Individualized Treatment for the Mandibular Segmental Defect: A Case Report

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Abstract Ameloblastomas are slowly growing, locally invasive tumors with high recurrence rate and more common in the mandible, if not treated they can grow to enormous size. Radical resection is the only predictable form of treatment for ameloblastomas. However, mandibular resection can lead to dysfunctions in appearance, speech, mastication, and deglutition, which severely impair the patients' quality of life. The reconstruction of extensive bone defects in the maxillofacial area is still challenging. To meet the demands of functional reconstruction, minimizing the negative influence of mandibular malformation, and disability on patients, the individualized systematic treatment plans highlight denture prosthodontics and require much consideration of multidisciplinary cooperation, with such related fields as maxillofacial surgery, oral implantology, prosthodontics, and radiology taken into account. In this report, we will present a case of reconstructing the mandibular segmental defect after the resection of a rarely giant ameloblastoma. In the case, we took the restoration of the missing teeth and the rehabilitation of the masticatory function as well as restoring bony continuities and facial appearance into consideration, communicated well with prosthodontists and implantologists before surgery, making the individualized systematic treatment plan more effective and efficient.

Keywords Mandibular defects · Reconstruction · Individualized treatment · Fibula · Ameloblastoma

Background

Ameloblastomas are slowly growing, locally invasive tumors with high recurrence rate and more common in the mandible, if not treated they can grow to enormous size [1, 2]. Radical resection is the only predictable form of treatment for ameloblastomas [3]. However, mandibular resection can lead to dysfunctions in appearance, speech, mastication, and deglutition, which severely impair the patients' quality of life. The reconstruction of extensive bone defects in the maxillofacial area is still challenging [4]. To meet the demands of functional reconstruction, minimizing negative influence of mandibular malformation, and disability on patients, the individualized systematic treatment plans highlight denture prosthodontics and require much consideration of multidisciplinary cooperation, with such related fields as maxillofacial surgery, implantology, prosthodontics, and radiology taken into account. In this report, we will present a case of reconstructing the mandibular segmental defect after the resection of the rarely giant ameloblastoma.

Case Report

Clinical Information

A patient aged 61, whose chief complaint was “a painless tumor existing in the mandible for more than 40 years, ulcerating through the skin with stench for 10 years” came to our hospital and was hospitalized (Fig. 1a). The X-Ray revealed honeycomb-like shadow in the chin and mandibular body extending to the mandibular angle on both sides (Fig. 1b). Preoperative pathological diagnosis was mandibular ameloblastoma.

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Fig. 1 **a** Preoperative photograph of the patient. **b** Preoperative X-Ray. **c~d** Preoperative rapid model. **e** Implant template. **f** completely resected tumor. **g** Postoperative panoramic radiograph. **h~i** Preoperative photograph compared with the postoperative photograph

Treatment

The surgery we planned was “mandibular tumor and segmental mandible resection and left fibula free flap repair”. The maxilla model and reconstructed mandibular model were successfully prepared with the help of preoperative application of computer aided design and manufacturing (CAD/CAM) technology (Fig. 1c~d), with which we bent the titanium plate into proper shape in advance, and shaped the fibula during the surgery. Besides, the implant template with four locating rods made by prosthodontists before the surgery could be worn on maxillary teeth and work in two ways: one was for ensuring the bone graft fixed in the accurate site to acquire proper interarch distance, and the other was for guaranteeing the accuracy of the implant’s site and direction (Fig. 1e).

The patient was discharged from hospital 2 weeks after the surgery and regular reviews at the 3rd, 6th, 12th, 18th, and 24th month showed a stable condition and no evidence of tumor recurrence. The panoramic radiograph of the 24th month after surgery revealed the bone graft healed well without complication (Fig. 1g). We did not test mandibular function, but the

patient at that time had normal mouth opening with no reported problems with speech or eating. Then, we intended to remove the titanium plate and perform implant surgery to recover the masticatory function of the patient, but pitifully the patient refused the implantation due to financial reasons at last.

Even so, we fully considered the necessity of creating the prosthodontics conditions for the edentulous area while reconstructing the mandibular defects, which met the demands of implantology and additionally, the patient’s facial symmetry was greatly improved with the application of the preoperative sketch model (Fig. 1i).

Conclusion and Discussion

Ameloblastoma in such size is rare and the treatment of it is a huge challenge. *Sharma A* have reported five cases of such giant ameloblastoma and discussed the surgical management, but restoring the missing teeth and functional reconstruction of the mandible have not been mentioned [5].

In this case, we took the restoration of the missing teeth and the rehabilitation of the masticatory function as well as restoring bony continuities and facial appearance into consideration, communicated well with prosthodontists and implantologists before surgery, making the individualized systematic treatment plan more effective and efficient. Although the patient refused to have dental implants due to financial reasons, this case of mandibular segmental defects reconstruction can be used as a clinical reference.

Conflict of Interest Statement All the authors declare that there are no financial and personal relationships with other people, or organizations.

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