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## Ranula

### Abstract:

This article discusses Ranula, its etiopathogenesis and management options currently available. The term ranula is reserved for a bluish cystic mass found in the floor of the oral cavity. This term has been derived from the latin word “Rana” which means frog. Since the cyst resembles the bluish underbelly of a frog this is appropriate. Commonly ranula arises due to collection of saliva from sublingual salivary gland whose ductal system could have been breached due to trauma / other causes. Management of these patients varies with simple marsupialization to excision of the sublingual gland along with the cyst. This article is an interesting case report of a patient with ranula with a review of published literature.

### Introduction:

Ranula was reported even during the period of Hippocrates and Celsius.<sup>1</sup> The word ranula has been derived from the latin word “Rana” which means the frog. This is because it resembles the translucent belly of a frog. Ranula is formed by rupture of excretory duct of the salivary gland, which is followed by rupture of saliva into the surrounding tissues<sup>2</sup>. This accumulation lacks a true epithelial capsule and hence is a pseudocyst<sup>3</sup>. Biochemical studies reveal that fluid within the ranula is rich in protein and amylase. Salivary secretions from sublingual gland is also rich in protein and amylase and hence it has been suggested that ranulas are commonly caused by ruptured sublingual excretory ducts. The high protein content of the fluid in the ranula stimulates inflammatory reaction causing pseudocyst formation<sup>4</sup>.

There are two different types of ranulas. These two types of ranula are caused by differing pathogenesis.

### True cyst:

This type of ranula has an epithelial lining. This type of ranula is usually caused due to obstruction of ducts of sublingual gland or ducts of one of the minor salivary glands.

### Pseudocyst:

This type of ranula does not have an epithelial lining. This is caused due to ductal injury of commonly the sublingual salivary gland, extravasation of saliva and accumulation into the submucous tissue. Sometimes this type of ranula is surrounded by granulation tissue or condensed connective tissue<sup>5</sup>.

Clinical classification of ranula:

Clinically ranula has been classified into two types:

1. Intra oral ranula
2. Plunging ranula

Intraoral ranula:

This type of ranula is confined to the floor of the mouth. It is known to slowly enlarge in size into painless fluctuant swelling.

Plunging ranula:

In this type the extravasating pseudocyst breaches the mylohyoid to present as neck swelling. Plunging ranulas commonly arise from sublingual salivary gland<sup>4</sup>. Rarely it can pass behind the posterior edge of mylohyoid muscle to present in the neck. The possibility of cervical / plunging ranula should be considered in a patient with painless swelling in the neck that gradually increases in size. History of trauma to oral cavity / surgical procedures involving the oral cavity should be sought.

Anatomy of sublingual salivary gland:

Sublingual salivary gland is paired. These glands are located below the mucosa of the anterior part of the floor of the mouth. These glands lie anterior to the submandibular ducts, above the mylohyoid and geniohyoid muscles. These glands drain their saliva into submandibular duct via 8-20 excretory ducts known as ducts of Rivinus. Salivary drainage from these glands can also occur directly into the floor of the mouth on an elevated crest of mucous membrane known as plica fimbriata located on either side of the frenulum of the tongue.

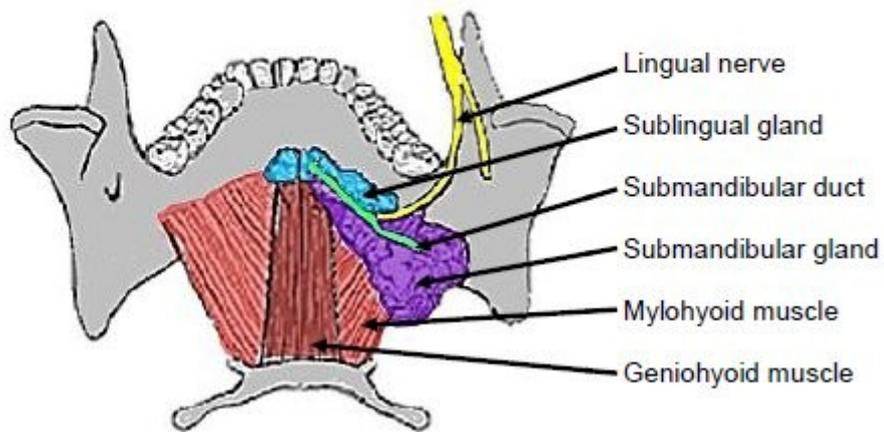


Figure showing submandibular and sublingual salivary gland above the muscles of the floor of the mouth

