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Salivary Gland Pathology

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ABSTRACT :

The major salivary glands, comprising the parotid, submandibular, and sublingual glands, play crucial roles in oral health by producing saliva. This research delves into the anatomy and function of these glands, alongside the 800–1000 minor salivary glands located throughout the oral cavity. Various conditions affecting these glands, including salivary gland aplasia, mucoceles, ranulas, necrotizing sialometaplasia, salivary duct cysts, sialadenitis, sialolithiasis, xerostomia, sialorrhea, Sjögren syndrome, IgG4-related diseases, cheilitis glandularis, sialadenosis, and adenomatoid hyperplasia, are examined. Each condition presents unique clinical features, pathophysiology, and treatment options. The study emphasizes the necessity for general dentists to recognize, diagnose, and manage salivary gland disorders effectively, given their implications for overall oral health and the potential complications arising from inadequate salivary function. This comprehensive overview serves as an essential resource for dental professionals to enhance their understanding and treatment of salivary gland-related conditions.

KEY WORDS : salivary gland diseases , mucocele , ranula, salivary duct ,sialodenitis

INTRODUCTION

The major salivary glands are divided into three ,they are parotid, submandibular, and sublingual glands. There are many minor salivary glands scattered throughout the oral cavity. The parotid gland, the largest of the major salivary glands, is located lateral to the ramus of the jaw and anterior to the sternocleidomastoid muscle. This enclosed gland produces serous saliva. The second largest glands are situated beneath the angle of the jaw in the neck of submandibular triangle. They are part of the floor of the oral cavity. This gland produces both serous saliva and mucous saliva. The sublingual glands, the smallest major salivary glands, are located beneath the mucosa of the floor of the mouth and above the mylohyoid muscle.

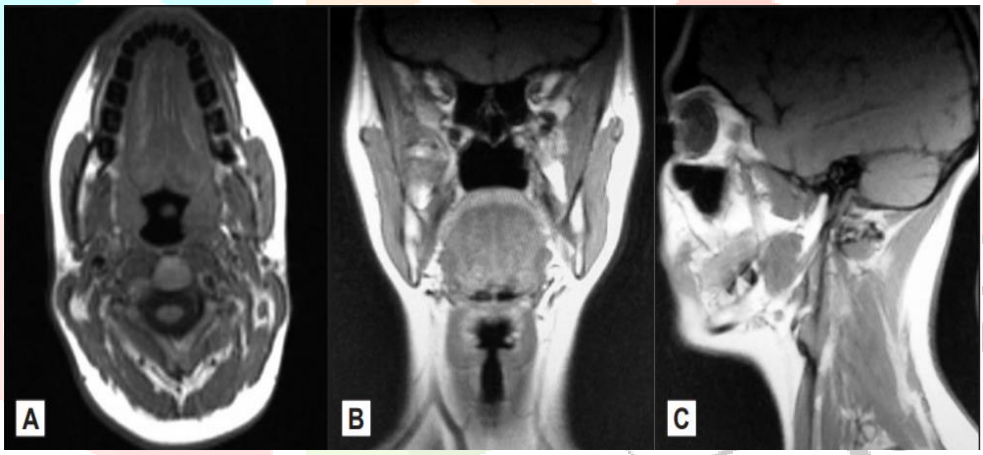
The sublingual gland is distributed across the sublingual region and is not encapsulated, in contrast to the parotid and submandibular glands. The sublingual gland secretes a mucous saliva. The 800–1000 microscopic salivary glands that comprise the minor salivary glands are found in the buccal mucosa, labial

