

**Case Report: Advanced Oral Submucous Fibrosis (Grade IV)**

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**Abstract**

Oral Submucous Fibrosis (OSMF) is a chronic, insidious condition associated with areca nut chewing and considered a precancerous disorder with significant morbidity. This report presents a case of Grade IV OSMF, characterized by marked fibrosis, restricted oral opening, and dysplastic changes. Through a multidisciplinary approach involving clinical evaluation, imaging, and histopathology, this case highlights the challenges and strategies for managing advanced OSMF, emphasizing early intervention and preventive measures.

**Introduction**

Oral Submucous Fibrosis (OSMF) is prevalent in South Asian regions, where areca nut chewing is common. The condition affects the oral mucosa, causing progressive fibrosis and limiting mouth function. The World Health Organization classifies OSMF as a potentially malignant disorder with a 7–13% chance of transformation into squamous cell carcinoma<sup>1</sup>. Advanced grades, particularly Grade IV, present significant challenges due to extensive fibrosis and high risk of malignancy<sup>2</sup>. This case report provides a detailed account of a Grade IV OSMF case, offering insights into clinical presentation, diagnostic complexities, and treatment modalities.

**Case Presentation**

A 25 year-old male presented with progressive difficulty in mouth opening and a burning sensation in the oral cavity exacerbated by spicy food intake. The patient had a history of areca nut chewing for over 10 years, consuming an average of [quantity] per day. Clinical symptoms included restricted

mouth opening (<10 mm), dry mouth, and intolerance to spicy foods. On examination, the buccal mucosa appeared pale with loss of elasticity, palpable fibrotic bands, and blanching. Leukoplakic patches were noted on the left buccal mucosa, raising concerns about potential dysplasia. The patient's medical history was non-contributory, with no known systemic illnesses.



*Pre-operative picture*

### **Investigations**

To confirm the diagnosis and assess the extent of the condition, the following investigations were performed:

1. Histopathology: Biopsy samples from the leukoplakic patch revealed epithelial dysplasia with subepithelial hyalinization and dense fibrosis. Inflammatory cell infiltration and obliteration of submucosal vasculature were evident.
2. Imaging Studies: CT scans excluded malignant invasion but confirmed restricted soft tissue mobility.
3. Blood Tests: Complete blood count and serum markers ruled out systemic inflammatory or autoimmune conditions.
4. Oral Function Assessment: Measurement of maximum interincisal distance confirmed severe trismus (<10 mm), consistent with Grade IV OSMF.

### **Differential Diagnosis**

Advanced OSMF can mimic other conditions with similar oral manifestations. Differential diagnoses included:

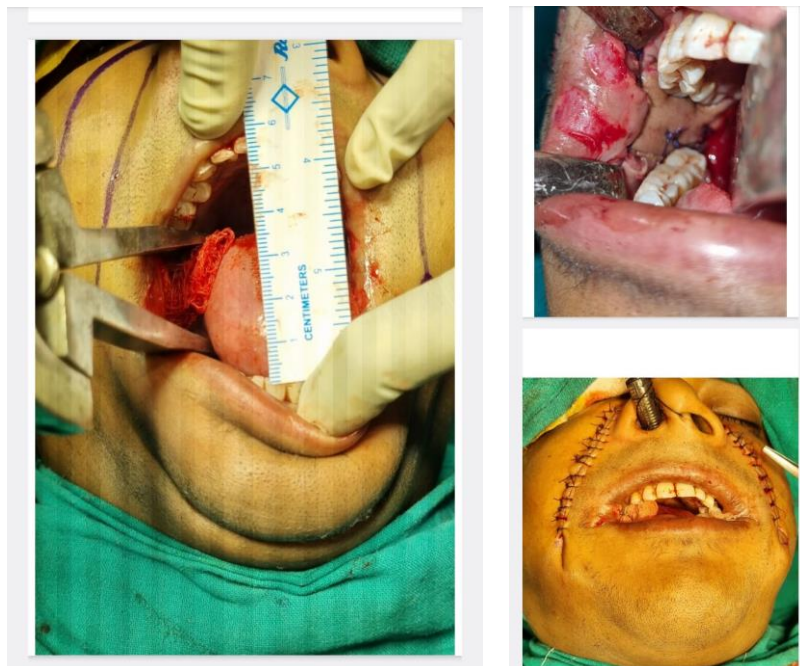
1. Scleroderma: Distinguished by systemic involvement such as skin thickening and Raynaud's phenomenon.
2. Lichen Planus: Ruled out based on histopathological findings and absence of characteristic Wickham's striae.
3. Leukoplakia: Coexisting leukoplakia was noted but did not explain the overall fibrosis.
4. Squamous Cell Carcinoma (early stage): Biopsy confirmed absence of malignant transformation, although epithelial dysplasia indicated a high-risk state.

