

# Minimally Invasive Treatment of Oral Ranula with “Mucosal Tunnel Technique” - A Case Report

Dr. M. Suresh Kumar MDS<sup>1</sup>, Dr. K. Amarnath MDS<sup>2</sup>, Dr. G. Saichand MDS<sup>3</sup>, Dr. B. Suraj<sup>4</sup>

<sup>1</sup>Professor and HOD, Department of Oral and Maxillofacial Surgery, Meghna Institute of Dental Sciences, Nizamabad

<sup>2</sup>Professor, Department of Oral and Maxillofacial Surgery, Meghna Institute of Dental Sciences, Nizamabad

<sup>3</sup>Senior Lecturer, Department of Oral and Maxillofacial Surgery, Meghna Institute of Dental Sciences, Nizamabad

<sup>4</sup>Post Graduate Trainee, Department of Oral and Maxillofacial Surgery, Meghna Institute of Dental Sciences, Nizamabad

**Abstract:** We have developed a new method for minimally invasive treatment of uncomplicated oral ranula using a mucosal tunnel technique. We established a mucosal tunnel technique by making two parallel incisions across the top of the protruding ranula which were placed 2 – 3 mm apart. Dissection of soft tissue was done along the incisions to its wall. The fluid was removed and the cavity was irrigated with normal saline. The wall of the ranula was not treated. The first mucosal tunnel was made by suturing the base of the mucosal strip to the deepest part of wall of the ranula. The mucosal base of the tunnel and the deepest part of the ranula were fixed with absorbable sutures. The two external edges of the incisions were sutured together to form the second mucosal tunnel and opposing sutures were inserted between the two parallel incisions to form two natural mucosal tunnels. Outcome was satisfactory without any relapse during follow up period. Duration of follow up ranged from 10 - 12 months. Patient was satisfied with the outcome. The mucosal tunnel is safe, effective, simple and minimally – invasive treatment for oral ranula.

**Keywords:** Minimally invasive, effective, safe, simple, low recurrence rate

## 1. Introduction

A ranula is a pseudocystic lesion of the sublingual gland that is found in the floor of the mouth. A simple ranula is found above the level of mylohyoid muscle and is usually the result of sublingual duct obstruction. A plunging ranula refers to a pseudocyst that occurs with salivary duct rupture and is found below the level of mylohyoid muscle. Thus, as a pseudocyst, it lacks true epithelial lining. Many techniques has been described in literature and it is important to choose a safe, effective, easy and minimally invasive approach. Micro marsupialisation is effective for intra oral ranula, particularly in children.<sup>[3-4]</sup>

## 2. Case Report

A 12 year – old female patient was referred to our department with swelling below the tongue since 15 days. Initially it was small in size and gradually increased to present state. The lesion is not associated with pain but the patient had difficulty in mastication and swallowing.



Figure 1: Profile

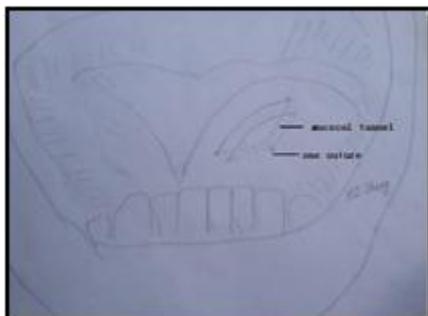
On examination, a single dome shaped well circumscribed asymptomatic swelling measuring approximately 3 X 3 cm, bluish in colour was present on the left side of the floor of the mouth extending from 31 to 36 anterioposteriorly and from lingual frenum to lingual vestibule was noted. On palpation, a swelling was non tender, fluctuant, non compressible. There was no evidence of blanching noticed and the swelling did not emptied on compression.



Figure 2: Intra oral

### Operative Technique

Patient was shifted to minor operation theatre. Under sterile aseptic conditions bilateral lingual nerve block was given using 2% Lignocaine hydrochloride with 1: 80,000 epinephrine. The tongue was pulled to one side to expose the whole ranula. Two parallel incisions were made that crossed apex of the protruding ranula, with a distance of about 2 – 3mm between them.



