

# A guide to salivary gland disorders

The salivary glands may be affected by a wide range of neoplastic and inflammatory disorders. This article reviews the common salivary gland disorders encountered in general practice.

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The salivary glands include the parotid glands, submandibular glands and sublingual glands (Figure 1). There are also hundreds of minor salivary glands located in the mucosa of the hard and soft palate, oral cavity, lips, tongue and oropharynx. The parotid gland lies in the preauricular region and extends inferiorly over the angle of the mandible. The parotid duct courses anteriorly from the parotid gland and enters the mouth through the buccal mucosa adjacent to the second upper molar tooth. The submandibular gland lies in the submandibular triangle and its duct passes anteriorly along the floor of the mouth to enter adjacent to the frenulum of the tongue. The sublingual glands are small glands that lie just beneath the mucosa in the lateral floor of mouth region.

The salivary glands may be affected by a range of neoplastic and inflammatory disorders. Inflammatory disorders may be due to viral or bacterial infections, granulomatous conditions or autoimmune diseases. A thorough history and physical

examination are often adequate to recognise and differentiate many of these conditions. A wide array of benign and malignant neoplasms may also affect the salivary glands and a neoplasia should always be considered when assessing a salivary gland mass.

## Inflammatory disorders

### Acute sialadenitis

Acute inflammation of the salivary glands is usually of viral or bacterial origin. Mumps is the most common causative viral illness, typically affecting the parotid glands bilaterally. Children are most often affected, with peak incidence occurring at approximately 4 to 6 years of age. The parotid swelling is accompanied by constitutional symptoms such as fever and malaise, but many cases are mild and subclinical in nature. Treatment is symptomatic. In addition to the mumps virus, other viruses that may manifest as acute viral sialadenitis include cytomegalovirus, coxsackievirus, echovirus,

## IN SUMMARY

- Salivary gland disorders represent a heterogeneous group of conditions ranging from inflammatory disorders to a diverse group of benign and malignant neoplasms.
- Acute inflammation of the salivary glands is usually of viral or bacterial origin; mumps is the most common causative viral illness.
- Chronic inflammation and fibrosis most often affect the parotid gland.
- Most salivary stones (80%) occur in the submandibular gland; 20% occur in the parotid gland.
- Salivary gland neoplasms are relatively uncommon, comprising only about 2% of all head and neck neoplasms. The histopathology of these tumours is incredibly diverse, with most (80%) occurring in the parotid gland.

parainfluenza virus and HIV.

Acute suppurative bacterial sialadenitis most often affects the parotid gland and, to a lesser extent, the submandibular glands. Acute reduction in salivary flow from dehydration or chronic reduction as a result of psychotropic medications, combined with poor oral hygiene, may predispose to parotitis. Fever, painful unilateral gland swelling, trismus and purulent sialorrhoea are the typical signs of this potentially serious infection. *Staphylococcus aureus* is the most common pathogen. Treatment includes rehydration, warm compresses, repeated gland massage and antibiotic therapy. If an abscess develops, incision and drainage may be required once the exact location of the collection is localised radiologically.

### Chronic sialadenitis

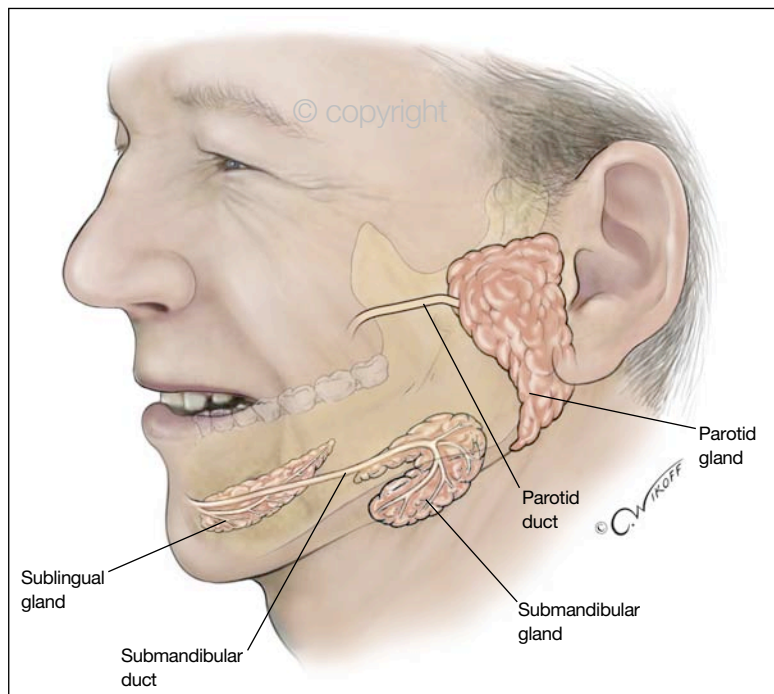
Chronic inflammation and fibrosis most commonly affect the parotid gland, often resulting from repeated acute infections with progressive damage to the ductal epithelium leading to stricture formation and acinar atrophy.

