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## Case Report

# Surgical excision of sublingual gland ranula - An ambiguous treatment modality?

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### ABSTRACT

The term Ranula is derived from the Latin term rana meaning frog. Rupture of one of the ducts of Rivinus in the sublingual salivary gland results in the extravasation of saliva into the surrounding tissues to form an extravasation cyst which is a form of pseudocyst.

Ranula may present in two forms: a simple (or intraoral) ranula and a plunging (or cervical) ranula. There has been little consensus on the ideal first-line treatment, but currently, definitive treatment involves excision of ranula along with the involved sublingual gland. Minimally invasive surgical alternatives include marsupialisation and micro marsupialisation which is associated with a high rate of recurrence.

In this case report, treatment of oral ranula which was present above the mylohyoid and encompassing the floor of mouth was done by meticulous dissection and surgical excision of the cyst along with the involved sublingual salivary gland.

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## 1. Introduction

Ranula are one of the commonest benign salivary gland tumours which occurs due to mucous extravasation; sublingual salivary gland being the most common among all. It is a type of mucocele which mostly presents itself as a cystic mass in the floor of the mouth. Ranulas are divided into oral and plunging (cervical) ranula based on its extension.<sup>1</sup> Hippocrates initially described ranula as a chronic inflammatory process. Suzanne and von Hippel described the origin of ranula from the sublingual gland. However, Bhaskar et al. in 1956 concluded that ranulas are produced by extravasation of saliva from damaged salivary ducts and are lined by connective tissue without epithelium. Ranulas are considered a type of pseudocyst since they are lined by granulation tissue instead of epithelium.<sup>2,3</sup>

There are various treatment modalities for treatment of ranula which can be divided into surgical and non-surgical.

The minimally invasive non-surgical line of treatment includes sclerotherapy using intra lesional injection of sclerosing agents such as dehydrated alcohol or OK-432. According to literature, the success rate of sclerotherapy is <90%. The other conservative line of treatment includes cryotherapy, laser ablation and electrocautery. The other surgical line of treatment includes conservative management using marsupialization or surgical excision along with micro marsupialization. The radical surgical procedures include surgical excision of ranula with removal of sub lingual or submandibular salivary gland.<sup>4</sup> An online survey conducted by Patel et al. among 220 members of the American Head and Neck Society found that the most preferred approach to treat oral ranula includes sublingual gland excision along with pseudocyst (32%), followed by marsupialization (30%), and ranula excision alone (25%).<sup>5</sup>

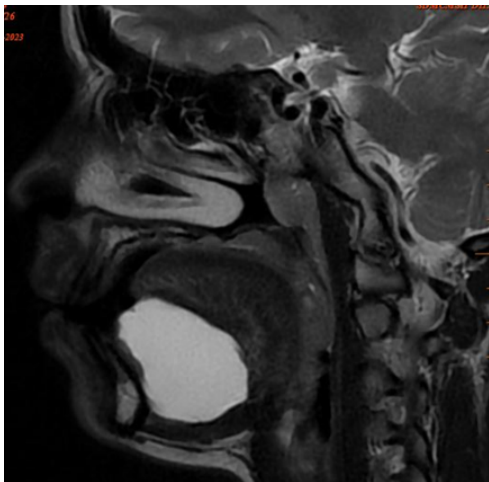
This is a case presentation in a patient with oral ranula in the left sublingual gland crossing the midline without any previous history of trauma.

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### 1.1. Diagnostic examination

There is no specific diagnostic test for Ranula which presents itself as a cystic fluctuant lesion. The higher salivary amylase and protein content of the fluid in ranula than serum suggests that ranula originates from the sublingual salivary gland which has higher mucin content. Ultrasonography is generally inconclusive due to its location. Computed Tomography (CT) scan helps to identify the anatomical extension of ranula. The sublingual gland can be examined most effectively through Magnetic Resonance Imaging (MRI). Ranula's characteristic pattern on MRI scan is primarily due to its increased fluid content, which results in a low T1-weighted intermediate proton density and high T2-weighted signal intensity. In this clinical case (Figure 1), MRI reported well defined cystic lesion in left sublingual space with hypo intensity in T1W image and hyper intensity on T2W image, with an approximate measurement of 43\*26\*33mm (AP\* ML\*CC).<sup>6</sup> The MRI image also showed extension to the mylohyoid muscle laterally, genioglossus and geniohyoid muscle medially and inferiorly till the ipsilateral submandibular space. Takimoto proposed a radiographic technique to assess the type of ranula prior to surgery, which entails application of 0.5 ml radiopaque medium into the sublingual space.<sup>7</sup>



