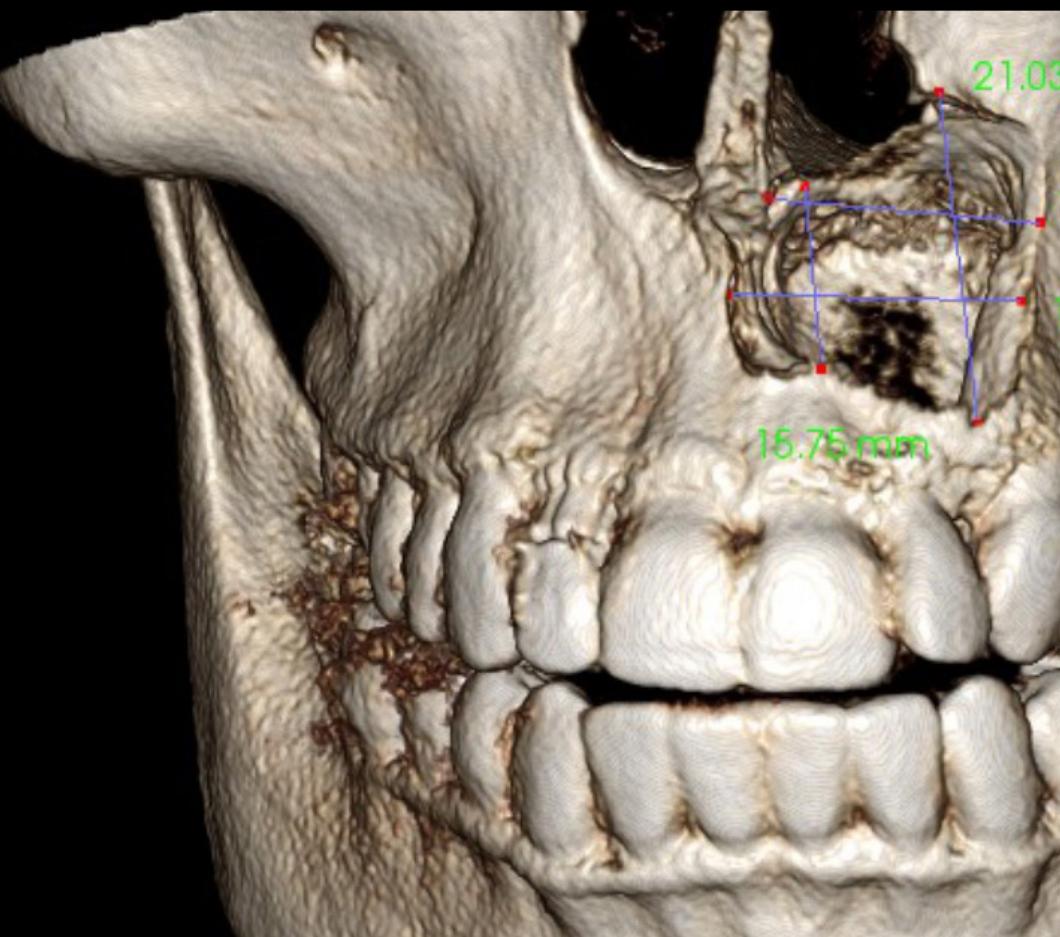


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IAOC  SPECIAL ISSUE

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President & Founder of the International Academy  
of Ceramic Implantology

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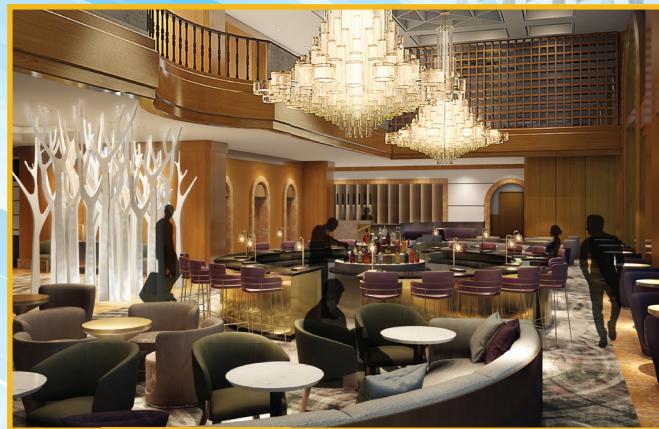
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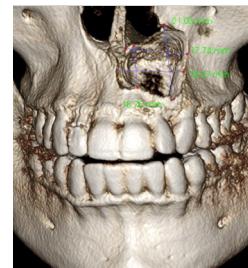


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Credit - Luis A. Alicea,  
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SAMMY NOUMBISSI DDS, MS

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# EDITOR'S DESK



## A NOTE FROM OUR GUEST EDITOR IN CHIEF

**SAMMY NOUMBSSI, DDS, MS**

Dear Colleagues,

I graduated from my graduate implantology residency program almost 18 years ago and I have been practicing metal free implant dentistry for the last 10 years. This would not have been possible without some pioneers such as the late Sami Sandhaus who back in the early seventies believed that ceramic implants could be an alternative to titanium and titanium alloy implants. The original ceramic implants were made of seashells and were found to have successfully integrated in mandibles of Mayan skeletons dating back to 600 AD.

In 1965 Brånenmark who coined the term "osseointegration" placed his first pure titanium dental implant into a human jaw and for the next fifty years titanium implants revolutionized dentistry, evolved significantly and have enjoyed great success both for fixed and removable dental prostheses. Despite the undisputable success of titanium and titanium alloy implants, their use has come with problems ranging from cosmetic challenges, to loss of bone, to degradation of the implants to the systemic effects on the recipient. Interestingly enough the demand for ceramic implants even after a decade in North America remain patient-driven. Furthermore, there has been a rise in reports of metal sensitivities to implant alloys and the United States FDA has begun to turn its attention to the effects of metal implants on their recipient's health.

The first ceramic implants were monocrystalline and made of 100% Alumina ( $\text{Al}_2\text{O}_3$ ) or Zirconia ( $\text{ZrO}_2$ ). They were not successful because of the physical properties of these materials. Fast forward to the early nineties, ceramic implants evolved to become polycrystalline, made of ceramic composite capable of withstanding the rigors of the oral environment. Since then there has been a very rapid evolution in the chemical composition, macro and micro design of ceramic implants. In less than ten years we have witnessed ceramic implants evolve from being exclusively one-piece to



two-piece like their metal counterparts. In the last 5 years we have witnessed the largest manufacturers of dental implants adding or seeking to add ceramic implants to their portfolios. Today we have ceramic implants with healing screws, straight and angled abutments and in some cases with metal free prosthetic screws. This evolution has made ceramic implants more versatile and fit to be used in a broad range of teeth replacement situations.

The latest development we are observing is digital dentistry workflows now incorporating ceramic implants. The once difficult to plan and place one-piece implants are remaining relevant thanks to guided surgery. Superior and predictable aesthetics can now be achieved especially since the implants are white in color. With technological advances, zirconia has become one of the materials of choice in implant dentistry, prosthodontics and even orthopedics. A lot has changed in the last decade, patients request less invasive procedures and materials, manufacturers have responded and thankfully dentists in rapidly growing numbers are embracing metal free implant dentistry.

The future is here!

Sincerely,

Sammy Noumbissi, DDS, MS



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LUIS A. ALICEA DMD, MSD

# ESTHETIC REHABILITATION

## with Zirconia Dental Implant on a Complex Pathology Patient

**D**ental fear and anxiety are constant worldwide. The dental fear, pain and anxiety have a direct impact on the dental health of the odontophobic patient. The prevalence of odontophobic persons is estimated to be around five (5%) to fifty-eight (58%) percent, but the percentage could be higher and reach values of seventy (70%) to eighty (80%) percent depending on the geographic areas. The majority of patients with dental fear had a traumatic experience during childhood. Another dental fear contributor are parents with fear of dentists that share their bad experience with the child, creating psychological barriers to access dental services. The socioeconomic status is another limitation to access dental services. The person with low socioeconomic status has more anxiety than a patient of high socioeconomic status. Patients may feel embarrassment of their current dental condition and feel concern of how others perceive them. This may increase a lack of compliance with their dental appointment, or delay in treatment, causing in some cases a worse outcome to the dental treatment.

A root canal is a treatment in which the goal is to preserve the tooth. The root canal procedure includes removal of the pulp or internal dental nerve to address possible infection inside of the tooth. Once the nerve tissue is removed, the space is sealed with thermoplastic material and sealer cements. Most people receive a root canal treatment due to dental decay or trauma. Some root canal treated teeth can become infected after several years. This can cause dental pain or discomfort to the patient, requiring retreatment with another root canal treatment, apicoectomy with retrofill or extraction.

