European Annals of Dental Sciences
Official Publication of Ankara University, Faculty of Dentistry

EADS, 2022, 49 (1), 34–37

e-ISSN : 2757-6744
doi : 10.52037/eads.2022.0007

Article Received : May, 5 2021
Article Accepted : December, 1 2021

CASE REPORT

Ameloblastoma of the Posterior Mandible: Radical Resection and Reconstruction Using Osteofaciocutaneous Free Fibular Flap

Mitat Selçuk Bozhöyük [1], Süha Beton [1], Burak Kaya [2], Poyzan Bozkurt [3,*], Mehmet Eray Kolsuz [4] and Kadir Anıl Naneci [3]

[1]Department of Otorhinolaryngology, Faculty of Medicine, Ankara University, Ankara, Turkey. and [2]Department of Plastic Reconstructive and Aesthetic Surgery, Ankara University, Faculty of Medicine, Ankara, Turkey. and [3]Department of Oral and Maxillofacial Surgery, Ankara University, Faculty of Dentistry, Ankara, Turkey. and [4]Department of Dentomaxillofacial Radiology, Ankara University School of Medicine, Ankara, Turkey.

*Corresponding Author; poyzanbozkurt@hotmail.com

Abstract

A case of ameloblastoma in the posterior region of the right mandible in a 38-year-old female patient is presented. The diagnosis was made after needle aspiration biopsy and resection treatment was planned. The resected mandible was constructed via osteofaciocutaneous free fibular flap. Today, this treatment option is considered the gold standard and in the present case, treatment results were favorable.

Key words: ameloblastoma; osteofaciocutaneous free fibular flap; mandible; radical resection

Introduction

Ameloblastomas are responsible for 1% of all oral cavity tumors and 90% of tumors in the mandible. [1] In the histological classification of odontogenic tumors made by the World Health Organization (WHO), ameloblastoma benign is defined as a locally invasive epithelial odontogenic neoplasm originating from the enamel organ and is divided into four categories: solid / multicystic (SMA), unicystic (UA), peripheral (PA) and desmoplastic ameloblastoma. [2,3] SMA is the most common subtype of ameloblastoma, accounting for 80% of cases. Although the tumor is seen in all ages, its incidence peaks in the 3rd and 4th decades. [4] Clinically, ameloblastoma is a mostly painless tumor that grows slowly, causing enlargement and perforation in the cortical bone and then infiltration of the adjacent soft tissue. It is characterized by the slow growth of the jaw without pain. [5]

Surgery is the main approach in the treatment of ameloblastoma. The treatment method to be chosen depends on the clinical presentation of the tumor; while enucleation and curettage options with more conservative limits are recommended for PA and UA, a more radical treatment is recommended in the SMA. [6] Although conservative methods require shorter recovery time, these approaches have high recurrence rates, and the procedures often must be repeated, even with the less aggressive UA. [6–8] In contrast, radical segmental mandibulectomy reveals the problem of reconstruction while having lower recurrence rates. [9–11]

The mandible is an important structure in the face for chewing, speaking, swallowing, and for the tongue to function normally. After the treatment of tumors in the mandible with radical resection, large defects occur and lead to the impairment of the functions mentioned. In addition, the cosmetic problems that occur also cause the patients to be socially isolated. For this reason, repair of the defective mandible is very important in order to restore the functions of these patients and prevent their social isolation. [12] Osteofaciocutaneous free fibular flaps meet these restorative needs by providing high amount of cortical bone and showing sufficient tissue coverage both intraorally and extra orally, and in addition, they also allow dental rehabilitation. [13] A case of multicystic ameloblastoma of great extent in the mandibular posterior region and its surgical treatment is presented.

Case Report

A 38-year-old female patient presented with complaint of a swelling in the right mandibular posterior region. Clinical examination re-

How to cite: Bozhoyuk MS, Beton S, Kaya B, Bozkurt P, Kolsuz ME, Naneci KA. Ameloblastoma of the Posterior Mandible: Radical Resection and Reconstruction Using Osteofaciocutaneous Free Fibular Flap. EADS. 2022;49(1):34-37

vealed extraoral swelling (Figure 1), and panoramic radiography examination revealed a lytic lesion with scalloped margins or a "soap bubble" appearance (Figure 2). Fine needle aspiration biopsy was made and as a result diagnosis of ameloblastoma was made. Computerized tomography scan was obtained to precisely evaluate the lesion margins (Figure 3).

