

Alloplastic Reconstruction in Post-ablation Oral Squamous Cell Carcinoma Surgery: A Case Report

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ABSTRACT

Surgical management of Oral Squamous Cell Carcinoma (OSCC) leads to ablative defects. There are various reconstructive options for these defects, such as autogenous grafts from the patient, including local flaps, regional flaps and distant flaps. Harvesting these flaps to reconstruct the defects can cause a significant amount of morbidity. The use of alloplasts in the reconstruction of the head and neck can reduce this morbidity at the donor site and decrease the surgical time required for flap harvesting. The present case of a 45-year-old female patient presented a microinvasive squamous cell carcinoma in whom an alloplast was used to restore the ablative defect following excision. This case report demonstrates the innovative application of alloplastic materials in surgery, eliminating the need for harvesting autologous grafts and minimising pain, recovery time and complications for patients postsurgery. This method reduces operating time, enhances patient outcomes and is flexible enough to meet various clinical requirements. The present case study highlights the challenges of restoring shape and function while considering aesthetic concerns by examining a cutting-edge alloplastic reconstruction procedure used in a patient following OSCC ablation. The surgical technique, materials utilised and results obtained after surgery are described herein, illustrating how alloplastic techniques can successfully overcome the drawbacks of conventional reconstructive methods. The results suggest that, in the context of OSCC, alloplastic reconstruction can improve surgical outcomes and enhance the patient's quality of life with proper planning and implementation. This instance emphasises the importance of customised treatment programs and the potential of advanced reconstructive methods to address the specific challenges posed by oral cavity abnormalities.

Keywords: Collagen sheet, Oral cancer, Rehabilitation, Surgical treatment

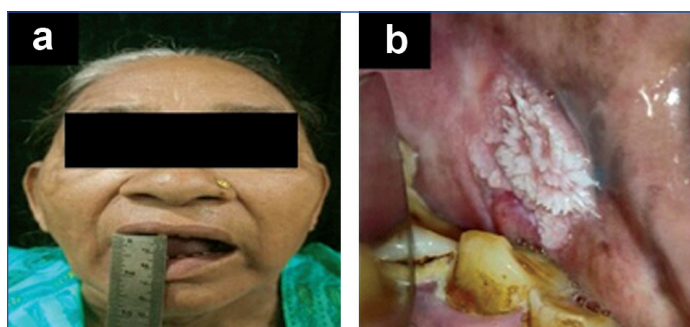
CASE REPORT

A 45-year-old female patient reported to the Department of Oral and Maxillofacial Surgery. She had been experiencing swelling and pain in the lower left back area of her jaw for two months. The pain was throbbing and constant, aggravated by opening her mouth, chewing and cleaning her teeth. The patient also reported a history of a burning sensation, difficulty chewing and swallowing, difficulty opening her mouth for one month, decreased appetite, weight loss and increased salivation over the last 15 days. Additionally, the patient admitted to chewing tobacco for the past 15 years.

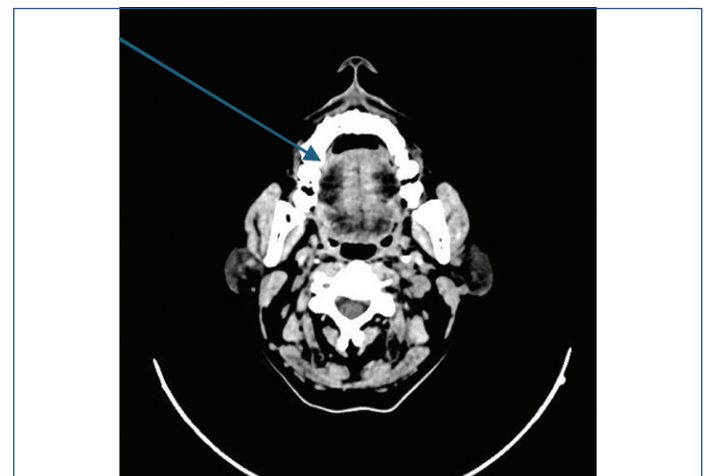
On general examination, the patient's build was average. The clinical examination indicated a limited mouth opening of approximately 2.5 mm, as shown in [Table/Fig-1a]. Intraoral examination revealed a non tender lesion that was firm in consistency and indurated on palpation. It presented as a painful, whitish-coloured proliferative lesion in the left buccal mucosa in the posterior region, with a rough surface measuring approximately 2.5×2 cm, as shown in [Table/Fig-1b]. Widespread oedema was observed on the left side of the face. Lymph node examination revealed a palpable left submandibular

lymph node that was non tender, approximately 1 cm in size, roughly oval and mobile. The differential diagnosis included leukoplakia, erythroplakia, leukoedema and oral lichen planus. The provisional diagnosis was squamous cell carcinoma.

