

# Salivary Gland Disorders

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Salivary gland disorders include inflammatory, bacterial, viral, and neoplastic etiologies. The presentation can be acute, recurrent, or chronic. Acute suppurative sialadenitis presents as rapid-onset pain and swelling and is treated with antibiotics, salivary massage, hydration, and sialagogues such as lemon drops or vitamin C lozenges. Viral etiologies include mumps and human immunodeficiency virus, and treatment is directed at the underlying disease. Recurrent or chronic sialadenitis is more likely to be inflammatory than infectious; examples include recurrent parotitis of childhood and sialolithiasis. Inflammation is commonly caused by an obstruction such as a stone or duct stricture. Management is directed at relieving the obstruction. Benign and malignant tumors can occur in the salivary glands and usually present as a painless solitary neck mass. Diagnosis is made by imaging (e.g., ultrasonography, computed tomography, magnetic resonance imaging) and biopsy (initially with fine-needle aspiration). Overall, most salivary gland tumors are benign and can be treated with surgical excision. (*Am Fam Physician*. 2014;89(11):882-888. Copyright © 2014 American Academy of Family Physicians.)

**CME** This clinical content conforms to AAFP criteria for continuing medical education (CME). See CME Quiz Questions on page 855.

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Saliva is a complex mixture of fluid, electrolytes, enzymes, and macromolecules that function together to perform several important roles<sup>1</sup>: lubrication to aid in swallowing and digestion<sup>2</sup>; digestion of starches with salivary amylase<sup>3</sup>; modulation of taste<sup>4</sup>; protection against dental caries<sup>5</sup>; and defense against pathogens. The major salivary glands are the paired parotid, submandibular, and sublingual glands. The minor salivary glands line the mucosa of the lips, tongue, oral cavity, and pharynx.

Diseases of the major salivary glands are occasionally encountered in the primary care setting (*Table 1*). Obstructive sialadenitis (from stones or strictures) accounts for approximately one-half of benign salivary gland disorders.<sup>1</sup> Neoplasms of the salivary glands are relatively rare; they make up 6% of all head and neck tumors, and their overall incidence is two to eight per 100,000 persons in the United States.<sup>2</sup> Infections and inflammation of the salivary glands have a wide range of presentations (*Table 2*).<sup>6</sup> An organized approach to the evaluation improves the likelihood of correct diagnosis and appropriate treatment (*Figure 1*).<sup>3</sup>

## Inflammatory Disorders

### ACUTE SUPPURATIVE SIALADENITIS

Acute sialadenitis is a bacterial inflammation of the salivary gland. It typically affects

one major salivary gland, most commonly the parotid,<sup>4</sup> and is common in medically debilitated, hospitalized, or postoperative patients. Retrograde bacterial contamination from the oral cavity is thought to be the inciting etiology.<sup>5</sup> Stasis of salivary flow secondary to dehydration or decreased oral intake allows bacterial migration into the gland parenchyma.

Predisposing factors for acute sialadenitis include diabetes mellitus, hypothyroidism, renal failure, and Sjögren syndrome. The use of certain medications, especially those with anticholinergic properties, can also reduce salivary flow. Sialolithiasis and duct strictures can impair salivary flow and predispose the patient to acute infection, but more commonly cause chronic or recurrent infections. The most common bacterial cause of acute sialadenitis is *Staphylococcus aureus*, which has been cultured in 50% to 90% of cases.<sup>7,8</sup> Streptococcal species and *Haemophilus influenzae* are also common causes.<sup>9</sup>

Patients with acute sialadenitis typically present with acute onset of pain and swelling of the affected gland. Physical examination may reveal induration, edema, and extreme localized tenderness. Massage of the gland may express pus from the respective intra-oral orifice (*Figure 2*). This should be cultured to direct antibiotic therapy.

