Journal of Surgery

Reddy GV, et al. J Surg 10: 11445

www.doi.org/10.29011/2575-9760.11445

www.gavinpublishers.com

Case Report

OPEN ACCESS

GAVIN PUBLISHERS

From Resection to Restoration: Mandibular Rehabilitation After Ameloblastoma Over Five Years

G. V. Reddy[1], M. R. Haranadha Reddy[2], Sarah Fatima[3], G. Siva Prasad Reddy[2], I. Venkata Krishna[2], Bharatendu Swain[4]

[1]Department of Oral and Maxillofacial Surgery, HOD and Professor, Panineeya Mahavidyalaya Institute of Dental Sciences and Research Centre, Hyderabad, India

[2]Department of Oral and Maxillofacial Surgery, Professor, Panineeya Mahavidyalaya Institute of Dental Sciences and Research Centre, Hyderabad, India

[3]Department of Oral and Maxillofacial Surgery, Postgraduate III year, Panineeya Mahavidyalaya Institute of Dental Sciences and Research Centre, Hyderabad, India

[4]Department of General Surgery and Plastic Surgery, Hyderabad, India.

***Corresponding author:** Dr. Sarah Fatima, Department of Oral and Maxillofacial Surgery, Postgraduate III year, Panineeya Mahavidyalaya Institute of Dental Sciences and Research Centre, Hyderabad, India - sarahfatima1195@gmail.com

Citation: Reddy GV, Haranadha Reddy MR, Fatima S, Swain B, Reddy GSP, et al. (2025) From Resection to Restoration: Mandibular Rehabilitation After Ameloblastoma Over Five Years. J Surg 10: 11445 DOI: 10.29011/2575-9760.011445

Received Date: 11 September 2025; **Accepted Date:** 17 September 2025; **Published Date:** 19 September 2025

Abstract

Background: Ameloblastoma is a benign odontogenic tumour with aggressive local behaviour, often necessitating segmental resection of the mandible. Reconstruction and rehabilitation remain critical for restoring function and aesthetics.

Case Presentation: A 33-year-old female presented with a multi-cystic ameloblastoma of the left mandible. Segmental resection was performed, followed by five years of oncologic surveillance. A cortico-cancellous tibial graft was placed for mandibular reconstruction. After successful graft integration, three endosseous implants were placed, and a fixed prosthesis was delivered.

Results: At one-year post-rehabilitation and five years post-resection, the patient showed no recurrence. Functional and aesthetic outcomes were excellent.

Conclusion: Staged management with delayed tibial grafting and implant-supported prosthetics offers a reliable approach for mandibular rehabilitation post-ameloblastoma resection.

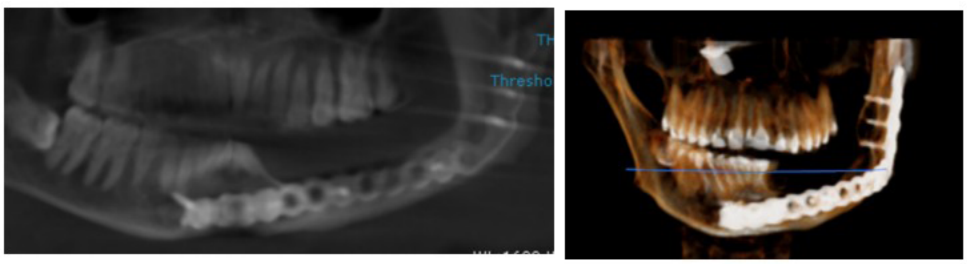
Keywords: Ameloblastoma; Case Report; Implant Rehabilitation; Mandibular Resection; Oral Oncology; Tibial Graft