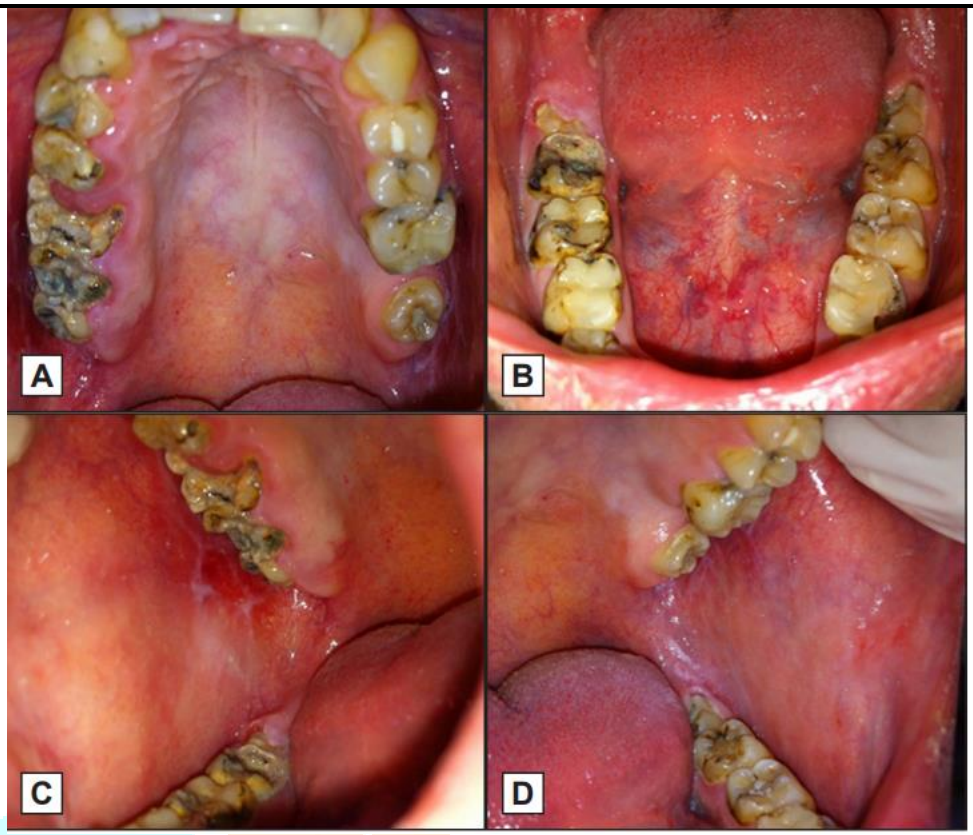
mucosa, lingual mucosa, soft/hard palate, and floor of the mouth.Most of the saliva that these gland clusters generate is mucus.
Numerous diseases can affect the salivary glands, including infections, painful blockages, and benign or malignant tumours. General dentists need to be aware of the diseases, abnormalities, and functions of the salivary glands. They should be capable of recognising, diagnosing, and treating issues with the major and minor salivary glands, including duct

SALIVARY GLAND APLASIA

Salivary gland aplasia is a rare disorder which causes the salivary glands to be either missing or under developed.Rare developmental abnormalities include severe salivary gland aplasia and hypoplasia. They might be unilateral or bilateral, solitary or a component of a syndrome. They have the potential to impact multiple major glands. Unilateral or bilateral aplasia of the major salivary glands primarily affects the parotid salivary gland, with the submandibular salivary glands being affected less frequently.. Many issues, including dysphagia, dysgeusia, widespread dental cavities, vulnerability to oral infections, malnourishment, and psychological issues, can result from hyposalivation brought on by salivary gland aplasia[1]. The exact pathogenesis of aplasia of the salivary glands is unknown

Magnetic resonance imaging examination revealing the absence of major salivary glands: A = axial; B = coronal; C = sagittal.[1]



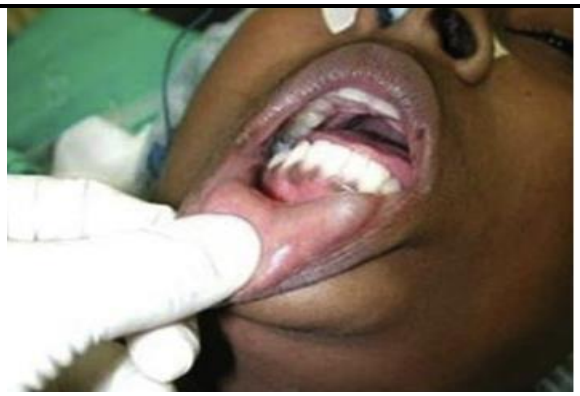


Images displaying the results of an oral cavity clinical examination. A and B = numerous resin and sealant restorations, extensive tooth erosions, and widespread dental caries. Observe that there is no free saliva on the floor of the mouth, and that the submandibular glands' Wharton's duct orifices are not visible (B). C and D = There are bilateral white striated lesions of the buccal mucosa that are in touch with carious teeth and resin restorations; the parotid papillae of the Stenson's ducts are absent.[1]

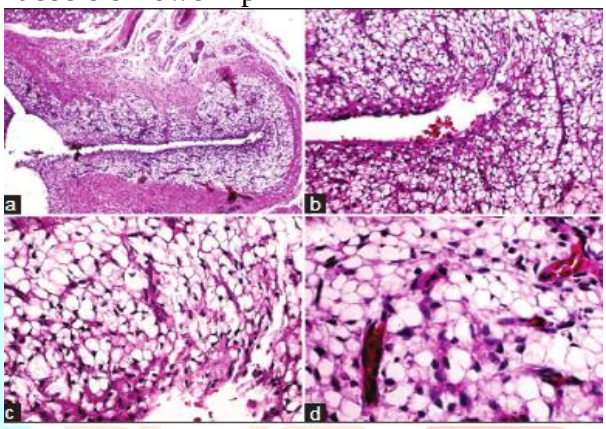
Regular dental checkups are necessary for patients with substantial salivary gland aplasia due to the hyposalivation-related side effects that include the dentition, as demonstrated in our instance. It is advised to use fluoride toothpaste every day, practise good oral hygiene and make dietary adjustments. Saliva replacements such glycerine and lemon, lactoperoxidase, glucose oxidase, and xylitol are used to treat xerostomia. [1]

