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2019 ANNUAL JOURNAL OF THE INTERNATIONAL ACADEMY OF MINI DENTAL IMPLANTS

MESSAGE
FROM THE PRESIDENT

Dear Fellow Academy Members, Colleagues, and Friends

I would like to take this moment to personally thank all of you for your continued participation and support of our Academy.

Growing our member base and encouraging the continued participation of doctors and staff in our courses and seminars continue to be our goals.

A giant step was taken earlier this year with the completion and Grand Opening of the Shatkin Learning Center in Buffalo, NY. If you have not yet had the opportunity to attend an event at the Center, please pick a date and take a first hand look at one of the world's largest, most well equipped and modernly designed facility of its kind.

A special thank you goes out to Todd and Sam Shatkin, Jr. and all others responsible for the opening of this incredible facility.

With this publication, our Academy membership has grown to over 175 members and the number of Mini Dental Implant Centers of America has now reached 71.

Our growth can be directly attributed to the mini implant's effect on our lives both professionally and personally.

I sincerely thank all of you in our Academy and the folks at Shatkin FIRST for making these past two years so enjoyable. It has been an honor and a privilege to serve as the President of this Academy,

And now, I pass the gavel to a wonderful friend and colleague, someone we all know and love, Dr. Joe Gillespie

RANDY STAPLES, DDS

President Emeritus & Diplomat of the IAMDI

MESSAGE
FROM THE EDITOR

Dear Fellow IAMDI Member,

It's once again Annual Session time for the IAMDI. Our numbers continue to grow, as does the prevalence and acceptance of Mini Dental Implant treatment by patients and our fellow Dentists. Still, there are neighboring Dentists completely unaware of the amazing possibilities, versatility and predictable success of Small Diameter Mini Dental Implant treatment.

We collectively need to inform patients and Dentists alike of the capabilities of our amazing Implant treatment modality.

If you contributed to this years journal, thank you. If not, propose to select an interesting, difficult or unique case and share it with your fellow IAMDI members in our Journal next year. I know that I have placed thousands of implants, yet I learn something from EVERY presentation I hear or read. You will be helping to advance our unique art to new levels of excellence.

To my Friends in the Academy, I can't wait to catch up here at the Meeting. To those whom I have not yet met, I'm looking forward to making your acquaintance.

At any time, if I can be of help to any IAMDI member, please contact me at (586) 228 0909

ALAN F. ROBINSON, DDS
MAGD DICOI DIAMDI
FAGD

President Emeritus of the IAMDI

GUEST SPEAKER

DENNIS FLANAGAN, DDS MSc

Dr. Dennis Flanagan is the managing partner of a two location private general dental group practice with 35 employees. He is a diplomate of the American Board of General Dentistry, International Congress of Oral Implantologists and American Board of Oral Implantology/Implant Dentistry.

Dr. Flanagan is an Attending Dentist for the US Olympic Committee and the Windham Community Memorial Hospital where he was Chief of Dentistry for more than 8 years.

Dr. Flanagan has published over 100 articles in dentistry and holds six US patents on medical and dental devices. He has made many presentations at national and international dental conferences. Dr. Flanagan is an Honored Fellow of the American Academy of Implant Dentistry, Fellow of the Academy of Osseointegration and American Board of Forensic Dentistry. He is on the editorial board of several dental journals. He is a former editorial consultant to the Academy of Osseointegration, and former editor for Oakstone Medical publishing. He is an examining board member of the American Board of General Dentistry and American Board of Oral Implantology/Implant Dentistry. He is a senior associate editor for the Journal of Oral Implantology. He has been a paid consultant to Proctor and Gamble, Blue Cross, and National Medical Insurance Consultants. He is a Georgetown University School of Dentistry (DDS) graduate, has studied oral implantology at Harvard University Dental School (certificate) and at the Goethe Medical University, Frankfurt Germany (MSc). He is an associate professor in dental medicine at Lugano University of Switzerland Malta.

MESSAGE

FROM TODD E. SHATKIN, DDS

Dear Fellow Academy Members, Colleagues and Friends,

It was an honor to be part of this of the International Academy of Mini Dental Implants. I would like to personally thank Dr. Robert Casledine for blazing the trail with past issues and for his professional leadership as President Emeritus.

This is an exciting time in Dentistry! With all of your help, Mini Dental Implants have revolutionized Dentistry, making an implant procedure less invasive, less painful with less healing time, less visits to the dentist, and more affordable than conventional implants. We can replace a missing teeth in as little as one visit and stabilize dentures in as little as an hour. WOW!!!

Dr. Gordon Christensen, a diplomat and founding member of our Academy, stated on numerous occasions that every General Dentist should be offering mini dental implants in his or her practice. My Father, the late Samuel Shatkin, Sr. DDS, MD (also a founding member of the Academy), told me 15 years ago that mini dental implants gave him a reason to keep working into his 70's. I was very fortunate to have practiced with him by my side for over 20 years. He helped dentists from all over the world gain a better appreciation for Mini Dental Implants. He prepared me to do what I do today, providing Doctors with the knowledge and skills needed to grow their practices while providing an affordable, fast solution to loose dentures and missing teeth.

In conclusion, I want to thank Dr. Randy Staples who has led us as President the past two years. He has represented the position as president in a honorable manner and we thank him for his leadership.!

I invite you to send me your interesting cases in a way (word document with photos) that we can share your experiences with your IAMDI family. Let's grow together and grow our membership.

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FIX On SIX® – A Mini Dental Implant Alternative to the All-on-4® Less Invasive, Less Time, Less Costly, and Less Discomfort

Todd Ellis Shatkin, D.D.S. –
Private dental practice Buffalo, NY, Owner Shatkin F.I.R.S.T., LLC
Alysa Brooke Sadkin –Dental student, University of Pittsburg Dental School

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

*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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FIX on SIX® – A Mini Dental Implant Alternative to the All-on-4® Less Invasive, Less Time, Less Costly, and Less Discomfort

Todd Ellis Shatkin, D.D.S. – Private dental practice Buffalo, NY, Owner Shatkin F.I.R.S.T., LLC
Alysa Brooke Sadkin –Dental student, University of Pittsburg Dental School

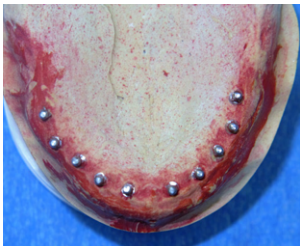


Figure 2. Dental model made using the impression taken at the consult appointment.

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.

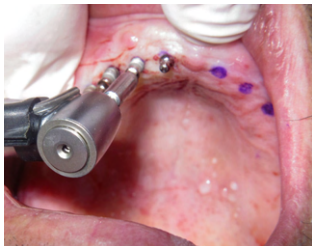


Figure 7. Fully seating the mini dental implant after removing the surgical guide stent.

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.

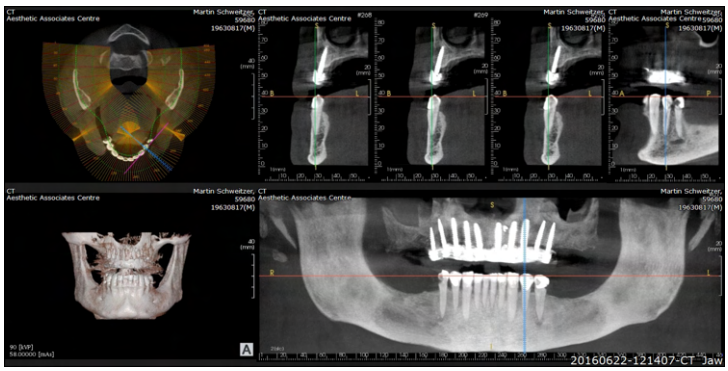


Figure 1. CBCT scan from consult.

CASE STUDY

ATROPHIC BONE MAY BE BEST TREATED WITH MINI IMPLANTS

DENNIS FLANAGAN, DDS MSc

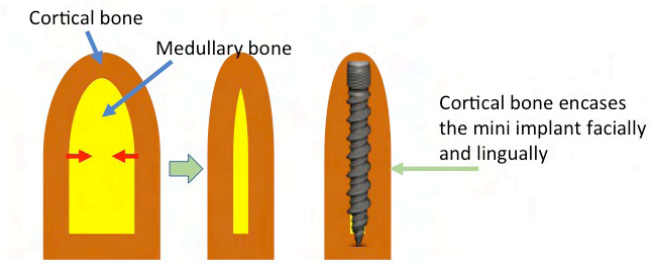
Mini implants have been used to support fixed and removable prostheses for many years (1). After a tooth is extracted the edentulous bone remodels and the facial cortex can migrate to the lingual (2). The resulting edentulous ridge will become smaller in time and as time progresses the ridge become narrower (Fig. 1). A narrow ridge, less than 5mm, may not accept a standard diameter implant. Generally, implants are successful when there is at least a 1.8mm thickness of bone that encases the implant (3). While this dimension is not firmly established it is probably correct. The bone surrounding an implant needs an adequate blood supply for remodeling and to resist the occlusal loading that is imparted by the implant (4). If there is a crack or greenstick type bone fracture with an adequate blood supply via an intact periosteum, this should enable osseous healing without causing a load failure, as long as the implant remains immobile. And the periosteum remains intact. Since the physical size displacement of mini implants is smaller, then the required 1.8mm osseous thickness may be smaller for mini implants, but this has not been studied.

After a long post extraction period an edentulous ridge can become very thin (Fig. 2). Nonetheless, facial and lingual cortices, in close proximity, can provide adequate osseous support and also provide adequate blood supply (Fig. 3).

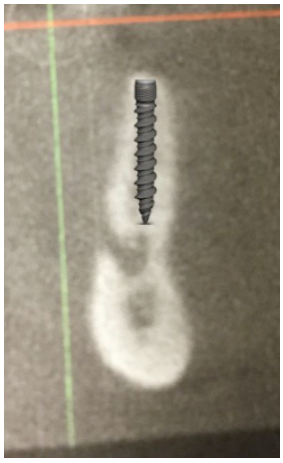
Mini implants can withstand a large amount of vertical loading. However, off axial loads can impart twice the load to the supporting bone as compared to standard diameter implants (5). Thus, dense cortical bone, in close proximity as in an atrophic ridge, can provide adequate support for a mini implant supported prosthesis with a long-term functional outcome.

A patient's bite load capacity may be measured pre-operatively as a parameter for patient assessment (5). A high bite load capacity patient may require additional or longer mini implants to withstand a high bite load capacity (6). A high bite load capacity may be over 150N (newtons). There are no established criteria for bite load magnitudes and bone load resistance.

Mini implants can be used to support fixed and removable dental prostheses in atrophic bone. The proximity of the facial and lingual cortices can provide increased support for resistance to occlusal loading.



During atrophy the facial and lingual cortices approach each other providing facial and lingual dense bone for support



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CASE STUDIES

BY RANDY STAPLES,DDS - PRESIDENT & DIPLOMATE IAMDI

MAXILLARY & MANDIBULAR FIXED/ RETRIEVEABLE PROSTHESES

A 31 year old male presented to our office for consultation requesting a full mouth makeover. Due to his work schedule, he requested that his work be done with long appointments having a minimum of 8 to12 weeks intervals and stated that he could not start his work for six months. He also requested that I devise a treatment plan that did not include removable dentures as a final product.

He stated that he was having some " severe pain with an upper left molar and two teeth on his lower right side." He requested that I get him out of pain and he would make the arrangements to return to the office in six months to begin his treatment.

With these patient requests regarding his treatment schedule in mind, we proceeded with a clinical exam, review of his medical profile, impressions for study models and a Panoral x-ray. Treatment plans were detailed and discussed that included different ways to achieve his full mouth reconstruction.

The patient chose the extraction of all remaining teeth with the fabrication of maxillary and mandibular mini implant retained fixed/retrievable full arch bridges.

The three teeth causing his immediate pain were then removed with forceps and a local anesthetic. All information required was then sent to Shatkin FIRST Lab along with instructions to fabricate maxillary and mandibular full arch temporaries.

At his request, the patient was then dismissed with an appointment to return to our office in six months. He received a water flosser, chlorhexidine rinse, and detailed suggestions for his oral hygiene maintenance until his next dental appointment.

When the patient returned to our office, we proceeded with the removal of all remaining teeth, the placement of mini implants and the seating of the temporary bridges fabricated by Shatkin FIRST Lab. The temporary bridges were retained with Shatkin FIRST plastic healing caps.

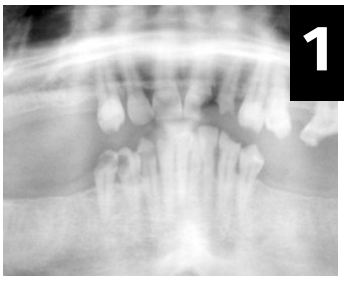
The patient wore these temporary bridges for four months before returning to our office to complete the placement of additional implants and taking of the impressions for his final restorations. These final implant placements were planned and guided with use of a Genoray Papaya 3D Combination Cone Beam X-Ray Imaging System.

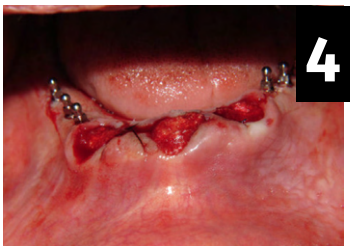
One month later we completed his treatment with the seating of his fixed prostheses.

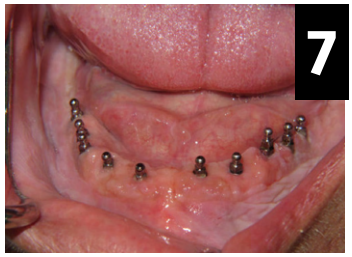
JACKSON, TN
Mini Dental Implant Centers of America

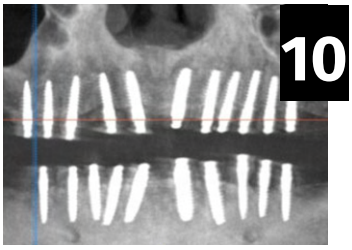
Photo Documentation

1. Initial panoral xray
2. Initial intraoral photo
3. extractions and placement minis in maxilla
4. extractions and placement minis in mandibl
5. temporary bridges
6. final placement minis maxilla
7. final placement minis mandible
8. seated bridge maxilla
9. seated bridge mandible
10. CT minis placement
11. photo finished case









CASE STUDIES

BY STEPHEN J. WESSELS, DMD, PA

SOLVING A COMPLICATED RESTORATIVE CASE USING CROWNS, BRIDGES & MINI DENTAL IMPLANTS

Will presented in my office March 2019 for a mini implant consultation. He is a 17 year old high school student athlete who appeared very shy and reluctant to smile. His mother and grandmother accompanied him at the consult. After getting a through medical history and taking a panoramic x-ray along with CBCT 3D xrays, a dental exam was performed. We all set down in the operatory and discussed their concerns.

Will had amelogenesis imperfecta (A.I.) a condition that includes multiple congenitally missing teeth, in Will's case he was missing #'s 1, 2, 3, 7, 8, 10, 14, 15, 17, 18, 24, 25, 31 &32; #'s 4, 5, 6 were present but were positioned distally by one tooth width so for this article #'s 4, 5, and 6 will be referred to as #'s 3, 4 & 5. Other symptoms of A.I. include smaller sized teeth, pitted, chalky, decalcified enamel. Decay was present on all of Will's existing teeth with #9 being unsalvageable. The main things Will disliked about his smile were missing teeth, smaller than normal sized teeth, darker teeth, and wearing upper and lower flippers to replace #6, 7, 8, 10 & 24, 25; The flippers were fabricated by his orthodontist. He was very self-conscious about his smile, and like a lot of people he learned to communicate without showing his teeth. He also shared with us how he had been teased and made fun of about his smile since was a small child. His mother expressed excitement in the fact that Will was old enough for them to consider permanent (implant) options.

Will's general dentist recommended that he consider extracting all his teeth and having all-on-4 appliances. He went to an oral surgeon for a consultation before seeing me.

I treatment planned crowning existing teeth #'s 3, 4, 5, 11, 12, 13 with a full-arch pre-fabricated temporary bridge from #3-13. Zirconia crowns were selected for strength and durability. On the lower arch crowns were recommended for teeth #'s 19, 20, 21, 28, 29, &30. In replacing the missing teeth a six-unit bridge #'s 22, 23-26 & 27 was decided upon based upon the fact that there was extensive bone loss on #'s 24 & 25 so mini implants were not an option on the lower. On the maxillary I recommended having a five-unit mini implant retained bridge #'s 6-10 utilizing sites # 6, 7, 9 (immediate) and 10 for the mini implants. Site #8 has insufficient bone for an implant. This VDO was to be increased a total of 5mm (3mm maxillary and 2mm mandibular). B1 shade was selected (pre-op A3).

The advantages of saving Will's existing teeth (except #9) with crowns, bridges and mini dental implants to replace his missing teeth on the uppers were explained to everyone at the consult. Mini dental implants are significantly less expensive than traditional surgically placed larger implants, usually no bone grafting is required, very little pain or discomfort, no surgery needed, a lot less healing time needed (a few weeks compared to up to a year with bone grafting and traditional implants) and a lot less dental appointments. Will, his mother and grandmother were excited at the prospect of being able to restore his smile in a more affordable, timely and conservative manner.

After some discussion, the treatment plan presented was agreed upon. We took initial polyvinyl impressions and a bite registration (Imprint) to fabricate a maxillary temporary bridge #'s 3-13. Intra-oral pictures were taken and Will was scheduled for his first restorative appointment with us two weeks later.

At Will's first restorative appointment teeth #'s 3, 4, 5, 11, 12 & 13 were prepped for crowns. All six teeth required core-build ups due to decay. Margins were intentionally placed slightly sub-gingival. The temporary bridge was lined with Luxatemp. Final impressions and a bite registration indicating midline and plane were taken. The temporary bridge was polished and cemented with Telio cement. Very little occlusal preparation was needed since we were increasing the VDO by 3mm.

A side note worth mentioning; just having the temporary bridge was very encouraging and exciting for Will. A brighter smile with normal sized teeth gave Will the confidence he needed to go to his junior prom and smile for all the photos!

For Will's second restorative appointment after removing the temporary bridge #'s 3-13, we cemented his solid Zirconia crowns #'s 3, 4, 5, 11, 12 & 13 using Relyx cement. Next, two 2.5 x 15mm MDL Intralock mini implants were placed in #'s 6 & 7 sites. Site #8 has insufficient bone so nothing was placed there, tooth #9 was extracted and an immediate 2.5 x 15mm MDL Intralock mini implant was placed in solid palatal bone. A slim Osteogen collagen plug was packed in the socket around the mini implant with a 4-0 gut suture approximating the tissue. Site #10 had a 2.0 x 15mm MDL Intralock mini dental implant. The implants were all solid on percussion and torqued above 30 NCM. PA x-rays confirmed good positioning. The next step was to section the temporary bridge between #'s 5/6 and 10/11; shims and housings on #'s 6, 7 and 10 minis were placed with a healing cap on #9 mini. Next the temporary #6-10 was lined with Luxatemp picking up the housings and healing cap, polished and cemented Will's temporary out of occlusion. Will was on a regimen of Amoxicillin 500mg for 7 days, along with Motrin 800mg q 8h prn pain. Eight weeks were allowed for healing. We saw Will the next day for a postop visit and he was doing very well with minimal discomfort.

Eight weeks went by quickly. The temporary bridge #'s 6-10 was removed using a Schumaker crown/bridge remover. Postop PA x-rays were taken, gum tissue and mini implants were examined and appeared healthy and normal. No discomforted noted. Final polyvinyl impressions were taken for the permanent bridge #'s 6-10, along with a lower Silgenot impression and an Imprint bite registration noting plane and midline. The temporary was re-seated.

Three weeks later the temporary bridge # 6-10 was removed and the permanent bridge cemented permanently using Shatkin resin cement. Intra-oral pictures were taken. Will was very pleased with his progress at this stage.

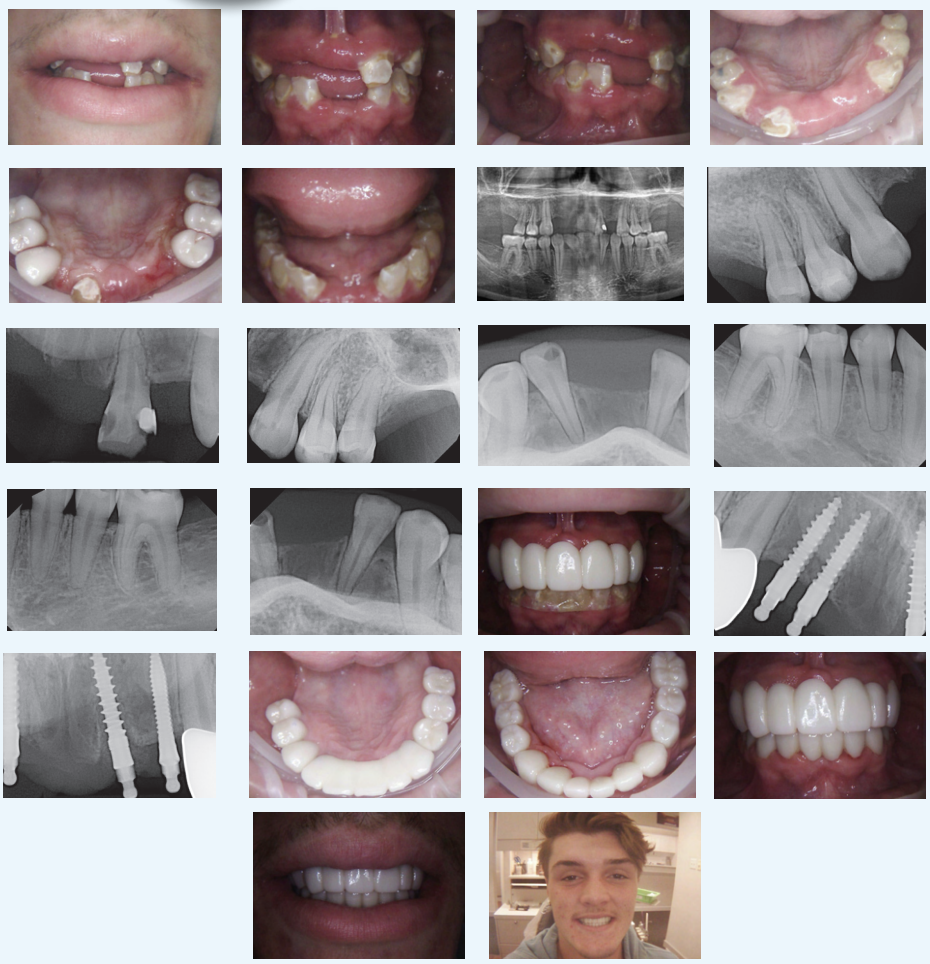
WILKESBORO, NC
Mini Dental Implant
Centers of America

With the advancement of mini-dental implant technology specifically using the Intralock mini-dental implants, and from the training and guidance from Dr. Todd Shatkin at the mini-dental implant training center in Amherst, NY, I was able to successfully navigate an unusual restorative situation with a fairly quick and economical solution. The Intralock mini dental implants are advantageous for several key reasons: they have an Ossean surface coating which aids in better integration by attracting osteocytes at the nano-level, they are self-threading, and the abutment implant are one-piece so no screws or extra parts are needed to be ordered.

A few weeks later we saw Will to restore his lower teeth. An immediate lower temporary bridge #'s 19-30 had been fabricated previously. Crown preps for solid Zirconia crowns were done on #'s 19, 20, 21, 28, 29 & 30. Core buildups were placed on all six teeth due to decay. The VDO was to be increased by 2mm. Teeth #'s 22, 23, 26 & 27 were also prepped for a six unit bridge 22-27. Final polyvinyl impressions were taken, a bite registration and an opposing model. The temporary was lined with Luxatemp, trimmed, polished and cemented with Telio cement.

