

Case Report

Management of Partial Necrosis of Submental Flap – A Case Report

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ABSTRACT

We report a case of a 68-year-old male with recurrent unicystic ameloblastoma involving the anterior mandible who underwent anterior marginal mandibulectomy and reconstruction with a submental artery island flap. Despite uneventful intraoperative planning, the patient developed partial distal flap necrosis postoperatively. Given the patient's age and systemic comorbidities, conservative wound care was chosen over secondary surgical intervention. Gradual healing was achieved without functional or aesthetic compromise. This case highlights the submental flap's utility in elderly patients and emphasizes the importance of early identification and non-surgical management of flap complications.

Key words: Submental flap, Anterior marginal mandibulectomy, Oral cavity reconstruction, Partial flap necrosis, Unicystic ameloblastoma

Submental flap has become an important option for the reconstruction of small to moderate defects in the oral subsites. Since its first report by Martin et al in 1993, the robust nature and versatility of the flap has found itself more useful in cases where less tissue bulk is required and concomitant comorbidities are the limitation [1].

The submental artery island flap is a fasciocutaneous axial flap that includes skin, subcutaneous tissue, platysma, and fat [2]. It is pedicled on the submental artery, a consistent branch of the facial artery, and the veins. It lies in close proximity to the oral cavity and has a wide arc of rotation; it is easy to raise and has low donor site morbidity. The challenge faced in the submental flap is that the submental artery arises deep to the submandibular gland and may be deep (70%) or superficial (30%) to the digastric muscle [3]. The small caliber perforators, along with draining veins, subject the flap's distal margin to necrosis, which is not uncommon.

A case report on the reconstruction of a residual defect by submental flap, along with the assessment and management of partial necrosis, is described.

CASE REPORT

Clinical history and presentation

A recurrent case of unicystic ameloblastoma involving the anterior mandible with overlying mucosa was reported to the Department of Oral and Maxillofacial Surgery. The 68-year-old male patient with nephrotic comorbidities had undergone

enucleation with peripheral ostectomy and chemical cauterization 2 years back. Since the lesion was also involving the mucosa, it was planned for marginal resection along with the affected mucosa.

Clinical evaluation and preparation

Non-contrast computerized tomography (NCCT) revealed a well-defined expansile lytic lesion with sclerotic margins involving the symphysis and parasymphysis of the mandible for a length of 5.4 cm, perforating alveolar bone, cortex, and mucosa. Plan for marginal mandibulectomy along with excision of overlying affected mucosa was supported by the above CT findings. This mucosal and bony defect had to be reconstructed, and one of the viable options was a submental flap. Blood flow to the desired submental area was clinically evaluated and re-established through Ultrasonography (USG). Pinch test was done to check the adequacy of flap closure [4]. (Figure 1)

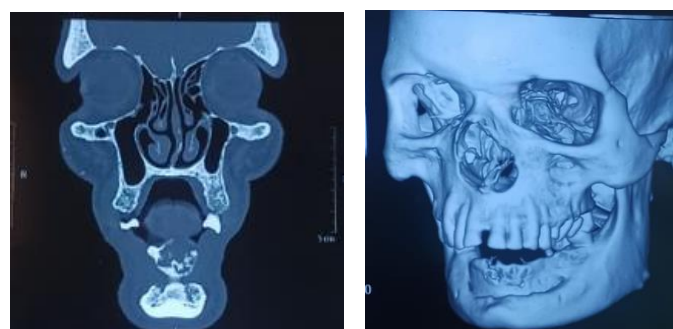


Figure 1- Radiographic presentation of the lesion on an NCCT

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Adopted surgical approach

Under general anaesthesia, after proper positioning, under strict aseptic protocol, an intraoral incision was given with a 1cm safe margin from the apparently affected bone on the anterior alveolus. Marginal mandibular resection was done, including apparently unaffected bone along with overlying mucosa.

After intraoral resection, the size of the defect guided the size of the flap. The flap outline was marked and raised from the opposite side of the pedicle. (Figure 2)



Figure 2- Size and outline of the submental flap

Submental flap harvestment

With the patient's head extended, the outline of the submental flap was designed across the mandibular midline. Upper incision was given 1.5 cm below the mandible [2]. Incision of the skin and fat down to the platysma muscle was done. The incision was extended through the platysma, taking care not to injure the common or anterior facial veins. The facial artery was identified just below the lower border of the mandible, and submental artery originating from the facial artery 3 mm to 15 mm below the border of the mandible [5].

The pedicle was identified and dissected to mobilize the flap into the defect created in the anterior segment of the mandible and closure was done with 3-0 Vicryl (Figure 3).

