Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies *NLM ID: 101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Indian Citation Index (ICI) Index Copernicus value = 100

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Case Report

Sinus augmentation for a single implant supported crown

Shabir A. Shah[1], Talib Amin Naqash[2], Adiba Ihsan[3], Shubert Anto[4]

[1,2]Professor, Department of Prosthodontics, Government Dental College and Hospital, Srinagar, India;
[3,4]Postgraduate, Department of Prosthodontics, Government Dental College and Hospital, Srinagar, India

***ABSTRACT*:**
Poor bone density and sinus floor closeness exacerbate sinus pneumatization following tooth loss, which decreases alveolar bone for posterior maxillary implants. This case report describes the simultaneous implant implantation and direct lateral window sinus augmentation for a 32-year-old woman's missing maxillary left first molar (Kennedy Class III mod 1). Bone was exposed by a buccal flap; suturing, resorbable membrane covering, fixture insertion, implant site preparation, and Schneiderian membrane elevation were all made possible by a 2x1.5 cm window that was 3 mm above the sinus floor. Orthopantomograms confirmed the 4-month transplant success after antibiotics and anti-inflammatory drugs were administered. Metal-ceramic crown loading produced continuous function without complications. In inadequate maxillae, the technique confirms the effectiveness of single-implant restorations.

Keywords: maxillary sinus, dental implant, sinus augmentation, autogenous bone graft, crown

Received: 18 December, 2025 Accepted: 16 January, 2026 Published: 26 January, 2026

Corresponding Author: Shabir A. Shah, Professor, Department of Prosthodontics, Government Dental College and Hospital, Srinagar, India

This article may be cited as: Shah SA, Naqash TA, Ihsan A, Anto S. Sinus augmentation for a single implant supported crown. J AdvMed Dent Scie Res 2026; 14(1):92-96.

INTRODUCTION

Placement of an endosseous implant in the posterior maxilla should overcome two clinical concerns. The first concern is regarding the quality of the available bone, which is less dense; however, it can be compensated by prolonging the time of osseointegration. The second concern is the close proximity of the apically situated cortical bone to the sinus floor. At the same time, the maxillary sinus is the biggest pyramidal-shaped paranasal sinus, whose average volume is 15 ml.[1] While the natural teeth are present in this area, the maxillary sinus is able to maintain its overall size mainly from the increased strain of occlusal function. However, when the teeth are lost and the occlusal function is no longer available, the maxillary sinus begins to expand and increase in size (pneumatization), thus reducing the amount of available bone between the maxillary sinus floor and the crest of the residual alveolar ridge. Contrarily, early loss of opposing mandibular tooth can result in supraeruption, which alters the occlusal plane while also bringing the maxillary sinus down. Comprehensive prosthodontic rehabilitation requires occlusal plane analysis,[2] which may be used post-implant for optimal occlusal harmony in identical posterior restorations. Preserving natural dentition traits throughout different types of prosthodontic rehabilitation that may range from a conservative resin-bonded prosthesis to full-mouth rehabilitation with implants may be considered when building the ultimate implant-supported restoration to match the patient's dentition and occlusal scheme.[3] In natural dentition the roots of the maxillary premolars and molars have an intimate relation to the inferior aspect of the maxillary sinus.[4] The apex of the mesiobuccal root of the maxillary second molar is as close as 0.83 mm from the sinus wall.[5] The maxillary sinus from the inside is lined by a Schneiderian membrane (pseudostratified columnar respiratory membrane with ciliated epithelium).[6] chances of sinus membrane perforation during implant placement are high if the angle formed between the lateral and the medial wall of the sinus is 60 degrees or less (30°–60° angle—28.6% chance; and <30° - 62.5% chance).[7] While the evolution of posterior tooth replacements from transplants to modern-day dental implants is mainly credited to branemarks work,[8] the major contribution for sinus augmentation goes

to Tatum H, who performed the first lateral window technique with autogenous bone graft as early as 1975.[9]

