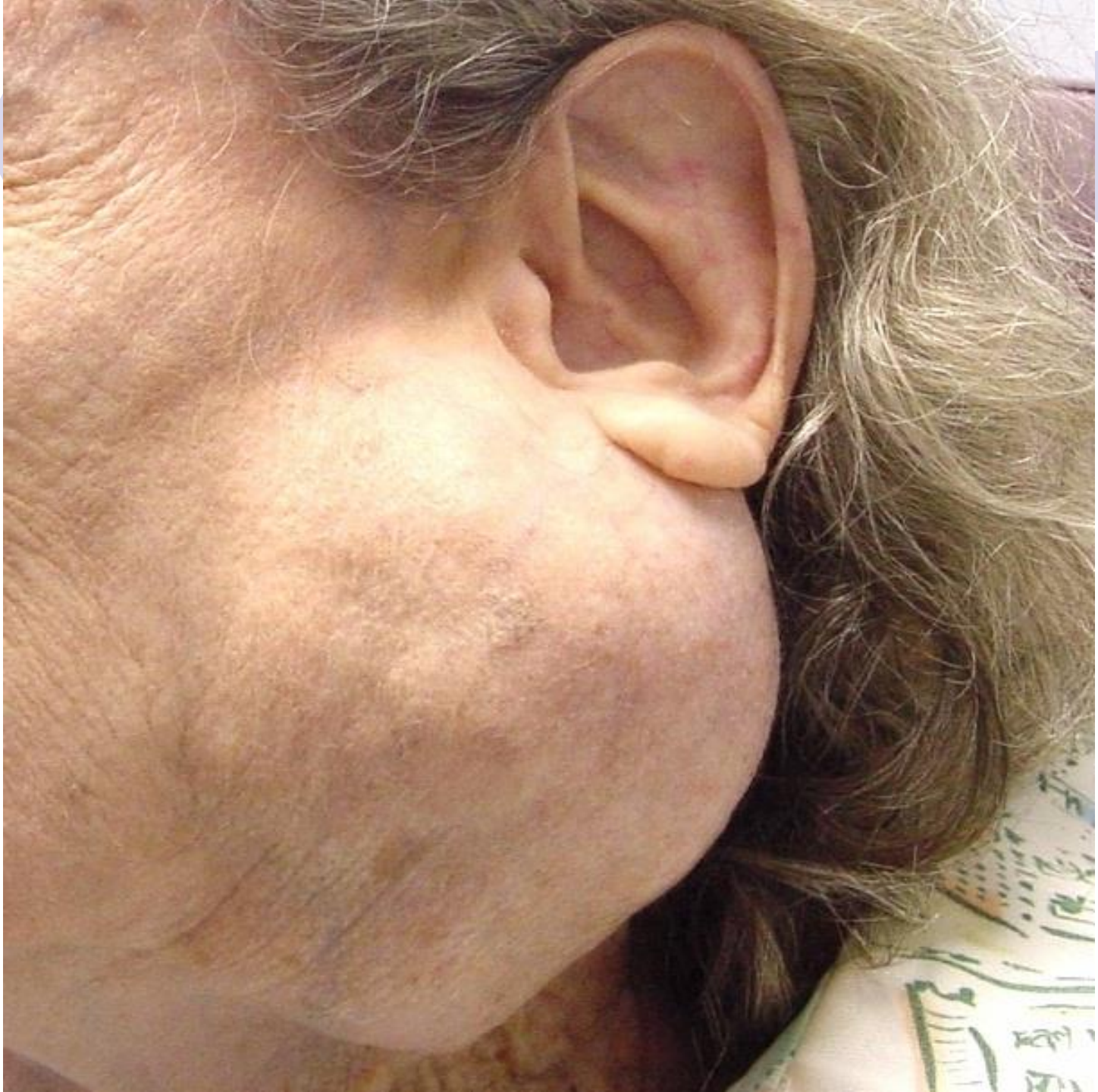
Salivary gland tumors

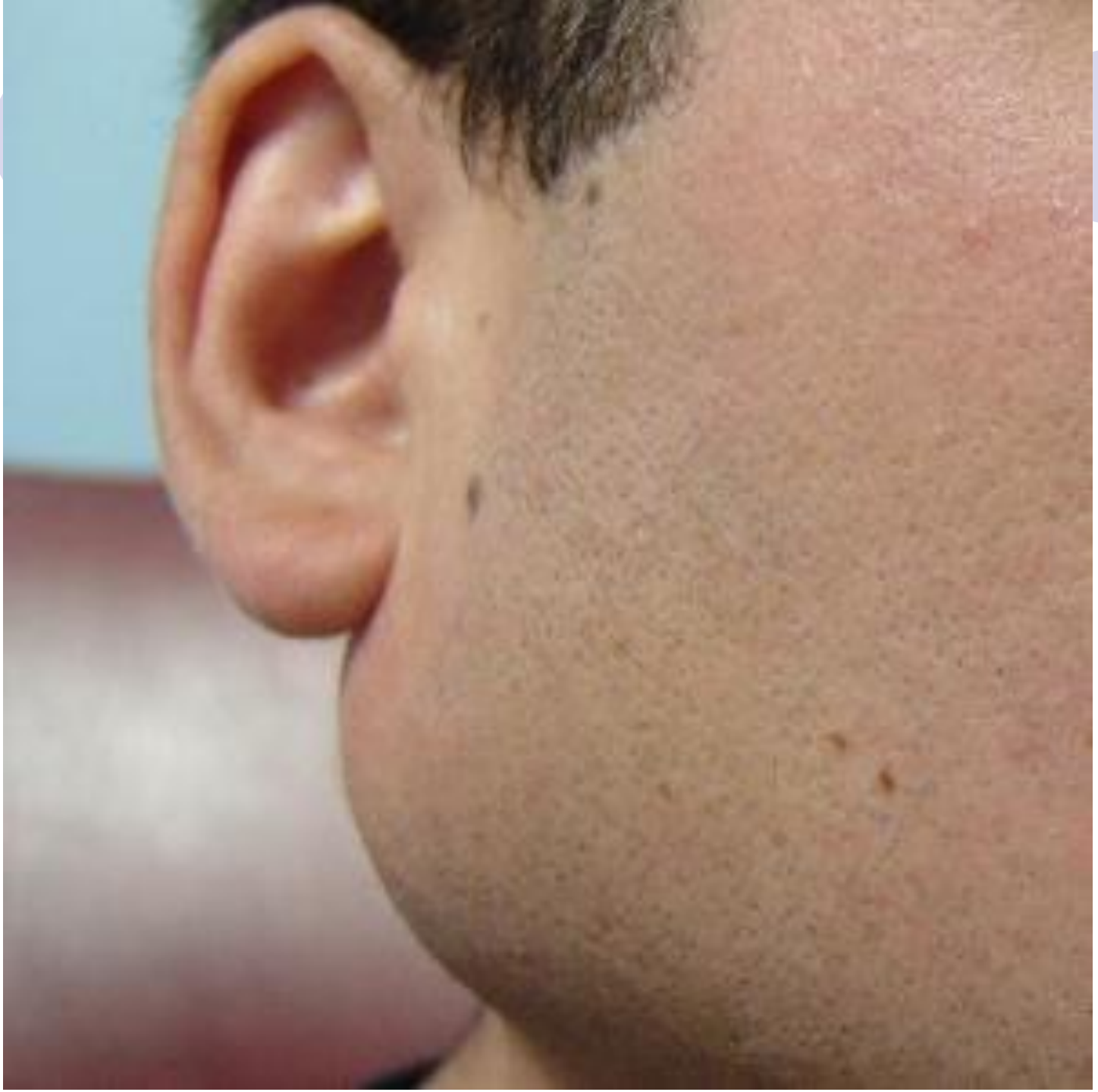
- **Non-Epithelial tumours**
  - Lymphoma
  - Sarcoma
  - Haemangiomas
- Secondary mets.

