



2026
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International Academy of Mini Dental Implants



BRANSON CONVENTION CENTER

CASE STUDIES

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QUINCY THOMPSON, DMD

KEYNOTE SPEAKER

DENNIS FLANAGAN, DDS

2026 LECTURERS

TODD E. SHATKIN, DDS
THOMAS BAGGETT III, DDS
BOYD SHEPHERD, DDS, J.D.
JARED SHATKIN, DMD

AUGUST 7 ^{AND} 8, 2026
BRANSON, MO





International Academy of Mini Dental Implants (IAMDI) Founding Member Letter to the Membership

Todd E. Shatkin, DDS

Founding Member & Treasurer



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Edward Gillespie, DDS
Todd E. Shatkin, DDS
Joseph Gillespie, DDS

Dear Colleagues and Members,

Over 20 years ago, my father, Samuel Shatkin Sr., DDS, MD, and I joined three other visionary clinicians in founding the International Academy of Mini Dental Implants. It is with great pride and enthusiasm that I address you at this exciting and pivotal moment in the evolution of implant dentistry.

First and foremost, I would like to extend my deepest gratitude to Dr. Thomas Baggett III for his outstanding leadership during his first year as President of the IAMDI. His vision, dedication, and tireless efforts have helped guide our Academy through a period of growth, innovation, and increasing clinical acceptance. His contributions have strengthened our organization and will have a lasting impact on both our Academy and the greater dental community.

Today, we are witnessing what many of us have long believed: the Mini/-Mono One-Piece Dental Implant, especially the Shatkin One-Piece Implant, is rapidly gaining recognition as a new standard of care in dental implantology. Its minimally invasive design, cost-effectiveness, immediate stability, and remarkable clinical success have made it a transformative solution for both patients and providers.

During a recent Shatkin F.I.R.S.T. Advanced Training Course, world-renowned dental educator Dr. Gordon Christensen commented on the significant advantages of One-Piece Dental Implants and their ability to reduce many of the complications commonly associated with traditional two-piece systems, particularly peri-implantitis. Validation from one of dentistry's most respected educators reinforces what many of us have experienced firsthand in our practices for decades.

As we look toward the future, the IAMDI remains committed to advancing education, clinical research, and global awareness surrounding One-Piece Mini/Mono Implantology. The momentum is undeniable. I am especially excited to see the next generation of implant dentists embrace this technology, including my son, Dr. Jared Shatkin, and many other talented young clinicians who will continue to move our profession forward with integrity, innovation, evidence-based dentistry, and patient-centered care.

As we celebrate the 19th Anniversary of the International Academy of Mini Dental Implants, we can all take pride in how far this movement has come. What began as a vision shared by a handful of pioneers has grown into a worldwide educational organization dedicated to improving patient outcomes and expanding access to implant treatment.

Thank you for your continued support, commitment, and belief in our mission. Together, we are shaping the future of implant dentistry—one patient, one practitioner, and one innovation at a time.

With respect and appreciation,

Todd E. Shatkin, DDS

Founding Member & Treasurer



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From the Desk of Thomas Baggett, DDS President & Diplomat

America 250 and Your Invitation To Attend Our Annual Symposium

As America celebrates its 250th birthday, it is with both great pride and the uncovering of a relevant bit of history that I would like to highlight the importance of the International Academy of Mini Dental Implants and extend this invitation to you to join us for the 2026 IAMDI SYMPOSIUM in "The Live Entertainment Capital of the World," Branson, Missouri.

The History Lesson

George Washington's lifelong battle with tooth decay and ill-fitting, painful dentures demonstrate the immense limitations of 18th-century dentistry.

The General's Silent Burden

Throughout his military and presidential career, General George Washington suffered from severe periodontal disease, which many historians suggest was a mix of poor genetics and primitive medicine. By the time he was inaugurated in 1789, he had lost nearly all of his natural teeth. His dentures were technological marvels for the time but were far from perfect.

Fashioned from hippopotamus ivory, brass screws, gold wire springs, and real human teeth, these bulky appliances lacked a secure foundation. They constantly pinched his gums, caused chronic sores, and notoriously forced his lips to bulge—a trait famously captured in portraits like those painted by Gilbert Stuart. The physical pain and fear of his dentures slipping made the great orator dread public speaking.

The Evolution of Modern Dentistry

Fortunately, dentistry has evolved leaps and bounds beyond hippopotamus ivory and spring-loaded wires. Today, we have diagnostic tools—such as 3D imaging and digital impressions—that ensure flawless, comfortable, and custom-fit oral prosthetics. The most significant leap in restorative dentistry is the development of **dental implants**, including **mini dental implants**.

Why Mini Dental Implants Change Everything

Unlike traditional dentures that merely rest on the gums, rely on messy adhesives, and cause further atrophy of the alveolar bone, implant-supported prosthetics are anchored directly into the jawbone.

Mini dental implants (MDIs) act as artificial tooth roots:

- **Less Invasive:** MDIs are narrower than traditional implants, often allowing them to be placed in a single, minimally invasive visit.
- **Superior Stability:** They snap securely into the underside of a denture or allow for cementation of a prosthesis, eliminating the slipping, clicking, and chafing that plagued Washington.
- **Bone Preservation:** By acting as a root, the implant stimulates the jawbone, preserving the natural facial structure and preventing the sunken look that the General experienced when his dentures were removed.

Where General Washington had to endure severe discomfort to simply speak or eat soft foods, one-piece implant dentistry offers a life-changing alternative that restores full function and confidence.

Today, modern dentistry eliminates these historical miseries through advanced solutions like **mini and mono dental implants**, which offer a secure, natural, and minimally invasive way to snap-in or permanently lock dental prosthetics in place.

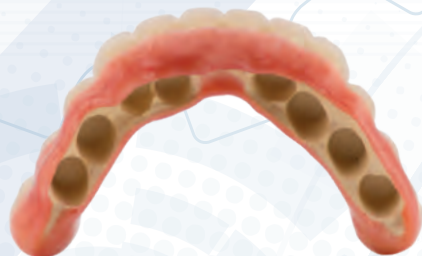
In short, as we "Celebrate America 250", let's also celebrate the IAMDI and the great strides we've made as one-piece implant dentists to "Make America Smile Again!"

Warm regards,
Dr Thomas Baggett
President, IAMDI



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Todd E. Shatkin, DDS
Jared E. Shatkin, DMD



KEYNOTE SPEAKER

DENNIS FLANAGAN, DDS

Dr. Dennis Flanagan is a highly accomplished dentist specializing in general dentistry and oral implantology. He is the former managing partner of Windham Dental Group and Groton Dental Group, where he led a team of 37 employees and provided care to over 15,000 patients. He now practices full-time at Mystic Dentistry and Implantology at 56 Whitehall Avenue (Route 27) in Mystic, Connecticut. Dr. Flanagan is a Diplomate of the American Board of General Dentistry, the International Congress of Oral Implantologists, and the American Board of Oral Implantology/Implant Dentistry. He has served as an Attending Dentist for the U.S. Olympic Committee and previously held the position of Chief of Dentistry at Windham Community Memorial Hospital for over eight years. A prolific contributor to the field, Dr. Flanagan has published more than 140 articles in dentistry and holds eight U.S. patents for medical and dental devices. He is a frequent speaker at both national and international dental conferences.

His professional affiliations and achievements include:

- Honored Fellow of the American Academy of Implant Dentistry
- Diplomate/Fellow of the Academy of Osseointegration and the American Board of Forensic Dentistry
- Recipient of the American Academy of Implant Dentistry Lew Research Award
- Editorial Board Member and Reviewer for multiple dental journals
- Former Editorial Consultant for the Academy of Osseointegration and Oakstone Medical Publishing
- Senior Associate Editor for the Journal of Oral Implantology
- Editor of the quarterly American Academy of Implant Dentistry News

Dr. Flanagan earned his Doctor of Dental Surgery (DDS) from Georgetown University School of Dentistry and pursued advanced training in oral implantology at Harvard University Dental School (Certificate) and Goethe Medical University in Frankfurt, Germany (MSc).



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CASE STUDY

IMPLEMENTATION OF A CONNECTOR BAR DESIGNED FOR MDI SUPPORT OF A REMOVABLE APPLIANCE

THOMAS B. BAGGETT, III, DDS, DIAMDI

Splinting mini dental implants (MDIs) with a connector bar as a superstructure for a removable denture provides superior stability, better load distribution, and reduces marginal bone loss compared to using unsplinted (single-unit) implants. While non-use of a bar (using individual stud attachments) allows for better hygiene and a lower initial costs, it often results in higher rates of prosthetic maintenance.¹

Clearly, the choice of using a splinted or non-splinted approach should be based on solid scientific evidence that considers the conditions and need for each patient. Large bodies of existing data and exhaustive research already exist with regard to stress distribution, implant loading, crestal bone resorption, the impact of occlusion, the influence of prosthetic design and risk factors.²

Splinted mini-implants with a rigid superstructure decrease the bone stress level in comparison with single mini-implants. The effects of bone stress magnitude may explain the clinical outcome, in which splinted mini-implants supporting a mandibular overdenture showed less marginal bone loss compared with nonsplinted mini-implants. Vertical bone resorption morphology was significantly more prevalent in the latter group.¹

Comparative studies of splinted and nonsplinted implants in both maxilla and mandible have shown benefits occur in both arches. Thus, splinted implants were seen to be more productive and successful than non-splinted implants.^{3,4}

While an argument exists that splinting implants increases the oral hygiene requirement, in cases of mini dental implant placement into compromised or atrophic bone, the benefits weigh on the side of splinting.

BACKGROUND

In December 2021, a 50 year old white male presented requesting stabilization of existing maxillary and mandibular complete dentures. A medical history revealed Type II diabetes with an A1C of 7.0 and was managed daily with Metformin. He reported high blood pressure that was managed with Lisinopril. At that time, no other medical concerns were reported.

Clinically: The patient had been edentulous for approximately 6 years. From that time forward, he had been unable to wear dentures. Examination of the existing dentures in situ revealed placement of the denture teeth were set into Class III malocclusion despite evidence that he was Class I. It was determined that MDI stabilization of the existing LCD was possible, but a new maxillary denture would be necessary.

Radiographically: Moderately severe atrophy of the maxilla with insufficient available bone to place an implant larger than a MDI. Both vertical height and buccal lingual width were greatly compromised. Classification of bone density was D3. Moderate atrophy of the mandible with adequate available bone for MDI stabilization. Density classification of the lower anterior ridge was D2.

A new UCD was fabricated and (6) MDIs were successfully placed in the maxilla and (4) in the mandible. For the following two year period, the patient was seen every six months for o-ring changes and follow-up CBCT 3D x-rays. By all accounts, he was very pleased with the outcome. Oral hygiene was fair and radiographs indicated the MDIs were well integrated and no bone loss was seen.

However, December 2023, the patient reported that he had been intubated by an anesthesiologist. Following the procedure, all (6) maxillary implants were mobile and he was in pain. It was learned that the anesthesiologist did not remove the patient's MDI stabilized UCD for the intubation procedure and, in addition to breaking several denture teeth, CBCT 3D radiograph revealed fracture of (3) MDIs. Following several weeks of hospitalization, the patient returned to the office on an emergency visit.



Figure 1. Broken MDIs in situ.

The loose MDIs were removed under local anesthetic to provide immediate relief of discomfort. However, the separated fragments were not retrieved.



Figure 2. Separated MDI being removed.

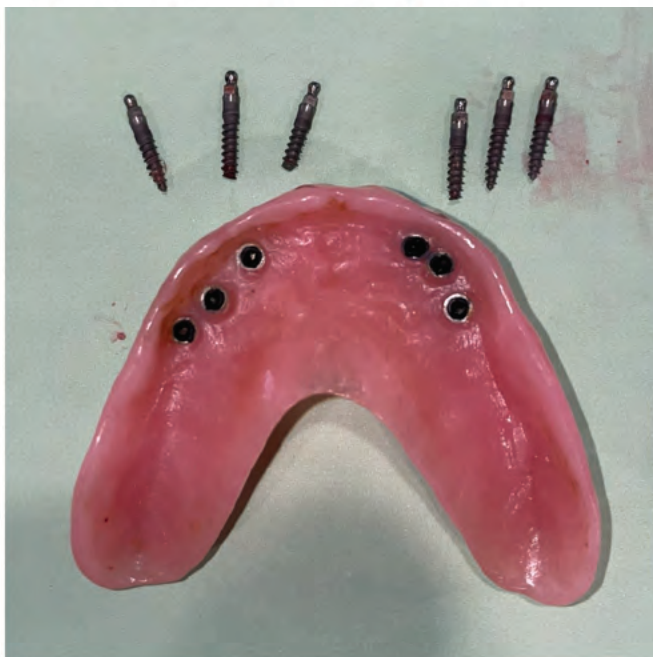


Figure 3. MDIs following removal.

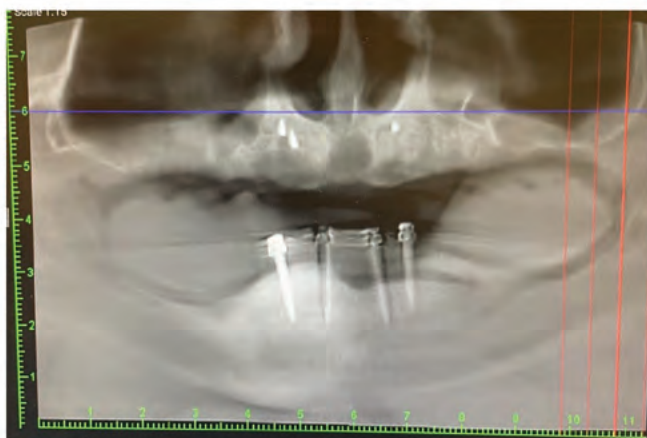


Figure 4. CBCT image following removal of loose MDIs.

As a result of the patient's statements of intent to ensue legal action against the hospital, the decision was made to refer him to an oral maxillofacial surgeon for evaluation and potential removal of the separated MDI fragments. The report from the surgeon stated, frankly, that he saw more potential harm than benefit from attempting to remove them. Without referral, the patient chose to be evaluated by another oral surgeon. As did the former, the second surgeon recommended leaving the fragments in place.

Despite the fact that the position of the fragments would limit the optimal replacement of the MDIs, the patient requested that more MDIs be placed.

Following a frank discussion regarding scenarios which might occur, including collision of implants, it was agreed that (5) 2.0 diameter MDIs would be placed and that they would be splinted for a period of three months prior to fabrication of a connector bar.

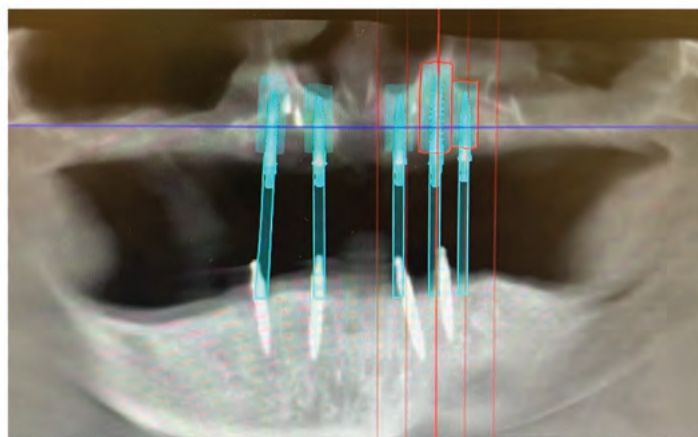


Figure 5. MDI planning on CBCT 3D.

Following onset of local anesthetic, (5) Intralock MDIs were placed using CBCT 3D guidance. A 1.2mm pilot drill was used with copious saline lubrication. All five implants achieved 30NCm of torque or greater. The positioning was confirmed with CBCT 3D and there was clear evidence that there were no collisions with the residual fragments.



Figure 6. CBCT confirmation of MDI placement.

Healing caps were placed and splinted with paste composite.



Figure 7. Paste composite splinting over healing caps.

The upper denture was troughed adequately to allow for relined with a PVS based soft-liner.



Figure 8. PVS soft liner impressed over splinting.

The patient tolerated the procedure well, was given post operative instruction, oral hygiene, and a water flosser with instructions for use.

Following a healing and integration period of three months, the splinting was removed and the arch was impressed with PVS for bar fabrication. All MDIs were solid to percussion and the soft tissue response was unremarkable.



Figure 9. Appearance of soft tissue on day of splint removal.

A cast chrome-cobalt connector bar with locator attachments was fabricated. The bar was highly polished and designed for cementation using resin cement.



Figure 10. Cast chrome-cobalt connector bar with locator attachments.



Figure 11.



Figure 12.

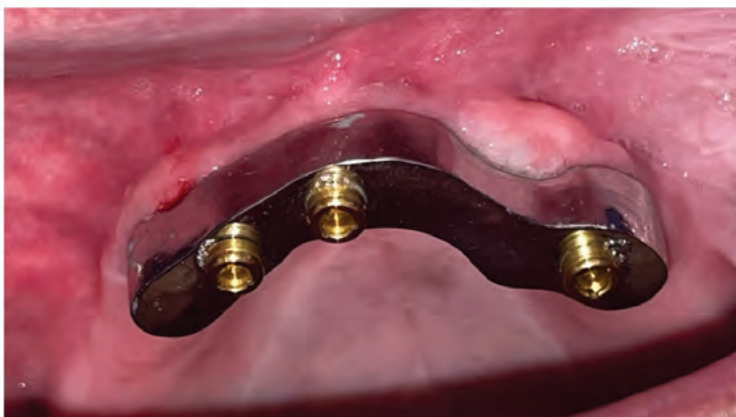


Figure 13. Connector bar cemented with resin cement.

Following cementation with NexTemp Resin Cement, the locator impression copings were placed and a reline pickup impression was made using a PVS material into the upper denture.



Figure 14. Locator copings placed for pickup in PVS reline impression.



Figure 15. Troughing of the denture in preparation for reline impression.

The day following, the denture was delivered, snapped nicely to place, and was seen to have excellent stability. The patient demonstrated the ability to place and remove the unit. Oral hygiene instructions were repeated and the patient was appointed for follow-up in one week.

The patient, however, failed to return for the follow-up visit and refused to appoint despite numerous attempts to bring him in for observation. Over the more than 2 years he was without observation, his reply was always that he was doing "great" and would let us know if he needed anything.

Although the patient continued to resist follow-up visits and contended he was doing "great," he did return May 2026, as a courtesy, to allow me the opportunity to take a CBCT and conclude the documentation of the success of the connector bar used in this case.



Figure 16. PVS impression picking up locator copings.

CONCLUSION

Treatment with an implant connector bar overdenture resulted in significant improvement in quality of life for this patient. Implant overdentures provide excellent esthetics, stability, and function for many patients and help address budget limitations.

While connector bar overdentures may not necessarily be required for successful outcomes of all one-piece implant overdenture cases, this solution adds significantly to the list of available options when planning for individual case needs.

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DOI:10.1563/aaid-joi-D-23-00077
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- 4 Lemos CAA, Verri FR, Santiago Junior JF, de Souza Batista VE, Kemmoku DT, Noritomi PY, Pellizzer EP. Splinted and nonsplinted crowns with different implant lengths in the posterior maxilla by three-dimensional finite element analysis. J Healthc Eng. 2018 Sep 3;2018:3163096.