Key indications for implant placement in the posterior maxilla include residual alveolar bone height of less than 5-6 mm, particularly in the 4-10 mm range, often caused by maxillary sinus pneumatization following tooth loss.[10-12] Contraindications for the procedure include acute or chronic sinusitis, thickened sinus membranes (>4-5 mm), and other sinus pathologies that pose risks of infection or perforation, as well as uncontrolled systemic conditions such as poorly managed diabetes, recent maxilla-focused chemotherapy /radiation, severe immunosuppression, active oral infections, untreated periodontal disease, heavy smoking or alcoholism, pregnancy, and inadequate patient compliance.[13-15] Advantages consist of the procedure providing sufficient bone volume (4-10 mm gain) for stable implants in atrophic posterior maxilla, achieving over 90% success rates in prosthetics, predictable bone regeneration with various graft types, and improvements in facial aesthetics and mastication while preventing further bone loss.[16,17] Disadvantages entail a 5-20% risk of Schneiderian membrane perforation leading to potential graft failure and postoperative complications like swelling, infection (1-3% incidence), pain, prolonged healing time (4-9 months), and higher costs along with surgical morbidity, especially in smokers or medically complex patients that may increase risks of graft loss or implant failure.[16,18] Additional concerns involve post-extraction bone resorption affecting molar or premolar areas, where the sinus floor may invade the implant site.[19] factors, such as a naturally low sinus floor position, enlarged sinuses, or bone loss from periodontal disease or trauma, can hinder primary implant stability, indicating a need for vertical bone augmentation of 4-6 mm to support standard-length implants.[18] To overcome the problem of accidental perforation and better osseous compliance for implant-supported prosthesis, the maxillary sinus lift grafting procedure is advocated. This allows greater implant-to-bone contact area once the graft bone has matured.[20] This article in the form of a clinical case report presents a case of a sinus lift procedure using a direct technique for placement of a maxillary single endosseous implant.

CASE REPORT

A female patient aged 32 years reported to the postgraduate section of the department of prosthodontics for replacement of a maxillary left first molar with a fixed prosthesis. Patients' medical, social, or drug history was within normal limits without any unusual impact on future prosthodontic treatment. Extraoral examination revealed normal clinical features, while intraoral examination revealed a Kennedy Class 3 modification 1 partial edentulous situation. Missing teeth included the left first molar and the right second molar. Other clinical findings included plaque accumulation and class 1 caries in relation to the maxillary right first molar. After thorough radiographic investigations, diagnostic impressions were made, and the casts were mounted on the semi-adjustable articulator that was programmed as per the patient's interocclusal records. Analysis of the diagnostic tools helped to formulate various treatment options that, in the preferred order, included a single implant-supported crown on either side of the maxillary arch, a three-unit fixed partial denture in relation to missing teeth, or a posterior resin-bonded prosthesis with occlusal stops. OcclusalAnalysis was performed keeping in mind the implant restoration so as to protect the implant fixture during primary healing.[21] The patient consented to the implant-supported prosthesis. Due to the decreased compact bone volume between the floor of the sinus and the cortical plate in the region, a sinus augmentation protocol was necessary while placing the implant. A direct technique (lateral window) was employed for the bone augmentation procedure. Infection control protocol was followed as per the guidelines for surgical, prosthodontic, and covid-19 pandemic guidelines.[22,23] After giving the respective anesthesia, soft tissue incisions were given and a flap was elevated. With a sterile pencil the outline of the lateral wall window on the buccal plate of bone was marked. The apical outline of the window was kept close to the anterior wall and was approximately around 3 mm above the sinus floor (Fig 1A). Window size was approximately 2 cm mesiodistally and 1.5 cm coronoapically (Fig. 1A). This was followed by elevation of the sinus membrane using a blunt instrument and extending with sinus curettes upto the medial wall, where the graft (Fig 1B) was supposed to be placed. Meanwhile, the implant site was prepared using routine implant clinical procedure, and the chosen implant was placed within the alveolar bone (Fig. 1C). A resorbable membrane was placed over the window, and a non-resorbable monofilament suture was placed to suture the flap (Fig. 1B). The patient was put on a regimen of antibiotics and anti-inflammatory drugs. Two orthopantomographic exposures, one immediately after surgery (Fig 2A) and one after four months (Fig 2B,C), were taken to gauge the progression of the sinus lift augmentation procedure. Routine clinical and laboratory procedures were then done to fabricate a metal ceramic crown for the implant placed (Fig 3A, B). The patient was instructed regarding maintenance and was put on an implant follow-up protocol indefinitely. The patient continues to wear the prosthesis without any difficulty till date.to

