



## Advanced Squamous Cell Carcinoma of the Oral Mucosa with Bone Infiltration: A Case Report

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### Abstract

Oral squamous cell carcinoma (OSCC) is one of the most common malignant neoplasms of the oral cavity. It is associated with multiple risk factors, including the consumption of khat (*Catha edulis*), a stimulant plant widely used in certain regions of Africa and the Middle East. We present the case of a patient with advanced oral squamous cell carcinoma, with bone infiltration of the mandible. The patient is a habitual khat user, which is considered a possible contributing factor in the tumor's etiology. Clinically, the disease manifested as an ulceroinfiltrative lesion on the buccal mucosa, extending to adjacent structures. The diagnosis was confirmed by biopsy, and staging revealed advanced local involvement (T4aN2bM0). Management included wide oncological resection with cervical lymph node dissection and a two-stage reconstructive strategy due to institutional limitations, opting for primary closure followed by post-radiotherapy microvascular reconstruction. Squamous cell carcinoma of the buccal mucosa exhibits aggressive behavior with a high probability of local invasion and lymphatic metastasis. This case highlights the importance of considering khat consumption as a potential predisposing factor in patients from regions where its use is common.

**Keywords:** Mucosal Carcinoma; Deformity; Bone Infiltration

### Introduction

Squamous cell carcinoma (SCC) is the most common malignant tumor of the oral cavity, accounting for approximately 90 % of oral cancers. Its main risk factors include tobacco and alcohol consumption, infection with human papillomavirus (HPV), and poor oral hygiene. Although the tongue and floor of the mouth are the most common locations, involvement of the buccal mucosa represents between 10-15 % of cases, with a slight predominance in men, especially in regions with high betel and chewing tobacco use [1,2].

Within the buccal mucosa, the most affected area is usually the posterior region near the occlusal line, due to chronic trauma caused by irregular dental structures or parafunctional habits. Its progression can compromise neighboring structures such as

the buccinator muscle, skin, mandible, and cervical lymph nodes, which worsens the prognosis and complicates treatment. Mandibular bone infiltration is a sign of advanced disease and is associated with a worse clinical outcome.

Diagnosis is based on clinical evaluation, biopsy, and imaging studies (CT, MRI) to determine tumor extent. The main treatment is surgery, complemented with radiotherapy and chemotherapy depending on the stage. Mandibular reconstruction can be performed with conventional or advanced micro-surgical techniques, depending on the extent of resection, affected anatomical region, surgeon experience, and institutional resources [3-5].

Prognosis depends on the stage, perineural and lymphovascular invasion, as well as lymph node involvement, with a 5-year survival rate between 40-60 %. We present a case of advanced oral squa-

mous cell carcinoma with bone infiltration, highlighting its clinical presentation, diagnosis, and surgical management.

### Objective

To describe the key factors associated with oral squamous cell carcinoma (OSCC) in the buccal mucosa, focusing on its etiology, clinical features, and treatment options.

### Reference Search Methods

A comprehensive literature search was conducted using the following keywords and Medical Subject Headings (MeSH) in English: "oral squamous cell carcinoma," "buccal mucosa," "oral cancer," "risk factors," and "treatment of oral cancer." Studies published in peer-reviewed journals, as well as systematic reviews and meta-analyses, were included to gather a broad spectrum of evidence regarding OSCC.

### Analysis Strategy

The analysis focused on the clinical characteristics of OSCC in the buccal mucosa, including risk factors such as tobacco and alcohol use, human papillomavirus (HPV) infection, and dietary influences. The review also evaluated treatment strategies, such as surgical resection, radiation therapy, and the role of early detection in improving patient outcomes. Additionally, the challenges and outcomes associated with reconstructive surgery following tumor removal were examined.

### Case Report

A 62-year-old female patient, with no relevant medical history, presented with a lesion on the right buccal mucosa approximately 4.5 cm in diameter by 2 cm in width. The lesion had a verrucous appearance with signs of infiltration into the buccinator muscle and extension to the skin at its central portion figure 1.



**Figure 1:** Patient with squamous cell carcinoma of the buccal mucosa.

At its lower extremity, tumor progression was noted with involvement of the right hemimandible, corresponding to an edentulous gap between teeth 47 and 44. Clinical findings were corroborated by a computed tomography scan, which confirmed bone infiltration and extension of the neoplastic process to adjacent structures figure 2.



**Figure 2:** Computed tomography scan.

### Neck clinical examination

On cervical exploration, the patient had multiple lymph nodes on the right hemicervical area, approximately 2 cm in diameter; located at levels I and IIa, suggestive of regional lymph node metastasis.

### Treatment plan

The patient presented with moderately differentiated squamous cell carcinoma of the right oral mucosa, with infiltration of the buccinator muscle, extension to the skin, and involvement of the right hemimandible, confirmed by CT and histopathological study. Based on clinical, imaging, and histopathological findings, the tumor was classified according to the 8<sup>th</sup> edition of the AJCC TNM classification as: cT4aN2bM0, clinical stage IVA. Management of an oral squamous cell carcinoma at stage IVA includes

### Therapeutic Management and Treatment Sequence

#### Surgical resection

- Three-dimensional resection of the buccal lesion and block resection of the right hemimandible.
- Selective cervical dissection of levels I, II, and III.