Introduction

Ameloblastoma is a relatively uncommon yet clinically important odontogenic neoplasm. It constitutes approximately 1% of all tumours arising within the oral cavity and accounts for nearly 11% of odontogenic tumours specifically originating from tooth-forming tissues [1,2]. Despite its benign histological nature, ameloblastoma is known for its locally aggressive behaviour, particularly in its multicystic or solid variants. These forms often infiltrate surrounding bone, necessitating radical surgical intervention such as segmental resection to achieve complete tumour clearance and minimize recurrence risk [3-5]. The surgical removal of extensive mandibular lesions inevitably results in discontinuity defects, which compromise essential functions such as mastication, speech articulation, and facial aesthetics. Therefore, reconstructing the mandibular framework is not only a structural necessity but also a functional imperative to restore the patient's quality of life [6-8]. Among the various reconstructive options available, autogenous bone grafts continue to be regarded as the gold standard. Their superiority lies in their inherent osteogenic, osteoinductive, and osteoconductive properties, which facilitate robust bone regeneration and integration with native tissues. Moreover, their biocompatibility significantly reduces the risk of immunologic rejection or graft failure [9-11]. While iliac crest and fibula grafts are more commonly employed in large defects, tibial bone grafts present a viable alternative for moderate-sized reconstructions. Tibial grafts offer sufficient bone volume and are associated with relatively low donor site morbidity, making them a pragmatic choice in select cases [12-14]. Following successful bone reconstruction, implant-supported prosthetic rehabilitation plays a pivotal role in restoring oral function. Dental implants anchored in the grafted bone allow for stable prosthetic placement, which enhances chewing efficiency, speech clarity, and overall patient satisfaction. This approach not only improves functional outcomes but also contributes to psychological well-being and social reintegration [15-17].

Case Presentation

A 33-year-old female presented with a painless swelling in the left mandibular region. Radiographic imaging revealed a multilocular radiolucency extending from tooth 32 to the mandibular angle. Incisional biopsy confirmed a solid/multi-cystic ameloblastoma.



Pre-operative CBCT of the patient showing the recon plate

Pre-operative image of the patient

Surgical Technique: Segmental Mandibulectomy and Delayed Tibial Graft Reconstruction

Preoperative Preparation

The patient was placed under general anaesthesia with nasotracheal intubation to facilitate unobstructed access to the oral cavity and mandibular region. Standard aseptic protocols were observed, and the surgical field was draped to expose the left lower face and neck.

Mandibular Segmental Resection

A submandibular incision was made approximately 2 cm below the inferior border of the mandible, extending from the para-symphysis region (tooth 32) to the posterior border of the ramus. Dissection proceeded through the platysma and subcutaneous tissues, with careful preservation of the marginal mandibular branch of the facial nerve. The periosteum was elevated to expose the mandibular cortex. Segmental resection was performed using rotary instruments and osteotomes, excising the affected bone from 32 to the ramus. Haemostasis was achieved via bipolar cautery and ligation of facial artery branches. A pre-contoured titanium reconstruction plate was adapted and secured to maintain mandibular continuity and facial contour.

Histopathological Confirmation

The excised specimen was submitted for histopathological evaluation, which confirmed the diagnosis of ameloblastoma with tumour-free surgical margins.

Delayed Reconstruction with Tibial Cortico-cancellous Graft (Performed One Year Post-Resection)

Tibial Graft Harvesting

Under general anaesthesia, the patient was positioned supine. The ipsilateral leg was sterilized and draped. A longitudinal incision was made over the medial aspect of the proximal tibia, approximately 2–3 cm below the tibial tuberosity. Dissection proceeded to the periosteum, which was incised and elevated. A cortico-cancellous block graft was harvested using osteotomes and bone gouges, with care taken to preserve the tibial cortex and minimize donor site morbidity. Haemostasis was achieved, and the donor site was irrigated with saline and closed in layers using absorbable sutures for deep tissues and non-absorbable sutures for skin.

Mandibular Graft Placement and Fixation

The mandibular recipient site was re-accessed via the previous submandibular incision. Fibrous tissue was debrided, and the

Citation: Reddy GV, Haranadha Reddy MR, Fatima S, Swain B, Reddy GSP, et al. (2025) From Resection to Restoration: Mandibular Rehabilitation After Ameloblastoma Over Five Years. J Surg 10: 11445 DOI: 10.29011/2575-9760.011445

reconstruction plate was assessed for stability. The tibial graft was contoured using bone files and rotary instruments to match the defect dimensions. It was positioned and secured to the native mandible and reconstruction plate using titanium screws and Recon plates, ensuring rigid fixation and optimal host-graft contact.

Closure and Postoperative Care

Following confirmation of graft stability and haemostasis, the surgical site was irrigated with saline and closed in layers. Deep tissues were approximated using absorbable sutures, and skin closure was achieved with interrupted non-absorbable sutures. A suction drain was placed as needed and removed within 48–72 hours. Postoperative care included administration of antibiotics and analgesics, with close monitoring for signs of infection or graft rejection.