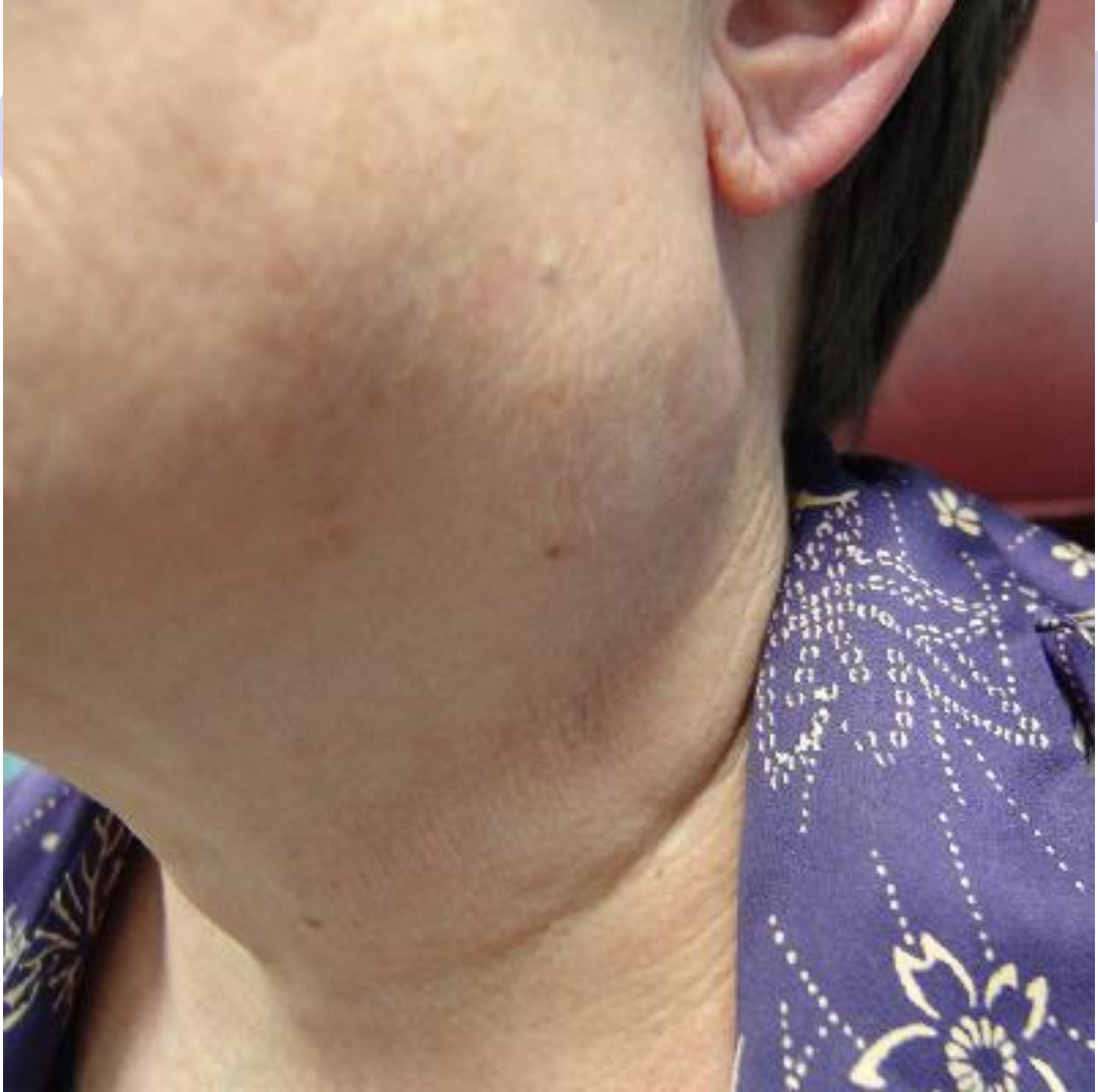
Pleomorphic adenoma

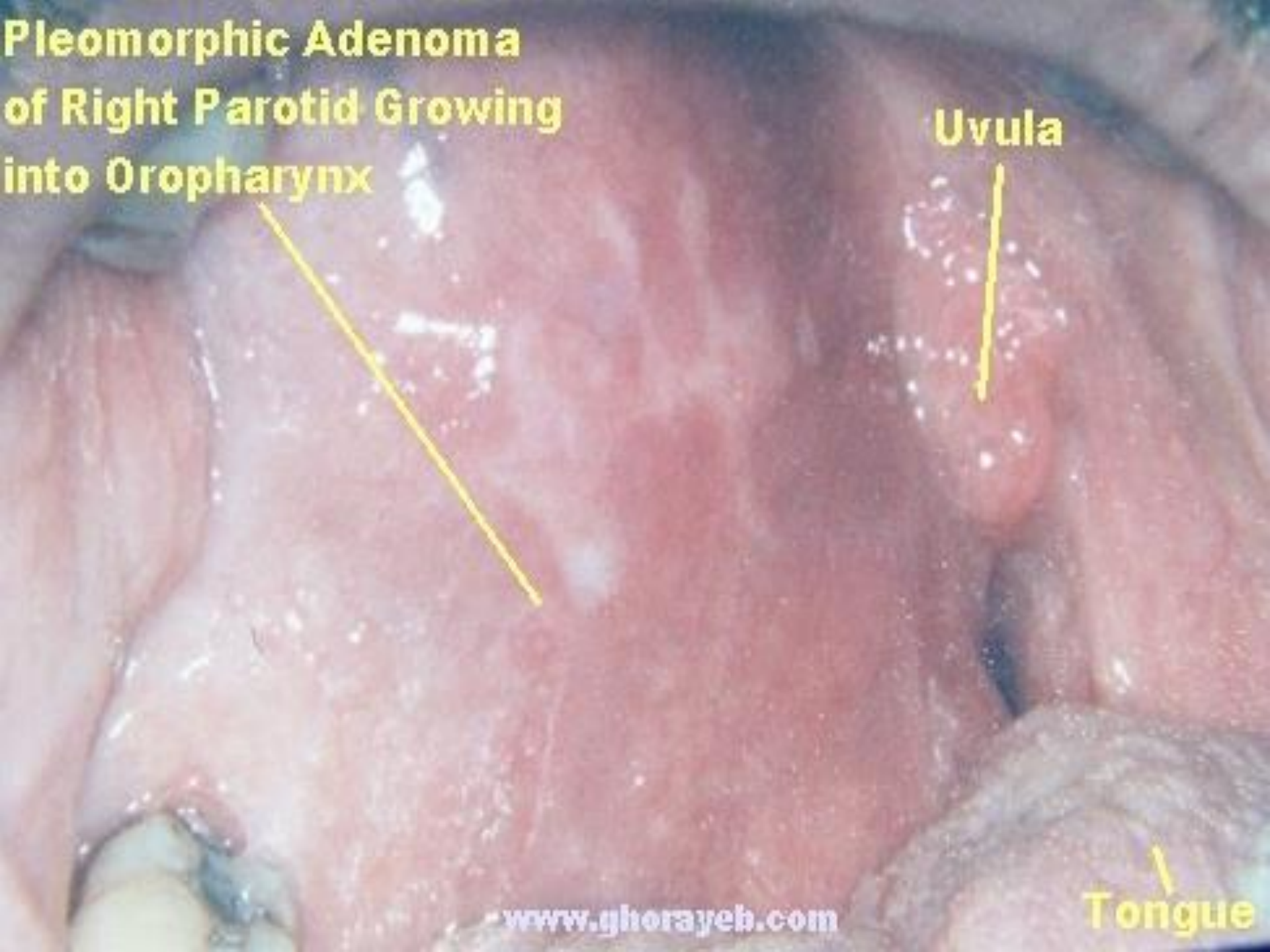
- *benign mixed tumor*
- Most common parotid gland tumor(60%)
- typically in adults from the 3rd to 5th decades
- Increased risk after radiation treatment
- slowly growing neoplasm
- painless ,firm, smooth mass
- More than 2/3 arise in the superficial lobe
- occasionally, they extend medially into the pharynx.