MUCOCELE

Mucocele is a common oral mucosal lesion caused by a mucus buildup that alters minor salivary glands. Limited swelling is a result of mucus buildup in mucocele. There are two different types : retention and extravasation. Extravasation mucocele results from a broken salivary glands duct and the consequent spillage into the soft tissues around this gland. Retention mucocele appears due to a decrease or absence of glandular secretion produced by blockage of the salivary gland ducts [8].Retention mucoceles can occur anywhere, however extravasation mucoceles are more frequently observed on the lower lip. Although mucoceles can afflict anyone, young people (20–30 years old) are more frequently affected. Clinically, they manifest as a translucent, blue, and soft cystic swelling that typically goes away on its own. Two crucial etiological factors in mucoceles: traumatism and obstruction of salivary gland ducts. Conventional treatment is commonly surgical extirpation of the surrounding mucosa and glandular tissue down to the muscle layer. With a simple incision of the mucocele the content would drain out but the lesion would reappear as soon as the wound heals . There is no need for treatment if superficial extravasation mucoceles resolve spontaneously [8].Small mucoceles can be removed completely with the marginal glandular tissue before suture. In the case of larger mucoceles, marsupialization would avoid damage to vital structures. Clinically there is no difference between both types of mucocele, and are therefore treated in the same manner. Nevertheless when an obstruction of retention mucoceles is detected treatment involves the removing the top of the cyst and introducing a lacrimal catheter into the duct to dilate it[8]



Mucoele of lower lip[2]

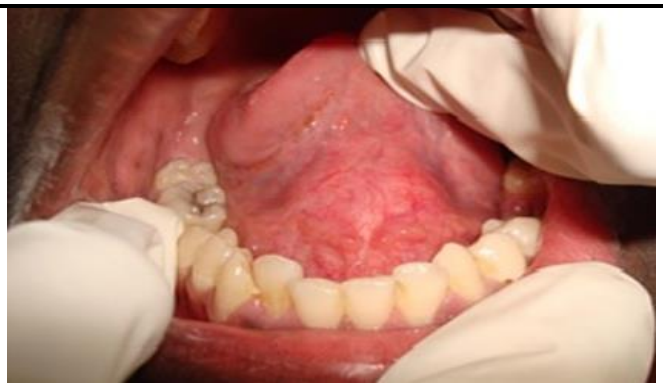


Histopathological features of the oral mucocele showing extensive clear cytoplasmic vacuolation and signet-ring formation (H&E stain). Notice a dense population of clear cells surrounding a central cavity (a) (b)In high-power view (×400), observe the clear cytoplasmic vacuolation (c) and signet-ring cell change surrounded by a delicate capillary network (d)[15]

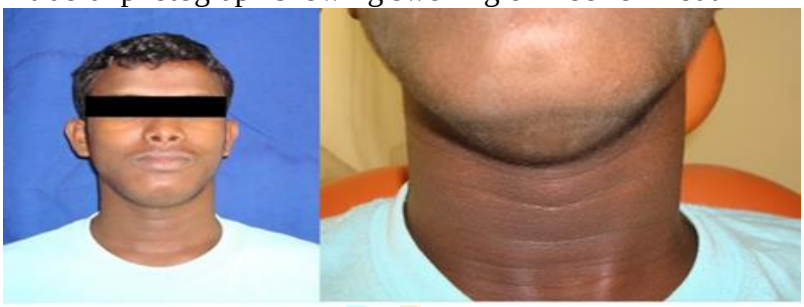
RANULA

Ranula are mucus-filled swellings found on the mouth's floor. The swelling is normally soft and blue, with a thin layer of epithelium covering it. Ranula can form when acini in the sublingual gland or Rivinus duct burst, causing mucus accumulation. There are two main types of ranulas: the simple (intraoral) type and the plunging (cervical) type. The simple ranula involves a localized mucus collection in the floor of the mouth and is more common than the plunging type. In the plunging ranula, the mucus collection is found in the submandibular and submental spaces of the neck, sometimes with an associated intraoral collection.[5]

