

# Horseshoe shaped, anterior crossing ranula, a case report

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## Abstract

We present a case of true left sublingual space ranula, crossing anteriorly behind the mandible and below the frenulum to the contra lateral side, demonstrating the appearance of a horseshoe shape, the awareness of such appearance helps ensure appropriate treatment along the same line as simple ranula is given.

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## 1. Introduction

The mylohyoid muscle extends from the medial-inferior aspect of the mandible to the hyoid bone. It separates the floor of mouth and sublingual space superomedially from the submandibular space inferolaterally.

The floor of mouth is defined as a semilunar area above the mylohyoid muscles, which is connected in the midline by a midline raphe extending from the mandible anteriorly to the body of hyoid posteriorly.

The sublingual spaces are paired spaces within the floor of the mouth, related superiorly to the undersurface of the anterior two-thirds of the tongue, each sublingual space (SLS) is a potential space between the mylohyoid muscle inferolaterally, and the geniohyoid, genioglossus muscles medially, posteriorly the SLS is continuous with the submandibular space (SMS) laterally, and inferior aspect of parapharyngeal space (PPS) medially, anteriorly it is limited by the body of the mandible, and the anterior most aspect of the midline raphe connecting the mylohyoid muscles, where both spaces communicate anteriorly beneath the frenulum of the tongue, which is a fold of mucous membrane connecting the floor of the mouth to the undersurface of the tongue in the midline.

Each SLS contains a sublingual gland (SLG), submandibular gland duct, lingual artery and nerve, hypoglossal nerve, and deep lobe of the submandibular gland.

SLGs are the smallest of the paired major salivary glands, weighing about 2 g, and shaped like a flattened almond measuring about 2.5 cm anteroposteriorly, each gland has a row of about 12–20 short ducts that open independently along the summit of the sublingual fold in the floor of the mouth, obstruction of one of these ducts results in formation of a mucous retention cyst in the sublingual space, termed simple ranula, further accumulation of secretions with time results in extension along sublingual space anteriorly and posteriorly, if posterior extension extends or extravasates beyond the free edge of, or through the mylohyoid muscle, a submandibular or cervical parapharyngeal pseudocyst results termed plunging or diving ranula [1–4].

## 2. Case report

A young healthy adult woman 25-year-old was referred to the radiology department with a history of swelling of the floor of the mouth, with progressively increasing fullness, and pain.

On clinical examination, a submucosal bluish smooth bulging lesion was seen crossing beneath the lingual frenulum on both sides of the floor of the mouth.

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Laboratory investigations demonstrated normal admission profile, including normal white blood cell (WBC), red blood cell (RBC), and platelet counts, normal hemoglobin (Hb) % and normal erythrocyte sedimentation rate (ESR).

Axial 3 mm thickness pre- and post-i.v. contrast computed tomography (CT) (CT scanner model Light Speed 16 slice, GE Medical System, USA 2005) showed a well defined unilocular cystic lesion measuring 5 cm × 1 cm in cross section, and a density of 34 hounsfield units (HU) with no post-i.v. contrast enhancement. This cystic lesion occupied the left sublingual space from the deep lobe of the left submandibular gland (SMG) posteriorly to the body of the mandible anteriorly where it crossed to the contralateral sublingual space in a horseshoe shaped fashion (Fig. 1). Magnetic resonance imaging (MRI scanner model Signa Excite 1.5 tesla GE Medical System, USA 2005), T1 (TR/TE 400/12 ms, number of excitations 4, FOV 24 cm), T1 post-i.v. injection of gadopentate dimeglumine (Gd), dose (2 mmol/kg body weight) and T2 (TR/TE 4660/86 ms, number of excitations 5, FOV 24 cm) in axial and coronal slice orientations, 3 mm thickness cuts with 0.3 mm interslice gap, showed the above described lesion extending above the mylohyoid muscle insinuating beneath the frenulum of the tongue to the



Fig. 1. Axial post-i.v. contrast CT at the level of the floor of the mouth showing the ranula as a non-enhancing horseshoe shaped cystic lesion (arrow) spanning the midline. G: genioglossus muscle, M: mylohyoid muscle, S: submandibular gland in submandibular space.

contralateral anterior half of the right sublingual space forming a horseshoe shape unilocular cystic lesion. The lesion showed homogeneous intermediate signal on T1 weighted sequences; homogeneously bright signal on T2 weighted sequences (Fig. 2a–c), and thin rim enhancement on post-i.v. Gd T1.

At surgery, a 1 cm × 1 cm × 5 cm unilocular cystic mass was found arising from the left sublingual gland. Both the cyst and the left sublingual gland were resected. Subsequent pathologic evaluation revealed a mucin-containing cystic mass, with epithelial lining consistent with the diagnosis of simple ranula. The patient remained asymptomatic with no evidence of recurrence on 3-month post-surgical follow up.

### 3. Discussion

Ranulas are mucous retention cysts arising from an obstructed sublingual or minor salivary gland in the sublingual space. They typically present during young adulthood, with most cases initially presenting during the second and third decades [5–8]. Ranulas may be of simple or diving variety. Simple ranulas are, by definition, limited to the sublingual space and are seen as intraoral mass lesions. Diving ranulas on the other hand are ranulas that have extravasated either around or through the mylohyoid muscle to escape the confines of the sublingual space to involve the submandibular and inferior aspect of parapharyngeal spaces; they are often seen as submandibular or neck masses with no clinically apparent oral connection.

Simple ranulas are true retention cysts, possessing mucosal lining, and are limited to the sublingual space. On the other hand diving ranula are pseudocysts with lining composed of condensed connective tissue rather than a true epithelial lining [1,2].

On imaging simple ranulas appear as characteristic unilocular homogeneous cystic lesion in the typical location, diving ranulas appear as a unilocular cystic lesion in submandibular and/or parapharyngeal space, often demonstrating extension of a small tail into the sublingual space (tail sign), which serves as a diagnostic signature for diving ranulas, if tail sign or abutment of the sublingual space is lacking, the diagnosis of a diving ranula is strongly questioned [1,6,7].

Differential diagnosis of ranula includes type two or four second branchial cleft cyst, in submandibular or parapharyngeal location, respectively, cystic hygroma, which can be uni- or multi-locular, and usually lacks the typical association with the sublingual space, a dilated submandibular gland duct, a submandibular gland cyst or cystic tumors, epidermoid of the floor of the mouth, and level I necrotic lymph node from infection such as tuberculosis or staphylococcus aureus, or metastatic squamous cell carcinoma, and cystic like metastatic lymph node from papillary thyroid carcinoma.

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