The patient underwent Contrast Enhanced Computed Tomography (CECT) of the head and neck, as well as high-resolution Computed Tomography (CT) of the thorax for metastatic work-up. The CECT showed an area of increased density on the left side of the lingual aspect of the mandible [Table/Fig-2]. Radiographic findings confirmed an area of increased density on the left side of the lingual aspect of the mandible. An incisional biopsy was performed, during which a small piece of tissue was removed from the suspicious area for examination. The removed tissue was then sent for histopathological examination. The histopathological examination of the biopsy sample indicated microinvasive squamous cell carcinoma with a Depth of Invasion (DOI)



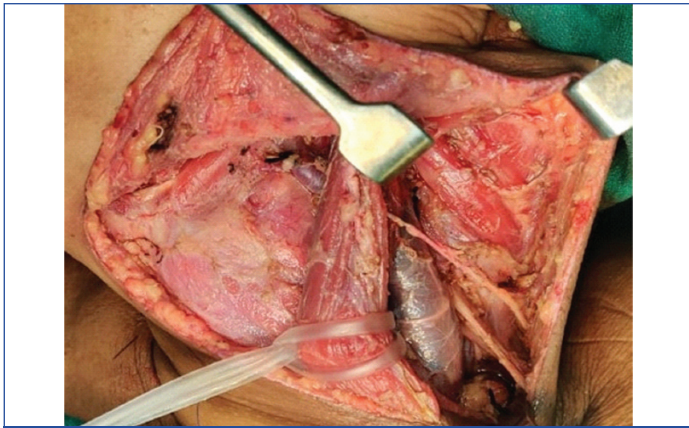
[Table/Fig-1]: Preoperative pictures showing: a) Mouth opening; b) Proliferative growth of size 2.5×2 cm approximately.



[Table/Fig-2]: Radiographic findings show the area of increased density on the left-side of the lingual aspect of the mandible.

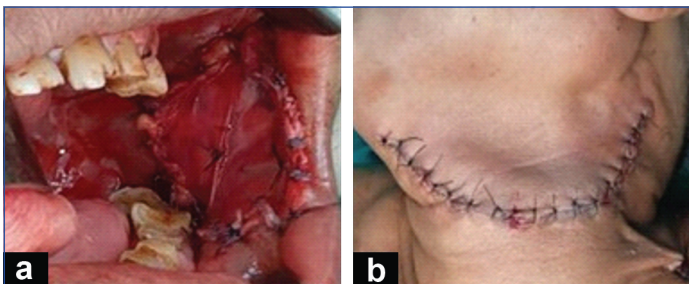
of 3 mm and negative lymphovascular, perineural and muscle invasion. The tumour grading was Tumour stage 1, Lymph node 0, Metastasis nil (pT1N0Mx). Clinical, radiographic and histopathological tests confirmed the diagnosis of microinvasive squamous cell carcinoma.

After assessing the extent of the lesion on the CT scan, the plan was to perform surgical excision of the defect followed by alloplastic reconstruction. After inducing general anaesthesia through nasoendotracheal intubation, a wide local excision of the lesion from the left buccal mucosa, with a 1 cm margin, was carried out. Selective radical neck dissection was performed, as shown in [Table/Fig-3], followed by reconstruction with a buccal fat pad and collagen sheet.

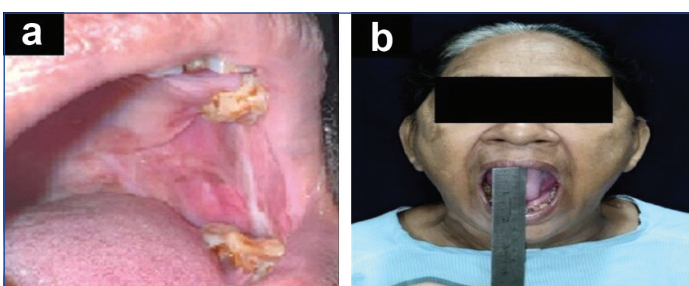


[Table/Fig-3]: Neck dissection.

The defect reconstruction was accomplished with a sterile meshed wet collagen sheet (ColloSkin®), as shown in [Table/Fig-4]. After surgery, the patient received intravenous antibiotics and analgesics for five days before being discharged. On the seventh day of follow-up, the patient had adequate mouth opening and the collagen sheet had adapted well to the defect area intraorally. According to the surgical margin report, which was discussed in the multidisciplinary tumour board panel-including an oral oncologist, medical oncologist, radiation oncologist, surgical oncologist and pathologist-the staging of the tumour was Stage 1 (pT1N0Mx), with a DOI of 3 mm. Therefore, the patient did not receive any adjuvant therapy and was advised to have regular follow-ups. After one year of follow-up, the patient had no other primary lesions and the collagen sheet was well integrated into the defect [Table/Fig-5]. The patient is healthy, disease-free, has adequate mouth opening and can perform everyday activities comfortably.