Right hemimandibulectomy followed by an osteofaciocutaneous free fibular flap was planned for the excision of the mass diagnosed with ameloblastoma in the posterior region of the right mandible and for the reconstruction of the defect to be formed. The operation was initiated by the otolaryngology, plastic and reconstructive surgery and oral and maxillofacial surgery teams simultaneously. After orotracheal intubation, the patient was positioned under general anesthesia. The patient was put on pneumatic boots, appropriate field cleaning (leg and neck) and dressings were applied.

Figure 1. Extraoral view of the patient.

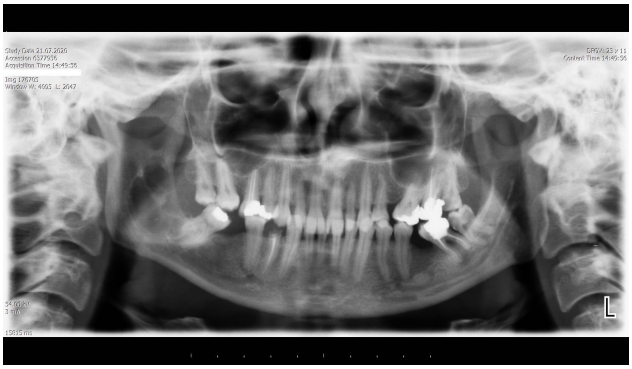

Figure 2. Lytic lesion with scalloped margins or a "soap bubble" appearance shown on panoramic radiography.

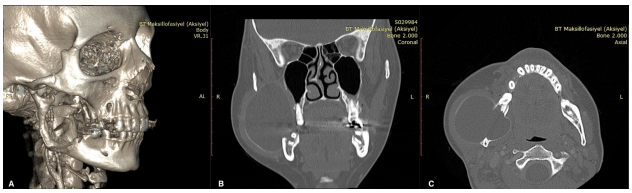

Figure 3. CT scan of the lesion. A) 3D reconstruction. B) Coronal view. C) Axial view.

Figure 4. Planned incision drawn with sterile pen.

Tracheotomy procedure:

A 3 cm horizontal incision was made at the midpoint of the distance between the lower border of the cricoid cartilage and the sternal notch. Dissection was continued by passing the skin and subcutaneous tissues and the infrahyoid muscles were lateralized to reach the trachea. An approximately 120-degree incision was made between the second and third tracheal rings and ventilation was continued by placing a spiral tube numbered 7,5. With 0 silk, 1 fixation stitch was made from the second tracheal cartilage and 3 from the third tracheal cartilage.

Hemimandibulectomy:

A J-shaped incision was planned to start from the right mastoid tip extending to the midline just above the thyroid cartilage, turning on to the mentum and lower lip and drawn with a sterile pen. (Figure 4) Subcutaneous jetocaine was administered to the incision line. Skin and subcutaneous tissue were passed, and the platysma was identified. The platysma was then sharply dissected. After the platysma was passsed the sternocleidomastoid muscle, posterior belly of the digastric muscle and suprahyoid muscles were identified. The mandibular angle and corpus were palpated. Submandibular gland was exposed. Preserving the marginal mandibular nerve, the tissue was deepened, and the periosteum of the mandible was reached. Then the mandible was dissected in a subperiosteal fashion starting from the masseteric sling and the masseter muscle was dissected from the mandibular angle up to the coronoid process and condyle. The mental foramen was visualized, and mental nerve was exposed (Figure 5 white arrow). The mass was exposed (Figure 5 yellow arrow). The mass was observed to extend in the superior direction deep into the masseter muscle and to the parotid gland. The mass was dissected from the surrounding tissues (Figure 6). There was no invasion of the tumor to the above-mentioned anatomical structures.

Correct maxillomandibular occlusion was stabilized by using 6 IMF screws (3 to the maxilla, 3 to the mandible) before the mandibulotomies. It was decided to make the first mandibulotomy line just lateral to the right mental foramen, and the second mandibulotomy line to be made obliquely, partially including the condyle and

Figure 5. Intraoperative view. White arrow: Visualized mental foramen and mental nerve. Yellow arrow: The ameloblastoma destructing the mandibular corpus, ramus, condyle and coronoid process.

