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CASE REPORT

# SURGICAL SUCCESS OF OVINE FORESTOMACH MATRIX IN THE MANAGEMENT OF PLEOMORPHIC ADENOMA OF HARD PALATE -CASE REPORT

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## ABSTRACT

Pleomorphic adenoma is one of the common benign salivary gland tumors, occurring in the hard palate due to a high density of minor salivary glands in this region. Surgical excision remains the mainstay of management; however, defect site reconstruction following tumor excision poses a considerable challenge. The current case report presents the first known use of the ovine forestomach matrix (OFM) for reconstructing the huge defect post excision. A 40-year-old patient male presented with a progressively enlarging, painless swelling in the hard palate. Clinical examination revealed a well-demarcated, fluctuant, non-tender lesion, crossing the midline, with a provisional diagnosis of mucocele. Surgical excision was performed with wide margins to prevent risk of recurrence. The OFM was employed as a biologic scaffold to facilitate wound healing and tissue regeneration. The patient demonstrated exceptional healing with full mucosal coverage and no signs of infection or necrosis at the nine-month follow-up. The successful integration of OFM in this case underscores its potential as a novel alternative adjuvant for reconstructing oral and maxillofacial defects. This case sets a precedent encouraging further research to elucidate its long-term efficacy and expand its application in maxillofacial surgical interventions.

***Keywords:*** **Pleomorphic Adenoma, Salivary Gland Neoplasms, Hard Palate, Wound Healing, Ovine Forestomach Matrix, Biocompatible Materials**

## INTRODUCTION

Pleomorphic adenoma is one of the most commonly occurring benign tumours of the salivary glands, primarily attributed to the parotid gland, but can also occur in the minor salivary glands. Previous reports in the literature account this condition for about 40 to 70% of all the major and minor salivary gland tumours [1].

It is also designated as the 'mixed tumour' owing to its composition, encompassing the epithelial and the mesenchymal elements [2].

The condition is characterized by a gradually growing, painless, submucosal firm mass, occurring in different parts of the oral cavity, including the hard palate, the upper lip, the floor of the mouth and the buccal mucosa. Clinically, the growth is encapsulated and well demarcated, though in some situations, it may infiltrate into the surrounding tissues, in which case it is more likely to be prone for recurrence [3]. It presents with a smooth or lobulated surface, generally, not ulcerated, unless subjected to trauma. The exact etiology of pleomorphic adenoma is still unclear; however, it is believed to arise from the intercalated ductal and myoepithelial cells of the salivary glands. In addition, genetic variations, such as the chromosomal aberrations involving PLAG1 and HMGA2 genes, have been reported to play a role in the pathogenesis of this condition [4, 5].

Pleomorphic adenomas shows a predilection towards adults, slightly towards females with highest occurrence between the third and the fifth decades of life. It frequently occurs in the hard palate accounting for over 50% of the cases, probably due to the high density of minor salivary glands in this particular region. Despite being a benign lesion, a small percentage of cases may show malignant transformation, particularly in long-standing or recurrent conditions. Literature reports varied prevalence, with up to 70% accounting to minor salivary gland neoplasm. This benign condition may cause functional derangement such as difficulty in speech, mastication, and swallowing, eventually affecting the patient's quality of life. The principal treatment modality for pleomorphic adenoma is complete surgical excision of the lesion and careful histopathological evaluation to rule out malignant transformation [6]. In cases of bone invasion or subjacent structures, extensive surgical approaches including maxillectomy or the usage of several matrices for grafting the huge defect may be warranted.

The ovine forestomach matrix (OFM) is known for its excellent regenerative potential. It has proven to promote cell migration, angiogenesis and tissue remodelling, thereby making it highly useful for supporting huge soft tissue defects [7]. Reports have suggested that OFM inhibits the release of inflammatory mediators like matrix metalloproteinase and neutrophil elastase, thereby reducing the exaggerated inflammatory status in and around the defect site, further preventing excessive tissue degradation [8]. In addition, the OFM has also proven highly beneficial in chronic wound management. In this case, the OFM was used in the surgical management of the palatal defect following pleomorphic adenoma excision. In addition, as the recurrence is reported to be 5-50%, proper and meticulous post-operative follow-up is key to monitor complete resolution, prevent recurrence and further complications.