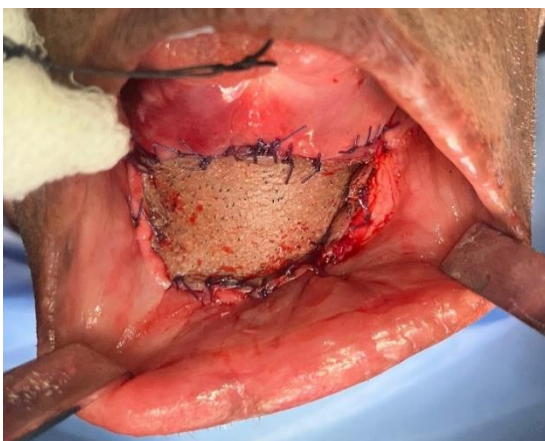


Figure 3- Flap inset at the recipient site

Partial flap necrosis

In the flap follow-up course on the 3rd subsequent day, partial dusking of the distal portion of the flap was noticed. On the 5th post-operative day, necrotic tissues were visible and thorough debridement of the necrotic tissue was done. On the 8th post-operative day, healthy granulation tissue appeared at the failing front of the flap. With proper home care instructions for wound maintenance, the patient was discharged on the 10th post operative day. Naso-gastric tube was in place to avoid food contamination of the flap and allow healing of the sutured site in the oral cavity [6]. On 2-week follow-up, the raw surface was completely covered by granulation tissue. The patient had proper mouth opening, and the defect was properly closed. (Figure 4)



Figure 4 -Surgical site after 3 months

DISCUSSION

The submental flap is based on the submental artery, a collateral branch of the facial artery, located medially on the lower border of the mandible. It is a well vascularized, easy to harvest, and thin flap, which has been used after infection, trauma, and also for reconstruction of nose, pharynx, palate, lower and mid face [3]. However, its application presents a paradoxical challenge in patients of different age groups, particularly concerning tissue bulk and flap viability.

In elderly patients, the submental region typically has greater tissue bulk due to age-related changes such as increased skin laxity and subcutaneous fat deposition. While this provides an ample amount of tissue for reconstruction, older patients often have compromised vascular integrity, increased comorbidities such as diabetes and hypertension, and reduced healing potential [7]. These factors can predispose them to vascular complications, delayed healing, and an increased risk of flap necrosis despite having sufficient donor site tissue. Additionally, the decreased elasticity of aged skin may make primary closure of the donor site more challenging.

Conversely, in younger patients, the submental region tends to have less soft tissue bulk, making it difficult to harvest a sufficiently large flap for reconstruction. The limited

volume can pose challenges in achieving adequate coverage for larger defects, leading to size constraints that may necessitate additional tissue augmentation techniques. Although younger patients generally have better vascular integrity and healing potential, the reduced tissue availability may impact the feasibility of the submental flap in extensive reconstructions [8].

This case report presents a novel perspective on submental flap reconstruction by documenting an instance of partial flap necrosis, highlighting the delicate balance between vascular reliability and patient-specific anatomical factors. While submental flaps are generally considered robust, our findings underscore the need for careful patient selection, preoperative vascular assessment, and intraoperative modifications to optimize flap viability. This report adds to the existing literature by addressing the age-related paradox in submental flap use and providing insights into strategies to mitigate complications, ultimately contributing to improved reconstructive outcomes in maxillofacial surgery.

It is ideal for the reconstruction of defects of the oral and facial region, where a composite defect is not present. In our patient, the anterior marginal mandible was intact, and the mucosal defect could be either closed with a split skin graft or direct closure, but this could invite their inherent shortcomings, like limited movement of the tongue and restrictive scarring in the adjoining tissues.

Submental flap is considered reliable in the reconstruction of defects in the elderly population, or with comorbidities such as malnutrition and other life-threatening situations where less aggressive treatment with reduced surgical time is needed [9], as in our 68-year-old patient with nephrotic comorbidities. Submental flap has inherent advantages such as minimal donor site morbidity, inconspicuous donor site scar, possible primary closure of the donor site, and good colour and texture match for skin defects [3]. It is a better option for elderly women because the submental skin does not bear hair follicles. It can be raised simultaneously with neck dissection and is favourable for cases of oral resection that are approached through neck dissection. Nevertheless the challenging flap harvesting and partial failure of the flap should be kept under consideration while flap selection.

The challenges faced with the flap are the risk of vascular compromise with neck dissection, inadequacy for moderate to large size defects, and improper neck clearance for malignant oral lesions [7]. The other associated disadvantages are its limited use in patients with reduced neck laxity and in revision surgeries where the previous surgical scar limits the flap harvest.

Causes attributing to partial necrosis of the flap can be a compromised pedicle during harvesting of the flap, compression of the flap due to local causes like haematoma, inadequate venous drainage, and improper positioning of the

flap. USG Doppler is an important tool following flap reconstruction and can supplement clinical evaluation of the flap [2]. Partial failure of the flap many times does not require a secondary flap and can heal with adequate wound care.

CONCLUSION

The submental flap remains a reliable and versatile option for reconstruction of small to moderate intraoral defects, especially in elderly patients with comorbidities. Despite its advantages, the risk of partial flap necrosis highlights the importance of careful flap planning, meticulous surgical technique, and vigilant postoperative monitoring. Conservative management can lead to successful outcomes in cases of partial flap failure, reinforcing the flap's utility in compromised clinical scenarios.

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