Odontogenic keratocyst (OKC) is a common developmental odontogenic cyst affecting the maxillofacial region. The OKC was introduced by Philipsen in 1956. In 2005 the World Health Organization (WHO) changed the name of odontogenic keratocyst to keratocystic odontogenic tumor. However, most of the dental professionals know it as OKC and I will refer to it as such. The etiology of OKC is not clear however the dental lamina is identified as one of the possible causes of the tumor development. The lamina is the



**Meet the Author -**  
**Luis A. Alicea**  
**DMD, MSD**

Dr. Luis A. Alicea was born and raised in San Juan, Puerto Rico. He pursued studies at the University of Puerto Rico, School of Dentistry. He then completed his Master's Degree, and Prosthodontic residency at that campus, where he focused his training in the placement, and restoration of Dental Implants. He has taught as an Associate Professor in the Research, and Restorative Departments at the University of Puerto Rico, and continues to hold privileges as a professor Ad Honorem in that institution. Dr. Alicea also completed additional training towards certification as an IV Sedation provider, at the University of Alabama, Birmingham.

Dr. Alicea is a member of the Peer Review Committee for "The International Journal of Oral & Maxillofacial Implants," and regularly reviews articles prior to publication for this Journal. He is also a member of the American Dental Association, American Academy of Cosmetic Dentistry, American College of Prosthodontics, Florida Prosthodontic Association, American Academy of Implant Dentistry, Academy of Osseointegration, American Dental Society of Anesthesiology, West Coast District Dental Association, International Academy of Oral Medicine & Toxicology, Holistic Dental Association, Hillsborough County Dental Association, International Academy of Ceramic Implantology, and also participates in the Seattle Study Club.

Dr. Alicea has an undeniable passion, and dedication for the dental profession. He has been practicing in the Greater Tampa bay area since 2006. He likes to give back to the community and participates in Dentistry from the Heart events. He loves spending time with his wife, daughter and twin sons.

tissue that helps develop the tooth. After the tooth has fully developed, the lamina disappears. Some research suggested a portion of the lamina is still on the tooth surface after full development of the tooth, forming the OKC. The OKC is more common in males than females. The diagnose of the tumor is reported between ten to forty years old, but the OKC is an uncommon cyst. Only three to fifteen percent of all odontogenic cysts are reported. Sixty (60 %) to eighty (80%) percent of diagnosed OKC cases are in the mandible, with the distribution of cases reported in the posterior segment of the mandible being forty-nine percent (49%), following with posterior maxillary segment being twenty percent (20%), anterior of maxillary segment being thirteen percent (13%), anterior of mandible being nine percent (9%), bicuspid or premolar area of mandible segment seven percent (7%) and bicuspid or premolar area of maxillary segment being two percent (2%). Twenty-five (25%) to forty (40%) percentage involve teeth which are not erupted. Root reabsorption is uncommon. Multiple Odontogenic Keratocysts are diagnosed as Gorlin Syndrome. This type of cancer affects several areas of the body with nevoid of basal cell carcinoma and multiple OKC in the maxillomandibular bones. The recurrence of the OKC is around thirty percent 30 % in five (5) to ten (10) years from initial surgical intervention. Neville and Damm's Oral pathology textbook reported the OKC recurs due to fragments of the original cyst lining still presents in the bone after the first surgical intervention and developed a new cyst. To eliminate the OKC lining they recommend to do a decortication of the alveolar bone defect with a surgical rotary instrument with copiously normal saline 0.9% irrigation and surgical curette. Also, treatment of

the alveolar bone defect with Carnoy's solution for 3 min or Liquid Nitrogen Cryotherapy. The Canoy's solution consists of 3 ml of chloroform, 6 ml of absolute ethanol, 1 ml of glacial acetic acid and 1 g of ferric chloride (Morgan et al., 2005). The principal limitation of Canoy Solution is carcinogenic due to the content of Chloroform. The other solution used is Liquid Nitrogen Cryotherapy. However, because of the difficulty in controlling the amount of liquid nitrogen applied to the cavity, the resultant necrosis and swelling can be unpredictable (Pogrel, 1993; Salmassy and Pogrel, 1995). The recommendation for the bone defect is to be filled with iodoform gauze and triple antibiotics or reconstruction with a bone graft. The histology of the OKC contains a cystic lumen with serum liquid and could be Keratinaceous debris like cheese looking particles, fibrous wall, epithelial lining with a uniform layer of stratified squamous epithelium (six to eight cell thickness), flat epithelial tissue and connective tissue interface with cyst lining epithelium from the wall.

The zirconia dental implants have several advantages over titanium implants. The zirconia implant is a high strength ceramic not a metal material, white in color and not visible through the gum tissue, offering a more aesthetically pleasing option for patients. Also, the ceramic is a more biocompatible material that will not corrode over time as other dental implants metal materials, so particles from corrosion are not emitted into the body as a foreign body. Holistic alternative to titanium implants, ideal for patients with metal allergies. The osseointegration of the zirconia implant is similar as the titanium dental implant. Zirconia dental implant and zirconia dental prosthesis are more resistant to harbor less initially adherent (plaque).

## Case Report

Thirty-three (33) year old female patient, reports excruciating pain on the left mandible and posterior right maxillary area. Patient with past medical history of anemia, chest pain, high blood pressure, irregular heartbeat, dizziness, kidney problems and psychiatric care. Past dental history includes dental fear, decay, root canal treatments and restorative work. The chief complaint of the patient was mobility "3" on tooth #7. The tooth had a previous endodontic treatment with post and core. Patient reported the restoration came out several times and was bonded several times by a general dentist. She also, reported pain on teeth #3 and #19. Both teeth had previous endodontic treatments. Tooth #19 had a post and core with all porcelain crown. The CBCT reveals a distal root fracture at the post level with periapical lesion.

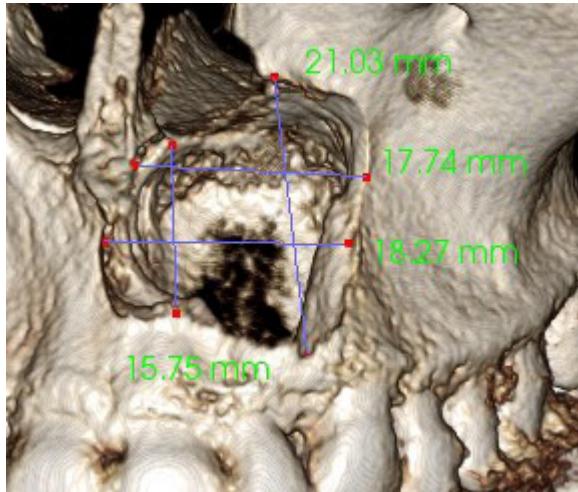


The x-rays and cone beam computer tomography (CBCT) reveal a radiolucent lesion on the area apical to teeth #9, 10, 11. Note that at the time of the dental evaluation patient wore a nose piercing. Our diagnosis was *Odontogenic keratocyst (OKC)*. The patient was referred to an endodontic specialist, for proper evaluation. The

patient declined root canal treatment alternatives and agreed on dental extractions and replacement by dental implants in zirconia.

One of our concerns was the OKC, which the patient reported having for more than (10) ten years and she

would like to address her chief complaint (pain, mobility) and then the bone lesion.



The OKC dimensions is around  $1.7 \times 2.1$  cm



Teeth #3,7,19 were extracted under IV sedation. The areas were decontaminated with surgical curette and piezo surgical instruments with copious normal saline irrigation 0.9%, Chlorhexidine 0.12%, Normal saline 0.12% and 20 gamma of ozone by (30) thirty seconds wait a (1) minute and repeated the procedure. Implant osteotomy was done with a surgical handpiece and implant burs at 800 rpm with copious normal saline irrigation 0.9%. Protein Rich Fibrin (PRF) liquid form was placed over the dental implant surface and bone graft material (to make sticky bone). Zirconia dental implants (AG Dental Point, Switzerland "Xeramex XT & Nobel Pearls") were placed using free hand technique on area of tooth #3 ( $5.5 \times 10$  mm), on area of tooth #7 ( $4.2 \times 14$  mm) and on area of tooth #19 ( $5.5 \times 10$  mm) with Protein Rich Fibrin membranes. Implants were torqued to 35 Ncm. The implant cover screws were placed hand tight. The gum tissue on area # 3 and #19 were closed by primary intention with nylon 4-0 sutures. Hemostasis was obtained. Temporary resin bonded pontic was placed on area of tooth #7 out of occlusion. Zirconia dental implants were chosen as they have several

advantages: they are biocompatible, aesthetic white in color and more resistant to plaque attachment. These were some of the qualities that the patients preferred.

