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Hemostatic Management using Surgicel® Fibrillar in Surgical Beds Following Submandibulectomy and Sublinguelectomy: A Retrospective Case Series of 18 Patients

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ABSTRACT

Submandibular and sublingual gland excisions are performed as treatment for various pathologies. In the sublingual gland, ranula represents the most prevalent condition, with complete gland excision being the most predictable definitive treatment. In the submandibular gland, the main surgical indication corresponds to obstructive sialolithiasis of the posterior third of Wharton's duct, which cannot always be managed through an intraoral approach. Both procedures involve anatomical spaces of the neck and the floor of the mouth, where complications, although infrequent, may be potentially serious, particularly postoperative infections and hemorrhage. The aim of this study is to describe the hemostatic management using Surgicel® Fibrillar, a resorbable hemostatic agent applied to the surgical bed following submandibulectomy and sublinguelectomy, which allows prevention of hemorrhage and/or hematoma formation while avoiding the use of surgical drains in these procedures.

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Introduction

Ranula is a mucous pseudocyst originating from the extravasation or retention of saliva, with accumulation of mucous content in the adjacent soft tissues. It is generally associated with trauma, obstruction of the excretory duct, or anatomical alterations of the sublingual gland, which represents the most frequent site of origin [1-3].

Clinically, it presents as a painless, translucent swelling in the floor of the mouth, typically exhibiting a characteristic bluish hue. According to its extent, ranula is classified as either simple ranula, confined to the floor of the mouth, or plunging ranula, a less common variant that traverses the mylohyoid muscle and extends into the neck, representing a diagnostic and surgical challenge due to its deep location [1-5].

The treatment of ranula has evolved from conservative techniques, such as marsupialization, to surgical procedures including complete excision of the sublingual gland, which is considered the gold standard due to its low recurrence rate [3-5]. Although marsupialization has been historically employed, it is associated with a high recurrence rate, reported to range between approximately 30% and 50% [4]. In contrast, sublinguelectomy directly addresses the origin of the ranula, achieving more predictable outcomes [2-4].

Sialolithiasis, on the other hand, represents the most common obstructive pathology of the major salivary glands, with an incidence ranging from 1 in 10,000 to 1 in 30,000 individuals, predominantly affecting the submandibular gland. Obstruction of Wharton's duct manifests as recurrent periprandial pain and swelling and, in prolonged cases, may predispose to sialadenitis or abscess formation. Treatment depends on the location and size of the calculus: distal or accessible sialoliths may be removed through an intraoral approach or by sialendoscopy, whereas proximal or intraparenchymal calculi, as well as recurrent cases or those not amenable to conservative management, require complete excision of the submandibular gland [6-8].

Technological advances over recent decades include sialendoscopy through a transoral approach with robotic assistance, which has enabled gland preservation in the majority of cases, with reported success rates exceeding 90% [8-10]. Nevertheless, submandibulectomy via a submandibular approach remains the standard and most commonly performed procedure when minimally invasive techniques are not feasible or have failed [11].

A wide range of intraoperative and postoperative complications associated with submandibulectomy has been described, the most

prevalent being neurosensory, motor, and vascular complications. Cumpston et al. (2025) reported management and protection of the facial nerve (marginal mandibular branch) throughout the procedure, with neuropraxia affecting 15.6% of cases and permanent paresis persisting in 2.2%. Xerostomia is an infrequent complication in cases of unilateral gland excision and, according to the literature, warrants further investigation. Another reported complication is hematoma of the floor of the mouth, primarily resulting from active bleeding of the facial vein and artery, which may compromise the airway [11]. Morel et al. (2025) described hematoma as a significant complication, recommending compression with saline-soaked gauze for 5 minutes in cases of uncontrolled arterial injury until adequate visualization is achieved for cauterization [12]. Basaran et al. (2025) reported a case series in which the use of bipolar LigaSure (Valleylab, Boulder, CO®, USA) proved to be a safe and time-saving alternative during the procedure [13].

Other local hemostatic measures used in head and neck procedures include tranexamic acid (TXA). Davison et al. (2025) described intraoperative management in rhytidectomy, including subplatysmal and submental approaches as well as submandibular gland resection, comparing intravenous TXA (1000 mg) with local TXA (150 mg). In their study, patients receiving intravenous therapy experienced reduced bleeding, with a lower incidence of postoperative hematoma and edema [13]. The authors recommended TXA use due to its postoperative antifibrinolytic effect, however, the balance between benefits and systemic exposure should always be considered. Another alternative hemostatic agent for the prevention of profuse bleeding and postoperative hematoma was described by Bannister et al. (2014), who used an absorbable porcine matrix (Surgiflo®) in 17 cases of submandibulectomy, reporting effective local hemostatic control, absence of allergic reactions, and no postoperative complications [14].

