Short dental implants in limited alveolar bone height

(A step-by-step guide)

By Ara Nazarian, DDS, DICOI – Sara Amin, BDS, MSc

Introduction

Short dental implants are an increasingly viable treatment option in cases with reduced alveolar bone height, growing evidence has been in the favor of their utility as a common alternative to additional surgical techniques (bone graft and/or sinus graft). Authors refer to the term short whenever the dental implant length is less than 8 mm, others consider them short at below 7 mm. The presented case describes a comprehensive guide for the clinical utility of dental short implants (an immediate load with a digital approach).

Case Presentation

A 52-year-old male patient presented to premier dental center for a consultation aiming to restore the upper right first molar edentulous site.

From Digital Plan to Reality

CBCT scan acquisition was done using CS 8100 3D (Carestream Dental) to provide patient relevant 3D data as an initial step for accurate treatment planning, identification of vital structures, and determining any possible additional surgical procedure. Within the same visit, upper and lower impressions and bite registration were taken using Kettenbach Dental and sent to ITX Pros for laser scanning and digitization. Thus, STL files representing the patient's teeth and gingiva were obtained (Figure 1).

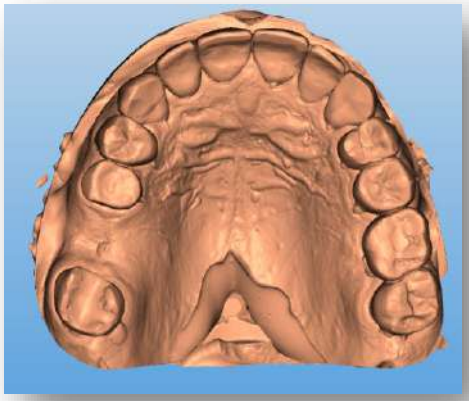

Fig. 1: STL file of the scanned intraoral impression

All records were sent to ITXPros through ITXDash, their secured HIPAA-compliant portal, for data merging and 3D treatment plan formulation using RealGuide software. Proper edentulous site assessment was done regarding the available mesio-distal space, bone height, width, density as well as the relation to the adjacent

anatomy and vital structures. The case was a good candidate for implant placement; however, the available bone height was only 7 mm (Figure 2). The possibility of additional surgical procedure (collar or sinus grafting) was declined by the patient for financial reasons, so an informed decision to proceed with a short implant was made.

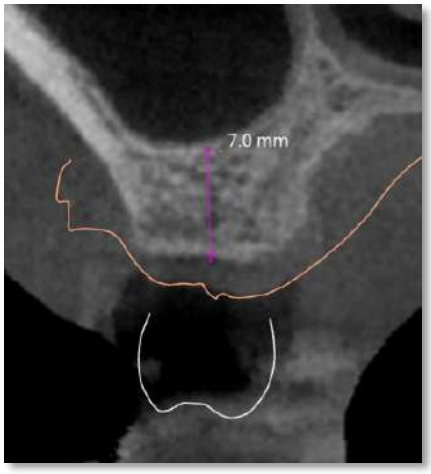

Fig. 2: Cross-sectional image showing the available bone height at the future implant site

Adin Touareg OS implant was selected for this case (6 x 6.25 mm), the short 6.25 mm length was compatible with the ridge height, while the 6 mm diameter matched the abundant mesio-distal and bucco-palatal bone and helped increase the contact surface area with the bone for enhanced osseointegration and primary stability (Figure 3 & 4). A virtual crown was added while planning to optimize the implant's emergence and facilitate the restorative part (Figure 5). Treatment plan was finalized, and surgical guide was requested to shorten the surgery time and minimize complications due to proximity of the implant's apex to the sinus. Surgical guide was designed and fabricated by iTXPROS with mesio-distal extension reaching the contra lateral side to ensure cross-arch stabilization (Figure 6).

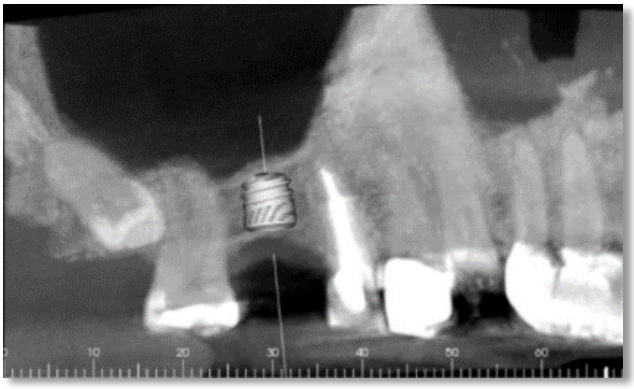

Fig. 3: Cropped reconstructed Panoramic image showing the virtual planned Adin Touareg OS 6 X 6.25 mm implant

