Disorders of the salivary glands

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INTRODUCTION

There are four main salivary glands, two submandibular glands and two parotid glands. In addition, there are multiple minor salivary glands.

MINOR SALIVARY GLANDS

Anatomy

The mucosa of the oral cavity contains approximately 450 minor salivary glands. They are distributed in the mucosa of the lips, cheeks, palate, floor of the mouth and retromolar area.

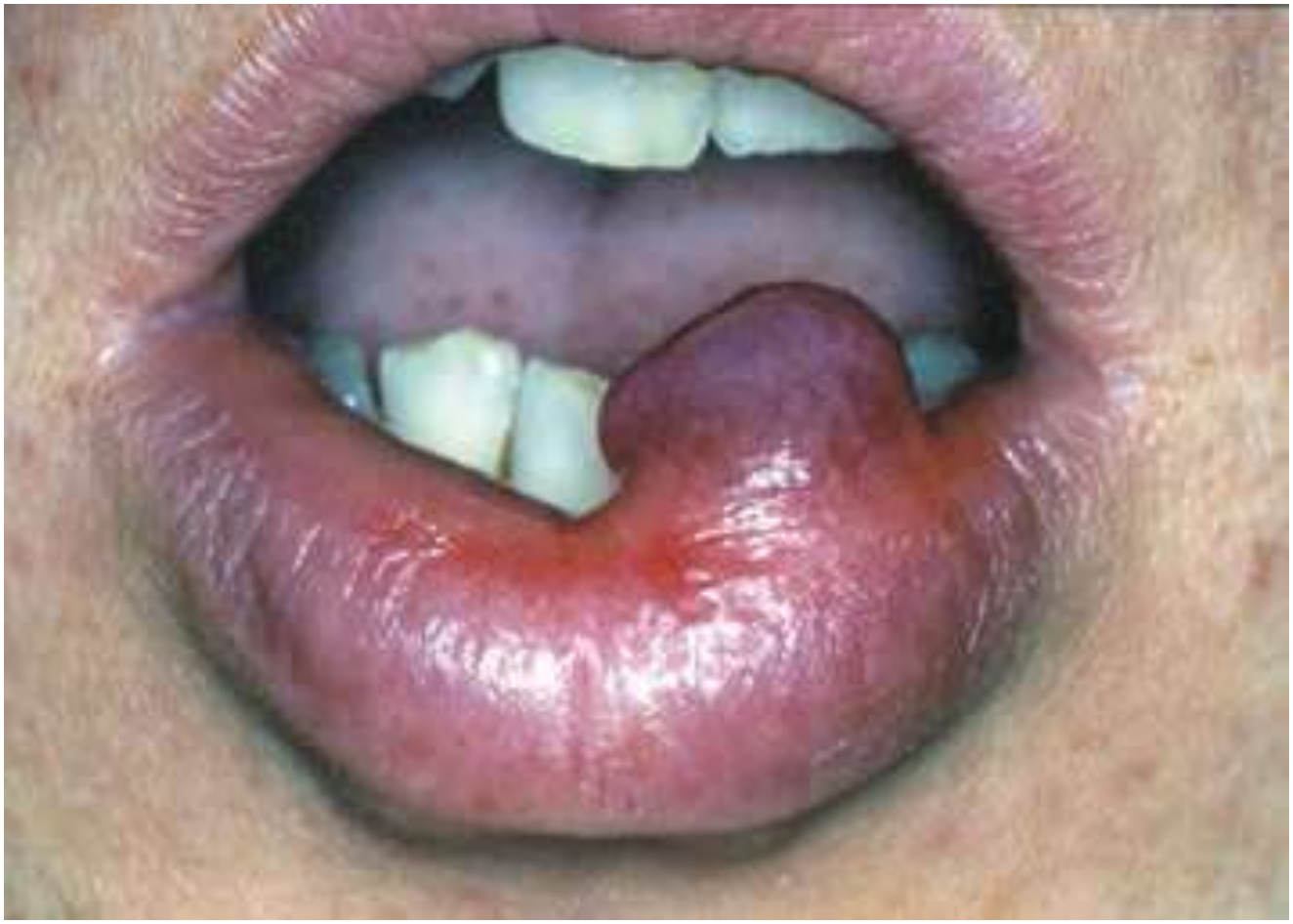
They have a histological structure similar to that of mucous-secreting major salivary glands.

Common disorders of minor salivary glands

Cysts

Extravasation cysts are common and result from trauma to the overlying mucosa. They usually affect minor salivary glands within the lower lip, producing a variable swelling that is painless and usually, but not always, translucent.

Some resolve spontaneously, but most require formal surgical excision that includes the overlying mucosa and the underlying minor salivary gland. Recurrence is rare.