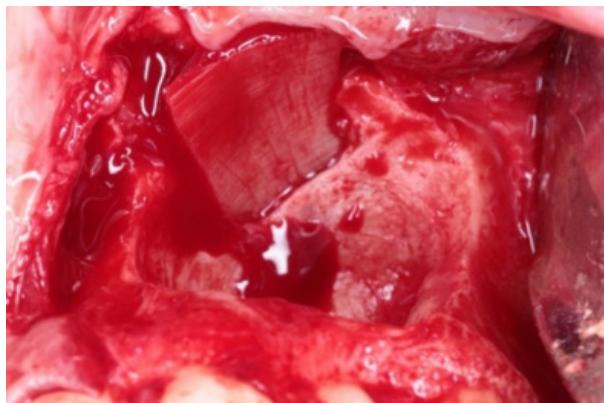
### OKC Surgery Removal (Enucleation)



OKC surgery removal was conducted under IV sedation. In this case we decided to use an alternative biological treatment to the bone defect after removal of the OKC tumor (enucleated). The bone trimmed around 2- 3 mm around circumference with surgical burs and, copious normal saline irrigation 0.9%. Piezo surgery unit with copious normal saline 0.9% irrigation was used with diamond round tip to access in the small corners of the defect. The bone was decontaminated with Chlorhexidine

0.12%, Peroxide 3%, Normal saline 0.9%, laser (BioLase Waterlase) and 20 gamma of ozone by (30) thirty seconds wait a (1) minute and repeated the procedure a total of (6) six times. No data show the effect of the laser or ozone in this type of tumor.

We decided to restore the bone defect allograft bone graft and PRF after decontamination.



The Left nasal floor of the nose was decontaminated and repaired with Laminar Allograft Bone graft 2.0 x 3.0 cm (Maxxeus dental, USA). Tri-antibiotics were applied to the bone and soft tissue surfaces.



5 cc of Mineral Cortico Cancellous allograft Bone Graft (Porus Zimmer Biomed, West Palm Beach, FL) with Protein Rich Fibrin (PRF) liquid or Autogenous Blood-Derived Grow Factor. Protein Rich Fibrin liquid was placed in the bone graft material (to make sticky bone). PRF can be used in liquid form (I-PRF) to add grow factors to the bone graft material. Also you can make the membrane form as Autogenous Blood-Derived Grow Factor Barrier Membranes A-PRF, L-PRF.



Protein Rich Fibrin (PRF) membrane is made by drawing patient's blood and spinning it in a centrifuge. L-PRF or A-PRF is a yellow "jello-like" mixture of white blood cells, fibrin, platelets, stem cells and bone morphogenic proteins. Other authors define PRF as Autologous Blood Concentrates.



The gum tissue on area # 8 and #14 were closed by primary intention with nylon 4-0 sutures. Hemostasis was obtained.

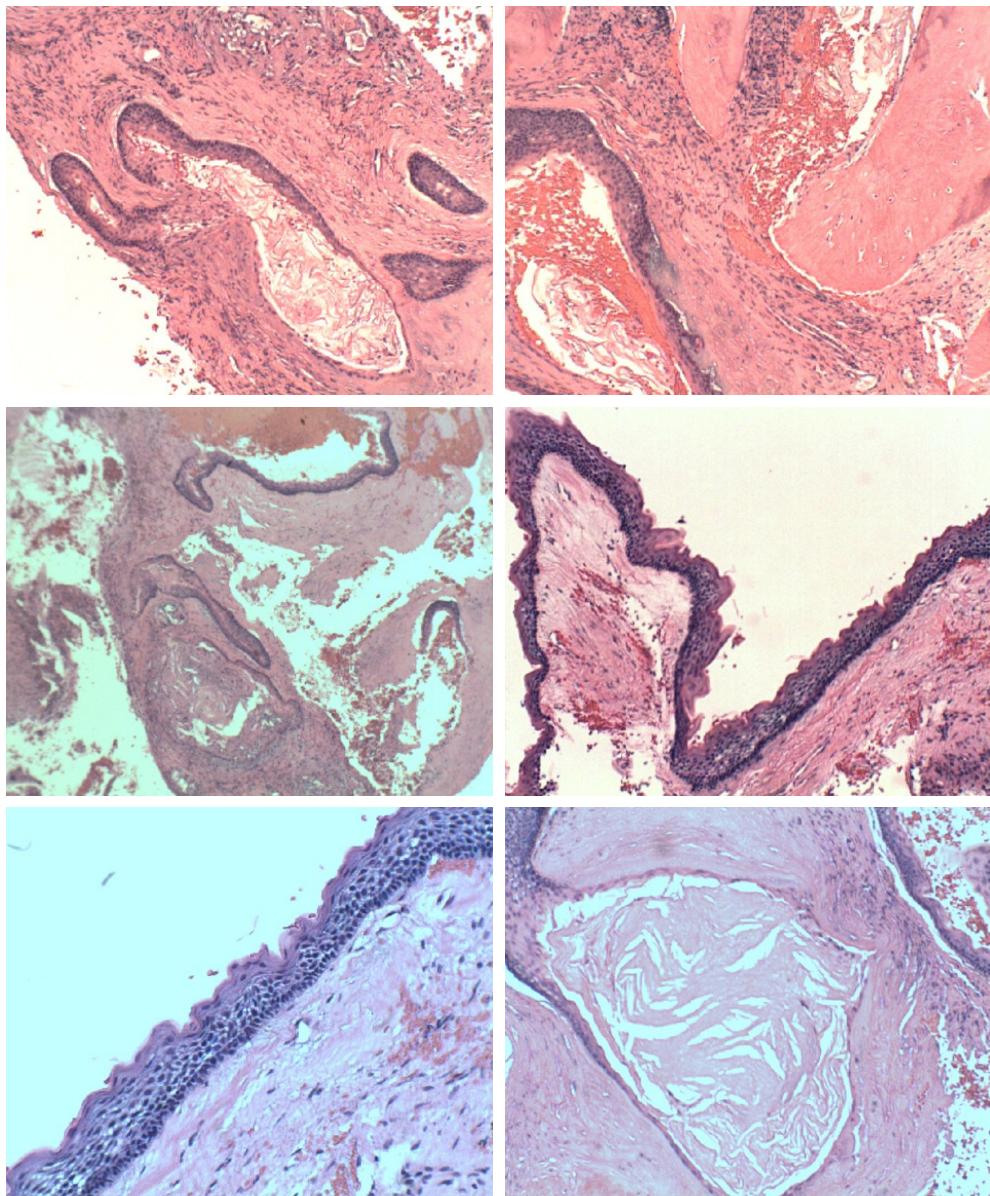




CBCT after removal of the OKC tumor of the cyst and bone defect repaired.

### Histopathologic Films

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Accession#:   
Patient Chart:

**Doctor:** Luis Alicea  
4129 W. Kennedy Blvd.  
Suite 1  
Tampa, FL 33609

**Patient:**

**Tel:** 813-288-9700**Fax:** 813-639-0300**DOB:** **Gender:** Female**Case Information:****Date of Biopsy:** 06/05/2019**Clinical Image/X-rays Received:** Y**Specimen Duration:** More than 10 years**Date Received:** 06/06/2019**Biopsy Type:** Excisional**Specimen Color:** A: UNK**Specimen Location:** A: Anterior maxilla, area of teeth #9, #10, #11 and #12**Clinical Impression:** A: OKC**Gross Examination:**

A: Specimen consists of multiple tan, brown, cyst-like pieces of soft tissue measuring 3.5 x 1.8 x 0.8 cm in aggregate, submitted as is.

**Microscopic Examination:**

A: Examination reveals keratinized odontogenic lining epithelium and supporting connective tissue. The lining epithelium is uniform in thickness throughout the specimen and is composed of 6-8 layers of squamous cells. The basal cell layer exhibits nuclear hyperchromasia and is arranged in a palisaded pattern. The luminal surface of the cyst lining is covered by a corrugated layer of parakeratin. The lining is fragmented and scattered throughout the specimen. The supporting connective tissue is composed of delicate to dense bundles of collagen fibers interspersed by fibroblasts and blood vessels. Large aggregates of desquamated keratin are seen throughout this framework.

**Diagnosis:**

A: Anterior maxilla, area of teeth #9, #10, #11 and #12 : ODONTOGENIC KERATOCYST

**ICD-10:** A: D16.4**CPT:** 88305

This report was electronically approved and signed by Indraneel Bhattacharyya on June 07, 2019.

13



14

The patient was referred to an endodontic specialist, for proper evaluation of teeth #8, #9, #10, #11 & #12. Teeth #9 to #11 are non-vital, she started to report mobility and pain. The patient declined root canal treatment alternatives and agreed on dental extractions. However, the patient declines to wear a temporary removable partial denture. The teeth were replaced by dental implants in zirconia with immediate temporary fix prothesis from tooth #7 to #11. The advantage to replace the teeth by a fixed temporary bridge prothesis is to maintain the architecture of the gum tissue. Tooth #12 responded to a vitality test under normal level. One of our concerns was recurrence of the OKC. The patient understood the benefit versus risk of the possible recurrence of the tumor and will be evaluated every 3 months for life.



Teeth #9, #10, #11 were extracted under IV sedation. The areas were decontaminated with surgical curette and piezo surgical instruments with copious normal saline irrigation 0.9%, Chlorhexidine 0.12%, Normal saline 0.9%, laser and 20 Gamma of ozone per 30 seconds.