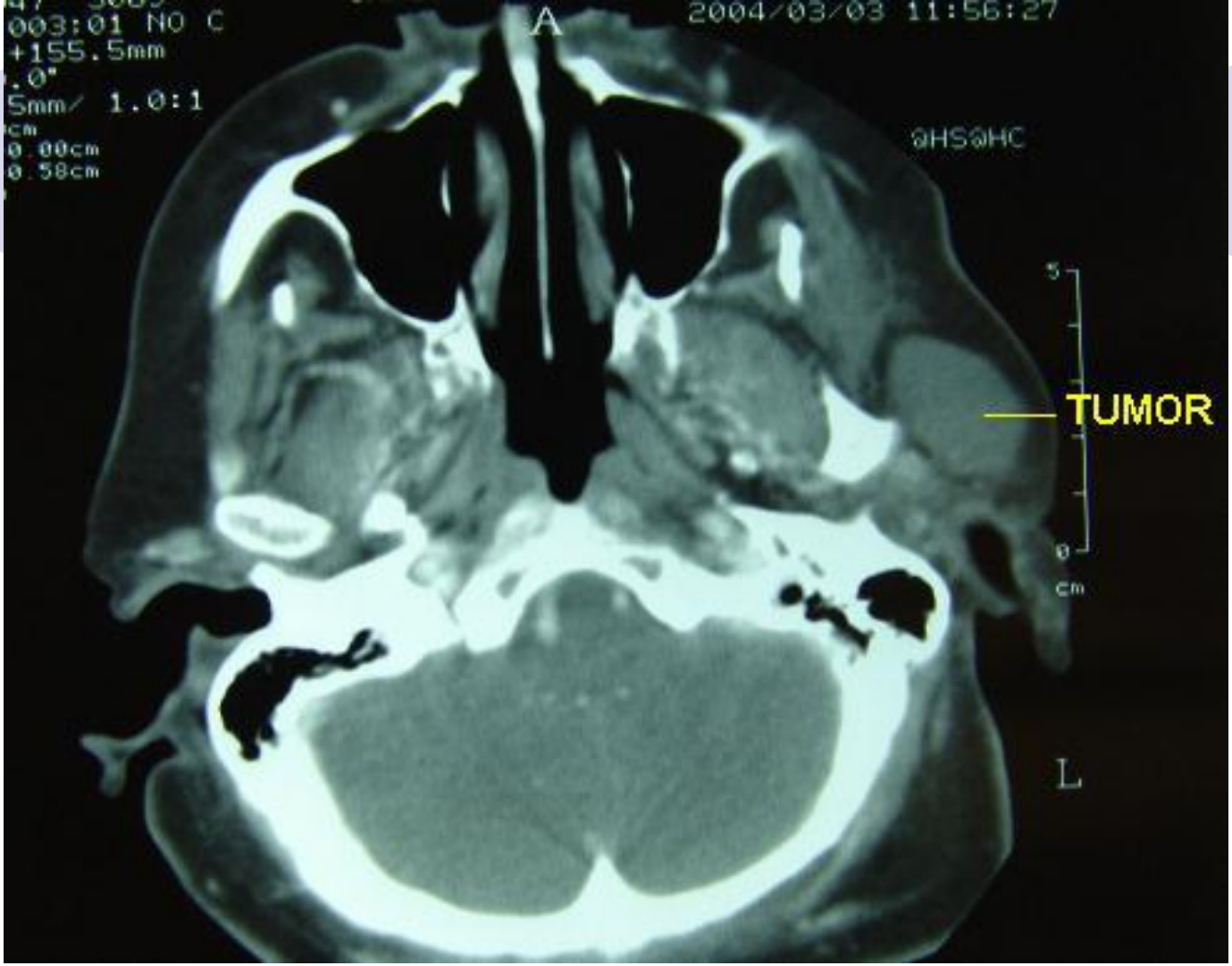




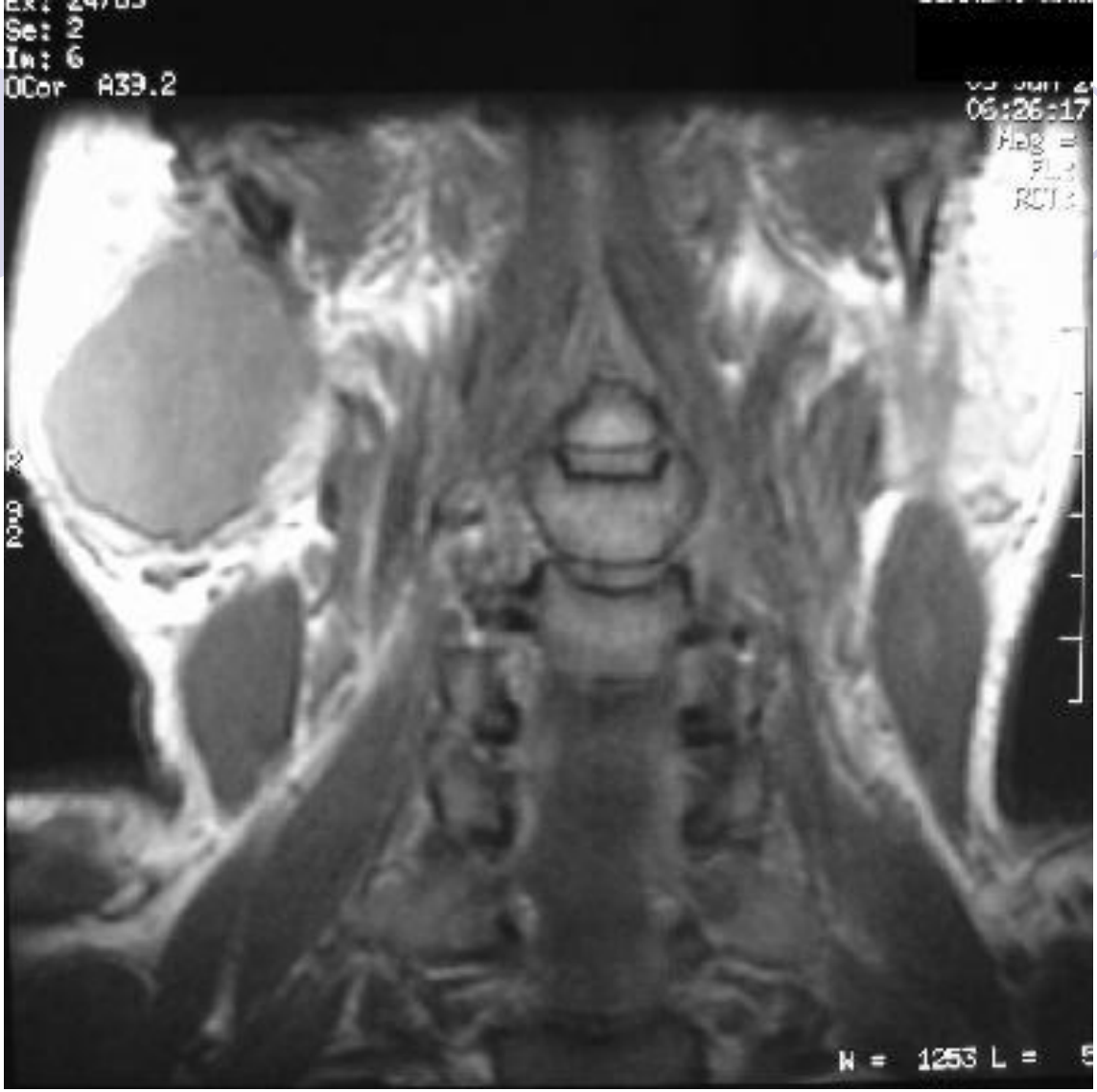





Pleomorphic Adenoma
of Right Parotid Growing
into Oropharynx
Uvula
Tongue
www.ghorayeb.com