[Table/Fig-4]: Intraoperative pictures showing: a) Placement of collagen sheet over buccal mucosa defect; b) Closure of Apron's incision over the left-side of the neck.



[Table/Fig-5]: Postoperative after one-year pictures showing: a) Healing of collagen sheet seen over left buccal mucosa; and b) Mouth opening.

DISCUSSION

Oral cancer ranks as the eleventh most common cancer globally [1]. OSCC accounts for about 90% of all oral cancers [2]. It generally develops from the mucosal lining of the oral cavity and is linked to tobacco use, alcohol intake and Human Papillomavirus (HPV) infection [3]. Clinically, carcinomas of the oral cavity present with ulceration, swelling, loose teeth and other symptoms [3,4]. Common therapies for OSCC include surgical excision and radical neck dissection, especially in cases of lymph node metastases [5].

For the restoration of aesthetics and function, reconstruction is critical following surgical intervention [2]. Reconstruction aims to restore function, cervicofacial symmetry and form, creating a barrier between cavities in the head and neck [3]. The type of reconstruction is determined by tumour size and location, the extent of tissue removal and the patient's overall health. Reconstruction is typically performed using autogenous grafts, which can include local flaps such as the buccal fat pad, tongue flap and palatal flap, as well as regional flaps like the pectoralis major myocutaneous flap and deltopectoral flap, or distant flaps such as the radial forearm free flap, free fibula flap and anterolateral free flap, depending on the defect's requirements [5]. However, autogenous grafts have disadvantages, such as the need for a second surgical procedure, procurement morbidity, donor site pain and limited availability [4,5].

Allografts are tissue grafts harvested from donors of the same species but genetically different from the recipient. They are treated to minimise the risk of rejection while maintaining the structural integrity and properties of the tissue for reconstruction [6]. Allografts come in different types based on the defect to be reconstructed, including cortical bone allografts, cancellous bone allografts, dermal allografts, fascia allografts, cartilage allografts and vascularised allografts [7]. Allografts are osteoconductive and osteoinductive, which avoids the need for a second procedure and provides rapid structural support. However, there are some disadvantages to allografts, such as the potential to trigger an immunological response, although the risk of contracting a disease is limited [8].

For the reconstruction of ablative soft-tissue defects in excised areas of OSCC, dermal allografts, fascia allografts, amniotic membrane allografts, collagen membranes, tendon allografts and ligament allografts can be used as needed [8]. The present paper presents a case of OSCC in which an allograft was used to reconstruct the ablative soft-tissue defect.

Allografts are easily obtained from tissue banks, avoiding the need for a second surgical site and shortening the surgery time. This reduces postoperative pain and complications. Colloskin is sterile collagen in sheet form derived from a bovine source. The use of Colloskin has been widely accepted for biological wound dressing, especially for burns. It is designed to imitate the qualities of real skin and is commonly utilised in various therapeutic applications, including burn therapy and surgical reconstruction [9]. However, availability may vary depending on the region and specific medical supply providers. Complications such as infection, rejection and allergic reactions are reduced when autologous tissue is used. Revision surgery, wound care and reconstruction are just a few of the applications for collagen. By providing long-term stability and coverage, the graft can lessen the need for subsequent treatments [10].

Collagen sheets were utilised in the aforementioned instance, particularly for wound healing and tissue regeneration after surgical resection. Collagen sheets can be used in various medical applications, including creating scaffolds that provide temporary support while the body regenerates new cells during the healing process. Their use aids both bone regeneration and wound healing [11]. Collagen sheets act as a barrier, shielding wounds from external contaminants, such as bacteria [12]. They maintain a moist

environment, which is essential for proper wound healing. Moist conditions promote cell migration, angiogenesis (the formation of new blood vessels) and collagen synthesis [13,14].

Surgery is the primary treatment option for non metastatic OSCC and less invasive curative surgical approaches are preferred in the early stages of the disease to reduce surgical-related morbidity. Adjuvant radiation therapy or chemoradiation is frequently used for patients with a high risk of recurrence [14]. Regular check-ups are required to monitor for recurrence or new tumours. Early detection is crucial for improving outcomes for patients with OSCC. In the present case, a selective radical neck dissection on the left side was performed under general anaesthesia, followed by reconstruction with a buccal fat pad and a collagen sheet.