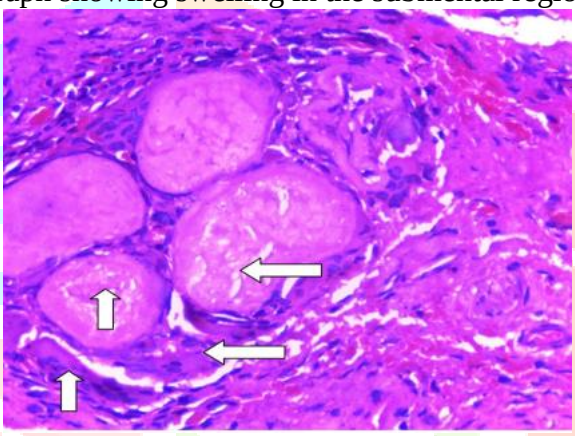
Ranula is diagnosed primarily through clinical presentation. However, imaging methods such as computed tomography (CT) and magnetic resonance Various imaging techniques, including MRI, ultrasound, sialography, and nuclear imaging, have been used to identify lesion borders and their connection with surrounding structures. [5]



Intraoral photograph showing swelling on floor of mouth [5]



Extraoral photograph showing swelling in the submental region[5]



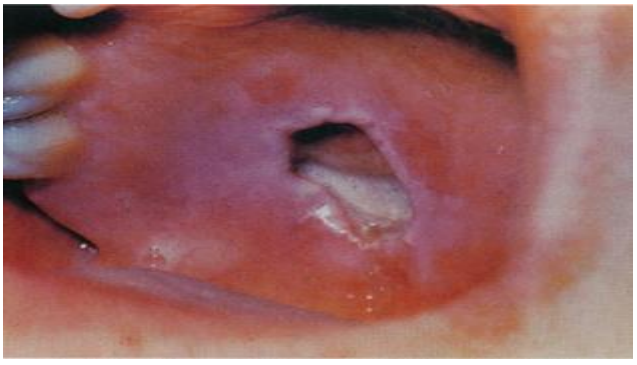
A photomicrograph of the ranula specimen following H&E low power (910) displaying pools of mucin surrounded by inflammatory cells and fibrosis. Also seen are giant cells (mucinophages)[16]

TREATMENT

Treatment options for ranula include incision and drainage, marsupialization, irradiation, and injection with a sclerosing agent. Cyst excision and removal of the sublingual gland and lesion. Alternative therapies include botulinum toxin type A injections for ranula control.[5]

NECTROTIZING SIALOMETAPLASIA

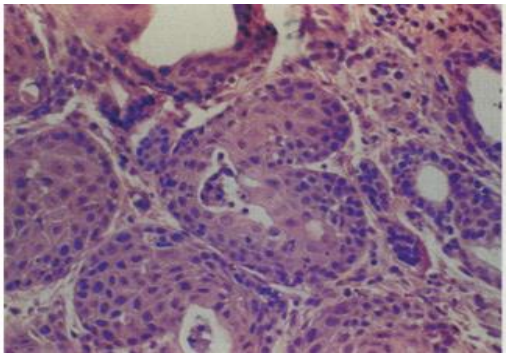
Necrotising sialometaplasia is a self-limiting inflammatory illness characterised by ulcerative lesions on the palate. The relevance of this condition stems from its clinical and histological similarities to malignant neoplasms such mucoepidermoid carcinoma or squamous cell carcinoma.Histopathological features of nectrotizing sialometaplasia can be of five stages 1) infraction 2) sequestration 3) ulcerative 4) reaparative 5) healing .[6]



Palatal ulcer[6]

Initial symptoms vary and may include fever, chills, malaise or swelling.3 Paresthesia or anes thesia ofthe involved area also has been reported. Palatal lesions can be quite large, averaging 1.8 cen timeters in diameter.The length oftime the lesion remains varies, generally ranging from four to 90 days.[6]

Over four to ten weeks, necrotising sialometaplasia recovers due to secondary intention. The slow healing process is due to the magnitude of the lesion rather than the problem itself. The dentist should monitor the patient's progress until recovery is complete. [6]



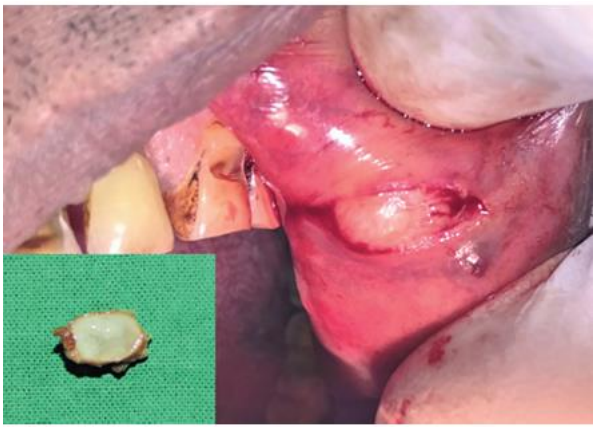
High power magnification demonstrates strating squamous metaplasia of salivary gland ductal epithelium[6]

