Sinus augmentation procedure a reliable technique for enhancing vertical height in preparation for implant placement – A case report.

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Abstract

Maxillary sinus pneumatization and variations in Schneider's membrane thickness contribute to anatomical complexity. The direct technique, which involves meticulously elevating the sinus membrane and placing bone graft material, offers precise control but is invasive. This study assesses the long-term radiographic changes in sinus graft height after lateral maxillary sinus augmentation with Bio-Oss®, typically allowing a comprehensive treatment plan that includes both horizontal and vertical bone augmentation. In such cases, incorporating a direct sinus lift may address height deficiency in the posterior maxilla, aiming to provide a solid foundation for successful dental implant placement. This case report provides a comprehensive examination of the direct techniques, synthesizing insights from diverse studies to help clinicians choose the most appropriate approach for their patients.

Keywords: Bone graft, dental implant, direct sinus lift, maxillary sinus, sinus augmentation.

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Introduction

The maxillary sinus, occupies a significant wodge of the posterior maxillary body, with dimensions typically ranging from 25 - 35 mm in width, 36 - 45 mm in height, and 38 - 45 mm in length in adults.[1] Pneumatization of the maxillary sinus and variations in Schneider's membrane thickness contribute to anatomical complexity.[2] Underwood's septa, observed in around 30% of cases, further complicate procedures due to potential membrane perforation risks.[3-,5] Sinus pneumatization exacerbates bone resorption challenges in the maxillary posterior region, necessitating techniques like elevation of sinus floor. Various approaches, including direct and indirect sinus lift techniques, aim to address vertical bone deficiencies and facilitate successful implant placement.[6-10]

The direct technique, which meticulously elevates sinus membrane and places bone graft material, offers precise control but is invasive.[11] Conversely, indirect technique provides a minimally invasive early recovery. Additionally, alternative techniques such as Piezosurgery and osteotome technique offer further options for sinus augmentation.

Evaluating the long-term radiographic alterations subsequent to lateral maxillary sinus augmentation assists in ascertaining the necessary bone and graft material volume, essential for achieving successful implant-prosthetic rehabilitation. This case report evaluates the long-term radiographic change in the sinus graft height following lateral

maxillary sinus augmentation with **Bio-Oss®**. The case report aims to elucidate necessary bone volume and required graft material to be placed apically to the implant, using deproteinized bovine bone mineral (DBBM) graft. This positioning aims to achieve a stability and functionality of sinus floor, facilitating successful implant-prosthetic recuperation.

Case Report

At the department of prosthodontics, a 54-year-old female patient was presented with a chief complaint of missing upper back teeth. On clinical examination, teeth #16 and #17 were found to be missing.

The case history revealed that caries and persistent pain led to the extraction of both teeth. Blood investigations showed no systemic abnormalities. The orthopantomograph revealed insufficient bone height in the region of tooth #16 (Figure 1).

CBCT analysis revealed homogeneousness of the alveolar that crestal width of bone respecting #16 was 9.9 mm (Figure 2). Misch's classification showed bone density of D3 type.[12]

Diagnostic cast were prepared prior to the surgery. The measured inter-occlusal distance showed a distance of 9 mm for tooth number #16 and 8 mm for #17, respectively. The interocclusal space for 16 was found to be 5 mm and 6 mm for #17.

Surgical phase

The buccal and palatal nerve was infiltrated using local anaesthesia. No.15 surgical blade was used to make an incision from the mesial surface of maxillary 1st molar to the mesial surface of premolar involving the end of the buccal vestibule. Tatum Sinus Retractor was used to hold the full thickness buccal flap. Piezo-surgical unit was used to trace a bony window in the #16 region. The #BS5 tip was used for the initial bone marking and by deepening it with the SL1 tip (Figure 3).

The remaining buccal plate was fractured with tweezers (Figure 4). Keeping the fractured section of bone attached to the antral lining bony window was rounded off using a SL2 tip, followed tip to raising the lining in the vicinity of the window by the SL3. Then the lining was further elevated completely (Figure 5).

The membrane was gently elevated and sinus floor and was packed by DBBM bone graft mixing 1-2 mm crumb of Bio-Oss,Geistlich Pharma AG, Wolhusen, Switzerland), aqueous saline solution and secured by plasma rich fibrinogen followed by repositioning and suturing of full thickness flap (Figure 6).[13] Post-operative instructions with and medication were prescribed and re-evaluation and suture removal was done after 7 days.

A one month and 6 month follow up was done. After the implant was placed, a postoperative radiograph was taken to assess the position (Figure 7).

Discussion

The Misch's classification system advances the evaluation of the posterior maxilla for dental implant placement based on the quality and quantity of available bone.[12] Thin cortical bone with insufficient height involves type III cases, typically allowing a comprehensive treatment plan including both horizontal and vertical bone augmentation. In such cases, incorporation of a direct sinus lift may address height deficiency in the posterior maxilla, aiming to provide a solid foundation for successful dental implant placement.

Understanding their intricacies enables informed decision-making, optimizing outcomes in maxillary sinus augmentation for dental implant placement.[14] A limitation of this procedure is its time-consuming nature,

along with the absence of a guaranteed predictable outcome. [14]

Conclusion

This case report underscores the significance of sinus lift techniques according to every patient requirement, deficiency of bone and objectives of treatment. It delineates the advantages, considerations are provided, and Valuable insights are provided for clinicians to make decisions in the realm of maxillary sinus augmentation for placement of dental implant. Altogether, this case report dispenses a thorough examination of the direct techniques, synthesizing insights from diverse studies so that clinicians can choose the most appropriate approach for their patients.

