



Mucus Extravasation and Retention Phenomena

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Mucocele is a common benign lesion of the oral mucosa that develops due to extravasation (extravasation phenomena) or retention (retention phenomena) of saliva from salivary glands, especially smaller glands. However, in any location where there is a salivary gland, the lesion can develop.

Mucocele affects children, adolescents, and young adults with no sex predilection. In pediatric patients (0–10 years), it is the most common lesion among reactive/inflammatory lesions, comprising 64%. Its incidence is 2.5 lesions per 1000 patients. A history of trauma at the site has been reported in approximately 72% of cases, as well as parafunctional habits. Mucocele can also develop when there is some aggression to the minor salivary glands in individuals who use orthodontic appliances or during surgical manipulation of oral mucosa soft tissues.

A mucocele located on the floor of the mouth is called a ranula. The ranula commonly originates from the body of the sublingual gland and occasionally from Ravini's or Wharton's duct. It derives from the Latin word *rana* (meaning “frog”) because the lesion is believed to resemble the belly of these amphibians.

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1 Clinical Characteristics

1.1 Mucocele

- Mucocele mainly affects the mucosa of the lower lip (81.9%), followed by the floor of the mouth (5.8%), the center of the tongue (5.0%), buccal mucosa (4.8%) (Figs. 1 and 2), palate (1.3%), and retromolar region (0.5%).
- The mucus extravasation phenomenon is more common and usually found in the lower lip of pediatric/young patients, while the mucus retention phenomenon is more frequently located in the upper lip of adult/older adult patients.
- Mucocele can vary from bluish, purple, or gray lesions (29.2%), normal mucosa coloring or pink (24.8%), whitish (12.1%), erythematous (5.3%), or yellowish

Fig. 1 Mucocele in the lower lip mucosa. Courtesy of Dr. Diego Tetzner Fernandes



Fig. 2 Mucocele in the center of the tongue. Courtesy of Dr. Diego Tetzner Fernandes



(2.6%). It is a small lesion approximately 0.8 cm in size, varying in soft or firm consistency.

- Approximately 83.4% of the lesions with the clinical appearance of mucocele had concordance in the histopathological diagnosis. However, some lesions, such as fibrous hyperplasia, papilloma, pyogenic granuloma, lipoma, amelanotic nevus, lymphoepithelial cyst, lymphangioma, and sialolithiasis, can also be included in the differential diagnosis of mucocele.

1.2 Ranula

- Clinical features are the main data used for the diagnosis of ranulas, and they are classified as oral or dipping, depending on the location.
- The ranula presents as a normal or bluish-colored, floating, dome-shaped swelling on the floor of the mouth. Usually, the bulla is located laterally to the midline (Fig. 3).
- Palpation and inspection help in the differential diagnosis between deep ranula and fibrous hyperplasia, dermoid cyst, mesenchymal lesions, and salivary gland neoplasms. The mucoepidermoid carcinoma, for example, may mimic the ranula when well circumscribed and in the absence of pain. However, it is important to note that mucoepidermoid carcinoma is fibrous to palpation.

1.3 Mucocele and Ranulas Related to Systemic Disorders

- The emergence of mucocele and ranula associated with HIV infection may be considered in the context of HIV-related salivary gland diseases. Furthermore, the occurrence of multiple superficial mucoceles in individuals with autoimmune diseases, mainly oral lichen planus and graft-versus-host disease, has also been reported.

Fig. 3 Ranula located on the floor of the mouth, lateral to the midline. Courtesy of Dr. Diego Tetzner Fernandes



1.4 Lesions Similar to a Ranula

- *Retention cysts of the Ravinus or Warthon ducts:* These are small (0.5–1.5 cm), superficial, and are located posteriorly along the course of the ducts of the sublingual glands (Warthon or Ravinus ducts). These lesions have partial or complete obstruction of these excretory ducts, which causes retention of saliva and duct dilation. Swelling, pain on palpation, and purulent secretion can be observed. Because of the anatomical location, a differential diagnosis with sialolithiasis is necessary. For example, occlusal radiography is a fundamental complementary method for the diagnosis of sialoliths on the floor of the mouth.
- *Incisal gland mucocele:* The incisal glands are a small group of mucous glands found on the floor of the mouth in the lingual region of the lower incisors. The ranula in this region has mucous or whitish coloration. They are small lesions measuring less than 0.5 cm with a regular shape that are well circumscribed and present as a discrete asymptomatic swelling.