**Figure 3:** Diagram showing the mucosal tunnel made by suturing the base of the mucosal strip to the deepest part of wall of ranula



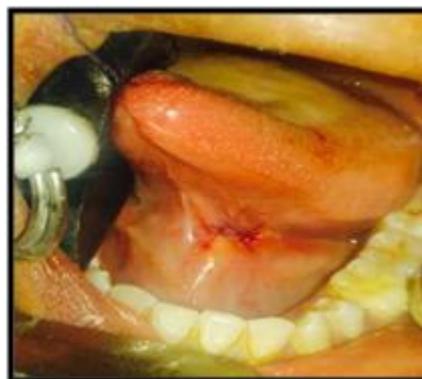
**Figure 4:** Diagram showing the two external edges of incisions sutured together to form the mucosal bridge

Adrenaline was injected submucosally below the line of the bridge to reduce the bleeding and then soft tissue was dissected from the incisions to the wall of the Ranula. After the fluid has been emptied, the cavity was irrigated with normal saline. The wall was not treated.<sup>1</sup>



**Figure 5:** Mucosal tunnel made by suturing the base of the mucosal strip to the deepest part of wall of ranula

The mucosal base of the tunnel and the deepest part of the ranula were fixed using absorbable sutures and apposition sutures were placed between the two parallel incisions to form two natural mucosal tunnels. A piece of squamous mucosa on floor of the mouth 2 – 3 mm wide was embedded and sutured to the bottom of the ranula to form two tunnels bilaterally.<sup>1</sup>



**Figure 6:** Two external edges of incisions sutured together to form the mucosal bridge

As the squamous mucosa remained vital, the openings of the tunnel failed to close and the fluid secreted was draining through these tunnels.<sup>1</sup>In this way, two drainage ports were established. The operating time ranged from 10 to 30 minutes and intra operative blood loss ranged from 5 to 10 ml. Apposition sutures were removed about 7 days post operatively.

**Outcome**

The ranula disappeared completely, the mucosa on the floor of the mouth appeared normal. There was no restriction of tongue movements observed. There were no signs of recurrence during followup period.



**Figure 7:** One year post operative

**3. Results**

Because of the squamous mucosa which was embedded under the bottom of the sublingual gland, the mucosal tunnels did not heal post operatively and the natural channels allowed sufficient drainage of cystic fluid for the ranula to disappear. The color of mucosa and the secretory function of the sublingual gland both were normal. The duration of follow up ranged upto one year and the patient was satisfied with the outcome.

**Rate of Recurrence for Various Techniques**

**Table 1:** Rate of recurrence for various techniques

	OK – 432 Sclerotherapy	Marsupialization	Ranula excision	Ranula and Sub lingual gland excision	Mucosal tunnel technique
Recurrence rate (%)	33 – 49	12 - 89	25 – 37	1.3 - 13	<b>2%</b>

#### 4. Discussion

Ranula is a relatively common cysts of the salivary gland that appear during development of oral and maxillofacial region. Most of them are caused by penetration of mucosa into the tissue after rupture of the gland or the duct and they lack epithelial lining. As the ranulas are retention cysts their walls are fibrous. Ranulas are divided into three types which are – simple, extra oral and dumbel. The simple type of ranula is located within the mouth under the tongue. Extra oral ranula is also known as plunging ranula and is located in the submandibular area outside the mouth. The dumbbell type of ranula is rare and combination of both.

A detailed history, careful examination and aspiration and ultrasonic examination of ranula allows a definitive diagnosis. Ranulas in the submandibular region if extra oral ordumbbell, should be pressed with a finger. The volume increases when it is at the bottom of the mouth or when the patient swallows or puts the tongue out. On aspiration of the ranula a viscous liquid which is similar in appearance to egg white is observed and contains amylase.