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CASE STUDY

ALTERNATIVES TO LOCATORS AND LOCATOR DENTURES USING MINI DENTAL IMPLANTS: 3 CASE STUDIES

DONALD B. BROCKLEY, DMD, DIAMDI

INTRODUCTION:

As a mini dental implant dentist with Shatkin F.I.R.S.T. for nearly 20 years now, one of my biggest frustrations as a clinician is the locator denture case with traditional large diameter implants. The patient comes into our office, having been treated by other dentists who use large diameter implants with housing and locator restoration techniques. Patients find that they spend a great deal of money to have this treatment, have teeth removed, and have 2 or 4 large diameter implants placed and thus wait 6 months or more, while healing with a temporary denture. They then have the locators placed inside the denture, which have little retention. When I see these patients, they cannot or will not wear the denture. When I ask them to remove their denture, they practically spit it out. The patients are unhappy because of the promises that the dentists make to them are not reflected in the treatment that they have been provided.

Over the years, I have helped these people by using mini implants (MDL's) to help stabilize their dentures to correct the loose denture problem or converting to fixed bridge work, utilizing both implants that I place and the two piece implants that were previously placed. Because of the diversity and sheer numbers of large diameter systems, it is also difficult to get information as to what parts to get for the large diameter implants.

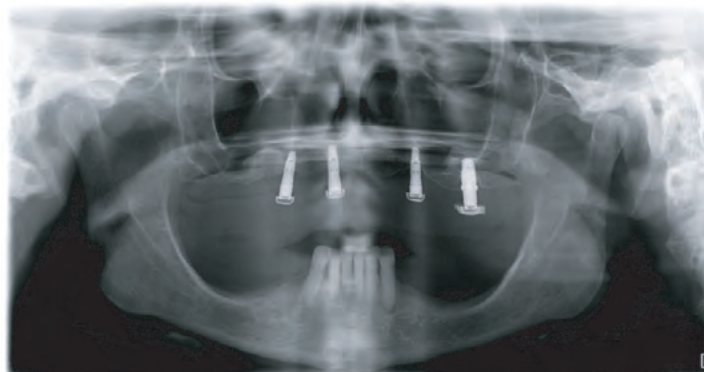
When these locator results do not meet the expectations of the patients after months of waiting to be able to function, they come to us for a solution. The cases below demonstrate how Dr. Gildersleeve and I have been able to give patients satisfaction with their implant retained teeth, with full arch solutions.

CASE 1: AJ

This 57 year old woman came into our practice with a maxillary implant denture that was loose. Cosmetically she was happy with the implant denture, which used traditional large diameter implants, but she found that it came loose easily and she could not bite on her front teeth. The patient stated that her teeth "would just pop out." She had waited almost a year to have her previous large diameter implants properly restored.

This patient saw our 30 minute infomercial and made an appointment with our office. We improved her implants and implant prosthetics by placing mini dental implants and integrating the large diameter implants from her previous dentist. Our treatment plan was to place more mini implants and to construct a permanent bridge, which we would immediately place a temporary fixed bridge.

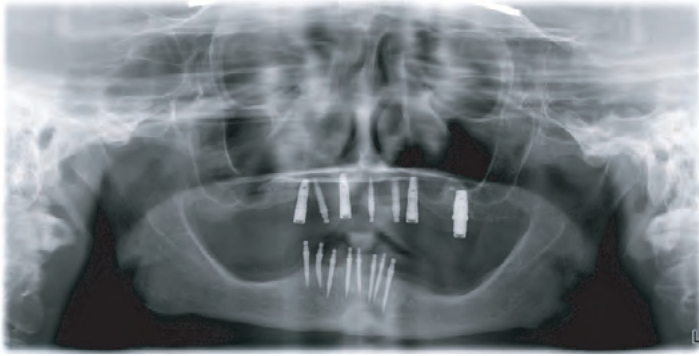
Three mini implants were placed using standard procedures in areas unsuitable for large diameter implants on the maxillary arch, and a temporary bridge was placed at the date of surgery. After the integration of implants, and the aid of using the four large diameter implants, the greater challenge was to achieve the proper cosmetic look for this patient. She had hated the way her original implant denture looked before coming to our office. It took some time to achieve the proper aesthetics that she wanted, but after several try-ins, she was truly happy to be able to have a beautiful fixed restoration that she and her husband approved of.



Case 1 AJ: Pre Op Panoramic X-Ray



Case 1 AJ: Pre Op Case Photo



Case 1 AJ: Post Op Panoramic X-Ray maxillary and mandibular implants placed



Case 1 AJ: Post Op Case Photo, completed permanent maxillary implant retained bridge



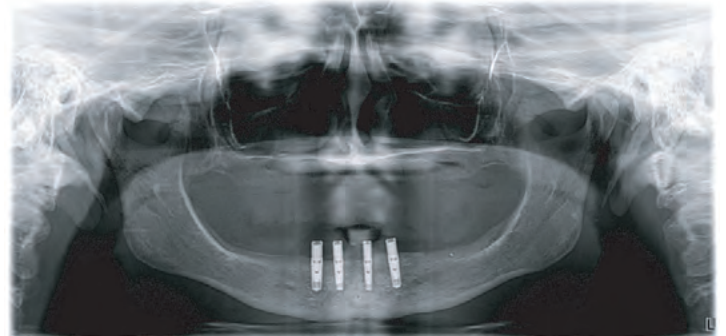
Case 1 AJ: Final Maxillary Implant Retained Bridge

CASE 2: TB

This 60 year old woman came in after seeing our infomercial and carried her lower denture in with her. Previously, she had her lower teeth removed, waited 6 plus months and had 4 large diameter implants placed with a denture with locators. After months, the retention was poor and she was unable to eat and digest her food, leading to gastric problems due to lack of proper nutrition and poor digestion. We placed 6 one piece Milo and MDL implants and proceeded to construct a lower fixed bridge by utilizing the 6 mini implants and the 4 large diameter implants, without locators. After patient approval, the bridge was cemented with temporary Telio cement, to be taken off at a later time for more permanent cementation. The patient came in at a later date and declined removal and recementation of mandibular fixed implant bridge, as she was doing well and her digestion had returned to normal.



Case 2 TB: Converting Mandibular Implant Denture into Implant Bridge



Case 2 TB: Pre Op Panoramic X-Ray



Case 2 TB: Changing a Locator Denture to Fixed Bridge on Mandibular Arch



Case 2 TB: Mandibular Implants, From OverDenture to Fixed Bridge Case



Case 2 TB: Post Op Panoramic X-Ray, 6 Mini and Milo Implants placed in the mandibular arch

CASE 3: PC

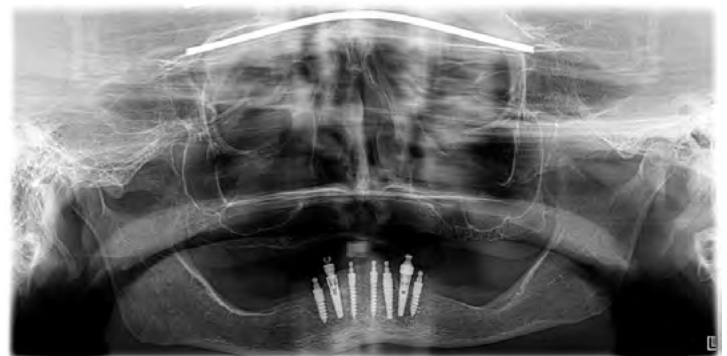
An 83 year old woman was referred to us by a previous patient; again the patient had a removable mandibular overdenture. At her previous dentist's office, teeth were removed, the patient waited over 6 months to heal, and then the patient had 2 large diameter implants placed with locator attachments. She came into our office crying because she could not eat anymore and wanted a tighter fitting denture. Because of the patient's financial concerns, I decided to simply change locator abutments to ball and square abutments on the 2 large diameter implants. I removed the previous abutments in the large diameter implants that the previous dentist had given me the implant information for. I placed the new ball and square abutments into the LDI's, which I purchased from Sterngold. The patient still had no success with ball and square replacements. The patient and I then decided to add 5 MDI's to her lower arch and fabricate a new mandibular implant denture. Stabilization was achieved and the patient was very pleased. She is grateful now that she can continue her activities, like her card clubs and senior citizen activities.



Case 3 PC: Post Op Photo after placing mandibular implants



Case 3 PC: Post Op Photo after placing mandibular implants



Case 3 PC: Post Op Panoramic X-Ray

FINAL THOUGHTS

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CASE STUDY

ONE PIECE IMPLANT DEBATE: MINI'S VERSUS MONO'S: WHAT SHOULD WE USE WHERE? AND WHY?

E. AHONO GILDERSLEEVE, DDS, DIAMDI

INTRODUCTION

One piece implants have revolutionized and shaken up the world of dental implantology since their inception and implementation. One piece Implants, especially mini dental implants, have especially become popular clinically since the 1990s and 2000s, following their FDA approval for long term use in 1999. As we know as dentists who place mini dental implants, the one piece implant gained popularity amongst clinicians and patients, as we were searching for a less invasive, simpler option to traditional two piece implants. One piece implants have certainly provided both clinicians and patients a less invasive, more timely, and less expensive alternative to their traditional two piece counterpart.

One piece implantology has developed even further in the United States in the past 10 years, specifically with Mono One Piece Implants, widely produced by Noris Medical. Mono or "basal" one piece implants, have been placed in Europe and India for years, but only became more widely available in the United States in the mid to late 2010's. Per Noris Medical's Mono Implant FDA Clearance letter from 2014, Noris Medical specifically states that "Mono implants are specifically indicated for replacing maxillary lateral incisors and mandibular central and lateral incisors." The FDA clearance document further states that "they are used for immediate, non-occlusal provisionalization in single-tooth restorations. Multiple-unit restorations should be splinted together and may be used immediately when clinically appropriate."

As One Piece implantology has changed and evolved quickly and steadfastly in the past 20 years, we must ask ourselves as clinicians, what one piece implant would be best for the patient, and why? Thus how the conversation of Mini dental implant versus Mono dental implants came to mind.

TREATMENT PLANNING AND DISCUSSION

Treatment planning is the quintessential and most important aspect when it comes to placing implants, whether it be for one piece implants or traditional two piece implants. Therefore, what should we consider in treatment planning for mini implants and mono implants? What type of one piece implant do we select for what bone and why? Treatment planning for dental implants should have two goals in mind; surgical goals and restorative goals. We can place a mini or mono implant in any ample bone, but once that implant is placed, we have to restore it. It is essential that implants are placed with restorability in mind. Angulations of implants need to be taken into account, with parallelism as our ultimate goal in full arch cases, especially for removable implant dentures.

When I treatment plan for one piece implants; I ask myself two initial questions, one is regarding the surgical approach, with the other regarding the restoration/restorative plan for the implant.

Question 1: How much bony width, height, and dentistry does the patient have?

Question 2: What is the goal for restoration?

BONE WIDTH

Regarding question 1: If the bone is less than 4 mm in width, I am most likely going to place an Intra-Lock MDL or Milo Implant. Why is that? Because one piece implants require at least .5 mm of bony support buccally and lingually/palatally. Therefore, for extremely thin, knife-edge ridges, which we see very often in the one piece/mini dental implant world, MDL's, especially 2.0 and 2.5 widths, may be the only viable option for these patients. We see this most often in long term traditional denture wearers, especially in our older female patients. After all, we see many thin ridged patients coming to us for second or third opinions. So many of these patients have already been told that they "don't have enough bone for traditional implants," and certainly looking at their CBCT's, that is true. Often these ridges are so thin, that the only way to gain adequate access to the ridge is a full thickness mucoperiosteal flap, and a small-moderate alveoplasty just to remove the knife edge ridge before placing MDL implants.

Alternatively, if the patient has about 4 mm, or even 3.75 mm of bony width, I am most likely going to place a Noris Medical Mono Implant.

BONE HEIGHT

Bony height is the next surgical aspect to consider: Short areas, i.e. no shorter than 8-9 mm, will only allow for MDL or Milo Implants of a 10 mm implant. Taller bony areas, at least 13 mm or so, can accommodate Mono Implants. Mono Implants have a significantly long head/neck/abutment compared to the simpler ball and square model of the MDL and Milo implant, see Image 1. This longer neck/head on the Mono Implant can prove challenging for short vertical bone. Therefore, MDL implants are more flexible in certain areas of limited vertical bone, such as the maxillary posterior with the maxillary sinuses, or the mandibular posterior with the presence of the inferior alveolar nerve or mental foramen.

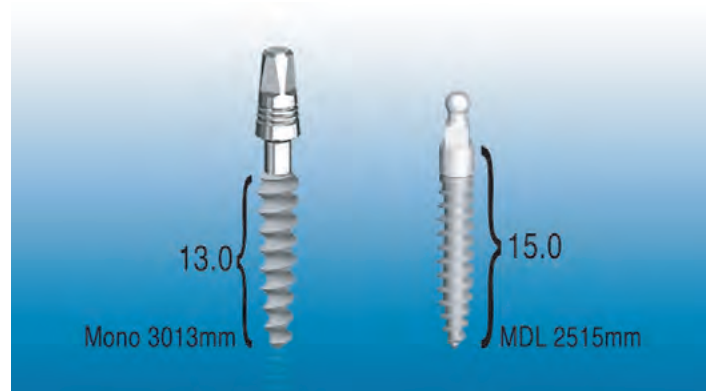


Image 1: Above image, courtesy of Shatkin F.I.R.S.T., demonstrated the difference in catalogue implant lengths on Mono versus MDL implants. Please note the longer neck/abutment head on the mono implant on the left, versus the shorter ball and square head design on the MDL implant on the right.

BONE DENSITY

Bone density is just as essential in treatment planning what implant to place, when compared to bony width and bony height. This is where the aspects of D1, D2, D3 and D4 bone come into play. Through other mini implant clinicians, especially through my mentor and clinical director Dr. Todd Shatkin in my residency at Shatkin Dental Health, it has been impressed on me to always try to place 3.0 Milo implants on the maxillary arch, if width allows. Why is this? One reason is because of the maxillary bone density. Maxillary bone is clinically less dense compared to the mandibular bone, with the premaxilla/anterior portion of the maxilla containing usually D3 bone, and the posterior portion of the maxilla containing D4 bone, the spongier and 'softest' in the oral cavity. Because of how clinically 'soft' the bone is in these areas, it is best to place thicker implants. Think of placing a 3.0 Milo implant versus a 2.0 or a 2.5 MDL. Placing a 3.0 will condense the bone much more than a 2.0, and will dramatically increase the surface area of bone to implant interface, which will most likely ensure a higher success rate of the implant. Alternatively, what implant would be best when placed in the mandibular anterior area? Figure 1 and Figure 2 note the extreme density of the mandibular anterior jaw, with virtually no trabecular bone, instead filled with compact, dense, cortical bone. When placing implants in this area, consider how dense this bone is. If you desire placing a Mono 3.75 x 13 mm non bendable implant in this area, consider that the drilling sequence will need to be significantly more than if placing a 2.0 x 15 mm MDL implant. I would therefore suggest placing thinner Mono implants in the mandibular anterior area, such as 3.0 or 3.3 mm widths, versus a 3.75 or a 4.2 mm width, if the areas are already edentulous. Recall that due to the dense nature of the mandibular anterior bone, the osteotomy must be more in depth and more steps compared to less dense areas, such as the maxillary posterior. Consider deeper and wider drilling depths when performing the osteotomy for a mono implant, with more successive steps. This would include not just the 1.2 pilot drill or the 1.5 pilot drill, but often the 2.0 drill, the 2.5 drill, and maybe even a small amount of drilling with the 3.0 drill, if needed. These surgical considerations are to be evaluated per patient and per bony site.

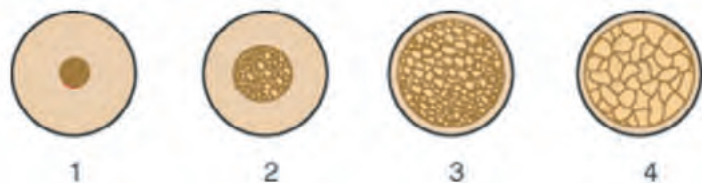


Figure 1: The above figure demonstrates D1, D2, D3, and D4 bone, the four bone qualities commonly found in the jaw. D1 contains compact cortical bone with minimal vascularization. As the bone qualities progress from D1 to D4, there is less cortical bone, and more cancellous bone. Therefore, D4 bone (all the way to the right) contains small amounts of cortical bone, instead having mostly trabecular bone, which is much less dense in nature.



Figure 2: This figure demonstrates the densities of bone in the maxillary and mandibular jaw. D1 and D2 demonstrate the bone most commonly seen in the mandible, whereas D3 and D4 correlate with the maxillary arch.

EXTRACTION SITE VERSUS HEALED RIDGE

Now that we have examined bony height, width, and bony quality aka dentistry, how do we decide what implants to place in an extraction site versus healed ridge? For this question, I believe part of the answer depends on the clinician's preference, but also what the restoration will be. Let's first examine the immediate implant; placing an implant the same day that the tooth is extracted. If #9 is extracted and replaced with an immediate implant the same day, I almost always utilize a Mono Implant, either bendable or non bendable. The aggressive threads on the mono implant make it an excellent choice for engaging the apical and palatal bone in the extraction socket. Additionally, the mono implants come in long catalogue lengths; the 16 mm bendable Mono with the bendable head/neck/abutment makes the implant in total 26 mm long. This is helpful when replacing long rooted teeth. In general, the mono threads have been very successful in our practice for engaging bone in immediate sites, and achieving the necessary torque for immediate placement. Please note that 30 ncm of torque is usually the baseline for this, but 60 ncm is desired, with many clinicians placing their Mono implants a bit past 60 ncm. My clinical preference for one tooth replacement in an immediate site is a Mono implant. I prefer the abutment head on the mono to the ball and square of the MDL/Milo implant. I also have prepped the Mono implant heads if needed, if the abutment head is too long (not enough occlusal clearance) or if angulations need to be adjusted on the abutment head. Being able to adjust the abutment head provides flexibility.

BENDABLE MONO IMPLANTS/PREPPING MONO IMPLANTS

The bendable Mono Implant is incredibly useful in single tooth replacement for immediate implants. I have found the bendable Mono to be an excellent clinical choice in replacing maxillary anterior teeth. Due to the angle of the anterior maxilla, often once we have placed the implant, the abutment head is very angled to the buccal, almost coming out the buccal in a 30 degree angle or more. By bending the abutment on the head of the Mono bendable implant (from buccal to palatal), we are able to bring the implant back into the arch form. This is incredibly helpful for those with angled pre-maxilla bone and immediate extraction sites where the palatal bone must be used. Bendable Mono implants are also very helpful when navigating around the anatomical structures of the maxilla and mandible, think the maxillary sinus or the IAN or mental nerve. For example, when placing a maxillary posterior implant and trying to avoid the maxillary sinus, an implant can be placed at an angle, such as the implant shown below at #14, Image 2.

