

TREATMENT OF NARROW EDENTULOUS SPACES

Fully-Guided Ultra-Narrow Diameter
Implant Placement Protocol



A PEER-REVIEWED CASE REPORT BY

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Many clinical situations challenge our ability to both meet the functional and esthetic expectations of the patient as well as the longevity, predictability and conservative nature we as clinicians desire for our patients. Historically, the intersection of these wants and needs had proven somewhat elusive. The advancement of material science that has allowed the implant industry to produce both narrow and short implants has opened the door to predictable and long-term treatment options that were not possible just several years ago.

Patients who present with narrow spaces and diminished mesio-distal or bucco-lingual dimensions have been traditionally treated with removable partial dentures, fixed prosthodontics, or advanced and at times unpredictable bone block or bone plate grafting with implant placement. Although more time-consuming orthodontic intervention can expand the arch in multiple dimensions and can lead to more ideal space requirements, the ability of the opposing arch to tolerate the expansion for appropriate post-treatment occlusion can at times be problematic.

Narrow-diameter implants have historically been used as single-piece integrated-abutment implants for the purpose of denture retention. The field of material science has advanced with subsequent generations of implant materials that have allowed engineers to both shorten

implant lengths and reduce implant diameters. Two-piece narrow (3.0 mm) and ultra-narrow (2.75 mm) diameter implants have provided clinicians with more options to treat smaller edentulous spaces without more involved and costly bone augmentations and surgical interventions. There have been systematic reviews performed that demonstrated the success of ultra-narrow diameter 2.75 mm implants to be between 94.7-97.6 %, a measurement equivalent to non-narrow implant therapy.

The accuracy of implant placement and its resultant implant prosthetics have a direct impact on the success of long-term implant therapy.^{5,6} Poor implant positioning leads to less than ideal implant prosthetic position and design and increases the forces being transmitted from the occlusal table to the implant and ultimately to bone. These increased forces have been shown by seminal studies to lead to overload forces that result in prosthetic complications, bone loss and implant loss.⁷

Implant treatment planning had previously consisted of an evaluation of panoramic radiography coupled with clinical measurements to assess height, width and bone density prior to implant placement. These methods, combined or separately were inefficient and led to deficiencies in data with tangible potential clinical implications.

Freehand implant surgery can be challenging under normal clinical circumstances. When attempting to perform more technique-sensitive and precise implant placements, small deviations in implant positions can have potentially significant detrimental effects during implant placement.¹¹

Cone beam imaging has allowed the clinician to visualize the critical anatomy, plan ideal implant positioning, and then transfer the ideal plan to the surgical field with predictable accuracy and precision using stereolithographic static surgical guides. Implant manufacturers provide guided surgery drilling kits that compensate for the thickness of the surgical guides and allow for drilling only in the desired location.¹³ A clinician can plan their own implant cases using implant planning software or utilize the services of a guided surgery digital laboratory that can assist doctors by planning cases together with clinicians.