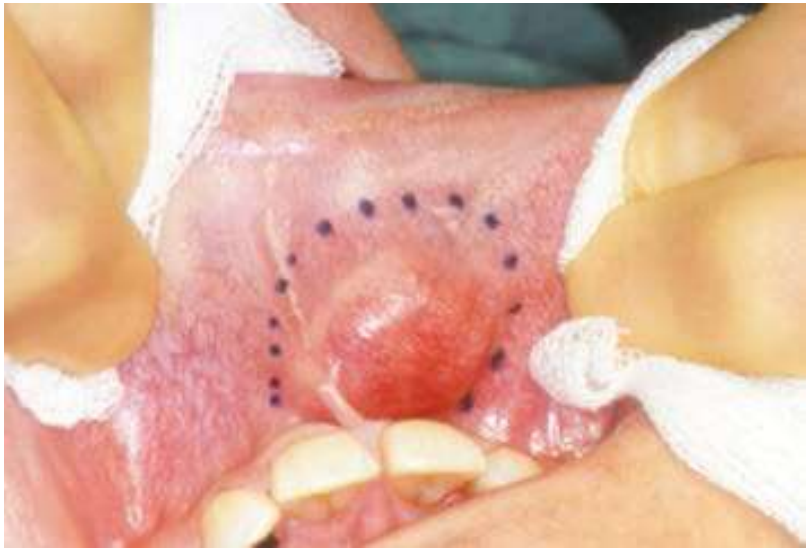
Mucous retention cyst. A translucent swelling on the lower lip

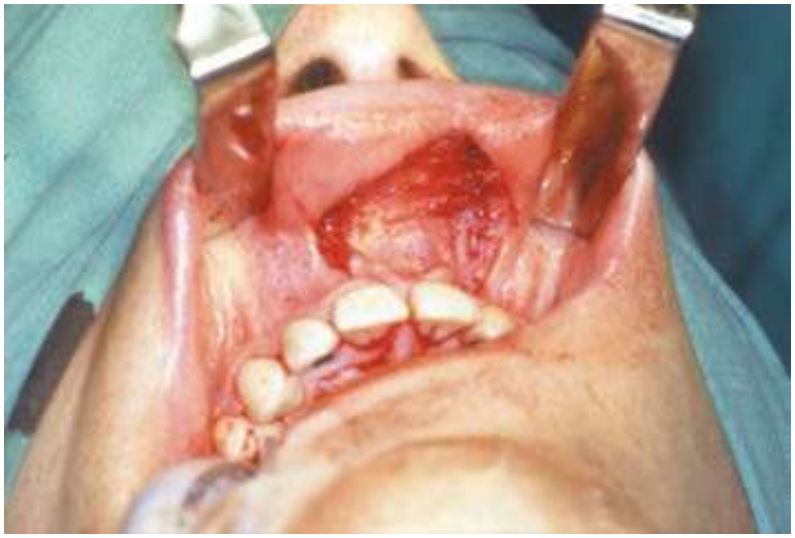
Tumors

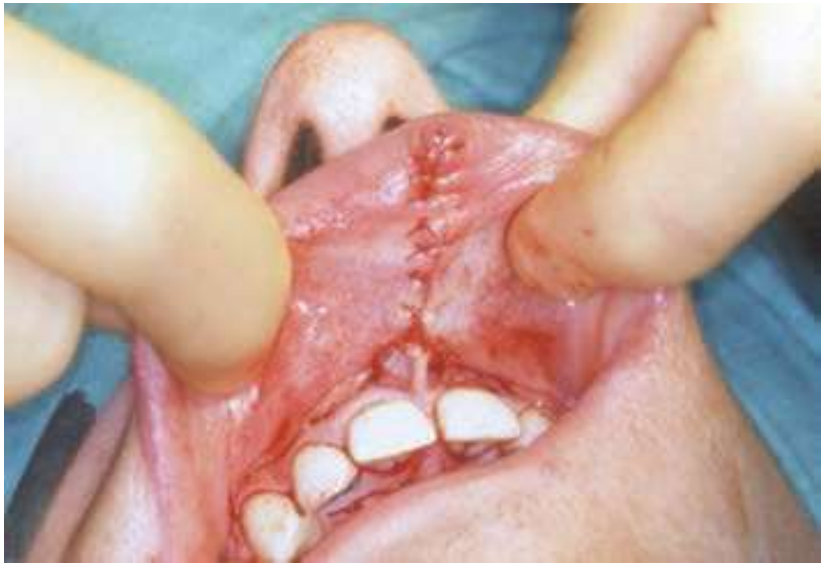
Tumours of minor salivary glands are histologically similar to those of major glands; however, *up to 90 per cent of minor salivary gland tumours are malignant*.

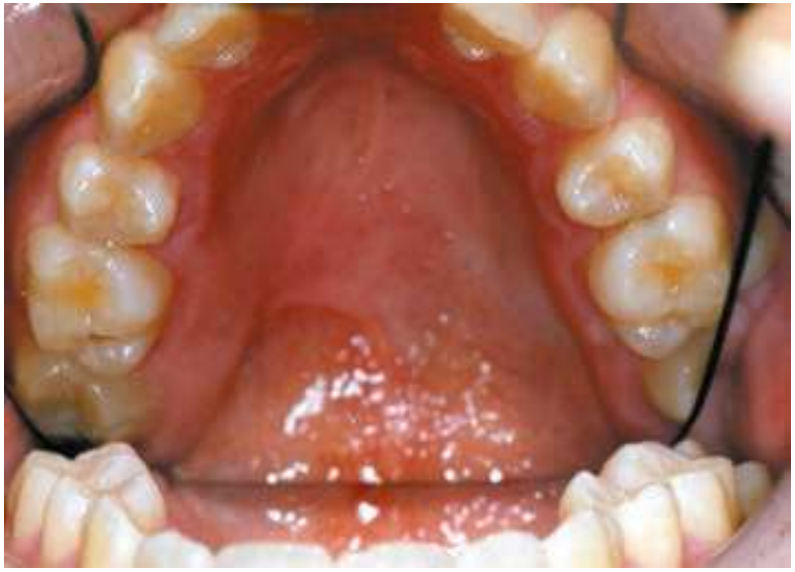
Although tumours of minor salivary gland origin occur anywhere in the upper aerodigestive tract, common sites for tumour formation include the upper lip, palate and retromolar regions.