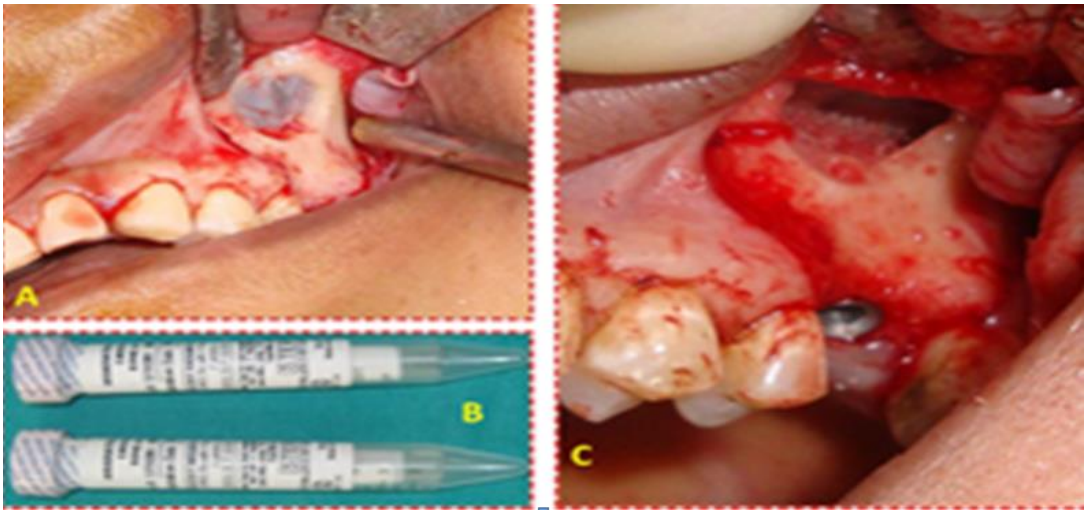

Figure 1: (A) removal of cortical bone plate exposing the maxillary sinus lining (B) bone graft (C) site preparation

