

## Bluish swelling on the floor of the mouth

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### Case summary

A healthy, six-year-old girl presented to the clinic with a three-day history of swelling on the floor of her mouth (**Figure 1**). The swelling was painless and was not associated with discharge or bleeding inside her mouth. She also denied any fever, significant loss of weight or appetite, halitosis, dysphagia, and odynophagia. There was no other neck or chest swelling.

On physical examination, her face and neck appeared normal and symmetrical. Cervical and submandibular lymph nodes were not palpable. However, there was an ill-defined, rounded, bluish swelling approximately 2 cm in diameter on the left floor of the mouth lateral to the frenulum. The swelling was soft with a smooth surface but non-tender upon palpation. There was no bleeding or discharge noted in the oral cavity. Other oral structures appeared normal despite multiple caries on her deciduous teeth.



**Figure 1.** Clinical picture showing the swelling on the floor of the mouth.

### Questions

1. What is the most likely diagnosis?
2. What are the differential diagnoses?
3. What are the possible causative factors for this condition?
4. How would you manage this patient during this consultation?
  - a. Prompt referral to a surgeon.
  - b. Perform aspiration under local anesthesia.
  - c. Observe the size and review the patient after 3 months.
5. In a situation where the primary care physician is unable to manage this case, to whom should this case be referred?
  - a. ENT surgeon.
  - b. Plastic surgeon.
  - c. Oral and maxillofacial surgeon.

### Answers

1. The most likely diagnosis is an oral ranula. Ranulas can be further classified into three clinical types: intraoral ranulas, plunging ranulas, and mixed ranulas.
2. Differential diagnoses for ranulas include abscess, cervical thymic cysts, thyroglossal duct cysts, branchial cleft cysts, cystic hygromas, submandibular sialadenitis, intramuscular hemangiomas, cystic or neoplastic thyroid disease, laryngoceles, lipomas, and dermoid cysts.<sup>1,2</sup>
3. Ranulas can occur spontaneously or as a result of local trauma to the floor of the mouth and obstruction of the sublingual salivary gland duct.

4. Answer: C

Parents and patient will be counseled that not all ranulas require treatment. In this case, as the size of the ranula is small and does not interfere with oral functions, observation is advocated. Parents and patient will be taught to monitor closely for any changes in appearance or size. An appointment will be given in three months to review the progression.

5. Answer: C

### Discussion

A patient with oral pathology often meets their primary care physician (PCP) to seek

treatment. It is therefore essential for PCPs to equip themselves with an adequate knowledge of common dental problems so that they can manage these conditions appropriately or refer the case to a dentist/oral surgeon promptly.

A ranula is a mucus-filled cavity in the floor of the mouth caused by a damaged salivary gland.<sup>3</sup> It can also be congenital or iatrogenic, such as trauma of the mouth and occlusion of salivary gland ducts.<sup>4</sup> The term “ranula” originates from the Latin word “rana,” which indicates the appearance of the abdomen of a frog. Intraoral ranula can occur in patients as young as three months old and up to 80 years old.<sup>5</sup> The incidence of intraoral ranula is highest among patients in their second and third decades of life,<sup>5-8</sup> but it can also spike among patients in their first ten years of age.<sup>9</sup> In terms of gender, ranula is generally thought to be equally common in both males and females.<sup>7</sup> However, a few studies have found a higher prevalence in either females<sup>5,8,9</sup> or males.<sup>6</sup>

A simple intraoral ranula typically presents with swelling in the floor of the mouth and only involves the mucous membranes.<sup>1</sup> Clinically, it appears round or oval in shape, bluish in color, mobile and soft in consistency, and fluctuant upon palpation,<sup>5,9</sup> as opposed to lipomas and tumors of the salivary glands.<sup>4</sup> Further enlargement of the swelling might lead to dysphagia, difficulty in speech, or even airway blockage.<sup>5,8</sup> In pediatric patients under five years old, an untreated ranula can lead to obstructive sleep apnea, and delay in seeking treatment can eventually lead to failure to thrive.<sup>6</sup> Intraoral ranulas are equally common on the right and left sides of the mouth.<sup>7,9</sup> They commonly present with unilateral swelling, but, in rare cases, they may progress to involve both sides and present as a bilateral swelling.<sup>5,7</sup> The size of ranulas can be less than 1 cm or larger than 2 cm in diameter.<sup>7</sup>

A plunging ranula presents differently from an intraoral ranula. It appears as a neck swelling that infiltrates and extends beneath the mylohyoid muscle. It is often confused with other neck pathologies.<sup>1</sup> Thus, further investigations might be required to differentiate a ranula from other neck pathologies such as a thyroglossal duct cyst, a cystic hygroma, an intramuscular hemangioma, or a neoplastic thyroid.<sup>1,2,5</sup>

In terms of investigation, for ranula smaller than 2 cm, fine-needle aspiration of the

lesion can aid the diagnosis and will reveal a straw-colored aspirate. Additionally, a histopathological examination will demonstrate the presence of granulation tissue and a chronic inflammatory reaction.<sup>5</sup>