A surgical guide was utilized for accurate implant placement. Implant osteotomy was done with a surgical handpiece and implant burs at 800 rpm with copious normal saline irrigation 0.9%. Protein Rich Fibrin liquid was placed over the dental implant surface and bone graft material (to make sticky bone).

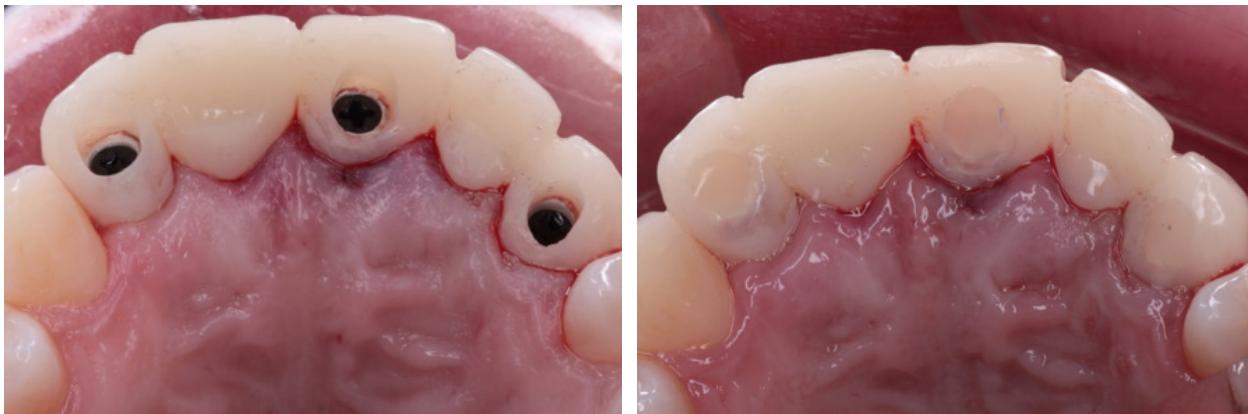


Zirconia dental implants (AG Dental Point, Switzerland "Xeramex XT & Nobel Pearls") were placed on the area of tooth #9 and #11 (4.2 x 14 mm), The primary stability of the dental implant was acquired. The dental implant was torqued to 35 Ncm. Mineral Cortico Cancellous Bone Graft (Porus Zimmer Biomed, West Palm Beach, FL) with Protein Rich Fibrin.



Temporary abutment (AG Dental Point, Switzerland "Xeramex XT & Nobel Pearls") was placed and prefabricated PMMA (Poly-methyl-methacrylate, Ivoclar Vivadent, USA) milled temporary fixed bridge was relined with PMMA material shade A-1, (Anaxdent, USA). The bridge was polished, and the internal connections of the temporary abutments were modified.

15



The screwable implant bridge was torqued to 15 Ncm. Teflon material and composite were used to cover the screw access. The lingual surface was polished with finishing burs and a composite rubber polishing kit (Brasseler, USA). The bridge was designed out of occlusion.



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## Actual Pictures 1-16-2020



The gum tissue outcome looks acceptable, however one error I had during the #8 ovoid pontic bridge fabrication was the over pressure to the soft tissue. I think if I make the pontic more similar in height of tooth #9 the gum tissue response will be better. I decided to wait 4 months for healing and to modify the bridge pontic and retrain the soft tissue. This could help to improve the scallop of the gum tissue levels. We will wait (1) one year to restore the anterior implants with a zirconia screwable fixed bridge.



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## INTERVIEW: SAMMY NOUMBISSI, DDS, MS



A One to One Interview with President and Founder of the International Academy of Ceramic Implantology (IAOCI)

**Q** What did you find most intriguing about ceramic implants?

**A** Ceramic implants are pretty intriguing at first sight because of their color which since composite fillings is the tooth replacement material that looks like a natural tooth. Then when one looks into the materials used to make ceramic implants and the tissue response, you realize that you have something very special and unique.

**Q** How do you stay educated on newer technology?

**A** The first step is to remain open minded. Second, I strive to stay in touch with the literature and research which in the case of metal free implants has grown exponentially in the last five years. Most importantly for me is attending technology and industry meetings as well as clinical.

**Q** More and more dentists are developing an interest towards ceramic implants and several remain in doubt. What advise can you give to those who express their interest and those who remain doubtful?

**A** I incorporated ceramic implants in my practice over 10 years ago and indeed the interest since then has grown significantly especially in the last five years. In the early 2000's there were only two FDA approved and commercially available ceramic implants systems in the United States. As of today, the two top implant manufacturers in the world have ceramic implants in their portfolio and there are seven FDA approved and commercially available ceramic implant systems in the USA. Having said that and based on my and many other early users experience, there is very little reason to continue to be doubtful and skeptical about ceramic implants. For those who are interested in understanding, acquiring knowledge and implementing zirconia implants in their practices, we encourage them to reach out to the academy (IAOCL.COM) and start by attending one of our many events throughout the year and across many countries.

Our 9th annual World Congress is coming up in New Orleans, Louisiana March 12 to 14, 2020 and this is the best way for anyone interested to start because we gather the greatest number of ceramic implant manufacturers and vendors. Our invited speakers are expert clinicians in six different ceramic implant systems and scientists who are at the forefront of research and development of dental bioceramics.

**Q** What type of future do you see for ceramic implants?

**A** The future is essentially here! Given the technological advances in materials technology, I can only see ceramic implants further establishing themselves in implantology and dentistry as a whole. The industry's response has been phenomenal and in the last 4 years current top manufacturers of dental implants have either inserted ceramic implants in their product offerings by either buying out small outfits or outsourcing

*“ The future of ceramic implants is essentially here! ”*

the manufacturing of their ceramic implants; other major players are in the process of adding ceramic implants in their portfolios. However today and in the foreseeable future, metal free implantology will be mostly patient and consumer driven. Patients are increasingly requesting less invasive treatment modalities; regulatory agencies are paying closer attention to implant materials and their effects on recipients and this is not limited to dentistry.

**Q** What are the advantages and disadvantages of zirconia implants compared to titanium alloy?

**A** Both implants are made of different materials which have different physical properties and trigger different physiological responses. Titanium alloy implants are made of metal alloys with manufacturer-specific proportions of titanium, aluminum

and vanadium. On the other hand, zirconia implants are made of ceramic composites and the components consists of zirconia, yttria and alumina. Titanium implants have been widely used for over five decades with great success. However, we now have enough background that making a case for titanium and titanium alloys to be the gold standard of implant materials has become increasingly difficult. There are now well documented issues with regards to material stability in the body environment with titanium implants which have been found to corrode and release metal ions in peri-implant tissues leading to problems ranging from tissue discoloration, metal sensitivity to per-implant osteolysis that lead in many cases to aseptic implant failures. Ceramic implants given their molecular structure are not susceptible to corrosion, their color is favorable when and where aesthetics are a concern and their physical properties contrary to popular belief allow ceramic implants to be used in a wide range of clinical situations.

**Q** Are these implants location dependent (can they be used in molars)?

**A** In the early days ceramic implants were monoblock (one-piece) and this macroscopic feature limited their use. Today we have two-piece ceramic implants which have allowed for a wider range of applications with the same level of success and predictability observed with titanium implants.

**Q** What are the differences in surgical protocol and healing times?

**A** The intrasurgical protocols and steps are no different than with other implants. The healing times and pattern are similar; ceramic

implants just like their titanium counterparts require 4 to 5 months of osseointegration time and in some cases under specific pre- and post-surgical patient preparation protocols can be immediately loaded.

**Q** Any restorative or occlusal modifications needed with these implants? Is the abutment design the same?

**A** When using monoblock ceramic implants, it is sometimes necessary to modify the abutments in height or width. However, one needs to be careful when and how to modify an abutment; proper burs and irrigation are paramount and the clinician should make sure that the implant system selected alloys for chairside post-manufacturing abutment modification. With the increasingly growing range of prosthetic options with ceramic implants, it is possible to minimize the need for intra-oral abutment adjustments. In order to learn how to avoid such constraints doctors should seek training and learn how to select the implants or implant system that suits best their day-to-day clinical needs and philosophy.

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**Q** What companies are considered the clinical leaders (not best advertisers) in the metal-free implant field?

**A** As I mentioned before there are over half a dozen commercially available ceramic implants in the United States and upwards of twenty around the world. In terms of company size Straumann (Straumann Pure), Nobel (Nobel Pearl) and Camlog (Ceralog) are the larger players in the implant industry that have added ceramic implants to their portfolio within the last three years. These three leaders are now conducting and supporting clinical

research and projects around the world. Then you have the smaller outfits such as Dental Point (Zeramex), Swiss Dental Solutions (SDS), CoHo (Zibone) who are doing the same but have had a greater number of implants placed and longer observation times than the big three.