2 Treatment

2.1 Mucocele/Ranula

- The forms of treatment for these lesions are complete excision with a scalpel or high-power laser, macro- or micromarsupialization, cryosurgery, or injection of OK-432. Superficial mucoceles often rupture and have spontaneous clinical resolution;
- Surgical treatment is performed by elliptical incision with a scalpel to the deep layers, followed by complete removal of the lesion and minor salivary glands near the lesion (Figs. 4 and 5). However, the patient's age, size, and anatomical location should be considered for choice of treatment. For example, in children or aesthetic locations—more superior labial mucosa—to avoid trauma (anesthesia in children) or possible scarring in an aesthetic location.
- Another surgical technique is to make a linear incision in the central portion of the lesion, and the covering tissue is divulsed for complete removal of the lesion. In this technique, all salivary glands close to the lesion should also be removed before suturing. The removal of the salivary glands close to the lesion aims to reduce the incidence or prevent recurrence.
- The micromarsupialization technique is an effective and efficient alternative often indicated for ranulas. It is a simple, low-trauma, minimally invasive technique performed under local anesthesia. A transfixion of a silk suture thread (3.0) is performed along the axis of the lesion, followed by suturing (Fig. 6).

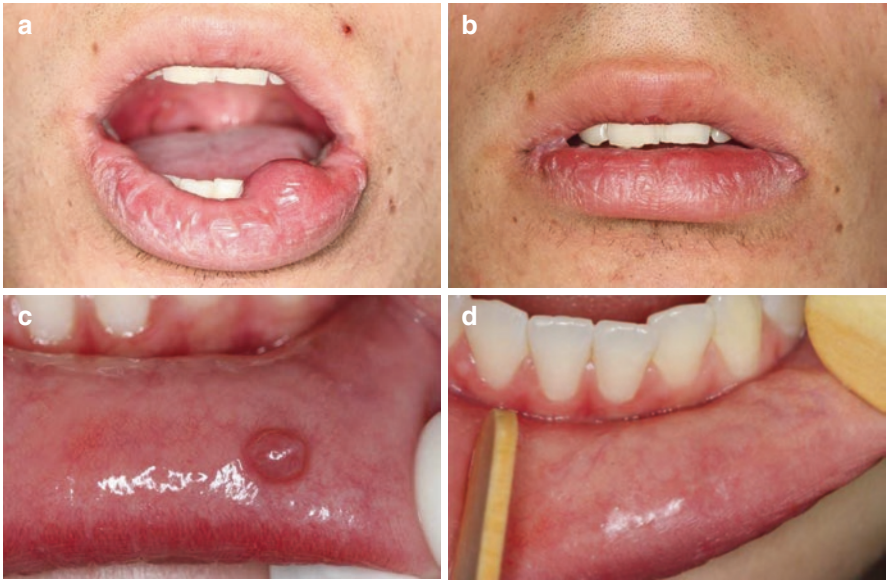


Fig. 4 Preoperative (a and c) and complete resolution (b and d) of lower lip mucocoeles in pediatric/young patients treated by surgery removal with scalpel

Fig. 5 Mucocele removed completely. Note the superficial vascularization and translucency of the lesion. Courtesy of Dr. Lara Eunice Cândido Soares



