History of Medicine, 2026, 12(1): 337-345

DOI: 10.48047/HM. V12.I1.2026.337-345

Indirect Sinus Floor Elevation with Simultaneous Implant Placement Without Bone Grafting: A Case Report

Dr Vishvajit patil[1], Dr. Ankita Raj[2], Dr Mohammed Haaris Khan[3], Dr Akash Tiwari[4], Dr Rajat Shrivastava[5], Dr Prasad Thakare[6]

Corresponding Author: Dr Vishvajit patil[1], Post Graduate, Department of Oral and Maxillofacial Surgery, Rama Dental College and Research Centre, Kanpur PO: SAVARDE, DISTRICT: KOLHAPUR, MAHARASHTRA – 416109 . vishvajitpatil18327@gmail.com, 9518517388
Professor, Department of Oral and Maxillofacial Surgery, Rama Dental College Hospital and Research Centre, Kanpur, Uttar Pradesh, India, drankitaraj.rdc@ramauniversity.ac.in 9415465531
Assistant professor, Department of Oral and Maxillofacial Surgery, Rama Dental College and Research Centre, Kanpur, Uttar Pradesh, India haarism.khan@gmail.com 8909771760
Assistant professor, Department of Oral and Maxillofacial Surgery, Rama Dental College and Research Centre, Kanpur, Uttar Pradesh, India akash.tiwari5186@gmail.com 9696643192
Assistant professor, Department of Oral and Maxillofacial Surgery, Rama Dental College and Research Centre, Kanpur, Uttar Pradesh, India raj08.sriva@gmail.com 7905734937
Post Grauate, Department of Oral and Maxillofacial Surgery, Rama Dental College and Research Centre , Kanpur, Uttar Pradesh, India pthakarepatil@gmail.com 7350115803

Abstract

Background: Rehabilitation of the posterior maxilla with dental implants is frequently complicated by insufficient bone height and increased pneumatization of the maxillary sinus following tooth loss. Sinus floor elevation procedures have been widely used to overcome this anatomical limitation. The osteotome sinus floor elevation (OSFE) technique is a minimally invasive approach that allows elevation of the sinus membrane through the alveolar crest. In selected cases, implants can be placed simultaneously without the use of bone grafting materials.

Case Presentation: A 45-year-old male patient presented with a missing maxillary left first molar and reduced residual bone height beneath the maxillary sinus. Radiographic evaluation showed approximately 6.7 mm of residual bone height, which was insufficient for conventional implant placement. Indirect sinus floor elevation using osteotomes was performed along with simultaneous placement of a dental implant without the use of bone graft material. Clinical and radiographic evaluations were performed immediately after surgery and at 3- and 6-month follow-up intervals.

Results: The implant achieved good primary stability and remained clinically stable throughout the follow-up period. Radiographic examination demonstrated progressive increase in bone height beneath the elevated sinus membrane, indicating new bone formation. Minimal crestal bone loss was observed during the healing phase.

Conclusion: Indirect sinus floor elevation with simultaneous implant placement without bone grafting can be a predictable and minimally invasive procedure for implant rehabilitation in the posterior maxilla with limited bone height. The technique reduces surgical morbidity, treatment time, and overall cost while maintaining favorable clinical outcomes.

DOI: 10.48047/HM. V12.I1.2026.337-345

Keywords: Dental implants, indirect sinus lift, osteotome sinus floor elevation, maxillary sinus augmentation, bone regeneration.

Introduction

Dental implants have become the preferred treatment option for replacing missing teeth due to their high success rates and ability to restore both function and esthetics.[1] Successful implant therapy largely depends on the presence of adequate bone volume and quality to achieve primary stability and long-term osseointegration. However, implant placement in the posterior maxilla often presents significant challenges because of anatomical and physiological changes that occur after tooth extraction.

Following tooth loss, progressive resorption of the alveolar ridge occurs. In the maxillary posterior region, this process is frequently accompanied by pneumatization of the maxillary sinus.[2] These changes result in a reduction in the vertical height of bone between the alveolar crest and the sinus floor, making conventional implant placement difficult or impossible.[2]

To address this limitation, various sinus augmentation techniques have been developed.[3] The two most commonly used approaches are the **lateral window technique** and the **transalveolar or indirect sinus floor elevation technique**.[3] The lateral window approach provides direct visualization of the sinus membrane and allows placement of large volumes of graft material; however, it is relatively invasive and associated with increased surgical time and patient morbidity.