Follow-Up and Outcome

Radiographic evaluation at four months post-reconstruction demonstrated satisfactory graft integration, with evidence of bone remodelling and restoration of mandibular continuity. The patient exhibited improved mandibular contour and function, with no clinical or radiographic signs of recurrence or graft failure**.**

Implant Rehabilitation: Three endosseous (compressive) implants were placed in the grafted segment using a guided protocol. Compressive implants were chosen for this case as:

- **Cortical Bone Engagement**: Mechanically engages **basal or cortical bone**, providing **primary stability** even in compromised bone conditions. Reduces dependence on bone grafting procedures.
- **Flapless, Minimally Invasive Protocol**: Often placed without raising a flap, minimizing trauma, bleeding, and postoperative discomfort. Shorter surgical time and faster recovery. But in this case, a flap was raised to check the position of the recon plates and screws while placing the implants.
- **Single-Piece Design**: Eliminates micro gaps between implant and abutment, reducing the risk of **peri-implantitis** and bacterial colonization. Simplifies the prosthetic workflow.
- **Versatility in Challenging Cases**: Suitable for **atrophic jaws**, **immediate post-extraction sites**, and **full-arch rehabilitations** where conventional implants may fail.

Implant sites chosen were 34, 35, and 36 of sizes 5.5x10mm, 5.0x10mm, and 4.5x10mm, respectively. Three months post-placement, the implant at site 36 failed secondary to peri-implantitis, presenting with progressive mobility. Given its proximity to the reconstruction plate and the associated risk of further complications, the implant was explanted. A replacement implant was deferred, and the patient was advised to wait six months to allow for adequate osseous healing and potential re-evaluation for future rehabilitation. After six months of osseointegration, a fixed implant-supported prosthesis was delivered that had teeth from 33 to 36 on the 2 implants in place of 34,35.

Intra-operative picture and IOPA after placement of implants

Post-operative picture after final Prosthesis was given.

Outcome

At three years post-rehabilitation:

- No recurrence was observed.
- CBCT confirmed graft stability and implant success of the 2 implants in positions 34 and 35.
- The patient reported high satisfaction with function and aesthetics.

Discussion

Multi-cystic ameloblastoma is a benign but locally aggressive odontogenic tumour that arises from the epithelial remnants of the tooth-forming apparatus. It is known for its infiltrative growth pattern and high recurrence rates, particularly when treated conservatively [4,5,18]. The multi-cystic variant, in contrast to the uni-cystic form, often invades surrounding bone and soft tissue, making complete excision challenging. As a result, radical surgical approaches such as segmental mandibulectomy are frequently warranted to ensure oncologic clearance and minimize the risk of recurrence [4,5]. The removal of a substantial portion of the mandible, while necessary for tumour control, leads to significant functional and aesthetic deficits. These include impaired mastication, speech difficulties, and facial asymmetry. Therefore, reconstructive surgery becomes an essential component of the treatment plan. The timing of reconstruction—whether immediate or delayed—remains a subject of clinical debate. Immediate reconstruction offers the advantage of restoring form and function in a single stage, but it may carry a higher risk of complications if residual tumour cells are present. Delayed reconstruction, on the other hand, allows for a period of surveillance to confirm the absence of recurrence and provides a more stable environment for graft integration [19-21]. Autogenous bone grafting remains the gold standard for mandibular reconstruction due to its superior osteogenic, osteoinductive, and osteoconductive properties. While donor sites such as the fibula and iliac crest are commonly used, the tibia presents a viable alternative in select cases. Tibial cortico-cancellous grafts offer a balanced composition of dense cortical bone for structural support and cancellous bone for rapid vascularization and integration. These grafts are particularly suitable for moderate-sized defects and have the added benefit of reduced donor site morbidity, shorter operative time, and easier harvesting technique [13,14,22,23].Once the graft has successfully integrated with the native bone, the next phase involves prosthetic rehabilitation using dental implants. Implant placement in grafted bone requires careful planning and timing to ensure optimal outcomes. Studies have consistently demonstrated that when implants are placed in a staged manner-after confirming graft stability and bone remodelling—the success rates exceed 95% [15,16,24,25]. This high predictability is attributed to the improved biomechanical environment and reduced risk of implant failure, infection, or graft resorption. In summary, the management of multi-cystic ameloblastoma necessitates a multidisciplinary approach that balances oncologic safety with functional restoration. Segmental resection followed by delayed tibial graft reconstruction and staged implant rehabilitation offers a reliable pathway to achieving long-term tumour control, structural integrity, and patient satisfaction. The tibial donor site, though less commonly utilized, provides a practical and effective solution for moderate mandibular defects, especially when minimizing donor site morbidity is a priority [23-25].