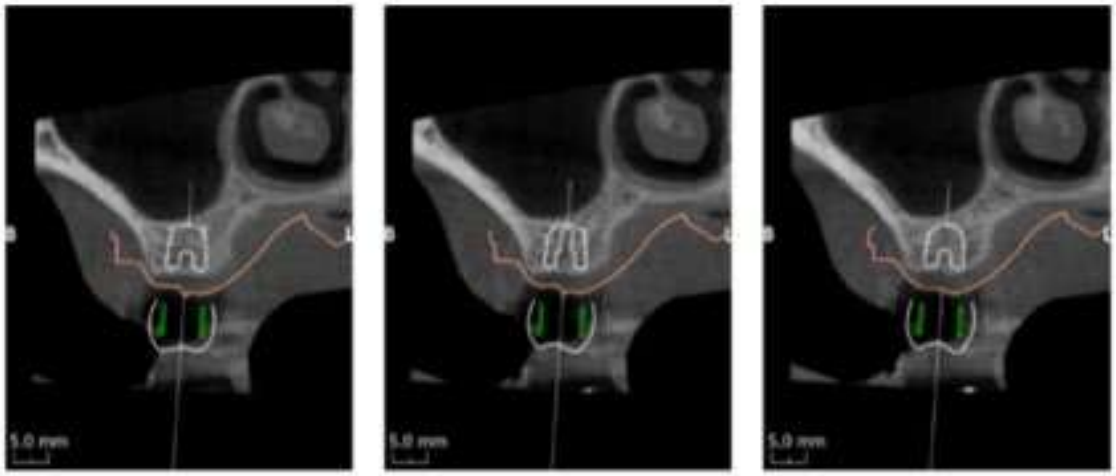

Fig. 4: Serial cross-sectional images showing the virtual planned Adin Touareg OS 6 X 6.25 mm implant

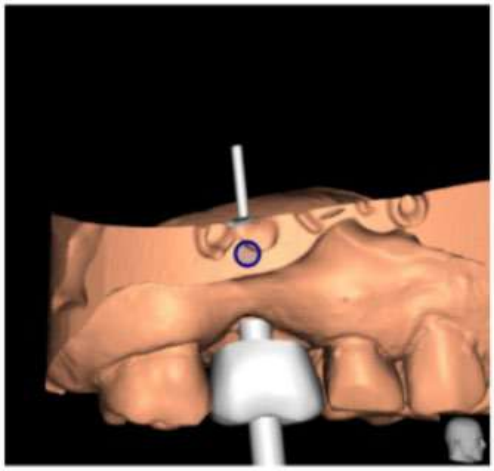

Fig. 5: 3D image showing the implant's emergence in the STL file of patient's teeth and gingiva in relation to the planned virtual crown

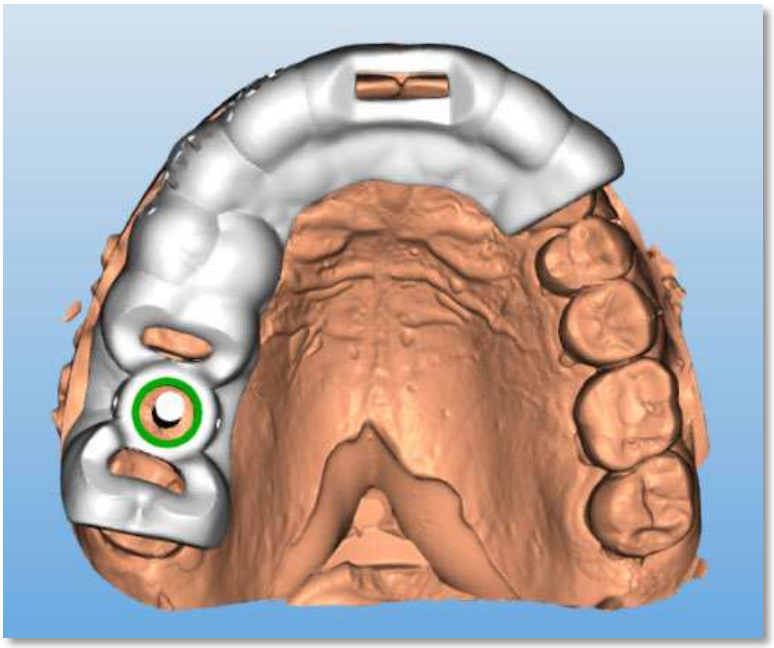

Fig. 6: 3D image showing the designed surgical guide in white color

Guided Implant Surgery

Guide fit was checked prior to the surgery and proper seating was confirmed by the aid of inspection windows anteriorly, mesial, and distal to the anticipated implant site **(Figure 7)**. A soft tissue flap was reflected for additional visibility and control over the surgical site. Pre-surgical intraoral periapical radiograph was taken with the guide in place for additional verification (**Figure 8)**. Osteotomy site was prepared following the Adin fully guided surgical kit till the final drill that corresponded to the correct length and diameter. Final implant delivery was successful, and implant was torqued down till the planned depth **(Figure 9)**.