SALIVARY DUCT CYST

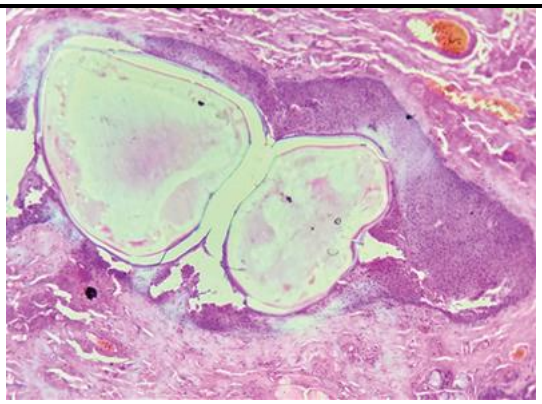
Salivary duct cysts (SDCs) are true cysts caused by obstruction of salivary ducts and are rare in minor salivary glands. Intraoral SDCs and mucoceles represent clinically salivary gland neoplasms, making diagnosis difficult and subject to errors in treatment.[3]

Salivary duct cysts typically manifest as asymptomatic, unilateral swelling in less trauma-prone areas. They are uniformly distributed in the buccal and lower lip mucosa areas. Salivary glands range in size from 0.8-10 cm and can be found in the mandibular vestibule, mouth floor, hard and soft palate, and minor salivary glands. They are uncommon in the major salivary glands and, when present, are often seen in the superficial lobe of the parotid with no involvement of the facial nerve[3]

Salivary duct cysts can affect anybody from children to the elderly, with the majority of cases occurring in people over the age of 30-40. SDCs affect both male and female populations equally. Salivary gland cysts can often be an early manifestation of a salivary gland tumor, therefore diagnosis and early treatment interventions play an important role in the prognosis of this lesion Primary diagnostic interventions involve imaging and histopathology[3]



Clinical image shows surgical exposure of salivary duct cyst in the left buccal mucosa and gross specimen showing cystic sac filled with slimy gel-like material[3]



Histopathological image showing cystically dilated salivary gland duct with intraluminal mucous plug and squamous metaplasia of the lining epithelium (H&E stain; ×100 magnification).[3]

TREATMENT

The treatment option for salivary duct cysts includes cryosurgery, carbon dioxide laser surgery, and conservative surgical excision. Dental Trauma tumors of the salivary glands are able to clinically mimic salivary duct cysts, excision is extremely necessary. Complete surgical excision along with the feeding minor salivary gland is curative. Chlorhexidine mouthwash and oral antibiotics are provided for secondarily infected SDCs. Sialagogues are also provided which may help in decreasing the risk of salivary stasis within dilated ducts by stimulating salivary flow[3]

SIALADENITIS

Either infectious or non infectious factors may be the cause of sialadenitis. Most often, acute sialadenitis is caused by bacteria and viruses. The most often affected glands are the parotids, followed by the submandibular glands to a lesser degree. Children, teenagers, and disabled adults are the most frequently impacted populations. In Infections with bacteria are more common than those caused by viruses. The two most dangerous viruses are the cytomegalovirus and the mumps virus. In cases of acute viral infection, dental care is not advised. The signs of sialadenitis include increasing localised enlargement of the affected gland, pain, discomfort, and redness. In the mouth, pus can seep through the duct. It is not recommended to do dental care unrelated to the infection.[2]

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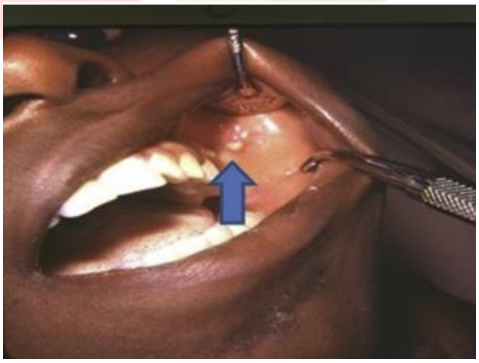
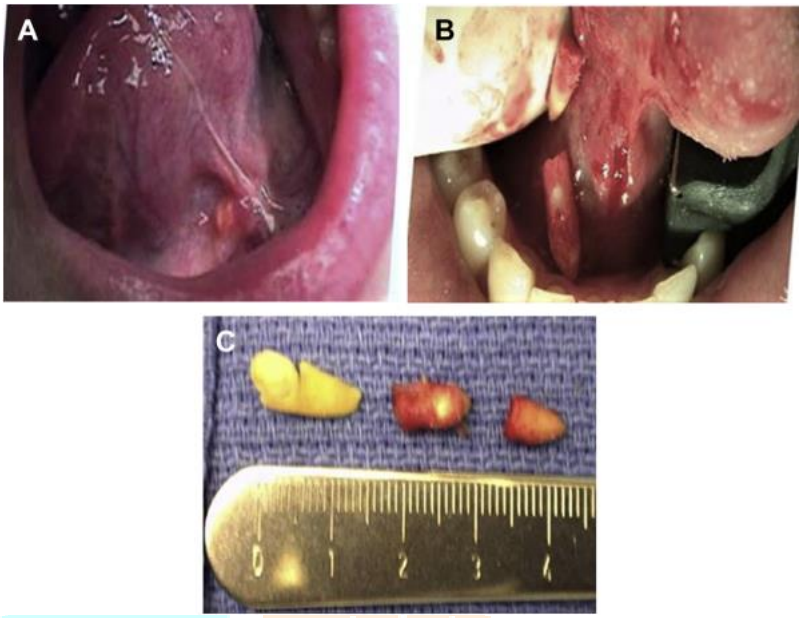