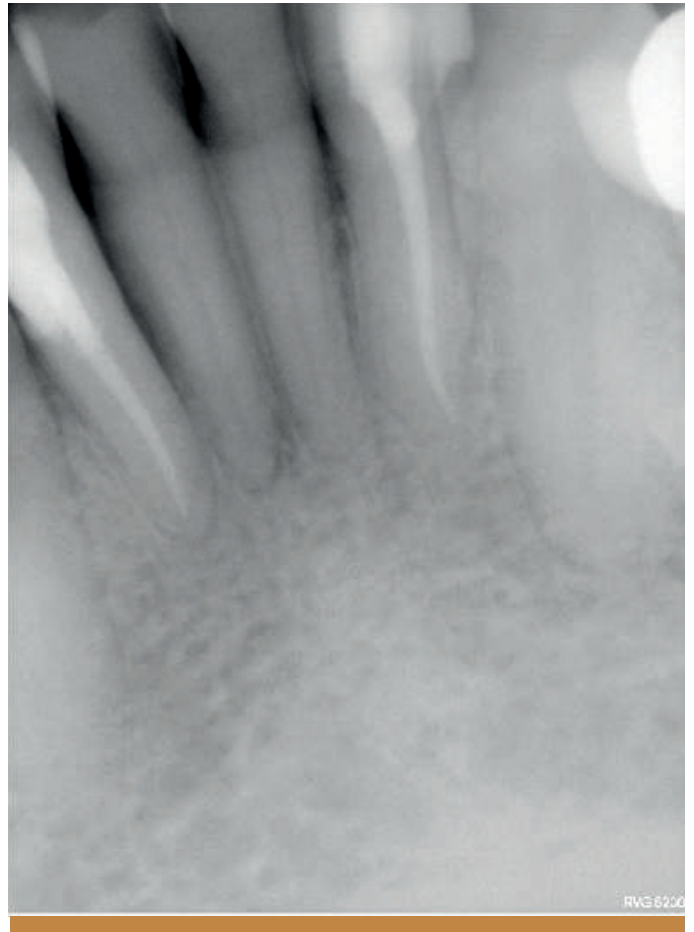
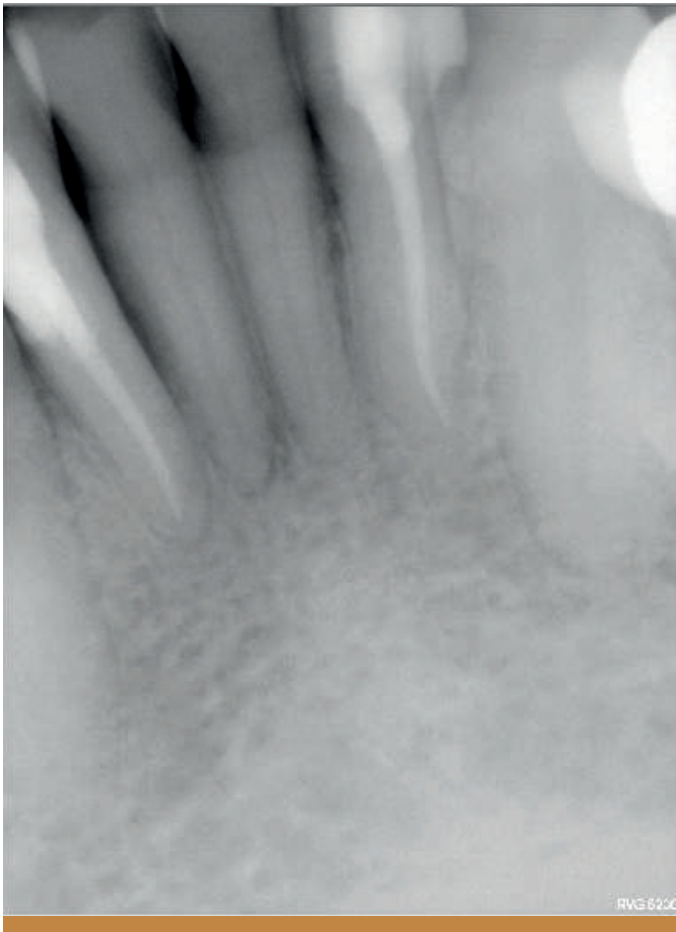
Numerous studies have articulated the clinically significant improvements in implant placement accuracy as a result of static guided implant surgery as compared to freehand surgery. In complex clinical cases such as ultra-narrow diameter implant placements, guided surgery can level the playing field and create successful outcomes with less stress and less chance for error.



This 81-year-old patient presented with clinically relevant friable, erythematous tissue with tooth mobility 24, 26, 25 in the anterior mandible. Periapical radiographs demonstrated greater than 50 % bone loss in this area. Options were reviewed with the patient, including periodontal surgery with likely low predictability for success due to the proximity of adjacent roots and lack of current bone support. Also discussed with the patient were extraction therapy and subsequent treatment options of removable partial denture, fixed partial denture and implant therapy.