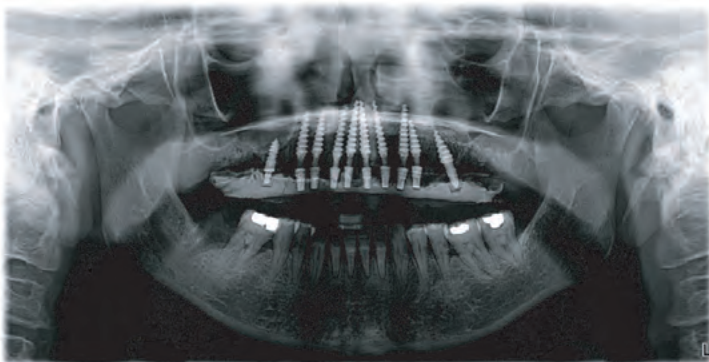


Image 2: Full Arch Maxillary Implants, noting the upper left #14 angled Mono implant, placed angled in order to avoid the maxillary sinus. Placed by Dr. E. Ahono Gildersleeve.



Image 2a: PA of angled and prepped implant at site #14. Placed by Dr. E. Ahono Gildersleeve

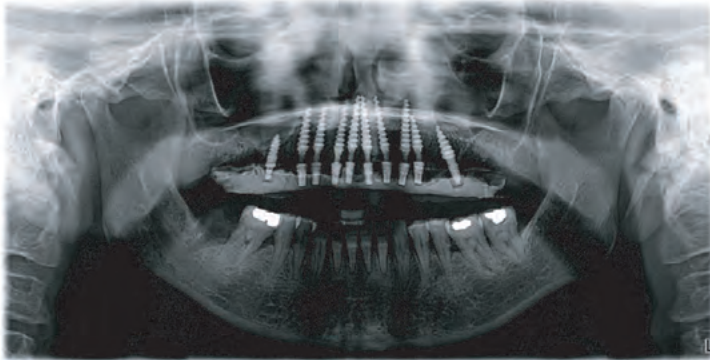


Image 2: Full Arch Maxillary Implants, noting the upper left #14 angled Mono implant, placed angled in order to avoid the maxillary sinus. Placed by Dr. E. Ahono Gildersleeve.

In this instance, an angled implant was not placed. Instead, a 4.2 x 10 mm non-bendable Noris Medical Mono Implant was placed and torqued to 60 Ncm. This was an extraction site. The implant head was then prepped with a high speed hand-piece and diamond bur so that the abutment was more parallel with the other implant heads. Note that the implant has been placed at a bit of an angle, so that the body of the implant is placed for mesial, while the head of the implant is more distal. Therefore, by placing at an angle, we have actually increased our AP (anterior-posterior) spread versus if we just placed this implant in the regular vertical, standard up and down direction. Please note that this technique of placing implants at an angle in this manner is extremely common and is the norm for "All on 4" and "All on X" cases, see Image 3.



Image 3: A traditional All on 4 Implant Technique on the maxillary arch. Note the angles of the maxillary posterior implants. Not my patient nor do I claim this work as my own.

The Mono's flexibility when it comes to difficult angles definitely gives it a leg up to the MDL or Milo implant in this area.

BENDABLE VERSUS NON BENDABLE MONO IMPLANTS

Bendable versus Non Bendable Mono is also an important discussion in treatment planning discussion. Where should we place bendable implants? Where should we not? In our clinical practice and opinion, we place non-bendable Mono implants as much as we can. We have a preference for non bendable in all posterior sites, but for anterior sites, bendables are doable, and often the best choice. The reasoning for this lies in the bendable neck of the Mono Implant. The neck on the Bendable Mono Implant is 1.8 mm in width, see Image 3.



Image 3: Courtesy of Noris Medical Instagram Page. Bendable Mono Implant shown on Implant on left, Non Bendable Mono Implant shown on Implant on right. Note the difference in the thickness of the neck of the implant. Mono Bendable Implant on the left has a longer and skinnier neck compared to Non-Bendable Mono Implant.

The reason the implant neck is 1.8 mm, which is thinner in width compared to the non bendable, is so that we can bend the implant abutment where-ever we like. Titanium under 2 mm is flexible, thus why the bendable neck is only 1.8 mm wide. However, the flexibility of the neck comes with risk of fracture, due to the thinness of this area. Therefore, we aim to place bendable implants primarily in the maxillary anterior sites. Our goal is not to stress our bendable implants too much with compressive forces, especially on the bendable Monos which have a skinnier neck. Because the posterior teeth complete the majority of compressive forces, we therefore try not to place bendables toward the posterior sites. However, we can ameliorate this issue by making sure to splint the implants if they are bent, if multiple implants are placed. Please note that Noris Medical also states in the FDA letter of clearance that "multiple-unit restorations should be splinted together" also.

RESTORATIVELY DRIVEN IMPLANTS

As implantologists, we are so focused on placing the implants into the bone in the right area in the right angle and achieving the right torque, that the thought of placing the implant restoration can sometimes seem less important. However, placing implants with the restoration in mind is absolutely essential. Without proper restorability, angulation, and occlusal space, our mono and mini implants are not usable. So how do we place implants with restorability in mind?

The first question we must ask is: what is the patient's goal and clinician's goal for the restoration, mostly regarding full arch cases? If we are planning on implant dentures, certainly we are placing MDL or Milo implants; the ball and square implants on which we have been creating snap on dentures now for over 20+ years. Please note that as of right now, Noris Medical Mono Implants are not designed for removal implant appliances. The abutment heads on Mono Implants are not conducive for removable; the abutments are quite long, and no dental manufacturer makes a "housing" that could snap onto the Mono implants. Therefore, when you plan on implant dentures, MDL and Milo implants are the tried and true choice.

Although no current implant or implant fixture exists (that I know of), in order to use Mono implants for removable implant dentures, please note that Dr. Todd Shatkin is currently working on fabricating his own implant that integrates the aggressive threads of the Mono Implant with the classic ball and square head of the MDL implants. This development will prove to be extremely useful for patients and one piece implantologists alike.

Regarding full arch fixed implant cases, we have developed some of our own habits and systems in our practice at Mini Dental Implant Center of America, the Greater Pittsburgh area. When treatment planning for full arch fixed/cemented implant cases, my father and mentor Dr. Donald Brockley and I usually favor Mono Implants in these cases. We especially like the design of the abutment head and the ability to bend the heads as needed. Being able to bring 8-10, or even 12 implants into parallelism by bending them is extremely helpful when figuring out restorability. Please note that for the case shown in Image 2, most of the implants placed were bendable Mono Implants, which I did in fact bend into the arch form, for the same of parallelism and path of draw.

FUTURE ENDEAVORS IN ONE PIECE IMPLANTOLOGY

Although no current implant or implant fixture exists (that I know of), in order to use Mono implants for removable implant dentures, please note that Dr. Todd Shatkin is currently working on fabricating his own implant that integrates the aggressive threads of the Mono Implant with the classic ball and square head of the MDL implants. This development will prove to be extremely useful for patients and one piece implantologists alike. I look forward to this advancement in one piece implantology, which will combine my favorite aspects of each one piece implant.

CLINICAL CHOICES IN OUR PRACTICE

Regarding full arch fixed implant cases, we have developed some of our own habits and systems in our practice at Mini Dental Implant Center of America, the Greater Pittsburgh area. When treatment planning for full arch fixed/cemented implant cases, my father and mentor Dr. Donald Brockley and I usually favor Mono Implants. We especially like the design of the abutment head and the ability to bend the heads as needed. Being able to bring 8-10, or even 12 implants into parallelism by bending them is extremely helpful when figuring out restorability. Please note that for the case shown in Image 2, most of the implants placed were bendable Mono Implants, which I did in fact bend into the arch form, for the sake of parallelism and path of draw.

CONCLUSION AND COMPARISONS

Clinically, it has become evident that in the discussion of one piece dental implants, it is not a matter of using mini dental implants (classic o-ball and square) versus mono one piece implants, but utilizing a combination of both. As clinicians, we must take into consideration the matter of removable versus fixed restorations, individual versus multiple units, and the quality and quantity of the bone in which we place implants. By taking all of these factors and more into careful treatment planning and consideration, we can ensure that patients receive the most optimal clinical success with one piece implants. Having a plethora of implants in our proverbial toolbox, whether it be bendable, non bendable, mini versus larger than 3.0 mm, helps provide optimal, long term implant results for patients and higher success rates for the implants that we place.



**E AHONO
GILDERSLEEVE, DDS, DIAMDI**



SOURCES:

Image 1: <https://shatkinfirst.com/mono-dental-implant-details/>

Image 2a: E. Ahono Gildersleeve, DDS. Brockley Dental Center 2025. Private Practice.

Image 2: E. Ahono Gildersleeve, DDS. Brockley Dental Center 2025. Private Practice.

Image 3: <https://malocliniceducation.com/all-on-4-2/>

Figure 1: https://www.accessdata.fda.gov/cdrh_docs/pdf14/K140440.pdf

Figure 2: <https://pocketdentistry.com/7-bone-density-a-key-determinant-for-treatment-planning/>

Image 3: <https://www.instagram.com/p/-CaRao2OgTwA/> Noris Medical Instagram Page





CASE STUDY

CREATING IMPLANT POSSIBILITY WHERE CONVENTIONAL IMPLANT THERAPY WAS NOT FEASIBLE: INVISALIGN-ASSISTED ORTHODONTIC SITE DEVELOPMENT PRIOR TO PLACEMENT OF A ONE-PIECE MINI DENTAL IMPLANT

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ABSTRACT

Keywords:

Mini Dental Implant; Invisalign; Orthodontic Site Development; Mandibular Incisor; Space Deficiency; Interradicular Bone; Narrow Diameter Implant; One-Piece Implant; CBCT; Implant Rehabilitation

INTRODUCTION

Long-standing loss of mandibular incisors often results in progressive space collapse, mesial drift, and root convergence, creating significant restorative challenges.

This case is unique because successful rehabilitation was achieved without ridge augmentation, block grafting, or preparation of adjacent teeth despite more than two decades of progressive space collapse. The treatment sequence demonstrates how orthodontic site development may convert an apparently non-restorable mandibular incisor site into a predictable implant-supported restoration utilizing a narrow-diameter one-piece implant.

This case report describes the successful rehabilitation of a mandibular incisor site that many clinicians would consider unsuitable for conventional implant therapy because of severe space collapse, root convergence, and extremely restricted alveolar dimensions. By combining Invisalign-assisted orthodontic site development with placement of a one-piece mini dental implant, a fixed implant-supported restoration was achieved without sacrificing adjacent teeth or performing ridge augmentation procedures.

The patient had previously been informed that implant rehabilitation was unlikely to be feasible because of severe space collapse, root convergence, and limited available bone dimensions.

A patient who had been told implant therapy was essentially not feasible because of severe space collapse and root convergence was ultimately restored through CBCT-guided diagnosis, Invisalign-assisted orthodontic site development, and placement of a 2.5 × 16 mm one-piece mini dental implant.

This perception was largely based on severe space collapse, root convergence, and the dimensional limitations associated with conventional implant therapy.

BACKGROUND

Long-standing mandibular incisor loss frequently results in progressive space collapse and root convergence, creating significant restorative challenges.

CASE PRESENTATION

A 33-year-old male presented with a missing mandibular central incisor lost during childhood and more than two decades of progressive mesial drift and restorative corridor collapse.

TREATMENT

Approximately one year of Invisalign therapy was used to reopen the implant site and improve root parallelism. A 2.5 mm × 16 mm one-piece mini dental implant was subsequently placed.

RESULTS

The restorative corridor increased from approximately 1.1 mm to 5.28–5.31 mm and the interradicular osseous corridor increased from approximately 2.1 mm to 6.31 mm. Successful implant rehabilitation was achieved without bone grafting.

CONCLUSION

Orthodontic site development may transform severely space-deficient mandibular incisor sites into implant-restorable environments while avoiding more invasive augmentation procedures.

INTRODUCTION: SITE MALALIGNMENT VS. ALVEOLAR VOLUMETRIC DEFICIT

Replacement of missing mandibular incisors remains one of the most challenging procedures in implant dentistry because of limited mesiodistal space, narrow ridge dimensions, and root proximity. Long-standing missing mandibular teeth often result in progressive localized space collapse, mesial drift, and secondary root convergence rather than presenting strictly as an isolated vertical or horizontal alveolar bone volume deficit.

In this case, the patient's vertical alveolar ridge height was largely preserved, while the restorative corridor itself had collapsed due to more than two decades of progressive mesial drift. This provided strong clinical justification for utilizing clear aligner therapy as a mandatory pre-surgical precursor. This diagnostic framing redefined the primary clinical challenge from a simple bone deficiency to a spatial and structural malalignment, validating why orthodontic site development needed to precede surgical intervention.



Figure 1A: Pre-operative panoramic radiograph demonstrating a severely collapsed mesio-distal restorative corridor measuring approximately 1.1 mm, secondary to long-standing mesial drift following childhood tooth loss.



Figure 1B: Pre-operative panoramic radiograph demonstrating a severely restricted inter-radicular osseous corridor measuring approximately 2.1 mm before orthodontic site development.

While orthodontic site development has been described for conventional implant therapy, limited literature exists describing the combined use of Invisalign-assisted site development and one-piece mini dental implants for rehabilitation of long-standing mandibular incisor space collapse.

CASE PRESENTATION & CLINICAL DIAGNOSIS

A 33-year-old male presented with a non-contributory medical history and a chief complaint regarding a missing mandibular central incisor lost during childhood. The patient was highly self-conscious about the esthetic gap but desired a treatment path that avoided preparation of healthy neighboring teeth for a fixed bridge and avoided highly invasive bone grafting.

Comprehensive panorex and cross-sectional cone-beam computed tomography (CBCT) analysis confirmed an extremely narrow, localized mandibular anterior ridge with profound mesiodistal space loss. Baseline pre-operative panoramic measurements revealed a severely compromised environment: the visible clinical crown/restorative gap was collapsed to approximately 1.1 mm, while the underlying inter-radicular bone pathway was restricted to approximately 2.1 mm. Multi-planar views confirmed that while vertical bone height was largely preserved, the inter-radicular space between the adjacent roots was inadequate for conventional implant diameters due to lingual and mesial convergence and tipping of the neighboring teeth.

Based on CBCT evaluation and intraoperative findings, bone density corresponded approximately to Misch D2-D3 quality, providing favorable support for primary implant stability and osseointegration.

The clinical assessment indicated a localized ridge deficiency and arch collapse secondary to long-standing childhood tooth loss. Mini dental implants were indicated because of the highly restricted dimensions. While the narrow ridge and inter-radicular proximity precluded conventional-diameter implants, the bone volume was favorable for a narrow-diameter, one-piece system once the crowns and roots were orthodontically uprighted.

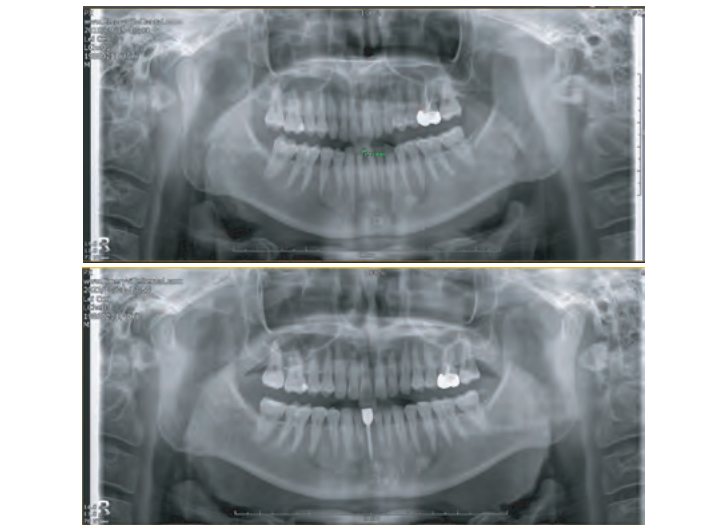
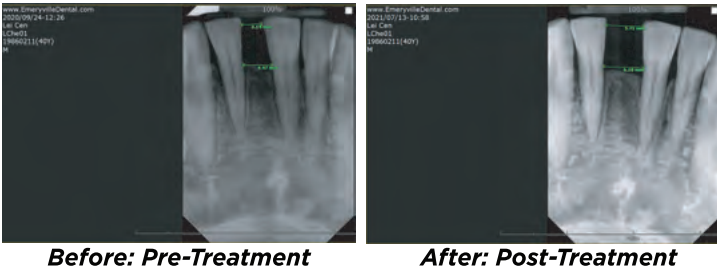


Figure 2: Pre-treatment panoramic and periapical radiographs demonstrating severe mesio-distal restorative space deficiency, narrow alveolar housing, and advanced root convergence before treatment, compared with post-treatment radiographs.

Clinical and radiographic follow-up of approximately 29 months demonstrated stable crestal bone levels, healthy peri-implant tissues, and continued functional success.

MANAGEMENT OF EARLY IMPLANT FAILURE

An initial implant placement performed in July 2021 failed to achieve long-term stability and was subsequently removed. Following a period of healing, reassessment, and modification of the treatment plan, a second 2.5 mm x 16 mm one-piece mini dental implant was successfully placed in September 2021. The replacement implant achieved excellent primary stability and remained clinically and radiographically successful throughout follow-up.

TREATMENT PLANNING: SELECTED TREATMENT JUSTIFICATION & SYSTEM RATIONALE

The mandibular anterior segment represents one of the most structurally and anatomically restrictive zones in implant dentistry due to narrow cortical plates and highly restricted inter-radicular corridors.

Three alternative treatment modalities were considered and rejected:

- 1. Traditional 3-unit fixed bridge: Rejected because it required irreversible preparation of healthy adjacent teeth.
- 2. Removable partial denture: Rejected due to limited long-term patient satisfaction, lifestyle inconvenience, and continued ridge atrophy concerns.
- 3. Conventional implant with block or particulate grafting: Rejected as more invasive, more complex, more costly, and requiring an extended healing timeline.

Utilizing a 2.5 mm x 16 mm one-piece mini dental implant combined with pre-surgical clear aligner therapy offered the most conservative treatment path. This approach required no preparation of adjacent teeth, avoided bone grafting, and matched the narrow ridge anatomy. The treatment plan effectively bypassed the physical dimension requirements of conventional two-piece implant designs.

ORTHODONTIC SITE DEVELOPMENT: QUANTITATIVE CORRIDOR RECOVERY

Rather than relying on subjective clinical descriptions, this case provides linear metrics derived from pre- and post-orthodontic radiographic mapping and digital clear aligner staging models. Orthodontic planning targeted the initial collapsed clinical width of approximately 1.1 mm and the restricted inter-radicular bone channel of approximately 2.1 mm.

Following approximately one year of Invisalign site optimization, post-orthodontic and post-implant evaluation confirmed successful recreation of a normalized clinical restorative corridor measuring approximately 5.28 mm to 5.31 mm mesiodistally.

Cross-sectional imaging and 3D CT volume reconstructions demonstrated that the adjacent roots were successfully uprighted and parallelized, expanding the available inter-radicular bone pathway to approximately 6.31 mm. This orthodontic recovery achieved the root spatial control required to create a safe osseous pathway for the 16 mm implant length while minimizing risk of mechanical or biological trauma to neighboring periodontal ligament structures.

