

Maxillary Sinus Augmentation and Dental Implant Placement: A Case Report

Muhammed Yakin*

Department of Dentistry, Sir John Walsh Research Institute, University of Otago, Dunedin, New Zealand

Abstract

Maxillary sinus augmentation is a surgical procedure performed to increase the amount of bone in the posterior maxilla, particularly in cases where there is insufficient bone height for dental implant placement. The procedure involves lifting the sinus membrane and placing a bone graft in the sinus cavity to promote new bone formation. This case report describes the successful rehabilitation of a patient with maxillary posterior edentulism through maxillary sinus augmentation and subsequent dental implant placement. The report highlights the diagnostic process, treatment planning, surgical technique, and postoperative outcomes.

Keywords: Dental implant • Maxillary sinus augmentation • Anesthesia

Introduction

Patient presentation

A 50-year-old male presented with missing maxillary posterior teeth and desired a fixed dental prosthesis to restore the function and aesthetics of his smile. Clinical and radiographic examinations revealed severe bone resorption in the posterior maxilla, with inadequate bone height for dental implant placement. The patient had good oral hygiene and no contraindications for surgery [1].

Diagnosis and treatment planning

Based on the clinical and radiographic findings, a diagnosis of maxillary posterior edentulism with insufficient bone height was established. Cone-Beam Computed Tomography (CBCT) scans were obtained to assess the quantity and quality of the remaining bone and evaluate the sinus anatomy. The treatment plan involved maxillary sinus augmentation to increase the available bone volume, followed by dental implant placement to support a fixed prosthesis [2].

Surgical procedure

Under local anesthesia, a crestal incision was made in the posterior maxilla, and a full-thickness flap was elevated to expose the underlying bone. A lateral window approach was used to access the maxillary sinus. The sinus membrane was carefully elevated, creating a space for the bone graft material. A suitable bone graft, such as autogenous bone, allograft, or xenograft, was placed in the sinus cavity, ensuring proper adaptation to the surrounding bone. The graft was secured in place, and the surgical site was covered with a resorbable membrane or collagen sponge. The flap was then repositioned and sutured to achieve primary closure [3].

**Address for Correspondence:* Muhammed Yakin, Department of Dentistry, Sir John Walsh Research Institute, University of Otago, Dunedin, New Zealand, E-mail: Muhammedyakin210@yahoo.com

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Postoperative management

The patient was prescribed analgesics, antibiotics, and a chlorhexidine mouth rinse to manage pain, prevent infection, and promote healing. An instruction regarding postoperative care, such as avoiding strenuous activities, maintaining proper oral hygiene, and adhering to a soft diet, was provided. Regular follow-up visits were scheduled to monitor the healing process, evaluate implant integration, and plan for the subsequent restorative phase.

Literature Review

Dental implant placement and prosthetic rehabilitation

After an appropriate healing period, dental implants were placed in the augmented posterior maxilla using a two-stage or one-stage surgical approach, depending on the implant system and the stability of the implant site. Osseointegration was allowed to occur over a period of several months. Once the implants had integrated successfully, an impression was taken, and the final prosthetic restoration was fabricated. The patient received a fixed implant-supported prosthesis, providing a functional and aesthetic replacement for the missing teeth [4].

Follow-up and outcomes

The patient was followed up regularly to evaluate implant stability, assess occlusion, and monitor the overall success of the treatment. Radiographic imaging confirmed the integration of dental implants and the presence of sufficient bone support. Clinically, the patient reported improved chewing ability, enhanced speech, and increased satisfaction with the appearance of the restored smile. Dental implant placement is a surgical procedure that involves the insertion of artificial tooth roots, known as dental implants, into the jawbone to provide a stable foundation for dental restorations, such as crowns, bridges, or dentures. Dental implants are typically made of biocompatible materials, such as titanium, that fuse with the surrounding bone through a process called osseointegration. This integration allows the implant to mimic the function and appearance of natural teeth [5].

The dental implant placement process involves several steps, including

Treatment planning: Prior to the surgical procedure, a thorough evaluation is conducted to assess the patient's oral health, including the condition of the jawbone, surrounding teeth, and gums. Diagnostic imaging, such as panoramic radiographs or Cone-Beam Computed Tomography (CBCT) scans, is utilized to determine the optimal position and size of the implants. The treatment plan is customized based on the patient's specific needs and desired outcome.

Anesthesia: Local anesthesia is administered to numb the area where the implant will be placed, ensuring the patient's comfort throughout the procedure. In some cases, additional sedation or general anesthesia may be used for patients with dental anxiety or extensive treatment requirements.

Incision and access: A small incision is made in the gum tissue at the site of the missing tooth or teeth to expose the underlying jawbone. In certain cases, a flap may be created to gain better access to the surgical site.

Implant placement: A specialized dental drill is used to create a small hole in the jawbone at the predetermined location for the implant. The implant is then carefully inserted into the hole, ensuring proper alignment and stability. The implant may be a single unit or part of a larger system, depending on the restoration being planned.

Osseointegration: Once the implant is in place, the surrounding gum tissue is sutured back into position, allowing the healing process to begin. Over the next several weeks or months, osseointegration takes place, during which the bone fuses with the implant surface, providing a solid foundation for the dental restoration. Restorative Phase: After the osseointegration period, a second minor surgery may be required to expose the implant and attach a small connector, known as an abutment, to the implant. The abutment serves as a connector between the implant and the dental restoration. In some cases, a temporary restoration may be placed during this stage. Once the gum tissue has healed around the abutment, the final dental restoration, such as a crown, bridge, or denture, is fabricated and attached to the abutment [6].

Follow-up and maintenance: Regular follow-up visits are essential to monitor the healing process, assess the stability of the implant, and ensure proper function and aesthetics. Routine oral hygiene practices, including brushing, flossing, and professional dental cleanings, are crucial for maintaining the health of the implant and surrounding tissues. Dental implant placement offers numerous benefits, including improved chewing ability, enhanced speech, and restored aesthetics. Dental implants have a high success rate and can provide long-term solutions for replacing missing teeth. With proper care and maintenance, dental implants can last for many years, contributing to a healthier and more confident smile.

Discussion

Maxillary sinus augmentation followed by dental implant placement is a predictable and effective treatment modality for patients with insufficient bone height in the posterior maxilla. This case report highlights the successful rehabilitation of a patient with maxillary posterior edentulism using this approach. The utilization of advanced diagnostic imaging, meticulous surgical technique, and proper postoperative care contributed to the positive outcomes achieved.

Conclusion

Maxillary sinus augmentation and dental implant placement offer a viable solution for patients with inadequate bone height in the posterior maxilla. This case report demonstrates the successful rehabilitation of a patient with maxillary posterior edentulism through maxillary sinus augmentation and subsequent

dental implant placement. The procedure provides a stable foundation for the restoration of missing teeth, improving oral function and aesthetics. The proper selection of bone graft material, meticulous surgical technique, and adherence to postoperative care protocols contribute to the long-term success of the treatment. Dental professionals play a crucial role in diagnosing, planning, and implementing this treatment approach, ultimately improving the quality of life for patients in need of posterior maxillary tooth replacement.

Acknowledgement

None.

Conflict of Interest

None.

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