Pus from parotid duct.[2]

SIALOLITHIASIS

Sialolithiasis, commonly referred to as salivary stones, is a disorder in which calcified masses grow in the salivary gland and obstruct the passage of saliva.Compared to the parotid gland (13%), the submandibular gland (84%), is where sialoliths are most commonly found. While parotid stones are more frequently found inside the gland itself, the majority of submandibular stones (90%) are found in the Wharton duct. Concentric layered layers of biological and inorganic materials encircle the amorphous, mineralised centre of salivary stones. Collagen, glycoproteins, amino acids, and carbohydrates are among the organic substances that make up salivary stones. Brushite, whitlockite, carbonate apatite, and hydroxyapatite are the main inorganic constituents.[2] Adults frequently get salivary stones.[4]

Treatment consists of first treating any acute infection if present, followed by surgical removal of the stone. Stones that are located from near the orifice up to the hilum in the submandibular gland can be removed transorally, but stones near the hilum of the gland will require gland excision. Sialendoscopy (a 0.8–1.6 mm semirigid endo scope is introduced into the salivary duct and is used to remove the stone) is an alternative to open surgery.[2]



(A) Stone at orifice of Wharton duct. (B) Stones removed from duct. (C) Stones.[2]

XEROSTOMIA

Xerostomia is characterised by symptoms like dry mouth. Women are more likely than men to experience this ailment, which often leads to a lower quality of life. Xerostomia is related to dental Oral health issues include caries, candidiasis, and bacterial infections, as well as functional issues such as dysgeusia (taste distortion) and dysphagia (swallowing difficulty). [2]

CAUSES OF XEROSTOMIA

Reversible Causes :Anxiety and depression ,Drugs ,Ductal obstruction—stones Infections Dehydration ,Nutritional deficiencies ,Snoring and mouthbreathing , Smoking

Irreversible Causes : Sjogrens syndrome, Radiotherapy ,Nerve damage, Parkinson disease[2]

TREATMENT

To prevent dry mouth, hydrate periodically with water, ice cubes, citric acid lozenges, artificial salivary substitutes (Biotene and Roxane), lubricants like Vaseline or lip balm, and oral gels. Such as oral equilibrium. Mouthwashes and sprays, sugar-free gums, mint water, and ice chips are all recommended.[2]

SIALORRHEA

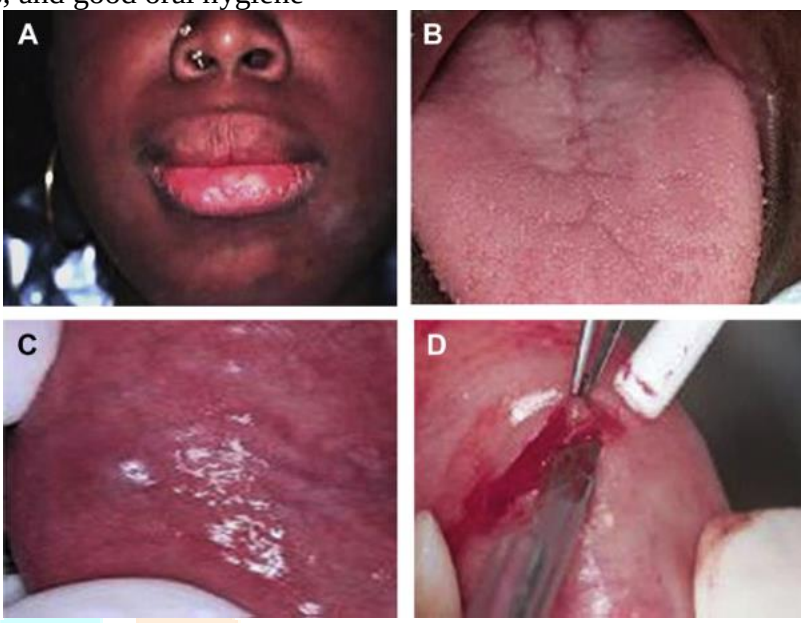
Sialorrhea is salivary hyper secretion. The diagnosis is difficult to make and the condition is rare. The most common cause is neuromuscular dysfunction. Mental retardation and cerebral palsy are conditions in which sialorrhea may be seen in children, whereas in adults, Parkinson disease is the most common cause. In most cases of drooling there is not an increase of salivary flow but the oral handling of the saliva is disturbed. Dental-related causes could be due to insertion of new dentures or decreased vertical dimension in complete dentures. Anticholinergic medications, such as glycopyrrolate and scopolamine, can be used to reduce drooling, but their side effects may limit their use.[2]