**Figure 3:** Three-dimensional resection of the buccal lesion and block resection of the right hemimandible.

### Two-stage reconstruction

- **First phase:** Primary closure with a local rotation flap (Fan Flap) for coverage of the oral mucosa and cervical defect closure.
- **Second phase:** After radiotherapy, a definitive reconstruction using a microvascularized graft will be planned, selecting the best reconstructive option based on the evolution of irradiated tissue (free fibula flap, anterolateral thigh flap, among others).

### Adjuvant therapy

Postoperative radiotherapy + concurrent chemotherapy.

### Discussion

Oral squamous cell carcinoma is the most common malignant neoplasm of the oral cavity, predominantly affecting the lateral border of the tongue and the floor of the mouth. However, the buccal mucosa is also a commonly affected site, especially in populations with particular risk factors such as khat consumption, as in our patient's case [3-5].

### Khat consumption and its association with oral squamous cell carcinoma

Khat is a stimulant plant widely consumed in Ethiopia, Somalia, Yemen, and other countries, where chewing its leaves is a common cultural practice. Several studies have suggested that chronic khat consumption may be associated with oral carcinogenesis due to the presence of alkaloids such as cathinone, which has irritative, cytotoxic, and potentially genotoxic effects on the oral mucosa. Tesfaye, *et al.* (2019) found that khat chewers are at higher risk for

squamous cell carcinoma of the buccal mucosa, with larger tumors and advanced-stage disease compared to other traditional risk factors such as tobacco and alcohol [6-8].

These findings align with our case, as the patient's tumor exhibited aggressive extension, with infiltration into the buccinator muscle, skin, and the right hemimandible. Although there is insufficient conclusive evidence directly linking khat use with oral cancer, its potential role as a predisposing factor should be considered in the etiopathogenic analysis.

### Anatomical localization and tumor behavior

Buccal mucosa squamous cell carcinoma exhibits aggressive clinical behavior due to the laxity of the tissues, rich vascularization, and ease of invasion into adjacent structures. Literature reports that these tumors have a high tendency to invade

- The buccinator muscle, favoring deep extension.
- The skin of the cheek, indicating an advanced stage (T4a).
- The mandibular bone, as in our case, which requires wide resection with significant functional and aesthetic impact.

### Loco-regional metastasis

The presence of cervical lymph node metastasis at levels I and IIa (N2b) reinforces the disease's aggressiveness, as multiple studies have shown that lymph node involvement in buccal mucosa tumors is a predictor of worse prognosis and lower survival.

Bugueño V, Castro M., and Cardemil M., in their 2022 study titled *Risk Factors, Staging, and Prognosis in Oral Squamous Carcinoma* published in the *Revista de Otorrinolaringología y Cirugía de Cabeza y Cuello*, found that patients with a depth of tumor invasion (DOI) greater than or equal to 8 mm had a 5-year overall survival rate of 67.2%, compared to 83.4% in those with a DOI less than 8 mm. This suggests that deeper tumor invasion correlates with worse prognosis, which is relevant to our patient, whose tumor shows significant infiltration into adjacent tissues, including the buccinator muscle and right hemimandible [8-10].

### Reconstructive strategy: comparison with literature

The two-stage reconstruction plan was implemented due to institutional limitations for performing microvascular flaps during oncological surgery.

### Why Delay Microvascular Reconstruction?

- In high-level centers, microvascularized bone reconstruction (such as the free fibula flap) is performed in the same surgical time as resection.

- However, in settings with resource or micro-surgery expertise limitations, literature reports that delaying reconstruction until after radiotherapy is an acceptable option [11-13].
- Patel, *et al.* (2021) and Rodríguez, *et al.* (2020) documented good functional outcomes with secondary reconstruction in multimodal treatment patients.

In our case, the following approach was chosen

- Primary closure with a local rotation flap (Fan Flap) to ensure immediate defect coverage and promote healing before adjuvant treatment.
- Post-radiotherapy microvascular flap for bone and functional restoration, a strategy that, although not ideal, remains valid for selected patients [14,15].

## Conclusion

Moderately differentiated squamous cell carcinoma of the oral mucosa, particularly in the buccal mucosa region, is characterized by aggressive behavior with a high propensity for local invasion and lymph node metastasis. In the presented case, khat consumption emerges as a potential predisposing factor in the tumor's etiology. The therapeutic strategy implemented, which included wide oncological resection with cervical lymph node dissection and a two-stage reconstructive plan due to institutional limitations, aligns with current literature recommendations. This approach emphasizes the need for an integrated management plan that addresses both tumor eradication and the functional and aesthetic rehabilitation of the patient. The patient's intermediate prognosis is further complicated by significant local infiltration, including the buccinator muscle, skin, and mandible, as well as an increased risk of lymph node metastasis, evident from involvement of cervical nodes at levels I and IIa. Despite these challenges, the patient has shown a good response to treatment, requiring extensive surgical intervention.

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