**Q** Will there be hands on courses offered in New Orleans?

**A** During our 9th World Congress in New Orleans there will be hands-on offered by Zeramex on their two-piece screw-retained abutment implants, the Zeramex XT and Swiss

Dental Solutions are offering a two-day program on their implant system using their revolutionary Swiss Biohealth Concept which involves comprehensive health assessment and patient optimization before, during and after implant surgery. Beyond New Orleans the IAOCI as an academy and also in partnership with some manufacturers will be hosting some hands-on and lecture-only programs across the United States, for more information about these educational events I invite your readers to visit [www.iaoci.com/iaoci2020](http://www.iaoci.com/iaoci2020).

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HENRIETTE LERNER, DDS

# DIGITAL DENTISTRY SOCIETY (DDS) AND INTERNATIONAL ACADEMY OF CERAMIC IMPLANTS (IAOCI): A Symbiosis of 2 Advantgardist Trends In Dentistry

## > Digitalization opens the doors to a new chapter in dentistry...

The Digital Dentistry Society International is an international society spread in 60 countries with the mission to be the reference, validation and educational platform in digital dentistry.

Biological treatment and digital workflows are 2 parallel trends in implant dentistry.

In the USA, DDS (<https://digital-dentistry.org>) is partnering with the IAOCI (<https://iaoci.com/>), spreading the digital technologies, science and education in connection with ceramic implants and restorations.

The “metal-free” trend has long been apparent starting with crowns and bridge prosthesis and by extension is also now evident in implantology. Titanium implants are subject to bio-corrosion, especially in the presence of lipopolysaccharides from bacterial walls and that titanium particles have been

found in the peri-implantary hard and soft tissues.

53% of patients who were questioned would correctly leave the choice of implant material to the treating dentist, but a significant 35% of patients would opt for a ceramic implant and only 10% for a titanium implant (Tartsch et.al).

With materials such as Y-TZP-A with a flexural strength of up to 1,200 MPa or ATZ with a flexural strength of up to 2,000 MPa, the risk of fracture is reduced to a minimum. Aging processes due to hydrothermal degradation have hardly any clinical relevance. Aluminum oxide blasting (macro-structuring) and acid etching of the implant surface (micro-structuring) create an enhanced bone-implant contact (BIC) comparable with that which is achieved with titanium, conditions for an optimum Osseointegration.

Two piece Ceramic Implants offer an option along with biologic features, the flexibility of restorations as well as a CAD/CAM approach. (Fig. 1 and 2)

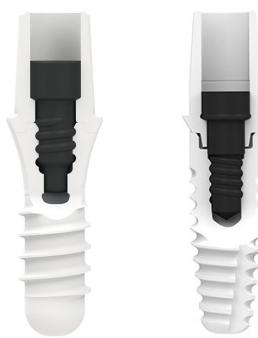
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> Figure 1. Straumann - PURE and SNOW  
> Figure 2. Zeramex P6 and Zeramex XT

2



Procedures consist in the addition of growth factors to collagen membranes and matrixes, in order to enhance the quality of periimplantary soft tissues (Ghanaati et al.).

The main approach in Implant dentistry was started many years ago as "free hand" Implant placement, a "mental" navigation. (Fig.1)

### Today static and dynamic navigation are state-of-the-art

Digital planning and implant navigation assures additional benefits to the implant procedure: higher precision, accuracy, predictability in the protection of the anatomical structures, minimally invasive procedures, faster result, and the possibility of immediate predictable restorations.

Navigation requires a different approach and workflow than free hand surgery, by following the sequence: SCAN, PLAN, MAKE, DONE. (Fig. 3)

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## DIGITAL IMPLANT DENTISTRY WORKFLOW

### SCAN

1. Picture / Face Scan
2. STL Situation
3. Digital Occlusal / Function Registration
4. 2d / 3d smile design

### MAKE

7. Manufacturing : Guide, Provisional ,Abutments

### DONE

8. Implant placement
9. Occlusal adjustment

### FINAL RECONSTRUCTION

- 10.Scanning Provisional
- 11.Scanning Implants
12. Final Reconstruction in Function

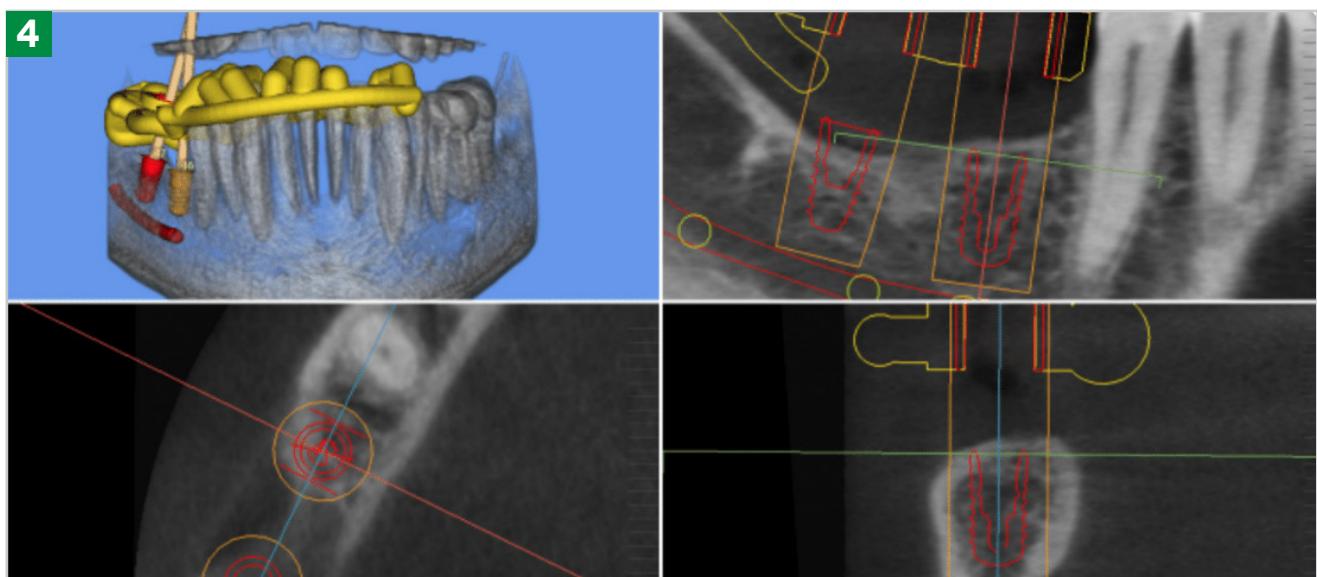
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### PLAN

6. Design Provisional in Function
7. Esthetic guided Implant planning

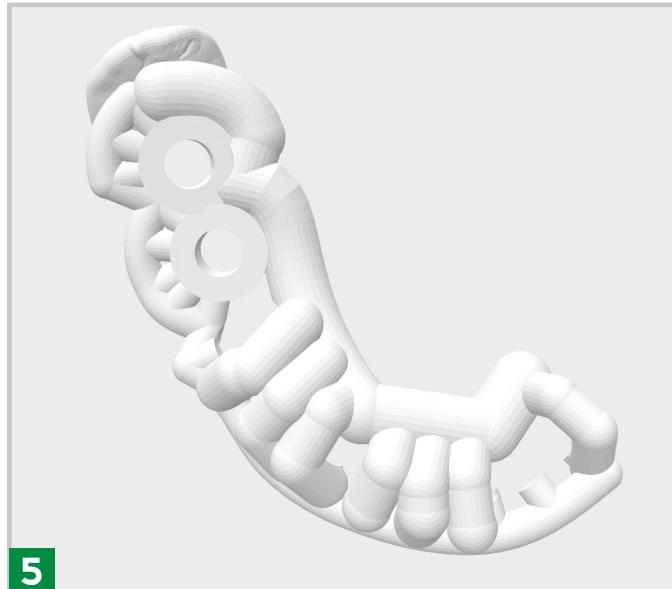
In the following phases, matching and planning of implants and reconstructions are parts of the workflow where esthetic parameters and experience play a primary role. (Fig.4)

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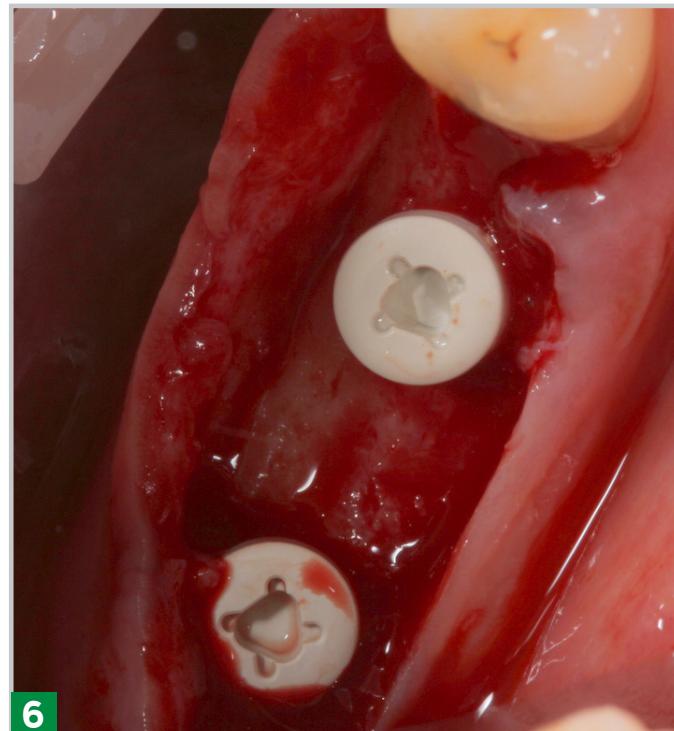


Teamwork, common "language" and education in this new discipline are conditions "sine qua non" for good results. More studies concerning trueness and precision of the technologies are necessary as well as a consequent and controlled implementation in a cohesive workflow.