SJOGREN SYNDROME

Sjogren syndrome is an autoimmune disorder.The primary presenting symptoms are dry eyes and dry mouth.Depending on the studies,female to male ratio varies from as high as 20:1 to 9:1.

The diagnosis is often based on a lip biopsy showing lymphocytes around salivary glands .The other tests are Schirmer test, Rose Bengal dye test, sialography, and sialochemistry.

The dental treatment should be aimed at relief of symptoms by the administration of saliva substitutes, fluoride applications, and good oral hygiene[2]



(A, B) Sjogren syndrome. (C, D) Sjogren syndrome. Lip biopsy.[2]

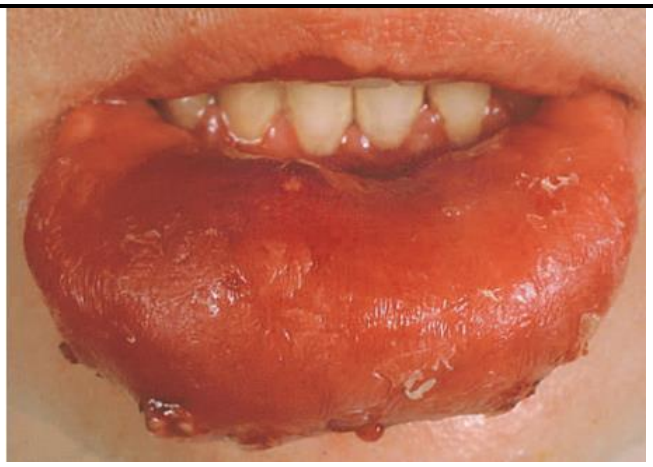
IG G4 RELATED DISEASES

Immunoglobulin G4-related disease (IgG4-RD), is an immune-mediated fibroinflammatory condition, which may involve multiple organs and mostly presents with high serum IgG4 levels and specific histopathological characteristics. The involvement of major salivary (parotid and submandibular) glands is a common feature of IgG4 RD. Lacrimal or parotid gland enlargements, which was previously termed as Mikulicz syndrome, and Küttner tumor (chronic sclerosing sialadenitis) have been incorporated into IgG4-RD context [. In IgG4-RD, lacrimal gland, parotid gland and submandibular gland are usually involved together at different combinations. Although it is not always symmetrical, glands are usually involved bilaterally. Renal involvement with low complement levels might be encountered in this condition In the morphology of IgG4-related sialadenitis, fibroinflammatory infiltration occurs in interlobular septa, but lobular architecture is preserved, and commonly hyperplastic irregular lymphoid follicles are detected . In some sialadenitis cases due to stones, IgG4 positive cells may be present. In a study, serum IgG4 levels were found elevated in 7.5% of patients with primary Sjögren syndrome (pSS). Compared to pSS, in IgG4-RD have higher serum IgG4 levels and negative antinuclear, anti Ro/SSA and anti-La/SSB antibodies . Radiologically, pSS demonstrates the “apple-tree sign” on sialography, indicative of contrast spilling from degenerated glands. Both pSS and IgG4-RD enlarge lacrimal and salivary glands, but dryness in mouth and eyes is milder in IgG4 RD and more severe in pSS due to more extensive epithelial cell apoptosis. Upon immunosuppressive treatment IgG4 RD patients regain their salivary functions whereas, pSS often leads to irreversible destruction of salivary units.[7]