Malignant minor salivary gland tumours are rare









THE SUBLINGUAL GLANDS

Anatomy

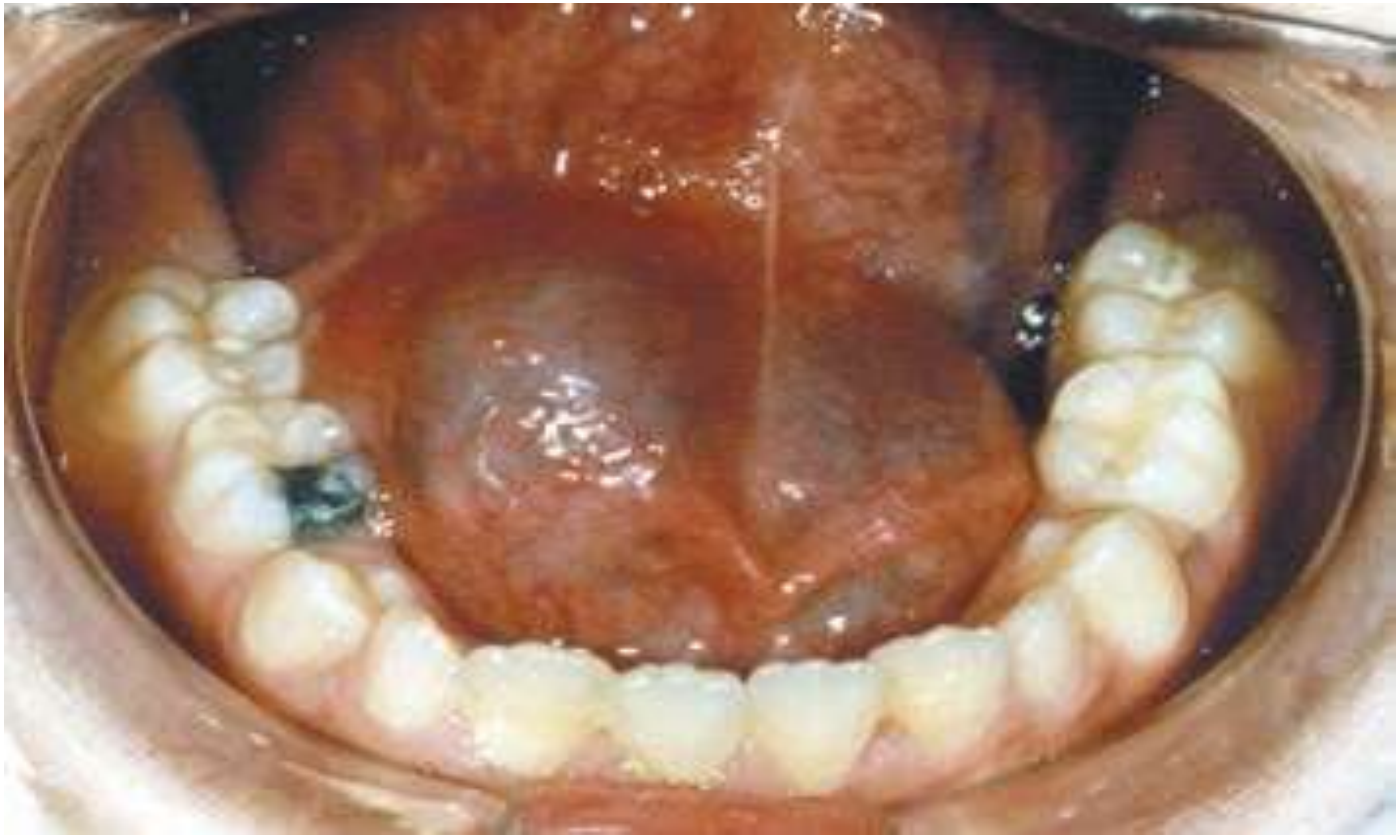
The sublingual glands are a paired set of minor salivary glands lying in the anterior part of the floor of mouth. Each gland has numerous excretory ducts that open either directly into the oral cavity or indirectly via ducts that drain into the submandibular duct.

Common disorders of the sublingual glands

Cysts

Minor mucous retention cysts develop in the floor of the mouth either from an obstructed minor salivary gland or from the sublingual salivary gland. *The term **'ranula'** should be applied only to a mucous extravasation cyst that arises from a sublingual gland*. It produces a characteristic translucent swelling that takes on the appearance of a 'frog's belly' (ranula).

A ranula can resolve spontaneously, but many also require formal surgical excision of the cyst and the affected sublingual gland. Incision and drainage usually results in recurrence.