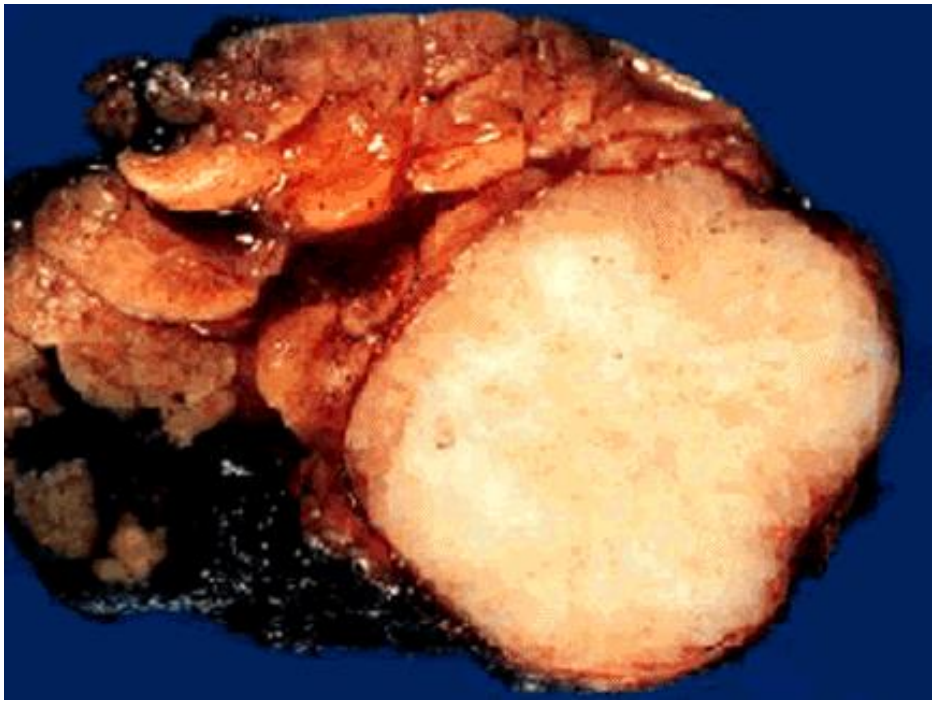
CT ,typically solitary, non-infiltrating and well demarcated



- Right parotid pleomorphic adenoma on coronal MRI scan of the neck

Pleomorphic adenoma (cont.)
Gross section

- well circumscribed
- Solid
- Smooth
- Occasionally nodular
- encapsulated
- Cut surface is typically gray-white or tan-white



Pleomorphic adenoma (cont.)
Microscopic

- the characteristic feature is the morphologic diversity of the tumor
- epithelial and mesenchymal-like elements
- The epithelial cells make up the majority of the cellular regions,
- the myoepithelial cells make up the stromal areas.
- The ratio of cellular elements to stromal elements can vary widely.
- The stromal component may have a myxoid, fibroid, or chondroid appearance.

Pleomorphic adenoma (cont.)

- Presence of pseudopodia that extend beyond the apparent margin of the tumor is responsible for the significant rate of recurrence with simple enucleation of pleomorphic adenomas.
- The treatment of choice for pleomorphic adenomas of the parotid gland is superficial lobectomy taking a cuff of normal glandular tissue with the tumors

Pleomorphic adenoma (cont.)

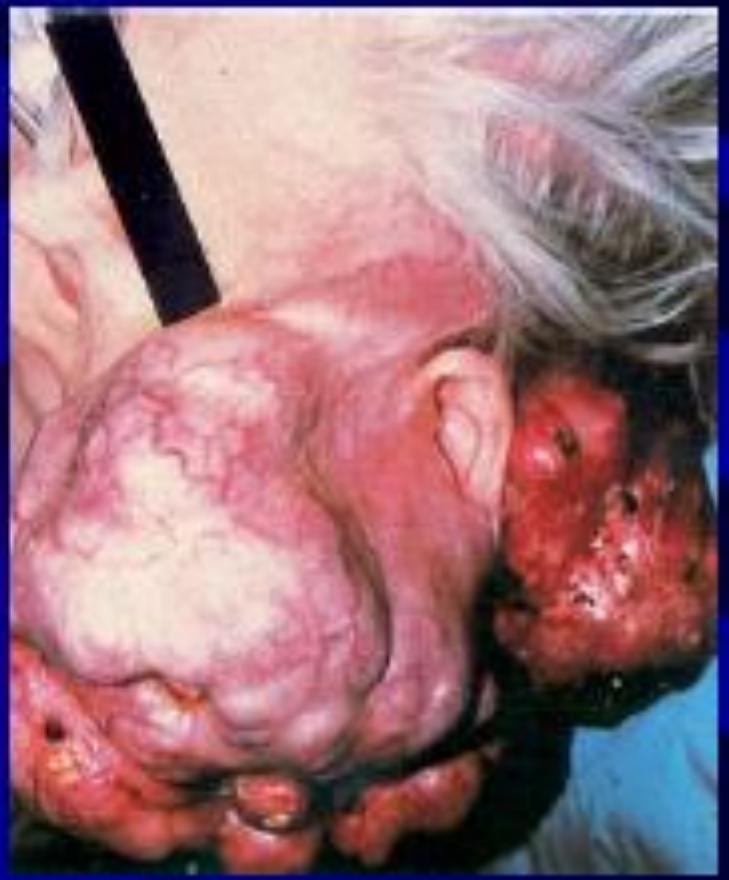
- Complete surgical removal is curative
- recurrence rate less than 2%.
- *carcinoma ex pleomorphic adenoma* 2-7%
- *metastasizing benign mixed tumors*.
  - very rare.
  - history of multiple local recurrences.
  - Metastases occur several years after the initial diagnosis and may occur to the lungs, regional lymph nodes, skin, and bone.
  - The usual clinical course is good
  - an aggressive clinical course leading to death in 22% of cases.

carcinoma ex pleomorphic adenoma

- 2-4% of salivary gland neoplasms
- 6^{th}-8^{th} decades
- Parotid > submandibular > palate
- Risk of malignant degeneration
  - •1.5% in first 5 years
  - •9.5% after 15 years
- Presentation
  - •Longstanding painless mass that undergoes sudden enlargement

Carcinoma Ex-Pleomorphic Adenoma

- Gross pathology
  - Poorly circumscribed
  - Infiltrative
  - Hemorrhage and necrosis