The surgical guide with sleeves is one of the methods of guided surgeries with the widest usage. (Fig. 5)



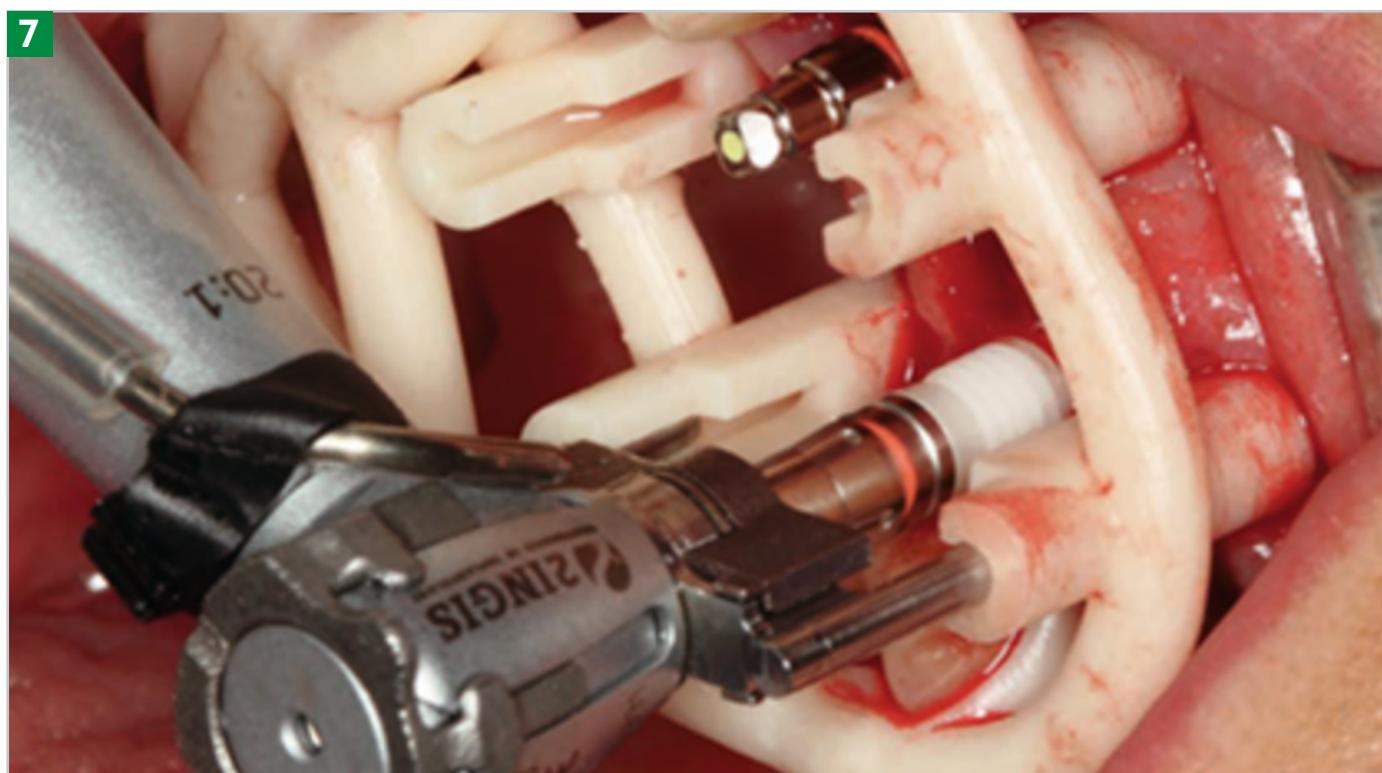
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In comparison, 2INGIS (Belgium) is an innovative sleeveless guided approach, compatible with all implant systems.



## The advantages of the “2INGIS” guided system:

Sterilizable at 135 degrees, open structure, good visibility, great irrigation, surgical approach without guide contact contamination and compatibility with any surgical system. There is no need for a system specific guide and it allows for implant placement in cases of limited space of mouth opening. They seem to have a higher accuracy compared to all systems.

Dynamic Navigation (Navident, Claronav, Canada) is a free hand surgery by 3-dimensional navigation that has proven to be more accurate than free hand implant placement (Block et al.). Fig. 7.



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## Common targets of the DDS / IAOCI cooperation:

- To validate all new digital technologies and their applications to ceramic implants.
- Set up esthetic parameters of planning, esthetic success.
- Build up a coherent, systematic approach, and workflow, for a predictable treatment.
- Common education in the symbiosis of digitalization, esthetics and biological driven implant dentistry.

Be present at  
The Third Digital Dentistry  
Society Consensus Conference  
2-3 October 2020  
Serralunga d’Alba, Italy

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**Meet the Author - Henriette Lerner, DDS**

Dr. Henriette Lerner is the founder and Director of HL Dentclinic and Academy in Baden-Baden, Germany, which is an academic clinical, teaching and research facility of the Johann Wolfgang Goethe University, in Frankfurt on Main, Germany.

Dr. Lerner is the Past President of the Digital Dentistry Society International (DDS).

In 1990, Dr. Lerner was granted the degree of Doctor Medic. (DMD degree) from the Faculty of Dental Medicine, in Temeschburg, Romania, and then completed her post-graduate education in Oral Surgery, in Bucharest Romania. Later, Dr. Lerner’s education in Implant Dentistry was completed in Germany and at Boston University.

Among her other certifications, she is a Board Member & AMP; Expert for the DGOI (The German Society of Oral Implantology,) and is an ICOI Diplomate. Dr. Lerner is also an Editorial Advisor for two scientific journals (Practical Implantology and DGOI Oral Implantology). She is the author of a number of scientific papers and book chapters (Esthetics in Dentistry; Implant Esthetics), which detail esthetics in Implantology, grafting procedures, biomaterials science and digital technologies. Dr. Lerner’s expertise spans the fields of clinical research, advanced techniques in the Digital Workflow of complex implant cases, soft and hard tissue augmentation techniques, biomaterials research, dental aesthetics, and designing functional occlusion in complete oral rehabilitation.

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# CONTRIBUTOR SPOTLIGHT



2INGIS is an innovative Belgian company founded in 2008 by Philippe De Moyer, that specializes in the design and manufacture of custom medical devices and more specifically surgical guides for the placement of dental implants.

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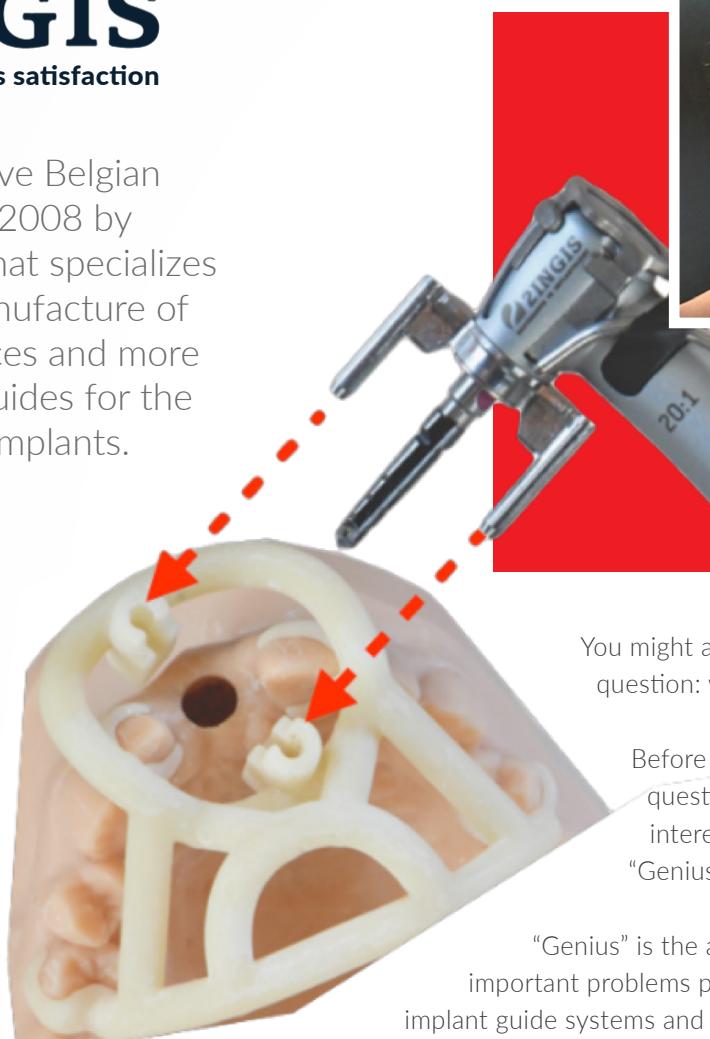
Thanks to its revolutionary and patented double guide system, the 2INGIS surgical guides allow for faster and minimally invasive surgeries, while maintaining a very high level of safety during surgeries.