Here, we present a case of utilising OFM which played a critical role in the surgical management of pleomorphic adenoma of the hard palate in a male patient as it provided structural integrity to the defect site, facilitated wound healing and presented no complications. The outstanding post-operative outcome of OFM usage in this case highlights its potential as a valuable adjuvant in oral and maxillofacial surgical management.

## Case description

### History

A 40-year-old male patient presented with a complaint of swelling in the roof of the mouth for the past six months and was thus referred to the department of Oral and Maxillofacial Surgery at Sri Ramachandra Dental College for evaluation and management. The patient noticed a small swelling on the hard palate, which gradually increased to the current size. History suggested that the swelling was not associated with pain or discharge. The patient had no contributory past medical or surgical history. His personal history was unremarkable, with normal bowel and bladder habits, as well as adequate sleep and appetite. He also showed no history of deleterious habits.

### Clinical Examination and Treatment Plan

On general examination, the patient was conscious, coherent, and afebrile. The vital signs were within normal range. Extraoral examination revealed no gross facial asymmetry, and no abnormalities were detected in the temporomandibular joint. The patient had adequate mouth opening and normal lateral jaw movements. No palpable lymph nodes were detected.

On intraoral examination, a swelling measuring approximately 5 cm in diameter on the hard palate was apparent, which extended from the anterior hard palate to the hard and soft palate junction, further reaching the region of the tooth, 27 and also crossing the midline. The lesion presented with a smooth and glistening surface with secondary erythematous

changes. On palpation, the swelling was soft, fluctuant, non-compressible, non-reducible, and non-tender. There was no evidence of discharge. The tooth 26 was tender on percussion, and a root stump was present in relation to 46 region. Generalized stains and calculus were also observed. Occlusion was stable. Computed Tomography revealed mild rarefaction in the lateral aspect of the palatal bone. Intraoral occlusal radiograph and orthopantomogram revealed no evidence of bony invasion (Figures 1, 2 and 3). Based on clinical findings and parameters, a provisional diagnosis of a mucocele in relation to the hard palate was arrived. Differential diagnoses included osteoid osteoma, fibrous dysplasia, maxillary tori, adenoid cystic carcinoma, and pleomorphic adenoma. These lesions were considered for differential diagnoses owing to their clinical presentation and similarity to the observed swelling in the hard palate. The treatment plan included surgical excision of the lesion under general anesthesia.