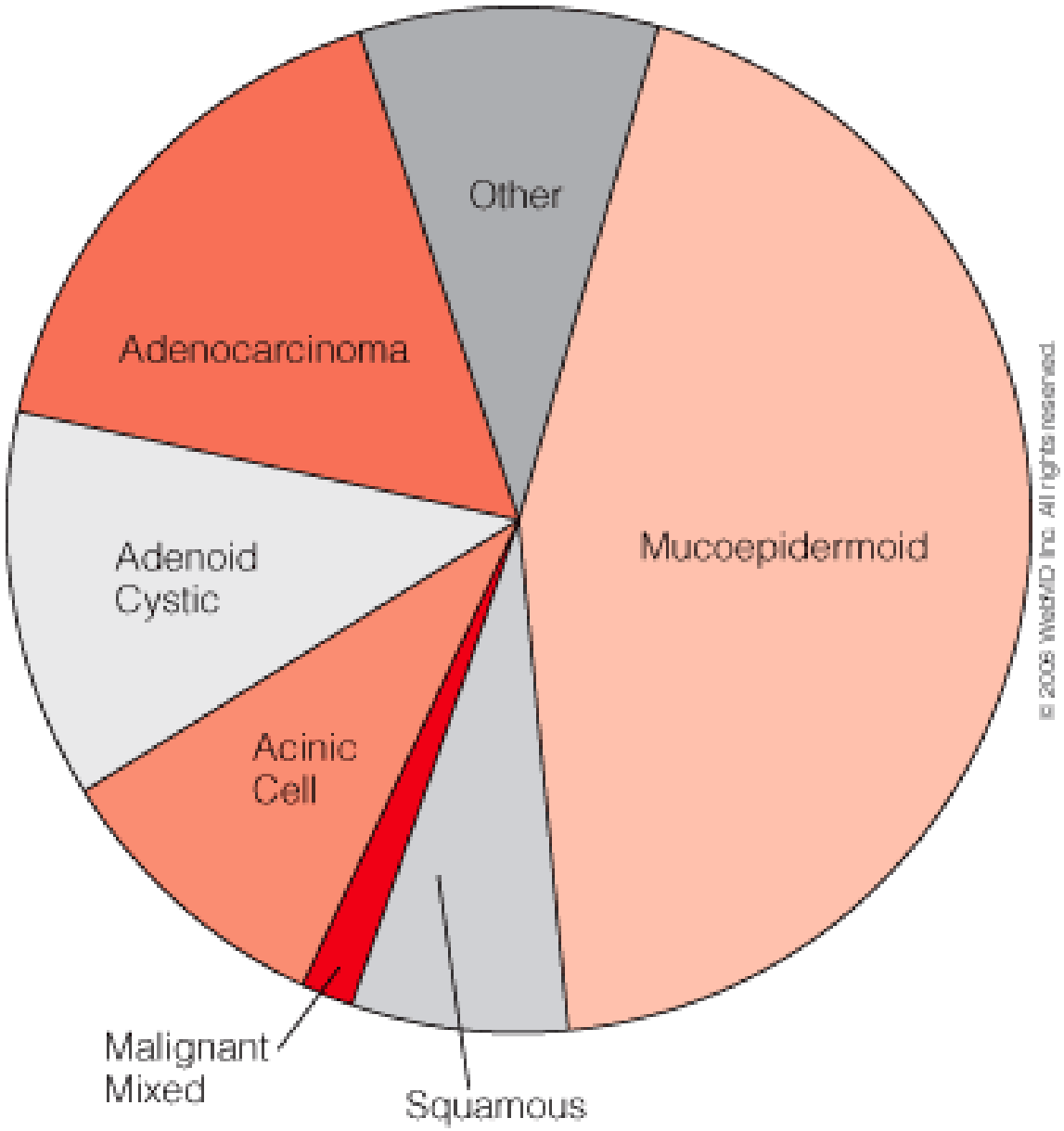


Warthin's tumor

- Papillary cystadenoma lymphomatosum
- second most common benign tumor of the parotid gland
- almost exclusively in the parotid gland
- 2-10% of all parotid gland tumors
- more common in older white men
- bilateral in 10% of the cases
- Rarely lymphoma or carcinoma may arise

Warthin’s tumor (cont..)

- 10% occur in the deep lobe
- 8% occur in the periparotid lymph nodes
- **Papillary cystadenoma lymphomatosum syndrome**
  - Acute onset of pain with sudden increase in size of the tumor
  - May be secondary to leakage of fluid and retrograde infection through Stenson's duct



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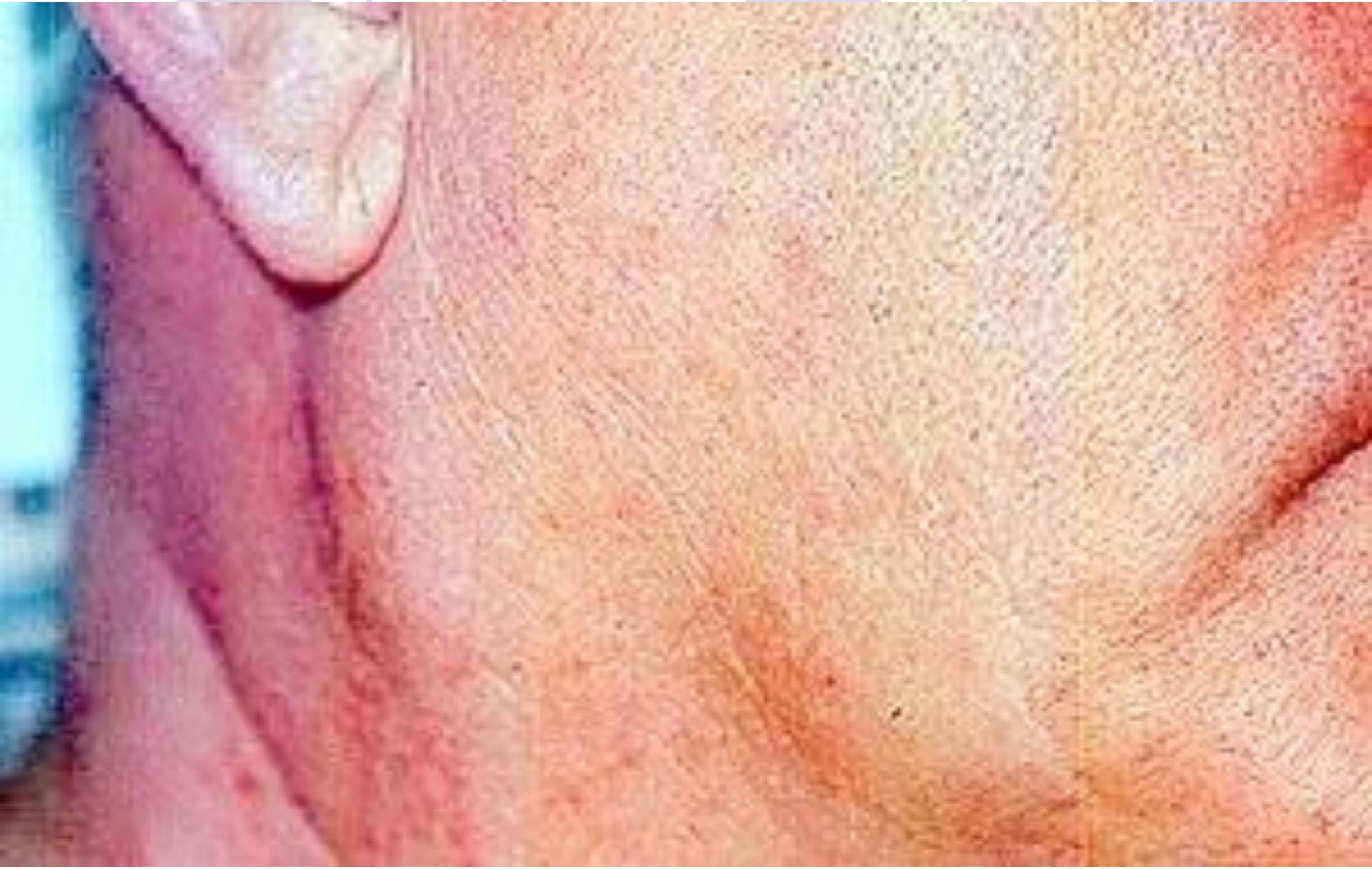
Mucoepidermoid carcinoma

- the most common malignant tumor of the parotid gland
- 30% of parotid malignancies.
- 5% of all salivary gland tumors.
- About 2/3 arise within the parotid gland
- The tumor is slightly more common in women
- peaks in the 5th decade.
- The tumor is usually asymptomatic.
- Pain is usually associated with high grade histology

Mucoepidermoid carcinoma cont.

- epithelial tumor that is composed of various proportions of mucous (columnar), epidermoid (squamous), &intermediate cells
- often prominent cystic growth
- Prior exposure to ionizing radiation increases the risk



Grading

- Intracystic component (+2).
- Neural invasion present (+2).
- Necrosis present (+3).
- Mitosis (4 or more per 10 HPF) (+3).
- Anaplasia present (+4).
- Total point scores are
  - 0 to 4 for low-grade,
  - 5 to 6 for intermediate-grade
  - 7 to 14 for high-grade.

Mucoepidermoid Tumor Grading

Low Intermediate High

Mucoid
Cystic component

Epidermoid
Solid component

Histologic Grade	5 YRS	10 YRS	15 YRS
Low	92%	90%	82%
Intermediate	49%	42%	33%
High	40%	35%	25%

Adenoid cystic carcinoma

- the most common malignant tumor of the submandibular and minor salivary glands
- 4% of all salivary gland tumors.
- sometimes referred to as *cylindroma* .
- median age of 43 years.
- commonly present as a slowly growing tumor
- Pain and paresthesia
- occasionally with facial nerve paralysis

Adenoid cystic carcinoma cont.

- SEX (M:F)2:3
- Blood borne metastases in 40-60% are common
- the lung being the recipient in 40% of cases.
- 33% of patients usually die within less than 2 years after distant metastases.
- lymph node metastases are uncommon.
- unpredictable behavior.
- It possesses a highly invasive quality but may remain quiescent for a long time.

Adenoid cystic carcinoma cont.