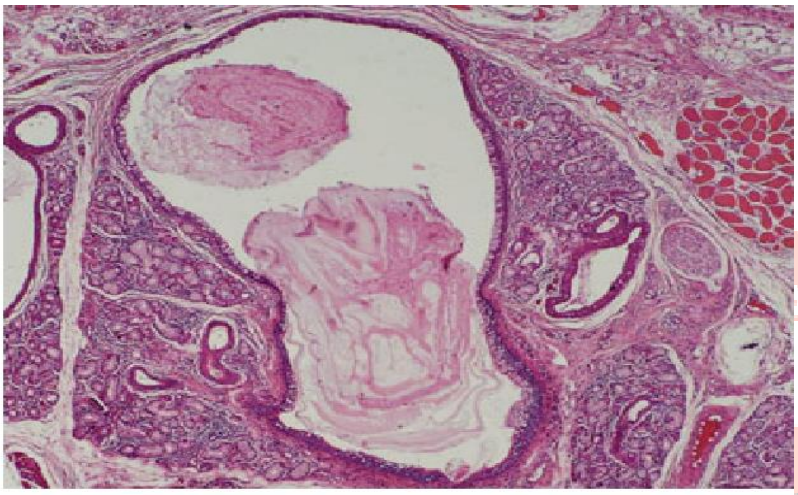
CHEILITISGLANDULARIS

Cheilitis glandularis (CG) is a rare condition characterised by hyperplasia of labial mucous glands, heterotopic mixed salivary glands, and Ectasia of glandular ducts . Patients with CG may experience CG apostematosa, a severe deep-seated inflammation that causes abscesses and fistulous tracts (1-3)[9]

CG primarily affects middle-aged or elderly males and is typically found on the lower lip. Children and women may also experience upper lip occurrences. Although the pathophysiology of CG is not entirely understood, bacterial superinfection, particularly from staphylococci, appears to be necessary for the progression of CG simplex to suppurative forms. [9] surgical treatment should be done for cheilitis glandularis



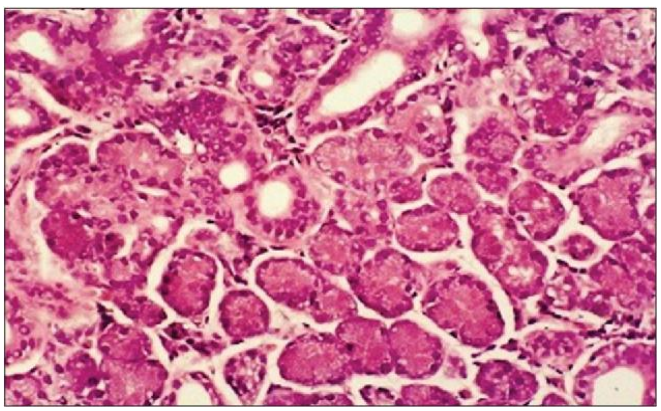
Impressive swelling of the lower lip and multifocal discharge of pus[9]



Ectasia of the salivary ducts and accumulation of mucus in the lumen of the ducts [10]

SIALADENOSIS

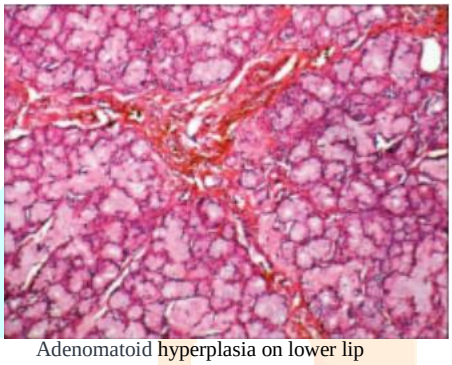
Sialadenosis is a non inflammatory ,non neoplastic conditions which cause salivary gland to enlarge. Sialadenosis is most prevalent in persons with non-tumor salivary gland disorders. These patients are most commonly diagnosed with metabolic syndrome. Histopathology of sialadenosis shows acinar hypertrophy and granules in cytoplasmUsing autothrombocyte mass and rheopolyglucin effectively treats dystrophic and inflammatory illnesses of the salivary glands in 58% of patients. To assess the effectiveness of treatment, it's best to analyse it over a longer period of time, such as a month or more, as the therapeutic effect may not be immediate. [11]



Histology: Microscopy showing acinar hypertrophy and cytoplasm with granules [12]

ADENOMATOID HYPERPLASIA OF MINOR SALIVARY GLAND

Adenomatoid hyperplasia of minor salivary glands is a rare clinicopathologic condition. This condition is characterised by clinical swelling similar to a tumour and histologic findings of abnormal salivary gland tissue in excess of the expected size for the anatomic region. This lesion is significant because it clinically resembles a salivary gland tumour. [13] Under a microscope, the lesions were made up of several, different-sized clumps of mucous acini that looked normal and were encircled by fibrous cells. Stroma of necrotic tissue, The acini seemed hypertrophic in several instances. Additionally observed were ductal structures with a typical histomorphologic pattern. However, in several instances, it seemed that they were few. In a few cases, isolated focal regions of mucus splashing were seen. [13]incision are done for removal of adenomatoid hyperplasia.



Adenomatoid hyperplasia on lower lip

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