We saw Will for his final restorative procedure a few weeks later. Permanent zirconia crowns were cemented on teeth #'s 19, 20, 21, 28, 29, 30 using Rely-x cement, then the lower anterior six unit bridge #'s 22-27 was cemented also using Rely-x cement. Occlusion was verified. Postop intra oral pictures were taken and high fives and hugs were going around! Everyone was a little overcome with emotion as we admired Will's new smile! Several tears were shed thinking about how far Will had come in a few short months.

In conclusion, Will presented to me for a consultation March 2019. He had a very challenging restorative situation with Amelogenesis Imperfecta – lots of missing teeth, small, chalky, pitted and decayed existing teeth. He had very little bone to work within the area ofmissing teeth, major cosmetic issues, VDO issues, not to mention the emotional component of a young man who was picked on and teased about his teeth/smile since he was a small child. To solve all these issues, crowns were placed on 3, 4, 5, 11, 12, 13, 19, 20, 21, 28, 29 & 30. A six unit bridge from 22-27 was placed, permanently replacing 24 and 25 missing teeth. Implants were not possible on 24, 25 area due to an extreme amount of bone loss. A mini-implant supported bridge was cemented over # 6, 7, 9 & 10 areas replacing five missing teeth on the upper. Vertical dimension of occlusion was increased by a total of 5mm (3mm maxillary, 2mm mandibular). The shade selected was B1. After everything was done, Will now had normal-sized teeth and a beautiful bright smile! Increased self-confidence was noted every time we saw him using crowns, bridges, and mini dental implants we were able to restore/rebuild Will's smile beyond what was hoped or expected – and his confidence! Priceless.



CASE STUDIES

BY RONALD PAUL PETROSKY,DDS,MAGD,DICOI

The Zirconia Roundhouse on 12

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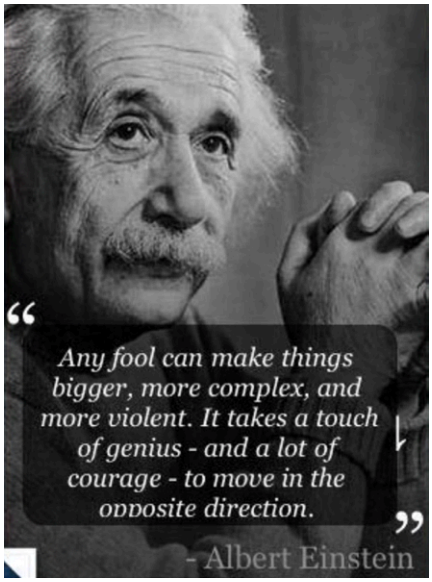


"Implants with SMALL DIAMETERS are one of the MAJOR ADVANCEMENTS in DENTAL HISTORY; they can be USED SUCCESSFULLY in a VARIETY of clinical situations."
2012 Gleiznys,Etal 13

INTRODUCTION

What a great time in history to be an implant dentist !
US News & World report has had 'dentist' as the # 1 Top Healthcare Job in the nation for many years...in 2019 it's #2 .
Available for the progressive dental practioner today...is game-changing technology ,such as minimally invasive implants,3D CBCT,the CEREC Primescan,lasers,LPRF,the Piezotome Cube ,etc....all for faster,safer, and more predictable solutions to our patients problems.

Such blessings do make the Day in The Life of a dentist ...so much nicer!
Also ,such advances greatly enable a dentist through years of training and experience ...to restore and transform a virtual dental cripple... who lost all their God given teeth...to the form ,fit ,function & feel of what they once naturally had ...like with the fixed ZirconiaRoundhouse (ZRH) on 10-12 .
Once you have personally delivered this amazing prosthesis for your patient....you will have witnessed a truly modern day miracle in the historical annals of dentistry...no exaggeration!
A literal dream & prayer come true for your trusting and grateful patient to be able to smile & chew like their ole' high school days !
Such has been the case over the last 20 years, whereby Mini Dental Implants have progressed from transitional applications of 1999 to full arch fixed and removable restorations today.
Thanks to such visionary pioneers like Christiansen,Shatkin, Flanagan,Mascolo,Gillespie,Mazor,and many others who have blazed trails for us all to follow.

Given the fact that nothing is perfect ... with everything having advantages and disadvantages...it is my experience that The ZRH has emerged as the best solution for the partially or fully edentulous dentition ,achieving a total restorative satisfaction for the patient. In my opinion along with that of many others,the ZRH is actually a COMPARABLE ALTERNATIVE...and in many ways SUPERIOR ...to the widely advertised and advocated All on 4.

Now, it is recognized that there are and always will be VARIABLE OPINIONS in the dental implant community ...like those that love the All on 4 & those that prefer the ZRH.
As the noteble congressman Daniel Patrick Moynihan from NY once said...

"EVERYONE IS ENTITLED TO THEIR OWN OPINION... BUT NOT THEIR OWN FACTS"

This VARIATION of OPINIONS is NOT unusual in that...
as Dr.Bader points in his 1995 article entitled:
'Variation in Dentists' Clinical Decisions'
"Nevertheless, the available information reflects SUBSTANTIAL VARIATION in measures such as rates of provision of specific procedures; cost and numbers of procedures recommended for specific patients; and diagnoses, intervention decisions, and treatment selections for individual teeth."

In a concluding remark...Dr. Bader states:
"Even when DIFFERENCES in patients are controlled, VARIATION in dentists' CLINICAL DECISIONS is UBIQUITOUS.
While its consequences remain undetermined, the VARIATION in basic clinical DECISIONS such as caries diagnosis signals the need to consider the extent to which the APPROPRIATENESS of CARE is affected."

Such VARIATIONS are good ...just choose for yourself whatever it takes to SATISFY the needs and desires of the patients you serve .

The Minimally Invasive Approach

The longer we practice implant dentistry, as far as I'm concerned , it should become quite evident to the seasoned clinician that a Minimally Invasive Approach to Oral Implantology is the ULTIMATE and PREFERRED WAY to practice for a much happier & satisfying patient-doctor relationship.
How wonderful is it to call a patient the next day post-op and learn ...'I'm doing just fine'! For me ...Ain't Nothing Better !

Our highly esteemed mentor of many decades Dr.Gordon Christensen,wrote of this in his 2005 JADA article entitled:
'The Advantages of Minimally Invasive Dentistry' stating:
"In my opinion, during the past several years, there has been an obvious TREND in dentistry toward COMPLEX techniques and accomplishing MORE treatment THAN REQUIRED "

This is a Case In Point he shared in lecture:
referred to Dr Christensen relative to OVERTREATMENT ...
...a complete disservice for the patient !!
This unsuspecting patient absolutely did not have to lose all those teeth !!! #19 has to go ...but not the others IMHO!

Dr. Christensen writes: "Miniature implants versus standard-size implants...Placement of these SMALL-diameter implants in MULTIPLES should be considered for optimum resistance and retention of FIXED or removable prostheses."4

This restorative option certainly applies to the ZRH on 12 advanced simplified option.

In Dr. Christensen's Clinicians Report of Oct 2009 Newsletter entitled: 'Minimally Invasive Dentistry Can Be Win Win!'
he writes:

"Small diameter implants are a CLASSIC EXAMPLE of a MINIMALLY INVASIVE procedure..."2

In interview with GlidewellLab...Dr.Christensen stated:
"Minimal INVASIVENESS is one of the MAJOR BENEFITS of small-diameter implants. Another SIGNIFICANT ADVANTAGE is that they can be IMMEDIATELY LOADED in bone that is adequate."

In a DrBicuspid Magazine of 2008 ,an article entitled:
'Christensen 'embarrassed' by U.S. dentistry'
he stated:"...dentists should NOT shy away from Mini-Implants. Yes, they SHOULD BE USED" he said.
"There are 40 MILLION edentulous people in the United States, and I would guess AT LEAST Two-Thirds 2/3) or Three-Quarters (3)4) of them DON'T have ENOUGH BONE for a NORMAL IMPLANT."

"Mini-implants can also SAVE MONEY for frugal patients, he added.
"If one of them falls out, big whoopee.
It has expanded the bone, and so when you take it out within even a few weeks, the bone has come back.

It's not like a normal implant with a big hole you need to drain.... Move it over 3 mm and screw in again."

"But technique is important when using these smaller implants. They've got to be put in right, Dr. Christensen noted. "
"TWO MINIS in SURFACE AREA of 1.8 mm EQUALS ONE STANDARD implant 3.75mm.

So put in TWO for ONE and ... KEEP them LOW like a sports car, NOT like an SUV."

Let's Compare Surface Area of ZRH on 12 to All on 4:

Biomechanical Principal : The greater SurfaceArea can withstand greater forces.

The entire formula for the: surface area of a cylinder is
SA = 2 π r2 + 2 π r h.

ImplantSurfaceArea:
SA = pi(3.141168) x diameter x height

Surface Area Implant Diameter Comparison
P
(it is noted that implants are not perfect cylinders... therefore the calculations are approximations)
SA = 2 π r2 + 2 π r h.

one 2.5x13 implant:
SA=2(3.14)(1.25)(1.25)+2(3.14)(1.25)(13)
SA=9.81 + 102.05
SA=111.86 sq mm

Therefore, Two (12) MDI's = 12(111.86)=1,342.32 sq mm

one 4.0x13 implant
SA=2(3.14)(2)(2)+2(3.14)(2)(13)
SA=25.12 + 163.28
SA=188.4 sq mm

Therefore;
Four(4) MDI's = 4(188.4) = 753.6 sq mm

Therefore
TWELVE 2.5x13 (1,342.32) > FOUR 4.0 x 13 (753.6)
753.6/1,342.32 = .56

So, TWELVE (2.5x13) are 44% GREATER Surface Area than FOUR (4.0 x 13)
Therefore,

The ZRH on 12 is 44% > than All on 4 !

Mathematically speaking...it should be obvious then WHY Dr.Christensen would write in a 2006 JADA article entitled:
The 'mini'-implant has arrived:
Gordon J. Christensen, DDS, MSD, PhD JA
DA, Vol. 137 2006

"In my opinion, I find MORE indications for NARROW-diameter implants
(≈ 1.8 mm) than for STANDARD-diameter implants (≈3.75 mm)."

Dr. Andrea Mascolo wrote an excellent article in 2016 entitled:
"Small Diameter Implants (SDIs) in FIXED RESTORATIONS:
Clinical Cases Considerations During 4 Years Follow-Up" where he states:

"MINIMALLY INVASIVE DENTISTRY is
A REALITY that in the last several years has involved ALL branches of dentistry.
In IMPLANTOLOGY these MINIMALLY INVASIVE TECHNIQUES have REVOLUTIONIZED the STANDARD TREATMENTS and are showing a high possibility of increased practice."14

Time and experience has proven to me this MINIMALLY INVASIVE FUNDAMENTAL TRUTH of the SURGICAL aspect of Implantology... namely that :

"Every surgical procedure presents advantages and disadvantages. Priority should be given to those procedures which are SIMPLER and LESS INVASIVE, involve LESS RISK of COMPLICATIONS, and reach their goals within the SHORTEST TIME FRAME."1

That's exactly the virtues of ...
What Mini dental implants are all about...
What Minimally Invasive dentistry is all about...
Bigger is NOT always better !
In medicine and dentistry... many times 'Less is More'!
Ask yourself...'What would you want in your mouth?'
I rest my case!

Why The ZRH Alternative to All on 4?

So...Why NOT the ZRH ?
Just as one size implant does NOT fit all ...
NOT does one procedure fit all !
It’s a good thing to have other viable alternatives & choices due to such variations as:

- **lack of bone**
- **lack of finances**
- **lack of physical compromised health**
- **fear of surgery**

Ask yourself...

Do we ...Make the Patient Fit the Implant ?

or

Do we...Make the Implant Fit the Patient?

Zirconia Roundhouse Advantages

The Zirconia Roundhouse is:
1) Preferred by patients with visual model comparison
2) Half the Cost
3) ‘Twice as Nice’ prosthetically
4)No issues of perennial ‘screw loosening’!
5)Stronger and more stable biomechanically
6)More Surface Area
7)Less invasive

The alternative choice is yours to make!
Once again...What would you put in your mouth??

BIOMECHANICAL Considerations:

Cemented

ZRH on 12 **VERSUS** **All-on-4**

When COMPARING both the ZRH on 12 to the All on 4 from a BIOMECHANICAL point of view...
you don’t have to go to engineering school to mathematically figure out that the ZRH on 12 is far more stable above 40% more surface area to resist the masticatory forces than the All on 4 !

Furthermore,screw loosening and peri implantitis is a big problem with standard size implants and the All on 4 !
If one implant comes loose ...then it’s
‘None on 3’ ...as a full prosthetic replacement is necessary !
That’s a nightmare folks!!

Some Clinical Studies on the Advantages of MDI Fixed Applications are:

A) Less susceptible to peri-implantitis
As Dr. Flanagan explains
Dr. Dennis Flanagan explains in his informative article entitled : Fixed Partial Dentures and Crowns Supported by Very Small Diameter Dental Implants in Compromised Sites’ of 2008 :

“Conversely, there may be PHYSIOLOGIC ADVANTAGE to very small diameter implants. An ADVANTAGE that very small diameter implants have over standard diameter implants is the LESSER amount of linear or CIRCUMFERENTIAL PERCUTANEOUS EXPOSURE and BONE DISPLACEMENT.
The circumference of a 2 mm implant is (diameter) 6.28 mm whereas the circumference of a standard 4.0 mm diameter implant is 12.56 mm.
The very small implant has HALF of the linear percutaneous exposure thus exposing LESS of the implant- gingival attachment to BACTERIAL ATTACK”7

Less of an impediment to angiogenesis

"The 4 mm diameter implant has 4 times the OSSEOUS DISPLACEMENT as compared with the 2 mm diameter implant. This difference may be important .
Intuitively, this may be a PHYSIOLOGIC ADVANTAGE for the very small diameter implant in that there may be MORE of an available OSSEOUS BLOOD SUPPLY for the implant supporting bone or less of a barrier.
In larger diameter implants this larger barrier to blood supply or angiogenesis may contribute to the classic "resorption to the first thread" in the larger implant.
The larger barrier may hinder ANGIOGENESIS and subsequent OSTEOGENESIS around a newly placed implant.
BLOOD SUPPLY at the osseous crest may be HINDERED by the larger implant and produce the characteristic resorption to the first thread.
This phenomenon does not seem to be prevalent with the 2 mm diameter implants."7

B) Dr. Brian Jackson of Utica,NY, in his 2014 article 'Fixed Partial Denture Treatment With Mini Dental Implants' in JOP he states:

"Very small diameter implants or mini dental implants (MDI) are a TREATMENT ALTERNATIVE due to their reduced size.
MDI does NOT require BONE AUGMENTATION PROCEDURES, which are TECHNIQUE SENSITIVE,TIME CONSUMING, and VARY in PREDICTABLE RESULTS.
The OPTION of utilizing MDI provides a MINIMALLY INVASIVE , safe, and cost-effective approach for restoring the patient with DEFICIENT BONE VOLUME."8

C) In a 2019 China study entitled :
Retrospective study on the clinical outcomes of SMALL-DIAMETER IMPLANTS supporting FIXED prostheses WITHOUT bone augmentation in the POSTERIOR region after 2 to 12 years ,Dr's Si & Zhang state:

"SDIs COULD BE and MIGHT HAVE ALREADY BEEN...A STANDARD and PROMISING TREATMENT ALTERNATIVE at PREMOLAR and MOLAR SITES.
In conclusion, subject to the limitations of the present study, the results suggested that...
pure titanium SDIs SUPPORTING FIXED DENTAL PROSTHESIS in the POSTERIOR REGION without bone augmentation yield...
• PROMISING LONG-TERM OUTCOMES promising
• with HIGH IMPLANT and PROSTHESIS SURVIVAL RATES,
•MINIMAL MBL and
•a relatively LOW INCIDENCE of COMPLICATIONS.
CONCLUSION
SDIs supporting FIXED PROSTHESES in the POSTERIOR REGION...
ACHIEVED PREDICTABLE LONG-TERM CLINICAL OUTCOMES."9

D) In the Harvard University study entitled:
How Successful are Small Diameter Implants:2012

A Literature Review of
(41 Forty one studies
Over a 18 yr period : 1993 -2011
10,093 total of SDIs inserted
2762 patients.)

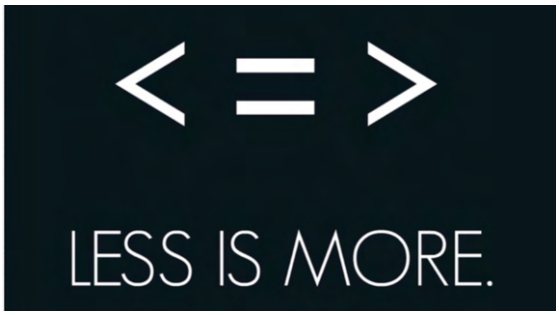
Dr. Keyvan Sohrabi, Deptartment of Oral Health Policy and Epidemiology,
Harvard School of Dental Medicine, Boston, MA, Clin. Oral Impl. Res. 0, 2012
states in part the following:

"Survival rates reported for SDI are SIMILAR to those reported for STANDARD width implants.
SDIs could be considered for use with FIXED restorations and mandibular overdentures, since their SUCCESS RATE appears to be COMPARABLE to that of REGULAR diameter implants.
They might also be an EFFICIENT,LOW-COST SOLUTION for elders who wish to reduce problems with denture instability."10

E) A 2012 article entitled Mini Dental Implants: A Retrospective Analysis of 5640 Implants Placed Over a 12-Year Period by
Todd Ellis Shatkin, DDS; and Christopher Anthony Petrotto
Compendium , Volume 33,Special Issue 3. September states the following:

"The high rates of success show that mini dental implants are suitable for use in
supporting FIXED and removable prosthetics."

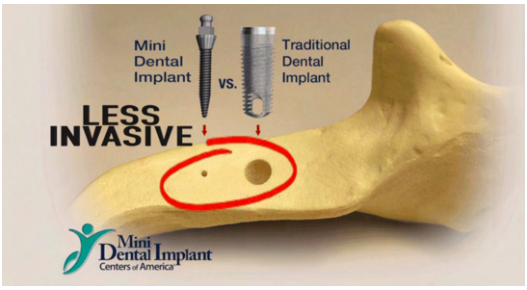
F) "Multiple SDIs can offer an ADEQUATE SURFACE AREA needed for a successful FIXED prosthetic." Mascolo14



MDI's Are Seven (7) Times LESS !

1. Less Expensive
In many cases, mini dental implants are are HALF the COST of STANDARD conventional implants.
Mini implants range in fees from $1000-$2000
Standard size implants range from $2500-$3000 not counting the abutment.

2. Less Invasive
Because the mini dental implant requires only a SMALL PILOT HOLE to be placed, it is less traumatic,minimally invasive to the bone and soft tissue; as compared to a traditional conventional implant that usually involves extensive surgery and bone grafts.



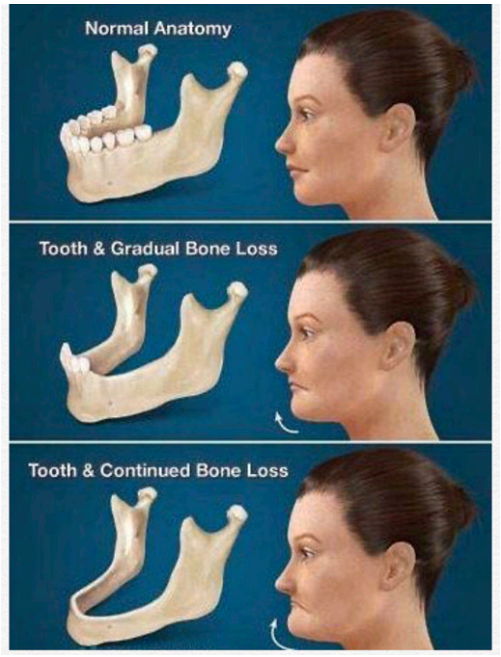
3. Less Discomfort
Less trauma to the gums, bone and underlying tissue means less discomfort.
Many patients need only over the counter pain medication for a day or so after the procedure.

4. Less Healing TIME
Because placing the smaller diameter mini implant does not cause as much trauma to the bone and soft tissue in the mouth, your healing time is reduced from months to days.

5. Less Restorative TIME
In many cases, the mini implant can be loaded immediately after placement.
This means that most procedures, including anchoring dentures can be done in one visit.

6. Less Bone Required
Mini implants require less (about half as much) bone ...so you're less likely to need additional costly bone grafts that many patients do not desire or can afford.

7. Less Bone Loss
A mini dental implant preserves the bone ...so that you can preserve the shape of your face MDI's therefore STABILIZES the JAW...
...not just the TEETH (2 fold Benefit)



In medicine, MORE is NOT always BETTER!
"There is good evidence that in some developed countries, particularly in the USA,healthcare providers are overtreating. This means people receive too many unnecessary treatments, tests, and screenings. Additionally, there is also frequent overdiagnosis of many medical conditions."3

The Current 2019 Standard of Care
There are still well meaning clinicians living in the past who think MDI's are...
still transitional...still only for overdentures .
Well for them...dental IMPLANT TIME has passed them by!

It's been said the ONLY CONSTANT THING in life is CHANGE !
•Many ClinicalStudies from Around the World have been written on the partial & full arch fixed & removable applications over last 20 years to further validate this viable MDI option.
•ShatkinFirst lab in Buffalo ,for example , has fabricated over 500,000 MDI restorations and trained over 20,000 dentist nationally and internationally over the last 20 years .

The standard of care in dentistry:
Where did it come from? How has it evolved? Graskemper JP1.

CONCLUSIONS:
The standard of care CONTINUALLY EVOLVES with the advent of new materials, ne
procedures and new court rulings.
Before applying the standard of care, dentists should consider NEW available
treatments, as well as their state's current interpretation of the standard of care.
PRACTICE IMPLICATIONS:
The standard of care should be applied to all dentists when patients claim alleged
malpractice.
It should be tempered by CHANGESin the practice of dentistry, which dentists shoul
be aware of.

The Standard of Care and Evidence–Based Dentistry
Michael D. Weitzner, DMD, MS, vice president of clinical product development at United Healthcare Dental, has another way of explaining the standard of care and what it means to the practicing dentist.
"The standard of care is the scientifically vetted evidence to support the treatment rendered," he says..

. "Always put the interests of your patient first, be able to support treatment decisions with GOOD SCIENCE and SOUND JUDGEMENT, and document extremely well. If anything, we are being overloaded with information, some of which can be contradictory, and this may be leading to confusion.
Even within the evidence-based movement, there isn't universal agreement on the definition of what constitutes evidence or how it should be used. And sometimes when there is agreement, good quality evidence is not always available."

Advanced Prosthetic Options of MDI's

Conclusion

The Bottom Line is that the ZRH is, IMHO...
The Clear Alternative Choice to All on 4 by far!
It's a paradigm shift in the STANDARD of CARE whose time has come... whose future is bright.
Having personally restored many ZRH restorations...it is documented that The ZRH has stood the 'Test of Time' with thousands of satisfied doctors and patients.
As Albert Einstein once said:

"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 direction."

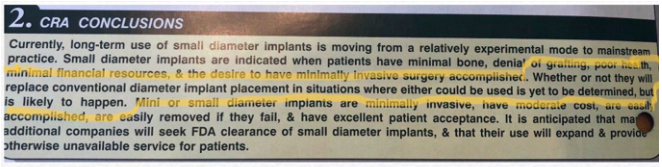
Less is More !
Yes...2019 is a Great Time to be an implant dentist with all the non-invasive advanced equipment,techniques and prosthetic procedures available...making Implantology more accessible and affordable for the patients we are fortunate to serve.
We are truly blessed!

So...Don't miss the boat...life is too short!
Take lots of implant CE...from the AAID,ICOI ,and especially at The ShatkinFirst new state of the art educational training center in Buffalo, NY.
Talk to lots of colleagues...it will truly keep the fire for implant dentistry burning for years to come. It's an exciting world out there!