- 5 years is approximately 65%,
- but 15-year survival is only 12%
- Three histologic types have been identified:
  - cribrose,
  - tubular,
  - solid

Staging TNM definitions
Primary tumor (T)

- TX: Primary tumor cannot be assessed
- T0: No evidence of primary tumor
- T1: Tumor 2 cm or less in greatest dimension without extraparenchymal extension*
- T2: Tumor more than 2 cm but not more than 4 cm in greatest dimension without extraparenchymal extension*
- T3: Tumor more than 4 cm and/or tumor having extraparenchymal extension*
- T4a: Tumor invades skin, mandible, ear canal, and/or facial nerve
- T4b: Tumor invades skull base and/or pterygoid plates and/or encases carotid artery

Staging TNM definitions
Regional lymph nodes (N)

- NX: Regional lymph nodes cannot be assessed
- N0: No regional lymph node metastasis
- N1: Metastasis in a single ipsilateral lymph node, 3 cm or less in greatest dimension
- N2: Metastasis in a single ipsilateral lymph node, more than 3 cm but not more than 6 cm in greatest dimension, or in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension, or in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
- N2a: Metastasis in a single ipsilateral lymph node more than 3 cm but not more than 6 cm in greatest dimension

Staging TNM definitions
Regional lymph nodes (N)

- N2b: Metastasis in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension
- N2c: Metastasis in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
- N3: Metastasis in a lymph node more than 6 cm in greatest dimension

Staging TNM definitions
Distant metastasis (M)

- MX: Distant metastasis cannot be assessed
- M0: No distant metastasis
- M1: Distant metastasis

AJCC stage groupings

- **Stage I**
  - T1, N0, M0
- **Stage II**
  - T2, N0, M0
- **Stage III**
  - T3, N0, M0
  - T1, N1, M0
  - T2, N1, M0
  - T3, N1, M0
- **Stage IVA**
  - T4a, N0, M0
  - T4a, N1, M0
  - T1, N2, M0
  - T2, N2, M0
  - T3, N2, M0
  - T4a, N2, M0
- **Stage IVB**
  - T4b, any N, M0
  - Any T, N3, M0
- **Stage IVC**
  - Any T, any N, M1

Treatment

Stage I Major Salivary Gland Cancer

- **Low-grade tumors**
  - **Surgery alone.**
- High-grade tumors
  - may be cured by radical surgery alone
  - Postoperative radiation therapy may improve local control and increase survival rates
  - The role of chemotherapy remains under evaluation

Treatment

Stage II Major Salivary Gland Cancer

- **Low-grade tumors**
  - Surgery alone or with postoperative radiation therapy if indicated .
  - Chemotherapy should be considered when radiation therapy or surgery are refused .

- **High-grade tumors**
  - may be cured by radical surgery alone .
  - Postoperative radiation therapy may improve local control and increase survival rates
  - The role of chemotherapy is also under study

Treatment

Stage III Major Salivary Gland Cancer

- **Low-grade tumors**
  - Surgery alone or with postoperative radiation therapy when indicated.
  - Chemotherapy should be considered, when radiation or surgery are refused or when tumors are recurrent or nonresponsive.

Treatment

Stage III Major Salivary Gland Cancer

- **High-grade tumors**
  - may be cured by radical surgery alone.
  - Postoperative radiation therapy may improve local control and increase survival rates

Treatment

Stage IV Major Salivary Gland Cancer

- Standard therapy for tumors that have spread to distant sites is not curative .
- Fast neutron beam radiation or accelerated hyperfractionated photon beam schedules have been reported to be more effective than conventional x-ray therapy in the treatment of inoperable, unresectable, or recurrent malignant salivary gland tumors

Treatment

Stage IV Major Salivary Gland Cancer

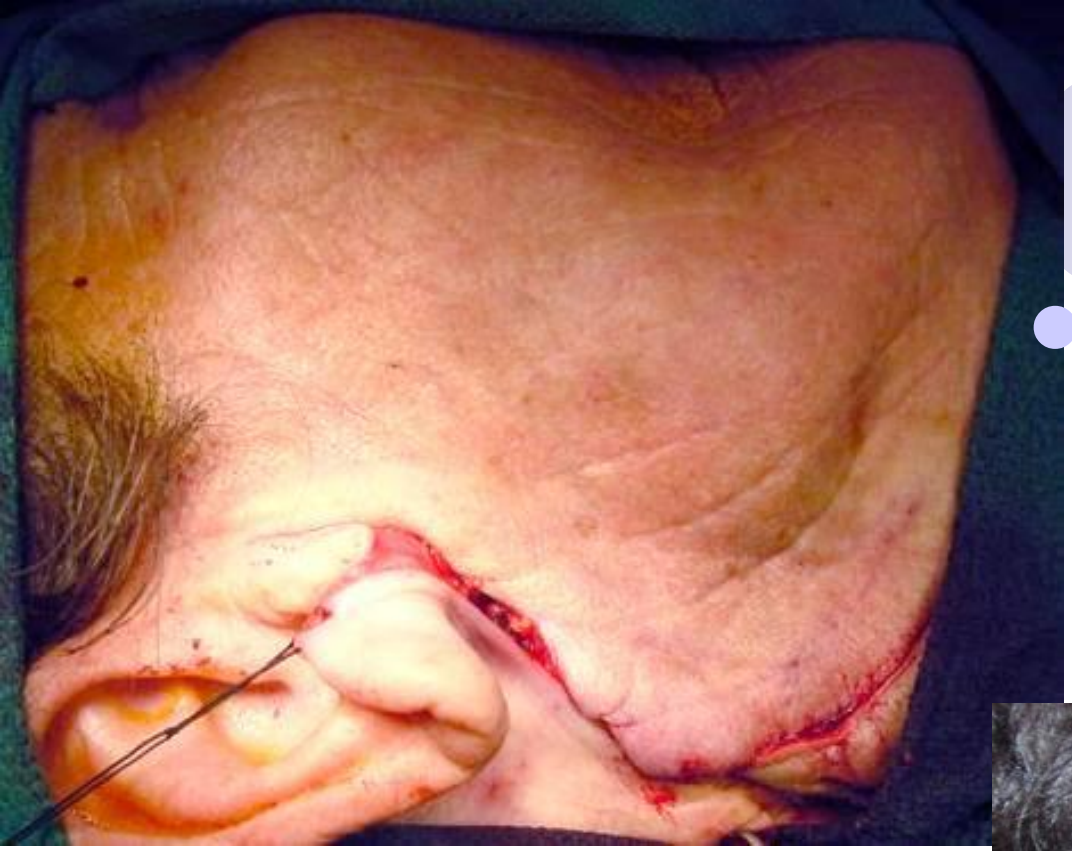
- Patients with stage IV salivary gland cancer should be considered candidates for clinical trials.
- Their cancer may be responsive to aggressive combinations of chemotherapy and radiation.
- Patients with any metastatic lesions could be considered for clinical trials of chemotherapy using doxorubicin, cisplatin, cyclophosphamide, and fluorouracil as single agents or in various combinations

Recurrent Major Salivary Gland Cancer

- The prognosis is poor, regardless of cell type or stage.
- Selecting further treatment depends on many factors, including
  - the specific cancer,
  - prior treatment,
  - site of recurrence,
  - individual patient considerations.
- Fast neutron radiation therapy has been reported to be superior to conventional radiation therapy using x-rays and may be curative in selected cases of recurrent disease. 1