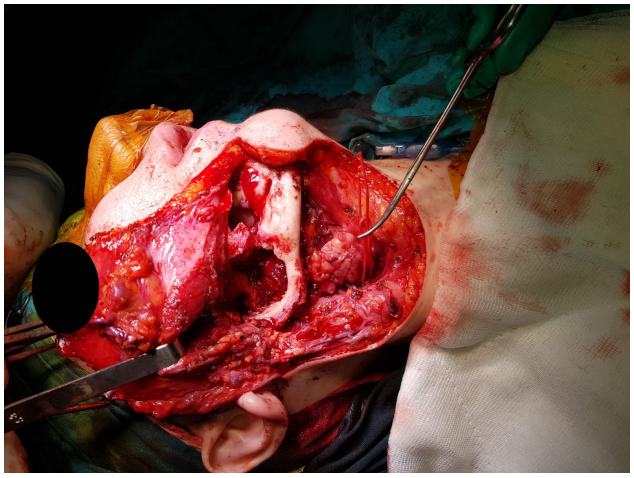

Figure 6. The remaining bone margins after dissection of the ameloblastoma.

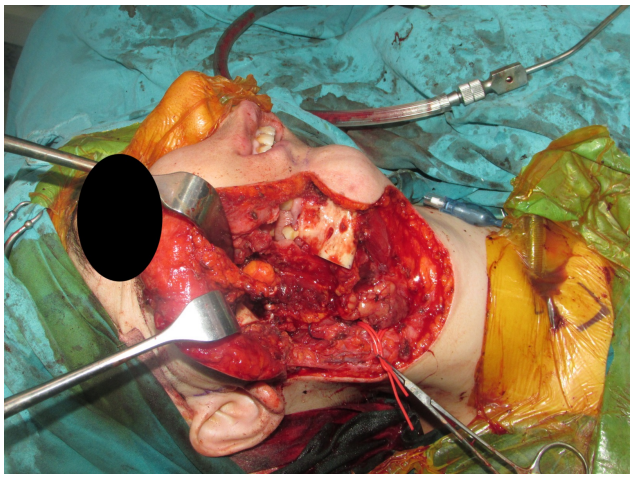

Figure 7. The resected mandible.

coronoid process with 1cm of safe margins into the healthy bone. Adjacent oral mucosa was excised along with the mass to provide a safe surgical margin (Figure 7).

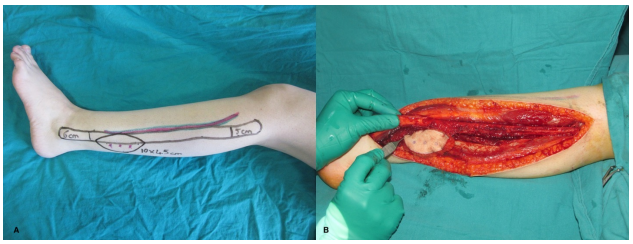

Figure 8. Free fibular flap. A) Planned design. B) The osteofasciocutaneous free fibular flap.

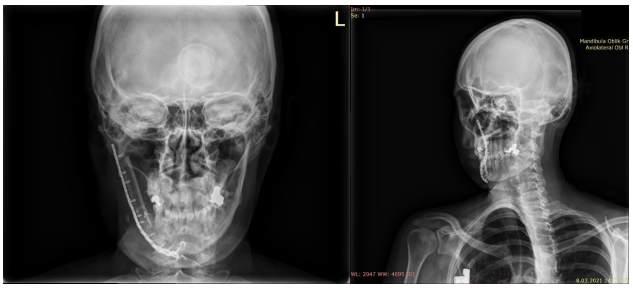

Figure 9. Postoperative view.

Osteofasciocutaneous free fibular flap:

In order to obtain the osteofasciocutaneous free fibular flap from the left leg, a skin island was planned 6 cm above the outer malleolus, on the axis extending from the left caput fibula to the left outer malleolus (Figure 8 A). The peroneus longus and brevis muscles were reached with the incision made in accordance with the plan. With the dissection performed from the posterior of these muscles, the septocutaneous perforator vessels feeding the skin were preserved and the fibula was reached, sufficient amount of bone tissue was explored, and the bone tissue was separated from the fibula with gigli wire. The pedicle was explored up to the common peroneal bifurcation by dissecting medial to the fibula. Then, the pedicle of the osteofasciocutaneous free fibular flap was tied and separated from the peroneal artery and vein (Figure 8 B).