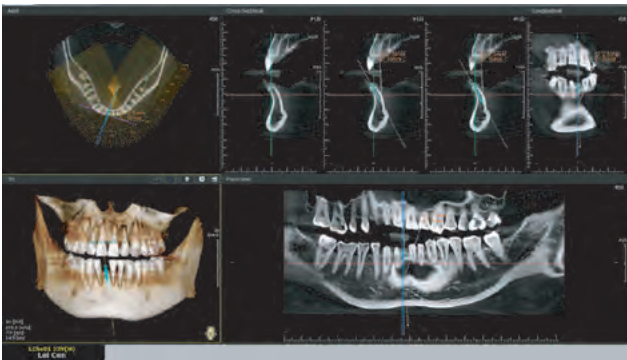


Figure 3: Post-orthodontic CBCT planning demonstrating Invisalign-assisted orthodontic site development, root parallelization, and creation of a biologically acceptable implant corridor.

Mesio-Distal Measurement	Value
Initial restorative corridor	1.1 mm
Initial interradicular osseous corridor	2.1 mm
Final restorative corridor	5.28–5.31 mm
Final interradicular osseous corridor	6.31 mm

SURGICAL AND PROSTHETIC PHASE

Following a comprehensive clinical examination, prosthetically driven treatment planning, and three-dimensional cone beam computed tomography (CBCT) evaluation, a definitive interdisciplinary treatment plan was developed to replace the missing mandibular central incisor while preserving the surrounding hard and soft tissues. [1, 7] CBCT imaging was indispensable for evaluating available bone volume, adjacent root angulation, restorative space, and the limited mesiodistal dimensions created by the longstanding edentulous site. Three-dimensional assessment allowed precise virtual planning of implant position, trajectory, depth, and emergence profile while minimizing the risk of root encroachment and optimizing prosthetically driven implant placement.

The primary challenge in this case was not simply limited bone volume, but the absence of a biologically safe and restoratively acceptable implant corridor. Orthodontic site development using Invisalign® therapy was therefore selected to create sufficient mesiodistal restorative space and improve inter-radicular root positioning before implant placement. This interdisciplinary approach preserved healthy adjacent teeth and native alveolar bone while avoiding more invasive treatment alternatives, including horizontal ridge augmentation and conventional fixed bridge preparation. [12] Following successful orthodontic site development and confirmation of an adequate restorative corridor, a one-piece narrow-diameter mini dental implant was selected because its reduced osteotomy requirements were compatible with the newly established implant corridor. Selection of a one-piece implant was based on both the anatomical limitations of the site and the restorative objectives of the case. Compared with conventional two-piece implant systems, this approach preserved native bone, reduced surgical morbidity, minimized treatment complexity, and avoided the prolonged healing associated with grafting procedures. [8,9,12]

A minimally invasive flapless surgical protocol was performed to preserve the periosteal blood supply, minimize soft-tissue trauma, reduce postoperative discomfort, and maintain the vascular integrity of the alveolar bone. Preservation of the periosteum may contribute to maintenance of cortical bone vitality while reducing surgical morbidity. A conservative pilot osteotomy, with sequential preparation as clinically indicated, was completed under copious sterile saline irrigation according to the manufacturer's recommended surgical protocol. [1]

Throughout implant placement, continuous attention was directed toward implant angulation, trajectory, depth, rotational orientation, and parallelism to optimize the definitive prosthetic path of insertion and emergence profile. Primary implant stability was achieved at the time of placement, allowing progression to the planned restorative phase in accordance with established immediate-loading principles when clinically appropriate.

The integrated one-piece implant design eliminated the implant-abutment interface present in conventional two-piece implant systems. Because one-piece implants eliminate this junction, they also eliminate the implant-abutment microgap that has been shown in two-piece implant systems to permit bacterial colonization and micromovement. Experimental and clinical investigations have demonstrated that bacterial leakage and inflammatory cell infiltration may occur at the implant-abutment interface of two-piece systems, potentially contributing to crestal bone remodeling. Elimination of this interface may therefore

contribute to improved maintenance of crestal bone levels and peri-implant soft tissue stability in appropriately selected clinical situations. [18–23]

Following verification of implant position, occlusion, restorative contours, and emergence profile, a provisional restoration was fabricated to maintain esthetics, preserve the surgically developed tissue architecture, and guide soft tissue maturation during healing. [6,12]

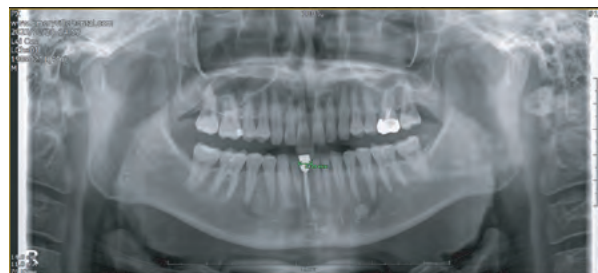


Figure 4A: Post-Treatment panoramic radiograph showing successful implant placement and verifying an achieved clinical restorative corridor width of approximately 5.28 mm.



Figure 4B: Post-Treatment panoramic radiograph confirming stable structural positioning with an optimized clinical dimension of approximately 5.31 mm.

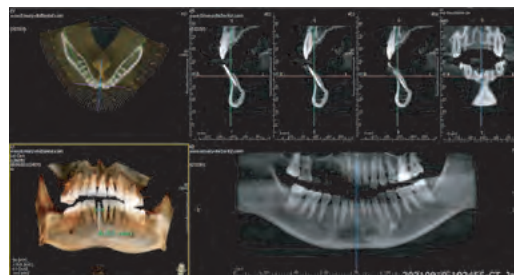


Figure 5A: Three-dimensional CBCT reconstruction validating an inter-radicular bone pathway of approximately 6.31 mm, confirming safe clearance from adjacent roots while remaining confined within the available buccolingual bone housing.

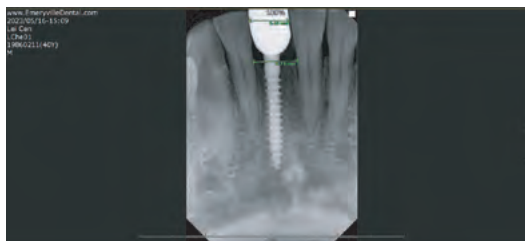


Figure 5B: Linear measurements of approximately 6.75 mm and 6.13 mm represent projected two-dimensional radiographic dimensions obtained using digital imaging software. These values reflect differences in image projection and measurement methodology and are therefore not directly comparable to the three-dimensional CBCT-derived measurements used as the quantitative reference standard throughout this report

RESULTS: SOFT TISSUE PERFORMANCE AND EMERGENCE PROFILE

The clinical course proceeded ideally and according to plan, with minimal chair time and excellent patient tolerance. At final prosthetic delivery, the peri-implant soft tissue response demonstrated an optimal, inflammation-free margin and a natural emergence profile.

Because a traditional fixed partial denture was avoided, the natural gingival margins and interdental papillae architecture of the healthy neighboring teeth were preserved. Follow-up monitoring confirmed successful osseointegration, stable crestal bone levels surrounding the implant body, and healthy peri-implant soft tissue. The patient reported a significant improvement in confidence and quality of life.

Quantitatively, orthodontic site development increased the clinical restorative corridor approximately fivefold (1.1 mm to 5.28-5.31 mm) and the inter-radicular osseous corridor approximately threefold (2.1 mm to 6.31 mm), creating sufficient restorative and biologic space for implant placement.

DISCUSSION: BIOMECHANICAL ADVANTAGES OF THE ONE-PIECE NARROW-DIAMETER ARCHITECTURE

This case illustrates the value of an interdisciplinary approach in managing a severely space-deficient mandibular anterior site. The primary obstacle was not simply inadequate bone volume, but the absence of a biologically safe and restoratively acceptable implant corridor. Rather than proceeding directly to horizontal ridge augmentation or attempting placement of a conventional-diameter implant within a compromised anatomical site, orthodontic site development was selected to establish adequate mesiodistal restorative space and improve inter-radicular root positioning while preserving the patient's native alveolar bone. This conservative strategy facilitated ideal implant positioning and improved both prosthetic and esthetic outcomes. [8, 9, 12,16]

Three-dimensional CBCT evaluation played a pivotal role throughout diagnosis and treatment planning. In addition to assessing available bone volume, CBCT enabled comprehensive evaluation of adjacent root angulation, implant trajectory, restorative space, and anticipated emergence profile. Such information is often difficult to appreciate using conventional two-dimensional imaging alone and substantially improves the predictability and safety of implant placement in anatomically restricted sites. [1, 12]

This case also illustrates the importance of distinguishing anatomical limitations from restorative limitations. While conventional evaluation might classify the site as unsuitable for implant placement based primarily on limited space and root convergence, comprehensive three-dimensional diagnosis demonstrated that orthodontic site development could transform the site into one capable of supporting predictable implant rehabilitation. The limiting factor was therefore not simply bone quantity, but the absence of a biologically safe and restoratively acceptable implant corridor. [1, 8, 9]

Following successful orthodontic site development, placement of a one-piece narrow-diameter implant provided several biologic and biomechanical advantages. The reduced osteotomy diameter preserved native bone volume, minimized surgical trauma, and eliminated the need for horizontal ridge augmentation in this patient. The flapless surgical approach preserved the periosteal blood supply, reduced postoperative morbidity, and helped maintain existing soft-tissue architecture. Because one-piece implant systems eliminate the implant-abutment interface, they also eliminate the microgap that has been demonstrated in two-piece implant systems to permit bacterial colonization and micromovement. Experimental and clinical investigations suggest that elimination of this interface may contribute to improved crestal bone preservation and peri-implant soft tissue stability in appropriately selected cases. [18-23]

The interdisciplinary collaboration among orthodontics, implant surgery, and restorative dentistry was fundamental to the successful outcome. Orthodontic treatment established an appropriate restorative corridor, CBCT-guided implant planning optimized surgical precision, and prosthetically driven implant placement facilitated a favorable emergence profile and harmonious esthetic integration within the anterior dentition. This coordinated treatment sequence expanded treatment possibilities while preserving healthy adjacent teeth and reducing the need for more invasive augmentation procedures. [1,9, 12, 16]

Beyond the favorable clinical outcome, this case highlights the importance of individualized treatment planning based on anatomical limitations, restorative objectives, and patient preferences. Careful case selection, comprehensive three-dimensional diagnosis, minimally invasive surgical techniques, and interdisciplinary collaboration may allow predictable rehabilitation of carefully selected anatomically challenging sites while preserving native tissues and reducing overall treatment morbidity. [1, 2, 7, 9]

Although this report describes a single clinical case, the diagnostic principles demonstrated may be applicable to carefully selected patients presenting with severe restorative space deficiency following comprehensive three-dimensional evaluation. [1]

The principal obstacle was not inadequate bone volume, but rather the absence of a biologically safe and prosthetically acceptable implant corridor. Distinguishing restorative space deficiency from true alveolar bone deficiency fundamentally altered treatment planning and ultimately allowed preservation of the patient's native tissues.[1,9,12]

COMPARISON TABLE: CONVENTIONAL IMPLANT VS MDI PROTOCOL

Category	Conventional Implant	One-Piece Mini Implant
Diameter	3.5–4.5 mm	2.5 mm
Bone Graft	Often Required	Not Required
Flap	Usually	Flapless
Cost	Higher	Lower
Treatment Time	Longer	Shorter
Morbidity	Greater	Reduced
Orthodontic Site Development Required	Often	Used Successfully



Figure 6. Clinical Smile Series - Pre-Operative Smile (Before), Post-Operative Smile (After), Final Implant Crown Restoration

SPACE DEFICIENCY VS BONE DEFICIENCY

A deficiency in restorative space should not automatically be interpreted as a deficiency in alveolar bone. In many patients, the principal limitation is the absence of a biologically safe and prosthetically acceptable implant corridor caused by root convergence, mesiodistal space loss, or unfavorable tooth position rather than inadequate bone volume alone. Comprehensive three-dimensional CBCT evaluation, combined with interdisciplinary orthodontic site development when indicated, may transform an initially unsuitable site into one capable of predictable implant rehabilitation while preserving native alveolar bone and healthy adjacent teeth. Accordingly, treatment planning should distinguish restorative space deficiency from true alveolar bone deficiency before considering ridge augmentation or alternative restorative options. [1, 2, 9, 12, 16]

ROLE OF INTERDISCIPLINARY ORTHODONTIC-IMPLANT THERAPY

Orthodontic site development and implant rehabilitation function synergistically as a single interdisciplinary treatment pathway.

A critical distinction in this case is that successful treatment required recovery of both the restorative corridor and the interradericular osseous corridor. Creation of crown space alone would not have been sufficient to permit implant placement. Orthodontic site development simultaneously increased the clinical mesiodistal restorative dimension and the root-to-root osseous pathway, ultimately establishing the biologic and prosthetic requirements necessary for placement of a 2.5 mm × 16 mm one-piece mini dental implant.

This case illustrates that restoration of the interradericular osseous corridor may be equally as important as restoration of the clinical restorative corridor when planning implant rehabilitation in long-standing mandibular incisor deficiencies.

WHY A CONVENTIONAL IMPLANT WAS NOT SELECTED

Conventional implant placement was not considered a predictable option because the available mesio-distal restorative corridor, inter-radicular osseous corridor, and buccal-lingual ridge dimensions were inadequate to safely accommodate a conventional 3.5–4.0 mm implant while maintaining accepted biologic safety margins around adjacent roots and cortical plates. Placement would likely have required significant ridge augmentation, prolonged treatment time, increased morbidity, and additional cost.

The combination of Invisalign site development and a 2.5 mm × 16 mm one-piece mini dental implant created a conservative solution that preserved adjacent teeth while avoiding grafting procedures.

RATIONALE FOR ONE-PIECE MINI DENTAL IMPLANT SELECTION WHY A MINI IMPLANT WAS CHOSEN

- Narrow ridge
- Limited corridor
- Avoid grafting
- One-piece architecture
- Immediate primary stability
- Reduced surgical morbidity

MESIO-DISTAL MEASUREMENT DISCUSSION AND SPACE RECOMMENDATIONS

Implant Type	Typical Diameter	Common Space Requirement
2.0–2.5 mm Mini Implant	2.0–2.5 mm	Often 4–5 mm restorative space
3.0 mm Narrow Implant	3.0 mm	Often 5–6 mm restorative space
3.5–4.3 mm Conventional Implant	3.5–4.3 mm	Often 6–8 mm restorative space
4.5–5.0 mm Conventional Implant	4.5–5.0 mm	Often 8–10 mm restorative space

The actual mesio-distal requirement depends on:

- Implant diameter
- Adjacent root anatomy
- Interradicular bone availability
- Periodontal ligament preservation
- Prosthetic emergence profile
- Esthetic requirements
- Occlusal loading considerations
- Manufacturer recommendations

TRADITIONAL IMPLANT PLANNING CONCEPT

A commonly accepted surgical guideline recommends maintaining approximately 1.5–2.0 mm clearance between an implant and the root of an adjacent natural tooth.

Example:

4.0 mm Conventional Implant

- 1.5 mm clearance from mesial root
- 1.5 mm clearance from distal root
- = 7.0 mm total mesio-distal space preferred

Many clinicians become more comfortable with approximately 7–8 mm of available restorative corridor when placing a conventional 4.0 mm diameter implant in the esthetic zone.

Example:

2.5 mm One-Piece Mini Dental Implant

- 1.5 mm clearance from mesial root
- 1.5 mm clearance from distal root
- = 5.5 mm total mesio-distal space preferred

In selected cases, narrow-diameter one-piece mini dental implants can be successfully utilized in significantly more restrictive restorative corridors than conventional implant systems.

APPLICATION TO THE PRESENT CASE

The primary limitation in this patient was not loss of vertical bone height but rather severe collapse of both the restorative corridor and the interradicular osseous corridor resulting from more than two decades of mesial drift and root convergence following childhood tooth loss.

Initial measurements demonstrated:

- Clinical restorative corridor: approximately 1.1 mm
- Interradicular osseous corridor: approximately 2.1 mm

These dimensions were inadequate for placement of either a conventional implant or a mini dental implant.

Following approximately one year of Invisalign-assisted orthodontic site development:

- Clinical restorative corridor increased to approximately 5.28–5.31 mm
- Interradicular osseous corridor increased to approximately 6.31 mm

This orthodontic correction established both the prosthetic space necessary to restore a mandibular incisor and the biologic osseous pathway required for safe placement of a 2.5 mm × 16 mm one-piece mini dental implant while preserving adjacent roots and periodontal structures.

A critical distinction in this case is that successful treatment required recovery of both the restorative corridor and the interradicular osseous corridor. Creation of crown space alone would not have been sufficient to permit implant placement. Orthodontic site development simultaneously increased the clinical mesio-distal restorative dimension and the root-to-root osseous pathway, ultimately establishing the biologic and prosthetic requirements necessary for successful implant rehabilitation.

CASE MEASUREMENT SUMMARY

Measurement	Initial	Final
Clinical Restorative Corridor	1.1 mm	5.28–5.31 mm
Interradicular Osseous Corridor	2.1 mm	6.31 mm
Implant Diameter	N/A	2.5 mm
Implant Length	N/A	16 mm

BUCCAL –LINGUAL MEASUREMENT DISCUSSION:

Implant Type	Typical Diameter	Common Ridge Width
2.0–2.5 mm Mini Implant	2.0–2.5 mm	Often 4–6 mm
3.0 mm Narrow Implant	3.0 mm	Often 5–7 mm
3.5–4.3 mm Conventional Implant	3.5–4.3 mm	Often 6–8 mm
4.5–5.0 mm Conventional Implant	4.5–5.0 mm	Often 8–10 mm

The actual requirement depends on:

- Implant diameter
- Bone density
- Buccal plate thickness
- Lingual plate thickness
- Esthetic demands
- Manufacturer recommendations
- Whether grafting is planned

TRADITIONAL IMPLANT PLANNING CONCEPT

A common surgical guideline is: **At least 1.0–1.5 mm of bone should remain on both the facial (buccal) and lingual aspects of the implant.**

Example:

4.0 mm Conventional Implant

- 1.0 mm buccal bone
- 1.0 mm lingual bone
- = 6.0 mm ridge minimum

Many clinicians prefer:

4.0 mm implant

- 1.5 mm buccal bone
- 1.5 mm lingual bone
- = 7.0 mm ridge

For esthetic areas some dental colleagues prefer even more.

Example:

2.5mm MDI Mini Implant

- 1.0 mm buccal bone
- 1.0 mm lingual bone
- = 4.5 mm ridge

Many clinicians become more comfortable around 5–6 mm ridge width.

FOLLOW-UP TABLE

Time Point	Findings
Immediate Placement	Primary stability 60 Ncm
Crown Delivery	Stable soft tissue
6 Months	Stable bone levels
12 Months	Functional success
24 Months	Continued osseointegration
29 Months	Stable crestal bone and peri-implant tissues

CLINICAL DECISION-MAKING IN A HIGHLY RESTRICTED MANDIBULAR INCISOR SITE

This case presented a uniquely challenging restorative scenario. The patient had been missing a mandibular central incisor for more than two decades following childhood tooth loss. During this prolonged period, progressive mesial drift, space collapse, and root convergence resulted in severe reduction of both the restorative corridor and the interradicular osseous corridor. CBCT analysis demonstrated a narrow alveolar housing, restricted root-to-root dimensions, and anatomy that significantly limited conventional implant treatment options.