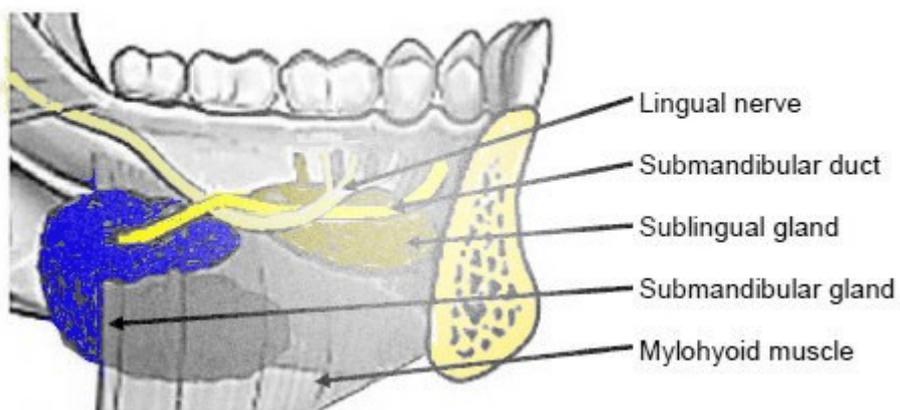


Figure showing the relationship between submandibular and sublingual salivary glands

Important structures related to sublingual salivary gland in the floor of the mouth:

Lingual nerve crosses deep to the submandibular duct in the lateral floor of the mouth. In the anterior part of the floor of the mouth this nerve is located posterior to the duct.

Submandibular duct is located deep to the mucosa of the anterior and lateral floor of the mouth. It opens into the oral cavity on either side of the frenulum.

Case Report:

20 years old female patient reported to outpatient department with:

Complaints of :

Swelling over the floor of the mouth – 1 year

Inability to speak properly – 6 months

She gave no history of injury / surgical procedure involving the floor of the oral cavity

On examination:

Bluish mass could be seen occupying the anterior portion of the floor of the oral cavity pushing the tongue backwards. It appeared cystic in nature. Dilated veins could be seen over the swelling.

On palpation the mass was soft and cystic. It was not bidigitally palpable.



Figure showing intraoral view of ranula pushing the tongue backwards



Image showing ranula on elevating the tongue

CT scan neck:

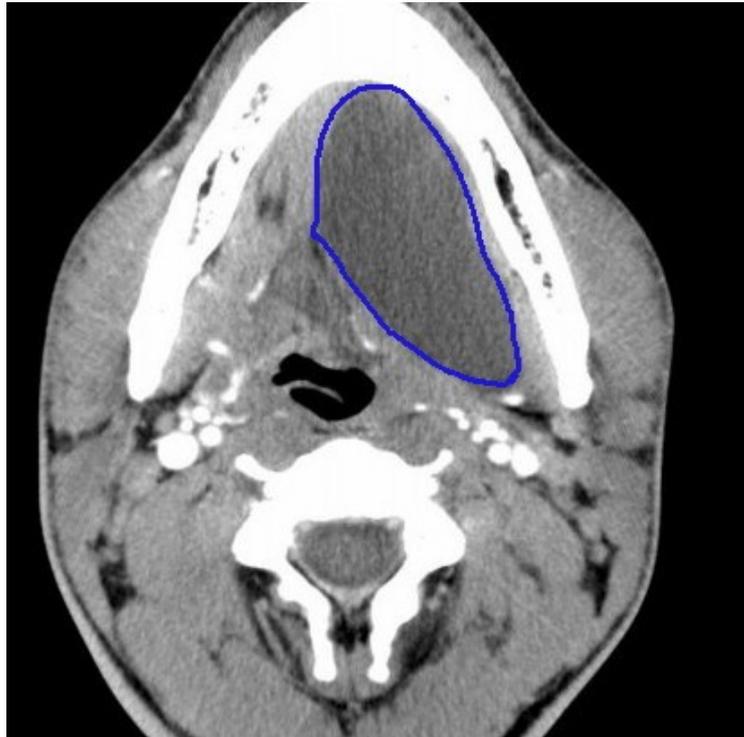


Image showing axial CT neck the fluid filled space

In a CT scan uncomplicated ranulas appear as thin walled cystic lesion with central fluid attenuation (10-20 HU). If this cyst gets infected / has been drained / sclerosing agents used will appear with increased attenuation values and thickened lining<sup>5</sup>. It may sometimes under these circumstances appear as non-enhancing soft tissue mass.

