# Anterior Sinus Grafts for Angled Implant Placement for Severe Maxillary Atrophy as an Alternative to Zygomatic Implants for Full Arch Fixed Restoration: Technique and Report of 5 Cases

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We report on 5 cases, 4 to demonstrate the anterior sinus graft technique for angled implant placement and 1 comparison zygomatic case, all for immediate function implant restoration despite severe maxillary atrophy. The sinus graft was low volume, with less than 5 mL of bone morphogenetic protein-2/absorbable collagen sponge allograft in a 50% mixture placed against the lateral nasal wall, often in conjunction with implant placement. The importance of the technique is to simplify treatment of severe maxillary atrophy for immediate function to avoid the need for zygomatic implant placement in the vast majority of severely atrophic maxillas.



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The use of zygomatic implants for the treatment of severe to extreme maxillary atrophy has been complicated by the absence of alveolar bone stock, the presence of large maxillary sinuses, and, not least, the inexperience of the oral-maxillofacial surgeon.[1-3] The treatment of such patients has been relatively rare in most private practice settings; thus, unless the practitioner is highly familiar with zygomatic fixture placement, the alternative use of sinus grafting might be advisable.[4,5] Despite reports of success, multiple complications can occur with zygomatic implants, including oral antral fistula, chronic sinusitis, orbital injury, and a steep learning curve compared with sinus grafting.[6-8] Alternatively, sinus grafting with the use of bone morphogenetic protein-2 (BMP-2)/absorbable collagen sponge (ACS) allograft in a 50:50 ratio will form high-quality bone for osseointegration, particularly, in the sinus floor.[9-11] However, advocates for the use of BMP-2 have designed sinus grafts and augmentations that have been inordinately large and not cost effective for common patient treatment.[9-11] We present a concept of a small-volume sinus graft placed anterior in the maxillary sinus next to the lateral nasal wall. The technique can sometimes be done simultaneously with implant placement.[12] If a delayed approach is used, a 4-month healing period will be followed by implant placement and immediate function.[13]

## Technique

A crestal incision is made around the arch with a posterior releasing incision at the first molar area and continuing into the vestibule. A buccal mucoperiosteal flap reflection will reveal the nasal fossa and lateral sinus wall. An antrostomy window 10 mm in diameter is created next to the nasal wall, taking care not to enter the nasal fossa in what can be paper-thin bone. The sinus membrane is reflected off the nasal wall and sinus floor, continuing posterior about 10 to 15 mm, without much vertical membrane reflection. An implant is placed from an entry point on the palatal side of the residual ridge, traversing the anterior sinus cavity to enter into the nasal wall. Then, 2 to 4 mL of BMP-2/ACS allograft in a 50:50 ratio is grafted around the implant, and a decision is made to submerge or load the implant. This procedure can be

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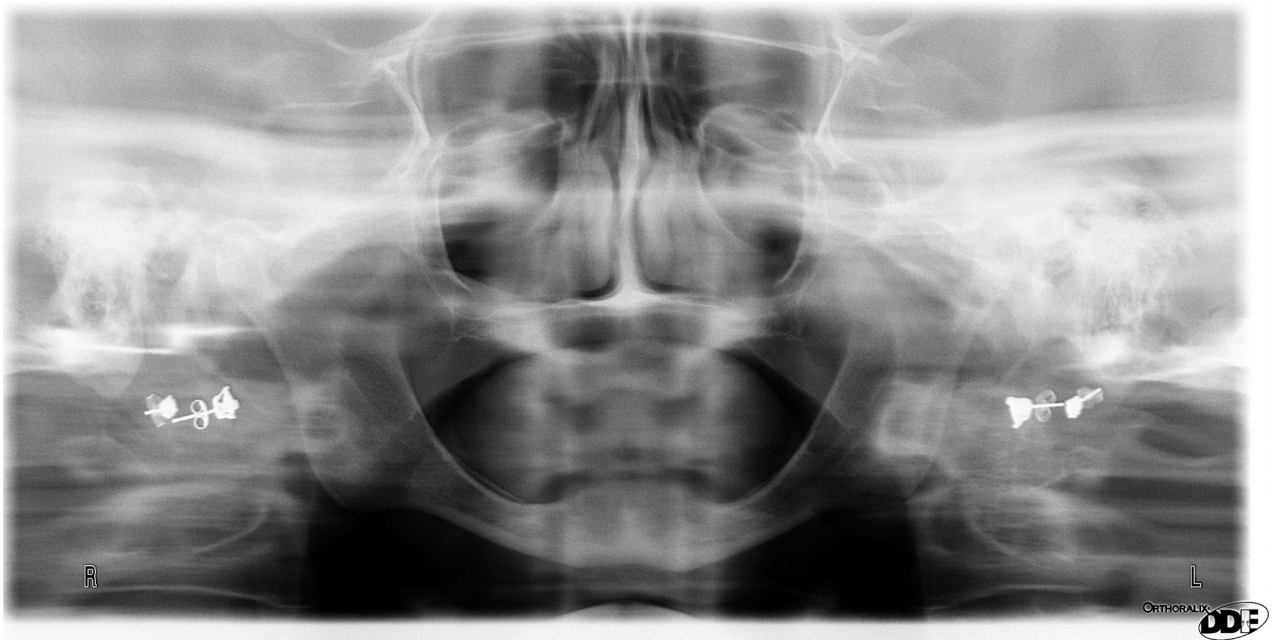