From a traditional treatment-planning perspective, several alternative approaches could have been considered. These included acceptance of the existing space discrepancy, orthodontic space closure, restoration with oversized adjacent crowns to camouflage the edentulous area, a conventional fixed partial denture, or removable prosthetic replacement. Conventional implant therapy would likely have required substantial orthodontic correction and potentially ridge augmentation procedures before a standard-diameter implant could be considered.

A key element of this case was the recognition that the adjacent teeth were structurally healthy and unrestored. Preparation of these teeth for a fixed bridge would have required irreversible removal of healthy tooth structure. Furthermore, the patient expressed significant dissatisfaction with the esthetic appearance of the space and desired a fixed solution that preserved the neighboring dentition whenever possible.

Rather than viewing the site as unsuitable for implant rehabilitation, an interdisciplinary treatment strategy was developed. Comprehensive CBCT evaluation, Invisalign-assisted orthodontic site development, and prosthodontically driven implant planning were combined to create the spatial requirements necessary for implant placement. Orthodontic treatment successfully increased both the restorative corridor and the interradicular osseous corridor, creating a biologically safe pathway for implant placement while preserving adjacent roots and supporting structures.

Following site development, a 2.5 mm × 16 mm one-piece mini dental implant was selected because its narrow diameter and extended length were compatible with the available anatomy. This approach allowed rehabilitation of a site that would have been highly challenging for conventional implant systems without grafting procedures or sacrifice of healthy neighboring teeth.

This case illustrates how interdisciplinary treatment planning and narrow-diameter implant therapy can expand restorative options in highly restrictive mandibular incisor sites. Careful evaluation of the restorative corridor, interradicular osseous corridor, and overall patient goals may reveal treatment possibilities that are not immediately apparent through conventional treatment paradigms.

CLINICAL DECISION-MAKING: CONVENTIONAL ASSESMENT VERSUS INTERDISCIPLINARY ASSESMENT

Why Conventional Thinking Failed

- Missing mandibular incisor for more than 20 years
- Severe root convergence
- Severe space collapse
- Narrow ridge anatomy
- Limited inter-radicular bone
- Conventional implant therapy highly impractical without major orthodontics and/or grafting

COMMON TREATMENT RECOMMENDATIONS

- Accept the space
- Orthodontic space closure
- Enlarged adjacent crowns
- Fixed bridge
- Removable partial denture

WHAT THIS TREATMENT PLAN RECOGNIZED

- Adjacent teeth were healthy
- The patient disliked the esthetics
- A bridge would sacrifice healthy teeth
- Conventional implant therapy was not predictable
- Invisalign could create restorative space
- A one-piece mini implant could fit where a conventional implant could not

INTERDISCIPLINARY SOLUTION

- CBCT planning
- Invisalign site development
- Mini implant biomechanics
- Prosthetic rehabilitation

This transformed a site that appeared non-restorable into a fixed implant-supported restoration.

CLINICAL SIGNIFICANCE OF THE CASE

An additional distinguishing feature of this case was the patient's prior understanding that implant rehabilitation was not a realistic treatment option because of the severe space deficiency, root convergence, and restricted mandibular anatomy. Conventional restorative recommendations had largely focused on acceptance of the space discrepancy, restorative camouflage through modification of adjacent teeth, fixed bridge therapy, or other non-implant alternatives.

Comprehensive interdisciplinary evaluation demonstrated that although conventional implant therapy would have been highly challenging because of the restricted dimensions, a combination of Invisalign-assisted orthodontic site development, CBCT-guided treatment planning, and narrow-diameter one-piece mini dental implant therapy could create a predictable pathway toward fixed implant-supported rehabilitation.

The successful outcome illustrates how careful diagnosis and interdisciplinary treatment planning may expand restorative possibilities in patients who have previously been considered poor candidates for implant therapy using conventional treatment approaches.

POSSIBLE FACTORS CONTRIBUTING TO THE INITIAL IMPLANT FAILURE

The precise cause of the initial implant failure cannot be determined with certainty. However, several factors may have contributed to the lack of long-term stability.

At the time of the initial implant placement, the orthodontically developed site was still relatively narrow and represented a clinically challenging anatomical environment. Limited available bone volume, restricted inter-radicular dimensions, and the complex biomechanics associated with mandibular incisor replacement may all have influenced the outcome.

Another possible contributing factor was implant diameter. The initial implant measured 2.0 mm × 16 mm, whereas the replacement implant measured 2.5 mm × 16 mm. The increase in diameter provided a substantially greater implant surface area and bone-to-implant contact interface, potentially enhancing primary stability and long-term load distribution.

Differences in osteotomy preparation, insertion torque, healing response, occlusal loading, or local bone remodeling may also have played a role. Because implant failures are often multifactorial, it is unlikely that a single factor alone was responsible.

Importantly, the initial failure did not preclude successful rehabilitation. Following healing, reassessment, and modification of the treatment plan, a 2.5 mm × 16 mm one-piece mini dental implant was placed and achieved excellent primary stability, successful osseointegration, and long-term functional success.

A 2.5 mm implant may not sound much larger than a 2.0 mm implant, but the difference is significant.

Cross-sectional area:

- 2.0 mm implant = 3.14 mm²
- 2.5 mm implant = 4.91 mm²

That is approximately: **56% greater cross-sectional area** and substantially greater implant surface area available for osseointegration.

The successful outcome achieved with the replacement 2.5 mm × 16 mm implant suggests that increased implant diameter, enhanced implant surface area, improved biomechanical load distribution, and favorable healing conditions may have contributed to the long-term success observed in this case.

Increasing implant diameter from 2.0 mm to 2.5 mm increases the implant cross-sectional area from 3.14 mm² to 4.91 mm², representing an approximate 56% increase in available implant cross-sectional area. This increase may improve resistance to functional loading while maintaining compatibility with anatomically restricted implant sites.

CLINICAL TAKEAWAY

By shifting the diagnostic paradigm from immediate ridge augmentation to orthodontic site development, clinicians can expand the indications for conservative narrow-diameter single-piece implant systems while minimizing patient morbidity and structural risk in highly restrictive corridors.

Clinicians should not automatically dismiss severely collapsed mandibular incisor sites as non-restorable. Strategic orthodontic site development combined with narrow-diameter one-piece implant therapy may create restorative opportunities where conventional implant treatment appears impractical or impossible.

This case demonstrates that patients who appear unsuitable for implant rehabilitation under conventional treatment paradigms may become candidates for fixed implant-supported restoration when orthodontic site development, three-dimensional imaging, and narrow-diameter one-piece implant therapy are strategically combined.

TIMELINE TABLE

Treatment Milestone	Date
Initial Consultation	Sep-19
Initial Panoramic & CBCT Evaluation	Sep-19
Orthodontic Consultation	Jan-20
Invisalign Therapy Initiated	Mar-20
Orthodontic Site Development Completed	May-21
Implant Planning CBCT	May-21
Initial Placement of 2.0 × 16 mm One-Piece Mini Implant	July 2021 (subsequently failed)
Implant Removal / Healing Period	July 2021- September 2021
Placement of 2.5 × 16 mm One-Piece Mini Implant	Sep-21
Final Restoration Delivered	Oct-21
Follow Up	Every 6 months
Last Follow-Up Evaluation, Patient Moved	Feb-24

CLINICAL PEARLS

- Differentiate restorative space deficiency from alveolar bone deficiency. A site that initially appears unsuitable for implant therapy may become treatable when orthodontic site development creates a biologically safe and restoratively acceptable implant corridor. [9]
- Three-dimensional CBCT analysis should precede implant placement whenever mesiodistal space, root proximity, or alveolar anatomy is limited. Accurate assessment of the restorative corridor, implant trajectory, adjacent root position, and available bone volume is essential for predictable treatment planning. [1,2]
- Interdisciplinary orthodontic site development may eliminate the need for aggressive ridge augmentation or unnecessary preparation of healthy adjacent teeth. Creating restorative space may be more conservative than attempting to create additional bone augmentation. [8,9,16]
- Restoratively driven implant planning should guide implant selection and positioning. Implant diameter, angulation, depth, and emergence profile should be determined by the planned definitive restoration rather than by available bone alone. [2,12]

• One-piece narrow-diameter mini dental implants may provide a predictable, minimally invasive treatment option in carefully selected anatomically restricted sites when combined with appropriate interdisciplinary treatment planning and meticulous surgical execution. [3,21,22]

• Flapless implant surgery, when clinically appropriate, may preserve the periosteal blood supply, reduce surgical morbidity, maintain soft tissue architecture, and facilitate patient recovery. [1,6]

• Primary implant stability remains one of the most important prerequisites for successful immediate or early provisionalization. Adequate primary stability should be confirmed before selecting an immediate-loading protocol. [17]

• Long-term success depends on more than implant placement. Careful occlusal management, maintenance of peri-implant health, routine professional follow-up, and patient compliance with oral hygiene are essential for preserving crestal bone stability and long-term implant function. [2,7]

LIMITATIONS

Although this case demonstrates successful interdisciplinary management of a severely space-deficient mandibular anterior site using orthodontic site development followed by placement of a one-piece narrow-diameter implant, several clinical limitations should be recognized.

The primary anatomical limitation was the restricted mesiodistal restorative space and limited alveolar ridge dimensions commonly encountered in long-standing edentulous or congenitally missing sites. These conditions frequently present with root proximity, reduced bone volume, and compromised restorative space that require meticulous interdisciplinary planning before implant placement. Comprehensive CBCT evaluation is therefore essential for assessing available bone, adjacent root anatomy, implant trajectory, restorative space, and a prosthetically acceptable emergence profile. These findings emphasize that implant selection should be guided by a comprehensive three-dimensional diagnosis rather than reliance on ridge width alone.

One-piece implant systems require exceptional surgical precision because the abutment is integrated into the implant body. Unlike two-piece implant systems, implant angulation cannot be modified prosthetically with custom or angled abutments following placement. Consequently, implant trajectory, depth, rotational position, and parallelism must be accurately established during the initial surgical procedure to achieve an optimal restorative outcome.

Careful prosthetically driven treatment planning is equally important in anatomically restricted implant sites. Implant position should be dictated by the planned definitive restoration rather than solely by available bone, thereby facilitating an appropriate emergence profile while minimizing excessive restorative contours and plaque-retentive areas.

Occlusal management represents another important consideration for narrow-diameter implants. Patients exhibiting parafunctional habits, including bruxism or clenching, require careful occlusal evaluation because excessive lateral loading may increase biomechanical stress on narrow-diameter implants. Appropriate occlusal adjustment, elimination of nonaxial interferences, and avoidance of cantilever forces may reduce functional overload and contribute to long-term biomechanical stability.

Finally, long-term success depends not only on appropriate case selection and precise surgical execution but also on patient compliance with maintenance therapy. Excellent oral hygiene, routine professional maintenance, periodic radiographic evaluation, and ongoing monitoring of peri-implant tissues, occlusion, and crestal bone levels remain essential for early detection of biologic or mechanical complications and for maintaining peri-implant health over time.

The author believes this case illustrates an important treatment-planning principle: clinicians should evaluate both the restorative corridor and the interradiacicular osseous corridor independently. In selected patients, orthodontic site development may eliminate the need for ridge augmentation by

restoring the spatial requirements necessary for implant placement while preserving native anatomy and minimizing surgical morbidity.

Expanding Treatment Possibilities Through Interdisciplinary Thinking

This case highlights an important principle in contemporary implant dentistry: treatment limitations are not always dictated solely by anatomy, but also by the clinician's willingness to consider interdisciplinary solutions. Through CBCT-guided diagnosis, Invisalign-assisted orthodontic site development, and placement of a 2.5 mm × 16 mm one-piece mini dental implant, a site that appeared unsuitable for conventional implant therapy was successfully restored while preserving adjacent teeth and avoiding ridge augmentation. Although this report describes a single case, the diagnostic principles demonstrated may be applicable to selected patients presenting with severe mandibular anterior space deficiency after comprehensive three-dimensional evaluation.

CONCLUSION

This case demonstrates that severe mandibular anterior space collapse and root convergence do not necessarily preclude implant rehabilitation. Through careful diagnosis, interdisciplinary treatment planning, Invisalign-assisted orthodontic site development, and placement of a 2.5 × 16 mm one-piece mini dental implant, a site previously considered unsuitable for conventional implant therapy was successfully restored while preserving healthy adjacent teeth and avoiding ridge augmentation procedures.

Invisalign-assisted orthodontic site development successfully recreated the biologic and prosthetic space necessary for implant placement. Subsequent placement of a 2.5 × 16 mm one-piece mini dental implant provided a fixed implant-supported restoration while preserving healthy adjacent teeth and avoiding ridge augmentation procedures.

This interdisciplinary approach illustrates how CBCT-guided diagnosis, orthodontic site development, and narrow-diameter implant therapy can expand treatment possibilities in highly restrictive mandibular incisor sites.

The success was not merely placing a mini implant. The success was recognizing that a site many clinicians would have considered non-restorable could be transformed through interdisciplinary planning into a fixed implant-supported restoration.

This case demonstrates that a patient who had previously been considered an unsuitable candidate for conventional implant therapy because of severe space collapse and root convergence could be successfully restored through CBCT-guided diagnosis, Invisalign-assisted orthodontic site development, and placement of a 2.5 × 16 mm one-piece mini dental implant.

This case demonstrates that successful implant rehabilitation sometimes depends less on creating additional bone than on recognizing when interdisciplinary treatment can establish a biologically safe and prosthetically acceptable implant corridor that enables predictable fixed implant rehabilitation while preserving healthy adjacent teeth and native alveolar bone.

MULTI-PANEL APPENDIX GUIDE: VISUAL MAP

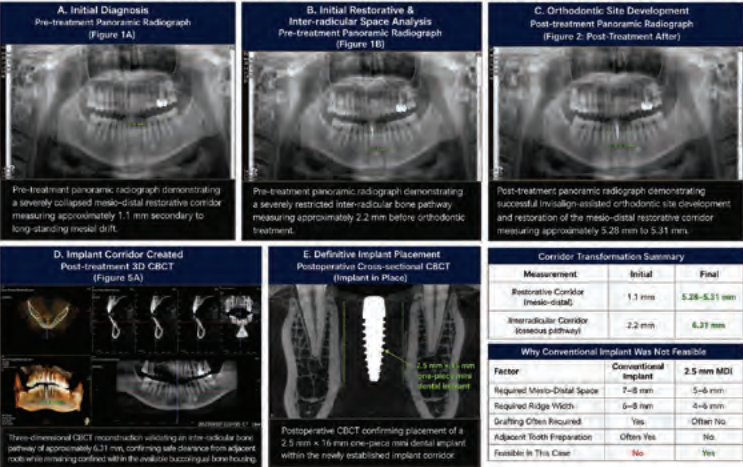


Figure 7: Orthodontic Site Development and Implant Corridor Creation

- Panel A. Initial diagnosis demonstrating severe mesiodistal restorative space deficiency.
- Panel B. Initial inter-radicular osseous pathway analysis.
- Panel C. Post-orthodontic panoramic radiograph demonstrating restoration of the implant corridor.
- Panel D. Three-dimensional CBCT reconstruction demonstrating a 6.31-mm inter-radicular osseous pathway.
- Panel E. Definitive implant placement confirmed on cross-sectional CBCT.
- Panel F. Summary of dimensional changes and treatment rationale.

Measurement	Initial	Final
Restorative Corridor	1.1 mm	5.28–5.31 mm
Interradicular Corridor	2.1 mm	6.31 mm

Figure 8: Corridor Transformation Summary

Factor	Conventional Implant	2.5 mm MDI
Required Mesio-Distal Space	7–8 mm	5–6 mm
Required Ridge Width	6–8 mm	4–6 mm
Grafting Often Required	Yes	Often No
Adjacent Tooth Preparation	No	No
Feasible in This Case	No	Yes

Figure 9: Why Conventional Implant Was Not Feasible

SIMPLE DIAGRAM:

FINAL CORRECTED MEASUREMENT SUMMARY

Measurement / Clinical Finding	Corrected Value
Initial collapsed clinical/restorative space	Approximately 1.1 mm
Initial restricted inter-radicular bone pathway	Approximately 2.1 mm
Final clinical restorative corridor after Invisalign	Approximately 5.28 mm to 5.31 mm
Final inter-radicular bone pathway	Approximately 6.31 mm
Implant placed	2.5 mm × 16 mm one-piece mini dental implant
Approach	Minimally invasive flapless placement after Invisalign site development

Formal Table Number

- Table 1 – Treatment Timeline
- Table 2 – Mesio-Distal Corridor Measurements
- Table 3 – Conventional Implant vs Mini Implant Comparison
- Table 4 – Case Measurement Summary
- Table 5 – Buccal-Lingual Width Recommendations
- Table 6 – Follow-Up Findings

ETHICS STATEMENT

Written informed consent was obtained from the patient for publication of clinical photographs, radiographs, CBCT images, and treatment information. Identifying information has been removed to protect patient privacy.

CONFLICT OF INTEREST

The author reports no conflicts of interest related to this case report.

FUNDING

No external funding was received for preparation of this manuscript.

FUTURE PERSPECTIVE:

Although this report describes a single clinical case, the diagnostic principles illustrated may have broader applications for patients presenting with severe restorative space deficiency. Future prospective clinical investigations comparing orthodontic site development followed by one-piece narrow-diameter implant placement with conventional ridge

augmentation protocols are warranted. Comparative studies evaluating implant survival, peri-implant tissue stability, esthetic outcomes, patient-reported satisfaction, treatment morbidity, cost-effectiveness, and long-term maintenance would further strengthen the evidence supporting this interdisciplinary treatment approach. Additional research examining digital treatment planning, CBCT-guided workflow, and biologic differences between one-piece and two-piece implant systems may further refine treatment protocols for anatomically restricted implant sites. Future multicenter prospective clinical investigations will be important to determine the reproducibility of this interdisciplinary treatment strategy across larger patient populations.