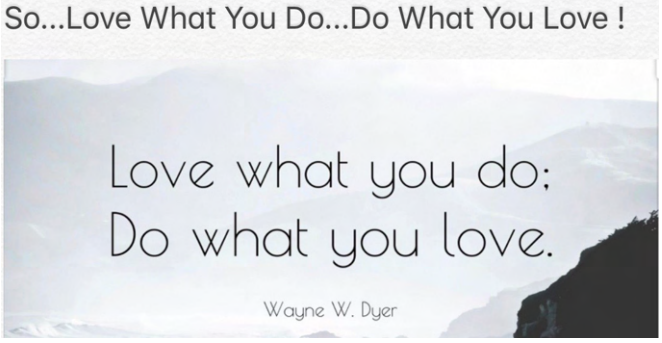
All this current standard of care is now available...featuring a more affordable, more efficient & minimally invasive state of the art approach to implant dentistry.
Such is the amazing ZRH solution as developed & taught at Shatkin-FIRST in Buffalo utilizing small/mini diameter implants for restoring the fully edentulous patient.
If you're not yet providing this game changing service for your patients...
'You're Missing the Boat' IMHO! What are you waiting for ?

As Dr. Christensen prophetically wrote in his Nov 2007 CRA Newsletter :

"Whether or not they (small diameter implants) will replace conventional diameter implant placement in situations where either can be used is yet to be determined , but is likely to happen."


2. CRA CONCLUSIONS

Currently, long-term use of small diameter implants is moving from a relatively experimental mode to mainstream practice. Small diameter implants are indicated when patients have minimal bone, denia[illegible] of grafting, poor health, minimal financial resources, & the desire to have minimally invasive surgery accomplished. Whether or not they will replace conventional diameter implant placement in situations where either could be used is yet to be determined, but is likely to happen. Mini or small diameter implants are minimally invasive, have moderate cost, are easily accomplished, are easily removed if they fail, & have excellent patient acceptance. It is anticipated that many additional companies will seek FDA clearance of small diameter implants, & that their use will expand & provide otherwise unavailable service for patients.



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Misi Si DDS, PhD1 | Yu Zhang DDS2
1Dept of Oral Implantology, Stomatology Hospital affiliated to the School of Medicine, Zhejiang University, Hangzhou, Zhejiang, China
2Dept of Prevention and Health protection, Hangzhou Dental Hospital, Hangzhou, Zhejiang, China
Clin Implant Dent Relat Res. 2019;21:454–461.

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Clin. Oral Impl. Res. 0,

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Volume 55, Issue 3 June 1995
- James D. Bader DDS, MPH
- Drs. Bader and Shugars are affiliated with the Department of Operative Dentistry, University of North Carolina

Journal of Public Health Dentistry
Center for Health Services Research, CB#7590, University of North Carolina, Chapel Hill NC 27599–7590.

13)New approach towards mini dental implants and small-diameter implants: an option for long-term prostheses 2012

"Implants with SMALL DIAMETERS
are one of the MAJOR ADVANCEMENTS in DENTAL HISTORY; they can be USED SUCCESSFULLY in a VARIETY of clinical situations." Gleiznys,Etal

Alvydas Gleiznys, Gediminas Skirbutis, Ali Harb, Ingrida Barzdziukaite, Ieva Grinyte
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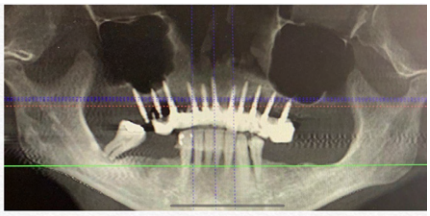
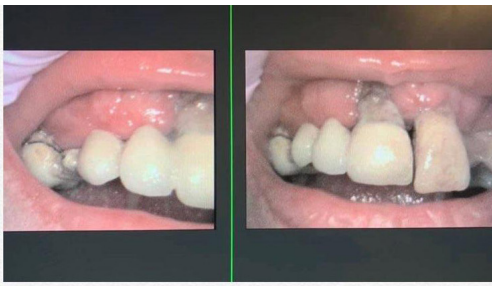
Clinical Cases Considerations During 4 Years Follow-Up 2016
Andrea Mascolo*
D.D.S, Master in Oral Surgery and Odontostomatological Urgency, Expert in Minimally Invasive Procedures, Italy
Research & Reviews: Journal of Dental SciencesThis VARIATION of OPINIONS is NOT unusual in that...
as Dr.Bader points in his 1995 article entitled: Variation in Dentists' Clinical Decisions

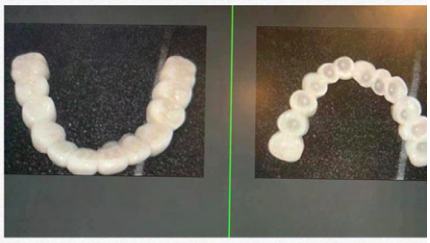
Contact: Email: drpetrosky@comcast.com
Cell: 609-338-7170 - Office: 609-296-1007

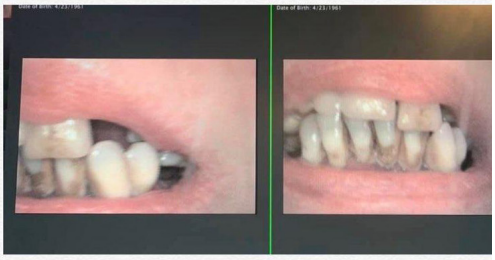
CASE STUDY #1 ZRH ON 12

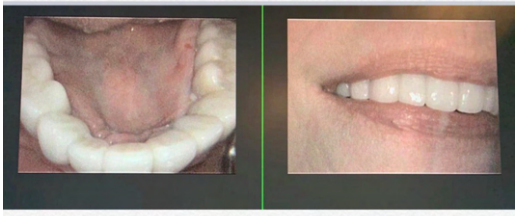
BY RONALD PAUL PETROSKY,DDS,MAGD,DICOI

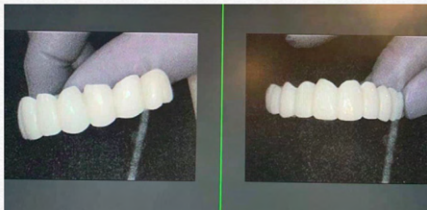


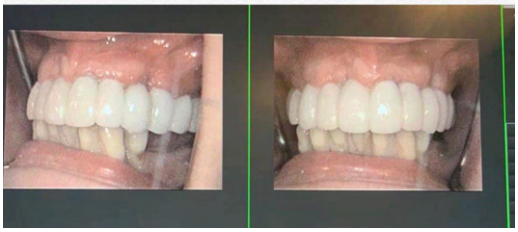


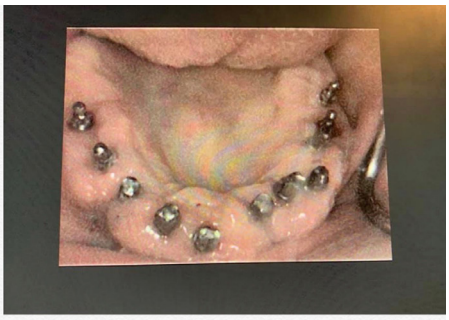


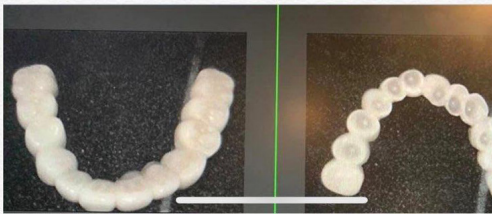


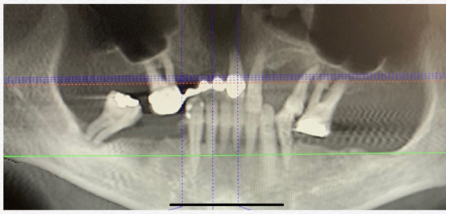






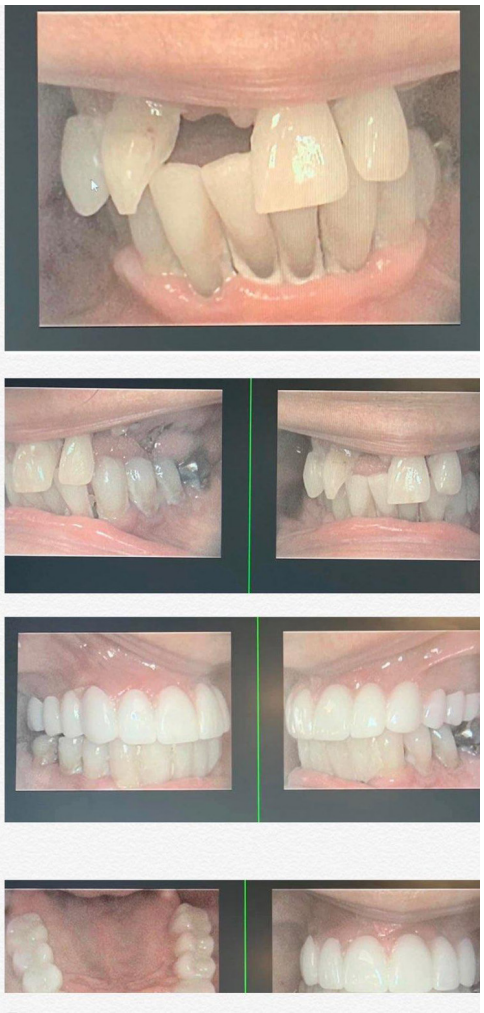


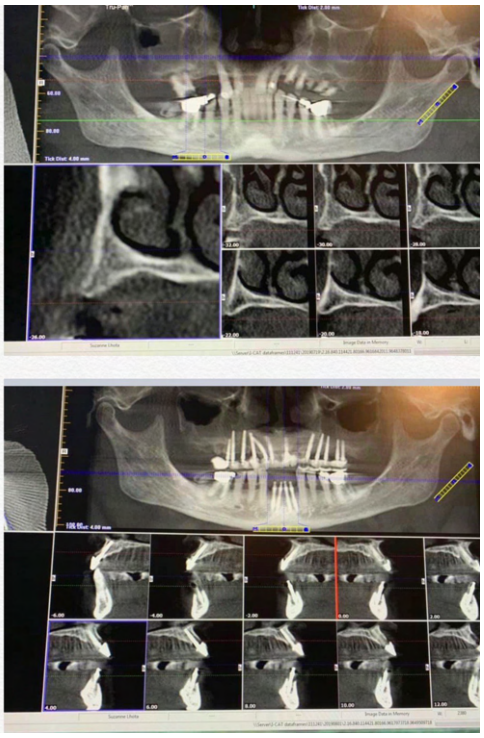


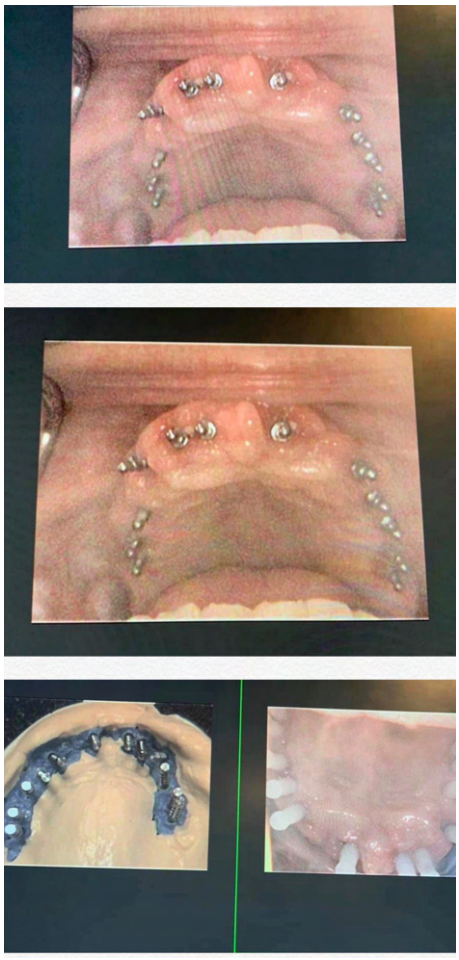


CASE STUDY #2 ZRH ON 12

BY RONALD PAUL PETROSKY,DDS,MAGD,DICOI







CASE STUDY #3 ZRH ON 12

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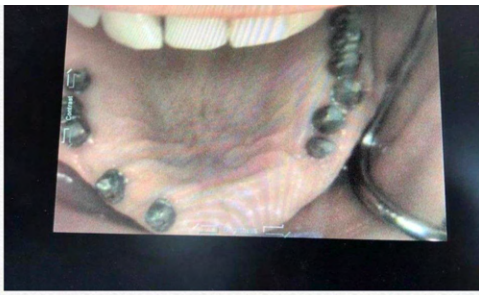

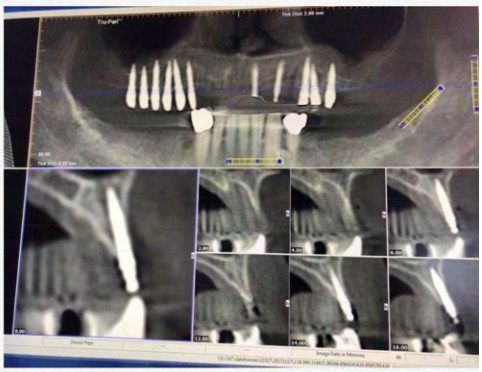

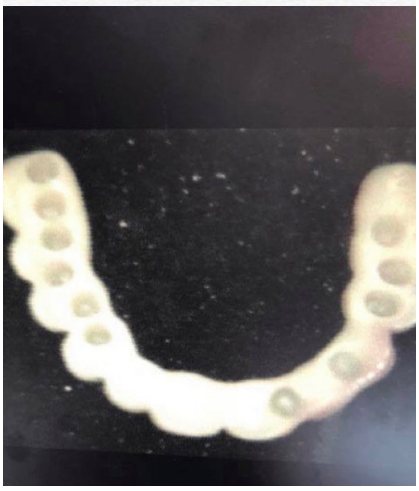

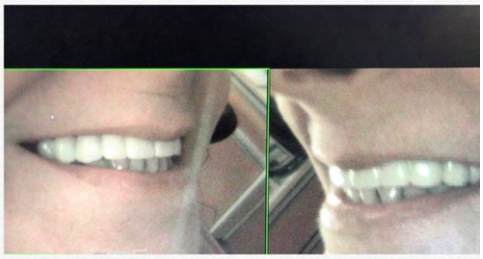

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CASE STUDY #5 ZRH ON 12

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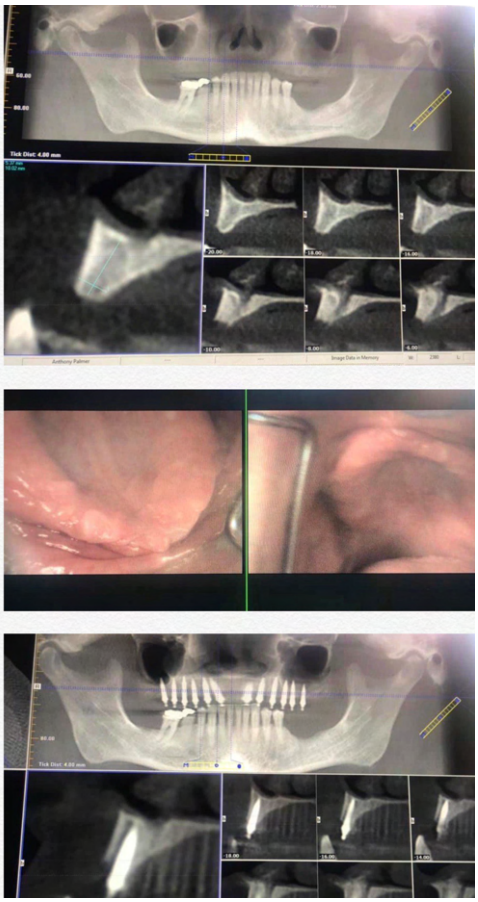

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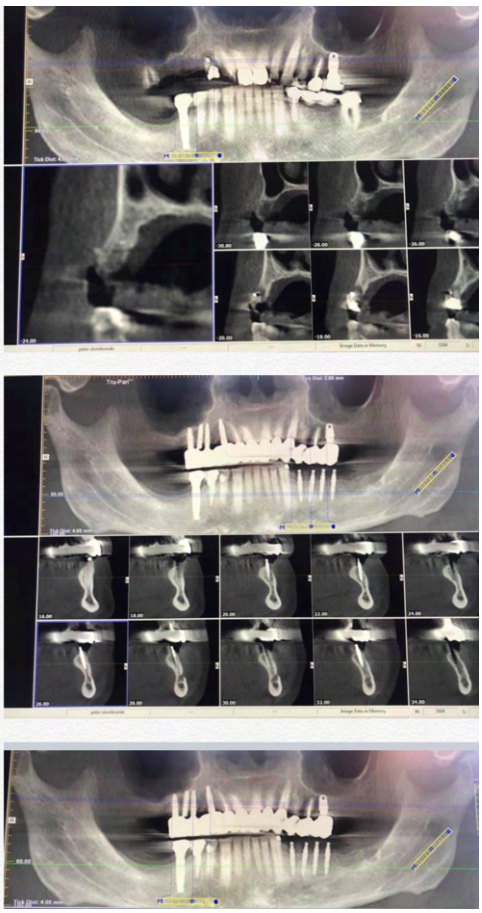

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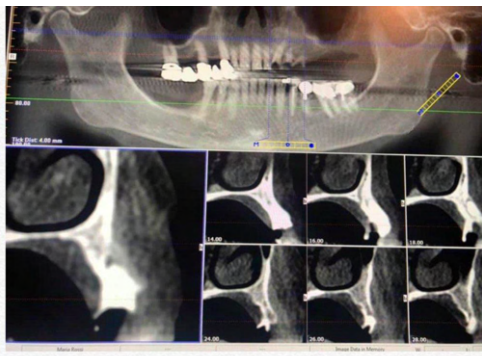

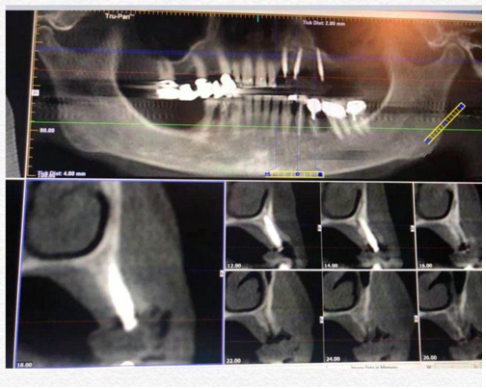

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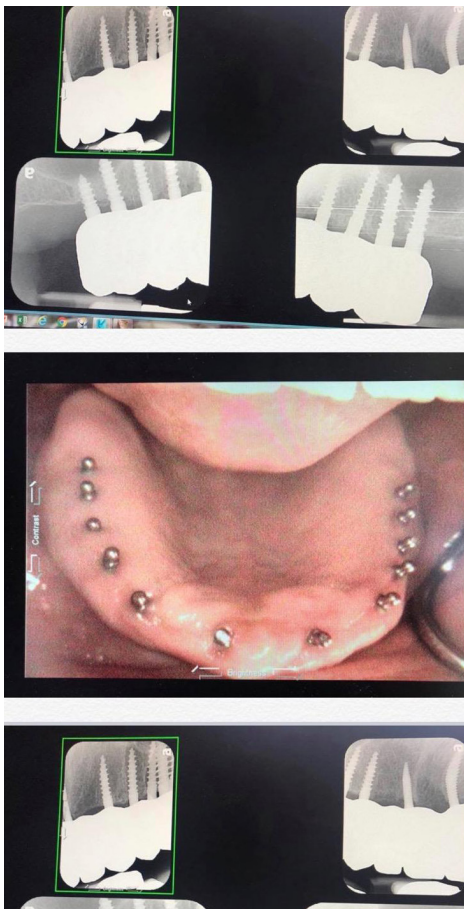

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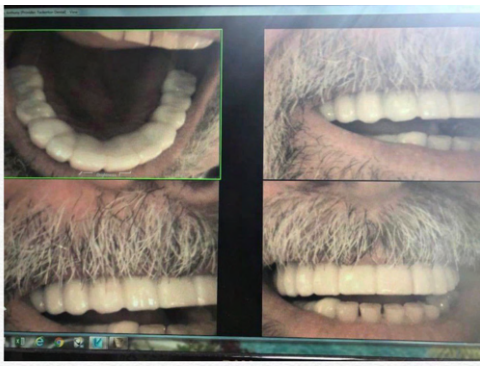

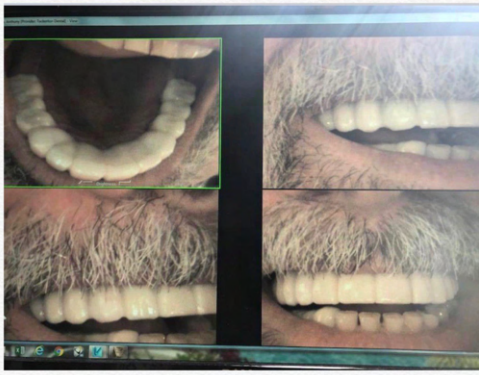

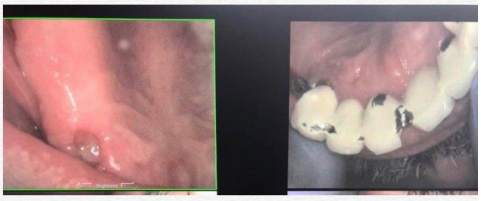

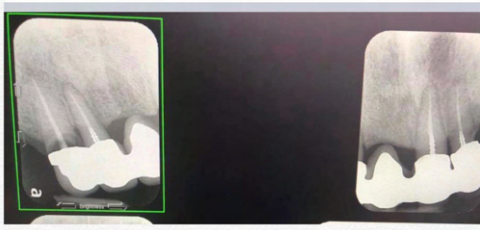

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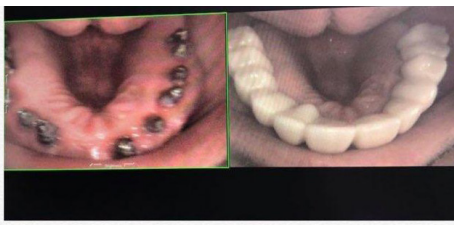

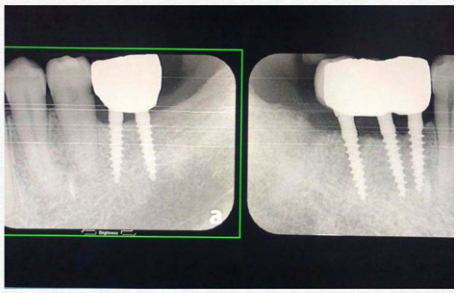

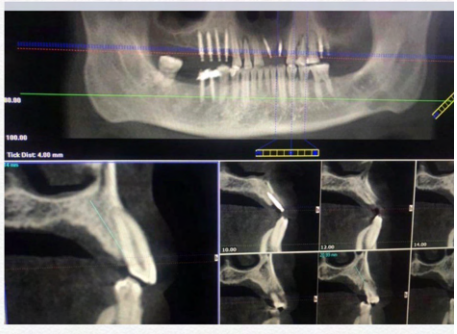

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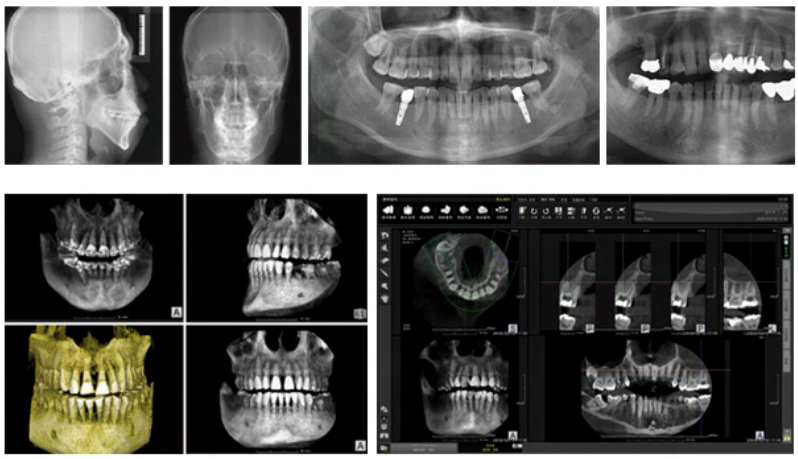