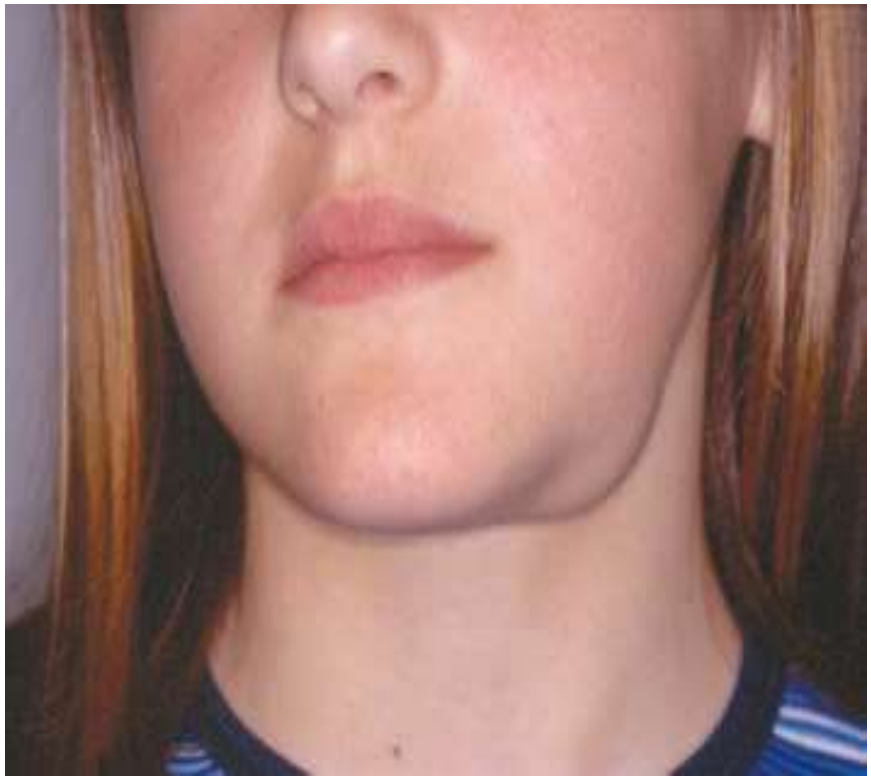
Large ranula affecting the floor of the mouth.

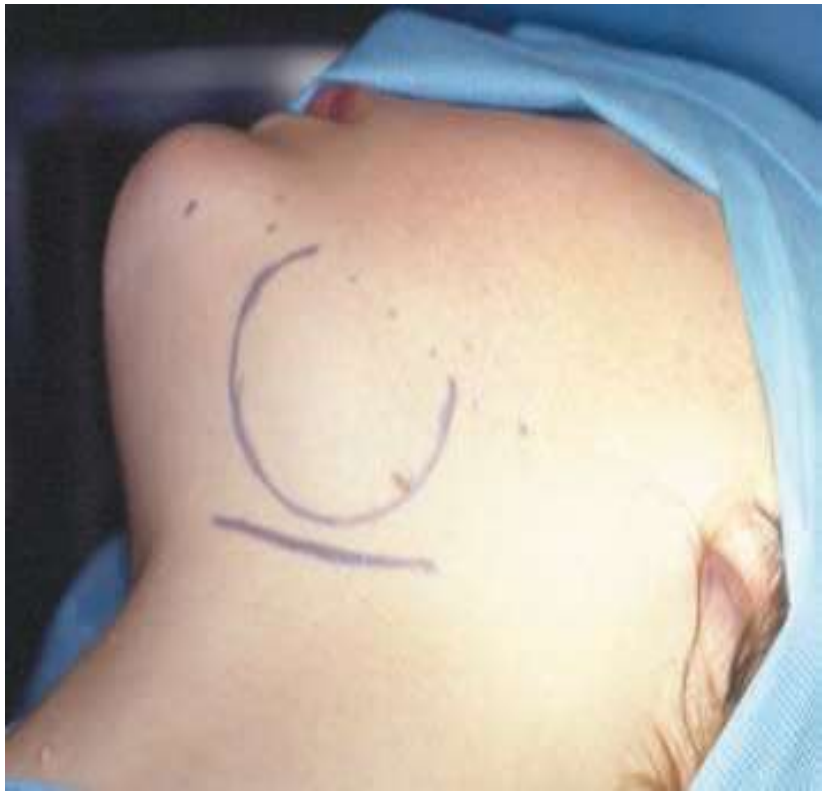
Plunging ranula

Plunging ranula is a rare form of mucous retention cyst that can arise from both sublingual and submandibular salivary glands. Mucus collects within the cyst, which perforates through the mylohyoid muscle diaphragm to enter the neck. Patients present with a dumb-bell-shaped swelling that is soft, fluctuant and painless in the submandibular or submental region of the neck .

Diagnosis is made on ultrasound or (MRI) examination.

Excision is usually performed via a cervical approach removing the cyst and both the submandibular and sublingual glands.





Plunging ranula in the left submandibular region.

Tumours

Tumours involving the sublingual gland are extremely rare and are usually (85 per cent) malignant. They present as a hard or firm painless swelling in the floor of the mouth. Treatment requires wide excision involving the overlying mucosa and simultaneous neck dissection.