Reconstruction:

The facial artery and vein in the recipient area were dissected and prepared for anastomosis. Afterwards, the fibular segment in the flap was modified with osteotomy and striker in accordance with the planned 3D outline and adapted to the defect in the right mandible as 3 parts. Stabilization was achieved with plates and screws (14 screws and 1 reconstruction plate). The facial artery and vein where the anastomosis will be performed was made suitable for anastomosis with the osteofasciocutaneous free flap pedicle of the fibula. Using a microscope in accordance with the microsurgery technique, the pedicle of the flap was anastomosed to the facial artery and its accompanying vein with 8/0 prolene suture (Ethicon, USA). The skin island was adapted to the defect in the oral mucosa with 4/0 vicryl (Ethicon, USA). A size 10 passive drain was placed in the right neck. The operation area, subcutaneous tissue and skin tissue in the right neck area were repaired with appropriate sutures. Tissue defect that occurred after the insertion of an osteofasciocutaneous free fibular flap to the site with approximation sutures and 1 number 10 active silicone drain was primarily repaired with appropriate sutures. The operation was terminated following the application of a plaster splint to the left lower extremity extending to the knee, following the appropriate dressing of the incision lines.The postoperative CT scan of the reconstructed mandible is presented in Figure 9.

Discussion

The histological growth characteristics of ameloblastomas and the surgical method preferred in the initial treatment are stated as important factors determining the prognosis of ameloblastoma treatment.[2] Traditionally, preventive approaches were preferred in the surgical treatment of ameloblastomas due to benign histological structure and slow growth rate.[2]However, radical resections are currently preferred overprotective excisions, due to local aggressive spread and high recurrence rate, especially for the SMA subtype. For the less aggressive UA subtype, it has been reported that curettage / enucleation treatment with / or without application of Carnoy's solution may be appropriate.[2]

The recurrence rates of 90% reported after conservative surgeries decrease to nearly 0% after radical surgeries.[2] In addition, the potential of recurrent ameloblastomas to transform into aggressive ameloblastic carcinoma also supports this situation.[2] However, the oromandibular region is an important part of the face and due to loss of bone continuity and loss of teeth hosted by bone, cosmetic and functional problems occur after radical treatments, so it is still a matter of debate which surgical method will be preferred.[2,5,11] In the present case, radical resection and immediate reconstruction with a free fibular flap were preferred in the treatment of multicystic ameloblastoma.[5,11]

The iliac crest flap and fibular free flap are the most commonly used vascularized flaps in mandibular reconstruction today. and these treatment protocols are considered state-of-the-art procedures.[5,11] In a study comparing the iliac crest flap and fibular free flap for mandibular reconstruction, there were fewer complications in the fibular free flap group, better oral continence, socialization and facial appearance features to meet functional and aesthetic needs, and higher patient satisfaction in this group.[11] A bone of 20-30 cm is obtained with free fibular graft and the diameter of the obtained bone is very close to the diameter of the mandible. This long bone is advantageous in putting it into the mandible form with multiple osteotomies.[5] However, multiple osteotomies required to accommodate this straight bone to the defect in the mandible, compromise the bone's perfusion and prolong the operative time. Even with these disadvantages, a jawbone that will allow even dental implant surgery in the future is achieved. Satisfactory cosmetic and functional results are obtained immediately after resection and increased patient's quality of life is obtained compared to late reconstruction.[5]

Since ameloblastomas that expand in the bone generally expand the soft tissue along with it, there is sufficient soft tissue available, soft tissue repair is generally not required in the surgery of these tumors. However, in the presented case there was a tumor anatomy extending beyond the bone into the soft tissue, the associated soft tissue was also excised together with the lesion and the possibility of recurrence was desired to be reduced. For this reason, the osteofasciocutaneous free fibular flap has been used to repair the defect in the intraoral tissue.

