

The Buccinator Myomucosal Flap is an axial flap, based on the facial and/or buccal arteries. It is a flexible and versatile flap well suited to reconstructing soft tissue defects of the oral cavity, oropharynx and nasal septum. Unlike most free flaps, it provides mucosal cover, as opposed to skin cover, and is sensate. The donor site can usually be closed primarily without causing deformity or scarring. The flap is about 5mm thick, and comprises buccal mucosa, submucosa and buccinator muscle, with the feeding vessels and vascular plexus.

### Relevant Anatomy

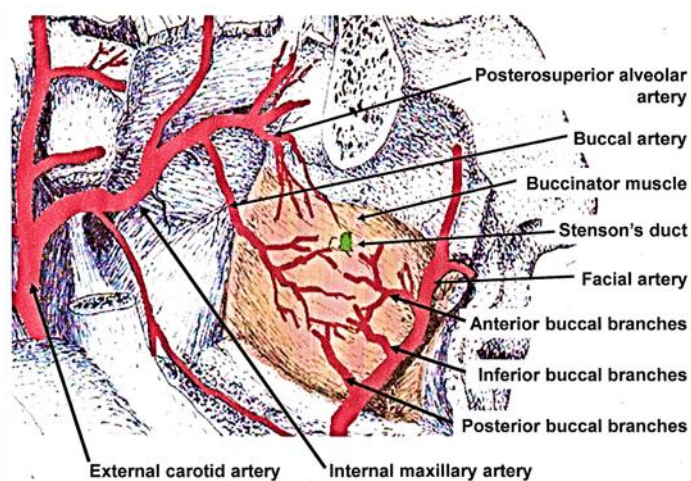
#### *Buccinator muscle*

The buccinator muscle is a thin, quadrilateral muscle in the cheek. It originates from the outer surfaces of the alveolar processes of the maxilla and mandible. Posteriorly it arises from the pterygomandibular raphe. Anteriorly it inserts into the orbicularis oris muscle. Laterally it is related to the ramus of the mandible, the masseter and medial pterygoid muscles, the buccal fat pad and the buccopharyngeal fascia. Medially, it is covered by the submucosa and mucosa of the cheek. It is part of the pharyngeal-buccal-orbicularis sphincter system and functions to facilitate whistling, sucking, propelling food during mastication and voiding the buccal cavity.

#### *Blood supply (Figure 1)*

The buccal, facial and posterosuperior alveolar arteries provide the main blood supply to the muscle. These arteries form an extensive **vascular anastomotic plexus** on the lateral surface of the muscle and within its fibres.

The **buccal artery** is a branch of the internal maxillary artery and supplies the posterior half of the muscle. It courses anteroinferiorly under the lateral pterygoid muscle to reach the posterior half of the muscle, where it anastomoses with the posterior buccal branch of the facial artery.



*Figure 1: Blood supply of buccinator muscle, demonstrating vascular plexus*

The **facial artery** hooks around the inferior margin of the mandible at the anterior edge of the masseter muscle, and supplies numerous branches to the buccinator muscle, the largest of which is the posterior buccal artery that supplies the posterior half of the muscle. The facial artery also gives off 1-3 inferior buccal branches to supply the inferior half of the muscle, and then continues in an anterosuperior direction to give off 3-5 small, anterior buccal branches to the anterior half of the muscle. The **posterosuperior alveolar artery** is a branch of the internal maxillary artery and provides 2 small branches that enter the muscle posterosuperiorly. The **infraorbital artery** gives off a few small branches which enter it anterosuperiorly. **Venous drainage** occurs via the pterygoid plexus

and internal maxillary vein. It lies posterior, superior and superficial to the buccinator muscle and drains into the buccal vein via the deep facial vein. Anteriorly, the deep facial vein drains into the facial vein proper.

### *Innervation*

**Mucosal sensory innervation** is by the long buccal nerve, a branch of the maxillary division of the trigeminal nerve, which courses with the buccal branch of the internal maxillary artery. **Motor innervation** of the buccinator muscle is via the temporal and cervical divisions of the facial nerve laterally in the buccal fat pad.

### *Parotid duct*

The duct pierces the buccinator muscle opposite the 2<sup>nd</sup> upper molar, slightly above the center of the muscle, and should be identified and preserved when raising the flap.