THE SUBMANDIBULAR GLANDS

Anatomy

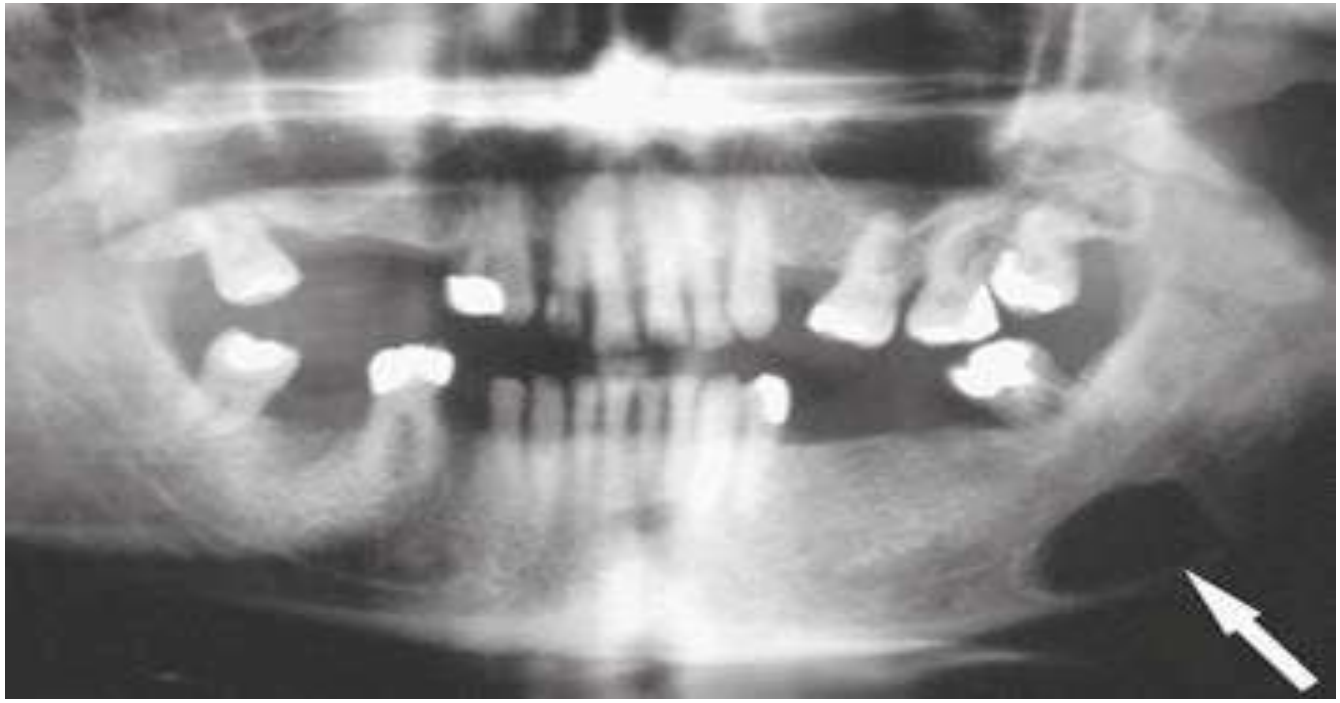
The submandibular glands are paired salivary glands that lie below the mandible on either side. They consist of a larger superficial and a smaller deep lobe that are continuous around the posterior border of the mylohyoid muscle. The gland is drained by a single submandibular duct (Wharton's duct) that emerges from its deep surface and runs in the space between the hyoglossus and mylohyoid muscles. It drains into the anterior floor of the mouth at the sublingual papilla. There are several lymph nodes immediately adjacent and sometimes within the superficial part of the gland .

Important anatomical relationships of the submandibular glands

Lingual nerve
Hypoglossal nerve
Anterior facial vein
Facial artery
Marginal mandibular branch of the facial nerve

Ectopic/aberrant salivary gland tissue

The most common ectopic salivary tissue is the Stafne bone cyst. This presents as an asymptomatic, clearly demarcated radiolucency of the angle of the mandible, characteristically below the inferior dental neurovascular. No treatment is required.



Plain radiographic appearance of a Stafne bone cyst

Clinical features of malignant salivary tumors

These include:

- facial nerve weakness
- rapid enlargement of the swelling
- induration and/or ulceration of the overlying skin
- cervical node enlargement.

THE PAROTID GLAND

Anatomy

The parotid gland lies in a recess bounded by the ramus of the mandible, the base of the skull and the mastoid process.

Several important structures run through the parotid gland.

These include:

- branches of the facial nerve.
- the terminal branch of the external carotid artery that divides into the maxillary artery and the superficial temporal artery.
- the retromandibular vein.
- intraparotid lymph nodes.

The gland is divided into deep and superficial lobes, separated by the facial nerve. Eighty per cent of the parotid gland lies superficial and 20 per cent deep to the nerve.

Inflammatory disorders

Viral infections

Mumps is the most common cause of acute painful parotid swelling and predominantly affects children. It is spread via airborne droplets of infected saliva. The disease starts with a prodromal period of 1–2 days, during which the patient experiences fever, nausea and headache. This is followed by pain and swelling in one or both parotid glands. Parotid pain can be very severe and exacerbated by eating and drinking.

Symptoms resolve within 5–10 days. The diagnosis is based on history and clinical examination.

A single episode of infection confers lifelong immunity.

Treatment of mumps is symptomatic with regular paracetamol and adequate oral fluid intake.

Complications

orchitis, oophoritis, pancreatitis, sensorineural deafness and meningoencephalitis are rare, but are more likely to occur in adults.