In an outpatient setting, a simple way to investigate a ranula is via a surgical sieve, which can be used to know the site, size, shape, and consistency of a ranula. However, a high-resolution ultrasound is recommended over other imaging modalities as it is readily available, involves no radiation, and does not require sedation. Additionally, an ultrasound can also demonstrate herniation of sublingual glands and help in determining the extent of cervical space involvement of the pseudocyst for a plunging ranula.<sup>10</sup> It will appear as a homogeneous cystic mass which has a well-circumscribed border.<sup>11</sup> In a more advanced setting, an MRI or CT scan is preferred if the ranula is larger than 2 cm to ascertain the extent of the lesion.<sup>8</sup> In plunging ranulas, a CT scan image will show a classical tail sign extending from the sublingual gland through the mylohyoid muscle, which differentiates it from other pathologies.<sup>10</sup>

A pediatric patient with a small and asymptomatic ranula might not require surgical intervention, as it may spontaneously resolve after few months.<sup>10</sup> The parents should be advised to monitor its size in case it becomes larger and interferes with oral functions. Observation for six months is appropriate to give time for the ranula to spontaneously resolve, thus preventing unnecessary complications related to treatment.<sup>8,10</sup> However, if the ranula is persistent, symptomatic, or increases in size, treatment must be considered.<sup>10</sup>

In general, patients with symptomatic and large ranulas of more than 2 cm in diameter require treatment. To date, there is no medication that can be prescribed by a PCP to accelerate the resolution of a ranula. Thus, a referral to an oral maxillofacial surgeon for further treatment is warranted.

Sclerotherapy and carbon dioxide laser excision are the commonly used non-surgical methods to treat ranulas.<sup>8,10</sup> Sclerotherapy is performed with OK-432 injected into the lesion, which initiates an inflammatory reaction and subsequent destruction of the ranula wall.<sup>8</sup> The patient might experience transient fever and pain after the procedure; however, there

are fewer adverse effects and complications such as scarring and deformity of the injected site as compared to surgery.<sup>10</sup> The other non-surgical method is laser excision by carbon dioxide, which generates heat and subsequently ruptures the ranula and secures the minor salivary gland and ducts.<sup>10</sup> This technique also has lower complication and recurrence rates and also reduces the risks of damaging the submandibular nerve duct and tissue scarring.<sup>10</sup>

There are various surgical methods to treat ranulas with varying degrees of recurrence. These surgeries should be performed only by an oral maxillofacial surgeon who is adequately trained for such procedures to avoid serious complications following the operation. Among the techniques are the aspiration of ranula content, marsupialization, ranula excision, sublingual or submandibular gland excision, combined ranula and sublingual/submandibular gland excision, and, lastly, excision of the ranula and both salivary glands.<sup>7,8</sup>

Patel et al. (2009) reported that, among all procedures, aspiration of ranula has the highest recurrence rate (81.8%), followed by sclerotherapy (49.4%), ranula excision (44.4%), submandibular gland plus ranula removal (33.3%), and marsupialization (24.2%).<sup>7</sup> Treatments that resulted in lower recurrence rates were sublingual gland plus ranula excision with unspecified incision (2.2%) and sublingual gland excision (1%), while no recurrence were reported after sublingual gland plus ranula excision through transoral and cervical

approaches (0%) and submandibular gland excision (0%).<sup>7</sup>

Ranula surgery is not without complication. Bleeding and hematoma can occur during or following the surgery.<sup>7,9</sup> Numbness of the tongue and damage to the Wharton's duct during the evacuation of sublingual gland intraorally have been reported in some instances.<sup>7,9</sup> The ranula itself could also grow in size if aspiration is performed as the method of the treatment.<sup>5</sup>

The surgery could also harm the marginal mandibular, lingual, and hypoglossal nerves if the surgery is done through a cervical approach.<sup>8</sup> Additionally, this approach also poses a higher risk of oro-cervical fistula and scar formation.<sup>8</sup> Thus, the choice of the surgical approach should be based on the extension of the ranula cyst to prevent unwanted complications.<sup>8</sup>

In conclusion, a ranula is a mucocele that results in a damaged salivary gland. Small ranulas are usually asymptomatic and can spontaneously resolve. However, they can also grow in size and lead to pronounced symptoms and complications. In this case, the PCP scheduled for a regular appointment every three months for observation. In this case, the prognosis was good, as it resolved on its own without any specific treatment. However, a referral letter to a dentist was given to treat multiple caries of her deciduous teeth.

### How does this paper make a difference to general practice?

Patients with this oral condition may attend primary care clinics to seek medical treatment. This paper highlights that small intraoral ranulas are benign and do not require emergency referral to a dental surgeon. This paper also provides guidance to PCPs for diagnosing ranulas correctly and managing these cases appropriately, especially for PCPs who have never encountered ranula cases before.

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