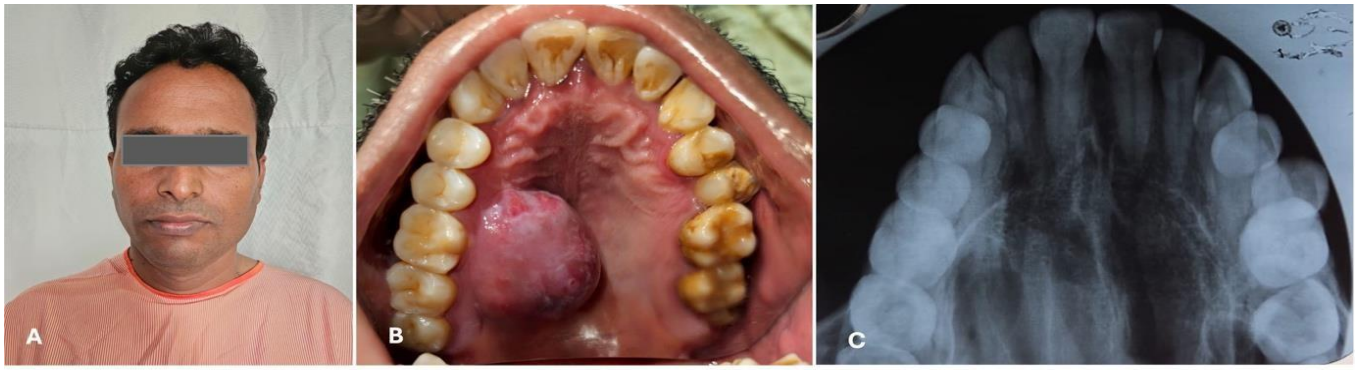


**Figure 1.** Shows the extraoral and intraoral findings (A and B); corresponding radiograph (C)

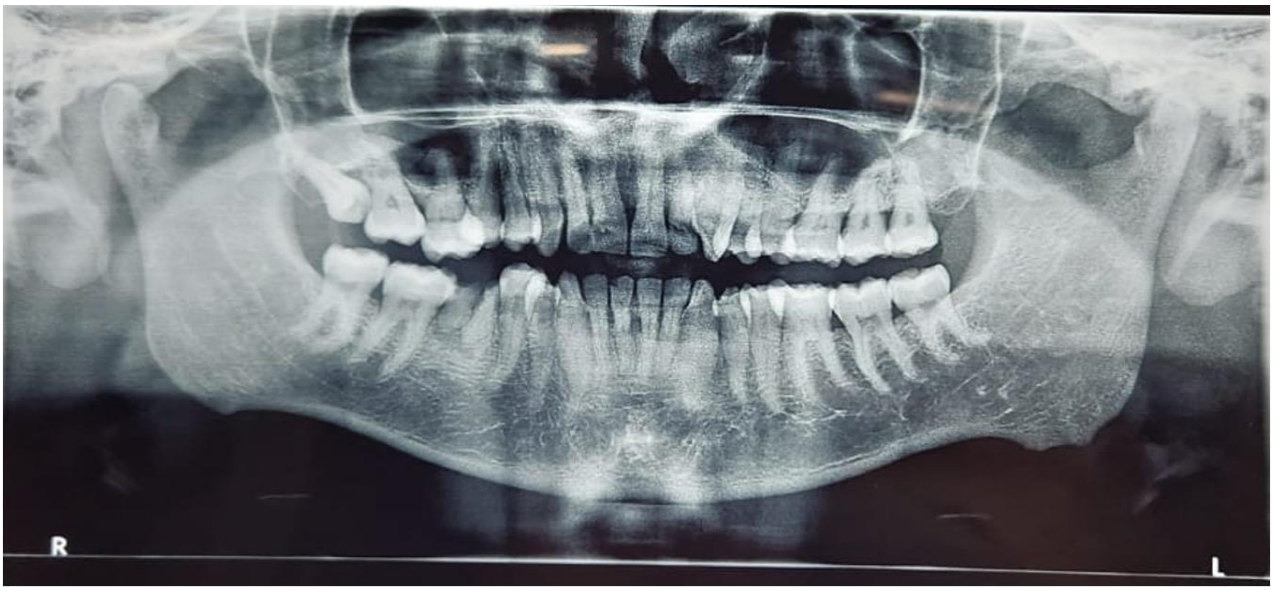


**Figure 2.** Shows the orthopantomogram with no evidence of bony invasion

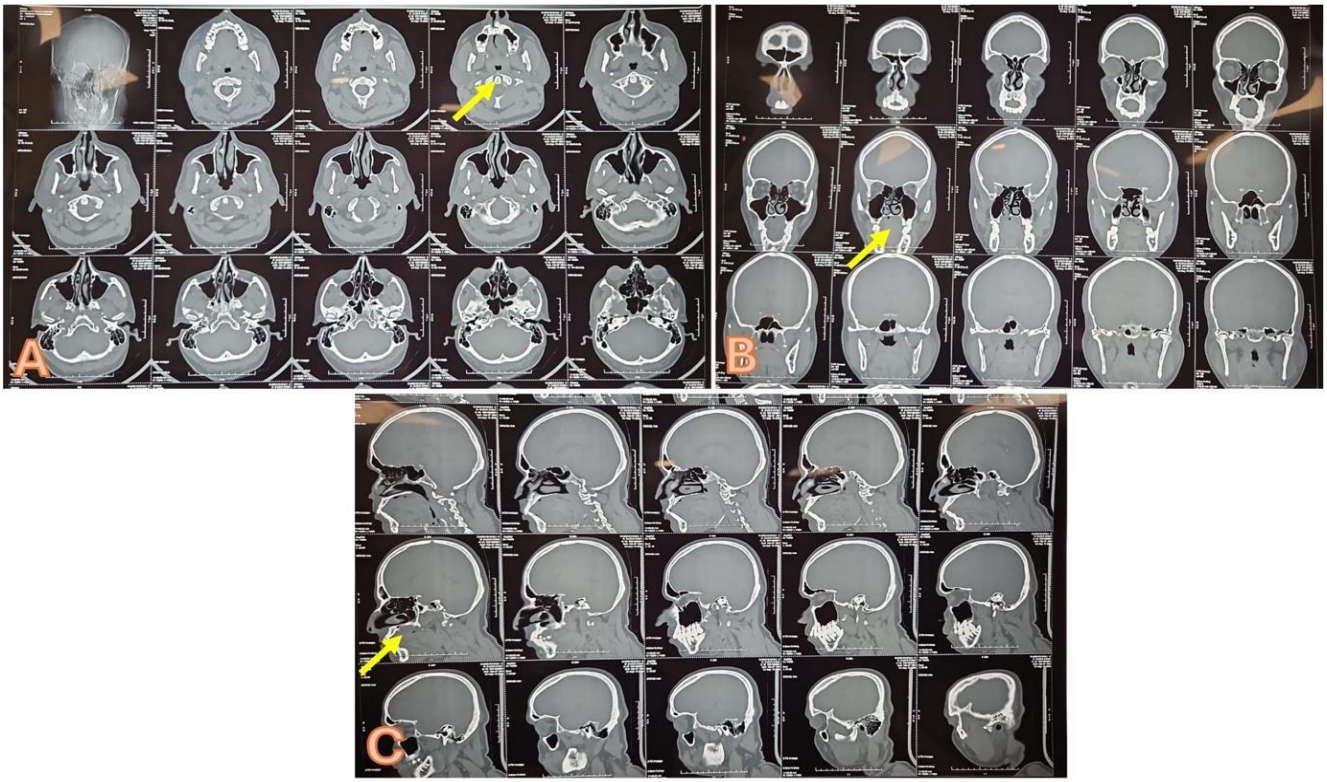


**Figure 3.** CT showing mild rarefaction (highlighted by arrows)

**Surgical management**

The patient underwent surgical excision of the lesion under general anesthesia. He was placed in a supine position, and general anesthesia was administered with nasal intubation. The surgical site was prepared with intraoral and extraoral antiseptic application using 10% povidone-iodine, and the patient was draped under sterile conditions. Fine needle aspiration