Management involves treating the infection and reversing the underlying medical

**Table 1. Salivary Gland Disorders**

<i>Condition</i>	<i>Etiology</i>	<i>Clinical presentation</i>	<i>Diagnosis</i>	<i>Treatment</i>
Acute suppurative sialadenitis	Bacterial infection	Sudden onset of pain and swelling	Swollen, indurated, tender gland; purulence from duct may be seen	Antibiotics, gland massage, hydration, sialagogues, warm compresses, oral hygiene
Chronic or recurrent sialadenitis	Obstruction (stone or stricture) of the duct	Repeated episodes of pain and swelling, often with meals; recurrent infections	Swollen or firm gland; may appear normal on examination; imaging (computed tomography or ultrasonography) may show calculus or dilated duct	Hydration, gland massage, sialendoscopy or open surgery
Neoplasm	May be benign or malignant	Painless, firm, slow-growing mass	Imaging (computed tomography or magnetic resonance imaging); fine-needle aspiration	Surgical removal of gland
Recurrent parotitis of childhood	Unknown	Repeated episodes of pain and swelling of the parotid gland in children	Clinical history; examination and imaging findings are usually normal; parotid gland may be swollen	Antibiotics, gland massage, hydration, sialendoscopy
Viral infections	Most commonly mumps or human immunodeficiency virus	Swelling, often bilateral; may be tender	Viral serology	Supportive care; antiretrovirals for human immunodeficiency virus infection

condition and predisposing factors. This includes stimulation of salivary flow by application of warm compresses, administration of sialagogues such as lemon drops or vitamin C lozenges,<sup>10</sup> hydration, salivary gland massage, and oral hygiene. Empiric antimicrobial therapy is initially directed at gram-positive and anaerobic organisms, which are often penicillin-resistant, so augmented penicillin that contains beta-lactamase inhibitors (e.g., amoxicillin-clavulanate [Augmentin]) are recommended. Culture-directed therapy is administered, if possible. Rarely, acute suppurative sialadenitis can lead to abscess formation; surgical drainage is indicated in these cases.

#### RECURRENT PAROTITIS OF CHILDHOOD

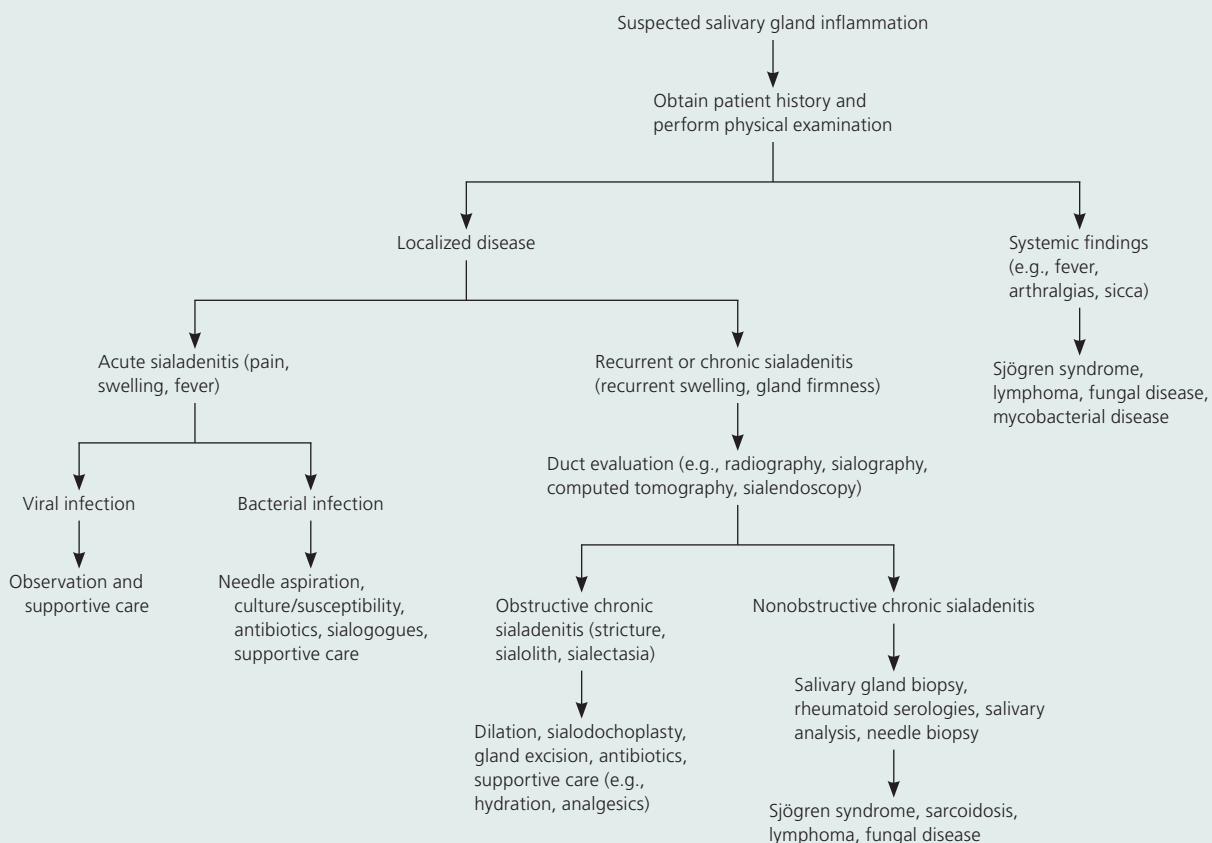
Recurrent parotitis of childhood is an inflammatory condition of the parotid gland characterized by recurrent episodes of swelling and pain. The cause of this disorder is not known. Children typically present with recurrent episodes of acute or subacute parotid gland swelling with fever, malaise, and pain (Figure 3). The disorder is usually unilateral, but can affect both sides. Episodes may last days to weeks and occur every few months. Treatment consists of supportive care with adequate hydration, gland massage, warm compresses, sialagogues, and