### **Treatment**

Management of Grade IV OSMF required a multidisciplinary approach combining medical, surgical, and rehabilitative strategies:

1. Medical Management:
  - Systemic corticosteroids (e.g., dexamethasone) were prescribed to reduce inflammation and fibrosis.

- Antioxidants such as lycopene and beta-carotene were included to mitigate oxidative stress.
  - Hyaluronidase injections were administered to improve tissue elasticity.
2. Surgical Intervention:
- Bilateral fibrotomy was performed to release fibrotic bands.
  - Coronoidectomy was conducted to address trismus by removing coronoid processes impinging on jaw movement.
  - Grafts ( nasolabial flaps) were used for mucosal reconstruction.
3. Physiotherapy:
- Postoperative jaw exercises were prescribed to enhance mobility and prevent re-fibrosis.
  - The patient was instructed to use jaw-stretching devices and maintain a soft diet during recovery.
4. Lifestyle Modifications: - The patient was counseled to cease areca nut consumption and provided with behavioral support for habit cessation.



Intra operative picture

Post operative picture

### Discussion

The pathogenesis of OSMF involves chronic irritation from areca nut alkaloids, leading to collagen deposition and submucosal fibrosis<sup>3</sup>. The condition progresses from burning sensations and mild fibrosis to severe trismus, leukoplakia, and potential malignant transformation<sup>6</sup>. This case emphasizes the importance of recognizing early signs and intervening before advanced stages develop<sup>4</sup>. Grade IV OSMF presents unique challenges due to its irreversible fibrosis and high cancer risk<sup>5</sup>. Multimodal treatment, including surgical release of fibrotic bands, corticosteroid therapy, and patient compliance with physiotherapy, is essential for functional improvement<sup>9</sup>. Early identification of dysplastic changes and regular surveillance for malignancy are critical<sup>3</sup>. Conservative treatment is recommended for patients with a mouth opening greater than 25 mm, typically involving physical therapy and medical management<sup>6</sup>. Physical therapy may include the use of splints or devices to assist with mouth opening<sup>7</sup>. Additionally, some studies suggest that hyperbaric oxygen therapy (HBOT) may help by promoting fibroblast apoptosis and reducing the secretion of proinflammatory cytokines like interleukin-1, which can inhibit fibroblast function<sup>8</sup>. Oral submucous fibrosis (OSMF) is

managed with medications that target vascular and inflammatory pathways, as well as dietary supplements and complementary treatments. Key medications include steroids, interferon gamma, placental extracts, colchicine, anti-inflammatory and anti-fibrotic drugs, along with intralesional injections and immunized milk. These treatments aim to regulate inflammation and reduce fibrosis severity. Medications for vascularity or ischemia relief, such as nylidrin, pentoxifylline, and buflomedil hydrochloride, work to alleviate tissue hypoxia and improve blood flow, thereby slowing fibrosis progression. Nutritional supplements like beta-carotene, lycopene, vitamins, and minerals help boost antioxidant defenses and promote tissue healing<sup>9</sup>. In severe cases of OSMF, additional treatments such as collagenase, hyaluronidase, and chymotrypsin may be used to support tissue remodeling and functional recovery.

Surgical options are typically considered when the mouth opening is less than 25 mm. These may include procedures like fibrotomy, coronoidectomy, and/or myotomy. To avoid re-fibrosis and encourage healing with minimal scarring, various flap and graft techniques are used to fill the gap. Graft options include split skin grafts, collagen membranes, artificial dermis, and human amniotic membrane. Flap techniques can be intraoral (e.g., palatal island flap, buccal fat pad, tongue flaps) or extraoral (e.g., nasolabial flap, platysma mucocutaneous flap, submental artery-based flap, temporalis myofascial flap, or radial forearm free flap). Public health measures to reduce areca nut consumption, along with educational campaigns, are necessary to curb the disease's prevalence<sup>6</sup>.

### Conclusion

Advanced OSMF cases require a multidisciplinary approach to manage symptoms and reduce malignancy risk. This case highlights the need for timely diagnosis, aggressive management, and preventive strategies to address this debilitating condition. Public awareness and legislative measures to control areca nut usage are vital for reducing the burden of OSMF in at-risk populations.

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