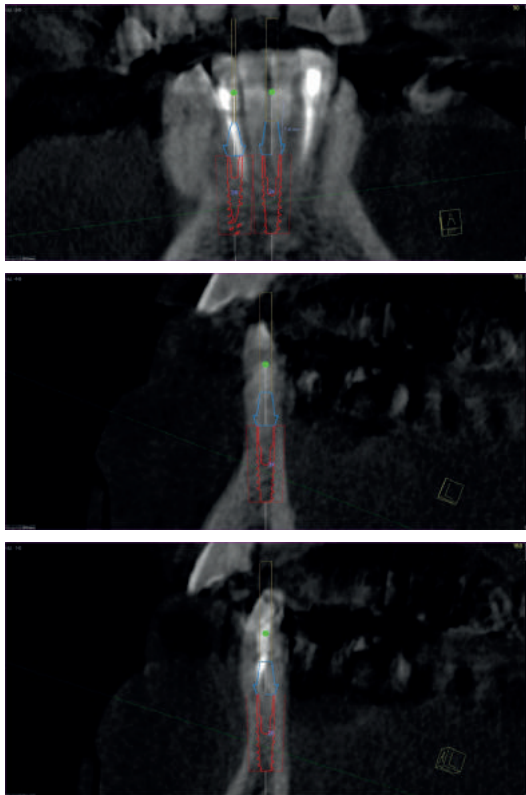
The patient declined more traditional prosthetics with non-surgical treatment modalities and ultimately opted for implant placements. A cone beam image was taken using the Icat Flx which indicated a narrow ridge in the affected site. Options were reviewed with the patient for managing a narrow ridge after extractions, including

bloc grafting, ridge splitting and orthodontics. Detailed discussions were also held about co-morbidities, healing times, chances for success and treatment duration.

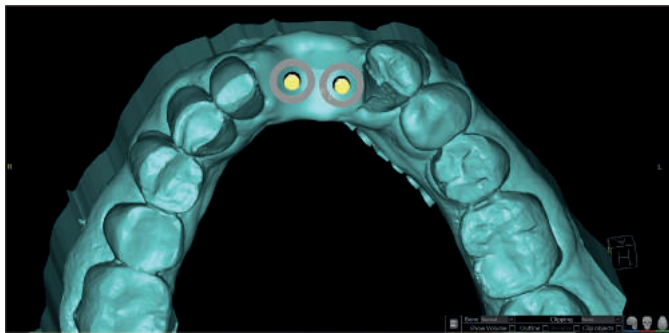


For this clinical case, ultra-narrow diameter 2.75 mm Adin Touareg Closefit implants were selected and guided implant surgical treatment was planned using [Atomica.ai implant planning software](#) and the 3Sixty digital treatment planning service.

The consultation appointment included a cone beam three-dimensional image and an intraoral scan taken with the Cerec Omnicam to be used for guided implant planning. The information was transmitted to 3Sixty utilizing their HIPAA-compliant 3Sixty Courier software and treatment planning was executed cooperatively between the surgeon and the assigned 3Sixty Dentist during a live Zoom session.



The 3Sixty Dentist used the Atomica.ai implant planning software to digitally extract the offending teeth and plan the implants in their ideal positions with the surgeon. Once the treatment plan was set, the static resin surgical guide was designed automatically utilizing artificial intelligence from the Atomica.ai software and reviewed together before it was fabricated and delivered.



On the day of surgery, the procedure was reviewed with the patient including day-of-procedure steps, follow-up appointments required, prosthetic steps and relative time-frames for healing. Consents were signed, and the patient was given Clindcamycin 600 mg prior to the surgery and 2.5 carpules of 4 % Articaine with 1:100k Epinephrine were administered. Teeth 24,25,26 were extracted using forceps, the adjacent teeth were scaled and irrigated and the surgical guide was seated clinically to verify precise seating.