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FIGURES

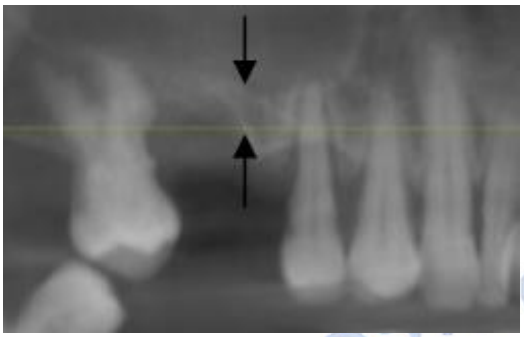

Figure 1

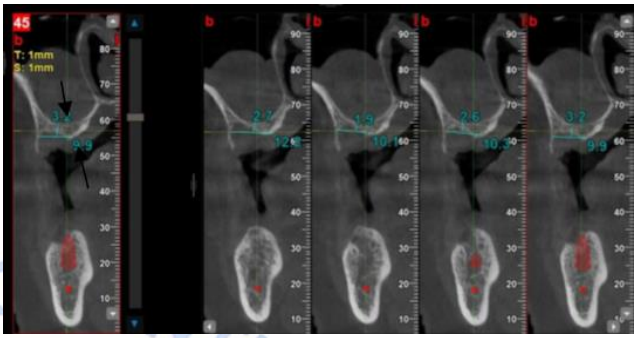

Figure 2

Figure 3

Figure 4

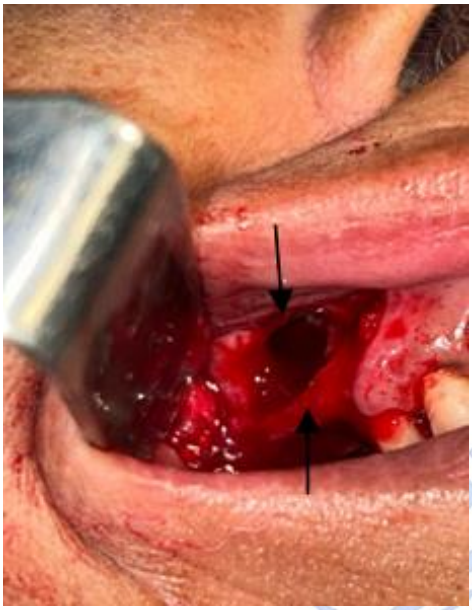

Figure 5

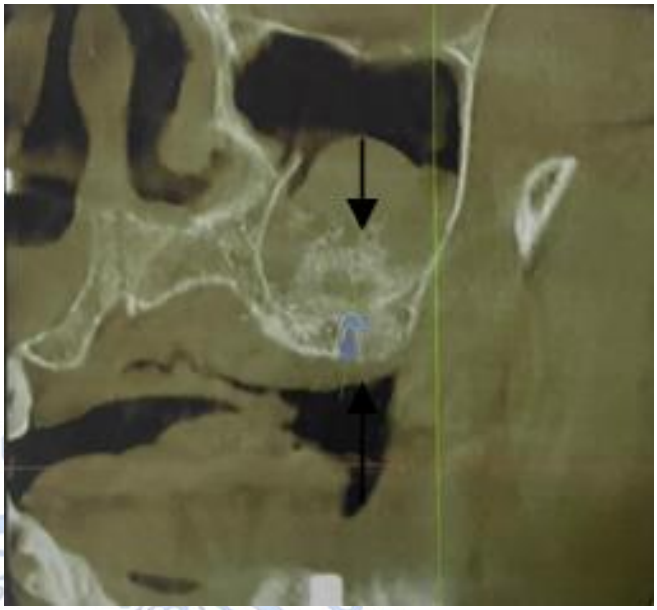

Figure 6

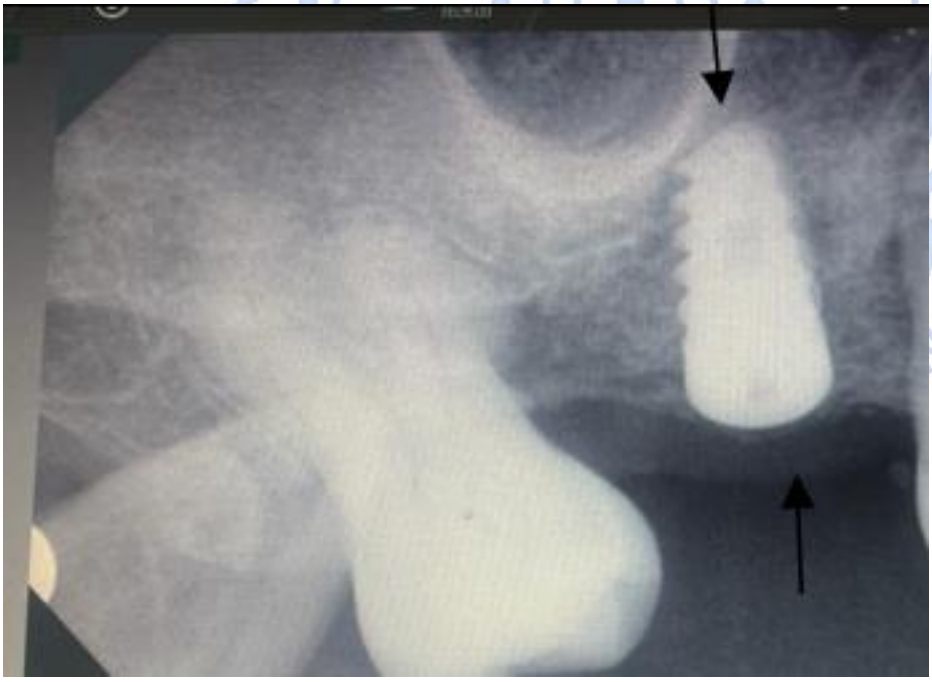

Figure 7