Conclusion

Osteofasciocutaneous fibular free flap is a favorable option in reconstructing the mandible for the surgical resection of ameloblastoma.

Author Contributions

All authors have contributed to; conception and design of the study, data collection and analysis, writing the manuscript, approval of the final version to be submitted.

Conflict of Interest

Authors declare no Conflict of Interests for this article.

Authors' ORCID(s)

M.S.B. 0000-0001-8647-5709
S.B. 0000-0001-8647-5709
B.K. 0000-0001-8516-3658
P.B. 0000-0001-6752-3998
M.E.K. 0000-0001-8872-1897
K.A.N. 0000-0002-9983-0674

References

1. Avelar RL, Primo BT, Pinheiro-Nogueira CB, Studart-Soares EC, de Oliveira RB, Romulo de Medeiros J, et al. Worldwide incidence of odontogenic tumors. J Craniofac Surg. 2011;22(6):2118–23. doi:10.1097/SCS.0b013e3182323cc7.
2. Milman T, Ying GS, Pan W, LiVolsi V. Ameloblastoma: 25 Year Experience at a Single Institution. Head Neck Pathol. 2016;10(4):513–520. doi:10.1007/s12105-016-0734-5.
3. Snead ML, Luo W, Hsu DD, Melrose RJ, Lau EC, Stenman G. Human ameloblastoma tumors express the amelogenin gene. Oral Surg Oral Med Oral Pathol. 1992;74(1):64–72. doi:10.1016/0030-4220(92)90217-e.
4. Olaitan AA, Adekeye EO. Clinical features and management of ameloblastoma of the mandible in children and adolescents. Br J Oral Maxillofac Surg. 1996;34(3):248–51. doi:10.1016/s0266-4356(96)90279-x.
5. Li X, Zhu K, Liu F, Li H. Assessment of quality of life in giant ameloblastoma adolescent patients who have had mandible defects reconstructed with a free fibula flap. World J Surg Oncol. 2014;12:201. doi:10.1186/1477-7819-12-201.
6. Dandriyal R, Gupta A, Pant S, Baweja HH. Surgical management of ameloblastoma: Conservative or radical approach. Natl J Maxillofac Surg. 2011;2(1):22–7. doi:10.4103/0975-5950.85849.
7. Hertog D, Bloemena E, Aartman IH, van-der Waal I. Histopathology of ameloblastoma of the jaws; some critical observations based on a 40 years single institution experience. Med Oral Patol Oral Cir Bucal. 2012;17(1):e76–82. doi:10.4317/medoral.18006.
8. Sehdev MK, Huvos AG, Strong EW, Gerold FP, Willis GW. Proceedings: Ameloblastoma of maxilla and mandible. Cancer. 1974;33(2):324–33. doi:10.1002/1097-0142(197402)33:2<324::aid-cncr2820330205>3.0.co;2-u.
9. Müller H, Slootweg PJ. The ameloblastoma, the controversial approach to therapy. J Maxillofac Surg. 1985;13(2):79–84. doi:10.1016/s0301-0503(85)80021-7.
10. Simon EN, Merkx MA, Kalyanyama BM, Shubi FM, Stoelinga PJ. Immediate reconstruction of the mandible after resection for aggressive odontogenic tumours: a cohort study. Int J Oral Maxillofac Surg. 2013;42(1):106–12. doi:10.1016/j.ijom.2012.07.010.
11. Yilmaz M, Vayvada H, Menderes A, Demirdover C, Kizilkaya A. A comparison of vascularized fibular flap and iliac crest flap for mandibular reconstruction. J Craniofac Surg. 2008;19(1):227–34. doi:10.1097/scs.0b013e31815c942c.
12. Gbara A, Darwich K, Li L, Schmelzle R, Blake F. Long-term results of jaw reconstruction with microsurgical fibula grafts and dental implants. J Oral Maxillofac Surg. 2007;65(5):1005–9. doi:10.1016/j.joms.2006.06.294.
13. Chai KS, Omar FH, Mat Saad AZ, Wan Sulaiman WA, Halim AS. A 20-year experience of immediate mandibular reconstruction using free fibula osteocutaneous flaps following ameloblastoma resection: Radical resection, outcomes, and recurrence. Arch Plast Surg. 2019;46(5):426–432. doi:10.5999/aps.2018.01487.