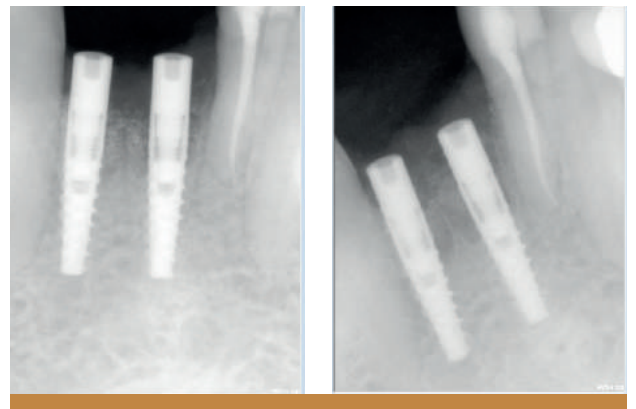
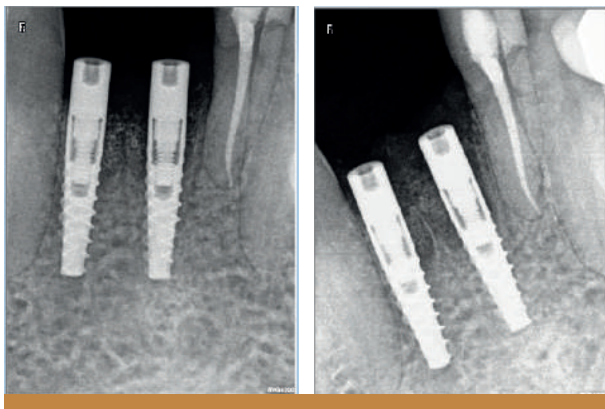


Adin Touareg Closefit 2.75 mm x 11.5 mm ultra-narrow diameter implants were placed utilizing the 3Sixty static surgical guide and Adin Implants ultra-narrow implant keyless guided surgery kit with copious irrigation. Bio-Oss xenograft bone graft and Bio-Gide collagen membrane were placed and subsequently healing abutments were placed and torqued to 20 Ncm. The surgical site was closed utilizing PGA (polyglycolic acid) sutures and hemostasis was achieved.



After the surgery, the patient was given Amoxicillin 500 mg three times daily for 7 days and given instructions to use Ibuprofen 800 mg every four hours for the first 24 hours and as needed thereafter, 12 % Chlorhexidine rinses twice daily for 1 week and warm salt water rinses 6-5 times per day for 7 days. A post-surgical follow-up at 10 days facilitated suture removal and review of oral hygiene instructions.

In a very narrow ridge clinical situation, placing implants free-hand can be very challenging. Yet with Atomica.ai implant planning software and 3Sixty digital treatment planning service, placing 2.75 mm ultra-narrow diameter implants can be as predictable, accurate and stress-free as placing a traditional implant in a healed molar site.



About Dr. Paul Mozer



Dr. Paul Mozer graduated from Buffalo School of Dental Medicine where he received academic distinction and clinical commendations. He conducted oral cancer research at Roswell Park Cancer Institute and completed a residency at New York Medical College.

Dr. Mozer has a Master of Science Degree in Oral Implantology from the University of Frankfurt Goethe Dental School, where he is now on faculty lecturing on guided implant surgery and serves as a Clinical Supervisor and Advisor to Master Thesis candidates.

Dr. Mozer is also on the faculty of the AAID Maxicourse in Boston and the VA Hospital in Buffalo. He has conducted clinical research in 3D static and robotic guided implant surgery and is both a Diplomate and Fellow in International Congress of Oral Implantologists.

ABOUT 3SIXTY

3Sixty has been a steadfast pioneer in the field of digital dental technology since 2007. Based in Atlanta, Georgia, we provide market-leading implant planning and guided surgery solutions for dental professionals across the US.

We have improved the oral health of more than 100,000 people by delivering treatment planning services, cutting-edge treatment planning, guided surgery and full-arch rehabilitation and restorative solutions to thousands of dental practices and labs.

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(e.g. Anatomic Guide®, Scalloped Guide)
- **Restorative Solutions**
- **Radiology Reports**
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Continuing dental education platform

3Sixty Surgical Guides

3Sixty offers a wide variety of cutting-edge surgical guides fabricated from various biocompatible, FDA-approved resins. From single implant placement to full-mouth restoration, 3Sixty's wide range of surgical guides covers just about every clinical scenario, including:



● Pilot Guide

Used with the pilot drill to ensure accurate positioning and orientation of the implant.



● Tooth-Supported Guide

Perfect for single and multiple implant placement in partially edentulous cases.



● Tissue-Supported Guide

Supported by the patient's mucosa and fabricated based on an existing removable prosthesis.



● Bone-Supported Guide

Suitable for edentulous patients. Supported on the alveolar ridge.



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