Patients experience recurrent low grade infections in one or both glands, characterised by intermittent swelling, pain or discomfort precipitated by eating. *Streptococcus viridans* is the usual organism responsible and penicillin is the antibiotic of choice. Maintaining adequate hydration and gland massage are adjunctive measures that facilitate resolution of this often frustrating condition. If conservative measures fail, excision of the gland may be required; however, the chronic inflammatory changes and fibrosis can make surgical resection challenging.

Sometimes an enlarged gland raises the possibility of malignancy and both CT scanning and fine needle aspiration (FNA) biopsy are required to exclude a neoplastic process. Sialography can also support the diagnosis of sialadenitis by demonstrating strictures and dilatation of the relevant salivary ductal system.

### Juvenile recurrent parotitis

Juvenile recurrent parotitis represents the second most common inflammatory salivary gland disease of childhood after mumps. Patients usually present with unilateral recurrent swelling of the parotid gland, often with associated pain, fever and malaise. This interesting condition generally



begins between 7 and 9 years of age, and the frequency of attacks often subsides after puberty. The cause is thought to be bacterial infection ascending from the oral cavity, and hence treatment with a penicillin based antibiotic is indicated for severe acute attacks.

### Sjögren's syndrome

Sjögren's syndrome is an autoimmune disorder that results in immunologically mediated destruction and inflammatory enlargement of the lacrimal and salivary glands. Sjögren's syndrome occurs predominantly in postmenopausal women and presents with dryness of the eyes and mouth, leading to chronic mouth and ocular discomfort. Patients may develop slowly progressive symmetrical enlargement of the salivary glands. Sudden increased swelling of the parotid gland should alert the GP to the possibility of lymphoma, which is 40 times more likely to occur in patients with Sjögren's syndrome than in the general population.

Treatment for salivary gland disease in Sjögren's syndrome is symptomatic and supportive. Sometimes superficial parotidectomy is required for markedly enlarged glands that are causing cosmetic concern, or if recurrent infections become problematic.

Figure 1. Salivary glands, showing position of the parotid, sublingual and submandibular glands.

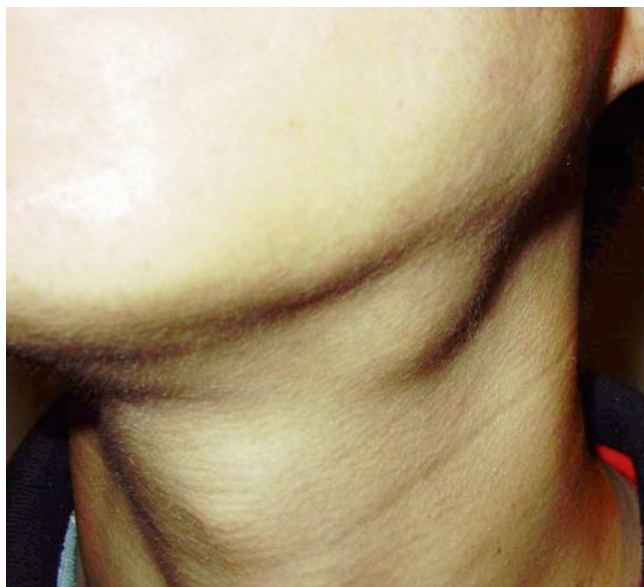


Figure 2. Enlarged submandibular gland.