Ultrasound neck:

Revealed thin walled cystic lesion involving the floor of the mouth.

Management:

This patient was managed by total excision of ranula along with sublingual salivary gland.

Excision was performed under general anesthesia. Patient was placed in a supine position with a slight elevation of head end. The oral cavity is kept open using bite blocks. Tongue is held out using tongue holding forceps.



Figure showing tongue being held out with the help of tongue holding forceps

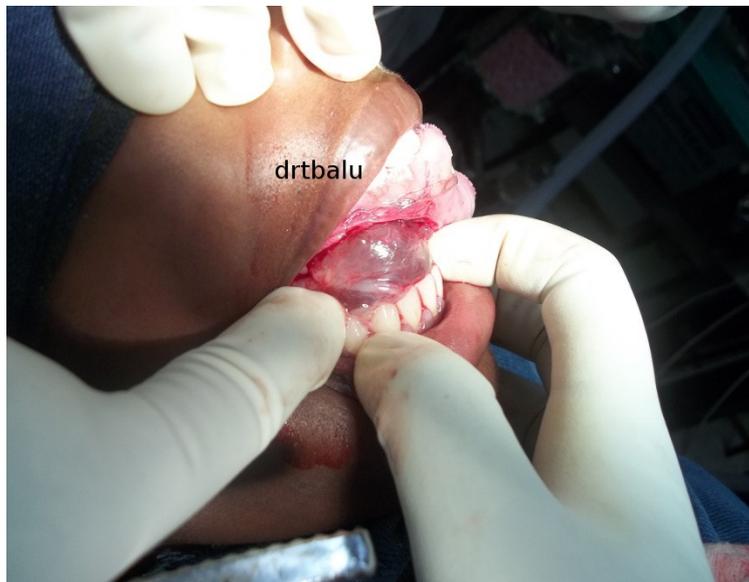
The mucosa over the ranula was incised taking care not to enter the sac. A dissection plane in the submucosa is established over the wall of the ranula. The cyst was excised along with sublingual salivary gland taking care not to damage submandibular duct and lingual nerve.



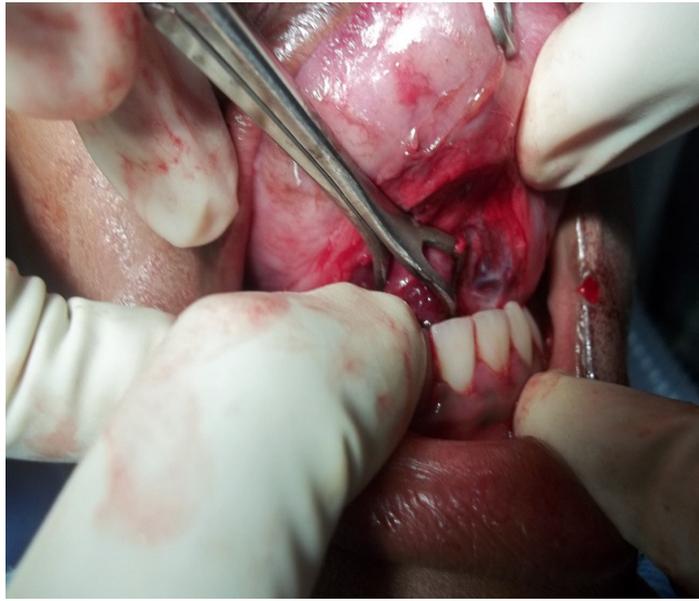
Figure showing ranula being exposed



Image showing ranula being dissected from the submucosa. Note sharp dissection is being used



