

# Minimally invasive treatment of oral ranula with a mucosal tunnel

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## Abstract

We have developed a new method for minimally-invasive treatment of uncomplicated oral ranulas using a mucosal tunnel, and we report the clinical outcome. We constructed a mucosal tunnel for each of 35 patients who presented with an oral ranula, by making 2 parallel incisions across the top of the protruding ranula 2–3 mm apart, and dissected the soft tissue along the incisions to its wall. The fluid was removed and the cavity 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 the wall of the ranula. The mucosal base of the tunnel and the deepest part of the base 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 apposing sutures were inserted between the two parallel incisions to form two natural mucosal tunnels. The duration of follow-up ranged from 1 to 5 years. One patient was lost to follow-up and 34 patients were cured. Outcomes were satisfactory without relapse during the follow-up period and the patients were satisfied with the outcome. The mucosal tunnel is a safe, effective, simple, and minimally-invasive treatment for oral ranula.

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**Keywords:** Ranula; Mucosal tunnel; Minimally invasive treatment

## Introduction

Ranulas are extravasation mucocoeles that arise from the sublingual gland,<sup>1,2</sup> and they can be classified as plunging and intraoral. Most are currently treated by excision together with removal of the sublingual gland.<sup>1,2</sup> Many techniques have been described and it is important to choose a safe, effective, easy, and minimally-invasive approach.<sup>1,2</sup> Micro-marsupialisation is effective for intraoral ranulas, particularly in children.<sup>2–4</sup>

Since 2007, we have used a minimally-invasive technique with a mucosal tunnel to treat simple intraoral ranulas, and outcomes have been satisfactory.

## Patients and methods

Thirty-five patients with oral ranulas were treated in our department between January 2007 and January 2012. There were 23 male, and 12 female, patients, age range 4–58 years. The size of the ranulas ranged from 5.5 cm × 4.4 cm to 1.5 × 1.5 cm. In all patients they presented as translucent or light purple cystic masses that protruded from the mucosal surface of the floor of the mouth, and the ranula was

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covered with a thin wall and mucosa. A viscous liquid similar to egg-white was aspirated.

### Operative technique

General anaesthesia was used for 2 children and local anaesthesia for the remainder of the patients, all of whom were over 10 years old. The tongue was pulled to one side to expose the whole ranula. Two parallel incisions were made that crossed the apex of the protruding ranula, with about 2–3 mm between them. Adrenaline was injected submucosally below the line of the bridge to reduce bleeding, and then soft tissue was dissected from the incisions to the wall of the ranula. After the fluid had been removed, the cavity was irrigated with normal saline. The wall was not treated.

The mucosal base of the tunnel and the deepest part of the ranula were fixed with absorbable sutures, and apposition sutures were placed between the two parallel incisions to form two natural mucosal tunnels. A piece of squamous mucosa on the floor of the mouth 2–3 mm wide was embedded and sutured to the bottom of the ranula to form two tunnels bilaterally. Because the squamous mucosa remained vital, the openings of the tunnels failed to close, and the secreted fluid flowed out through them. In this way, two drainage ports were established (Figs. 1–6). The operative time ranged from 10 to 30 minutes, and intraoperative blood loss ranged from 5 to 10 ml. Sutures were removed about 7 days postoperatively, or left in place.

### Outcome

The ranulas disappeared completely, the mucosa on the floor of the mouth looked normal, and the tongue moved freely. Cure was defined as no recurrence at the 2-year follow-up. Improvement was defined as a considerably reduced ranula that had not completely disappeared. Treatment was deemed unsuccessful if the ranula recurred.

Since 2007, we have tried minimally-invasive surgery using a mucosal tunnel to treat simple intraoral ranulas, and compared the results with those of other techniques. During the period 1992–2007, we used the tunnel for simple intraoral ranulas ( $n = 119$ ), excised the ranula ( $n = 5$ ), marsupialised the ranula ( $n = 13$ ), and excised the sublingual gland and ranula ( $n = 101$ ).

### Results

Because of the squamous mucosa embedded under the bottom of the sublingual gland, the mucosal tunnels did not heal postoperatively, and the natural channels allowed sufficient drainage of cystic fluid for the ranula to disappear. The colour of the mucosa and the secretory function of the sublingual gland were both normal. The duration of follow-up ranged from 1 to 5 years, and one patient was lost to



Fig. 1. The ranula in the left floor of mouth (published with the patient's permission).

follow-up. Thirty-four cases were cured with no recurrence, and all patients were satisfied with the outcome.

The recurrence rate after excision of the sublingual gland and ranula was 2%, after marsupialisation 39%, and after excision of the ranula 80%.

### Discussion

Ranulas are relatively common cysts of the salivary gland that appear during oral and maxillofacial development. Most are caused by penetration of mucus into the tissues after rupture of the gland or the duct, and they lack an epithelial lining.<sup>1,2</sup> In a few cases, they are caused by the retention of secreted fluid in the proximal segment after blockage of the duct of a sublingual gland in the distal segment. Because ranulas are retention cysts, their walls are fibrous. This type of ranula is

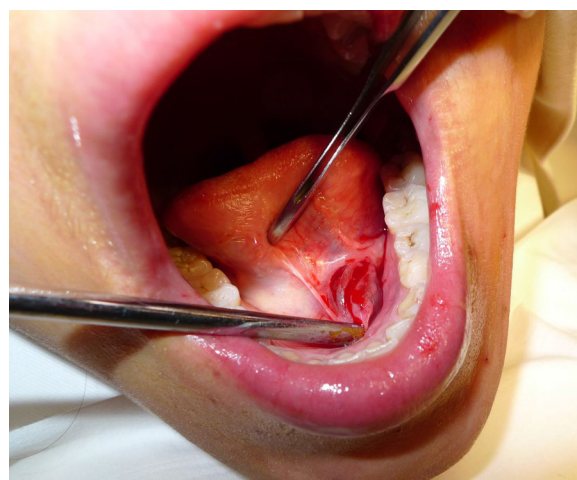


Fig. 2. Two parallel incisions were made about 2 mm apart, and the soft tissue dissected along the incisions on the wall of the ranula (published with the patient's permission).

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