Currently, ranula can be managed either conservatively or surgically.<sup>8-10</sup> One of the options in conservative management is injection of drugs into the cavity of ranula following the complete removal of fluid. These drugs include 2% iodine; benadryl, lidocaine and maalox(BLM); BLM + dexamethasone ; promethazine hydrochloride solution ; anhydrous ethanol ; hypertonic saline ; 5% cod liver oil ; tetracycline hydrochloride and picibanil (OK – 432). The goal is to destroy the acinar cells within the sublingual gland with subsequent loss of the secretory function of the gland, so preventing recurrences. The procedure is simple, cost effective and risks are minimal. However, the drugs can have the adverse effects, the ranulas recur easily and long term follow up is needed. Certain drugs, such as anhydrous ethanol, are not suitable for children and surgical treatment may be required later.

Other modes of treating ranula are by using laser, freezing, electrocautery and microwave thermal coagulation.<sup>9,10</sup> Their advantages include a small laser window, less bleeding and no need for sutures. However, patient selection has to be done carefully using strict criteria. Additionally, post operative ulcers or infections may develop. A lengthy course of treatment a patient compliance is required and the rate of recurrence is relatively high.

Resection is most commonly employed. Traditionally the ranula is removed along with the sublingual gland and is the only strategy that can cure the disease.<sup>9</sup> However, the minimal space in the floor of the mouth provides enough challenges for the surgeon in the intra operative period. The sublingual gland and its duct are associated with many vital structures like sublingual artery and vein and lingual nerve. Injury to any of these vital structures may lead to uncontrolled haemorrhage in the intra operative period and reduced vascularity and numbness of tongue post operatively.

Other surgical modalities include marsupialization, modified marsupialization<sup>9</sup> and modified packing. Regardless of

treatment that is used to treat ranulas, the best approach is to preserve the sublingual gland which ensures that physiological functions are maintained. It is therefore important to find an effective procedure that would allow a short course of treatment, reduce post operative complications and prevent recurrences.

We designed this method which is also suitable in less cooperative children and elderly individuals who cannot tolerate lengthy procedures. The operating time was short with minimal intra operative blood loss and maintenance of functionally intact sublingual gland post operatively. The duration of follow up ranged from 10 – 12 months. This approach provides a safe, effective, simple, minimally invasive method and is a new option in treating ranula.

#### References

- [1] T. Jia, L. Xing, F. Zhu, X. Jin, L. Liu, J. Tao, Y. Chen, Z. Gao, H. Zhang, Minimally invasive treatment of oral ranula with a mucosal tunnel. *Br J Maxillofac Surg* 2014; YBJOM – 4381 - 4
- [2] Baurmash HD. Mucocoeles and ranulas. *J Oral Maxillofac Surg* 2003;61:369–78.
- [3] Morton RP, Bartley JR. Simple sublingual ranulas: pathogenesis and management. *J Otolaryngol* 1995;24:253–4
- [4] Delbem AC, Cunha RF, Vieira AE, et al. Treatment of mucus retention phenomena in children by the micro-marsupialization technique: case reports. *Pediatr Dent* 2000;22:155–8.
- [5] Pandit RT, Park AH. Management of pediatric ranula. *Otolaryngol Head Neck Surg* 2002;127:115–8.
- [6] Lyall JB. Plunging ranula – an unusual presentation. *Br J Maxillofac Surg* 1989;27:60–2.
- [7] Devisscher JG, Van der Wal KG, de Vogel PL. The plunging ran-ula. Pathogenesis, diagnosis and management. *J Craniomaxillofac Surg* 1989;17:182–5.
- [8] Baurmash HD. Marsupialization for treatment to for oral ranula: a second look at the procedure. *J Oral Maxillofac Surg* 1992;50: 1274–9.
- [9] Haberal I, Gocmen H, Samim E. Surgical management of pediatric ranula. *Int J Pediatr Otorhinolaryngol* 2004;68:161–3.
- [10] Zhao YF, Jia J, Jia Y. Complications associated with surgical management of ranulas. *J Oral Maxillofac Surg* 2005;63:51–4.