The indirect sinus floor elevation technique, first popularized with the use of osteotomes, offers a less invasive alternative.[4] In this technique, the sinus membrane is elevated through the alveolar crest using specially designed osteotomes. This method is particularly useful in cases where a moderate amount of residual bone height is present and allows simultaneous implant placement.

Traditionally, bone graft materials such as autogenous bone, allografts, xenografts, or synthetic substitutes have been used during sinus augmentation procedures to promote bone formation and maintain space beneath the elevated sinus membrane.[5] However, recent studies have suggested that bone grafting may not always be necessary. The blood clot formed beneath the elevated sinus membrane may serve as a scaffold for bone regeneration[6], and the osteogenic potential of the Schneiderian membrane may contribute to new bone formation.

Eliminating the use of graft materials can reduce surgical complexity, cost, and the risk of complications associated with donor site harvesting or graft rejection. Therefore, the present case report describes the successful use of **indirect sinus floor elevation with simultaneous implant placement without bone grafting** in the rehabilitation of a missing posterior maxillary tooth.

Case Report

Patient History

History of Medicine, 2026, 12(1): 337-345

DOI: 10.48047/HM. V12.I1.2026.337-345

A 45-year-old male patient presented to the Department of Oral and Maxillofacial Surgery with the chief complaint of difficulty in chewing due to a missing tooth in the upper left posterior region. The patient reported that the tooth had been extracted approximately one year earlier because of extensive dental caries.

The patient's medical history was non-contributory. He was not taking any medications and had no history of systemic diseases such as diabetes, hypertension, or sinus pathology. The patient expressed interest in a fixed prosthetic replacement and was considered a suitable candidate for dental implant therapy.

Fig.1- Occlusal view of missing 26 (direct view)

Clinical examination revealed an edentulous space in the region of the maxillary left first molar. The alveolar ridge appeared moderately resorbed but showed adequate mesiodistal width for implant placement. The surrounding soft tissues were healthy, and oral hygiene was satisfactory.

Radiographic Examination

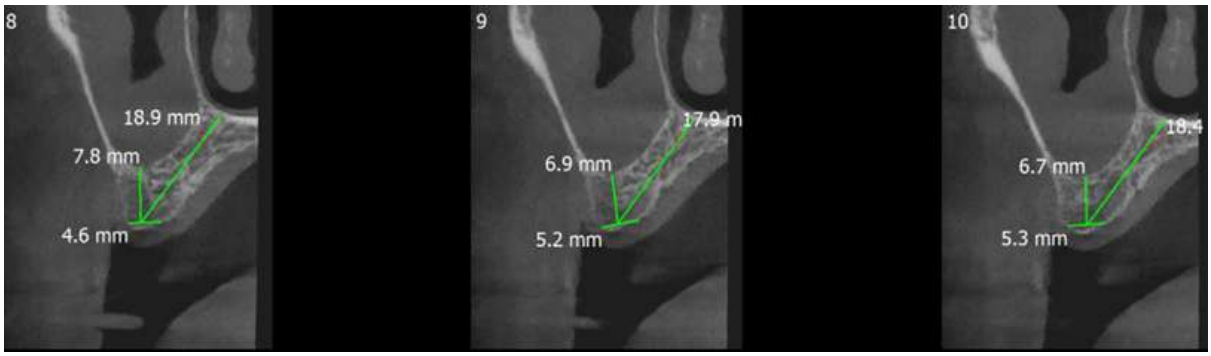

Fig 2- CBCT with respect to 26

Preoperative radiographic evaluation was carried out using an intraoral periapical radiograph with a long-cone paralleling technique. The radiograph revealed reduced vertical bone height between the alveolar crest and the floor of the maxillary sinus.

DOI: 10.48047/HM. V12.I1.2026.337-345

The **residual bone height (RBH)** was measured to be approximately **6.7mm**, which was insufficient for placement of a standard-length dental implant without sinus augmentation. Based on these findings, indirect sinus floor elevation using the osteotome technique with simultaneous implant placement was planned.

The patient was informed about the procedure, potential risks, benefits, and alternative treatment options. Written informed consent was obtained prior to the surgery.

Surgical Procedure

The surgical procedure was performed under strict aseptic conditions. Local anesthesia was achieved using **2% lignocaine hydrochloride with adrenaline (1:80,000)**.

A **mid-crestal incision** was made along the edentulous ridge, and a full-thickness mucoperiosteal flap was carefully reflected to expose the alveolar bone. Care was taken to preserve the surrounding soft tissue structures.