### Chronic granulomatous sialadenitis

Granulomatous disorders may present with acute or chronic salivary gland swelling. This group of disorders is often painless and includes tuberculosis, cat scratch disease, sarcoidosis, actinomycosis and Wegener's granulomatosis. CT scanning and FNA biopsy can often assist with the diagnosis.

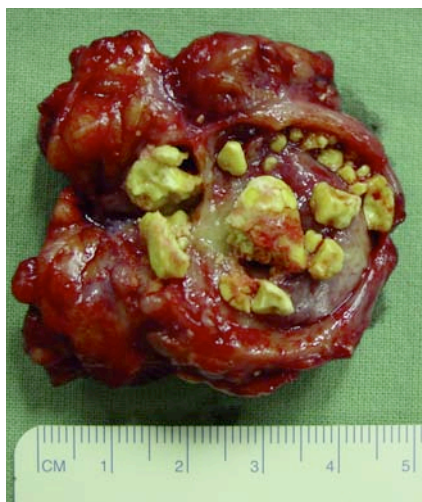


Figure 4. Submandibular gland removed and sectioned, demonstrating numerous stones filling the hilum of the gland.



Figure 3. CT scan demonstrating a large stone impacted in the hilum of the submandibular gland. Stones are typically smaller than this and in the majority of cases can be readily identified with standard plain x-rays.

### Noninflammatory disorders Salivary calculi

Most salivary stones (80%) occur in the submandibular gland; 20% occur in the parotid gland. Stone formation is thought to be more common in the submandibular gland as a result of the higher mucin and calcium content of its saliva. Interestingly, there is no association between serum calcium and phosphorous levels and the formation of calculi. Calculi may be found within the ductal system itself or within salivary gland parenchyma.

Submandibular duct stones most often present with intermittent salivary gland swelling and discomfort associated with eating (Figure 2). Sometimes mucopurulent saliva can be expressed from the duct in the floor of the mouth and the offending calculus may be palpable. Most submandibular duct stones can be palpated bimanually. The index finger of one hand is placed in the floor of the mouth with the other hand palpating the submandibular region. The normal submandibular gland will feel soft to firm in consistency, while stones will feel hard. If a stone is palpable, radiological studies are usually not necessary. If a stone is

suspected but is impalpable, x-rays of the submandibular region with intraoral views may identify the offending calculus; however, 20% of stones are radiolucent and thus will be missed with plain x-rays. Sialography, where contrast is injected into the salivary duct, is technically challenging and usually unnecessary but is the most accurate imaging method to detect salivary calculi. Both CT scanning and ultrasound can also be used to identify calculi with a high degree of accuracy. They are particularly useful for identifying stones in the hilum or parenchyma of the affected salivary gland (Figure 3).

Treatment of small stones is initially conservative. It includes adequate hydration, sialagogues such as lemon juice, heat, massage, and appropriate antibiotics for established infection. Although small stones often extrude spontaneously, surgical removal is sometimes required. Stone removal may be performed transorally for calculi located distally within the duct; however, adequate removal of larger stones located more proximally often requires submandibular gland resection (Figure 4).



### Benign lymphoepithelial lesion

Benign lymphoepithelial lesion is also known as Mikulicz's syndrome. It has a predilection for women in the fifth and sixth decades of life and also occurs commonly in HIV-infected populations. Patients present with unilateral firm or cystic swelling of the parotid gland, with bilateral involvement in 20% of cases. Ultrasound or CT scanning reveals multiple cystic lesions, and FNA demonstrates acinar atrophy and diffuse lymphocytic infiltration. Treatment is supportive unless parotid enlargement is severe enough to warrant parotidectomy.

### Sialadenosis and systemic diseases

Sialadenosis is the term used to describe the non-neoplastic, noninflammatory enlargement of the salivary glands that occurs in association with many systemic disorders. The cause is unknown and the disease most often presents with bilateral asymptomatic parotid gland swelling. Associated disorders include:

- obesity
- malnutrition
- alcoholic cirrhosis
- hypothyroidism
- diabetes
- other endocrine abnormalities.

Salivary gland enlargement usually resolves with treatment of the underlying condition.

### Ranula

A ranula is a benign cystic lesion that occurs in the floor of mouth as a result of mucous extravasation that originates from the sublingual gland. It appears as a bluish cystic lesion in the anterior floor of mouth (Figure 5). A plunging ranula occurs when a ranula penetrates through the floor of mouth muscles and presents as a submandibular or submental mass (Figure 6).