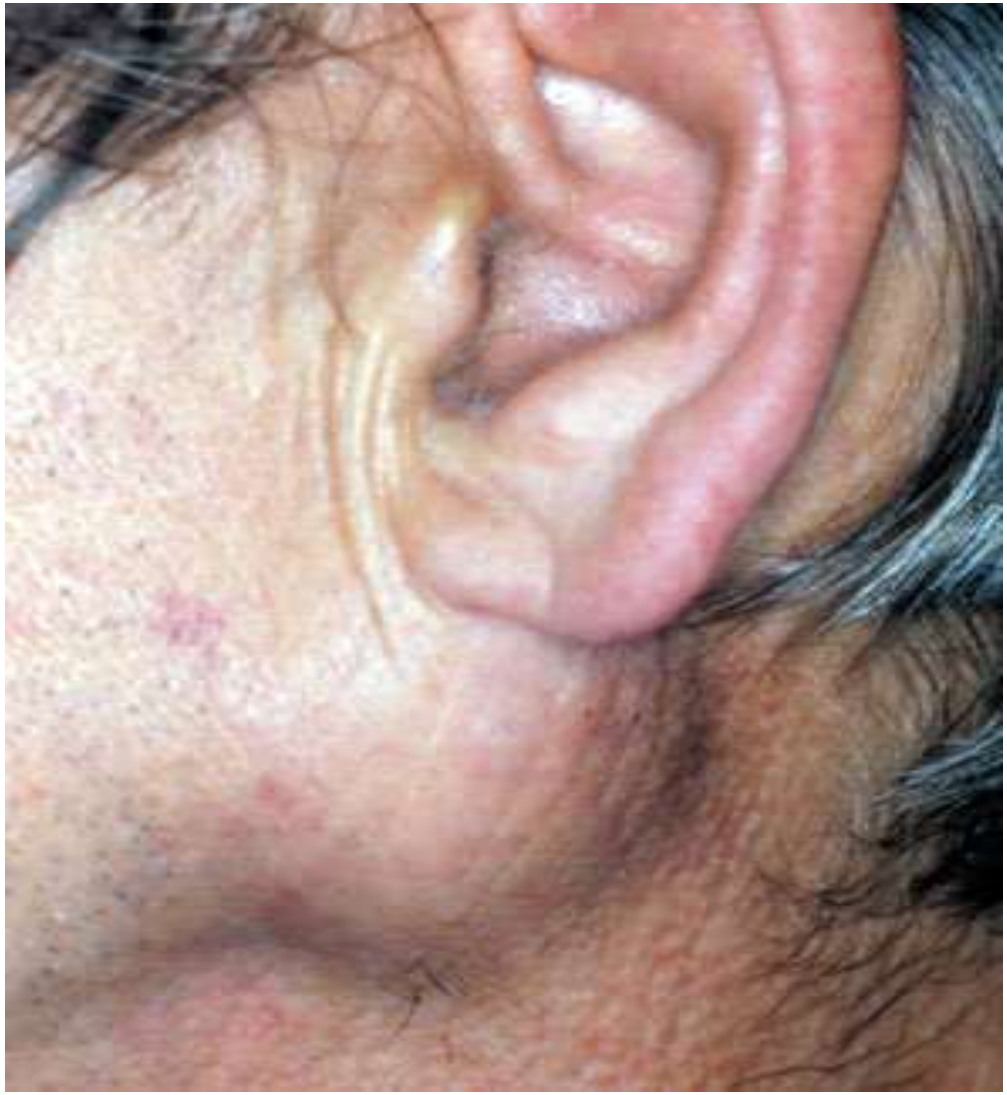
Stone formation

Sialolithiasis is less common in the parotid gland (20 per cent) than in the submandibular gland (80 per cent).

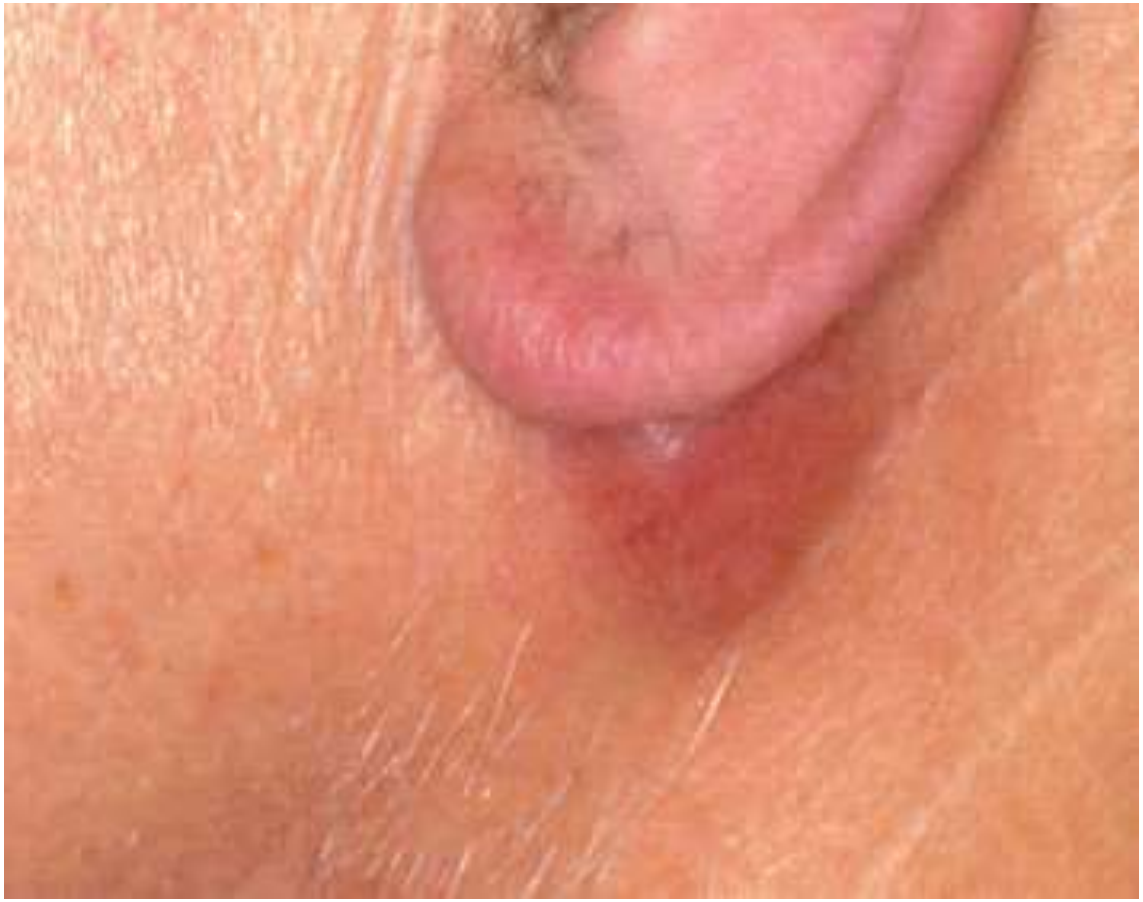
Parotid duct stones are usually radiolucent and rarely visible on plain radiography.