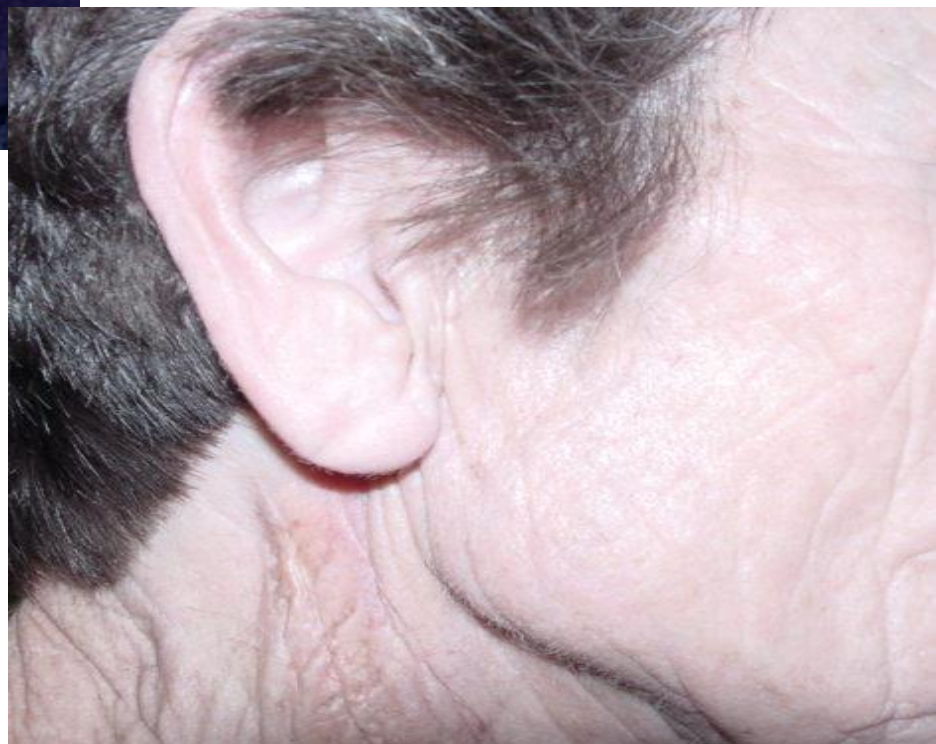
Parotidectomy

- **Superficial Parotidectomy**
- **Conservative Total Parotidectomy**
- **Total Radical Parotidectomy**
- **Extended Radical Parotidectomy**



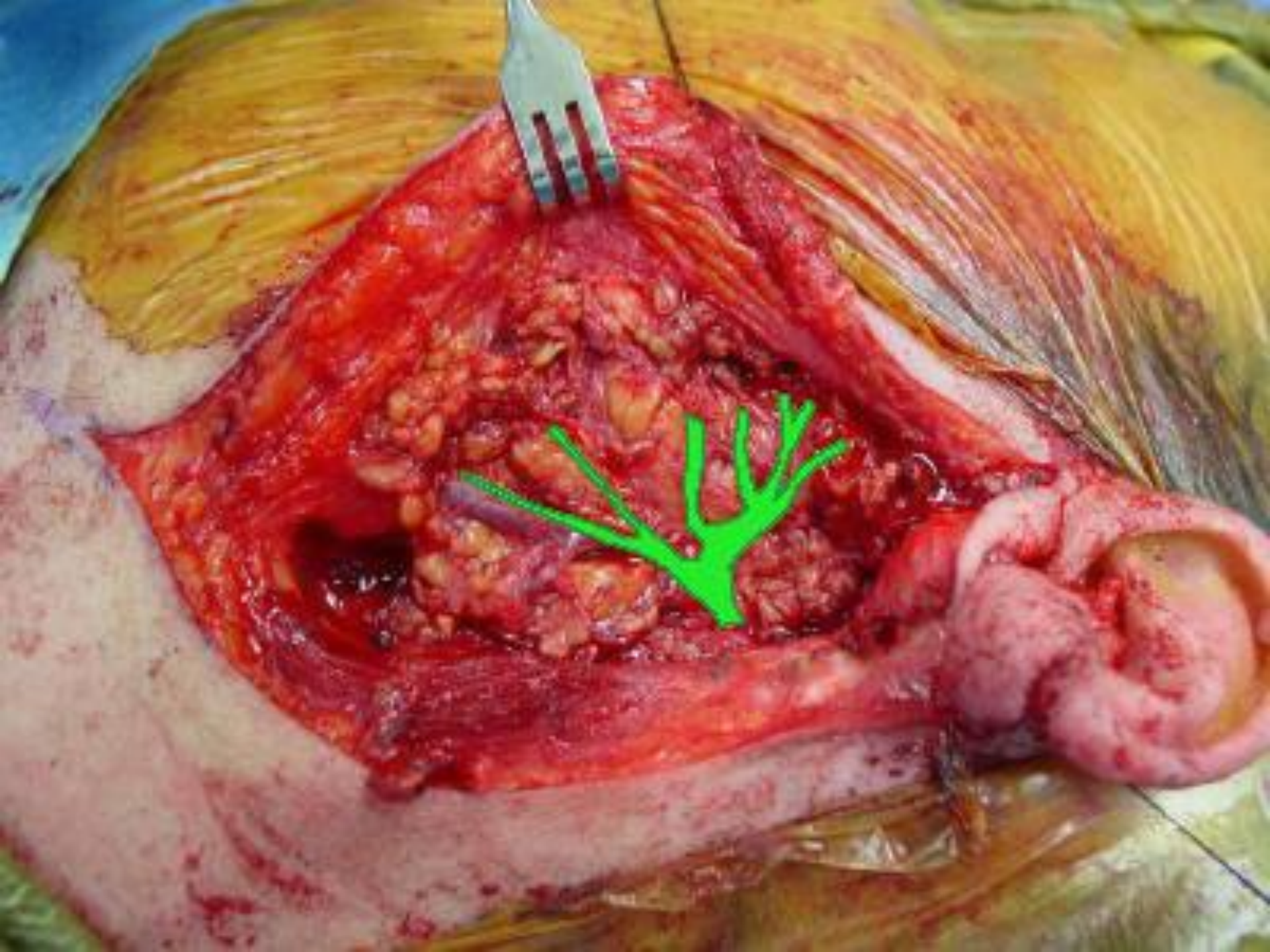
- Parotidectomy incision

- 6 weeks later



Superficial Parotidectomy

- The removal of the superficial part of the parotid salivary gland
- **Indications**
  - Conditions involving the superficial part of the gland:
    - Usually benign tumours,
    - enlarging intraglandular stones.
    - Small intraglandular malignant tumours, or lymph node metastases from tumours at other sites.
- The risk of facial nerve weakness
  - Permanent 1/200 to 1/100
  - Temporary 1/4 to 1/5 (recovery 6-8 wks)



Conservative Total Parotidectomy

- removal of both the superficial and deep parts of the parotid salivary gland, whilst avoiding damage of facial nerve.
- Conditions involving the deep lobe or both the superficial and the deep part of the gland:
  - pleomorphic adenoma
  - Malignant parotid neoplasms without preoperative facial nerve palsy and where tumour can be separated off from the nerve.
  - Small intraglandular deep lobe malignant tumours.
  - recurrent severe suppurative parotitis
- Conditions requiring access to deep structures whilst preserving the facial nerve, eg, parapharyngeal space or infratemporal fossa tumours not involving the facial

Conservative Total Parotidectomy

- The risk of facial nerve weakness
  - permanent 1 in 100 to 1 in 50
  - Temporary 1/2 to 1/4

Total Radical Parotidectomy

- Involves removal of both the superficial and deep part as well as the facial nerve
- **Indications**
- Conditions involving the deep lobe or both the superficial and the deep part of the gland:
  - Recurrent pleomorphic adenoma where nerve goes through recurrent tumour.
  - Malignant parotid neoplasms with preoperative facial nerve palsy
  - when tumour cannot be separated off from the nerve.

Total Radical Parotidectomy

- Conditions requiring access to deep structures where preservation of the facial nerve is not possible, eg, parapharyngeal space or infratemporal fossa tumours
- If a sural nerve graft is used to replace the resected part of the facial nerve, early return of function may take up to one year

Extended Radical Parotidectomy

- a total radical parotidectomy, as well as adjacent structures involved with disease. This may involve
  - bone (lower jaw, jaw joint, mastoid)
  - muscle (from the neck and face)
  - cartilage from the ear canal.
- A radical or modified radical neck dissection is usually performed at the same time.

Extended Radical Parotidectomy

- **Indications**
- Conditions involving the deep lobe or both the superficial and the deep part of the gland, as well as adjacent structures :
  - Recurrent pleomorphic adenoma where nerve goes through recurrent tumour and involves adjacent structures such as skin, muscle and cartilage .
  - Malignant parotid neoplasms with preoperative facial nerve palsy and where tumour cannot be separated off from the nerve and involves adjacent structures .
  - Malignant neoplasms of adjacent structures involving all of the parotid gland including facial nerve, eg, malignant middle ear or mastoid tumours .