These three assets are perfectly reflected in the motto of 2INGIS: **"Simple, precise for patient's satisfaction"**.

The founder, Philippe De Moyer is the creator and inventor of the double guidance, the "Genius" system unique in the world and patented.

The double guide technology is the result of his forty-four years of experience in the dental sector and 19 years in the field of guided surgery.

Philippe De Moyer started producing guides for guided surgery with central sleeves like all other existing systems, before he had the idea of separating the guidance from the borehole. This brilliant revolution led to the creation of 2ingis society.



▲  
**Philippe  
De Moyer**

You might ask yourself the question: what is "Genius"?

Before answering this question, it would be more interesting to ask why "Genius"?

"Genius" is the answer to the important problems presented by traditional implant guide systems and offers the following solutions:

- Irrigation of the implant site,
- Visual control of the implant site,
- Totally avoids the presence of metal residue or resin in the opening site intended for the implant,
- Eliminates any risk of contamination of the implant surface during placement,
- Possibility of sterilization of the guide.

"Genius" has been designed and developed to overcome the limitations of centrally guided guides by creating coaxial guidance.

This guidance which is fixed on the handpiece differs greatly from the guides with central sleeve.



The 2ingis bilateral guidance system responds to the shortcomings displayed by conventional central guidance systems and is the only system that provides the following possibilities:

- Use standard drills and implant drivers from different implant brands.
- During surgery you can switch from drilling to an expansion screw or condensation drills.
- Tapping the implant site using standard taps.
- Place any different shapes or brands of implants with the same 2ingis kit.

**“‘Genius’ is  
the answer to  
the important  
problems  
presented by  
traditional implant  
guide systems.”**

“Genius” surgical guides can be produced in Cr-Co, Ti or resin. They are fixed on the teeth with hooks and / or screwed into the bone for complete edentulous cases and thus offer optimal stability on the jaw.

The surgical guide is perfectly adjusted on the teeth and gums and allows to have an optimal control on the position of the guide.

The 2ingis guides have undergone many evolutions since the foundation of the company and the filing of the first patents, beginning with bilateral guides in PMMA before evolving towards more open and refined guides printed in Cr-Co, Ti and resin.

Today 99% of the guides are printed in resin. All 3D printers and resins are not suitable. At present only a limited selection of printers may be suitable. Here are some examples: Nextrdent 5100, Envision one, Asiga, ...

Likewise, all resins are not suitable. Only biocompatible resins for medical devices are eligible. 2ingis favors resins sterilizable at 135 ° C.

“Genius”, the latest development from 2ingis, offers the most advantages and benefits to dentists and surgeons, namely:

- **Sterility:**

All 2INGIS® Cr-Co, Ti or Resin guides can be sterilized at 135 ° C, thus ensuring that the sterilization chain is maintained.

- **Rigidity:**

Non-flexible materials offer a great stability in the mouth thus offering more safety during surgery.

- **Open structure:**

Thanks to double guidance, the surgery receives optimal irrigation and a perfect view of the surgical site. All conventional surgical procedures can be performed also including the addition of bone material and membranes.

- **No contact with the drill or implant:**

The 2ingis bilateral guiding offer the possibility to use, drills and to place the implants without any contact with the guide during the drilling or during the placement of the implant.

As a result, there is no risk of introducing metal debris or resin into the implant site and contaminating the surface of the implant with the guide.

Dentists and surgeons are not the only ones enjoying the benefits of “Genius”. Indeed, 2ingis surgical guides are also beneficial to patients for the following reasons:

- **Sterility:**

Thanks to sterilization at 135 °, there is no risk of infection by the guide.

- **Less need for mouth opening:**

The 2ingis guides compared to other guides, requires 22 mm less mouth opening. This gives patients more comfort during surgery and allows placement of implants even with an extremely small mouth opening.



- **Surgery with or without a small flap can be performed which offers the patient a postoperative without or with little pain.**

- **Control over the result:**

Thanks to the precision of the surgery, all the prosthetic expectations can be reached.

### How does the 2ingis system work?

Everything started from two main interrogations: are the radiological data correct and do we have the possibility to place implants?

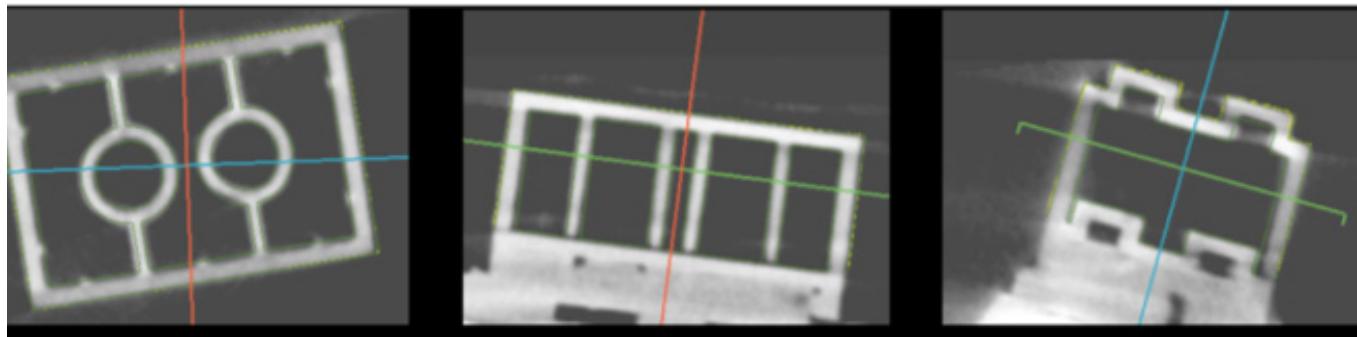
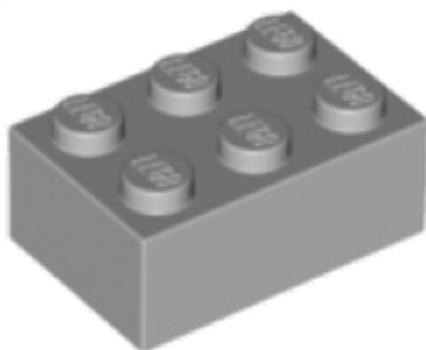
The former interrogation is linked with the 2ingis motto to does not leave the accuracy to chance. The first step is to control the radiological acquisitions.

To ensure that the radiological data are perfect, 2ingis recommends the use of references in order to control the accuracy of the data.

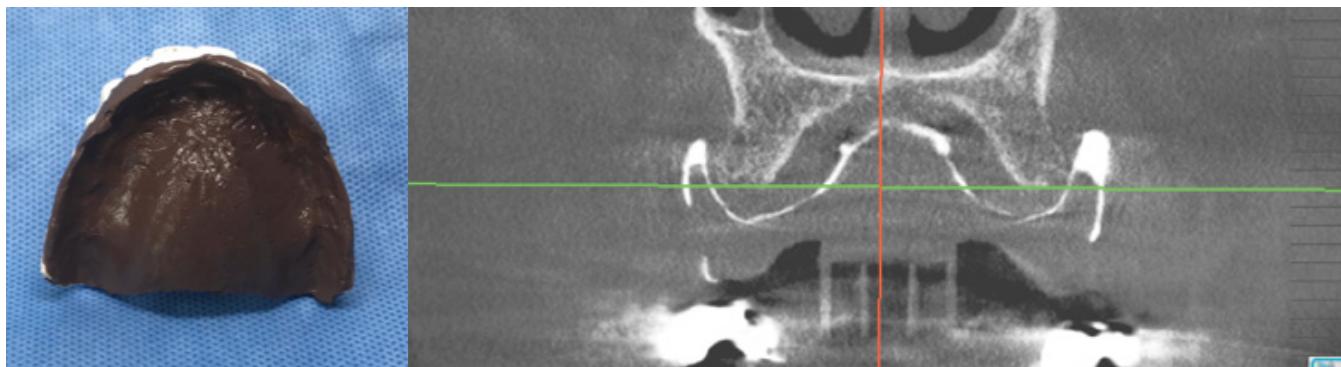
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2ingis uses Lego® blocks. These blocks are radio opaque and have an accuracy of 5 microns.