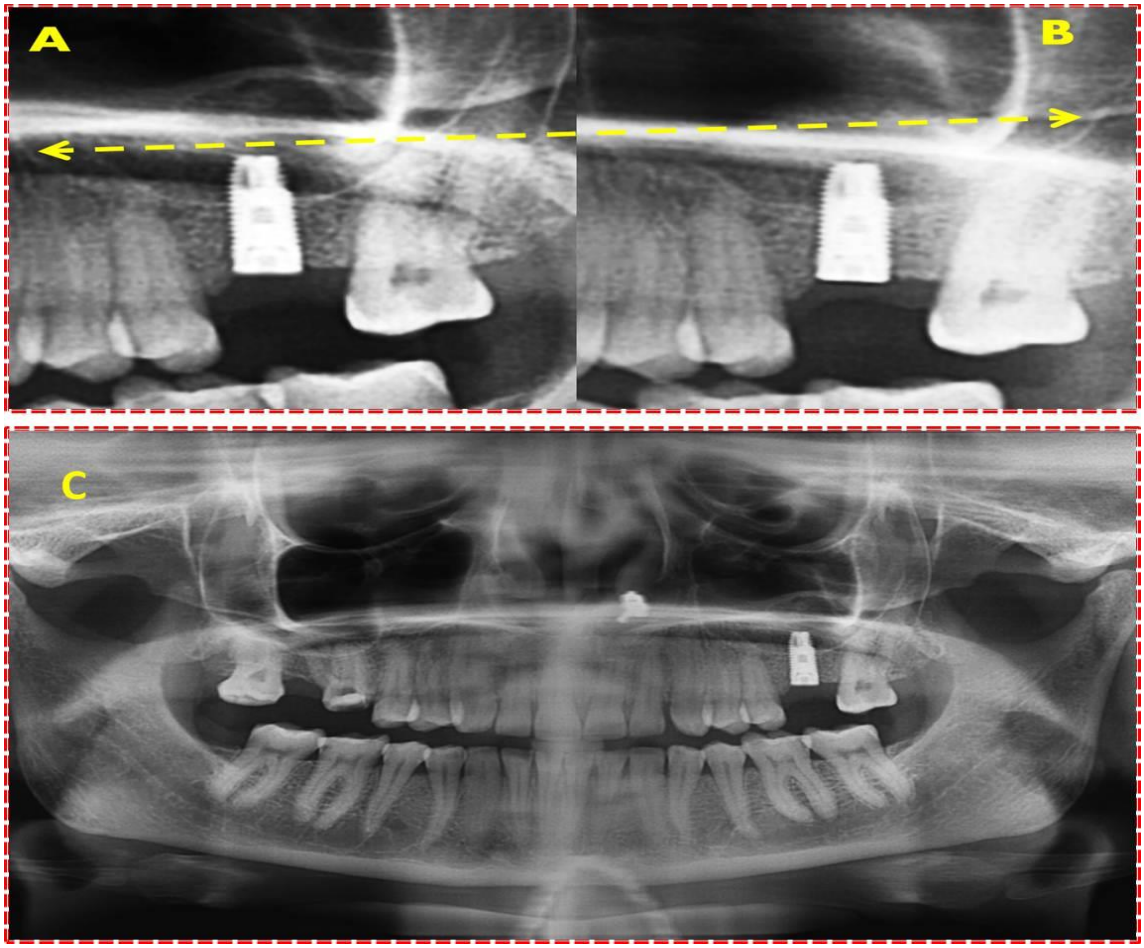

Figure 2: (A) Post-operative orthopantomograph (OPG) after sinus augmentation showing the differences between pre and post sinus augmentation bone levels in first molar region (B) OPG showing bone level gained before prosthodontic restoration.

Figure 3: (A) prosthodontic rehabilitation showing implant abutment placement (B) porcelain fused to metal crown with full occlusal porcelain in relation to maxillary molar.

DISCUSSION

A case of a single implant-supported crown for which a sinus lift augmentation was necessary has been reported in this article. The procedure of sinus floor elevation is increasingly becoming popular in implant dentistry since it allows a relatively contraindicated situation to be treated with dental implants in posterior maxillae where available bone is less, either due to sinus pneumatisation, bone atrophy, or a combination of both. The procedure was first devised in 1970,[9] and later further designed in 1980 and is not the same procedure at present.[14] Numerous modifications regarding different grafting materials and techniques have been done. [24,25] An important aspect of sinus lift surgery is the postoperative instructions and care of the patients, which is slightly different from conventional implant surgery. These include head elevation (by pillows) on the first night after surgery, a liquid diet for 2 days followed by a soft diet for 2 weeks, the possibility of nasal bleeding and a method to control it, and avoiding certain functions that create negative pressure within the sinus (like smoking, sucking liquid, blowing, flying in pressurized aircrafts, scuba diving, weight lifting, carbonated drinks, and musical instruments). Chewing on the same side where surgery is done should also not be done for a period of 2 weeks. Patients should also be educated about how to sneeze with their mouths open. Opening the mouth while sneezing does not allow negative pressure to build up within the sinus. 9 Implant-supported prostheses range from single replacements of missing natural teeth to extensive maxillofacial rehabilitations like maxillectomy,[26] with most patients showing significant improvements in mastication, speech, aesthetics, and quality of life (QOL) in individuals with extensive defects. One of the limitations of such treatments is the restorative space for the crown. Recently introduced abutment-free implants could overcome this lacunae since the restoration is directly attached to the implant fixture.[27]

CONCLUSION

This case report highlights the effective use of a direct lateral window technique for sinus lifting alongside simultaneous single endosseous implant placement for a 32-year-old woman with insufficient bone due to pneumatization. Four months postoperatively, orthopantomograms indicated graft maturation, leading to the fabrication of a metal-ceramic crown with no complications. The patient successfully continues using the prosthesis. This approach addresses challenges in posterior maxillary implant placement, improving stability despite sinus proximity and suboptimal bone quality.

Acknowledgements: The authors would like to acknowledge and thank the staff and postgraduate students of the department of oral surgery at the concerned institute. The authors would also like to thank the concerned dental technicians of the department of prosthodontics for their critical role in completion of the case.

REFERENCES

1. van den Bergh JP, ten Bruggenkate CM, et al. Anatomical aspects of sinus floor elevations. Clin Oral Implants Res. 2000;11:256–65.
2. Darraj A, Mattoo KA. Full Mouth Rehabilitation Involving Occlusal Plane Correction-Case Report. JMSCR. 2020;5(9):28204-208
3. Mattoo, Khurshid, Manas Singh, and Roma Goswami. "“Resin Bonded Loop Connector Fixed Partial Denture – A Subtle Solution to Maintain Midline Diastema”." Int. J Dent Sci Res 2.6 (2014): 168-170.
4. Fry RR, Patidar DC, Goyal S, et al. Proximity of maxillary posterior teeth roots to maxillary sinus and adjacent structures using denta scan. Ind J Dent. 2016;7:126–30.
5. Eberhardt JA, Torabinejad M, Christiansen EL. A computed tomographic study of the distances between the maxillary sinus floor and the apices of the maxillary posterior teeth. Oral Surg Oral Med Oral Pathol. 1992;73:345–6.
6. Kaufman E. Maxillary sinus elevation surgery: An overview. J Esthet Restor Dent. 2003;15:272–82.