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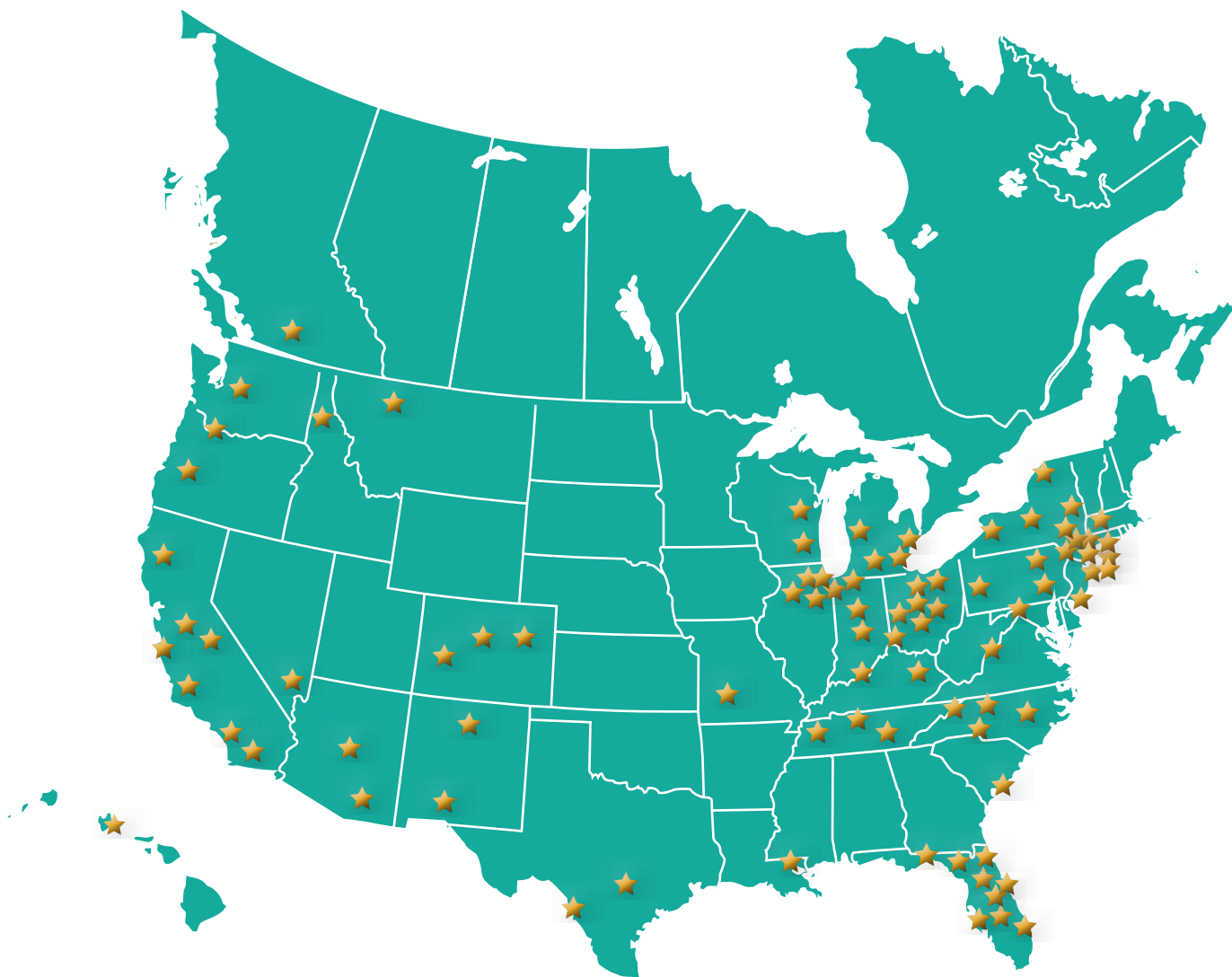
**DR. ROSE MAGNO, DDS,
FAACD, FICOI, DIAMD
ORCID # 0009-0000-6285-52-3X**

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CASE STUDY

OVERCOMING MANDIBULAR ATROPHIC NONKERATINIZED ALVEOLAR RIDGE USING A MINI IMPLANT RETAINED OVERDENTURE

CHRIS MOORE, DDS, FAGD

Dr. Chris grew up in rural West Tennessee. He graduated from the University of Tennessee Martin with a Bachelor degree in Science and the University of Tennessee College of Dentistry Memphis earning his DDS. He joined the Navy and completed a General Practice Residency at Bethesda Naval Hospital. He served 5 years in the United States Navy of which 2 years were aboard the USS Independence CV-62 during Operation Desert Shield.

He is a member of the ADA, TDA, AGD, TNAGD, ICD and Fellow International Academy of Mini Dental Implants.

Dr. Moore is married to Debbie and they have 3 children and 2 grandchildren. He enjoys spending time with his family, fishing, hunting, snow skiing, traveling and volunteering in his community and with his Church on Mission trips to Haiti.

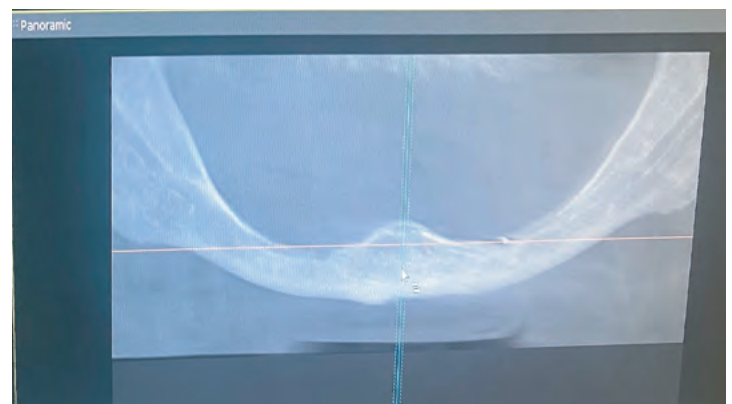
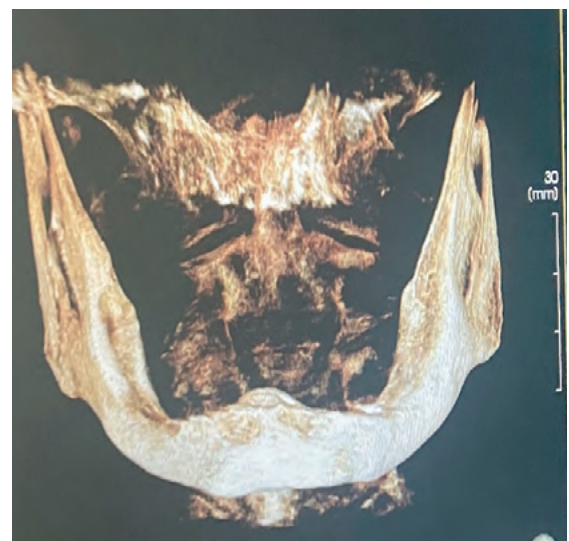
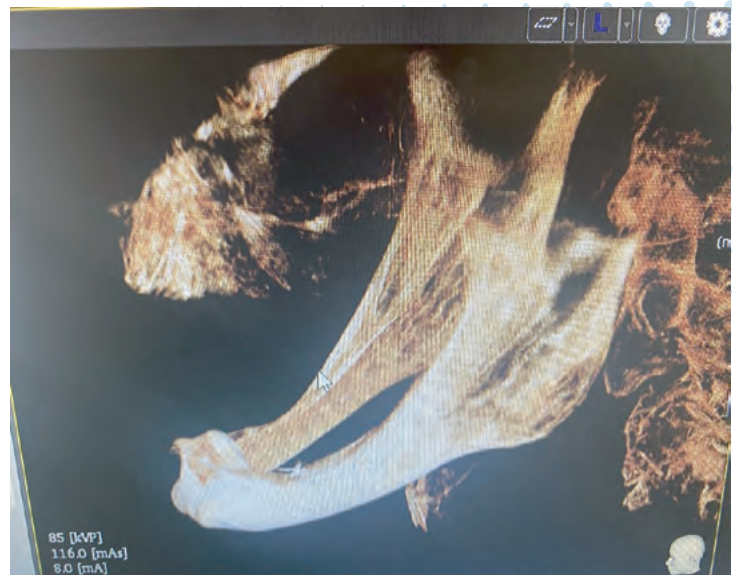
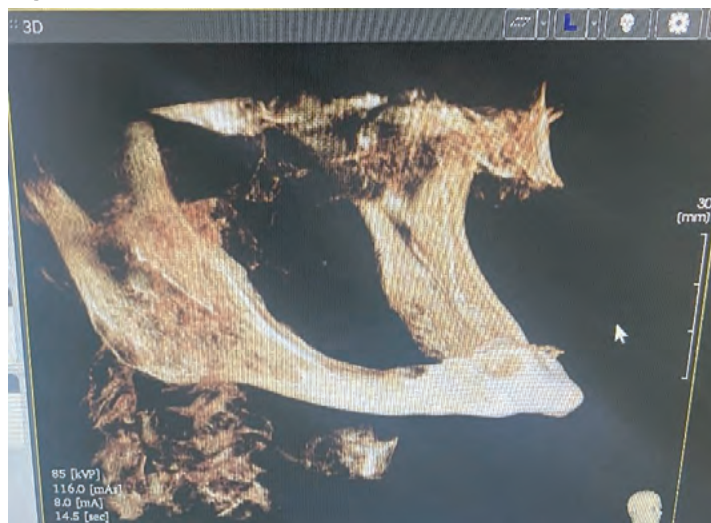
INTRODUCTION:

73 year old male presents to our office in August of 2019 with worn out upper and lower dentures. After introducing myself I asked, "How can I help you?" He said, "My dentures hurt my mouth and it is hard for me to eat and chew my food comfortably."

- Med Hx: Prostate cancer, sinus problems, stomach ulcers, frequent diarrhea
- Med List: Zyrtec (cetirine), Prilosec (omepazole), Vitamin D
- NKDA

He explained to me that he had his teeth removed and had been wearing full dentures for over 40 years. I reviewed his CBCT and completed an intra and extra oral exam of his mouth and prosthesis and realized that even though his upper denture had some retention, the lower mandible was severely resorbed with essentially no attached, keratinized gingiva on a flat ridge. It was hard to tell where the buccal vestibule and tongue were separated by the ridge of the mandible. He had a Class III skeletal jaw relationship with a severely decreased VDO (Vertical Dimension of Occlusion).

Figure 1. Images of CBCT (Pre-Op), Ant. view (Front), Left and Right View



I sat down and stated that I could make him new dentures, but could not guarantee long term success for a lower implant retained denture due to the limited ridge and lack of available alveolar bone. I discussed the risk and benefits of the procedure and he said “Doc, I can’t eat and I understand that this may not work out, but if you are willing to try to help me with the Mini Dental Implants and denture, then I want to go forward and work with you because no one else can.”

I made a decision to fabricate his Maxillary and Mandibular Dentures waiting a few months before proceeding with Mini Dental Implants. This allowed me time to determine his Vertical Dimension, occlusion, and esthetics in preparation for surgery. He also had time to prepare financially.

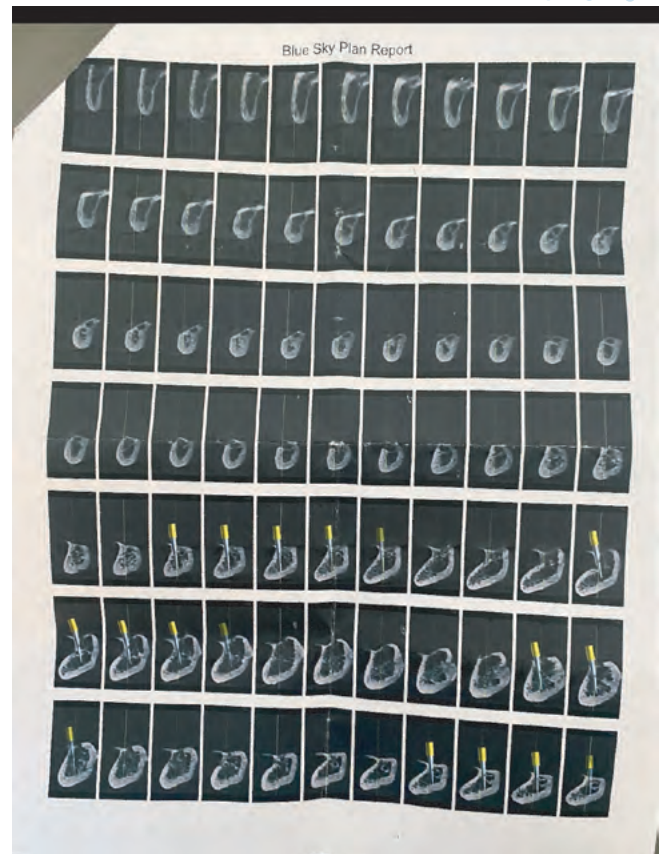
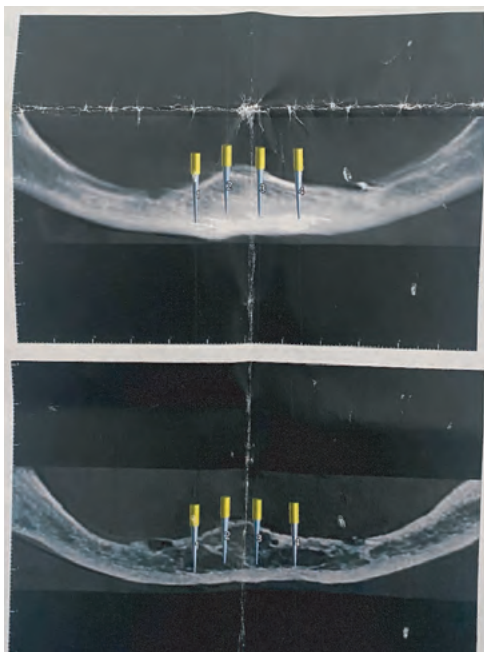
Figure 2. Patient



Phase 1.

1. CBCT and impressions sent to ShatkinFirst for treatment plan and Wax Rims.
2. ShatkinFirst treatment plan with four 2.0mm x 11.5mm Mini Implants using a surgical guide for the Mandibular Arch.
3. Wax Rims for Upper Complete Denture and Lower OverDenture, mould and shade.
4. Wax Try-In increasing Vertical Dimension, Class I Anterior/ Posterior relationship with centric occlusion and ideal lip support and esthetics.
5. Deliver Upper/ Lower Dentures from ShatkinFirst Lab.
6. Adjust Dentures and wait for a few months before proceeding with Mini Implant surgery.

Figure 3. Treatment Plan placing four 2.0mm x 11.5mm Mini Implants using a surgical guide.



Phase 2.

1. Mandibular Mini Implant placement using a Shatkin F.I.R.S.T. Surgical Guide.
2. Retrofit Lower OverDenture to four 2.0mm x 11.5mm Mini Implants.
3. Adjustments and confirm stability of Lower Mini Implants.
4. Impressions to make a Wax Rims for Final Mandibular OverDenture (O.D.).
5. Wax Rim, bite for Final Lower O.D.
6. Wax Try-In for Final Lower O.D.
7. Delivery of Final Lower O.D.

FOLLOW UP PLAN:

6 month follow up and O-Ring change, then continued 6 month follow-ups to check implants, dentures and O-Ring Change.

COMPLICATIONS AND CHALLENGES:

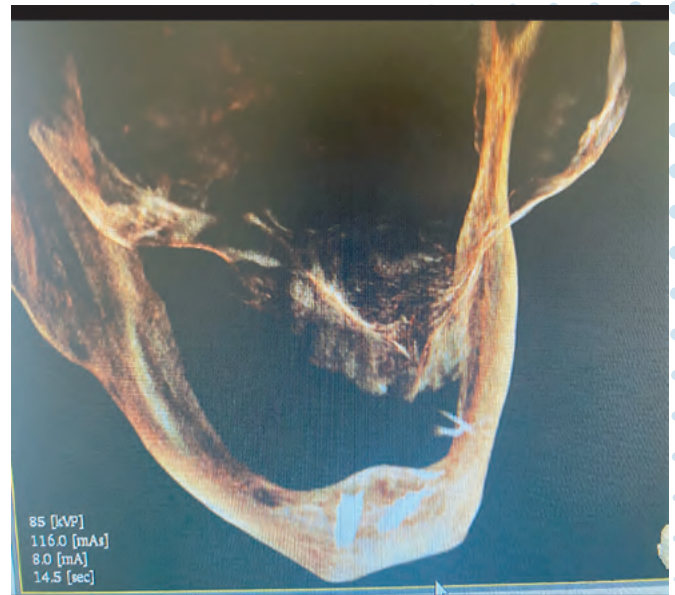
Patient's severely resorbed Mandible with no attached keratinized gingiva on a flat ridge made it extremely difficult to stabilize the surgical guide to place the implants into Type I Alveolar Bone.

Figure 4.



The nonkeratinized gingiva/mucosal tissue was irritated upon placement of the implants.

Figure 5.



I finished placement of the implants but went too far toward the buccal aspect of the mandible on one implant due to minimal bone and loose tissue over the ridge. The patient was great and continued to work with me during the surgery.

Figure 6.

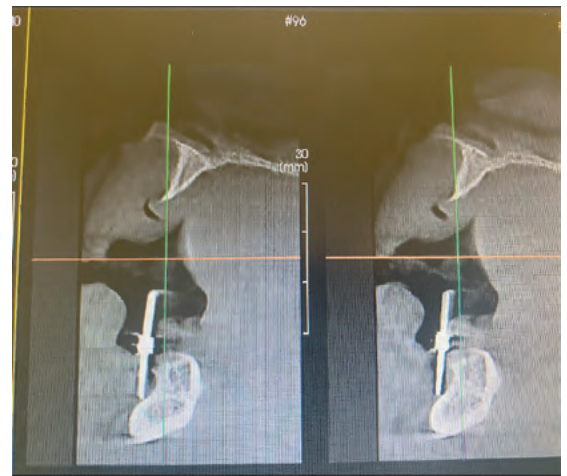


Figure 7.





Successful placement of 4 implants using Coe-Soft Liner to secure the Lower O.D. ; however, at the two week follow up , 3 implants did not integrate. I removed the 3 implants and placed osteogen bone graft into the sites. He left with 1 implant remaining and a Coe-Soft Liner in the denture.

Figure 8.



A few months later, I successfully placed three new 2.0mm x 11.5mm Mini Implants and retrofitted the denture with Coe-Soft.

Figure 9.



At the 1 week follow up , all implants were stable; however, the tissue around the implants were tender and ulcerated over the ball and square of the Mini Implants.

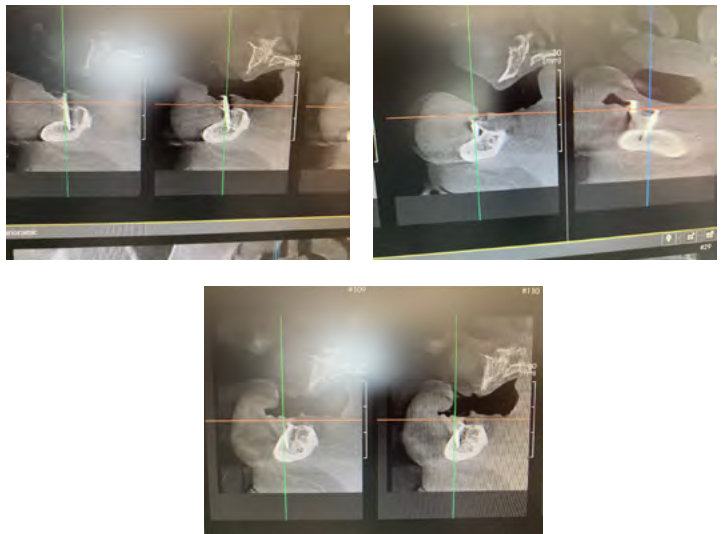


Figure 10.