**FIGURE 1.** Case 1. A panoramic view of the edentulous maxilla revealing extreme atrophy with very little bone stock for osseointegration, suggesting the need for zygomatic implants.

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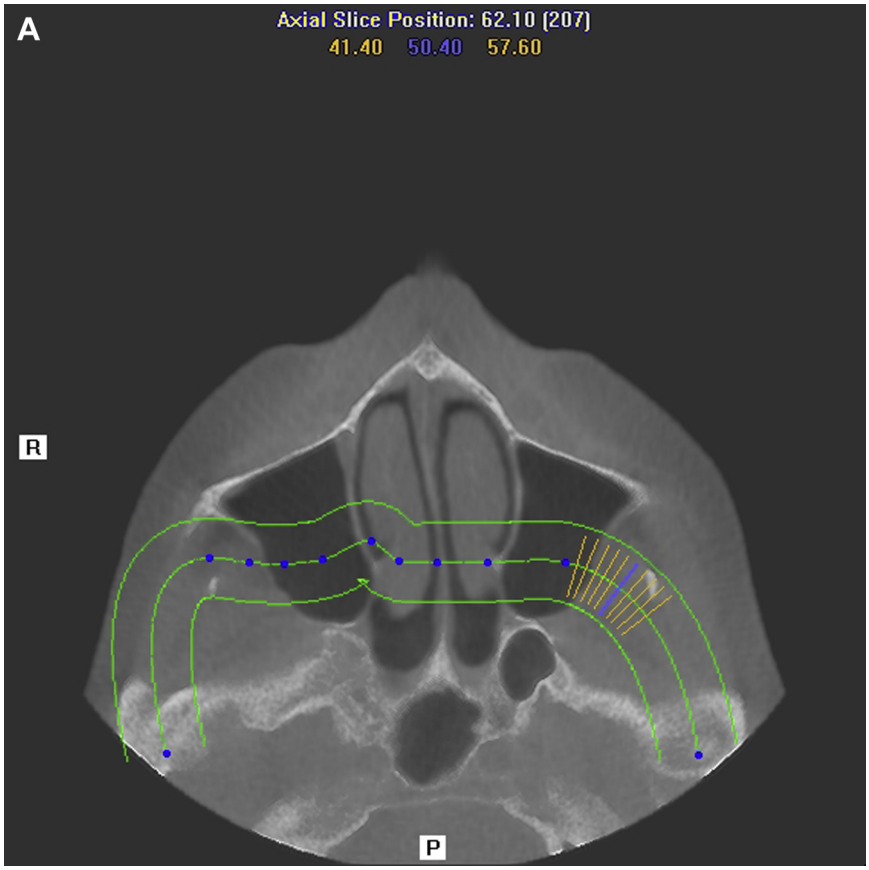


**FIGURE 2.** *A,* Computed tomography occlusal view revealing very little bone at the level of the sinus floor, demonstrating extreme maxillary atrophy. **(Fig 2 continued on next page.)**

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