was performed, followed by an elliptical incision around the lesion. Subperiosteal dissection was carried out to separate the mass from the underlying hard palate, and the lesion was excised in toto. Saline and betadine wash were given, and hemostasis was achieved. Sharp bony margins were smoothened, and the surgical site was packed with OFM (Endofoam$^{TM}$, Natural Dermal Template). The site was sutured using 2-0 and 3-0 Vicryl sutures. Bactigras dressing was applied, and an acrylic palatal plate was placed and secured with wire (Figures 4 and 5).

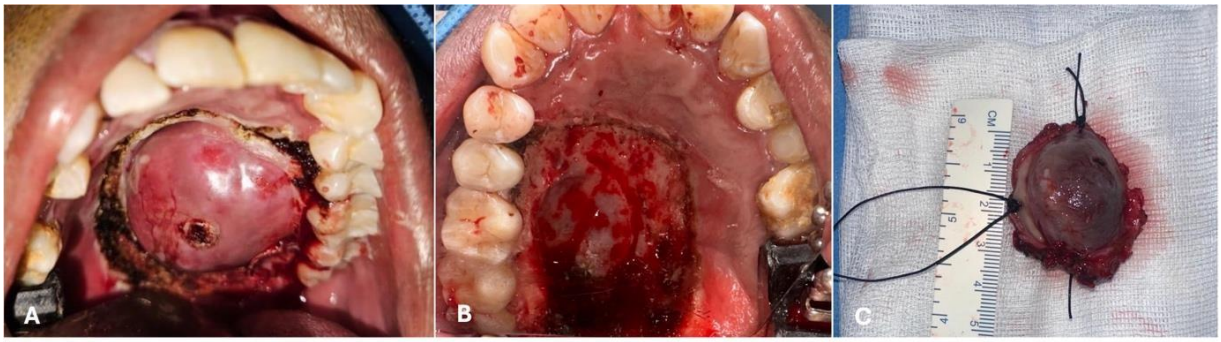


**Figure 4**. Intra-operative images showing planned margins of incision (A); post excision (B); Excised specimen to be sent for histopathological evaluation (C)