7. Cho SC, Wallace SS, Froum SJ, et al. Influence of anatomy on Schneiderian membrane perforations during sinus elevation surgery: Three-dimensional analysis. Pract Proced Aesthet Dent. 2001;13:160–3.
8. Singh M, Mattoo KA, Jain S. Replacement of a mandibular molar with implant retained single crown. Oral Surg Oral Med Oral Radiol. 2014;2(2):25-7.
9. Tatum H., Jr Maxillary and sinus implant reconstructions. Dent Clin North Am. 1986;30:207–29.
10. Rathi JN, Goswami R, et al. Implant Supported Mandibular Overdenture-Case Report. JAMDSR. 2019;7(11):128-30.
11. Sindi AS, Kumar L, Verma A, et al. Prosthodontic rehabilitation's role in alleviating anxiety and depression in mucormycosis-induced maxillectomy patients post-COVID-19. Med Sci Monit 2023;29:e941488-1.
12. Mattoo KH, Singh SP, Brar AN. A simple technique to align attachment components in implant supported mandibular overdenture. Int J Res Med Sci Technol. 2014;1(1):6-8.
13. Boyne PJ, James RA. Grafting of the maxillary sinus floor with autogenous marrow and bone. J Oral Surg. 1980;38:613–6.
14. Pjetursson BE, Tan WC, Zwahlen M, et al. A systematic review of the success of sinus floor elevation and survival of implants inserted in combination with sinus floor elevation: part I: lateral approach. J clin periodont 2008;35:216-40.
15. Rathi N, Jain K, et al. Placing an implant fixture during ongoing orthodontic treatment. SSRG Int. J. Med. Sci. 2019;6:19-21.
16. Tiwana PS, Kushner GM, Haug RH. Maxillary sinus augmentation. Dent Clin. 2006;50(3):409-24.
17. Jain S, Mattoo K, Khalid I, et al. A study of 42 partially edentulous patients with single-crown restorations and implants to compare bone loss between crestal and subcrestal endosseous implant placement. Med Sci Monitor. 2023;29:e939225-1.
18. Marincola M, Ewers R, Tomasetti BJ. Minimally invasive sinus lift using short implants. InShort Implants 2020 (pp. 161-176). Cham: Springer International Publishing.
19. Minocha T, Mattoo K, Rathi N. An 2/2 implant overdenture. J Clin Res Dent. 2020;3(1):1-3.
20. Smiler DG. The sinus lift graft: Basic technique and variations. Pract Periodontics Aesthet Dent. 1997;9:885–93
21. Mattoo K, Garg R, Bansal V. Designing the occlusion for a single tooth implant in a compromised occlusion. J Med Sci Clin Res. 2014;2(11):2996-3000.
22. Al Makramani BM, Al Sanabani F, et al. Reviewing infection control in prosthodontic practice with a case of herpes simplex in the times of a corona virus pandemic. Ann Roman Soc Cell Biol. 2021;25(6):10898-904
23. Mattoo KA, Jain S. Managing prosthodontic (geriatric) patients during the SARS-CoV-2 pandemic. J Int Oral Health. 2020;12(Suppl 2):S69-75
24. Wallace SS, Tarnow DP, et al. Maxillary sinus elevation by lateral window approach: Evolution of technology and technique. J Evid Based Dent Pract. 2012;12:161– 71
25. Stern A, Green J. Sinus lift procedures: An overview of current techniques. Dent Clin North Am. 2012;56:219–33.
26. Kumar L, Verma A, Pal US, et al. Influence of prosthodontic rehabilitation using zygomatic implants in Covid 19 related mucormycosis (rhino–orbital–cerebral) maxillectomy patients upon post-operative stress, anxiety and functional impairment: A prospective cohort study. Clin Interven Aging. 2023:1201-19.
27. Mugri MH, Reddy NK, Sayed ME, et al. Stress Assessment of Abutment-Free and Three Implant–Abutment Connections Utilizing Various Abutment Materials: A 3D Finite Element Study of Static and Cyclic Static Loading Conditions. Journal of Functional Biomaterials. 2025;16(10):372.