



Ameloblastoma: Resection of tumor followed by reconstruction of the Mandible using Iliac Crest graft and reconstruction plate

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Abstract

Ameloblastoma is a benign but locally aggressive odontogenic tumor that frequently affects the mandible, leading to extensive bone destruction and a high recurrence rate if inadequately treated. The preferred management involves surgical resection of the affected mandibular region, followed by reconstruction to restore both function and aesthetics. This article explores the use of autogenous iliac crest bone grafts for mandibular reconstruction after tumor resection. The iliac crest provides ample, well-vascularized bone, facilitating structural support and aesthetic contouring. Despite potential complications, such as donor site pain or graft failure, iliac crest grafts offer high success rates, particularly in ameloblastoma cases. Ongoing

advancements in surgical techniques continue to enhance patient outcomes.

Keywords: Ameloblastoma, Odontogenic Tumor, Mandibular Resection, Mandibular Reconstruction, Iliac Crest Bone Graft, Autogenous Graft, Bone Destruction, Recurrence, Hemimandibulectomy, Segmental Mandibulectomy, Cortical Bone, Cancellous Bone, Bone Graft Integration, Speech and Mastication, Dental Implants, Facial Aesthetics, Tumor-Free Margins.

Introduction

Ameloblastoma is a rare, benign yet locally aggressive tumor that originates from the odontogenic epithelium. Although it accounts for about 1% of all oral tumors, ameloblastoma is notable for its high recurrence rate and the extensive bone destruction it can cause, particularly in the mandible. The treatment of choice for

ameloblastoma involves surgical resection of the affected mandibular segment, often followed by reconstruction to restore function, aesthetics, and structural integrity. One of the most effective methods for mandibular reconstruction is the use of autogenous iliac crest bone grafts.

Understanding Ameloblastoma

Ameloblastoma typically presents as a painless, slow-growing swelling in the jaw, with a higher prevalence in the posterior region of the mandible. Despite its benign nature, the tumor can be aggressive, invading surrounding bone and soft tissues, and has a significant tendency to recur if not treated adequately. Radiographically, ameloblastomas often appear as multilocular, radiolucent lesions, resembling a "soap bubble" or "honeycomb" pattern.

There are several subtypes of ameloblastoma, including conventional solid/multicystic, unicystic, peripheral, and desmoplastic. The solid/multicystic form is the most common and aggressive, requiring wide excision to minimize recurrence. Due to the tumor's invasive nature, simple enucleation or curettage is insufficient, as the tumor tends to infiltrate adjacent bone tissue.

Resection of Ameloblastoma

The primary treatment for ameloblastoma is surgical resection with clear margins, which may involve a partial or complete removal of the mandible, depending on the extent of the tumor. The goal is to achieve a tumor-free margin of at least 1 to 2 centimeters of healthy bone to reduce the likelihood of recurrence. Depending on the size and location of the ameloblastoma, the surgery may involve a segmental mandibulectomy, hemimandibulectomy, or subtotal mandibulectomy.

This extensive resection often leads to significant defects in the mandible, compromising not only the patient's facial appearance but also key functions such as speech, mastication, and swallowing. As a result, immediate or delayed reconstruction is necessary to restore both form and function.

Reconstruction of the Mandible with Iliac Crest Graft

Reconstructive surgery following mandibulectomy is a critical component of the overall treatment plan. One of the most effective and widely used techniques for mandibular reconstruction is the use of an autogenous iliac crest bone graft. This method involves harvesting bone from the patient's iliac crest (part of the pelvic bone) and transplanting it to the defect in the mandible.

Benefits of Iliac Crest Graft

The iliac crest is a popular donor site for mandibular reconstruction due to its ease of access and the availability of both cortical and cancellous bone. The graft can provide the structural support necessary for dental rehabilitation and implant placement, while also ensuring a natural contour for facial aesthetics. Key advantages of iliac crest grafts include:

Ample Bone Volume: The iliac crest provides a substantial amount of bone, allowing for reconstruction of even large mandibular defects.

Good Vascularization: The bone from the iliac crest is well-vascularized, promoting quicker graft integration and healing.

Durability: The graft provides long-term stability and strength, making it an ideal choice for reconstructing load-bearing areas such as the mandible.



Figure 1



Figure 2

Harvesting the Iliac Crest Graft

The procedure for harvesting the graft begins with the patient lying in a supine position, with a small sandbag placed under the gluteal region to expose the iliac crest. A surgical incision is made over the iliac crest, and the bone is carefully harvested using an osteotome or saw. The graft is then contoured to match the shape of the mandibular defect and fixed into place using titanium plates and screws.

One of the key challenges in using non-vascularized grafts, such as the iliac crest graft, is ensuring adequate blood supply to the transplanted bone. However, when performed with proper technique and post-operative care, the graft typically integrates well with the surrounding tissues.

Complications and Success Rates

While the use of iliac crest grafts has a high success rate, there are potential complications associated with both the donor and recipient sites. Common complications at the donor site include pain, hematoma, infection, and, in rare cases, sensory disturbances due to nerve injury. At the recipient site, risks include infection, graft failure, and resorption.

Studies have shown success rates of iliac crest grafts for mandibular reconstruction ranging from 76% to 100%. The high success rate is often attributed to the graft's robust volume and structural integrity, which help in maintaining the desired facial contour and support for dental implants. Additionally, the absence of post-operative radiation therapy, often necessary in cases involving malignant tumors, further increases the likelihood of graft success in ameloblastoma cases.

Post-Operative Care and Rehabilitation

Following mandibular reconstruction with an iliac crest graft, patients require careful monitoring to ensure proper healing and graft integration. Antibiotics and pain management are typically prescribed to minimize the risk of infection and alleviate post-surgical discomfort. Regular follow-up appointments allow for the assessment of graft incorporation and the detection of any complications early on.

Rehabilitation involves restoring oral function, which may include dental implants to replace missing teeth, speech therapy, and nutritional support. In some cases, dental prosthetics or dentures may be necessary to restore chewing ability and aesthetic appearance.

Conclusion

Ameloblastoma, despite being benign, can cause significant destruction of the mandible, necessitating aggressive surgical resection. Reconstruction of mandibular defects with an autogenous iliac crest bone

graft remains one of the most effective techniques for restoring function and aesthetics in patients. With a high success rate and relatively few complications, iliac crest grafts offer an excellent option for patients undergoing mandibular reconstruction, particularly in settings where advanced reconstruction techniques may not be readily available. Ongoing advancements in surgical techniques and grafting materials continue to improve outcomes for patients affected by this challenging tumor.

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