Fig.3- Mid crestal incision and reflection of mucoperiosteal flap

Initial osteotomy was performed using a pilot drill at low speed under copious saline irrigation to prevent overheating of the bone. The osteotomy was extended to a depth slightly less than the measured residual bone height.

Sequential osteotomes of increasing diameter were then used to gradually expand the osteotomy site. Gentle malleting was applied to advance the osteotomes toward the sinus floor. Controlled pressure was used to fracture the thin cortical bone of the sinus floor and elevate the Schneiderian membrane.

The integrity of the sinus membrane was assessed during the procedure, and no perforation was detected. After sufficient elevation of the sinus membrane was achieved, the osteotomy site was prepared to receive the implant.

DOI: 10.48047/HM. V12.I1.2026.337-345

Fig.4 Implant placement

A **titanium dental implant measuring 4.0 mm in diameter and 10 mm in length** was inserted into the prepared osteotomy site. The implant achieved good primary stability with adequate insertion torque.

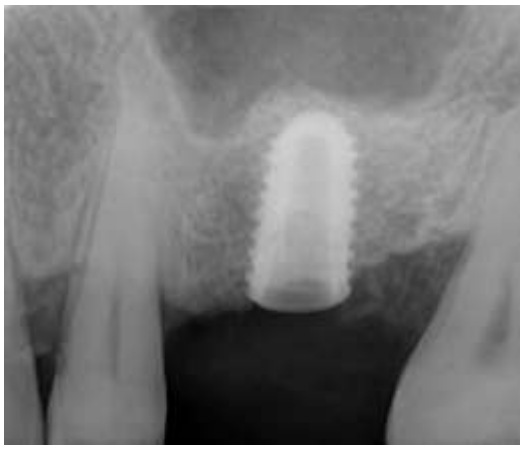

Fig.5- Implant placement postoperative radiograph

Postoperative Care

Post operative instructions were given to the patient.

The patient was prescribed:

- Broad-spectrum antibiotics for 5 days
- Non-steroidal anti-inflammatory analgesics for pain management
- Chlorhexidine mouth rinse for maintaining oral hygiene

The patient was also advised to avoid blowing the nose, sneezing forcefully, or performing activities that could increase sinus pressure for several days after surgery.

Sutures were removed after **7 days**, and the surgical site showed satisfactory healing with no signs of infection or inflammation.

History of Medicine, 2026, 12(1): 337-345
DOI: 10.48047/HM. V12.I1.2026.337-345

Results and Follow-Up

Clinical and radiographic evaluations were performed immediately after surgery and during follow-up visits at **3 months and 6 months**.

Implant Stability

Clinical examination revealed that the implant remained stable throughout the healing period. No signs of mobility, pain, or peri-implant infection were observed.

Residual Bone Height

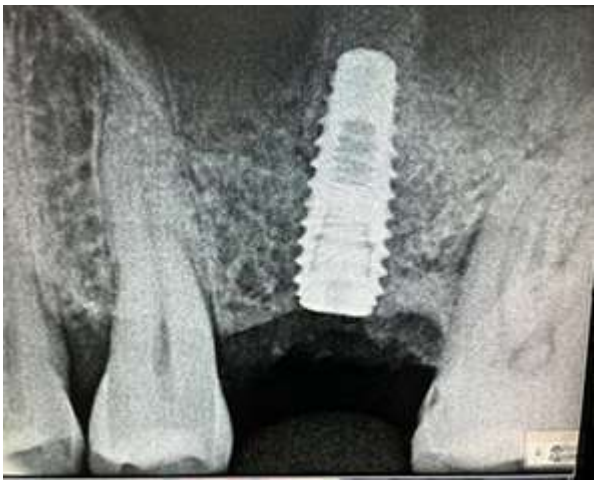

Fig.6- Radiograph at 6th month

Radiographic analysis showed a gradual increase in bone height beneath the sinus floor over the follow-up period. This suggested successful bone regeneration within the space created during sinus elevation.

Endosinus Bone Formation

Progressive **endosinus bone formation** was observed on radiographs taken at 3 and 6 months. The increase in bone height indicated that new bone had formed beneath the elevated sinus membrane.

Crestal Bone Level

Minimal crestal bone loss was noted during the healing period, which was within the acceptable limits for implant therapy.

At the end of **6 months**, the implant demonstrated successful osseointegration. The cover screw was removed and a healing abutment was placed. After adequate soft tissue healing, prosthetic rehabilitation was initiated with a metal-ceramic crown.