Fig. 7: Intraoral picture showing the guide fit check and the designed inspection windows

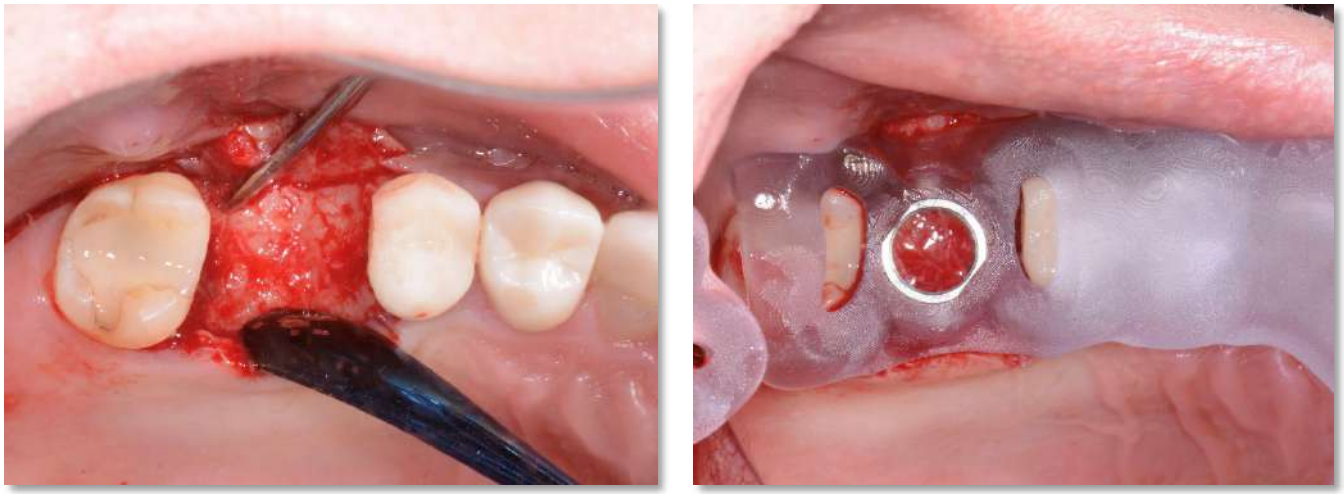

Fig. 8: Intraoral picture showing flap reflection (left) and guide seating with reflected flap (right)

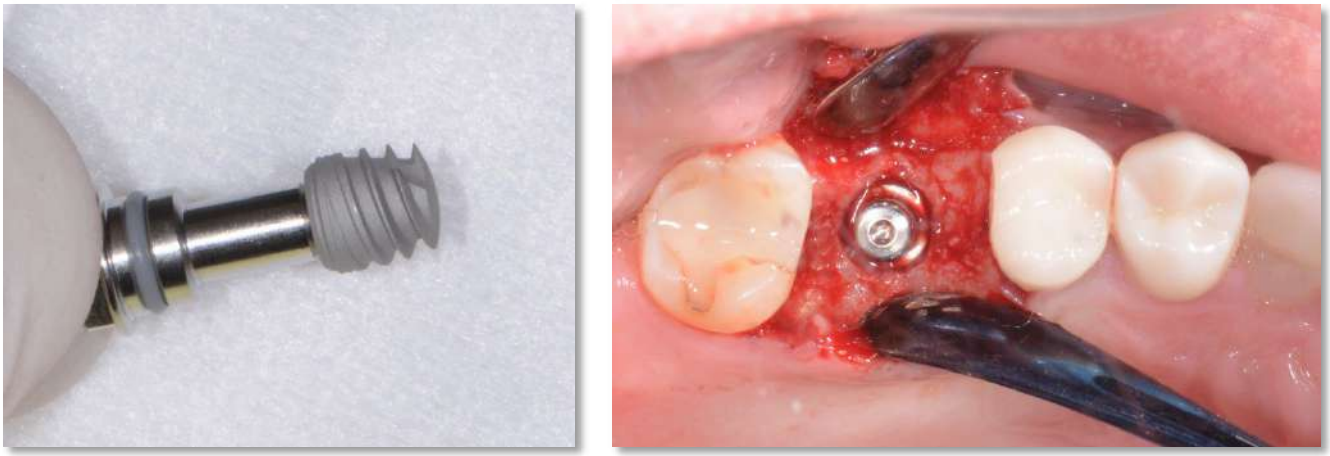

Fig. 9: Extraoral picture of Adin Touareg OS implant before implant delivery (left) Intraoral picture showing implant in bone (right)

ISQ reading was 82 and the implant was immediately loaded, a post-surgical intraoral periapical radiograph was taken to confirm the implant position and rule out possible future anatomic complications (Figure 10 & 11).

Fig. 10: Serial intraoral periapical radiograph with the guide in place and after implant delivery

Fig. 11: Intraoral picture showing the restored implant crown

Conclusion

Short dental implants can be successfully placed and immediately loaded in cases with limited alveolar bone height to obtain patient satisfaction with less surgical and financial burdens. This case highlights the importance of case discussion, virtual 3D planning, and guided implant in increasing the treatment accuracy, reducing the post operative complications as well as the surgery time.

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Dr. Nazarian graduated from the University of Detroit Mercy School of Dentistry and completed an AEGD (Advanced Education in General Dentistry) residency from the US Navy in San Diego, California.
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