### Xerostomia

Xerostomia (dry mouth) may be secondary to systemic disorders such as diabetes,



Figure 5. Ranula appearing as a floor of mouth swelling.

chronic infection and autoimmune disorders. It also often occurs after radiation therapy used to treat patients with head and neck cancer. The salivary glands are extremely sensitive to the effects of radiation and irreversible acinar cell damage is an inevitable consequence of radiation therapy. Xerostomia may also be secondary to the use of certain medications, especially those with anticholinergic side effects. Treatment is symptomatic, including increased hydration, sialagogues and artificial saliva. Recommended sialagogues include lemon with ice, sugarless candies and chewing gum.

### Neoplastic salivary gland disease

Salivary gland neoplasms are relatively uncommon and constitute only about 2% of all head and neck neoplasms. The histopathology of these tumours is incredibly diverse with most (80%) occurring in the parotid gland, while the remaining 20% occur in the submandibular and minor salivary glands. About 80% of parotid tumours are benign; however, the incidence of malignancy in submandibular tumours is approximately 50%.

Australia has the highest incidence of cutaneous squamous cell carcinoma (SCC) and melanoma in the world. Metastatic SCC to the parotid gland from a facial or scalp SCC is the most common



Figure 6. Plunging ranula appearing as a submandibular neck mass.

malignant parotid tumour in Australia. Similarly, malignant melanoma may also metastasise to the parotid, and hence a high index of suspicion is required when assessing parotid lumps, especially in patients with sun-damaged skin.

A list of the common benign and malignant salivary gland tumours is shown in the Table.

Most salivary gland tumours present as slow-growing, painless, firm, non-tender masses. Symptoms and signs that

**Table. Salivary gland tumours**

#### Benign

Pleomorphic adenoma  
Warthin's tumour  
Oncocytoma  
Monomorphic adenoma

#### Malignant

Metastatic cutaneous squamous cell carcinoma  
Mucoepidermoid carcinoma  
Adenoid cystic carcinoma  
Adenocarcinoma  
Acinic cell carcinoma  
Lymphoma

#### Miscellaneous

Haemangioma  
Cysts



Figure 7. Malignant parotid mass.

may indicate a malignancy include:

- pain
- rapid growth
- hard mass
- fixation to overlying skin or underlying structures (Figure 7)
- facial nerve palsy.

Generally, all salivary gland masses warrant further investigation. A CT scan is the preferred radiological modality as it provides excellent anatomical detail that helps the surgeon determine the exact location of the tumour as well as demonstrating infiltration of surrounding

structures. FNA cytology is a safe and highly reliable test for differentiating between neoplastic and non-neoplastic disorders. FNA allows the surgeon to counsel patients preoperatively about the extent of resection required to optimally manage their tumour type. As with other head and neck masses, open biopsy should be avoided because tumour spillage may compromise future curative surgical procedures.

Treatment of benign neoplasms involves resecting the affected salivary gland. As most benign tumours occur in the superficial lobe of the parotid, superficial parotidectomy is the most common operation performed. Careful dissection of the facial nerve is mandatory for all parotid resections. Temporary partial facial weakness occurs in about 5 to 10% of patients having superficial parotidectomy for benign tumours, while the incidence of permanent nerve damage is less than 1%.<sup>1</sup> Sometimes the facial nerve is invaded by tumour and requires sacrifice as part of the tumour resection.

High grade salivary gland malignancies may also require neck dissection and post-operative radiotherapy to minimise the chance of locoregional tumour recur-

rence. The multidisciplinary approach for managing salivary gland malignancies is similar to treatment paradigms for other head and neck cancers. This has been covered in a recent article in *Medicine Today*.<sup>2</sup>

## Conclusion

Inflammatory disorders of the salivary glands are relatively common, and usually respond to medical management. Patients with salivary gland masses require further investigation and appropriate referral. While most salivary gland tumours are benign, malignancy needs to be considered for all salivary masses. The high incidence of cutaneous cancers in Australia warrants a high index of suspicion when patients present with a persistent salivary gland lump.

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## References

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2. Bova R. Head and neck cancer: a guide to diagnosis and an overview of management. *Medicine Today* 2005; 6(4): 54-61.

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