



Graftless or Graft Less Implantology: Solutions for Severely Atrophic Maxillae?

Sung Hoon Choo DDS; Thomas G. Wiedemann MD, PhD, DDS

New York University – College of Dentistry – Department of Oral and Maxillofacial Surgery



INTRODUCTION

Severely atrophic maxillary arches can often necessitate extensive bone grafting procedures that come with high costs, long treatment times and potential complications such as infections, unpredictable graft resorption and even failures¹. Alternative implant macro designs and individualized implants that utilize the patient's residual bone structure and volume are increasingly applied as alternative solutions for these severely atrophic cases^{1, 2, 3, 4, 15, 17, 18}.

Methods

An electronic literature search was conducted. Only articles with clear and adequate descriptions and photo documentations of bone grafting procedures and implant treatments were selected for final review.

Objective

The aim of this literature review is to research and evaluate the current state-of-the-art of graftless implantology as an alternative to extensive bone grafting procedures to rehabilitate severely atrophic maxillary arches.

Results

Severely Atrophic Situations

- Graft**
 - Sinus lifts, autologous inlay/onlay, distraction osteogenesis, Le Fort 1 Osteotomy + Bone Graft
 - Long treatment times, donor site morbidity, possible failure
- Graftless**
 - Short, Narrow, Nonalveolar bone, Individualized
 - Maximal utilization of patient's existing bone volume and structure

Graftless Solutions

- Isolated edentulous areas
 - Short/Narrow
 - Paranasal
 - Pterygoid
 - Zygomatic
- Extended alveolar atrophy
 - Individualized Subperiosteal

Techniques: CAD/CAM + 3-D Printing

Figure 1 Example of Severely Atrophic Situation⁴

Figure 2 Bilateral Sinus Lift and Nasal Lift⁵

Figure 3 Sinus Lift and Vertical Bone Graft⁵

Figure 4 Autologous Horizontal Block Grafts⁶

Figure 5 Vertical Distraction Osteogenesis⁷

Figure 6 Short Implants¹⁰

Figure 7 Narrow Diameter Implants¹¹

Figure 8 Paranasal (Lateral Pyriform) Implants⁵

Figure 9 Pterygoid Implants¹³

Figure 10 Zygomatic Implants: Quad Zygoma¹⁴

Figure 11 Virtual Planning Implant¹⁵

Figure 12 Implant on 3-D printed bony model¹⁵

Figure 13 Individualized Subperiosteal Implant¹⁵

Conclusion

The complications and morbidity that could occur from extensive grafting procedures can sometimes outweigh the benefits. Minimally grafted and graftless implants are promising treatment options to avoid unpredictable large-scale bone grafts. These options have become especially more accessible with the modern development of diagnostic imaging and 3D printing technologies^{15, 16}.

References/Video Presentation