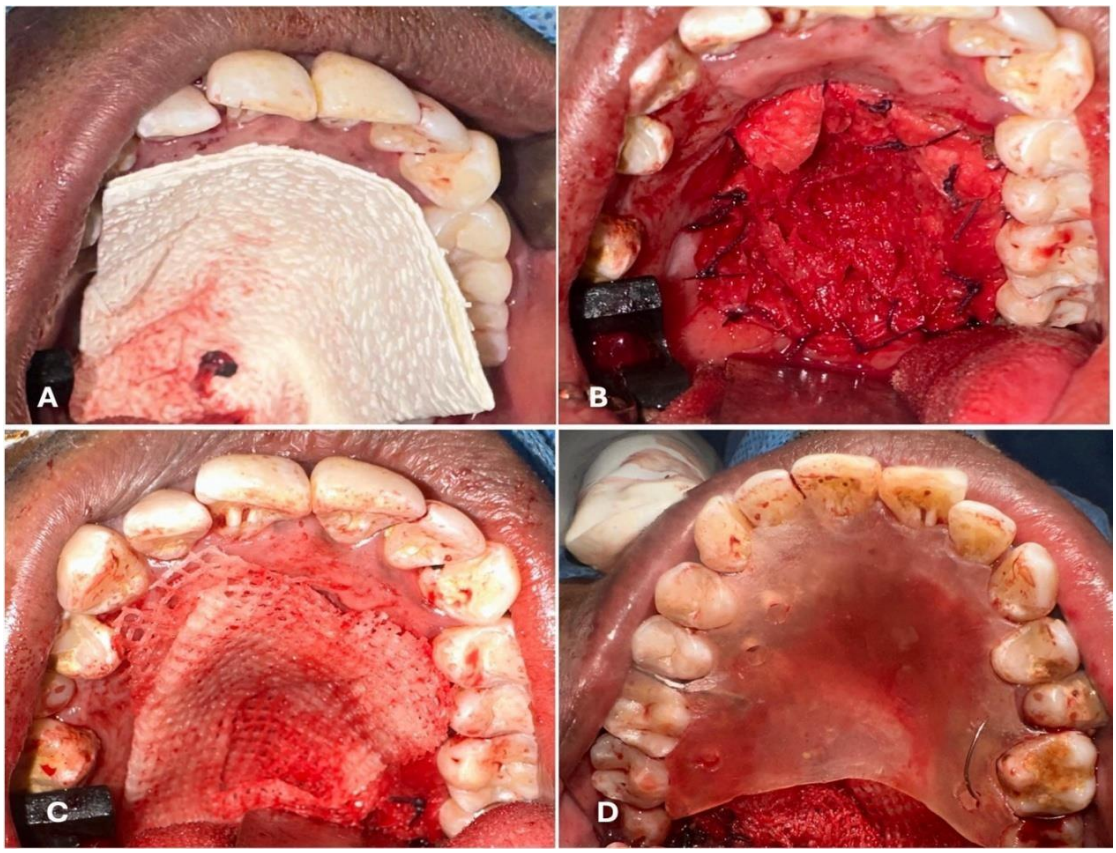


**Figure 5.** Intra-operative images showing OFM adaptation (A); OFM, post suturing (B); Bactigras placement (C); Palatal plate covering the post-operative site

**Histopathological features**

The histological section revealed cuboidal cells arranged in a ductular pattern, containing eosinophilic coagulum. Additionally, spindle-shaped cells were organized in strands with areas of hyalinization. There were also regions of squamous differentiation forming keratin pearls, along with chondromyxoid areas. The overlying palatal mucosa and mucus acini were also observed. All the features were suggestive of pleomorphic adenoma.

**Post-Operative care**

Following the procedure, the patient was extubated in a stable condition and shifted to the post-anesthesia care unit (PACU) for further observation. Postoperative care included pain management, maintenance of oral hygiene, and instructions for follow-up to monitor healing and prevent complications.

**At 9-month follow-up**

The nine-month post-operative follow-up demonstrated the defect site with excellent healing and complete mucosal coverage over the surgical site. The palatal tissue appeared well-integrated, with no indication of ulceration, dehiscence or necrosis. The colour and texture of the palatal mucosa blended seamlessly with the surrounding tissues. These clinical findings indicated complete epithelialization and successful integration of the ovine forestomach matrix. In addition, there was also no evidence of infection, fibrosis, or scar tissue formation which, all together, suggested optimal wound healing and restoration of palatal tissue integrity. These findings reinforce the effectiveness of the OFM in facilitating post-surgical defect closure and tissue regeneration (Figure 6).