Conclusion

This case underscores the clinical value of a staged approach in the management of multi-cystic mandibular ameloblastoma. The initial segmental resection ensured oncologic clearance, while delayed reconstruction with a tibial graft provided a structurally sound and biologically favourable foundation for subsequent implant-supported rehabilitation. The tibial graft's cortical-cancellous composition facilitated predictable osseointegration, and its minimal donor site morbidity made it a practical alternative to more commonly harvested sites such as the fibula or iliac crest. The decision to delay grafting allowed for vigilant postoperative surveillance, reducing the risk of graft compromise in the event of tumour recurrence. Implant placement in the grafted site was successful, restoring both function and aesthetics, and contributing to the patient's overall quality of life. This case highlights that tibial grafts, when selected appropriately, can offer reliable outcomes in moderate mandibular defects. Moreover, it reinforces the importance of individualized treatment planning, interdisciplinary coordination, and long-term follow-up in achieving durable disease control and optimal prosthetic rehabilitation.

Acknowledgments: The author acknowledges the surgical team and the OMFS department for their contributions to patient care and rehabilitation.

Ethical Statement: Informed consent was obtained from the patient for publication of this case report and accompanying images. The study was conducted in accordance with institutional ethical guidelines.

Conflict of Interest: The author declares no conflict of interest.

References

1. Reichart PA (1995) Betel-Quid And Areca-Nut Chewing, Oral Oncol 31: 45-49.
2. Alarcón-Sánchez MA (2023) Implant-supported prosthetic rehabilitation after Ameloblastomas treatment: a systematic review, BMC Oral Health 23: 1013.

3. Raoufi-Danner S (2018) Oral Rehabilitation of Patients with Ameloblastoma of the Mandible. Clinical Results in Three Patients with Different Bone Reconstruction Techniques. Open Dent J 12: 1107-1115.
4. Chrcanovic BR (2017) Analysis of risk factors for cluster behavior of dental implant failures, J Craniomaxillofac Surg 45: 1388-1393.
5. Effiom OA (2018) Head Face Med 14: 5.
6. Singh M (2015) J Oral Maxillofac Surg 73: 944-949.
7. Pogrel MA (2006) Etiology of lingual nerve injuries in the third molar region: a cadaver and histologic study. J Oral Maxillofac Surg 64: 376-382.
8. Ghandour L (2019) J Craniofac Surg 30: e548-e551.
9. Dhanuthai K (2012) Ameloblastoma: a multicentric study. Oral Surg Oral Med Oral Pathol Oral Radiol 113: 788-793.
10. Hidalgo DA (1989) Fibula free flap: a new method of mandible reconstruction, Plast Reconstr Surg 84: 71-79.
11. Urken ML (1991) Composite free flaps in oromandibular reconstruction. Review of the literature, Arch Otolaryngol Head Neck Surg 117: 724-732.
12. Brown JS (2002) Intermaxillary fixation compared to miniplate osteosynthesis in the management of the fractured mandible: an audit, Br J Oral Maxillofac Surg 40: 392-398.
13. Kalavathy N (2011) Indian Prosthodontic Society.
14. Kaban LB (2006) J Oral Maxillofac Surg 64: 765-769.
15. Kumar BP (2016) Mandibular Reconstruction: Overview, J Maxillofac Oral Surg 15: 442-447.
16. Chiapasco M (2006) Clin Oral Implants Res 17: 220-228.
17. Kumar V (2018) J Prosthodont Res 62: 273-279.
18. Nakamura N (2002) Comparison of long-term results between different approaches to ameloblastoma, Oral Surg Oral Med Oral Pathol Oral Radiol Endod 93: 13-20.
19. Erovic BM (2012) J Otolaryngol Head Neck Surg 41: E1-E5.
20. Chana JS (2004) Br J Oral Maxillofac Surg 42: 481-486.
21. Genden EM (2003) Comparison of functional and quality-of-life outcomes in patients with and without palatomaxillary reconstruction: a preliminary report. Arch Otolaryngol Head Neck Surg 29: 775-781.
22. Albrektsson T (1987) The long-term efficacy of currently used dental implants: a review and proposed criteria of success. Int J Prosthodont 1: 11-25.
23. Buser DJ (1997) Recent Process Design and Development Strategies for Dental Materials. Periodontol 68: 905-913.
24. Esposito M (1998) Biological factors contributing to failures of osseointegrated oral implants. (I). Success criteria and epidemiology Clin Oral Implants Res 9: 1-12.
25. Heboyan A (2023) New biomaterials for modern dentistry. BMC Oral Health 23:1013.