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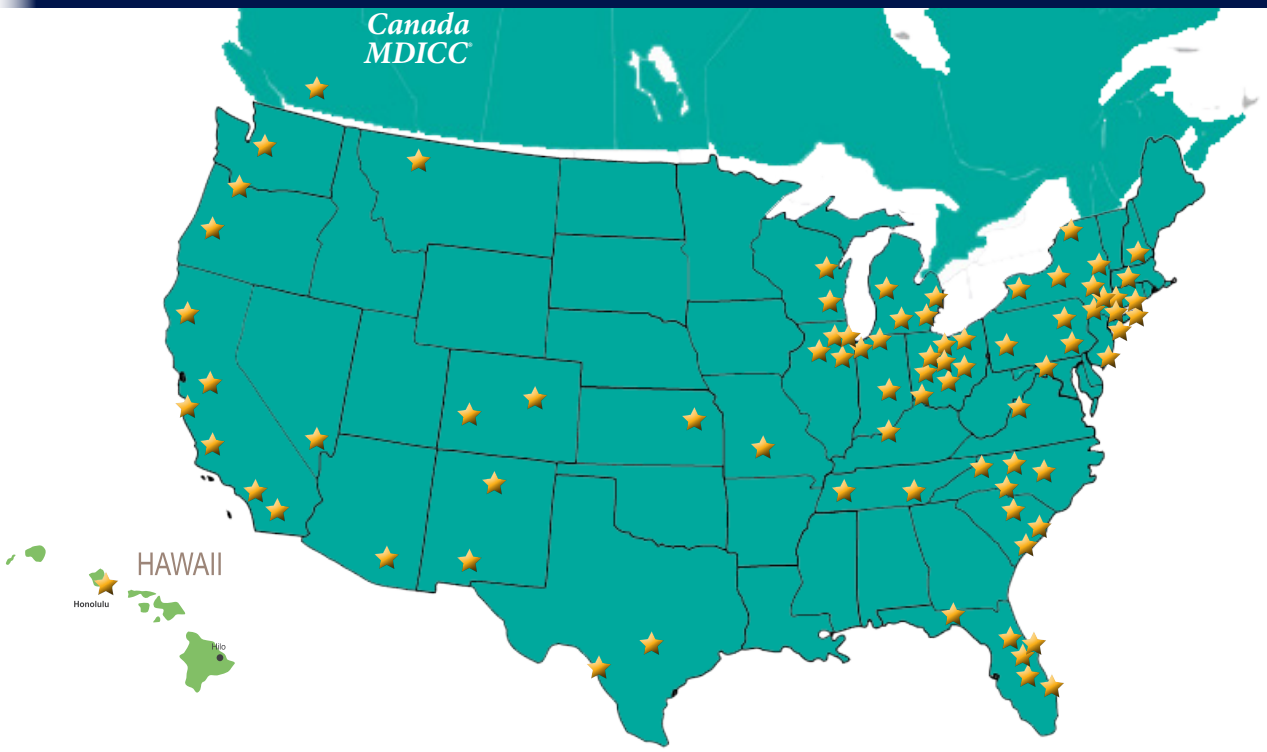

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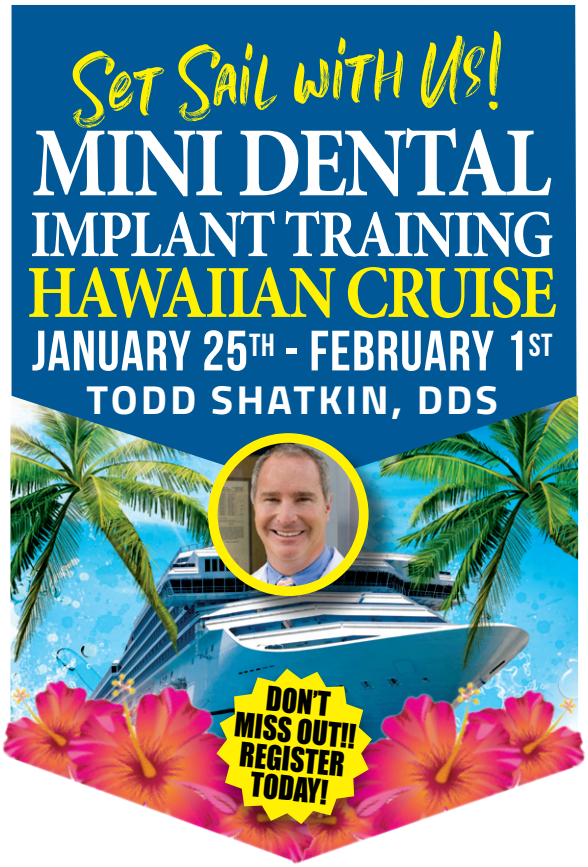

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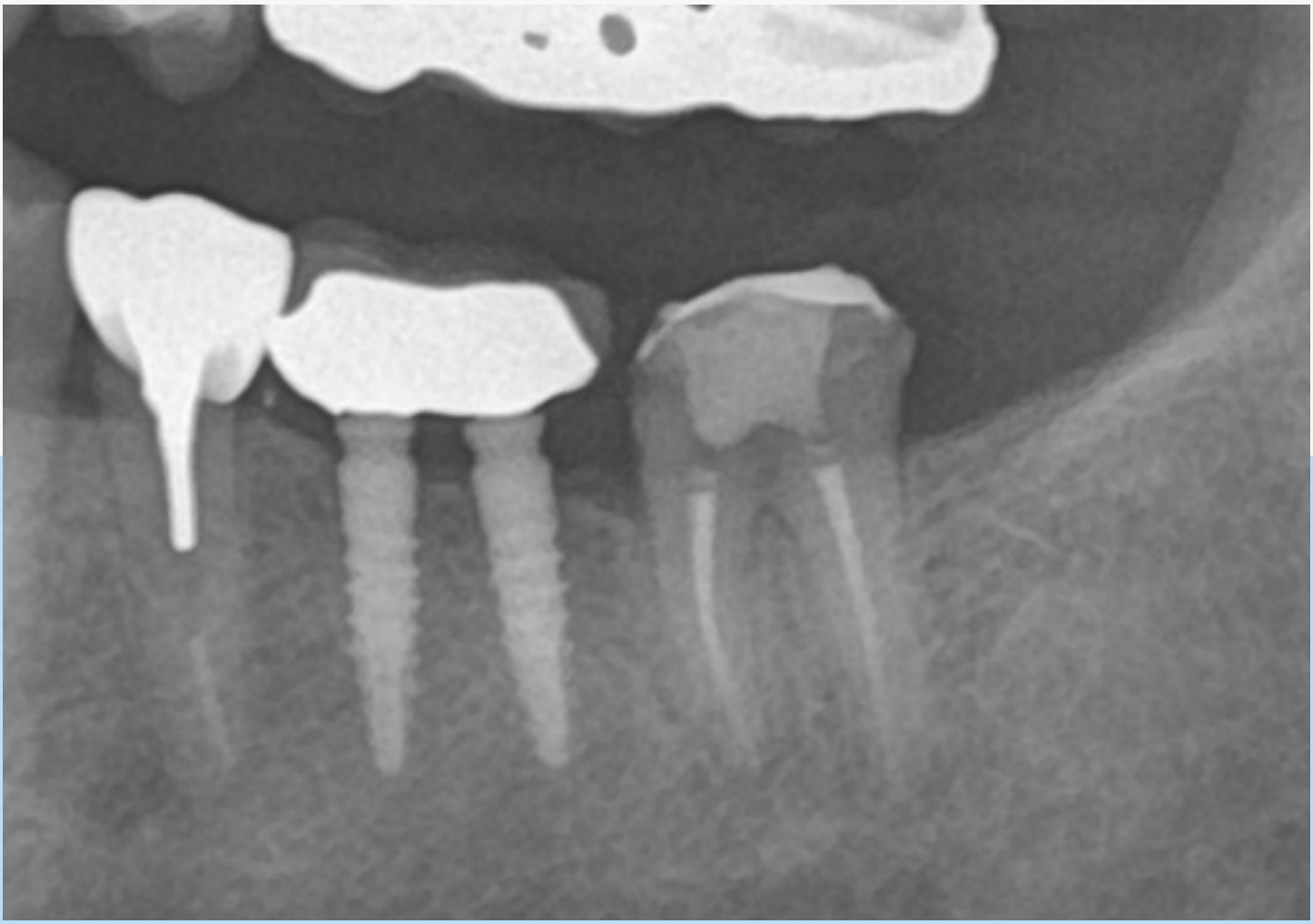
SPECIAL REPORT

Long Term Review of Multi Provider Placed Molar Crowns supported by 2 Mini Dental Implants

LONGEVITY STUDY



Recently, Dr. Todd Shatkin, our President Emeritus, asked if I would be willing to serve as Editor of The Journal of the International Academy of Mini Dental Implants. I am thrilled and honored to do so. My firm belief is that we need to shine the spotlight on our collective work for our entire Dental Profession to see. To that end, our Journal, Past and Present, will be available online for all!

This issue is a "Special Edition" to address the topic of Long term success of Molar Crowns supported by two Mini Implants. Probably nearly every Implantologist placing Mini Implants to support a missing Molar has been asked, "Why would you use two Mini Implants?" The immediate answer is, "Why Not?" Due to the speed, comfort, effectiveness and lesser cost patients who have previously had conventional implants and then had a Mini Implant Retained Molar Crown ask, "Why would anyone have the Conventional Implant?" Perhaps the greatest benefits are to the patients who were previously untreatable due too little bone in height or width anatomically, or now able to afford the much lower cost of a Mini Implant Retained Crown without the need for extensive, costly, pre-placement bone grafting. Many of our Dental Colleagues are totally unaware of the Concept, Modality,

Versatility, Benefits and Success of this procedure. So guided by The Scientific Method, in the requirement of repeatable results obtained by different observers, this article is an introduction to the technique and a Multiple Provider, Multiple Location review

of Long Term treatment results with Multiple Variations. Long term successes are demonstrated by 4 providers, 16 cases in total.

We welcome your case studies, comments and input for our upcoming Online Newsletter in the Spring and our Annual Journal Issue.

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LONG TERM REVIEW OF MULTI PROVIDER PLACED MOLAR CROWNS SUPPORTED BY 2 SMALL DIAMETER IMPLANTS

ALAN F ROBINSON, DDS, MAGD, DICOI, DIAMDI, FADI

Mini Implants or Small Diameter Implants are defined as Endosseous Implants less than 3 millimeters in diameter, usually of solid 1-piece titanium alloy (*1) construction; Implant and Abutment within a Single Machined Device. They were originally developed in France in 1966. In the 1970s, several US East Coast Doctors (among them Dr Charles English and Dr Victor Sendax, author of the text "Mini Dental Implants - Principles and Practice" Mosley/Elsevier) worked with Mini Implants to develop techniques to stabilize dentures after seeing unexpected bony integration when used as provisional anchors for temporary prostheses worn while Conventional Implants were healing after Surgical placement. They also examined to a lesser degree fixed Mini Implant Retained Crowns. Their work showed the Mini Implants had a stable long-term prognosis and were then used primarily as long-term Denture stabilization anchors. Around that time FDA approval was sought and granted for Mini Dental Implants for temporary and long-term use for fixed and removable prostheses. More recently, multiple studies have shown overall long term success rates for Small Diameter Implants to be comparable to Conventional Implant success rates (*4)(*5).

In 1999, Drs. Sam and Todd Shatkin, a Father/Son Oral Maxillofacial/Plastic/General Surgeon and General Dentist team began their work with Mini Dental Implants and brought much of the expansion of Mini Dental Implant Supported Crown and Bridge into being as well as refining Denture Stabilization techniques. Dr. Sam Shatkin used his Oral Surgery experience to design and guide placement positions and protocols and Dr. Todd Shatkin brought his Crown and Bridge experience to the technique to expand the range of cases in which Mini Dental Implants could be used. In 2003, after many successes with single rooted Crowns Supported by a Single Mini Implant, they placed their first Molar Crown Supported by 2 Mini Implants, guided in design by the normal Anatomy of the Molar being replaced. Since that time, thousands of Molars have been successfully restored on 2 Mini Dental Implants by Doctors around the globe (*2)(*6)(*7).

The placement of Small or Mini Dental Implants has grown exponentially in the last several decades, being used in Denture Stabilization, Denture Elimination via Hybrid Dentures, Single and Multiple Tooth Replacement Crown and Bridge, and Immediate Load and Function Temporary Crowns leading to Permanent Crowns within 12 weeks of time of Extraction. The placement involves a small pilot hole (usually 1.2mm) Partial depth of the implant length and the Implant advances into unpiloted bone for greater initial stability. (*3) These procedures are commonplace to those skilled in the techniques, but there seems to be an absolute rejection of even the concept of Molar replacement borne by 2 Mini Implants by some in Dentistry, despite their complete unfamiliarity with the technique or actual results.

The treatment planning concept in Mini Dental Implant supported Crown and Bridge is to mimic normal anatomical patterns; that is an implant supporting each missing root in the area being replaced. Therefore, when replacing for example, a Central and Lateral Incisor, 2 Implants are placed in as near to ideal position as is possible. The concerns about black triangles and space limitations in Conventional Implant placement do not apply in the same manner due to ability to place the implants within an acceptable "zone" and still have an excellent prosthetic result due to their small size and adaptability owing to the "u joint" like ball and square abutment. Similarly, in the case of Molar Crowns, 2 Mini Implants are used due to the greater width of the Molar crown and to mimic the root anatomy of the tooth being replaced. The Crown is designed with tissue surface contour resembling a typical crown and bridge pontic with conical depressions where the O-ball and square abutment is cemented into the crown. This design allows an intimate approximation of the edentulous tissue by the crown which is both esthetic and functional.

Home care is accomplished by brushing and flossing in a usual manner and using an oral irrigation device (Waterpik) to cleanse the proximal and tissue surfaces. Observed success rates in Mini Implant Crowns parallel Conventional Implant Crown success rates, even in the environment of Mini Implant Supported Crowns being placed at times in areas where it would be anatomically impossible due to too little height and or width of bone to place a Conventional Implant; in essence, a more severe application, so not really an "apples to apples" comparison. Yet, still comparable success rates are observed.

In cases of failure of the Integration of the Mini Implant, often just Immediately repositioning a replacement Implant to another area within the acceptable "zone" will correct the problem. If that strategy is not possible, allowing the area to heal on its own for 3-6 months and then replacing is nearly always successful. Even in the event of a problem, a straightforward solution is applied and usually successful. Contrast to the extensive grafting required almost universally should a Conventional Implant integration fail. Multiple Clinical examples of long term follow up of completed Mini Implant Supported Molar Crowns performed by 7 different Practitioners across the United States are presented following.

References
(*1) McCracken M: Dental Implant Materials: Commercially Pure Titanium and Titanium Alloys, J Prosthodontics 8:40, 1999.
(*2) Balkin BE, Diaz JH, Yang J, Rams TE: Mini Dental
Implants in human long term fixed prosthetic function, J Dent Res 84 (Special Issue A):
2081, 2005. [Abstract]
(*3) Balkin BE, Steflik DE Navel F: Mini Dental Implant Insertion with the Auto -Advance Technique for Ongoing Applications, J Oral Implantol 27:32, 2001
(*4) Jackson, Brian J: Small Diameter Implants: A 7-Year Retrospective Study, J Oral Implantology 43.02, 2017
(*5) Shatkin, Todd E., Petrotto, Christopher A: Mini Dental Implants; A Retrospective Analysis of 5640 Implants Placed Over a 12-Year Period, Compendium 33:03, 2012.
(*6) Jackson, Brian J: Small Diameter Implants: Specific Indications and Considerations for the Posterior Mandible: A Case Report. J Oral Implantology Vol 37, 2011
(*7) Mazor, Ziv, Lorean, Adi, et al: Replacement of a Molar with 2 Narrow Diameter Implants, Implant Dentistry, 21:01, 2012.

FUNCTIONAL FULL MOUTH RESTORATION UTILIZING MINIMALLY INVASIVE IMPLANTOLOGY INCLUDING SINUS BUMP UTILIZING PRF

ALAN F. ROBINSON DDS, MAGD, DICOI, FADI - SOUTHEASTERN MICHIGAN MDICA

VP, a 61-year-old Male Automotive Engineer, presented for an Implant Consultation

regarding replacement of multiple missing posterior teeth "so I can chew." Present are 6-12, 18-28 (19 pontic). #7 had an RCT and metallic post but the crown was lost and appeared restorable. Periodontal conditions were adequate.

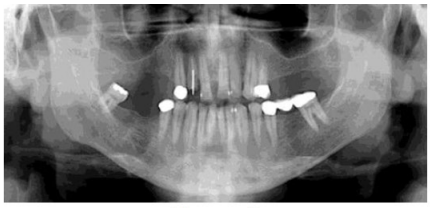


Figure 1

Figure 2

Figure 3

Figure 4

Our treatment plan was to replace the missing #7 crown with an aesthetic zirconium crown with a subgingival preparation of approximately 2mm. Teeth # 4, 5, 13, 29 and 30 were to be replaced with Mini Implant Supported Crowns. Implants in #3 and #14 positions were replaced with Conventional Implants due to less than adequate height of bone below the sinus to place Mini Implants. Both were Sinus Bumped utilizing the patient's own Platelet Rich Fibrin (PRF). #14 was 5.7 x 8 mm Zimmer clone, #3 was a 4.2 x 8 mm Zimmer clone. 6 months healing time was observed. (Figures 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19)

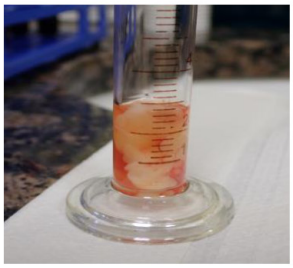


Figure 5

Figure 6

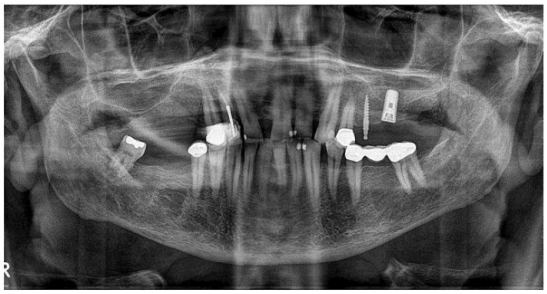


Figure 7

Figure 8

Figure 9

Figure 10

Figure 11

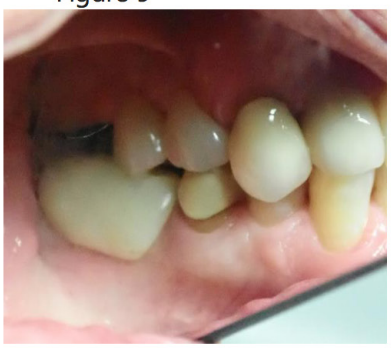


Figure 12

Figure 13

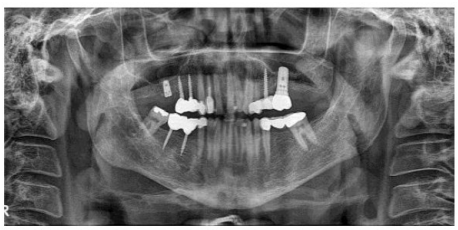


Figure 14

Figure 15

Figure 16

Figure 17

Figure 18

Figure 19

An aesthetic, highly functional result was obtained. (Figures 20, 21, 22)

Figure 20

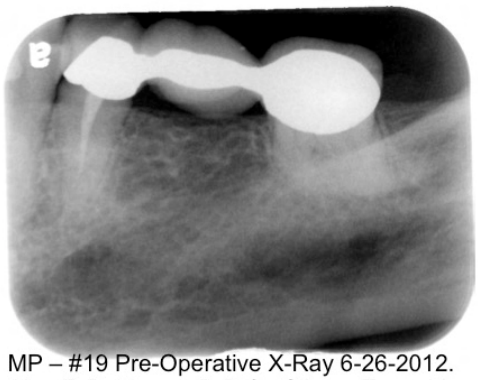
Figure 21

Figure 22

In critique, both Conventional Implants could have been placed slightly deeper in bone and better gingival esthetics would have resulted. Also, it is now my protocol to use the larger diameter Conventional in all Sinus Bump cases.

CASE #1

ALAN F. ROBINSON, DDS, MAGD, DICOI, DIAMDI, FADI

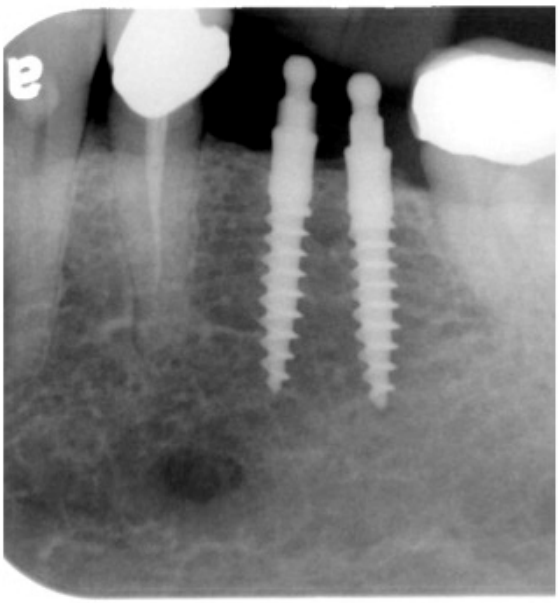


MP – #19 Pre-Operative X-Ray 6-26-2012. Alan F. Robinson, D.D.S., Clinton Township, Mich.

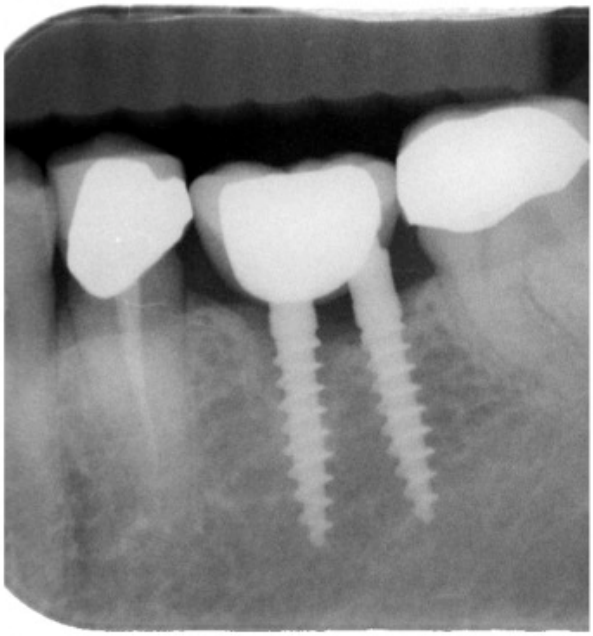
MP – #19 Pre-Operative Panorex 10-3-2012. Alan F. Robinson, D.D.S., Clinton Township, Mich.

MP – #19 Pre-Operative Intraoral Photo 11-09-2012. Alan F. Robinson, D.D.S., Clinton Township, Mich.

MP – #19 Post-Operative Intraoral Photos 12-03-2012. Alan F. Robinson, D.D.S., Clinton Township, Mich.



MP – #19 Post-Operative X-Ray 12-03-2012. Alan F. Robinson, D.D.S., Clinton Township, Mich.



MP – #19 X-Ray 10-28-2014. Alan F. Robinson, D.D.S., Clinton Township, Mich.