Extended Radical Parotidectomy

- Malignant tumours requiring access to deep structures where preservation of the facial nerve is not possible eg parapharyngeal space or infratemporal fossa tumours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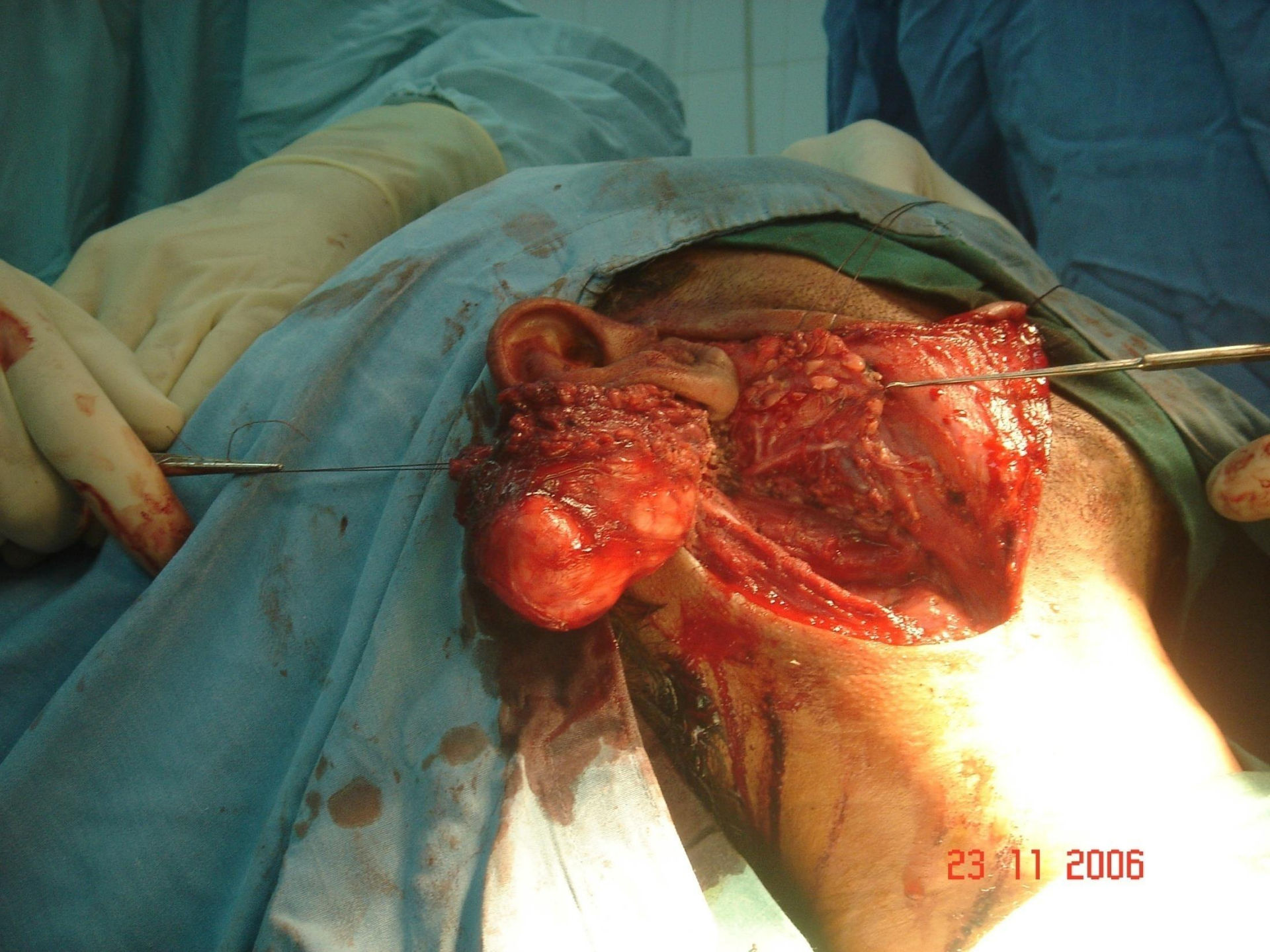
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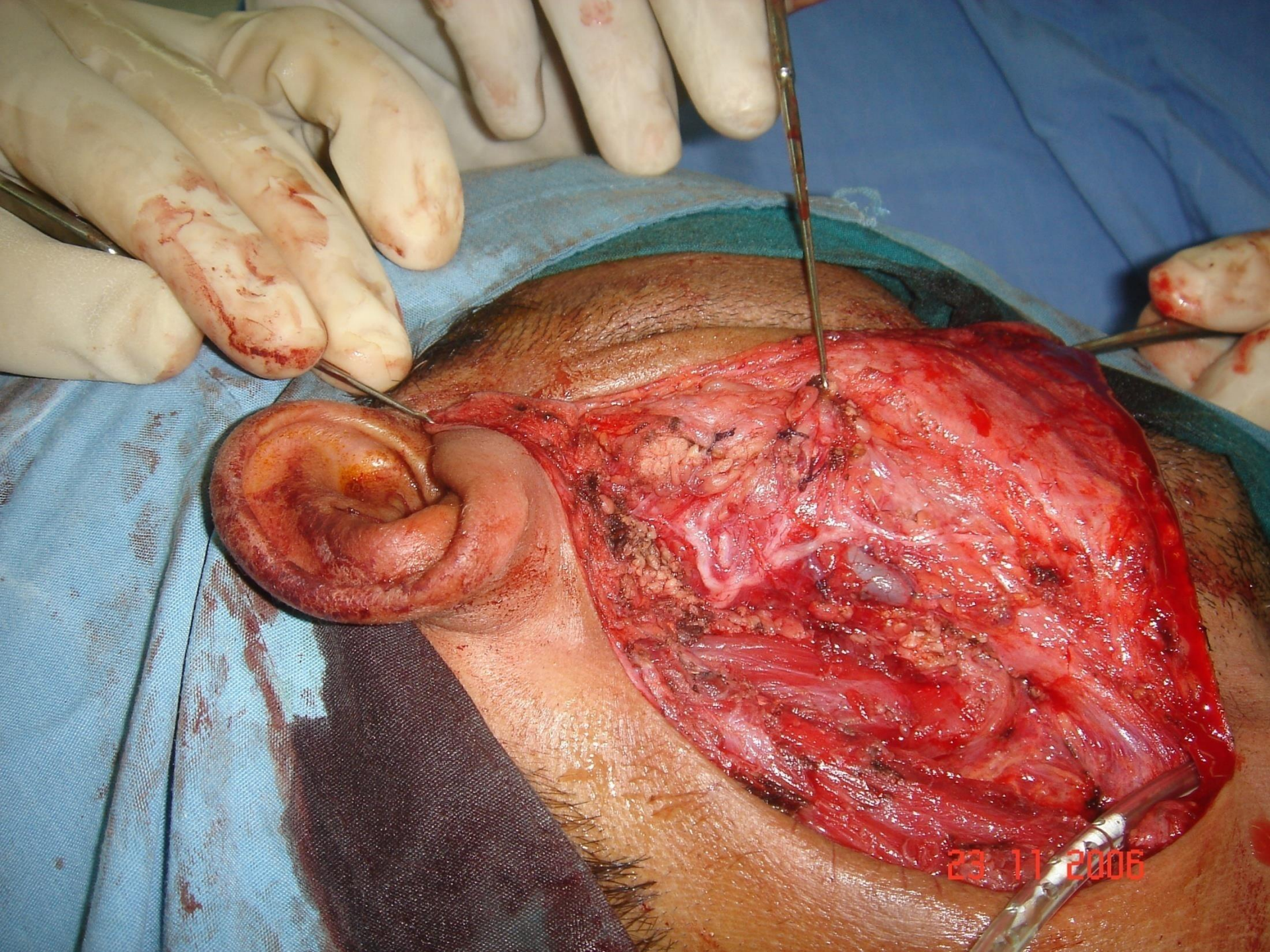
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Thank You