Surgicel® Fibrillar™ (Ethicon Inc., Johnson & Johnson, Somerville, New Jersey, USA) is a regenerated oxidized cellulose that, upon contact with blood, transforms into a gelatinous mass that promotes clot formation, acting as an adjunct to hemostasis. In addition, it exhibits a local bactericidal effect attributed to its low pH, ranging from 3.4 to 3.7 [15].

Regenerated oxidized cellulose is a widely used hemostatic agent due to its biocompatibility, biodegradability, and local efficacy. It acts by promoting platelet aggregation and coagulation factor concentration, while generating an acidic environment that favors clot formation. It is absorbed within a few weeks and has a favorable safety profile, although removal of excess material after achieving hemostasis is recommended. The fibrillar form is particularly notable for its adaptability to the surgical bed and its usefulness in head and neck surgery [16].

Recent clinical studies have supported its efficacy in reducing postoperative bleeding. Hwang et al. (2018) reported that the application of Surgicel® Fibrillar™ during endoscopic procedures in patients with gastric epithelial tumors reduced blood loss and hemorrhage rates without causing local adverse effects, confirming its utility as a safe and versatile hemostatic agent across different surgical settings [17].

The aim of this study is to demonstrate the effectiveness of Surgicel® Fibrillar for hemostatic management of the surgical bed following glandular excision, reporting a series of 18 cases—9 sublinguelectomies and 9 submandibulectomies—performed between 2015 and 2025 in private maxillofacial practice in Santiago, Chile.

Methodology

A retrospective case series study was conducted including 18 patients who underwent submandibulectomy or sublinguelectomy, in whom Surgicel® Fibrillar™ was used as an adjunct for hemostatic management of the surgical bed.

The study included patients treated between 2015 and 2025 in private maxillofacial clinical practice in Santiago, Chile. Clinical records were reviewed to collect clinical history, epidemiological data, surgical technique characteristics, intraoperative use of Surgicel® Fibrillar™, and immediate postoperative outcomes.

Data were tabulated and organized in a Microsoft Excel® spreadsheet for descriptive analysis, following the same methodology used in the reference case series (Table 1).

Table 1: Demographic and Surgical Characteristics of the 18 Patients Who Underwent Submandibulectomy or Sublinguelectomy with the Use of Surgicel® Fibrillar™

Variable		Percentage % (n)
Sex	Female	61% (n=11)
	Male	39% (n=7)
Age Range	13-30 years	56% (n=10)
	31-60 years	22% (n=4)
	>60 years	22% (n=4)
Type of intervention	Submandibulectomy	50% (n=9)
	Sublinguelectomy	50% (n=9)
Use of Surgicel® Fibrillar™	Yes	100% (n=18)
	No	0% (n=0)
Hemorrhagic complications	No	0% (n=0)
Non-hemorrhagic complications	Yes	16.6% (n=3)

Results

A total of 18 patients who underwent submandibulectomy or sublinguelectomy between 2015 and 2025 were analyzed.

Sex distribution showed a predominance of female patients (61%, n = 11), while male patients accounted for 39% (n = 7).

The most frequent age range was 13–30 years (56%, n = 10), followed by the 31–60 years group (22%, n = 4) and patients older than 60 years (22%, n = 4).

Regarding the type of intervention, 9 patients (50%) underwent submandibulectomy, while the remaining 9 patients (50%) underwent sublinguelectomy.

In all cases (100%, n = 18), Surgicel® Fibrillar™ was used as an adjunct hemostatic agent, applied directly to the surgical bed prior to closure. All procedures were completed without intraoperative hemorrhagic complications (Figures. 1A, 1B, 2A, 2B, and 2C).

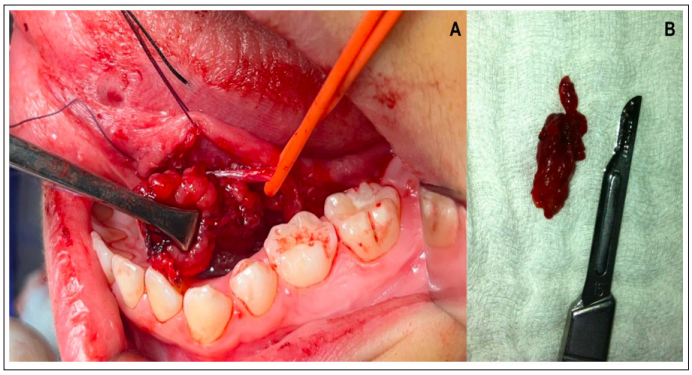

Figure 1: Left Sublinguelectomy
(A) Isolation of Wharton's duct using vessel loops, with adequate hemostasis achieved through the use of Surgicel® Fibrillar™
(B) Resected sublingual gland. Photograph taken on a sterile surgical drape alongside a No. 15 scalpel Blade