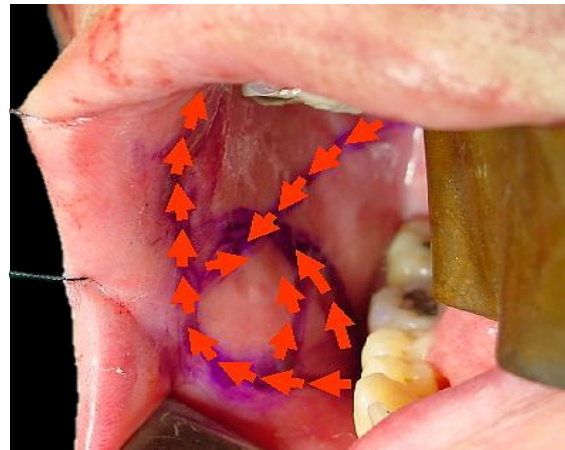
### **Elevation of flap**

A flap as large as 7x5cm may be raised. The extent is limited by the parotid duct posterosuperiorly, the oral commissure anteriorly and the pterygomandibular raphe posteriorly. It may be based **posteriorly (buccal artery), or anteriorly (facial artery) or superiorly (facial artery)**.

Although not essential, a handheld Doppler can be used to map out the facial artery and the buccal artery before raising the flap (*Figure 2*). If a Doppler is not used, then care has to be taken to place the initial incisions so as not to separate the vessels from the flap.

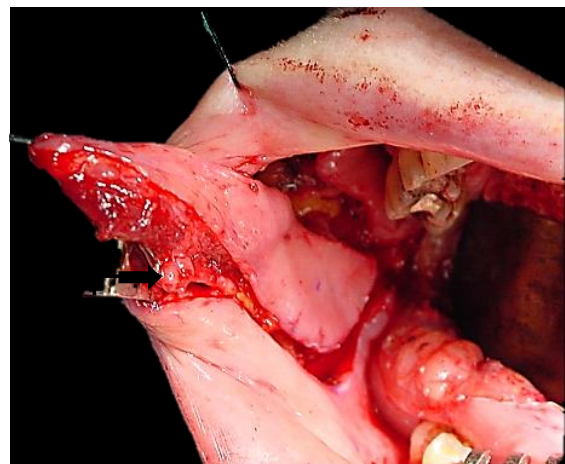
The buccal mucosa and the buccinator muscle are incised to the level of the buccopharyngeal fascia, and the flap

elevated, generally in an anterior to posterior direction. The flap is elevated in the loose areolar plane between the buccinator muscle and the buccopharyngeal fascia.



*Figure 2: Vessels mapped out with handheld Doppler probe*

The artery that the flap will be based on is identified, and dissection proceeds between the artery and the buccopharyngeal fascia, directed towards the origin of the vascular pedicle, keeping the vessel in full view, using dissecting scissors (*Figures 3, 4*). Preservation of the buccopharyngeal fascia prevents herniation of buccal fat and avoids injury to branches of the facial nerve. Minor bleeding vessels are coagulated with bipolar electrocautery.



*Figure 3: Flap elevation commences after identifying artery (Black arrow)*

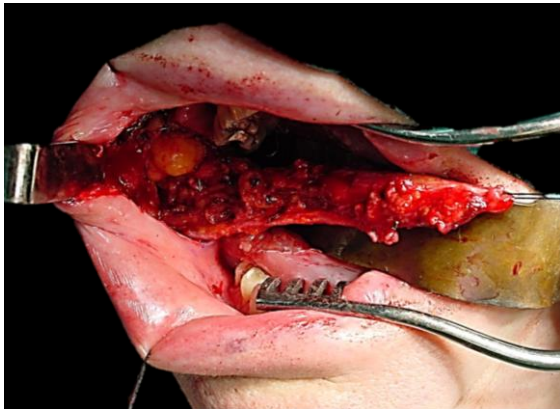


Figure 4: Flap elevated keeping artery in view

The flap is rotated to fill the soft tissue defect. The mucosa and muscle are generally not divided where the flap is pedicled. The pedicle may however be isolated to facilitate rotation, and to create a ‘**buccinator myomucosal neurovascular island pedicle flap**’. If the pedicle has to cross the alveolus e.g. to reach the floor of mouth, then care has to be taken that the pedicle does not interpose between the molar teeth, as this may interfere with mastication and might injure the pedicle. In such cases some teeth may need to be extracted to create space for the pedicle, or an island flap has to be created; alternatively, the vascular pedicle may be divided after a delay of a few weeks. Due to the elasticity of the buccal mucosa, the donor site can generally be closed primarily with vicryl absorbable sutures.

### Posteriorly Based Buccinator Flap

This flap can be rotated to reconstruct defects of the oropharynx (soft palate, base of tongue, tonsil fossa), lateral floor of mouth, and lateral tongue. It is based posteriorly on the **buccal artery** and buccal venous plexus (Figure 5).