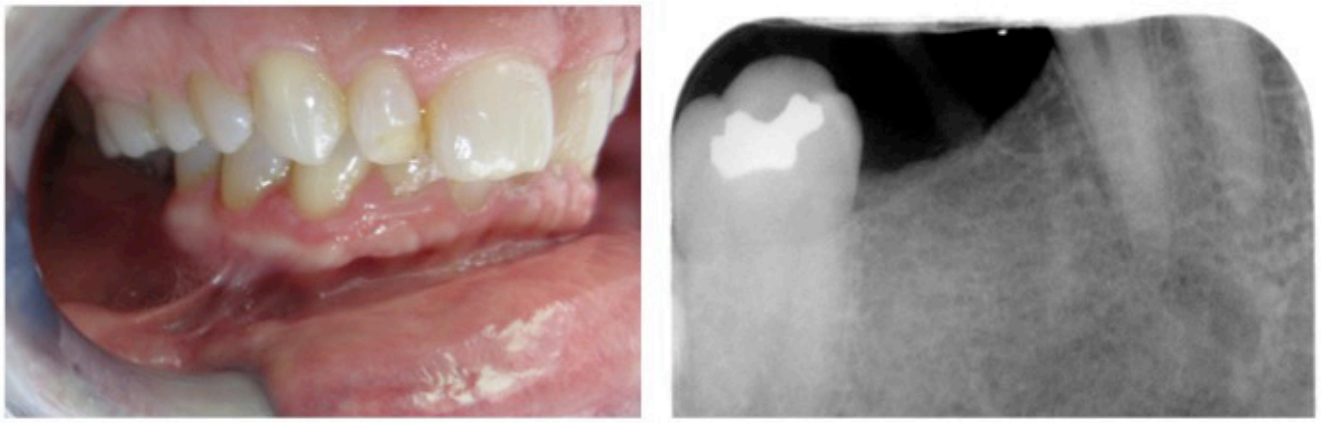
MP – #19 Intraoral Photos 3-6-2015. Alan F. Robinson, D.D.S., Clinton Township, Mich.

MP – #19 X-Ray 12-11-2018. Alan F. Robinson, D.D.S., Clinton Township, Mich.

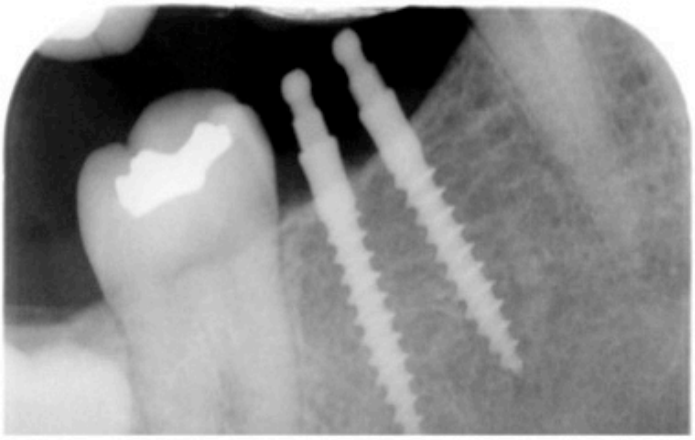
CASE #2

ALAN F. ROBINSON, DDS, MAGD, DICOI, DIAMDI, FADI

SD – #30 Pre-Operative Intraoral X-Ray 7-17-2012. Alan F. Robinson, D.D.S., Clinton Township, Mich.

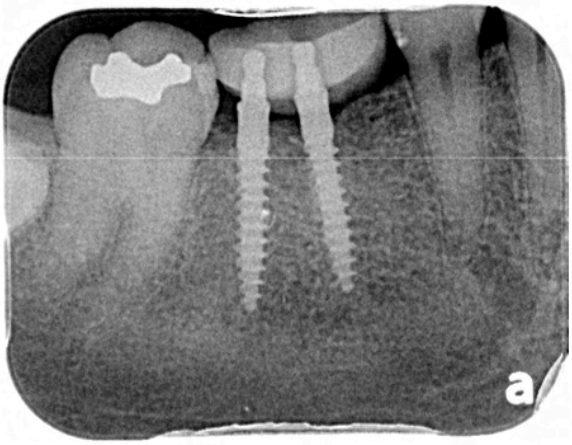


SD – #30 Pre-Operative Intraoral Photo & X-Ray 10-7-2012. Alan F. Robinson, D.D.S., Clinton Township, Mich.



SD – #30 Post-Operative Intraoral Photo & X-Ray 08-01-2012. Alan F. Robinson, D.D.S., Clinton Township, Mich.

SD – #30 Intraoral Photo & X-Ray 01-30-2017. Alan F. Robinson, D.D.S., Clinton Township, Mich.



SD – #30 Intraoral X-Ray 11-20-2015. Alan F. Robinson, D.D.S., Clinton Township, Mich.

CASE #3

ALAN F. ROBINSON, DDS, MAGD, DICOI, DIAMDI, FADI

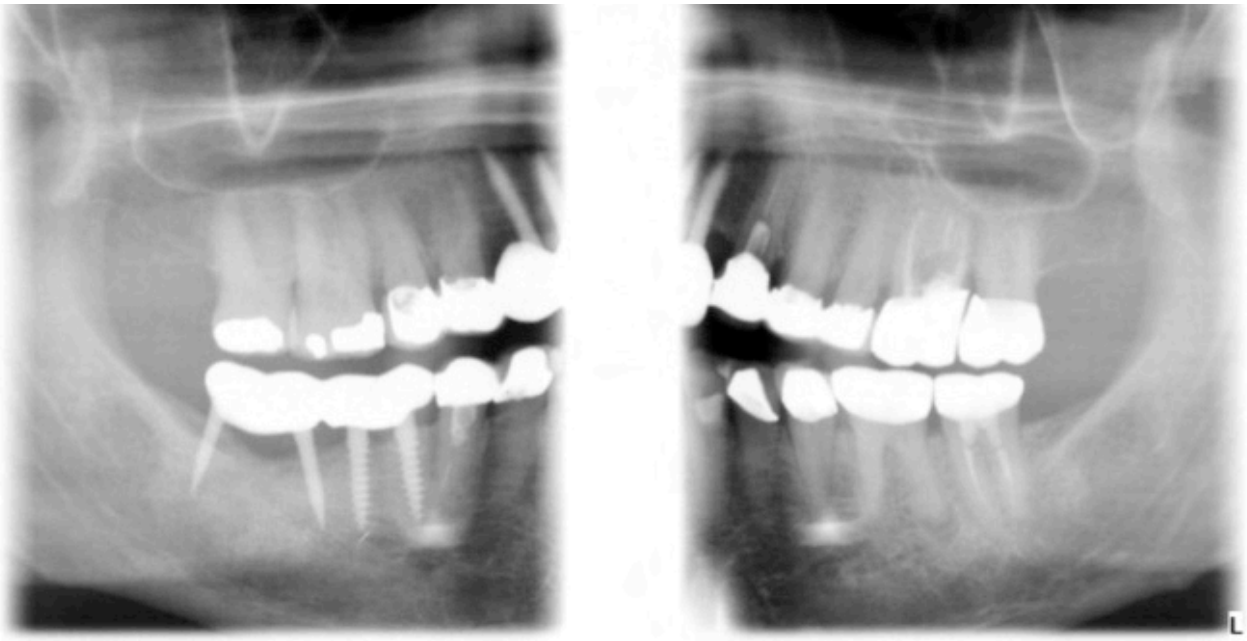
LH- #30, #31 Pre-Operative Intraoral Photos 03-20-2013. Alan F. Robinson, D.D.S., Clinton Township, Mich.

LH- #30, #31 Post-Operative Intraoral Photos 04-15-2013. Alan F. Robinson, D.D.S., Clinton Township, Mich.

LH- #30, #31 Post-Operative Intraoral Photos
05-08-2013. Alan F. Robinson, D.D.S., Clinton
Township, Mich.

LH – #30, #31 Panorex 7-22-2016. Alan F. Robinson, D.D.S., Clinton Township, Mich.

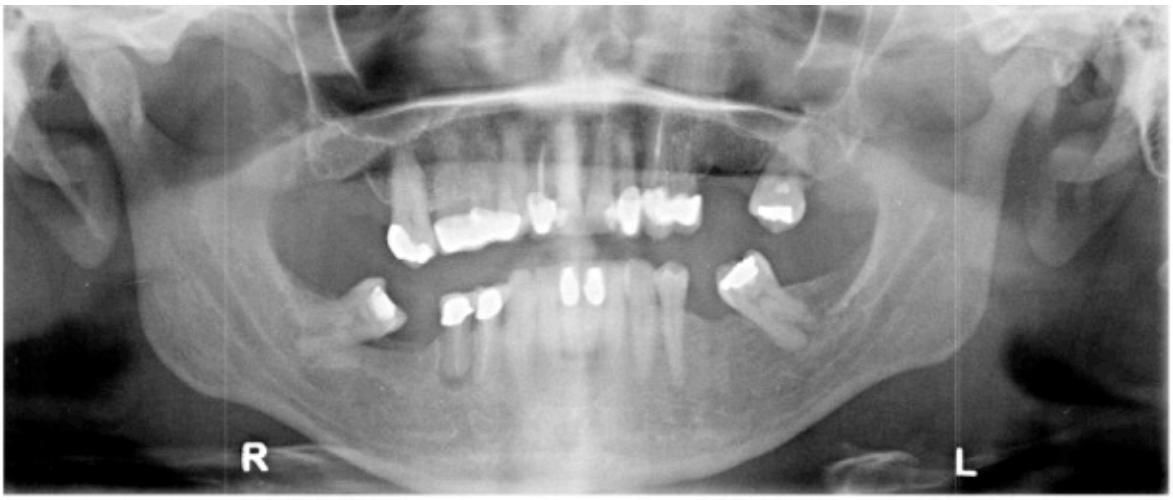
LH – #30, #31 Intraoral Photos 05-10-2017. Alan F. Robinson, D.D.S., Clinton Township, Mich.



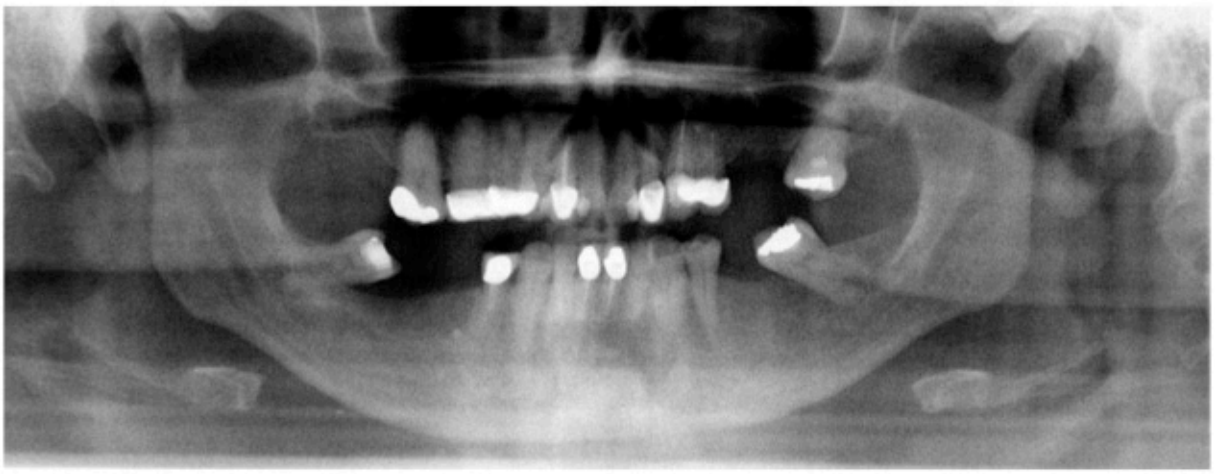
LH – #30, #31 BWX 11-15-18. Alan F. Robinson, D.D.S., Clinton Township, Mich.

CASE #4

ALAN F. ROBINSON DDS, MAGD, DICOI, DIAMDI, FADI

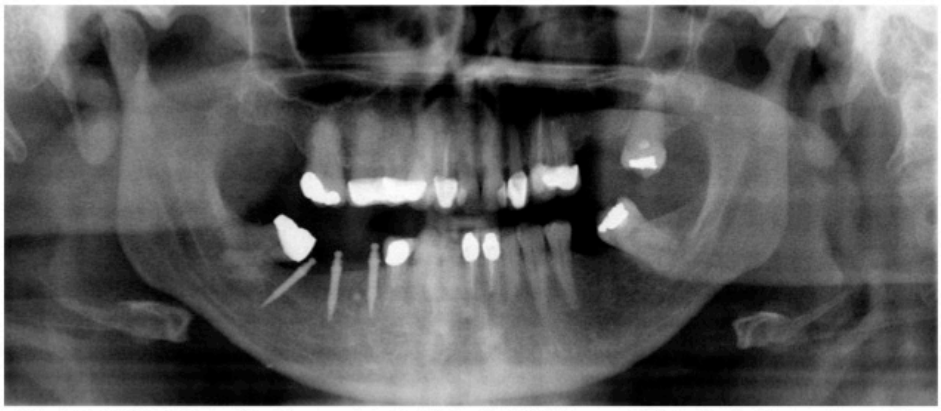


VK – #29, #30 Pre Operative Panorex 01-25-2012. Alan F. Robinson, D.D.S., Clinton Township, Mich.



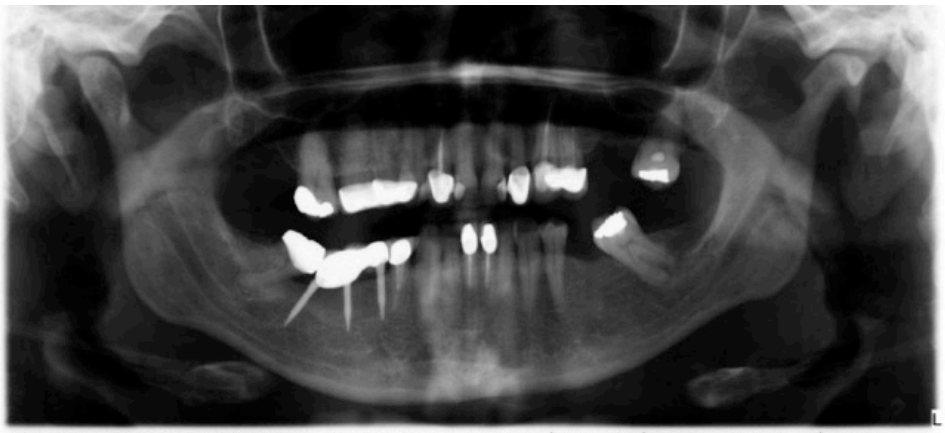
VK – #29, #30 Pre Operative Panorex 10-15-2013. Alan F. Robinson, D.D.S., Clinton Township, Mich.

VK – #29, #30 Pre Operative Intraoral Photos 10-15-2013. Alan F. Robinson, D.D.S., Clinton Township, Mich.



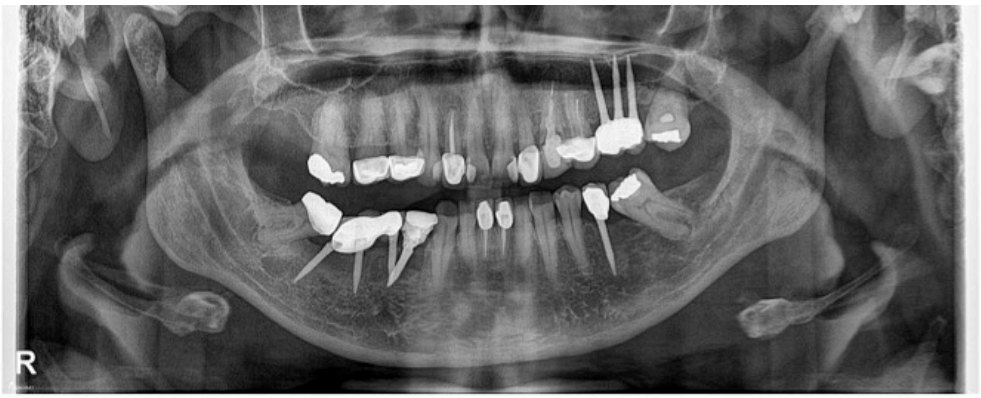
VK – #29, #30 Post Operative Panorex 11-11-2013. Alan F. Robinson, D.D.S., Clinton Township, Mich.

VK – #29, #30 Post Operative Intraoral Photos 12-03-2013. Alan F. Robinson, D.D.S., Clinton Township, Mich.



VK – #29, #30 Post Operative Panorex 9-9-2014. Alan F. Robinson, D.D.S., Clinton Township, Mich.

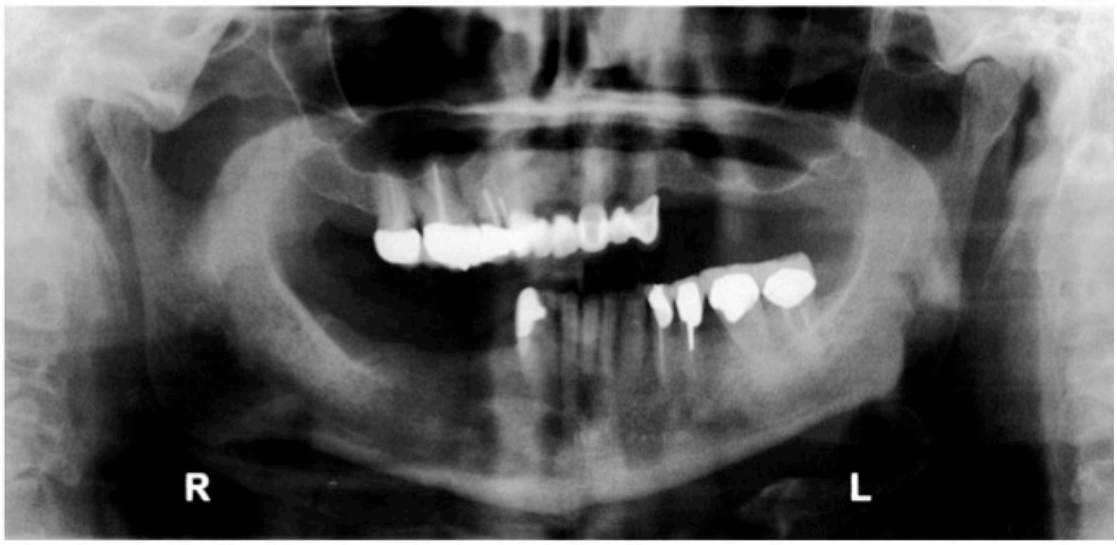
VK – #29, #30 Intraoral Photos 10-29-2018. Alan F. Robinson, D.D.S., Clinton Township, Mich.



VK – Panorex 1-14-19. Alan F. Robinson, D.D.S., Clinton Township, Mich.

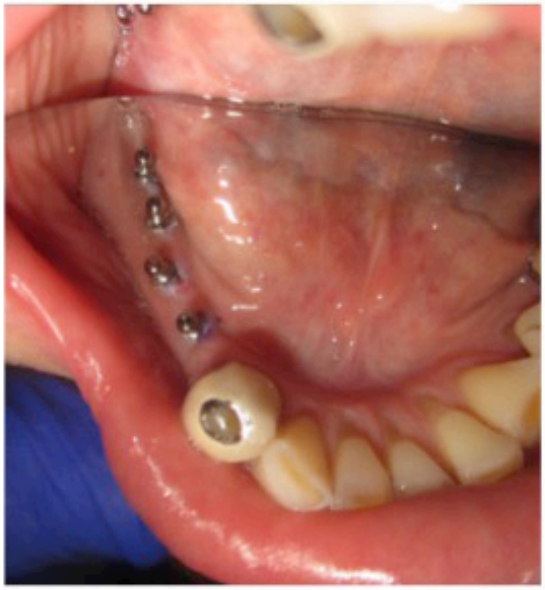
CASE #5

ALAN F. ROBINSON DDS, MAGD, DICOI, DIAMDI, FADI



JL – #28, #29, #30 Pre-Operative Panorex 3-11-2013. Alan F. Robinson, D.D.S., Clinton Township, Mich.

JL – #28, #29, #30 Pre-Operative Intraoral Photos 3-11-2013. Alan F. Robinson, D.D.S., Clinton Township, Mich.



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JL – #28, #29, #30 Post-Operative Intraoral Photos 05-01-2013. Alan F. Robinson, D.D.S., Clinton Township, Mich.

JL – #28, #29, #30 Intraoral Photos - 09-26-2017. Alan F. Robinson, D.D.S., Clinton Township, Mich.

JL – #28, #29, #30 Panorex -5-3-18. Alan F. Robinson, D.D.S., Clinton Township, Mich

RANDY STAPLES, DDS
PRESIDENT INTERNATIONAL ACADEMY OF MINI DENTAL IMPLANTS

CASE #1 L.W.
LOWER RIGHT PREMOLAR & MOLAR #'s 29 & 30

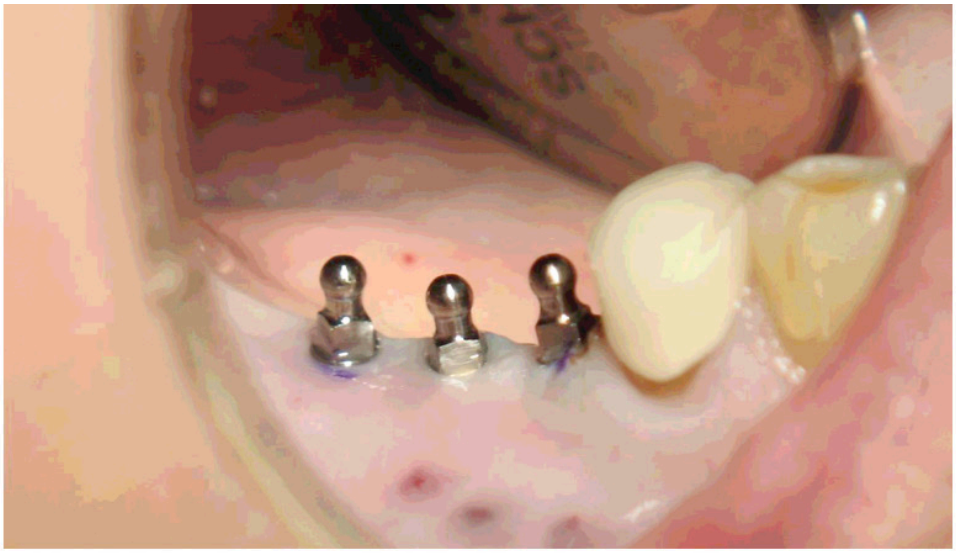
JACKSON, TN
Mini Dental Implant Centers of America

LW - #'s 29, 30 Pre-Op Panoral X-Ray 11-30-2010.
Randy Staples, DDS, Jackson, TN

LW- #'s 29, 30 Pre-Op Photo 11-28-2011
Randy Staples, DDS, Jackson TN

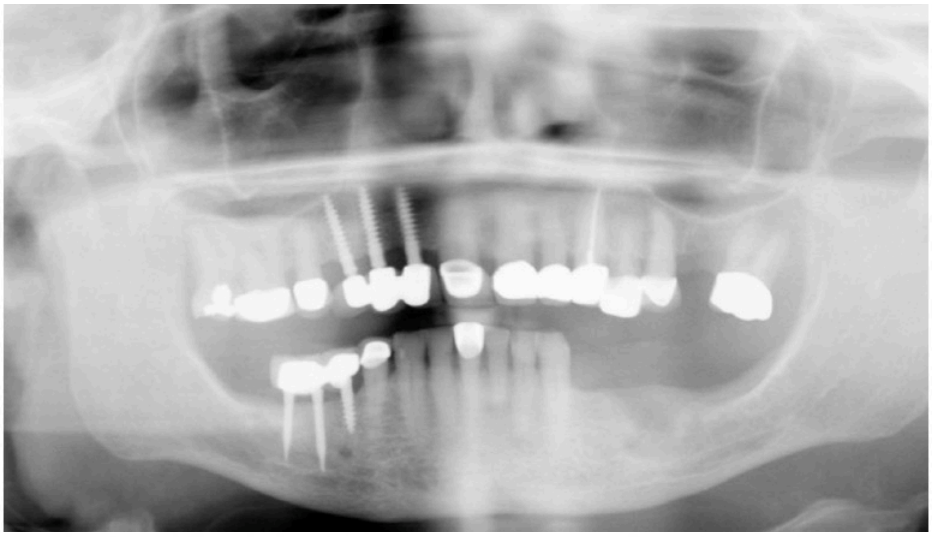
LW- #-s 29, 30 Post-Op Panoral X-Ray
11-29-2011