Tumours of the parotid gland

The parotid gland is the most common site for salivary tumours.
Most tumours arise in the superficial lobe and present as slow growing, painless swellings below the ear, in front of the ear or in the upper aspect of the neck.
Rarely, tumours may arise from the deep lobe of the gland and present as parapharyngeal masses.
Symptoms include difficulty in swallowing and snoring.
Some 80–90 per cent of tumours of the parotid gland are benign, the most common being pleomorphic adenoma.



Benign tumour of the left parotid gland producing characteristic deflection of the ear lobe.



Malignant tumour of the left parotid gland with invasion of the overlying skin.

Malignant salivary gland tumours are divided into two distinct subgroups:

1 Low-grade malignant tumours, e.g. acinic cell carcinoma, are indistinguishable on clinical examination from benign neoplasms.

2 High-grade malignant tumours usually present as rapidly growing, often painless swellings in and around the parotid gland. The tumour presents as either a discrete mass with infiltration into the overlying skin or a diffuse but hard swelling of the gland with no discrete mass.

Presentation with advanced disease is common, and cervical lymph node metastases may be present.

Adenomas

Of the variety of benign adenomas that has been described only two — the pleomorphic adenoma and Warthin's tumour

Pleomorphic adenomas

At least 75 per cent of all parotid tumours and more than 50 per cent of all submandibular gland tumours will prove to be benign pleomorphic adenomas.

Clinically the tumour has the texture of cartilage and has an irregular and bosselated surface. Very rarely after a number of years the tumour may undergo malignant change and for this reason all patients presenting with pleomorphic adenomas should be advised to undergo surgical removal of the tumors

This tumour which is only poorly encapsulated is very tense and if an incision is made into it the contents of the tumour burst into the surrounding tissue planes and it is impossible to eradicate the microscopic spillage of tumour cells. If this happens the patient will develop multiple local tumour recurrences over many years unless they are subjected to radical postoperative radiotherapy, which is best avoided in the management of benign disease.

Clearly if there is skin infiltration or ulceration an open biopsy is essential to establish a preoperative diagnosis upon which to plan surgery.

Warthin's tumour(adenolymphoma)

- The Warthin's tumour occurs only in the parotid gland where it accounts for approximately 15 per cent of all neoplasms.
- It is a disease of the elderly with a mean age of presentation of 60 years.
- Historically it had a male: female ratio of 4:1 but it is now becoming increasingly common in females.
- Recent evidence suggests that this tumour is related to cigarette smoking.
- **It does not undergo malignant change**.

Carcinoma

The acinic cell carcinoma and the mucoepidermoid carcinoma, although undoubtedly malignant tumours with a potential for local invasion and metastatic spread, are frequently very low grade histologically and do not require the radical treatment needed for more aggressive tumours. Together they account for only 5 per cent of all tumours at any time.

The mucoepidermoid tumour is much more common in the USA where it forms 10 per cent of all salivary neoplasms.

The adenoid cystic carcinoma, adenocarcinoma, squamous cell carcinoma and undifferentiated carcinoma are all aggressive malignant tumours that carry a poor prognosis regardless of treatment.

Investigations

CT and MRI scanning are the most useful imaging techniques.

Fine-needle aspiration biopsy may aid in obtaining a preoperative diagnosis*, but open surgical biopsy is contraindicated unless malignancy is suspected*.

All tumours of the superficial lobe of the parotid gland should be managed by superficial parotidectomy.
There is no role for enucleation even if a benign lesion is suspected. The aim of
superficial parotidectomy is to remove the tumour with a cuff of normal surrounding tissue. The term ‘suprafacial parotidectomy’ has been used as not all branches of the facial nerve need be formally dissected, particularly if a tumour lies in the lower pole of the parotid gland.

Table 50.2 Classification of salivary gland tumours (simplified).