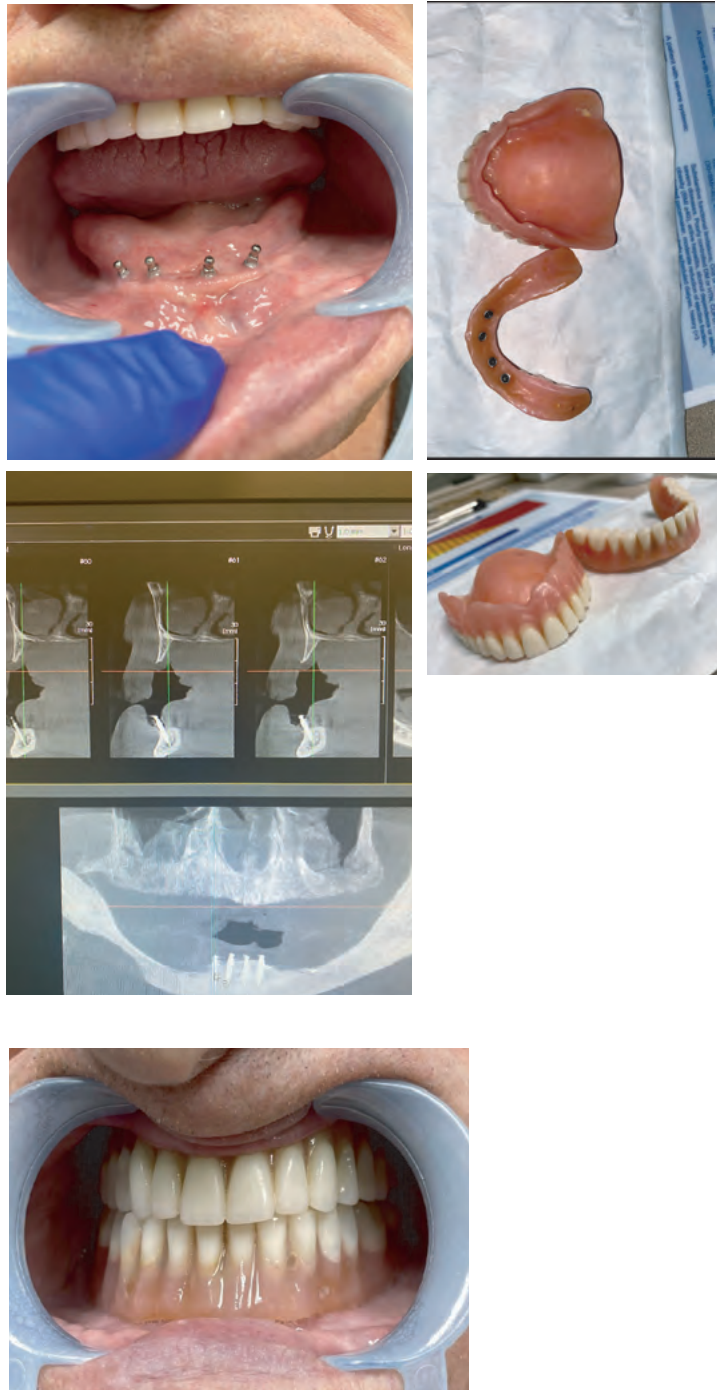
Over the next few weeks, I treated the peri-implantitis using the Gemini Diode Laser with Local Anesthetic, Peridex rinses and the placement of Shatkin F.I.R.S.T. white Teflon Healing Caps. I continued to use Coe-Soft to stabilize the Lower O.D.

Figure 11.



After 5 months, all 4 Mini Implants were stable and the entire ball and square of the Mini Implants were visible with keratinized tissue formed around the implants. I retrofitted the Lower O.D. Utilizing metal housings and Shatkin F.I.R.S.T. Hardline Material.

Figure 12.



PATIENT THOUGHTS AND CONCLUSION:

He is extremely happy and grateful about the successful results of his Upper Denture and Mini Implant Supported OverDenture. He can now eat anything he wants with Confidence and Comfort! He said "This has changed my life in many ways!" He follows up every 6 months and after 5 years, all 4 Mini Implants are 100% integrated and the Dentures are doing fantastic! Even with the difficulty of the procedure and the setbacks, he said "I would do it over again!" He loves telling his friends and family about Shatkin F.I.R.S.T. Mini Dental Implants and has referred others to Moore Dental Office!

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Dr. Shatkin's Sinus Lift Kit

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KIT INCLUDES:

- 5 Sinus Lift Drivers • 7 Depth Stoppers
One Diameter for Each Size Implant
- 1.6/2.0 for MDL 2.0 and 2.5
- 1.8/2.5 for 3.0 MLW & OP
- 2.0/3.0 for 3.75 MLW & OP
- 2.5/3.5 for 4.0 OP
- 2.8/4.0 for 4.75 OP
- 2 Pilot Drills
- Standard Ratchet Wrench
- Vertical/Screw Handle
Ratchet Driver
- Autoclavable Kit Box

HOW IS IT EFFECTIVE:

Pilot hole is drilled and then Sinus Lift Driver is screwed into the pilot hole, pushing bone into Sinus to "Tent/Bump/Lift" the low hanging sinus membrane.

Remove Sinus Lift Driver once it is placed to depth, and then place implant.
7 Different Length Stoppers for Lift Drivers.



Dr. Shatkin will now be planning Maxillary cases using the card below, that require a sinus lift accordingly.

He will recommend using the Sinus Lift Kit on low hanging sinus membrane when necessary.

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Dr. Shatkin's Sinus Lift Kit

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Please lift _____ by _____ mm's
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the _____ mm bone expander driver.
Doctor Name: _____

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A small image of the Sinus Lift Kit components is shown in the bottom right corner of the form, including the carrying case and the white tray with the drivers and stoppers.



CASE STUDY

FROM STRUCTURAL FAILURE TO FIXED SUCCESS: IMMEDIATE REHABILITATION WITH ONE-PIECE MONO IMPLANTS

BRIAN K. MORRIS, DMD

PATIENT PROFILE

- Age range: 45
- Sex: Male
- Relevant medical history: none
- Smoker? No
- Tobacco / bruxism / other risk factors: no
- Time edentulous / in current condition: 4 days

PRESENTATION & CHIEF COMPLAINT

What did the patient present with?

Pt presents with PFM bridge from 8-10. Tooth 8 has coronal fracture and the bridge retainer is not connected to the root. 9 is pontic. 10 is endo treated and the post and core is the only thing holding the bridge in place.



The bridge is extremely mobile and his concern is that it will fall out. This happened 4 days prior he bit a food item and heard a “pop” he has been very worried that it was going to fall out.



KEY CLINICAL AND RADIOGRAPHIC FINDINGS

First radiograph shows the fracture line on tooth 8. The second radiograph shows the space between the core and the root and this is the reason the bridge can rotate. It was definitely going to fall out!



DIAGNOSIS / CLINICAL ASSESSMENT

Based on the patient's clean health history. Nonsmoker and the amount of available bone apically to the roots, I felt he was a great candidate for immediate placement of Noris MONO bendable implants.

TREATMENT PLAN PROPOSED

The abutment teeth were not suitable to reuse as bridge retainers, and he did not want any type of removable appliance. The treatment plan proposed were 3 Noris mono bendable implants.

TREATMENT PROVIDED

Local anesthetic delivered and uncomplicated extraction of 8 and 10. Placed 4.2x13 at 8, 3.3x13 at 9 and 3.75x13 at 10. Implants all achieved 40 Ncm of torque. Pilot holes drilled through the apices of the extraction sites for immediate placement and pilot hole drilled through the gingiva at 9. Flapless.





The appointment lasted approximately 1 hour. Temporary restorations were made from composite resin in shade a2, out of occlusion.



CONCLUSION

Pt was very happy with the result. He was so concerned that his front teeth were going to fall out. He was impressed that we could perform this entire treatment in such a short appointment. He said even though he was numb it felt secure and he was very thankful.

Pt will be in temps for 3 months and at that time we will take radiographs to see if integration is complete. If so, I will remove the temps and scan using my Medit i700 and make a zirconia bridge to complete his treatment.

Having a variety of implants on hand is key to managing these cases. If we would have had to order implants and reschedule the patient, I am positive that his bridge would have come out. Mono implants make these cases a very straight forward and predictable.

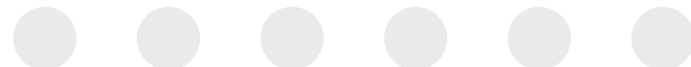
I am very pleased with the results for this patient. I'm confident that these implants will heal well and we will make him a beautiful final restoration that should last for several years of secure and confident eating and smiling.



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CASE STUDY

THE FULL-ARCH OPI APPROACH USING ONE-PIECE, MINI & MONO IMPLANTS

RONALD P. PETROSKY, DDS, MAGD, DICOI, IAMDIPLOMATE

THE FULL-ARCH OPI APPROACH

Using One-Piece, Mini & Mono Implants. A Contrast to the More Invasive All-on-4 / All-on-X Approach

- One-piece mini and mono implants (typically 2.0–5.0 mm)
- Often allows treatment in narrow ridges with little or no grafting
- Minimal or no bone reduction in many cases
- Preserves existing bone and soft tissue architecture
- Eliminates the implant-abutment microgap
- Multiple implants (often 8–12+) distribute occlusal forces
- Can be staged and progressively loaded based on patient biology
- Simplified restorative workflow with fewer components
- May preserve strategic teeth during treatment transitions
- Emphasizes:

"Make the implant fit the patient—not the patient fit the implant."

ALL-ON-4 / ALL-ON-X APPROACH

- Fewer larger two-piece implants (typically 4–6)
- Frequently requires wider ridges and extensive site preparation
- Often involves significant alveolar bone reduction
- Removes healthy bone to create restorative space
- Contains an implant-abutment junction and microgap
- Occlusal forces concentrated on fewer support points
- Commonly associated with immediate-load protocols
- Multiple prosthetic components, screws, and abutments
- Frequently involves extraction of all remaining teeth at one appointment
- Often requires modifying anatomy to fit the prosthetic design

KEY CONCEPT

The Full-Arch OPI Philosophy

"Preserve bone whenever possible."

"Use more implants, not less."

"Make the implant fit the patient—not the patient fit the implant."

WHY BONE PRESERVATION MATTERS

Bone removed during alveoloplasty cannot be naturally replaced. By utilizing multiple narrow-diameter one-piece implants, many patients can be treated while:

- Preserving existing bone
- Reducing surgical trauma
- Maintaining natural tissue contours
- Often avoiding grafting procedures
- Providing broad cross-arch force distribution

TAKEAWAY

FULL-ARCH OPI

- Bone-preservation focused
- Multiple implant support (8–12+)
- One-piece mini and mono implants
- Often graftless
- Less invasive
- Staged when indicated by patient biology
- Preserves anatomy whenever possible

ALL-ON-4 / ALL-ON-X

- Typically fewer implants (4–6)
- Frequently involves significant bone reduction
- More prosthetic components
- Often immediate-load driven
- Greater reliance on prosthetic compensation for lost anatomy

FINAL PRINCIPLE

Diagnosis Dictates Treatment.

Biology Dictates Treatment.

No single full-arch solution is appropriate for every patient.

OVERALL VERDICT

The collective evidence supports the biologic principles behind the Full-Arch OPI philosophy:

- Preserve available bone whenever possible
- Utilize narrow implants when anatomy permits
- Reduce or eliminate the need for grafting and ridge augmentation
- Distribute occlusal forces across multiple implants rather than fewer implants
- Utilize one-piece implants to eliminate the implant-abutment microgap
- Preserve existing hard and soft tissue architecture
- Often avoid extensive alveolar bone reduction required by some full-arch protocols
- Achieve survival rates comparable to conventional implant approaches

CORE PRINCIPLE

"Make the implant fit the patient, NOT the patient fit the implant." — a philosophy emphasizing biologic preservation, simplicity, and individualized treatment planning.

CLINICAL STUDIES SUPPORTING THE FULL-ARCH OPI PHILOSOPHY

Bone Preservation

1. Mini Dental Implants for Long-Term Fixed and Removable Prosthetics: A Retrospective Analysis of 2514 Implants Placed Over a Five-Year Period

Authors: Todd E. Shatkin, DDS; Thomas Petrotto, DDS

Journal: Compendium of Continuing Education in Dentistry

Date: 2007

Type: Retrospective Clinical Study

Takeaway: One-piece mini dental implants demonstrated high success rates when used to support both fixed and removable prostheses, suggesting a predictable long-term treatment option with minimal surgical intervention.

2. Mini Dental Implant Alternative to All-on-Four

Authors: Todd E. Shatkin, DDS; Alysa Brooke Sadkin; Jared Shatkin

Publication: Dentistry Today

Date: May 2017

Type: Clinical Case Report

Takeaway: Demonstrated that multiple mini dental implants can provide a less invasive fixed full-arch alternative to All-on-4 while often reducing the need for grafting, sinus augmentation, and extensive bone reduction

3. Systematic Review on Success of Narrow-Diameter Dental Implants

Authors: Klein MO, Schiegnitz E, Al-Nawas B

Year: 2014

Conclusion: Narrow-diameter implants demonstrated survival rates comparable to standard implants.

Takeaway: Narrow implants can often avoid grafting and ridge expansion.

4. Narrow-Diameter Implants: A Systematic Review and Meta-Analysis

Authors: Schiegnitz E, Al-Nawas B

Year: 2018

Conclusion: Narrow implants are a reasonable alternative to bone augmentation procedures.

Takeaway: Supports preservation of existing bone.

5. Small-Diameter Implants in Atrophic Alveolar Ridges

Authors: González-Valls et al.

Year: 2021

Conclusion: 97% survival with stable marginal bone levels.

Takeaway: Predictable treatment without extensive ridge augmentation.

THE FULL-ARCH OPI APPROACH

ONE-PIECE, MINI & MONO IMPLANTS



- ✓ Multiple Implants (8–12+)
- ✓ Distribute Occlusal Forces
- ✓ Narrow Diameter (2.0–5.0 mm)
- ✓ One-Piece Design (No Microgap)
- ✓ Often Graftless
- ✓ Minimal or No Bone Reduction
- ✓ Preserves Bone & Soft Tissue
- ✓ Staged & Personalized
- ✓ Simplified Restorative Workflow
- ✓ Less Invasive
- ✓ Make the Implant Fit the Patient

ALL-ON-4 / ALL-ON-X APPROACH

CONVENTIONAL IMPLANTS



- ✗ Fewer Implants (4–6)
- ✗ Larger Diameter (4–6 mm)
- ✗ Two-Piece Design (Microgap)
- ✗ Often Requires Bone Reduction
- ✗ May Require Grafting
- ✗ Removes Healthy Bone
- ✗ Often Immediate-Load Driven
- ✗ More Components, More Complexity
- ✗ More Invasive
- ✗ Make the Patient Fit the Implant

6. Survival Rates Between Narrow and Standard Diameter Implants

Authors: Ganji et al.

Year: 2023

Conclusion: Narrow implants showed survival rates nearly identical to standard implants.

Takeaway: Bigger implants do not automatically mean better outcomes.

7. Influence of Implant Diameter on Survival and Marginal Bone Loss

Authors: Pesce et al.

Year: 2023

Conclusion: No significant difference between narrow and standard implants.

Takeaway: Bone preservation can be achieved without sacrificing success.

8. Clinical Outcome of Narrow Diameter Dental Implants

Authors: Kim JE et al.

Year: 2023

Conclusion: Favorable clinical outcomes and low complication rates.

Takeaway: Supports routine use of implants ≤ 3.5 mm when indicated.

9. Retrospective Study of 510 Narrow Implants

Authors: Degidi M, Piattelli A, Carinci F

Year: 2008

Conclusion: High survival and favorable clinical performance.

Takeaway: Long-term evidence supports narrow implant therapy.

10. Small-Diameter Implants in Single and Multiple Restorations

Authors: Vigolo P et al.

Year: 2004

Conclusion: Small-diameter implants successfully restored both single and multiple units.

Takeaway: Multiple narrow implants can support fixed prostheses.

11. Narrow Implants Supporting Fixed Splinted Prostheses

Authors: Grandi T et al.

Year: 2017

Conclusion: Excellent outcomes with splinted narrow implants.

Takeaway: Supports the Full-Arch OPI concept of force distribution across numerous implants.

12. Narrow Implants in the Mandibular Molar Region

Authors: Osaka Dental University Study Group

Year: 2017

Conclusion: Approximately 97% cumulative survival rate.

Takeaway: Narrow implants can perform successfully in posterior load-bearing regions.



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CASE STUDY

SIMPLICITY MATTERS

RONALD P. PETROSKY, DDS, MAGD, DICOI, IAMDIPLOMATE

"Any fool can make things bigger, more complex, and more violent. It takes a touch of genius - and a lot of courage - to move in the opposite (aka-simplicity) direction."

~Uncle Albert Einstein

Simplicity Matters ... in Implant Dentistry!

Why Simplicity Wins?

In the 21st century, implant dentistry has become increasingly complex. More components, more screws, more connections, more guides, more laboratory steps, and more opportunities for complications.

Yet biology has not changed. Bone still heals the same way it did 50 years ago. The future belongs to treatment concepts that respect biology while reducing complexity.

That is why One-Piece Implants (OPIs) are attracting renewed interest worldwide.

THE SIMPLICITY ADVANTAGE OF ONE-PIECE IMPLANTS

1. NO IMPLANT-ABUTMENT JUNCTION

Two-piece implants contain:

- Implant body
- Abutment
- Abutment screw

One-piece implants eliminate these additional components.

Benefits:

- No microgap
- No screw loosening
- No screw fracture
- No abutment disconnect
- No bacterial reservoir at the connection

LESS HARDWARE = FEWER COMPLICATIONS.

2. FEWER COMPONENTS

A one-piece implant is exactly what its name implies:

ONE IMPLANT. ONE COMPONENT. ONE SOLUTION.

There are:

- No healing abutments
- No impression copings
- No abutment inventory
- No component mismatches

Simplification reduces:

- Chair time
- Inventory costs
- Laboratory complexity
- Treatment errors

3. Less Osteotomy Preparation

Many modern tapered OPIs require:

- A pilot drill
- Sometimes only one additional drill

The implant completes much of its own preparation during insertion.

Advantages:

- Less bone removal
- Less heat generation
- Better preservation of native bone
- Higher primary stability

4. OUTSTANDING PRIMARY STABILITY

Primary stability remains the cornerstone of implant success.

Modern tapered one-piece implants:

- Condense bone
- Increase mechanical engagement
- Achieve excellent insertion torque

This makes them particularly valuable in:

- Soft maxillary bone
- Extraction sites
- Narrow ridges
- Immediate provisionalization situations

5. BETTER FOR NARROW RIDGES

Many patients lack sufficient width for standard implants.

Traditional solutions often require:

- Ridge expansion
- Bone grafting
- Multiple surgeries

One-piece implants often allow treatment of narrow ridges with:

- Less grafting
- Less morbidity
- Lower cost
- Faster treatment

6. BIOLOGY DICTATES TREATMENT

The simplest treatment is often the most biologically favorable. As Carl Misch often emphasized: "Diagnosis dictates treatment."

One-piece implants support that philosophy by emphasizing:

- Preservation rather than reconstruction
- Simplicity rather than complexity
- Biology rather than mechanics

7. REDUCED MECHANICAL COMPLICATIONS

Common two-piece complications include:

- Screw loosening
- Screw fracture
- Abutment fracture
- Connection wear
- Component replacement

One-piece implants eliminate many of these issues entirely. The best complication is the one that never occurs.