Randy Staples, DDS, Jackson, TN



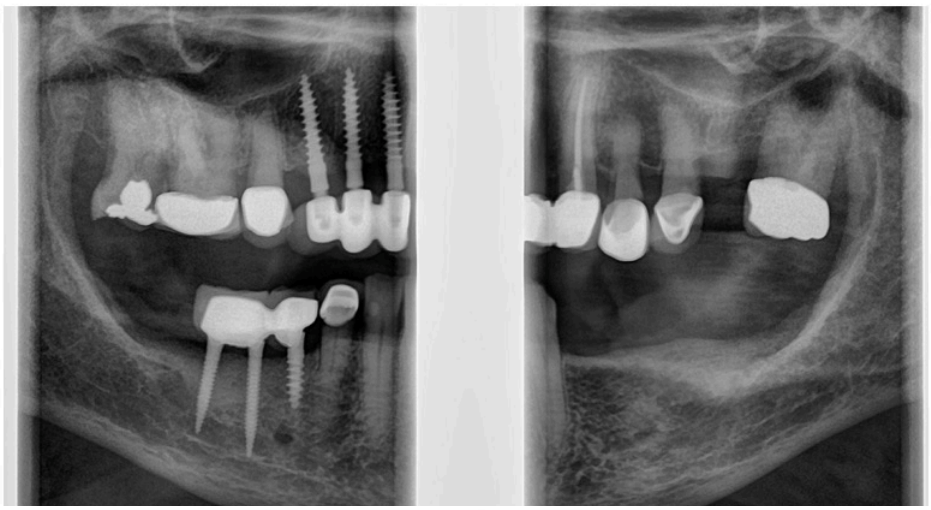
LW- #'s 29, 30 Post- Op Photo 11-29-2011

Randy Staples, DDS, Jackson, TN



LW - Recall Panoral X-Ray 12-09-2013

Randy Staples, DDS, Jackson, TN



LW - Recall Vertical BW X-Rays 03-05-2018

Randy Staples, DDS, Jackson, TN

RANDY STAPLES, DDS
PRESIDENT INTERNATIONAL ACADEMY OF MINI DENTAL IMPLANTS
CASE #2 M.H.
1st Molars #'s 19, 14, 3, 30

JACKSON, TN Mini Dental Implant Centers of America

MH- #19 Pre-OP Panoral X-Ray 03-07-2011
Randy Staples, DDS, Jackson, TN

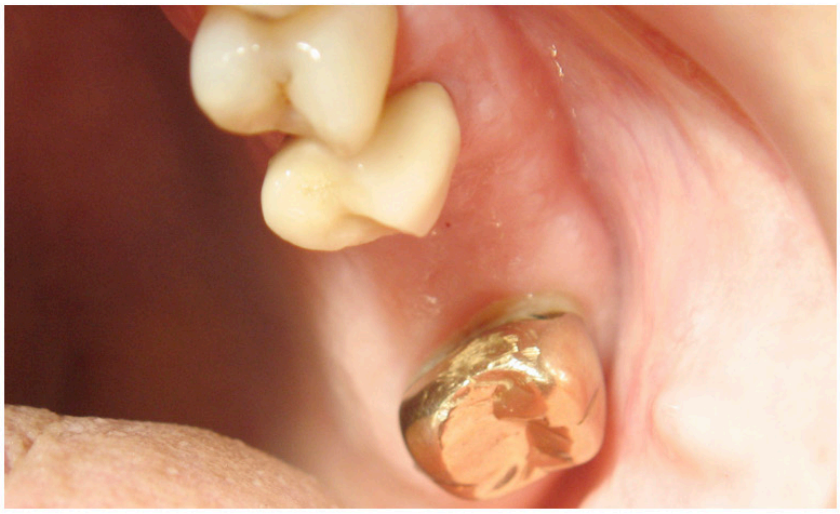
MH- #19 Pre-Op Photo 04-11-2011
Randy Staples, DDS, Jackson, TN

MH- #19 Post-Op Panoral X-Ray 04-11-2011

Randy Staples, DDS, Jackson, TN

MH- #14 Pre-Op Panoral X-Ray 07-16-12

Randy Staples, DDS, Jackson, TN



MH- #14 Pre-Op Photo 07-16-12

Randy Staples,DDS, Jackson, TN

MH- #14 Post-Op Panoral X-Ray 07-16-2012

Randy Staples, DDS, Jackson, TN

MH- #14 Post-Op Photo 07-16-2012

Randy Staples, DDS, Jackson, TN

MH- #3 Pre-Op Panoral X-Ray 09-24-2014

Randy Staples, DDS, Jackson, TN

MH- #3 Pre-Op Photo 10-21-2014

Randy Staples, DDS, Jackson, TN

MH- #3 Post-Op Photo 10-21-2014

Randy Staples, DDS, Jackson, TN

MH- #30 Pre-Op Panoral X-ray 10-11-2016

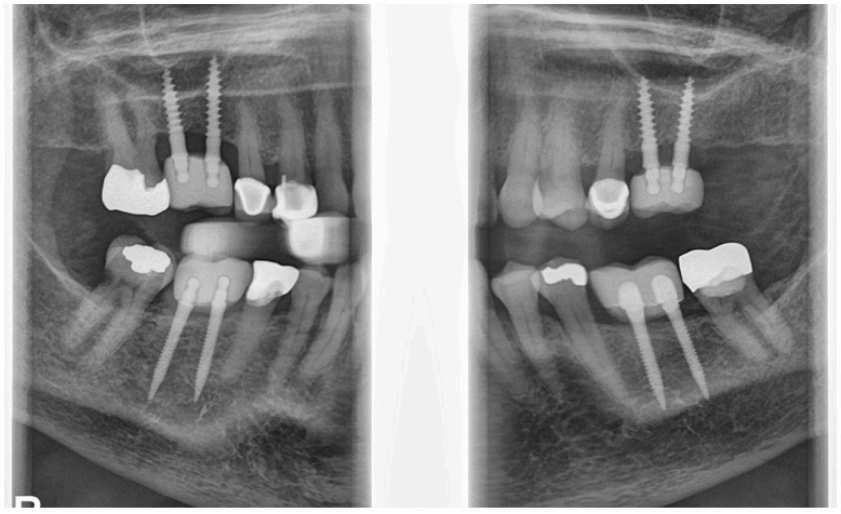
Randy Staples, DDS, Jackson, TN

MH- #30 Pre=Op Photo 02-07-2017

Randy Staples, DDS, Jackson, TN

MH- #30 Post-Op Panoral X-Ray 02-07-2017

Randy Staples, DDS, Jackson, TN



MH- Recall Vertical BW X-Rays 02-27-2018
#'s 19, 14, 3, 30

Randy Staples, DDS, Jackson, TN

RANDY STAPLES, DDS
PRESIDENT INTERNATIONAL ACADEMY OF MINI DENTAL IMPLANTS
CASE #3 P.D.
Molars #'s

JACKSON, TN Mini Dental Implant Centers of America

I was recently asked by a colleague if I had experienced a noticeable decrease in success rate of the implants placed under molar crowns restored with two implants as compared to non-molar crowns restored with one implant.

After consulting with my staff and reviewing some of our cases where we have indeed witnessed implants that did not integrate, the consensus was that we did not recognize any significant increase with crowns restored with two implants.

I feel that I can safely speak for those of us who have had the opportunity to place thousands of implants that we have all had implants to not integrate. Based on statistics that number will increase as we continue to place more and more mini implants.

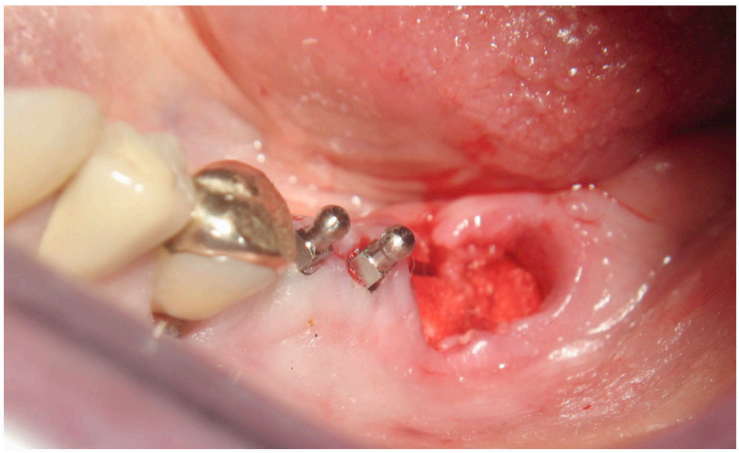
As our success rates continue to remain or better the success rates of our alternative treatment modality, the conventional implant, we should enthusiastically strive to spread the word about the mini implant!

In the cases I submitted for this article the recall X-rays document the success of these restorations.

I continue to be amazed at this awesome tool that we are blessed to now have in our practices to offer to our patients that will give them back their smiles!

Mini Implants, Major Improvements!

PD- #19 Pre-Op Panoral X-Ray 03-20-2012
Randy Staples, DDS, Jackson, TN



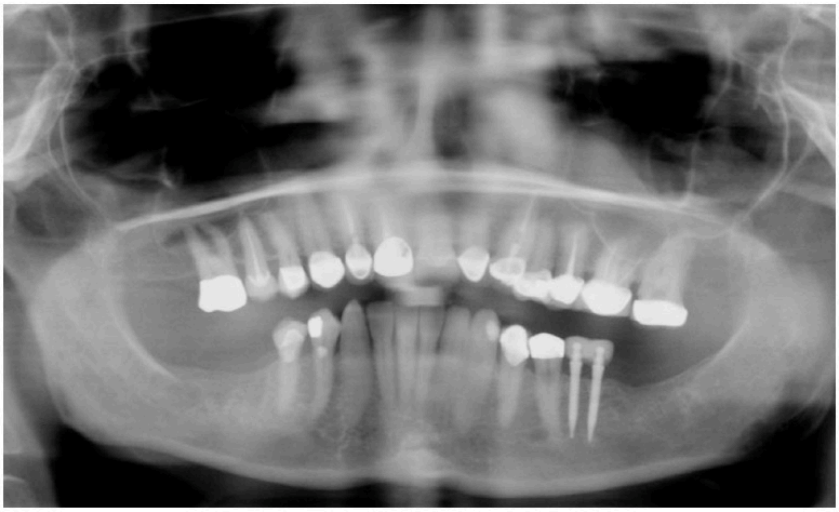
PD- #19 Post-Op Photo 04-11-2012
Randy staples, DDS, Jackson, TN

PD- #19 Post-Op Panoral X-Ray 02-18-2013

Randy Staples, DDS, Jackson, TN

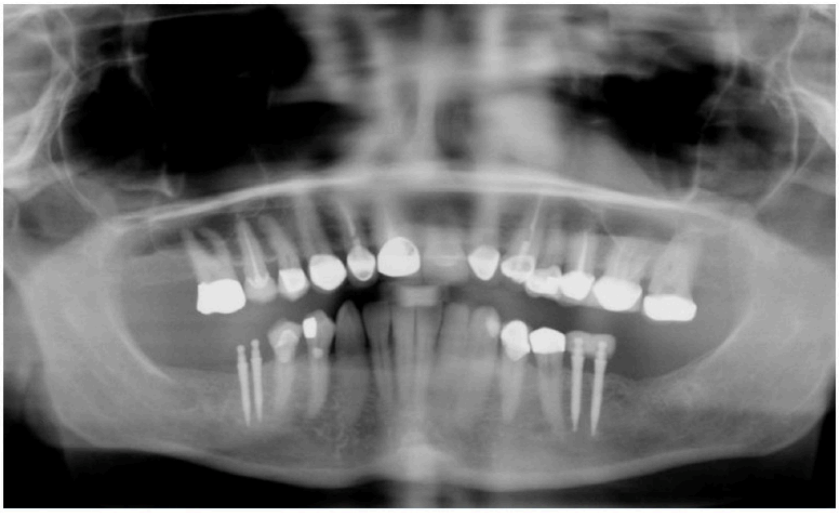
PD- #19 Post-Op Photo 02-26-2013

Randy staples, DDS, Jackson, TN



PD- #30 Pre-Op Panoral X-Ray 02-24-2014

Randy Staples, DDS, Jackson, TN



PD- #30 Post-Op Panoral X-Ray 02-24-2014

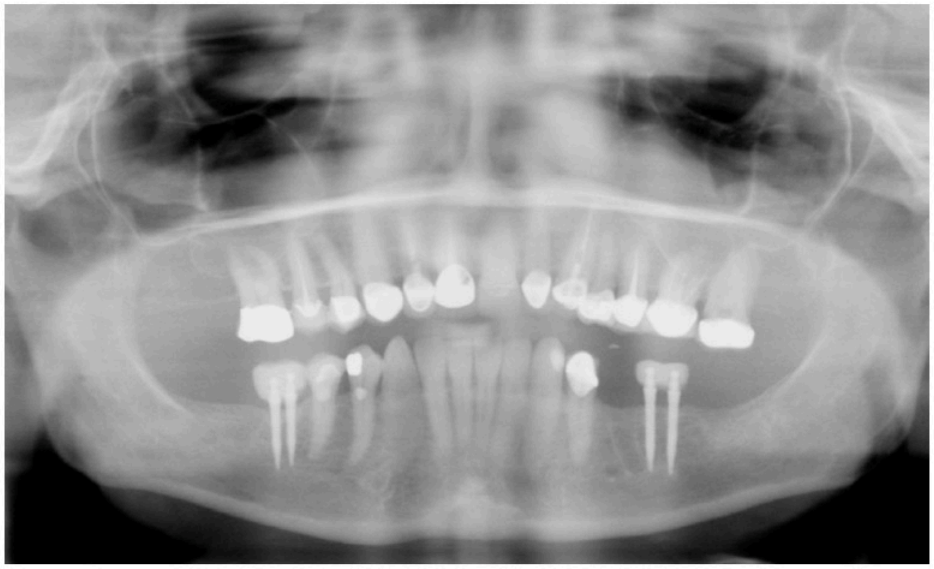
Randy Staples, DDS, Jackson, TN

PD- #30 Post-Op Photo 04-01-2014

Randy Staples, DDS, Jackson, TN

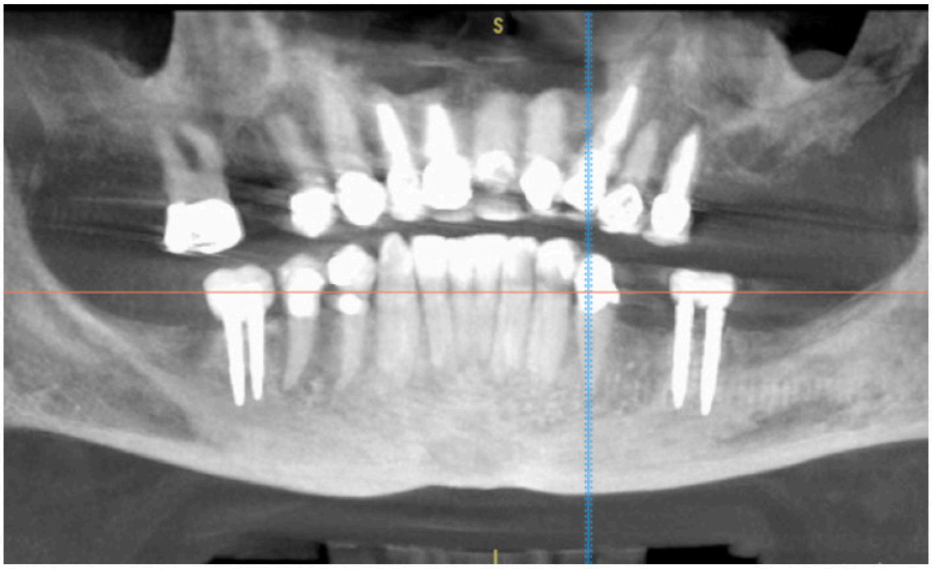
PD- #30 Post-Op Photo 04-01-2014

Randy Staples, DDS, Jackson, TN



PD- #'s19 & 30 Recall Panoral X-Ray
02-16-2016

Randy Staples, DDS, Jackson, TN



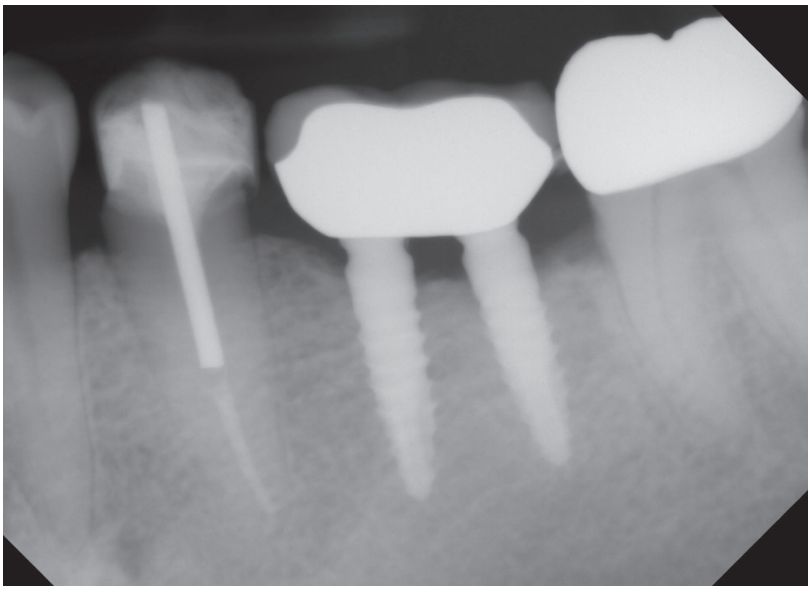
PD- #'s 19 & 30 CT Scan 12-13-2018

Randy Staples, DDS, Jackson, TN

ANDREA JOY SMITH, DDS
INTERNATIONAL ACADEMY OF MINI DENTAL IMPLANTS

SACRAMENTO, CA
Mini Dental Implant Centers of America

LONG TERM IMPLANT STUDY



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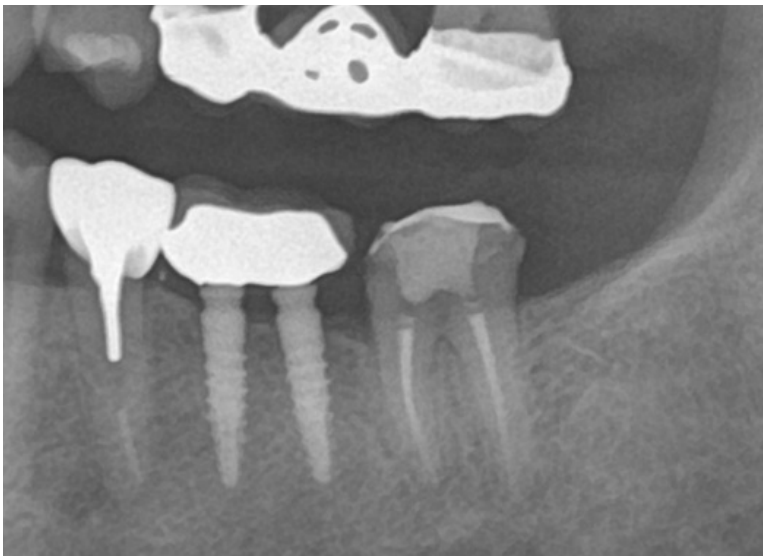

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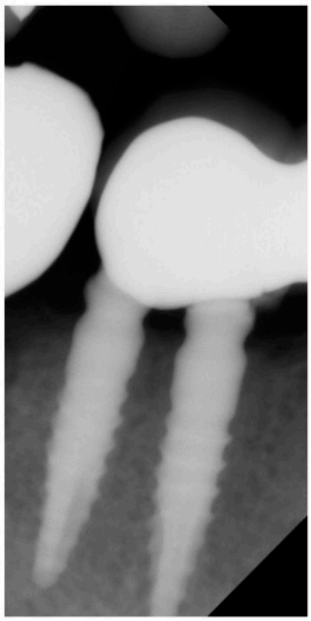
#30 TL 2018



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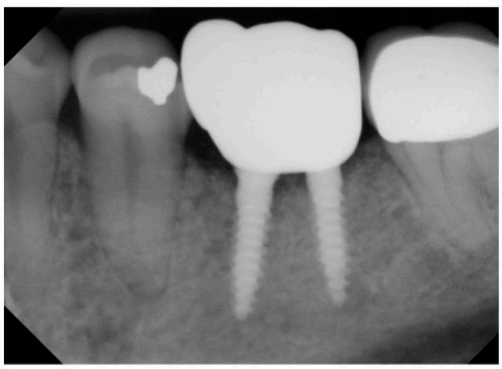

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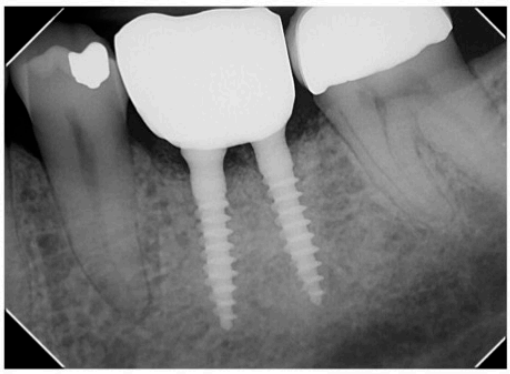

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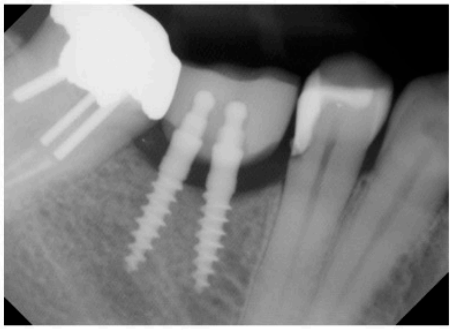

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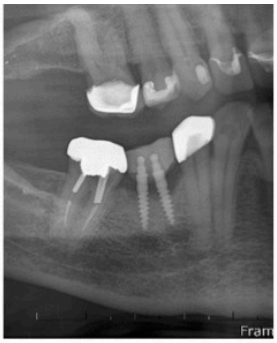

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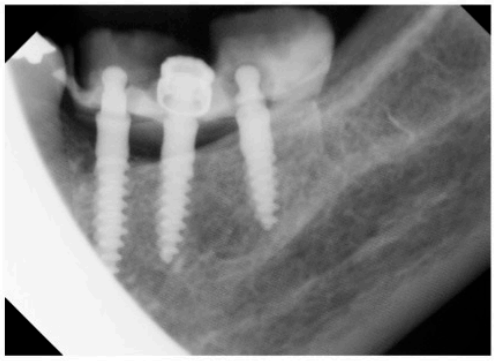

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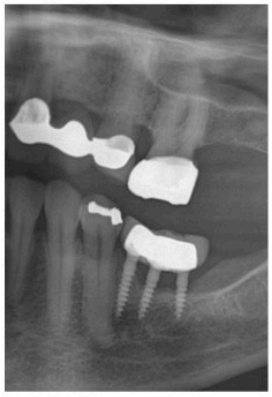

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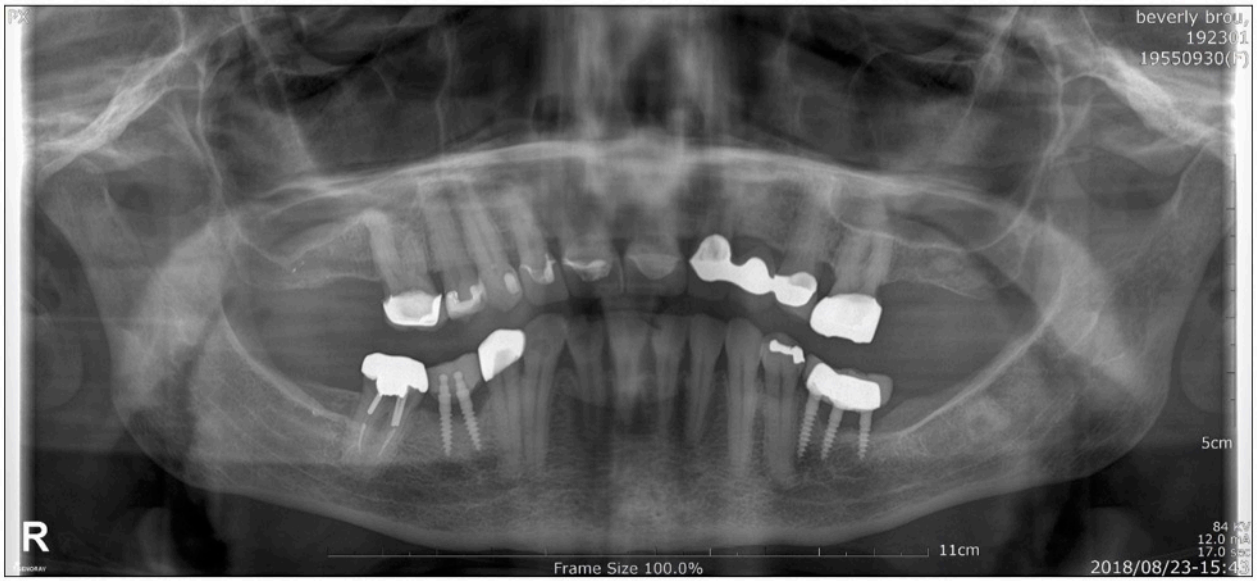


ENTIRE POST OP PANO BB 2018

MORGANTOWN DENTAL GROUP

JOSH DOLIN, DDS

January 16, 2019

To Whom It May Concern:

I have placed close to 2,000 mini implants over the past decade to restore everything from single anterior and posterior teeth, to denture and partial denture retention, to full mouth implant placement. My success rate over the decade is roughly 92-94%. Most failures can be directly linked to a causative agent such as an un-controlled systemic disease (diabetes for example), poor hygiene, or improper function (grinding for example). I have included radiographs of several cases restoring posterior teeth. Each patient will have a placement date and current radiograph for evaluation. The ongoing functional life span of the posterior molars documented for your review is between 4 to 7 years depending on the case. Please feel free to contact me if I can be of further assistance.