**Table 2. Diagnostic Findings in Patients with a Salivary Mass or Enlargement**

<i>Component</i>	<i>Finding</i>	<i>Most likely etiology</i>
<b>History</b>		
Constitutional symptoms	Fever, chills, malaise	Infection
	No other symptoms	Obstruction or neoplasm
Duration of symptoms	Acute	Infection
	Chronic	Chronic inflammation or neoplasm
Onset and pattern of symptoms	Recurrent	Obstruction
	Fluctuating	Obstruction
	Rapid	Acute infection
	Slow	Neoplasm
Pain	Painless	Neoplasm
	Tender	Infection or obstruction
<b>Physical examination</b>		
Cranial nerve examination	Facial weakness or decreased sensation	Malignancy
Massage of saliva from duct	No saliva	Obstruction
	Normal saliva	Other
	Purulence	Acute suppurative sialadenitis
Palpation of gland	Discrete mass	Neoplasm
	Tender, diffusely swollen	Infection, obstruction
Palpation of lymph nodes	Firm lymphadenopathy	Malignancy
	No lymphadenopathy	Chronic inflammation or benign neoplasm
	Tender lymphadenopathy	Infection

Information from reference 6.

## Evaluation of Patients with Suspected Salivary Gland Disorders



**Figure 1.** Algorithm for determining the etiology of salivary gland swelling.

Information from reference 3.

antibiotics. Sialendoscopy has been shown to decrease the frequency and severity of episodes.<sup>11</sup> The condition usually resolves spontaneously with puberty, and surgery is rarely required.

### CHRONIC SIALADENITIS

Chronic sialadenitis is characterized by repeated episodes of pain and inflammation caused by decreased salivary flow and salivary stasis. It most often affects the parotid gland.<sup>12</sup> The initial inciting factor is thought to be salivary duct obstruction from stones, strictures, scarring, foreign bodies, or extrinsic compression by a tumor.<sup>13</sup> Recurrent inflammatory reactions result in progressive acinar destruction with fibrous replacement and sialectasis.

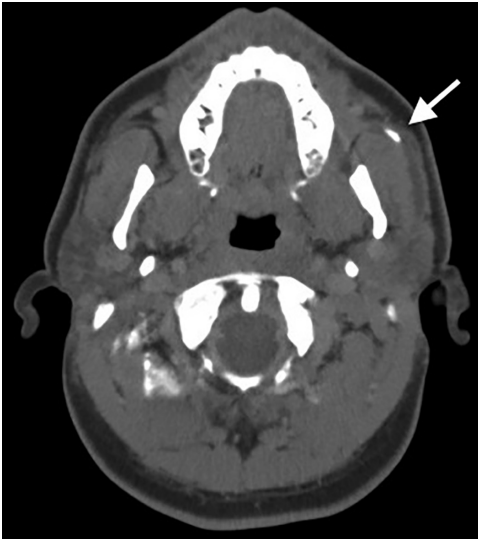
Patients with chronic sialadenitis should be evaluated with a history, physical examination, and possibly imaging, and the underlying pathology should be treated.<sup>3,13</sup> Patients typically present with recurrent



**Figure 2.** Intraoral view of purulence emanating from the parotid duct orifice in a patient with acute suppurative parotitis.



**Figure 3.** Child with parotid gland swelling.



**Figure 4.** Non-contrast-enhanced computed tomography of the neck showing a salivary stone in the left parotid duct (arrow) with postobstructive ductal dilatation.