8. EASIER LONG-TERM MAINTENANCE

Patients benefit from:

- Fewer parts
- Fewer interfaces
- Fewer potential failures

Clinicians benefit from:

- Simplified restorative procedures
- Simplified maintenance
- Predictable outcomes

9. COST EFFICIENCY

Simplicity often lowers costs by reducing:

- Components
- Laboratory procedures
- Inventory requirements
- Surgical time
- Restorative complexity

This benefits both clinician and patient.

10. THE FUTURE IS SIMPLICITY

Throughout medicine, the trend is toward:

- Minimally invasive procedures
- Preservation of tissue
- Fewer components
- Greater efficiency
- Lower complication rates

Implant dentistry is no different.

The future will favor systems that provide:

- Simplicity
- Predictability
- Biological compatibility
- Reduced complications
- Reduced complications
- Cost effectiveness
- Long-term success

TAKEAWAY

One-Piece Implants: Simplicity Matters. One implant. One component. One biological interface.

- No microgap
- No abutment screw
- No screw loosening
- Less osteotomy
- Better bone preservation
- Outstanding primary stability
- Reduced complexity

The Future of Implant Dentistry Is Not More Parts. The Future Is Intelligent Simplicity.

"Make the implant fit the patient, not the patient fit the implant."

~ Dr. Ronald P. Petrosky, DDS, MAGD, DICOI

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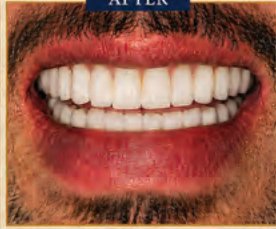
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CASE STUDY

FIX ON SIX®— A MINI DENTAL IMPLANT ALTERNATIVE TO THE ALL-ON-4® LESS INVASIVE, LESS TIME, LESS COSTLY, & LESS DISCOMFORT

TODD E. SHATKIN, DDS

INTRODUCTION

Aesthetic dentistry has evolved throughout the past few decades, specifically in the field of Implantology. Patients are preferring endosseous procedures over dentures and other removable prosthetics in order to increase stability, increase comfort and decrease pain.¹ Conventional implants require several procedures, multiple appointments and upwards of a year until completion, although some newer techniques promote a faster completion time. The All-on-4® technique is an immediate conventional implant procedure, in which four large diameter implants, two in the anterior and two in the posterior, are inserted at a forty five degree angle in order to take advantage of the available bone and reducing the need for bone augmentation and/or sinus lift.² According to the Nobel Biocare All-on-4® treatment concept manual, a minimum of 5 mm in bone width and 8 mm in bone height is necessary to begin the procedure.³ Though the All-on-4® technique claims to eliminate the need for bone augmentations and sinus lifts, these procedures cannot always be eliminated if the bone quantity does not meet the requirements due to the large diameter of a conventional implant.^{1,2,4} While the All-on-4® technique offers acceptable support with four implants, the endosseous procedure is still invasive and time consuming compared to the immediate and early loading procedures used with mini dental implants. The All-on-4® often requires a minimum of four to six months before the final restoration is fully completed.⁴ In addition, if one of the 4 implants fails to integrate or fails following placement of the restoration, the entire restorative procedure must be restarted, additional surgery performed and the restoration remade. Considering the average fee for All-on-4® is in the range of \$30,000 - \$40,000 per dental arch, this technique is not affordable to the vast majority of dental patients.

Immediate and early loading endosseous procedures with mini dental implants are more desirable to patients in many instances because of the speed of completion, the affordable fee, the less invasive procedure and the reduced post-operative discomfort.⁴ The small size of the mini dental implants (available in several lengths and diameters) eliminates the need for bone augmentation and/or sinus lifts. This is due to the fact that the mini dental implant can be angled into available bone rather than augmenting the bone.⁴ The Shatkin F.I.R.S.T.® Technique (Fabricated Implant Restoration and Surgical Technique) (Patent USPTO #7,108,511 B; September 2006), developed by Dr. Todd E. Shatkin DDS, provides for the mini dental implant(s) to be placed and the restoration(s) cemented in one patient visit.⁸ Dr. Shatkin's most recent innovation, FIX On SIX®, offers a combination of the Shatkin F.I.R.S.T.® Technique using 6 - 8 or 10 mini dental implants with a 12 unit fixed detachable zirconia full arch restoration with O-ring implant housings. The restoration is only removed at recall cleanings as the dentist is able to snap off the FIX On SIX® restoration. The hygienist will then completely clean the

implants, the restoration and the surrounding tissue and easily reinsert the restoration without patient discomfort. This FIX On SIX® procedure is completed in a fraction of the patient's and the dentist's time as required by the All-on-4® technique. The success rates of the immediate loading mini dental implant endosseous procedures are competitive with the All-on-4® technique. If one of the mini dental implants were to fail with a FIX On SIX® restoration, the failed mini implant can be easily replaced with a new mini implant and O-ring housing, placed in the same or different location. In addition, the FIX On SIX® restorations are considerably more affordable than the All-on-4®, costing approximately a third to half of the cost. Consequently the FIX On SIX® restorations are more desirable to the patient due to their affordability, greater comfort, reduced treatment time and the less invasive nature of the procedure.

Fixed partial dentures are commonly supported by mini dental implants to provide a natural, aesthetic appearance for the patient. In recent years, Zirconium Dioxide (zirconia) frameworks have been used in dentistry for fixed restorations.⁵ The introduction of zirconia has allowed for the production of metal free prosthetics, by means of Computer-Aided-Design/Computer-Aided-Manufacturing (CAD/CAM) technology. The result is improved aesthetics with increased success and reliability.⁶ There is also evidence that zirconia attracts less plaque accumulation preventing gingival problems.⁷ The architecture of these zirconia-based prosthetics enable superior strength and chewing resistance on the posterior teeth relative to other ceramics.⁸⁻⁹ Due to its favorable chemical composition and mechanical properties, clinicians have been eager to use zirconia in implant-supported restorations after its continued success in tooth-supported restorations.¹⁰

The following Case Study presents a clinical report of mini dental implants with the FIX On SIX® Technique. The use of 6 - 8 or 10 mini dental implants allows for the functional and aesthetically pleasing zirconia fixed prosthesis to be supported. Using CBCT technology, a zirconia prosthetic restoration was created and fixed over Shatkin F.I.R.S.T. (by Intra-Lock) mini dental implants using O-ring housings processed into the zirconia framework.

CASE STUDY

A 56 year old male patient with an upper denture presented himself at a consult on 5/13/2016. He had come to me from our TV marketing campaign. At the consult our new patient had a CT scan (using our Shatkin F.I.R.S.T. CBCT machine for pre op and postop scans), treatment plan and impressions taken for a FIX ON SIX® detachable-removable bridge. To minimize the discomfort and to eliminate the existing issues with his old denture, a zirconia bridge was prescribed and designed to fit on the mini dental implants that would be placed. Zirconia was chosen as the fabrication material due to its strength and durability and resistance to plaque.

A treatment plan for placing 10 IntraLock MDL's in the Maxillary arch using the Shatkin F.I.R.S.T.® Technique for mini dental implant placement was chosen. He was asked to return in 2 weeks for his procedure and placement of a temporary bridge.

6-22-17 The patient returns, signs the consent form and was administered Topical (2 carps of septo w/epi). A CT guided stent from Shatkin F.I.R.S.T. Lab was used and a Thompson marking pen was used to mark the position of the 10 implants using the CT guided stent. The Implants used were 9 Intra-Lock mini dental implants on the upper maxillary arch, size 25mm/15mm at #3,4,5,6,9,10,11,12,13 and one 25mm/11mm for #8. I used the CT guided stent through-out the procedure, removing it between final placement of each implant, using my patented F.I.R.S.T Technique (Fabricated Implant Restoration and Surgical Technique) (patent USPTO #7,108,511 B; September 2006). When finished placing all 10 implants using my Shatkin F.I.R.S.T. procedure I placed the housings and used A1 Luxatemp to create the Temporary Bridge. Patient liked the Temporary. Impressions were taken and sent to the Shatkin F.I.R.S.T. Lab. Two prescriptions (penicillin 500mg, Norco 51325) were sent to the patient's pharmacy and an appointment for two weeks was made for the delivery of the permanent "Fix on Six®" detachable removable bridge. 7-7-16 Patient returns, I removed the temporary and placed the "Fix on Six®" detachable -removable roundhouse restoration. The Fix on Six® restoration looked good, patient was happy. I provided the patient with a Shatkin Water Flosser and Sonicare toothbrush which I provide to all of my mini implant patients for hygiene. It has been a very successful tool in keeping tissue clean and free from food particles between checkups, when I remove the "Fix on Six®".

CONCLUSION

This article presents an alternative to All-on-4® which is less expensive, less painful, less invasive, with faster results utilizing a superior dental material. FIX On SIX® offers patients a beautiful zirconia restoration which is removable by the dentist but provides the patients with the feel and aesthetics of a fixed prosthesis. Creating a fixed prosthesis which is able to withstand the occlusal forces applied, provide cosmetic appeal and patient satisfaction is an enduring task for all dentists.¹¹ Today in dentistry, zirconia has traditionally been used in fixed partial dentures as tooth supported restorations.⁹⁻¹⁰ With most cases that use zirconia as a fixed restoration, high success rates have been recorded, most above 95%.⁹ Zirconia's ability to increase the durability of a prosthesis by up to 30-40% has made it a good candidate for use in hybrid fixed cases.¹¹ The use of CT technology increases zirconia's stability in conjunction with decreasing failure rates of these restorations, due to the industrial processing.

In this case study, the patient was dissatisfied with his upper denture because of cracks in the acrylic along the palate, the dentures were not comfortable to wear and food would trap under the dentures. By designing a fixed zirconia bridge (FIX On SIX®) instead of acrylic dentures or a hybrid acrylic fixed bridge, the patient will no longer have these negative experiences. The use of zirconia instead of acrylic increases durability of the prosthesis while also offering the comfort of fixed restoration and healthier surrounding gingival tissues.



Figure 2. Dental model made using the impression taken at the consult appointment.



Figure 3. The tissue was marked using a Thompson marking pen through the surgical guide stent to get a visual for placement of the mini implants.



Figure 4. Holding the CT guided stent still in preparation of placing mini implants.



Figure 5. Using the Shatkin F.I.R.S.T. Pilot Drill Guide and 20:1 MDL Contra Angle Driver to make Pilot hole.



Figure 6. Placing mini dental implant through the CT guided stent with 20:1 handpiece.



Figure 7. Fully seating the mini dental implant after removing the surgical guide stent.



Figure 8. After placing the first 5 mini dental implants, the clinician checks for proper alignment.



Figure 9. The 10 mini dental implants were placed in the maxilla. Notice the bottom of the square is level with the gingiva, and the ball and square are above tissue.



Figure 10. Placing all 10 micro metal housings on the mini dental implants.



Figure 11. Final restoration before placement of o-rings.



Figure 12. Fixed on 10 final restorations with o-rings placed in restoration.



Figure 13. Verification of final zirconia restoration fit.



Figure 15. Final CBCT and panoramic radiograph.

SOURCES

*All-On-4® is a registered patent owned by Nobel Biocare® developed together with Paulo Malo, DDS, PhD, at MALO CLINIC.

** Fix-On-Six® is a registered trademark owned by Shatkin F.I.R.S.T. developed by Todd Ellis Shatkin, DDS.

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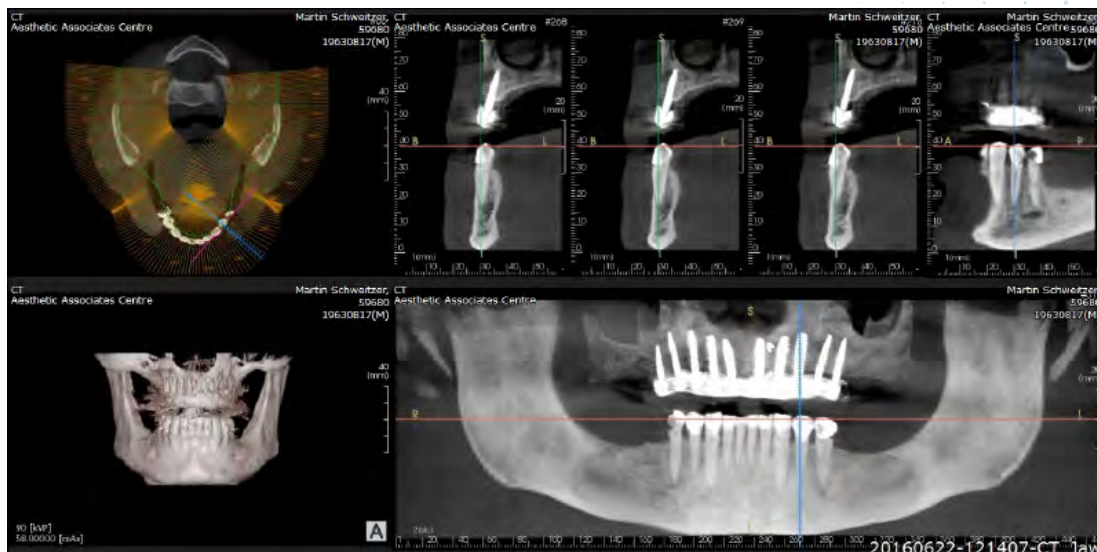


Figure 1. CBCT scan from consult.



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CASE STUDY

UTILIZING MINIS FOR A 5 UNIT BRIDGE IN COMPROMISED BONE SITUATION

QUINCY THOMPSON, DMD

PATIENT PROFILE

- 65yr old Male presents to office with Falling Bridge #4-13 (only 3 pontics - #5, 9, 13)
- CC: Pain on right side, can't chew, bridge is moving. I want this done ASAP
- Med Hx: Periodontal disease, heart disease, diabetes

TREATMENT PLAN:

Phase 1:

1. Intral Oral scan for immediate temp bridge and suckdown (whiting tray) surgical stent.
2. Section bridge at #9 and Ext of #5, implant placement and immediate temp bridge
3. Heal 2 months

Phase 2:

1. Place additional implants if needed/possible
2. Heal 1 month
3. Impressions/scan for final bridge
4. Delivery of final restoration

COMPLICATIONS AND CHALLENGES:

Pt did not want to be without teeth at all, did not want to wear a partial denture. Pt also wanted this done extremely fast. #5 lesion is very large and not a candidate site for socket grafting due to destruction of bucal plate. The bridge was mobile so taking an impression was not an option. Because of these things it was decided to scan the pt's max arch to create a suckdown tray to serve as a surgical stent to place the implants within the tooth sites of the existing bridge and use the printed model as a means to create a over impression to make a temporary bridge after EXT and implant placement.

#6 implant did not integrate due to the proximity to the lesion on #5. It was however replaced by angling the implant mesial and palatal with a longer implant 8 weeks later.

PT THOUGHTS AND CONCLUSION:

Pt was very happy with the results of the temporary and even happier with the results of his final bridge. I used denture housings to make the temp bridge easily removable, but if I was to change something I would have cemented it in place with a temporary cement instead.

Mini implants made this possible with immediate Ext and implant placement, would not have been possible with root form implants.

Pre-op CBCT and IO scans



After sectioning of bridge and implant placement with suckdown stent in place.

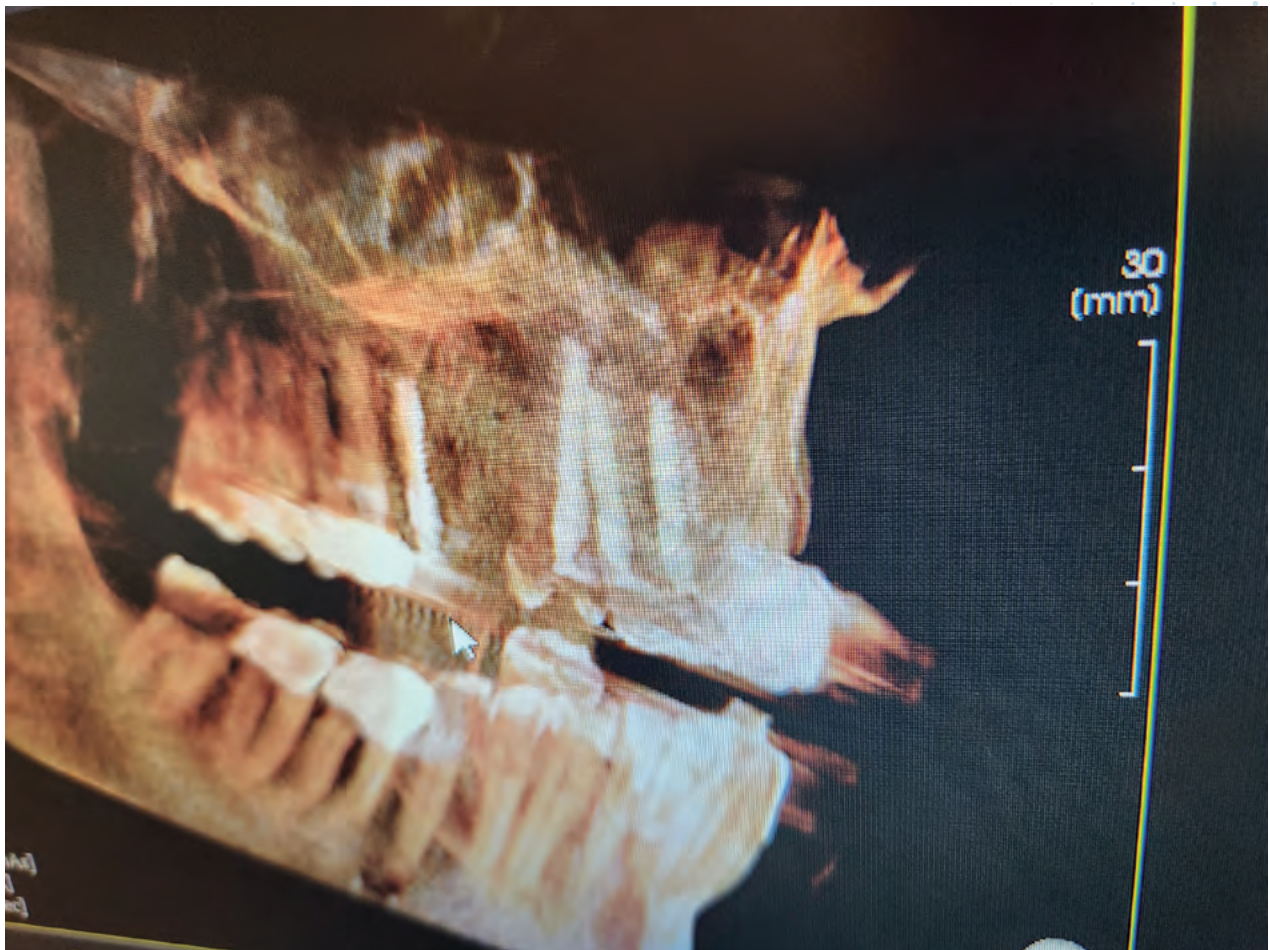


CBCT after Ext #5 and implant placement of 4 2.5x15 mini implants



Temporary Bridge #4-8





Photos after healing and final bridge after seating



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