**Figure 1:** MRI depicts well defined cystic lesion in left sublingual space

## 2. Case Report

A 23 year female patient reported to the Department Of Oral and Maxillofacial surgery in SDM Dental College and Hospital, Dharwad with a chief complaint of swelling in the left side floor of mouth since 2 months. There was no associated history of trauma. The swelling was gradually increasing in nature, fluctuant, compressible, non reducible, with a positive transillumination test and crossing

the midline. There was no extension of swelling in the cervical region. The swelling was not associated with pain but was associated with restricted tongue movements. There was no associated pus discharge or sinus opening.



**Figure 2:** Intra oral picture of left sublingual gland ranula crossing the midline

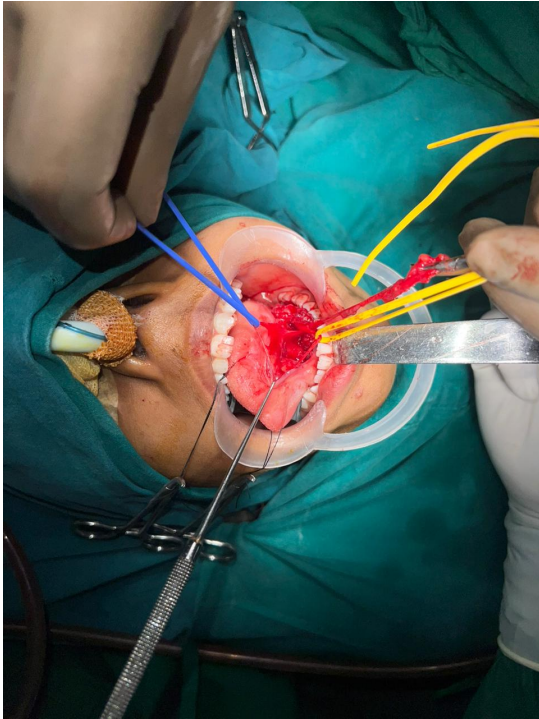
Magnetic resonance imaging (MRI) was done to know the extensions of the swelling and to rule out any vascular malformations.

The surgical treatment was planned as complete surgical excision of ranula along with removal of sublingual gland. During the surgical procedure, incision was given over predicted path of submandibular duct on the lesion resting over the floor of mouth. Blunt dissection was done in the medial, lateral, anterior, and posterior margins to separate the mucosal epithelium from ranula. The lingual nerve and submandibular duct were identified and preserved. Primary closure was achieved by removing the ranula and its associated sublingual gland and duct.



**Figure 3:** Incision placed over the lesion along the predicted path of submandibular duct





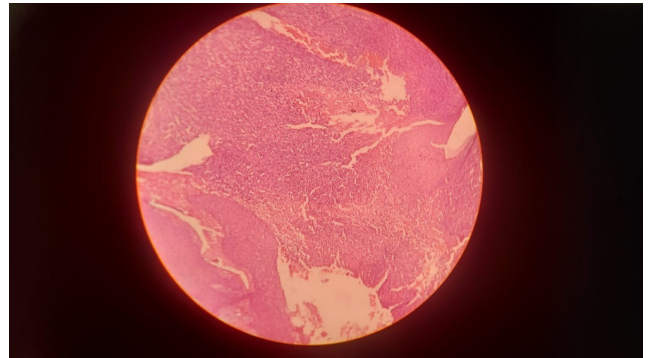
**Figure 4:** Retraction of lingual nerve and submandibular duct



**Figure 5:** Excision of ranula along with the associated sublingual gland

### 2.1. Histopathological examination

A histopathological analysis of the ranula reveals a cystic space in the centre that is filled with mucin and a pseudo cystic wall that is composed of loose, vascularized connective tissues. The pseudocyst wall is dominated by histiocytes, but they eventually become less prominent. An important histological feature is the absence of epithelial tissues in the wall of ranula.