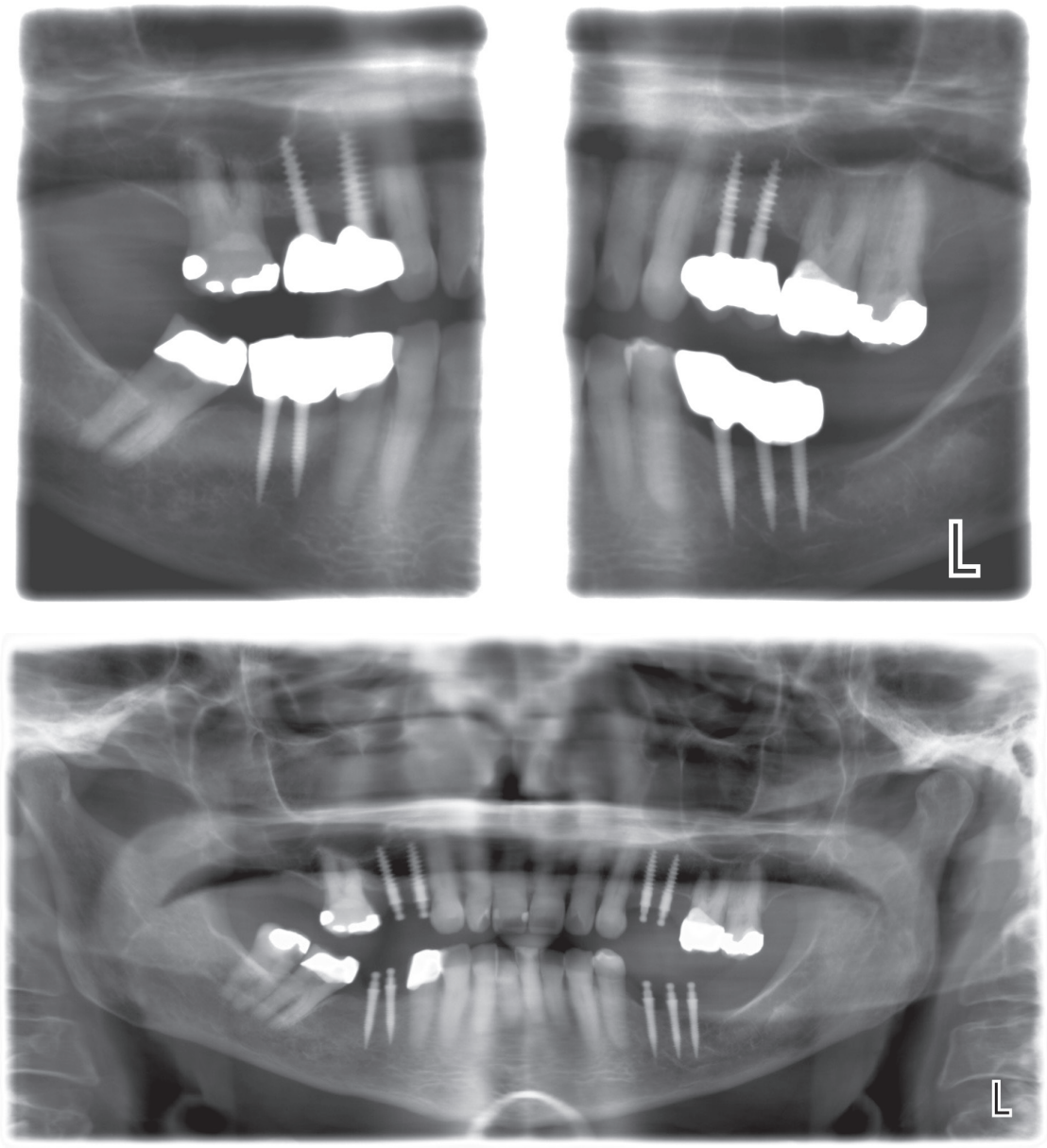
Thank you

Joshua M. Dolin DDS

Morgantown Dental Group

142 High Street, Morgantown, WV 26505

304-292-7307 jdolin@morgantowndentalgroup.com



AREFORD 10-3-2018

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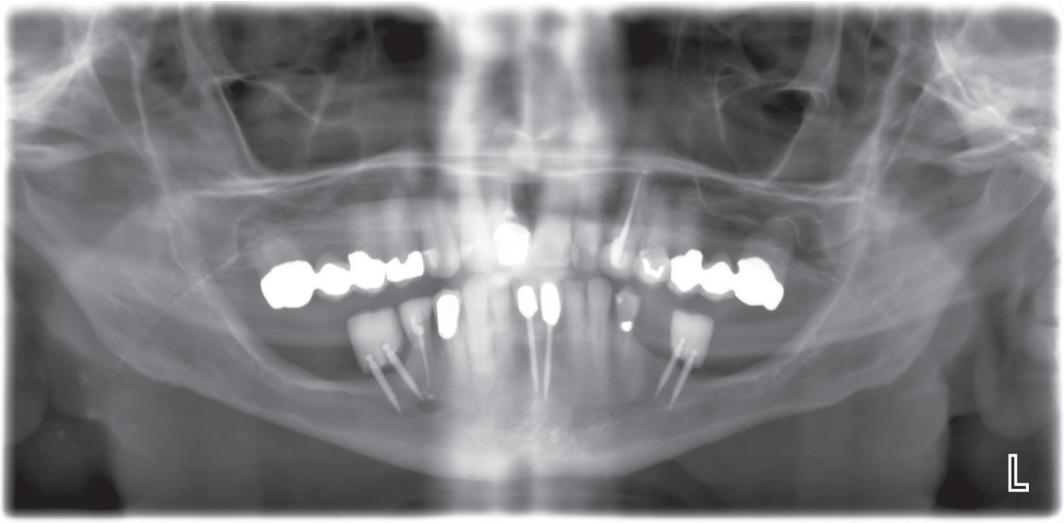

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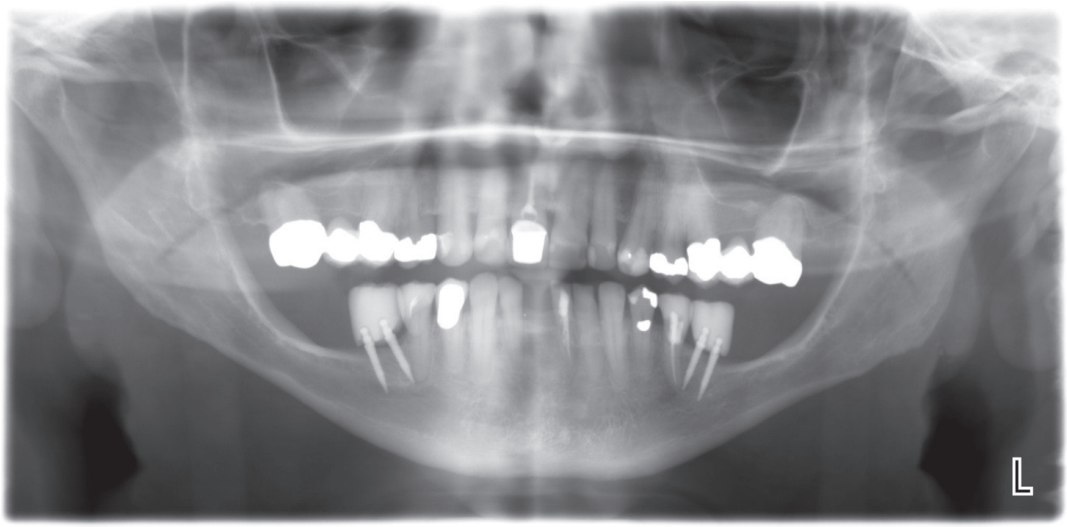

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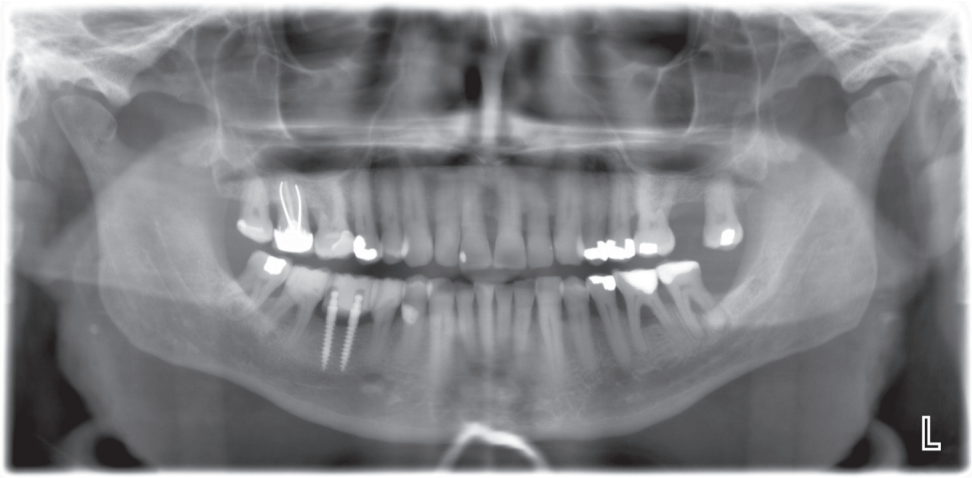

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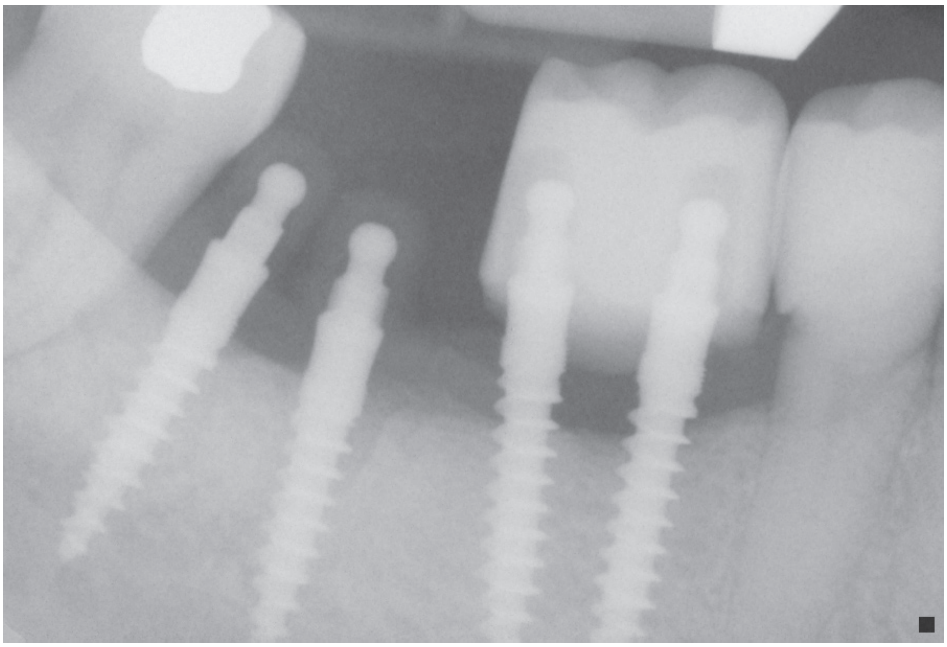

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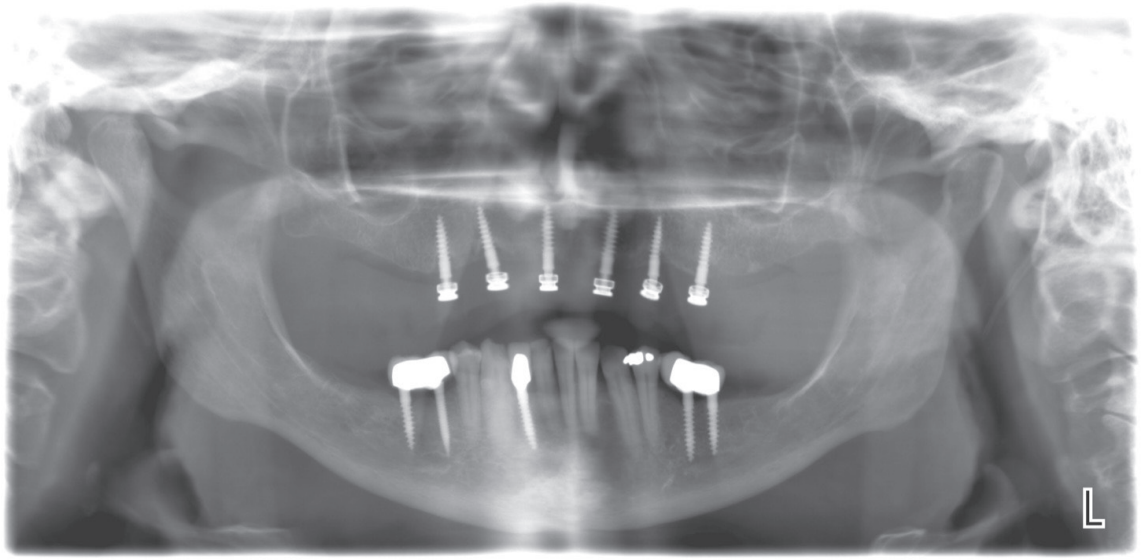

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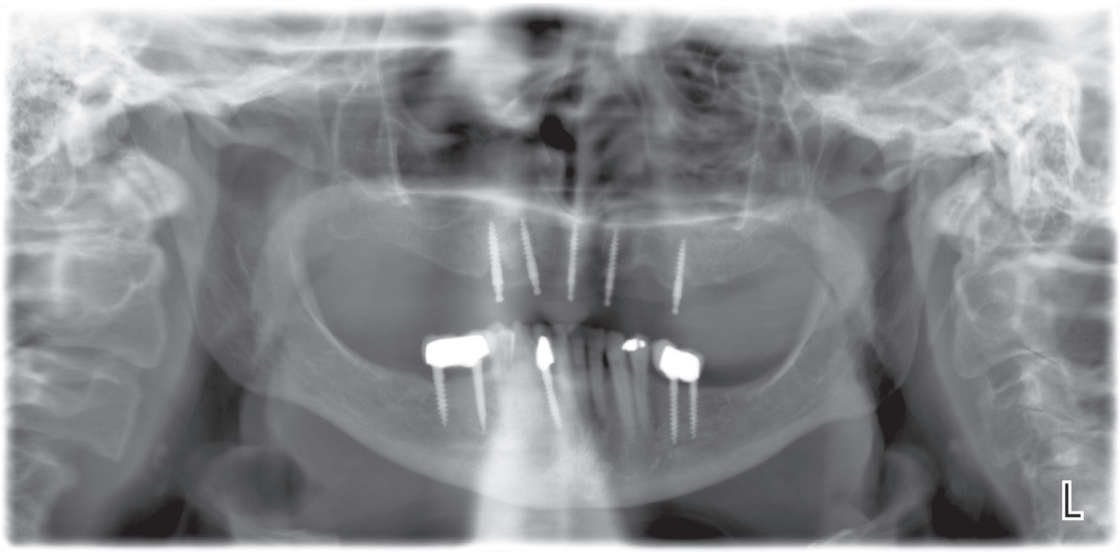

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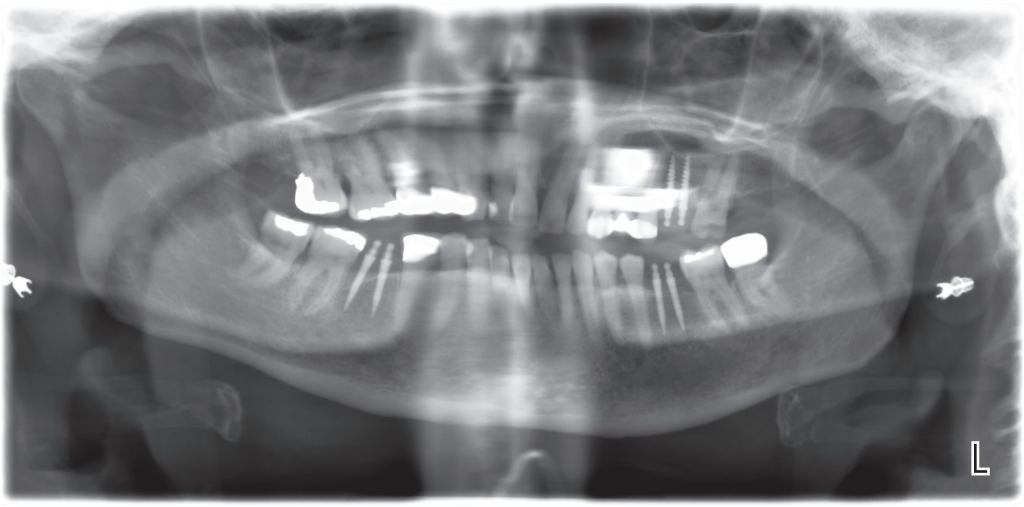

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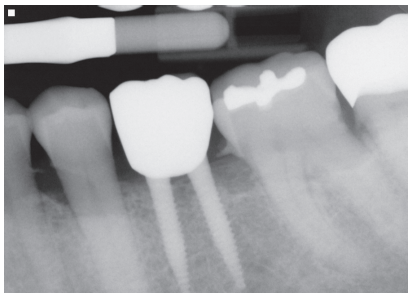

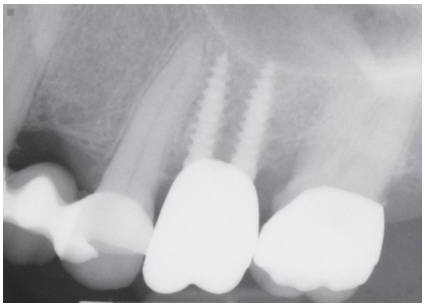

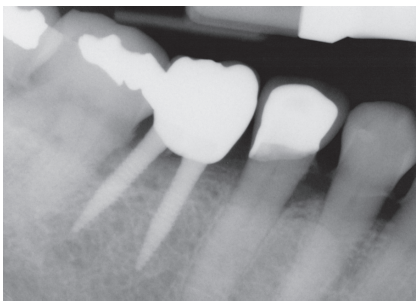

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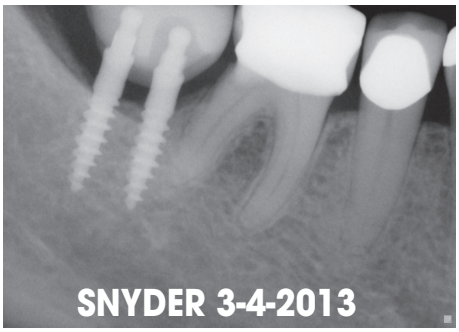

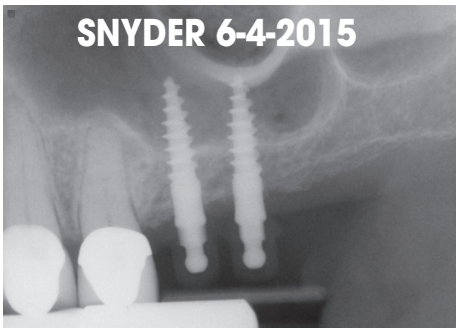

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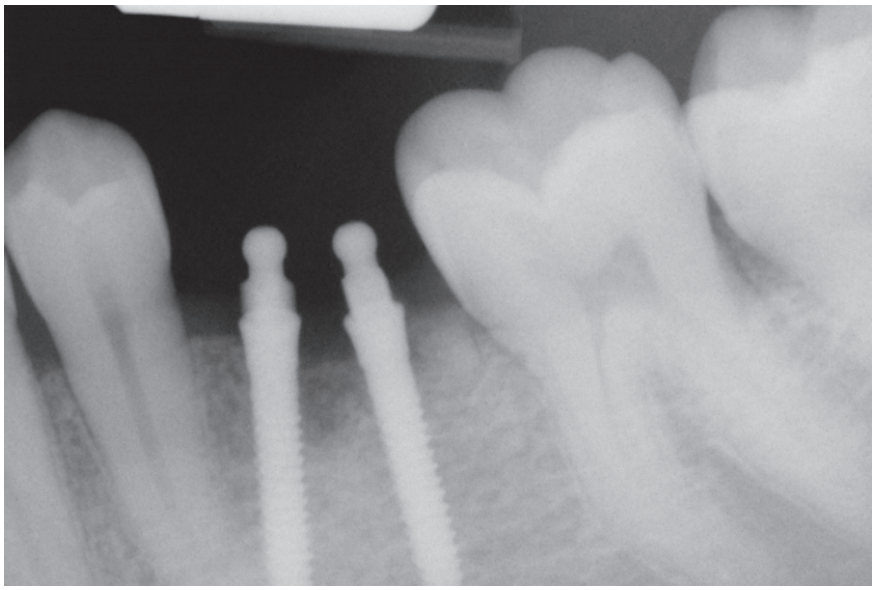

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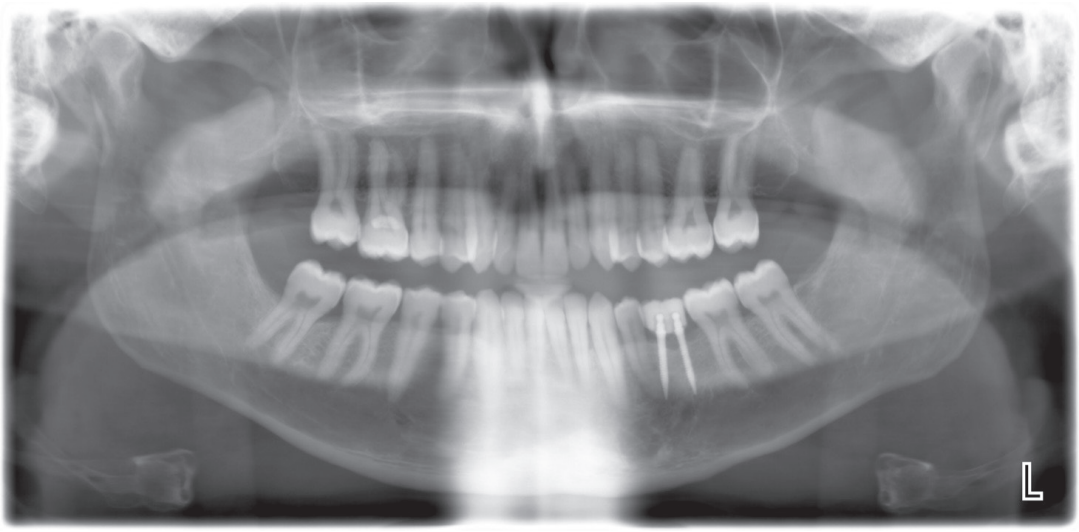

TAMASES 1-16-2019

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A Rationale for Fixed Restorations Supported by Mini Dental Implants: Case Reports and Practical Case Selection Guidelines

Raymond Choi, DDS

Abstract: Many patients prefer fixed restorations to replace missing teeth. However, various factors may preclude them from receiving fixed restorations supported by conventionally sized (≥3 mm in diameter) dental implants. The introduction of mini dental implants (MDIs) (≤2.9 mm in diameter) in dentistry has created more treatment options for a variety of clinical situations. Many dentists have successfully used MDIs to support fixed restorations despite generalized concern about the strength of these narrower implants to withstand occlusal load. Because of reduced implant diameter, clinical success of mini-implant-supported fixed restorations requires controlling occlusal load through proper case selection and clinical and laboratory techniques. Furthermore, more long-term studies are needed to develop evidence-based clinical protocols for predictable outcomes. Use of MDIs in areas of deficient ridge width and/or interdental space may be a viable alternative treatment option that can reduce treatment complexity and provide the benefits of implant-supported restorations to an expanded patient population.