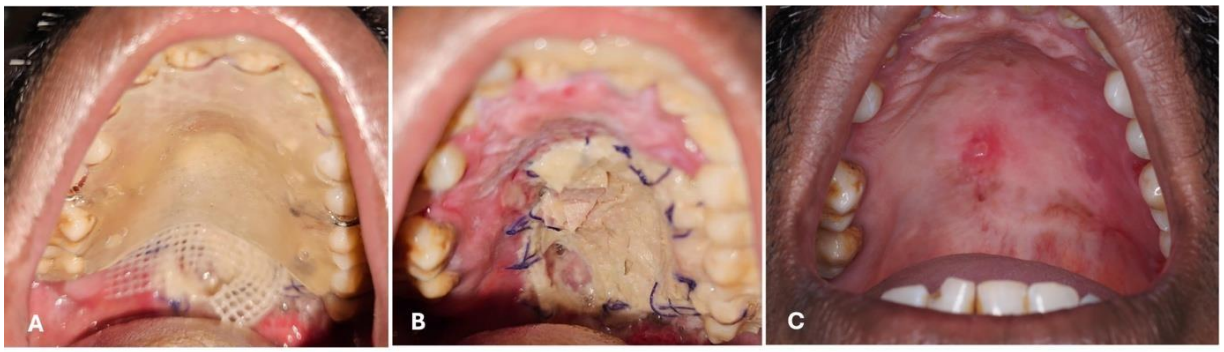


**Figure 6.** Postoperative view at 2 weeks follow-up (A); 9 month follow-up (B)

## DISCUSSION

Pleomorphic adenoma of the hard palate is a rare yet an important clinical entity that warrants prompt diagnosis and appropriate surgical intervention [9]. Any undue delay may only lead to complications, including local bony invasion, and malignant transformation. The present case highlights the surgical excision of a palatal pleomorphic adenoma and the novel application of ovine forestomach matrix (OFM) in defect reconstruction, demonstrating exceptional post-operative healing. To the best of our knowledge, this is the first reported case in literature, where OFM has been employed in managing a palatal lesion, underscoring its potential in oral and maxillofacial surgery.

Studies have indicated that prolonged presence of pleomorphic adenoma can result in osseous invasion, recurrence, and in some cases, even malignant transformation into carcinoma. Since the lesion customarily presents as slow-growing and painless, patients often tend to neglect the condition, allowing it to enlarge and plausibly infiltrate surrounding structures. Lesion infiltration can further complicate surgical intervention, upsurging the necessity for aggressive modalities, such as maxillectomy, leading to significant morbidity. The pseudo capsule of the lesion abodes microscopic extensions of neoplastic cells, contributing to recurrence in incomplete excisions [10]. This highlights the significance of wide surgical excision with clear margins to prevent remnants and recurrence.

Several biomaterials have been explored as adjuncts for wound healing and defect reconstruction following wide tumor excision [11, 12]. Conventionally, acellular dermal matrices, xenografts, collagen-based matrices, etc., have been utilized to support soft tissue regeneration. Ovine forestomach matrix (OFM) is a relatively novel biologic matrix that has obtained attention owing to its superior regenerative potential.

Unlike traditional matrices, OFM has demonstrated it property to retain its native extracellular components, including glycosaminoglycans and proteoglycans, which are pivotal for tissue remodeling and angiogenesis. Although, the matrix has been extensively applied in chronic wound management, hernia repair, and lower-extremity soft tissue defects, its application in oral and maxillofacial surgery, remains elusive [13]. Apart from matrices, other adjuvant approaches have been incorporated while managing PA excision such as negative pressure wound therapy, and platelet-rich fibrin (PRF). However, these modalities may not always prove sufficient in wider defects where structural integrity must be maintained, warranting the use of biomatrices such as OFM.

In this case, OFM acted as a biocompatible scaffold facilitating, cellular infiltration, neovascularization, and tissue integration [14]. In addition, it also helped prevent excessive tissue degradation and ensuring a stable wound environment. The excellent wound healing noted in this case could be attributed to the ability OFM to integrate well with both soft and hard tissues. The matrix was placed in direct contact with the bony surface of the palate, and its porous structure would have facilitated conducive grounds for guided tissue regeneration, leading to excellent post-operative healing [7].