Nataraj S et al., conducted a study in which collagen was used to cover surgical defects of Oral Submucous Fibrosis (OSMF) in 15 cases, while a buccal pad of fat was used in the remaining 15 cases [15]. They discovered that, while not statistically significant, the use of a collagen membrane after fibrotic band excision in managing OSMF resulted in better postoperative mouth opening, as observed in a 6-month follow-up. In a similar study, Pradhan H et al., found that the surgical group had better mouth opening with an insignificant difference in postsurgical morbidity and higher grades of surgical convenience when using a collagen sheet as a wound dressing material compared to buccal pads of fat [16]. Raghavendra Reddy Y et al., reported good results in OSMF cases when they impregnated dexamethasone into the collagen graft after fibrous band excision [17].

CONCLUSION(S)

The OSCC is a life-threatening disease. Early diagnosis can aid in prompt patient care, extending the patient's life. When it comes to head and neck cancers, surgery is still the standard of care. However, it causes significant morbidity for the patient; after resection of the lesion, reconstruction is done with flaps, which can damage the donor site. This morbidity can be reduced by using an alloplast, as it avoids considerable complications for the patient. Different alloplasts are available that are specific to the requirements of the defect. The present case report describes how a patient with OSCC

was successfully treated surgically using a collagen sheet. Overall, the present case contributes to the current body of research on OSCC and enhances the authors understanding of its management and consequences.

REFERENCES

- [1] Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C, Rebelo M, et al. Cancer incidence and mortality worldwide: Sources, methods and major patterns in GLOBOCAN 2012. *Int J Cancer*. 2015;136(5):E359-86.
- [2] Wallace ML, Neville BW. Squamous cell carcinoma of the gingiva with an atypical appearance. *J Periodont*. 1996;67(11):1245-48.
- [3] Bagan J, Sarrion G, Jimenez Y. Oral cancer: Clinical features. *Oncol*. 2010;46(6):414-17.
- [4] Scully C, Bagan J. Oral squamous cell carcinoma overview. *Oncol*. 2009;45(4-5):301-08.
- [5] Mohamad I, Glaun MD, Prabhaskar K, Busheri A, Lai SY, Noronha V, et al. Current treatment strategies and risk stratification for oral carcinoma. *American Society of Clinical Oncology Educational Book*. 2023;43:e389810.
- [6] Patel P, Dave H, Desai R, Cesar LM, Yagnik PJ. Squamous cell carcinoma of left buccal alveolar ridge. *Cureus*. 2019;11(7):e5271.
- [7] Maymone MB, Greer RO, Kessecker J, Sahitya PC, Burdine LK, Cheng AD, et al. Premalignant and malignant oral mucosal lesions: Clinical and pathological findings. *J Am Acad Dermatol*. 2019;81(1):59-71.
- [8] Odell E, Kujan O, Warnakulasuriya S, Sloan P. Oral epithelial dysplasia: Recognition, grading and clinical significance. *Oral Diseases*. 2021;27(8):1947-76.
- [9] Cologenesis Healthcare Pvt., Ltd., Colloskin: High-quality and affordable solution for wound care [Internet]. Medzell.
- [10] Johnson TM, Ratner D, Nelson BR. Soft-tissue reconstruction with skin grafting. *Journal of the American Academy of Dermatology*. 1992;27(2):151-65.
- [11] Stenzel KH, Miyata T, Rubin AL. Collagen as a biomaterial. *Annual Review of Biophysics and Bioengineering*. 1974;3(1):231-53.
- [12] Bhattacharya S, Tripathi HN, Gupta V, Nigam B, Khanna A. Collagen sheet dressings for cutaneous lesions of toxic epidermal necrolysis. *Indian Journal of Plastic Surgery*. 2011;44(03):474-77.
- [13] Chattopadhyay S, Raines RT. Collagen-based biomaterials for wound healing. *Biopolymers*. 2014;101(8):821-33.
- [14] Rinker B, Zoldos J, Weber RV, Ko J, Thayer W, Greenberg J, et al. Use of processed nerve allografts to repair nerve injuries greater than 25 mm in the hand. *Annals of Plastic Surgery*. 2017;78(6S):S292-S295.
- [15] Nataraj S, Guruprasad Y, Shetty JN. A comparative clinical evaluation of buccal fat pad and collagen in surgical management of oral submucous fibrosis. *Arch Dent Sci*. 2011;2(4):17-24.
- [16] Pradhan H, Gupta H, Sinha VP, Gupta S, Shashikanth MC. Two wound-covering materials in the surgical treatment of oral submucous fibrosis: A clinical comparison. *JOBCCR*. 2012;2(1):10-14.
- [17] Raghavendra Reddy Y, Srinath N, Nandakumar H, Rajini Kanth M. Role of collagen impregnated with dexamethasone and placetrin in patients with oral submucous fibrosis. *JOMS*. 2012;11:166-70.

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