**Figure 5.** A salivary stone after sialendoscopic removal.

or low-grade swelling and tenderness of the affected gland, especially when eating. Physical examination may reveal enlargement of the gland early on, but this may reverse in later stages of the disease. Massaging the gland toward the orifice often does not produce visible saliva. Workup should focus on identifying a predisposing factor, such as a calculus or stricture. If no cause is found, treatment is conservative and should consist of sialagogues, massage, hydration, and anti-inflammatory medications. In severe cases, excision of the gland is safe and effective,<sup>14</sup> with a low incidence of xerostomia.

### SIALOLITHIASIS

Sialolithiasis is caused by the formation of stones in the ductal system. The submandibular gland is most often affected (80% to 90% of cases), and nearly all other cases involve the parotid duct.<sup>15,16</sup> Stones are composed of precipitated salts and proteins, predominantly calcium carbonate.<sup>17</sup>

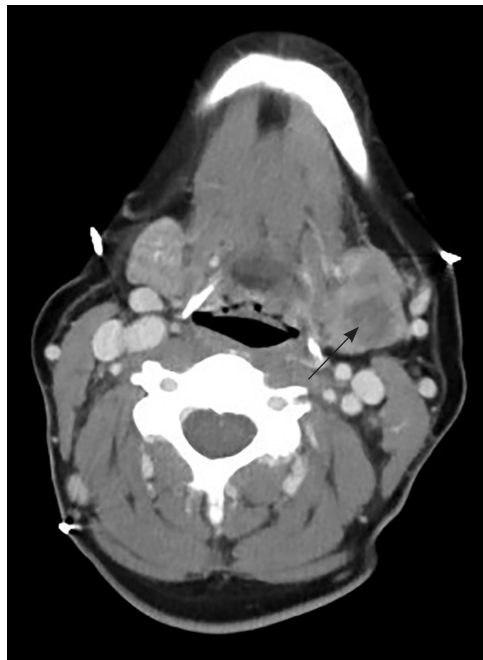
Patients with sialolithiasis typically present with postprandial salivary pain and swelling. They may have a history of recurrent acute suppurative sialadenitis. On examination, bimanual palpation along the course of the duct may reveal the stone. Ultrasonography and non-contrast-enhanced computed tomography are accurate in detecting the stone (*Figure 4*).

Initial management consists of treating any acute infection, followed by surgical removal of the stone (*Figure 5*). The surgical approach depends on the location of the stone. Submandibular stones that can be palpated and are located in the anterior floor of mouth can be excised intraorally, usually under local anesthesia. Submandibular stones near the hilum of the gland may require gland excision. Stones in the parotid duct are more difficult to manage and may require parotidectomy. An alternative to open surgery is sialendoscopy,<sup>18,19</sup> wherein a small (0.8 to 1.6 mm) semirigid endoscope is introduced into the salivary duct, allowing the stone to be removed. Several studies have demonstrated its superiority over open surgery in stone clearance, symptom resolution, gland preservation, and safety.<sup>20-23</sup>

### Viral Infections

#### MUMPS

Mumps is the most common cause of non-suppurative acute sialadenitis; 85% of cases occur in children younger than 15 years.<sup>4</sup> The disease is highly contagious and spreads by airborne droplets from salivary, nasal, and urinary secretions. The parotitis is characterized by local pain and edema, as well as otalgia and trismus. Most cases are bilateral, though it commonly begins on one side. Diagnosis is confirmed through viral serology. Treatment involves supportive measures, including hydration, oral hygiene,



**Figure 6.** Contrast-enhanced computed tomography of the neck showing expansion of the left submandibular gland by a benign-appearing tumor (arrow). Surgical excision confirmed a pleomorphic adenoma.

and pain control. Edema typically resolves over several weeks. Vaccination, which is usually completed by four to six years of age, is 88% effective in preventing mumps and has reduced the incidence by 99%.<sup>24</sup>

**Table 3. Common Neoplasms of the Salivary Glands**

Type	Overall incidence (%)	Clinical characteristics
<b>Benign</b>		
Pleomorphic adenoma	54 to 68	Most common tumor; usually found in parotid gland; may undergo malignant transformation, so excision is advised
Warthin tumor	6 to 10	More common in older men; associated with smoking; may be multifocal or bilateral
<b>Malignant</b>		
Mucoepidermoid carcinoma	4 to 13	Usually low-grade; excellent prognosis if treated early
Adenoid cystic carcinoma	4 to 8	Tends to invade nerves; higher incidence of facial weakness; may recur years after treatment

Information from references 28 and 31.