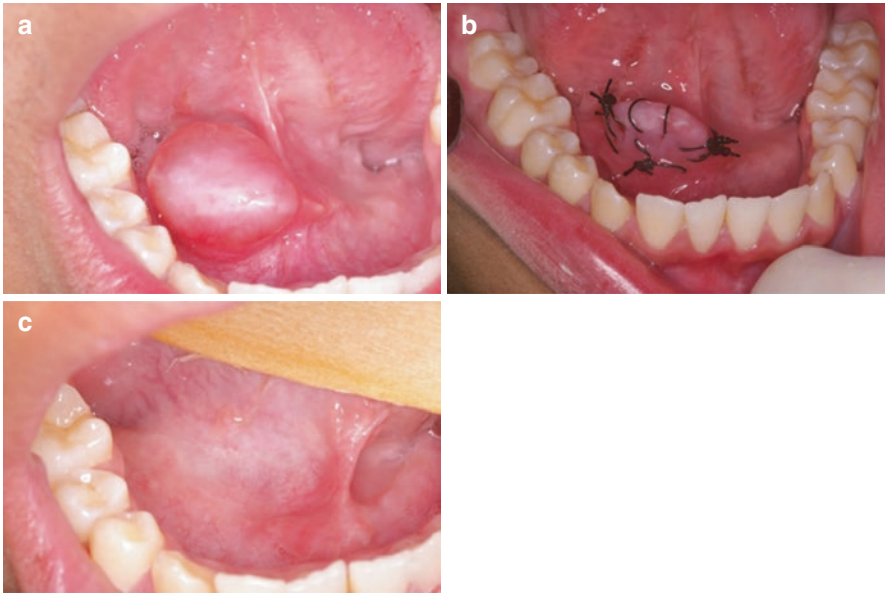


Fig. 6 (a) Ranula is a blister, well-delimited, smooth, and shiny surface, similar in color to the mucosa and measuring approximately 2.5 cm. (b) Presence of eight sutures along the largest diameter of the lesion. (c) Follow-up of the patient after three months and absence of clinical signs of recurrence

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Sources

- Amaral MB, de Freitas JB, Mesquita RA. Upgrading of the micromarsupialisation technique for the management of mucus extravasation or retention phenomena. *Int J Oral Maxillofac Surg.* 2012b2012a;41(12):1527–31.
- Bansal S, Verma DK, Goyal S, Rai M. Comparison of micromarsupialization and modified micromarsupialization for the management of mucocoele of lower lip: a prospective randomized clinical trial. *J Maxillofac Oral Surg.* 2017b2017a;16(4):491–6.
- Baumash HD. Mucocoeles and ranulas. *J Oral Maxillofac Surg.* 2003b2003a;61(3):369–78.
- Bezerra TM, Monteiro BV, Henriques AC, de Vasconcelos CM, Nonaka CF, da Costa Miguel MC. Epidemiological survey of mucus extravasation phenomenon at an oral pathology referral center during a 43 year period. *Braz J Otorhinolaryngol.* 2016b2016a;82(5):536–42.
- Chi AC, Lambert PR 3rd, Richardson MS, Neville BW. Oral mucocoeles: a clinicopathologic review of 1,824 cases, including unusual variants. *J Oral Maxillofac Surg.* 2011b2011a;69(4):1086–93.
- Chung YS, Cho Y, Kim BH. Comparison of outcomes of treatment for ranula: a proportion meta-analysis. *Br J Oral Maxillofac Surg.* 2019b2019a;57(7):620–6.

- de Arruda JAA, Jácome-Santos H, Kato CNAO, de Noronha MS, MBF d A, Silva TA, Mesquita RA. Micro-marsupialization technique with suture thread modification for improving the management of oral mucoceles and ranulas: a case series. *Oral Surg.* 2021b2021a;14:241–5.
- Hayashida AM, Zerbinatti DC, Balducci I, Cabral LA, Almeida JD. Mucus extravasation and retention phenomena: a 24-year study. *BMC Oral Health.* 2010b2010a;10:15.
- Huang IY, Chen CM, Kao YH, Worthington P. Treatment of mucocele of the lower lip with carbon dioxide laser. *J Oral Maxillofac Surg.* 2007b2007a;65(5):855–8.
- Lv K, Liu J, Ye W, Wang G, Yao H. Multiple superficial mucoceles concomitant with oral lichen planus: a case series. *Oral Surg Oral Med Oral Pathol Oral Radiol.* 2019b2019a;127(4):e95–e101.
- Mínguez-Martínez I, Bonet-Coloma C, Ata-Ali-Mahmud J, Carrillo-García C, Peñarocha-Diago M, Peñarocha-Diago M. Clinical characteristics, treatment, and evolution of 89 Mucoceles in children. *J Oral Maxillofac Surg.* 2010b2010a;68(10):2468–71.
- Silva LVO, Arruda JAA, Martelli SJ, Kato CNAO, Nunes LFM, Vasconcelos ACU, Tarquinio SBC, Gomes APN, Gomez RS, Mesquita RA, Silveira MMFD, Sobral APV. A multicenter study of biopsied oral and maxillofacial lesions in a Brazilian pediatric population. *Braz Oral Res.* 2018b2018a;32:e20.
- Syebale K, Bütow KW. Oral mucoceles and ranulas may be part of initial manifestations of HIV infection. *AIDS Res Hum Retrovir.* 2010b2010a;26(10):1075–8.