Despite a substantial increase in the number of dental implants being placed in recent years, many patients still are left functionally and esthetically debilitated. Lack of adequate bone volume and financial resources as well as compromised health, often accompanied by aging, are predominant factors that prevent patients from receiving treatment using conventional dental implants (CDIs) (≥3 mm in diameter). However, more patients may have clinical situations that are better suited for mini dental implants (MDIs) (≤2.9 mm in diameter) than CDIs in terms of bone volume.[1]

The small diameter of MDIs allows for minimally invasive surgical placement often without the need to raise a flap. Flapless implant insertion preserves more blood supply and leaves the periosteum intact, resulting in faster healing, greater patient comfort, and significant reduction in surgical complexity, treatment duration, and cost.[2,3] Because of the relatively simplified and minimally invasive surgical protocol with MDIs, as well as reduced cost, patients with financial limitations, compromised health, and deficiency in interdental space and/or ridge width may benefit from treatments using them. Furthermore, with an increasingly aging population, many elderly patients who may be unable to tolerate the rigors of complex bone grafting and conventional implant surgical procedures could benefit from mini-implant-supported fixed restorations (MISFRs).

MISFRs, in short, potentially reduce the need for bone grafting and the complications associated with such procedures, decrease patient morbidity related to invasive surgery, lessen treatment duration and costs, and minimize the need for cantilevered pontics. Additionally, their usage reduces the need for orthodontic intervention that might be required to gain interdental space to accommodate CDIs. These restorations may also improve patient satisfaction and comfort due to the avoidance of removable appliances and the potential for better mastication.

Historical Background of Mini Implants

The use of MDIs began when 1.8 mm pure titanium, smooth-surfaced transitional small-diameter implants were placed to support fixed provisional prostheses during the bone grafting and osseointegration period for CDIs.[4,5] In the 1970s a provisional implant was introduced in the form of a Lew screw.[6] Some years later, primarily surgical specialists started placing these 1.8 mm transitional mini implants to help restorative dentists provide more stable interim prostheses for their patients. These implants were often used without any specific guidelines or protocols. MDIs were frequently placed between CDIs and immediately loaded with fixed provisional prostheses with minimal regard for occlusal load considerations and adequate initial stability of transitional small-diameter implants. These transitional implants would be removed once their temporary purpose was fully served. This treatment modality has led some clinicians to believe that all small-diameter implants are for transitional use only. Although MDIs may be used for provisional purposes, in recent years they have been used mostly in long-term applications.[1]

Since receiving US Food and Drug Administration approval in 2003 for long-term removable and fixed applications (510K by IMTEC Corp), MDIs have been used to stabilize removable prostheses successfully at a relatively economical cost. Surgical placement cost of a MDI, estimated to be US$760, can be as much as 43% lower when compared to that of a CDI, estimated at $1,756. Furthermore, most clinicians use a one-piece implant/abutment rather than a laboratory-made custom abutment.[1] Often, MDIs are surgically placed in a less-invasive flapless manner and coupled with immediate load, offering a high level of satisfaction for many edentulous patients.[7-9] In addition, MDIs are often used to successfully support fixed restorations.[10-12]

Today, MDIs are made of titanium alloys for increased strength and with roughened surfaces to promote osseointegration similar to CDIs. Orthodontists also have been using 1.6-mm diameter implants, known as temporary anchorage devices, on short-term bases to create anchorage for a variety of teeth movements to lessen the need for orthognathic surgeries and reduce overall treatment duration and complexity. Studies have documented the clinical success of this application.[13,14]

Osseointegration of and Load Consideration for MDIs

A number of studies have reported successful osseointegration of surface-treated (roughened surfaced) MDIs at histological and clinical levels under immediate load.[15-18] Until the adjustable torque-measuring wrench became available for use with MDIs in 2003, clinicians were unable to accurately determine the level of initial stability of these implants at the time of placement. Unstable implants, whether conventional or mini, that are immediately loaded do not osseointegrate, and, thus, fibrous encapsulation results, followed by subsequent implant failure. With an adjustable torque-measuring wrench, initial stability of MDIs can be more accurately assessed to determine feasibility for immediate load for more predictable and successful outcomes.

Currently, a method of determining the implant stability quotient of a one-piece MDI is not yet available. Although not highly predictable, the author has been using Periotest (Medizintechnik Gulden, med-gulden.com) to measure relative stability of MDIs immediately after surgical insertion and during follow-up maintenance visits. In the author's clinical experience, MDIs with initial stability of 30 Ncm to 35 Ncm at the time of surgical placement that are loaded immediately under controlled protocol for complete mandibular dentures appear to function and achieve osseointegration successfully.

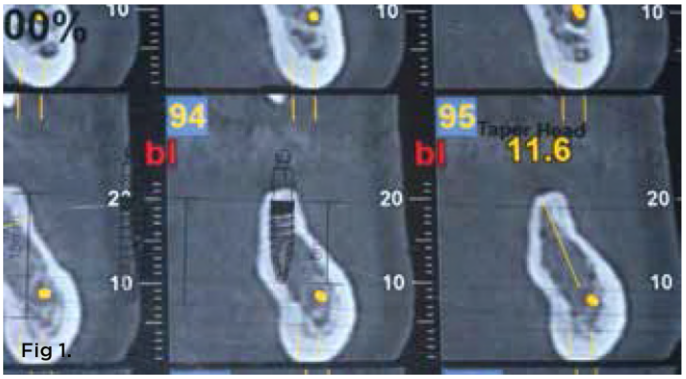

Fig 1.


Fig 2.


Fig 3.

Fig 1 through Fig 3. CBCT with mini-implant overlay (1:1) (Fig 1); two MDIs in the No. 19 and 20 positions (Fig 2); panoramic radiograph showing cemented two-unit splinted PFM MISFR for Nos. 19 and 20 3.5 years after cementation of final restoration (Fig 3).

Because of their reduced diameter, it is logical to question the ability of MDIs to withstand occlusal load. A finite element analysis was done to assess the fatigue life of 2-mm diameter implants and found that, mounted in rigid support and under a cyclic horizontal force of 200 N, the implants fractured after more than a million cycles.[19] In another study, 2.4-mm diameter implants embedded in acrylic resin that were subjected to horizontal force at a 45-degree angle fractured at 462 N.[1] Song et al studied the effect of implant diameter on fatigue strength and found that the ultimate failure load and fatigue cycle decreased as the implant diameter became

smaller, posing more potential risks on cyclic load.[20] Based on these findings, it appears that controlling cyclic horizontal forces is paramount for the long-term clinical success of MISFRs.

Use of MDIs for Fixed Applications

Although there have been concerns regarding the use of MDIs to support fixed restorations, such as the potential for implant fracture, their ability to withstand functional and parafunctional load, the degree of osseointegration achievable around the mini implant, as well as the need for clear clinical and laboratory protocols and more long-term studies, many clinicians have been using them for fixed applications successfully.[21-28] In a survey of 677 dentists experienced in implant dentistry, of which 95% were general dentists, 40% of respondents were using MDIs for single tooth replacement.[1] Additionally, 23% were placing mini-implant-supported splinted fixed partial dentures, and 14% were doing tooth/teeth and mini-implant-supported fixed partial dentures. Fixed MDI restorations in the posterior mandible opposing a removable prosthesis have shown 95% survival rate in 5 years.[11] Vigolo et al documented high survival rates of single-tooth MDI restorations ranging from anterior teeth to first molars.[12]

Some clinicians have found satisfactory clinical success in splinting MDIs with either CDIs or other MDIs.[10,18] Others have used MDIs to replace a single tooth in deficient interdental space and/or a compromised ridge width with a high success rate.[22,25] Degidi et al showed clinical success in replacing maxillary lateral incisors with MDIs.[23] Some clinicians who used transitional mini implants with a smooth surface for provisional purposes found an adequate degree of osseointegration and believed that MDIs could possibly be used under more definitive and long-term prostheses.[29,30]


Fig 4.


Fig 5.

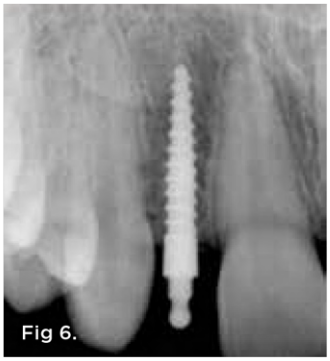
Fig 6.

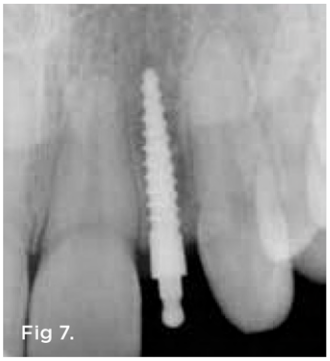
Fig 7.


Fig 8.

Fig 4 through Fig 8. Preoperative photograph showing congenitally missing teeth Nos. 7 and 10 (Fig 4); post placement of MDIs at Nos. 7 and 10 (Fig 5); periapical radiograph, post MDI placement, No. 7 (Fig 6); periapical radiograph, post MDI placement, No. 10 (Fig 7); post cementation of two lithium-disilicate MISFRs, Nos. 7 and 10 (Fig 8). **Fig 9 and Fig 10.** Post cementation of splinted PFM MISFR, Nos. 18 through 20 (Fig 9); panoramic radiograph of splinted PFM MISFR 10 years after cementation of final restoration (Fig 10).


Fig 9.


Fig 10.

Risks associated with MDIs are similar to those of CDIs. Because of the smaller diameter of MDIs, clinicians need to focus on reducing occlusal overloads with proper occlusal strategies and case selection.

Case Studies

Five case reports using MDIs (3M ESPE MDI, 3m.com) are presented. (*Author's note*: Because not all laboratories may be familiar with fabricating MISFRs, clinicians should check with the lab as to whether or not it has experience with these restorations before selecting a lab.)

Case 1

A female patient in her forties with an unremarkable medical history and flaccid masticatory muscles presented with a desire to replace her missing lower left posterior teeth with fixed implant restorations. Upon clinical and cone-beam computed tomography (CBCT) examination, buccolingual bone width on the lower left quadrant was found to be less than 5 mm and, thus, inadequate for CDIs (Figure 1). The patient declined bone grafting and subsequent conventional implant-supported fixed restorations due to the need for additional surgery, the morbidity associated with the procedure, and additional cost. An alternative treatment option using mini implants was presented, along with the risks and benefits.

Evaluation of the opposing dentition found that the patient was missing her upper left posterior teeth (Nos. 13 through 16), and she was wearing a removable partial denture. After the patient accepted the treatment involving the MISFR, two 2.4 mm x 10 mm mini implants were surgically placed according to the manufacturer's guideline in a flapless manner (Figure 2).

Four months of waiting time were allowed for osseointegration of the mini implants. A standard fixed crown-and-bridge protocol was followed for manufacturing splinted porcelain-fused-to-metal (PFM) crowns. The restoration was cemented with non-water-soluble resin-modified glass-ionomer cement.

Figure 3 shows a panoramic radiograph 3.5 years after cementation of the final restoration. The MISFR has been in function successfully for more than 6 years without any complications.

Case 2

A graduating high school senior female student in unremarkable health presented with congenitally missing right and left maxillary lateral incisors and a desire to replace these two missing teeth with fixed implant restorations (Figure 4). The patient and her guardian stated that she had stopped growing for the past 2 years. The patient had recently finished orthodontic treatment that lasted 2.5 years and was fitted with Hawley orthodontic retainers with pontics.

Upon examination, mesiodistal space for both missing teeth was found to be 5.5 mm. Further orthodontic treatment was recommended to increase the mesiodistal dimension for two-piece conventional implant therapy. Both the guardian and patient immediately declined the recommendation and sought alternative treatment options. Additionally, the patient wanted treatment to be completed before leaving for college in a few months. The clinician informed and discussed with the patient and guardian the risks and benefits of treatment for a MISFR, and they quickly accepted this option.

After CBCT scan evaluation was performed and study models were obtained for creating a restorative matrix for provisionalization, two 2.4 mm x 13 mm mini implants were placed in the No. 7 and 10 positions (Figure 5 through Figure 7). Both mini implants were fixated with initial torque value of 35 Ncm. Resin fixed provisional restorations were fabricated chairside using a restorative matrix and cemented to allow immediate esthetic replacement of the removable orthodontic retainer. The patient was very pleased with the immediate result.

After 4 months of osseointegration, a final impression was taken to fabricate two lithium-disilicate crowns. The crowns were cemented with non-water-soluble resin cement (Figure 8).

In function for more than 5 years, the MISFRs have been free of complications.


Fig 11.


Fig 12.


Fig 13.

Fig 11 through Fig 13. Four months post placement of MDIs for congenitally missing teeth Nos. 21 and 28 (Fig 11); post cementation of lithium-disilicate MISFRs for Nos. 21 and 28 (Fig 12); panoramic radiograph 4 months post placement (Fig 13).

Case 3

The patient was a 40-year-old woman with an unremarkable medical history. She presented with the intention of replacing missing teeth Nos. 19 through 21 with a fixed implant restoration. Bone width at Nos. 19 and 20 was sufficient for placement of 4-mm diameter conventional implants. However, bone width at the No. 21 area was inadequate to receive a conventional implant.

Two options were presented to the patient. One was to graft bone width at the area of tooth No. 21 with subsequent implant placement in that location. The other option was to manufacture a cantilever bridge with a pontic in the No. 21 position. Neither option was satisfactory for the patient. Therefore, as an alternative, placement of a mini implant in the No. 21 position to eliminate a cantilever pontic was discussed, and she agreed to proceed with this treatment.

A 2.4 mm x 10 mm mini implant was placed along with two 4 mm x 9 mm conventional implants on the same visit. The mini implant was left alone without any provisional restoration for 4 months along with the other two conventional implants for osseointegration before three-unit splinted PFM crowns were fabricated and cemented (Figure 9).

Figure 10 shows a panoramic radiograph taken 10 years after cementation of the final restoration. The MISFR has been in service for more than 11 years, and the patient has reported great satisfaction.

Case 4

A healthy male patient who was graduating from high school presented with his guardian with the hope of having two congenitally missing mandibular first bicuspids replaced. When offered a treatment option of conventional implants, the guardian asked for a more affordable alternative. Treatment for a MISFR was presented, which included discussion of risks and benefits, and this option was readily accepted.

A study model was generated for fabrication of a restorative matrix. Two 2.4 mm x 13 mm mini implants were placed in teeth No. 21 and 28 positions with initial stability of 35 Ncm. Nonfunctional resin provisional restorations were made and cemented immediately after implant placement. Four months later, after allowing time for osseointegration of the implants (Figure 11), final lithium-disilicate crowns were fabricated using a conventional crown-and-bridge protocol and cemented with resin cement (Figure 12). Figure 13 shows a panoramic radiograph taken 4 months post placement.

The MISFR has been in function for 4 years without any complications.

Case 5

A male patient with an unremarkable medical history presented with a failing Maryland bridge replacing tooth No. 25. The interdental space at No. 25, which was approximately 5 mm, was inadequate for a CDI (Figure 14). Non-implant treatment options were presented and discussed but declined by the patient, who insisted on an implant-supported fixed restoration. Due to the limited interdental space, the clinician determined that implant treatment would require the use of an MDI.

Before proceeding with the MISFR option, the clinician disclosed to and discussed with the patient the possible complication of adjacent roots being injured during implant placement, which may subsequently precipitate endodontic treatment or possible extraction. The patient decided to proceed with this option.

An MDI was carefully placed (Figure 15), with periapical radiographs taken to confirm the proper implant trajectory. The patient declined provisional restoration due to cost. A final PFM crown was fabricated and cemented with resin cement.

After 8 years of the MISFR being in function, the patient has reported no complications.

Practical Case Selection Guidelines for MISFR

Achieving adequate initial implant stability and controlling occlusal load are critical factors in the clinical success of restorations using mini implants. In 2008, the author developed and has since been teaching at his Global Mini Implant Institute (GMI) (miniimplanteducation.com) guidelines to help clinicians properly select cases for MISFRs by assessing level of potential risks. Each factor in the proposed guidelines, as described in the following paragraphs, is important in evaluating the feasibility of achieving favorable occlusal load and/or adequate initial mini-implant stability. These guidelines can be used chairside to quickly formulate a tentative prognosis for MISFR.

Mandible Vs. Maxilla

In most cases, the mandible offers higher bone density in comparison to the maxilla. There is higher probability that the clinician can achieve better initial implant stability in the mandible and that the final restorations will have stronger support against occlusal load.

Anterior Vs. Posterior

The anterior segments of both the mandible and maxilla offer higher bone density for better initial stability, and occlusal load is lighter in comparison to the posterior region.

Opposing Arch Load Consideration

Occlusal load on a MISFR depends largely on the type of teeth that are on the opposing arch. The opposing arch may have no teeth, removable denture teeth, natural teeth, or implant-supported teeth. For example, fixed implant-supported restorations will not have any vertical resiliency as compared to natural dentition and will exert the strongest occlusal force on a MISFR. Further, a soft-tissue-supported conventional removable prosthesis in the opposing arch will vertically move the most due to resiliency of soft tissue and will exert the least amount of occlusal force on a MISFR.[31,32] Depending on the type of teeth present on the opposing arch, the clinician can formulate an appropriate prognosis of a proposed MISFR.

Presence of Occlusal Stop Posterior to Teeth Being Replaced

The most posteriorly positioned tooth in an arch will be used most extensively for mastication. During swallowing and clenching, the same tooth will contact first before any other teeth come in contact. Therefore, the presence of an occlusal stop, whether a healthy natural or implant-supported tooth, posterior to the tooth/teeth being replaced will protect any teeth anterior to that tooth by absorbing the load. This will prevent overloading of a more anteriorly

Fig 14 and Fig 15. Preoperative photograph showing missing tooth No. 25 (Fig 14); post placement of MDI at No. 25 (Fig 15).

positioned MISFR and allow clinicians to create a desired level of centric contact on the MISFR for reduced occlusal load.

Elderly Vs. Younger

In general, younger patients can generate more masticatory and parafunctional forces.

Female Vs. Male

Generally speaking, male patients can generate more masticatory and parafunctional forces than female patients, provided they are of similar age and physical stature.

Crown-to-Implant Ratio and Available Bone Height

Misch found that increase in crown height from 10 mm to 20 mm would correspond with an increase in the occlusal force applied on an implant by 100%.[33] Thus, shorter crown height would be beneficial for a MISFR considering the reduced implant surface area of a MDI. Greater available bone height can increase the probability of achieving better initial implant stability.

Opportunity to Splint Vs. Individually Standing

A recent 3-year study found no correlation between non-splinted short implants and crestal bone loss.[34] However, only the non-splinted crowns showed screw loosening, whereas splinted prostheses exhibited no abutment screw loosening. Because a MDI is a one-piece implant without any abutment screw, the same force that causes screw loosening with a conventional implant possibly may cause crestal bone loss and/or implant body fracture of MDIs. Therefore, a MDI should be splinted to other consecutive MDIs or CDIs whenever possible.

Some studies have suggested that carefully and properly selected tooth–implant-supported fixed prostheses can be a viable alternative to bone grafting and fixed prostheses supported by implant only.[35,36] Splinting reduces abutment screw loosening when restoring adjacent conventional implants. A MISFR will withstand occlusal load more favorably when splinted to other stable entities.

Presence of Parafunction

Brief intraoral examination can reveal the presence of parafunction. Soft-tissue ridging on the lateral border of the tongue and buccal mucosa as well as teeth wear can be indications of parafunction. Conventional diameter implants and bone augmentation would be more preferable for teeth replacement in patients with severe parafunction.

Guidelines for Clinical and Laboratory Modifications for MISFR

Controlling occlusal load can be vitally important for long-term survival of a MISFR. Cyclic occlusal forces with horizontal components on the restoration have been associated with implant complications.[19] Because implants are vulnerable to forces with any degree of horizontal component, a monoplane occlusal design is typically most desirable for a MISFR to eliminate any deleterious lateral occlusal forces.

Misch and Bidez suggested reducing the size of the occlusal table (buccolingual dimension) for implant restorations.[37]

In the presence of an occlusal stop posterior to teeth being replaced by a MISFR, there should be very light or no centric occlusal contact and no lateral occlusal interferences. For a multiple-unit MISFR, fabrication of a nightguard may be very helpful and appropriate to minimize and reduce any uncontrollable and excessive parafunctional forces during sleep.

Implants should be given 3 to 4 months to allow osseointegration when possible. If the patient desires immediate provisionalization or the clinician needs to provisionalize immediately in an esthetically critical region, the provisional restoration should be nonfunctional with no centric or lateral contacts.

Conclusions

Many patients today are unable to overcome financial barriers to implant treatment. By reducing the complexity of treatment through the use of MDIs, more patients may benefit from implant-supported fixed restorations, with improved mastication and comfort. Furthermore, more than 6 million people, or about 2% of the US population, have one or both maxillary lateral incisors missing.[38] Maxillary lateral and mandibular incisors with deficient interdental space and ridge width may be safely treated with MDIs with less risk of injuring adjacent teeth. Clinical success of fixed applications of MDIs can be significantly enhanced through proper case selection based on practical guidelines presented in this article that clinicians can use chairside.

MDIs are currently used successfully in a variety of clinical situations. As more well-controlled long-term studies and improved protocols become available, fixed applications of MDIs hold great

promise and possibilities in broadening access to implant treatment for patients who otherwise may be unable to receive fixed implant restorations. Future research and development in stronger metal for implant bodies and more forgiving but strong restorative material may enhance performance of MISFRs.

ABOUT THE AUTHOR

Raymond Choi, DDS
Private General Practice with emphasis on Implant Dentistry, Tustin, California

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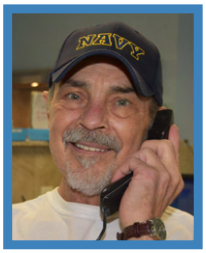

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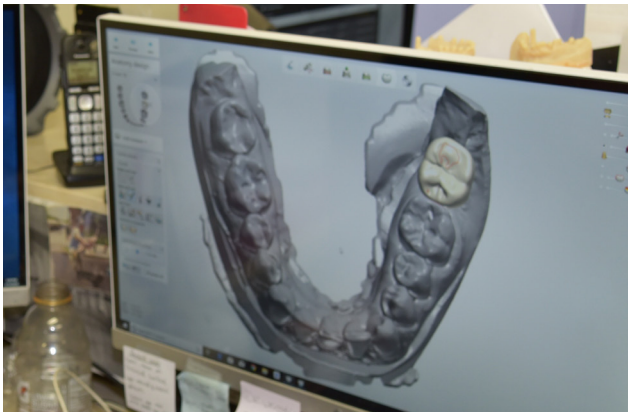

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