View of ranula before extirpation



Sublingual salivary gland held with Babcock's forceps and being mobilised



Image showing sublingual salivary gland being removed

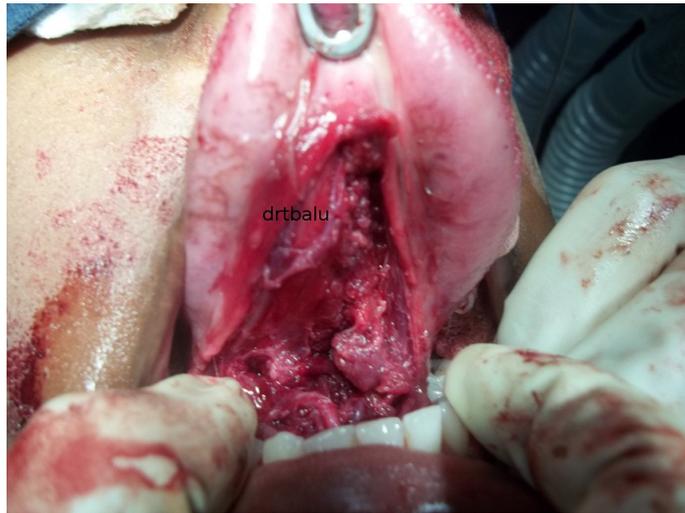


Image showing the floor of the mouth after removal of right sublingual gland

#### Discussion:

Even though the diagnosis can be made on clinical examination alone, imaging helps in confirming the diagnosis and ascertaining the neck extension if present. While imaging a ranula that has dissected its way out of the floor of the mouth is to identify the connection to sublingual space. This connection could be a huge fluid filled space or a thick sleeve of connective tissue<sup>6</sup>. MRI imaging is useful in identifying the state of sublingual salivary gland. Ranula in MR imaging demonstrates low T1 weighted images while T2 weighted images have high signal intensity because of its water content.

Sialography studies of submandibular performed did not show any communication with ranula space<sup>5</sup>.

Differential diagnosis of ranula include:

1. Abscess in the floor of the mouth
2. Dermoid cyst
3. Vascular lesions

Differential diagnosis of plunging ranula include:

1. Branchial cyst
2. Thyroglossal duct cyst

3. Epidermal cyst
4. Cystic hygroma
5. A-V malformation
6. Lymphadenopathy
7. Abscess / tumors

Surgical resection is invariably curative. Surgery should include not only removal of the ranula but also the sublingual salivary gland from which it has arisen. If ranula is removed along with sublingual salivary gland it does not recur that commonly.

Other methods include:

1. Incision and drainage – This procedure is like any other abscess drainage. It has a very high recurrence rate about 80%.
2. Marsupialization – In this procedure the cyst is opened up and drained. The cyst wall is everted and sutured to the oral cavity mucosa. This has a recurrence rate of about 40%.
3. The best results are achieved by total resection of the cyst along with sublingual salivary gland.

Sclerotherapy:

Currently this is holding out lots of promise. The sclerosing agent used is OK-432<sup>7</sup>. This is actually a lyophilized mixture of low virulence strain of streptococcus pyogenes incubated with benzyl penicillin. This acts by stimulating inflammatory lesion with destruction of cyst lining if present and cicatricial contraction of the lesion by scar tissue formation. Patients who have been treated with sclerotherapy have mild elevation of temperature and pain and tenderness over the lesion. The hitherto painless lesion becomes rather painful due to inflammatory reaction.

Caution:

Before proceeding with sclerotherapy, it should be ensured that the patient is not abnormally sensitive to Benzyl Penicillin which is commonly known to produce anaphylactic reaction.

This procedure is performed under ultrasound guidance. Angio catheter is used for this purpose. A catheter with 21 gauge needle is preferred. The cyst is punctured and the needle is placed at the centre of the cyst. About 10ml of cyst fluid is aspirated. The same amount of OK-432 solution is injected into the cyst. The needle is withdrawn and pressure dressing is applied. It is ideal to puncture the ranula via the neck because if done orally the sclerosing agent tended to leak into the oral cavity. This is more beneficial in treating plunging ranula.

Ultrasonic screening is performed at 3 month, 6 month and 1 year intervals following sclerotherapy.

This modality of treatment holds future promise for plugging ranulas.

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