Once the course of the buccal artery has been identified with Doppler ultrasound,

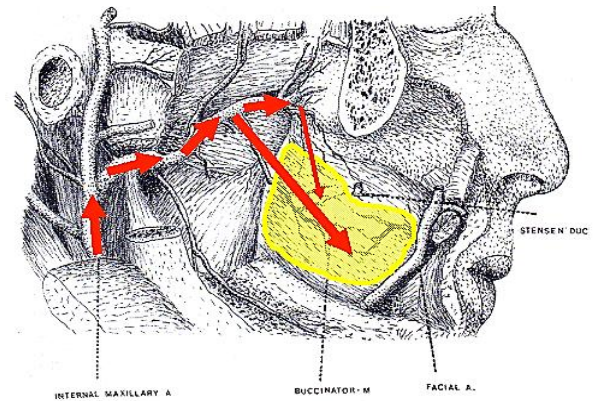


Figure 5: Blood supply of posteriorly based buccinator flap

the buccal mucosa and the buccinator muscle are incised to the level of the buccopharyngeal fascia, and the flap elevated in an anterior-to-posterior direction up to the pterygomandibular raphe where the neurovascular bundle enters the flap. The mucosa at the posterior end of the flap may also be divided from the underlying muscle and freed of its insertion to the pterygomandibular raphe, and passed through a short tunnel under the pterygomandibular ligament.

### Anteriorly Based Buccinator Flap

The anteriorly based flap is well suited to reconstructing soft tissue defects of the inferior alveolus, lateral and anterior floor of mouth and oral tongue and lower lip (Figure 6). It is based anteroinferiorly on the inferior and posterior buccal branches of the facial artery (Figure 7). It is however **essential that the facial artery be preserved** when dissecting Level 1b of the neck. This requires division and ligation of branches of the facial artery where it passes through or alongside the submandibular salivary gland (Figure 8).





Figure 6: Flap for anterior floor of mouth

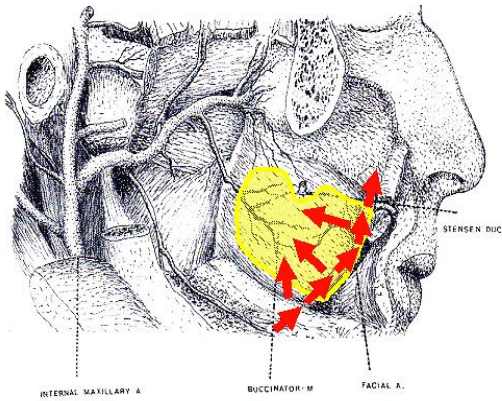


Figure 7: Blood supply of anteriorly based buccinator flap

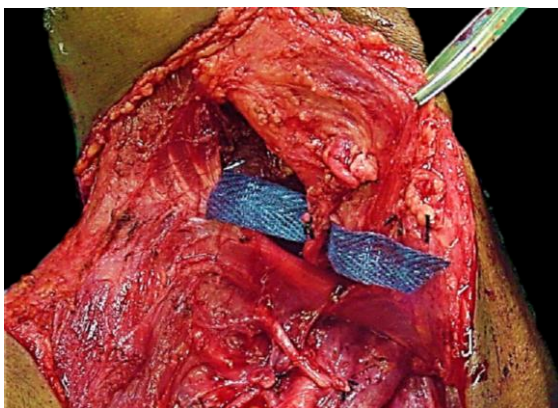


Figure 8: Preserved facial artery in Level 1

The mucosa and the buccinator muscle are incised just posterior (approx 1cm) to the commissure of the mouth, and the facial artery is identified in the cheek. The artery

is ligated and divided superiorly. The dissection continues in a plane lateral to the vessels, as the flap is raised from front-to-back, and from superiorly-to-inferiorly.

### Superiorly Based Buccinator Flap

This is a reversed-flow flap based on the facial artery and its anterior buccal branches (Figure 9).

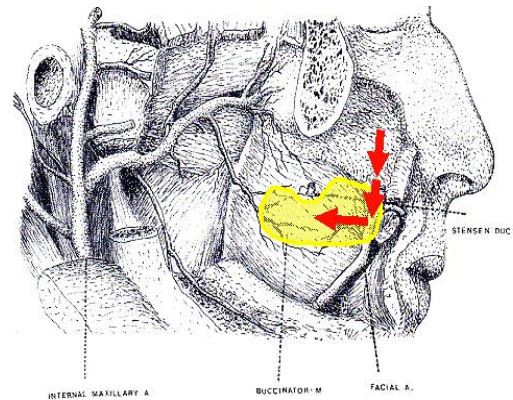


Figure 9: Blood supply of superiorly based buccinator flap

The flap is then elevated in a superior direction. It can be used for soft tissue defects of the hard palate and superior alveolus (Figure 10), including oronasal and oronasal fistulae, as well as for nasal nasal septal defects.