## HUMAN IMMUNODEFICIENCY VIRUS

Human immunodeficiency virus–associated salivary gland disease involves diffuse cystic enlargement of the major glands.<sup>25</sup> These lymphoepithelial cysts may be the initial manifestation of the disease or may present at later stages. It presents with a gradual, nontender enlargement of one or more of the major salivary glands, with the parotid being the most commonly affected. The patient may have decreased salivary function resulting in xerostomia, which can mimic Sjögren syndrome. Imaging generally demonstrates multiple low-attenuation cysts and diffuse lymphadenopathy. Management involves antiretroviral therapy, oral hygiene, and sialagogues.

## Neoplasms

### BENIGN

Benign neoplasms of the salivary glands typically present as painless, asymptomatic, slow-growing neck or parotid masses (Figure 6). The most common salivary gland neoplasms in children are hemangiomas, lymphatic malformations, and pleomorphic adenomas.<sup>26</sup> However, more than 50% of solid salivary gland tumors in children are malignant. In adults, pleomorphic adenoma is the most common salivary gland neoplasm.<sup>27</sup> Diagnosis requires fine-needle aspiration biopsy and ultrasonography, computed tomography, or magnetic resonance imaging. With some tumors, particularly pleomorphic adenomas, there is a risk of malignant transformation over time; thus, these radioresistant tumors are typically surgically resected. Salivary tumors generally should be completely excised to confirm the diagnosis and decrease morbidity and mortality.<sup>6,28,29</sup>

### MALIGNANT

Salivary gland malignancies are relatively rare; in a population-based study, only 16% of salivary gland tumors were malignant.<sup>30</sup> Most parotid gland neoplasms are benign (Table 3<sup>28,31</sup>), but tumors of the submandibular, sublingual, and minor salivary glands are more likely to be malignant.<sup>32</sup> Distinguishing a malignant neoplasm from

## SORT: KEY RECOMMENDATIONS FOR PRACTICE

<i>Clinical recommendation</i>	<i>Evidence rating</i>	<i>References</i>
Patients with chronic sialadenitis should be evaluated with a history, physical examination, and possibly imaging, and the underlying pathology should be treated.	C	3, 13
Sialendoscopy is useful in treating causes of chronic or recurrent sialadenitis, including sialolithiasis and recurrent parotitis of childhood.	C	11, 20-23
Salivary tumors generally should be completely excised to confirm the diagnosis and decrease morbidity and mortality.	C	6, 28, 29

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to <http://www.aafp.org/aafpsort>.



**Figure 7.** Malignant parotid gland tumor with fixation and inflammation of the overlying skin.

a benign one at initial presentation may not be possible until a biopsy is performed. Both types typically present as a painless mass in the gland.<sup>33</sup> Findings that are concerning for malignancy include pain, facial paresis, fixation of the mass to the skin or underlying tissue, and palpable neck lymphadenopathy (Figure 7). Patients who present with nonacute facial weakness should have the parotid gland evaluated with examination and imaging. If a mass is identified, prompt referral to an otolaryngologist is indicated.

Initial evaluation includes imaging with contrast-enhanced computed tomography and/or magnetic resonance imaging, and obtaining a tissue diagnosis through fine-needle aspiration. The most common histologic types of malignant salivary gland

**Table 4. Indications for Referral in Patients with Suspected Salivary Gland Malignancy**

Complications from infection (e.g., abscess, fistula, cranial nerve deficit)
Recurrent or chronic symptoms
Suspected neoplasm for biopsy and removal
Suspected salivary stone
Swelling or infection unresponsive to medical care

tumors are mucoepidermoid and adenoid cystic carcinomas.<sup>34</sup> Less commonly, face or scalp squamous cell carcinoma can present with metastases to the parotid gland. Most salivary gland malignancies are treated surgically, so prompt referral is recommended when one is suspected (Table 4).

**Data Sources:** A PubMed search was completed in Clinical Queries using the key terms salivary gland tumors, sialadenitis, and sialolithiasis. The search included systematic reviews, meta-analyses, reviews of clinical trials and other primary sources, and evidence-based guidelines. Also searched were the AHRQ evidence reports, the Cochrane database, Essential Evidence Plus, the Institute for Clinical Systems Improvement, and the National Guideline Clearinghouse database. Search dates: May 18, 2012, and January 14, 2014.

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