DOI: 10.48047/HM. V12.I1.2026.337-345

Fig.7- Prosthesis with respect to 26

Fig.8- Radiograph showing prosthesis with respect to 26

Discussion

Implant rehabilitation of the posterior maxilla is often complicated by reduced bone height due to alveolar ridge resorption and pneumatization of the maxillary sinus.[2] These anatomical changes limit the available bone for implant placement and may compromise primary implant stability.

Sinus floor elevation procedures have become a predictable method for increasing bone height in the posterior maxilla[3]. Among the available techniques, the osteotome sinus floor elevation method offers several advantages.

First, it is less invasive than the lateral window approach because it does not require the creation of a large bony window in the lateral sinus wall[4]. This reduces surgical trauma, postoperative discomfort, and recovery time for the patient.

DOI: 10.48047/HM. V12.I1.2026.337-345

Second, the osteotome technique allows simultaneous implant placement when sufficient residual bone height is present to achieve primary stability.[7] This shortens the overall treatment time and reduces the number of surgical procedures required.

In the present case, the implant was placed without the use of bone graft material. Several studies have suggested that new bone formation can occur beneath the elevated sinus membrane even without graft materials[8]. The blood clot formed in the created space acts as a natural scaffold for bone regeneration.

The Schneiderian membrane itself has been reported to possess osteogenic potential[9]. It may contain progenitor cells capable of contributing to bone formation when the membrane is elevated and stabilized.

Furthermore, the implant placed within the osteotomy site helps maintain the elevated position of the sinus membrane, creating a stable environment for bone regeneration.[10]

The results observed in this case support these findings, as progressive bone formation beneath the sinus membrane was evident during the follow-up period.

However, careful case selection is essential for the success of this technique. Adequate residual bone height is required to achieve primary implant stability, and meticulous surgical technique is necessary to prevent sinus membrane perforation.

onclusion

Indirect sinus floor elevation using the osteotome technique with simultaneous implant placement without bone grafting can be an effective and minimally invasive approach for the rehabilitation of posterior maxillary edentulous areas with limited bone height.

This technique reduces surgical morbidity, treatment time, and cost while still allowing successful implant integration and bone regeneration beneath the sinus membrane.

Further studies with larger sample sizes and long-term follow-up are necessary to evaluate the long-term success and predictability of this procedure.

Declaration of Patient Consent

The patient provided informed consent for the use of clinical information and radiographic images for academic and publication purposes. Efforts were made to maintain patient anonymity.

Financial Support and Sponsorship

Nil.

Conflicts of Interests

There are no conflicts of interest.

DOI: 10.48047/HM. V12.I1.2026.337-345

References

1. Branemark PI, Zarb GA, Albrektsson T. **Tissue-integrated prostheses: Osseointegration in clinical dentistry.** Chicago: Quintessence; 1985.
2. Misch CE. **Contemporary Implant Dentistry.** 3rd ed. St Louis: Mosby; 2008.
3. Boyne PJ, James RA. **Grafting of the maxillary sinus floor with autogenous marrow and bone.** J Oral Surg. 1980;38:613–616.
4. Summers RB. **A new concept in maxillary implant surgery: the osteotome technique.** Compendium. 1994;15:152–162.
5. Del Fabbro M, Rosano G, Taschieri S. **Implant survival rates after maxillary sinus augmentation.** Int J Oral Maxillofac Implants. 2008;23:511–524.
6. Thor A, Sennerby L, Hirsch JM, Rasmusson L. **Bone formation at the maxillary sinus floor following simultaneous elevation and implant placement without graft material.** Clin Oral Implants Res. 2007;18:758–764.
7. Fugazzotto PA. **Success and failure rates of implants in partially edentulous patients with 6 mm of bone height or less.** Int J Oral Maxillofac Implants. 2008;23:903–910.
8. Lundgren S, Andersson S, Gualini F, Sennerby L. **Bone reformation with sinus membrane elevation: a new surgical technique.** Clin Implant Dent Relat Res. 2004;6:165–173.
9. Srouji S, Ben-David D, Lotan R, Riminucci M, Bianco P, Livne E. **The Schneiderian membrane contains osteoprogenitor cells.** Tissue Eng. 2009;15:425–433.
10. Cricchio G, Lundgren S. **Sinus lift procedures without graft materials.** Clin Implant Dent Relat Res. 2003;5:59–65.