**Figure 6:** Histopathological picture depicts loose connective tissue with abundant histiocytes and absence of epithelium

### 3. Discussion

The term “Ranula” comes from the Latin terminology, which means toad. About 0.2% per 1000 persons have ranula, which accounts for 6% of all oral sialo cysts. Only 1% to 10% of the ranulas are true retention cysts. Ranula usually occurs in children and young adults. Ranula is most common in the second decade of life with a male to female ratio of 2:1.<sup>6</sup> Based on the location, ranula can be divided as sublingual, sublingual-submandibular and sub mandibular. Sublingual ranula is characterized by pseudocysts that are caused by mucus extravasation or retention on the floor of the oral cavity. The sublingual-submandibular and submandibular ranula groups represent the plunging of the ranula, which occurs due to the herniation of mucus content through the mylohyoid muscle. The ranula presents itself as painless, fluctuant sublingual, or submental or submandibular neck swelling with a bluish discoloration. These lesions consist of a mucus accumulation within the connective tissue without any epithelial lining. The duration of clinical symptoms is shorter in children and younger patients compared to adults. Large ranulas cause medial and superior displacement of tongue.<sup>8</sup> If left untreated, Ranula may cause trouble with speech, chewing, swallowing, and breathing. A large Ranula will suppress the salivary gland duct and cause the flow of saliva to be disrupted. Salivary gland obstruction can lead to pain when eating when the salivary gland is parasympathetically stimulated.

According to Harrison et al,<sup>9</sup> Ranula can be caused by several mechanisms:

1. Partial or complete obstruction of the excretory duct due to the occurrence of sialolith, congenital malformations, stenosis, periductal fibrosis, scarring around the canal, trauma, tissue formation in excretory ducts or tumors which causes inhibition of salivary flow. In turn, mucous comes out through a orifice or detachment in the mylohyoid muscle. Extravasation of the sublingual salivary gland plunging ranula.
2. Continuous production of the saliva in the sublingual gland will accelerate mucous accumulation in the neck and cause expansion of the cervical region.
3. • Rupture of the acini gland due to excessive pressure from a blocked duct is another mechanism which cause ranula.
4. Trauma which damages the parenchymal cells of the salivary gland lobe.

According to a study by Y S Chung et al. various treatment modalities were used for treatment of oral ranulas such as: intraoral resection of the sub lingual gland, excision of the ranula alone, marsupialisation and its modifications, micro marsupialization and its modifications, and injection of sclerosing agent- OK-432. Micro marsupialisation and its modifications included all types of suture-based techniques that did not remove the overlying mucosa of the ranula. The removal of the overlying mucosa of the ranula, regardless of whether there is any additional treatment, was categorised as marsupialisation and its modifications. Sclerosing injection included all techniques that used drugs to promote inflammation and sclerosis. The study revealed that the cure rate of intraoral resection of the sublingual gland along with the ranula is the highest and it was significantly better than excision of ranula alone.<sup>10</sup>

According to literature, the reported recurrence rates after various treatment modalities are: incision and drainage (70% to 100%), marsupialisation (36.4% to 80%), excision of ranula only (18.7% to 85%), and excision of ranula along with sublingual salivary gland (0% to 3.8%).<sup>11,12</sup>

### 3.1. Complications

Transient or permanent nerve injuries, formation of a haematogenous reaction, infection or sialadenitis, and dehiscence or injury to the Wharton's duct are some of the complications that can occur during surgical excision of ranula.<sup>10</sup>

## 4. Conclusion

Ranulas are extravasation cysts with majority of them arising from sublingual gland. There are various treatment

modalities available, however resection of the sub lingual gland along with excision of the lesion is the best and most reliable surgical treatment for oral ranula with least incidence of recurrence.

## 5. Conflict of Interest

The authors have no conflict of interest


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None.

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