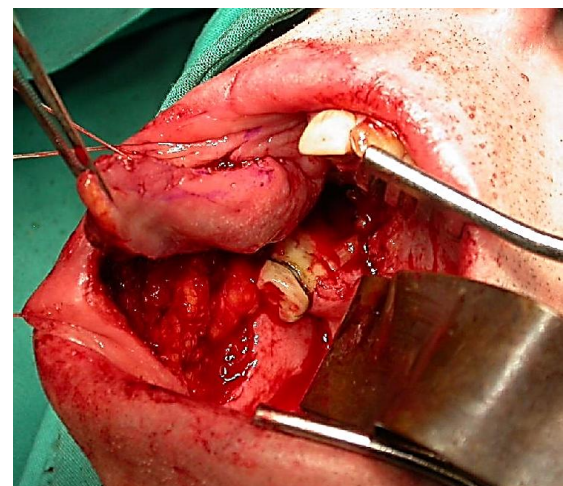


Figure 10: Superiorly based flap for superior alveolectomy defect

Dissection is commenced at the inferior margin of the flap, where the facial artery is identified and ligated.

### Benefits of buccinator flap

The buccinator flap is a versatile flap that can be used to reconstruct a variety of defects. It is very reliable, simple and quick to raise, replaces mucosa with mucosa, is sensate, and has very little donor site morbidity. It is remarkably elastic and malleable, and can be stretched to conform to complexly shaped defects and is an excellent alternative to radial free forearm flaps for reconstruction of small and moderate sized defects of the oral cavity and oropharynx (Figures 11 a, b, c).

### Useful reference

Van Lierop A, Fagan JJ. Buccinator myomucosal flap: Clinical results and review of anatomy, surgical technique and applications. *J Laryngol Otol*, 2008; 122: 181-7

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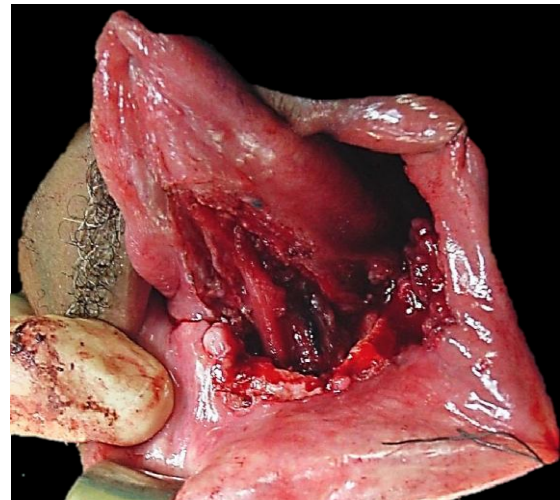


Figure 11a: Defect following antero-lateral floor of mouth resection and marginal mandibulectomy

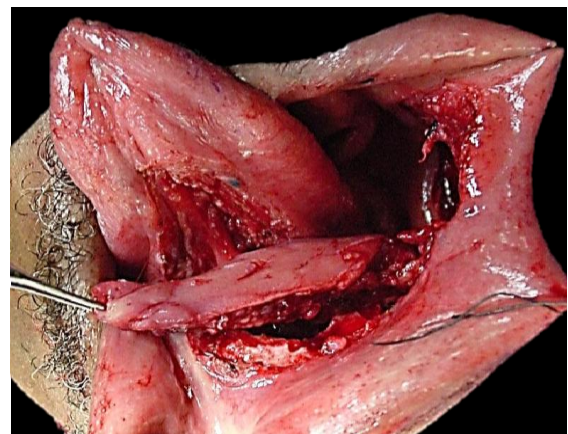


Figure 11 b: Anteriorly based buccinator flap

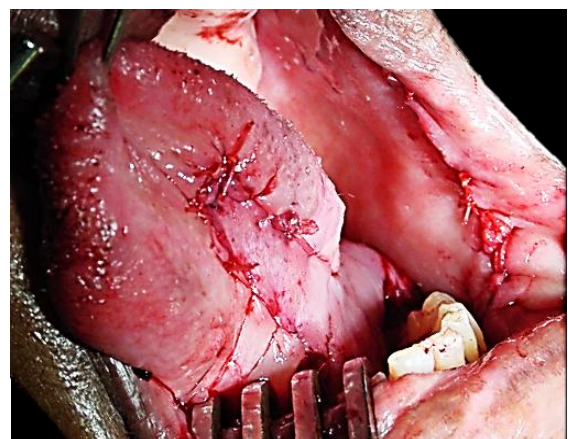


Figure 11 c: Inset of flap