Type	Subgroup	Common examples
I Adenoma	Pleomorphic	Pleomorphic adenoma
	Monomorphic	Adenolymphoma (Warthin's tumour)
II Carcinoma	Low grade	Acinic cell carcinoma
		Adenoid cystic carcinoma
		Low-grade mucoepidermoid carcinom
	High grade	Adenocarcinoma
		Squamous cell carcinoma
		High-grade mucoepidermoid carcinor
III Non-epithelial tumours		Haemangioma, lymphangioma
IV Lymphomas	Primary lymphomas	Non-Hodgkin's lymphomas
	Secondary lymphomas	Lymphomas in Sjögren's syndrome
V Secondary tumours	Local	Tumours of the head and neck especi
	Distant	Skin and bronchus
VI Unclassified tumours		
VII Tumour-like lesions	Solid lesions	Benign lymphoepithelial lesion
		Adenomatoid hyperplasia
	Cystic lesions	Salivary gland cysts

Parotidectomy

Superficial parotidectomy

Superficial parotidectomy is the most common procedure for parotid gland pathology. Surgery is performed under general anaesthesia, which may or may not be accompanied by hypotensive anaesthesia to facilitate dissection, improve the visual surgical field and reduce blood loss. The operation has several distinct phases.

Incision and development of a skin flap

The most commonly used incision is the ‘lazy S’ pre-auricular–mastoid–cervical.

Mobilisation of the gland

Landmarks commonly used to aid identification of the trunk of the facial nerve are:

- the inferior portion of the cartilaginous canal. This is termed Conley's pointer and indicates the position of the facial nerve, which lies 1 cm deep and inferior to its tip.
- the upper border of the posterior belly of the digastric muscle. Identification of this muscle not only mobilises the parotid gland, but also exposes an area immediately superior, in which the facial nerve is usually located.

Complications of parotid gland surgery

Complications of parotid gland surgery include:

- haematoma formation;
- infection;
- temporary facial nerve weakness;
- transection of the facial nerve and permanent facial weakness;
- sialocoele;
- facial numbness;
- permanent numbness of the ear lobe associated with great auricular nerve transection;
- Frey's syndrome.

Frey's syndrome

Frey's syndrome (gustatory sweating) is now considered an inevitable consequence of parotidectomy, unless preventative measures are taken.

It results from damage to the autonomic innervation of the salivary gland with inappropriate regeneration of parasympathetic nerve fibres that stimulate the sweat glands of the overlying skin.

The clinical features include

sweating and erythema over the region of surgical excision of the parotid gland as a consequence of autonomic stimulation of salivation by the smell or taste of food.

Prevention

There are a number of techniques described to prevent Frey's syndrome following parotidectomy. These include:

- sternomastoid muscle flap;
- temporalis fascial flap;
- insertion of artificial membranes between the skin and the parotid bed.

All these methods place a barrier between the skin and the parotid bed to minimise inappropriate regeneration of autonomic nerve fibers

Management of established Frey's syndrome

Methods of managing Frey's syndrome include:

- antiperspirants, usually containing aluminium chloride;
- denervation by tympanic neurectomy;
- the injection of botulinum toxin into the affected skin.

The last is the most effective and can be performed as an outpatient.

Thank you

Branchial cyst

A branchial cyst, thought to develop from the vestigial remnants of the second branchial cleft, is usually lined by squamous epithelium, and contains thick, turbid fluid full of cholesterol crystals.

The cyst usually presents in the upper neck in early or middle adulthood and is found at the junction of the upper third and middle third of the sternomastoid muscle at its anterior border.

It is a fluctuant swelling that may transilluminate and is often soft in its early stages so that it may be difficult to palpate

Other theories hypothesise that branchial cysts develop from cystic transformation of cervical lymph nodes.

If the cyst becomes infected, it becomes erythematous and tender and, on occasions, it may be difficult to differentiate from a tuberculous abscess.

Ultrasound and fine-needle aspiration both aid diagnosis, and treatment is by complete excision, which is best undertaken when the lesion is quiescent.

Although the anterior aspect of the cyst is easy to dissect, it may pass backwards and upwards through the bifurcation of the common carotid artery as far as the pharyngeal constrictors. It passes superficial to the hypoglossal and glossopharyngeal nerves, but deep to the posterior belly of the digastric. These structures and the spinal accessory nerve must be positively identified to avoid damage.

Branchial fistula

A branchial fistula may be unilateral or bilateral and is thought to represent a persistent second branchial cleft. The external orifice is nearly always situated in the lower third of the neck near the anterior border of the sternocleidomastoid, while the internal orifice is located on the anterior aspect of the posterior faucial pillar just behind the tonsil.

However, the internal aspect of the tract may end blindly at or close to the lateral pharyngeal wall, constituting a sinus rather than a fistula.

The tract is lined by ciliated columnar epithelium and, as such, there may be a small amount of recurrent mucous or mucopurulent discharge onto the neck. The tract follows the same path as a branchial cyst and requires complete excision, often by more than one transverse incision in the neck

Thyroglossal duct cysts

Embryology

The thyroid gland descends early in fetal life from the base of the tongue towards its position in the lower neck with the isthmus lying over the second and third tracheal rings. At the time of its descent, the hyoid bone has not been formed and the track of the descent of the thyroid gland is variable, passing in front, through or behind the eventual position of the hyoid body. Thyroglossal duct cysts represent a persistence of this track and may therefore be found anywhere in or adjacent to the midline from the tongue base to the thyroid isthmus. Rarely, a thyroglossal cyst may contain the only functioning thyroid tissue in the body.

Clinical features

The cysts almost always arise in the midline but, when they are adjacent to the thyroid cartilage, they may lie slightly to one side of the midline.

Classically, the cyst moves upwards on swallowing and with tongue protrusion, but this can also occur with other midline cysts such as dermoid cysts, as it merely indicates attachment to the hyoid bone.