The success of OFM in this case suggests its potential as a viable alternative for defect reconstruction in oral and maxillofacial surgery. Future studies are needed to demonstrate its long-term outcomes in oral surgical procedures, will serve as a benchmark for its expanded applications beyond the traditional use in soft tissue repair.

## CONCLUSION

Surgical excision remains the mainstay in the management of pleomorphic adenoma and the choice of reconstructive biologic matrix plays a pivotal role in post-operative outcomes. The use of OFM in this case proved exceptional in terms of wound healing,

demonstrating its potential in oral and maxillofacial surgical interventions. The case also underscores its clinical efficacy and versatility for being considered a viable option for maxillofacial applications.

## DECLARATIONS

**Conflict of interest**

The authors declare no conflict of interest

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**Ethical Approval**

"Not applicable"

**Consent for publication**

"Appropriate consent obtained"

**Acknowledgment**

Nil

## REFERENCES

1. Lopes MA, Kowalski LP, da Cunha Santos G, et al. A clinicopathologic study of 196 intraoral minor salivary gland tumours. *J Oral Pathol Med* 1999; 28: 264–267.
2. Jorge J, Pires FR, Alves FA, et al. Juvenile intraoral pleomorphic adenoma: report of five cases and review of the literature. *Int J Oral Maxillofac Surg* 2002; 31: 273–275.
3. Lingam RK, Daghir AA, Nigar E, et al. Pleomorphic adenoma (benign mixed tumour) of the salivary glands: its diverse clinical, radiological, and histopathological presentation. *British Journal of Oral and Maxillofacial Surgery* 2011; 49: 14–20.
4. Naik U, Amin SE, Elsayad M, et al. Pleomorphic Adenoma with a Novel Gene Rearrangement-LINC01606::PLAG1. *Head Neck Pathol* 2024; 18: 10.
5. Katabi N, Ghossein R, Ho A, et al. Consistent PLAG1 and HMGA2 abnormalities distinguish carcinoma ex-pleomorphic adenoma from its de novo counterparts. *Hum Pathol* 2015; 46: 26–33.
6. Galluzzi F, Garavello W. Surgical treatment of pleomorphic adenoma of parotid gland in children: a systematic review. *Auris Nasus Larynx* 2022; 49: 547–553.
7. Smith MJ, Dempsey SG, Veale RW, et al. Further structural characterization of ovine forestomach matrix and multi-layered extracellular matrix composites for soft tissue repair. *J Biomater Appl* 2022; 36: 996–1010.
8. Negron L, Lun S, May BCH. Ovine forestomach matrix biomaterial is a broad spectrum inhibitor of matrix metalloproteinases and neutrophil elastase. *Int Wound J* 2014; 11: 392–397.
9. Sundarajan K, Subagar AS, Arumugam K. 'Unraveling the Tapestry': A Retrospective Exploration of Recurrent Parotid Pleomorphic Adenoma Cases. *Indian J Otolaryngol Head Neck Surg* 2024; 76: 3227–3233.
10. Dai L, Lou W, Fang Q, et al. Recurrent Pleomorphic Adenoma of the Parotid Gland: Experience of 128 Patients with First Recurrence. *J Oncol* 2020; 2020: 6645340.
11. Jeyaraj G. Transformative impact of 3D-Printed implants and Virtual surgical planning in oral cancer reconstruction. *Oral oncology* 2024; 156: 106896.
12. Thomas S, Rajendran AR, Purushothaman B, et al. Advancing Bioactive Material for Mandibular Bone Regeneration: Transformation of Fibrous Mat into 3D Matrix Cotton for Enhanced Shape Retention and Rapid Hemostasis. *ACS Biomater Sci Eng* 2024; 10: 5194–5209.
13. Cormican MT, Creel NJ, Bosque BA, et al. Ovine Forestomach Matrix in the Surgical Management of Complex Volumetric Soft Tissue Defects: A Retrospective Pilot Case Series. *Eplasty* 2023; 23: e66.
14. Bosque BA, Dowling SG, May BCH, et al. Ovine Forestomach Matrix in the Surgical Management of Complex Lower-Extremity Soft-Tissue Defects: A Retrospective Multicenter Case Series. *J Am Podiatr Med Assoc* 2023; 113: 22–81.