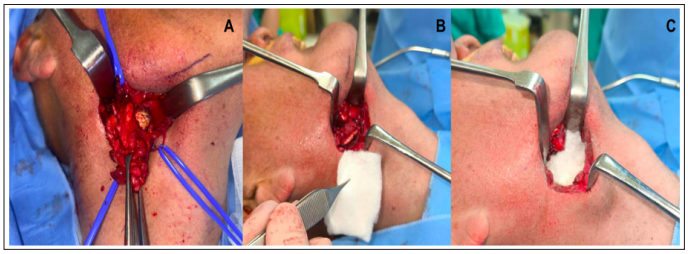

Figure 2: Right submandibulectomy
(A) Submandibular approach with dissection and isolation of the facial nerve and facial artery using vessel loops
(B) Presentation of the hemostatic agent Surgicel® Fibrillar™
(C) Surgicel® Fibrillar™ positioned within the submandibulectomy surgical cavity

With respect to non-hemorrhagic postoperative complications, two cases of facial nerve paresis involving the marginal mandibular branch and one case of lingual nerve paresthesia were reported. Notably, all nerve-related complications resolved within a 3-month postoperative period.

Discusion

Excisional therapies of the submandibular and sublingual glands require adequate training and meticulous dissection and separation of anatomical structures to avoid hemorrhage and/or neurological complications [5,18]. In our series of 18 cases (nine submandibulectomies and nine sublinguelectomies), the application of Surgicel® Fibrillar as an adjunct hemostatic agent allowed effective bleeding control, with no intraoperative or postoperative hemorrhagic complications reported. This absence of events contrasts with the literature, where postoperative hematoma rates following submandibulectomy range from 2% to 7%, representing one of the complications that may potentially compromise the patient's airway [18]. In contrast, Morel et al. (2025) described hematoma as a significant complication, however, in extraoral submandibulectomy procedures, it accounted for approximately 1.15% of reported cases [12].

Matsumoto et al. (2021) described the use of CO_2 laser for the removal of large salivary stones (>1 cm), maintaining effective hemostatic control throughout the procedure without postoperative complications such as nerve injury or damage to the sublingual gland (ranula formation), suggesting laser therapy as an effective alternative for the treatment of sialolithiasis [19].

In the treatment of ranulas through sublinguelectomy, Chung et al. (2019) reported among the main complications structural injury to the lingual nerve in approximately 4.89% of cases and injury to Wharton's duct in 1.82% of cases [4]. The literature has extensively discussed and compared extraoral (transcervical) versus intraoral approaches, with the latter considered preferable due to the absence of involvement of neural structures such as the facial nerve (marginal mandibular branch) and the lack of aesthetic sequelae [20,21]. However, hemorrhagic complications associated with intraoral approaches have not been adequately addressed in these studies.

Multiple alternatives for hemostatic control in submandibulectomy and sublinguelectomy have been described, each with specific advantages and limitations depending on the type of bleeding and proximity to neurovascular structures [15,18]. Regenerated oxidized cellulose (Surgicel®) provides effective hemostasis through its gel-forming capacity and local acidification [15,17]. Energy-based devices such as LigaSure® have demonstrated reduced intraoperative bleeding and shorter operative times, however, their availability and cost limit routine use [16]. Other topical agents, including gelatin matrices, collagen-based materials, or thrombin-containing combinations, provide effective hemostasis without the characteristic acidity of oxidized cellulose, making them useful in areas where neurological safety is a priority [3,16]. Additionally, the use of tranexamic acid has been reported as an effective adjunct to reduce postoperative hematoma formation in cervicofacial procedures [22].

Considering the available literature and the results reported in the present study, the use of Surgicel® Fibrillar is supported as a safe and practical alternative for hemostatic management of the glandular surgical bed, offering an appropriate balance between bleeding control, operative simplicity, and preservation of critical anatomical structures.

Conclusion

Adequate dissection and preservation of anatomical planes during procedures such as submandibulectomy and sublinguelectomy are essential to avoid neurovascular injury. With regard to hemostasis, achieving a surgical bed free of active bleeding is critical to prevent intraoperative or postoperative hemorrhage, which may be life-threatening. The present study provides a therapeutic alternative for hemostatic control in these procedures, with the potential to reduce operative time, the need for surgical drains, postoperative morbidity, and length of hospital stay, as well as to prevent the formation of clinically significant hematomas.

Statements and Declaration

Competing Interest and Funding: The authors declare that they have no conflict of interest. This research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors.

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