If the Lego® blocks in X-ray images exhibit deformation, this underlies a deformation of the X-ray data and, in addition, renders them unsafe. If this is the case, it is advisable to redo the radiological acquisitions.



For complete edentulous cases, it is necessary to be able to check if the guide is correctly placed in the mouth against the mucous membrane. To check this 2ingis advises the use of radio-opaque impression pastes like Permlastic from Kerr or Hydrorise from Zhermack.

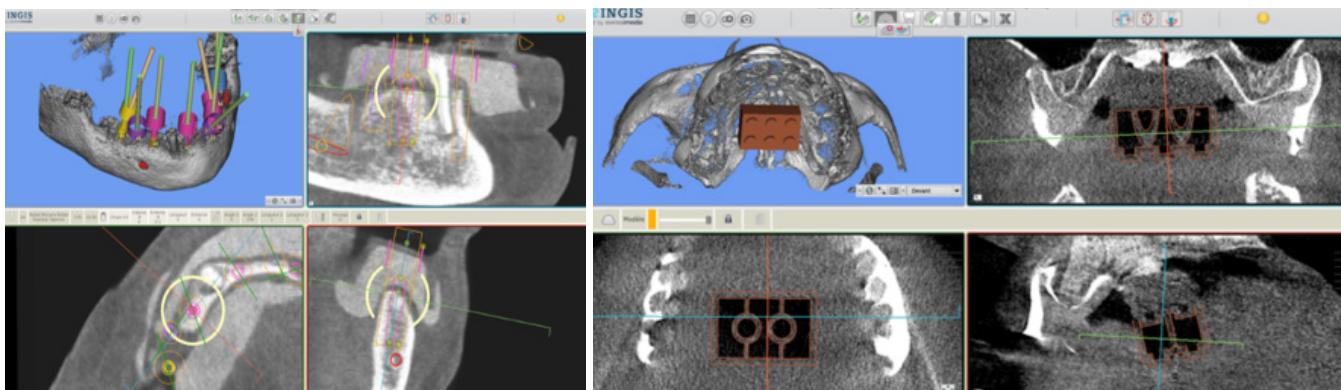


These radiopaque impression materials are clearly visible (white line) in the radiological images of the cone beam.

If the imprint is not correctly placed in the mouth, a black line or spot is seen against the white radiopaque area. If this is the case, it is advisable to repeat the radiological acquisitions.

The second interrogation is solved in the 2ingis/SMOP planning software.

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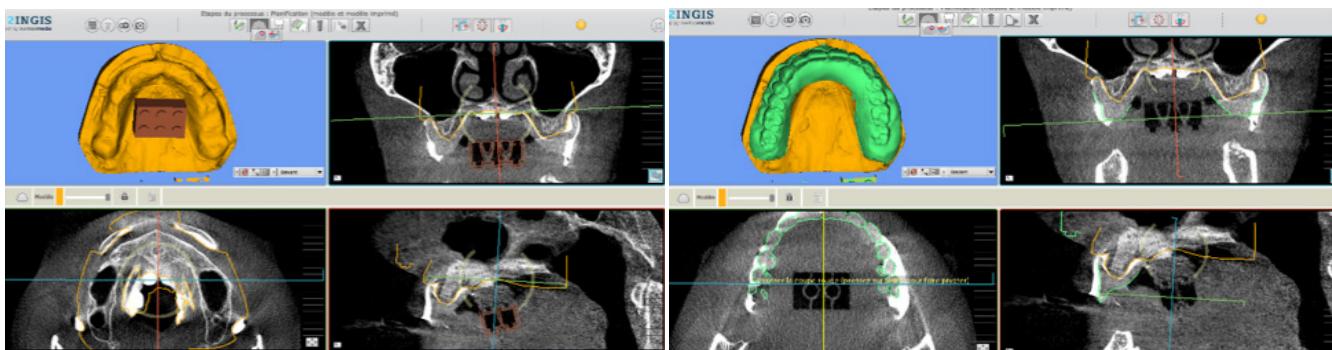


The patient's mouth information can be taken analogically via impression which are then scanned with a 3D laboratory scanner or digitally taken via a digital buccal scanner. The goal is to create digital STL files that can be integrated in the 2ingis software.

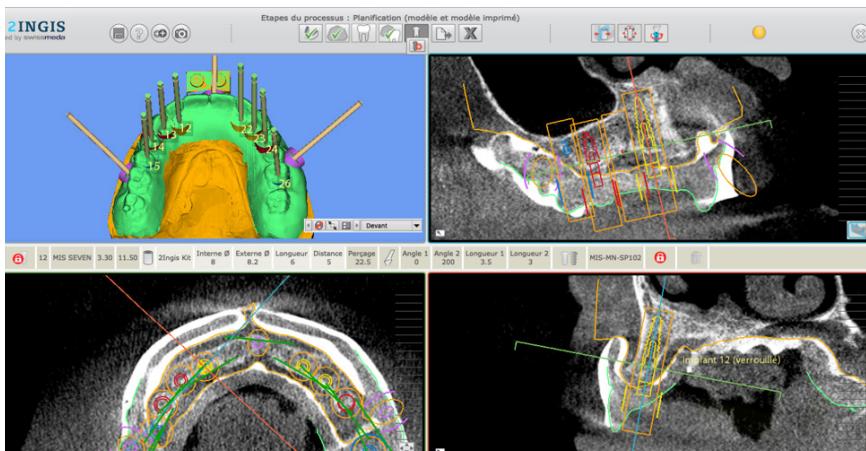


**PHOTO CREDITS:** Open Technologies and 3Shape TRIOS Intraoral Scanner

The Lego® reference is used to integrate the different STL files of the model as well as the mock-up .



Thanks to this information, we can now plan the exact position of the implants in correspondence with the prosthetic outcome.



**PHOTO CREDIT:**  
NextDent 5100 - 3DSystems.com

These planning data are then used in the 2ingis modelling software to design the 3D drawing of the "Genius" surgery guide.

"Genius" guide is then printed in a high-quality 3D printer.



Each guide is delivered with his individual surgery treatment plan per case. This surgical plan is made up of the standard drills and implant drivers from the surgical kit of the desired implant brand.

Then during the surgery, the surgeon follows step by step the drilling sequence until the implant placement.



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All stages of drilling and implant placement are completely guided from start to finish.

Furthermore, a study realized by Dr. Schnutenhaus from the University of Ulm comparing the precision of the existing guiding system available in the market has shown that our double guiding system 'Genius' is the most effective and precise. This study named "**Precision of sleeveless 3D drill guides for insertion of one-piece ceramic implants: a prospective clinical trial**" was published by Quintessence in their International Journal of Computerized Dentistry, Issue 2/2018, Volume 21.

Additionally, the 2ingis system can be used for any type of implant placement, single or multiple unit, with or without immediate loading.



# 25

YEARS

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**SAURABH GUPTA, BDS, MDS**

# IMMEDIATE REPLACEMENT of Infected Tooth in Mandibular Posterior by Zirconia Implant

This case study reports the replacement of an infected root by a monobloc zirconia implant in the first mandibular molar region. The procedure started with atraumatic extraction of root stump, thorough curettage, debridement of socket and followed by immediate placement of monobloc zirconia implant. Good primary stability was achieved, and the zirconia implant was restored with a zirconia crown after 6 months. Follow up after 1 year disclosed success in osseointegration with optimum form and function.

## Introduction

The search and innovation on oral implantology have been on the rise despite the existence of the titanium implant option. The reason for this need for alternatives is due to the increase in titanium allergy reports, as well as the demand for higher aesthetic standards and for metal-free reconstructions. This eventually resulted to the proposal for the use of advanced ceramics as possible replacement [1]. The evolution of the industry of zirconia has opened the advanced treatment alternatives for implant dentistry. In comparison with other ceramic-oxide types, zirconia displays outstanding mechanical and biochemical properties [2]. Since it has been introduced in the dental industry, zirconia, has been used as a fundamental material suited for dental all ceramic crowns and dental implants together with metal-free abutments. Zirconia is highly suited to be used for dental prosthesis because of its material properties and it has a natural

tooth-like color. Additionally, human studies have shown reduced bacterial adhesion on zirconia than on titanium [3-5]. Zirconia exhibits fewer inflammatory cells in peri-implant soft tissue, as well. Hence, this leads to minimal chance of peri-implantitis to occur in a zirconia implant [6,7].

An organized review study recently conducted showed survival rate of 95% of one and two piece zirconia implants [8]. Based on this assessment, the marginal bone loss and survival values of one and two-piece zirconia implants are quite acceptable. Also, it must be highlighted that there is lack of data specifying the outcome of the zirconia dental implants in the long run research studies. Thus, with time it has become essential to conduct more research and clinical studies for obtaining additional information and long-term data. In this context, a case study is also valuable for identification of risk factors for biological and technical complications.

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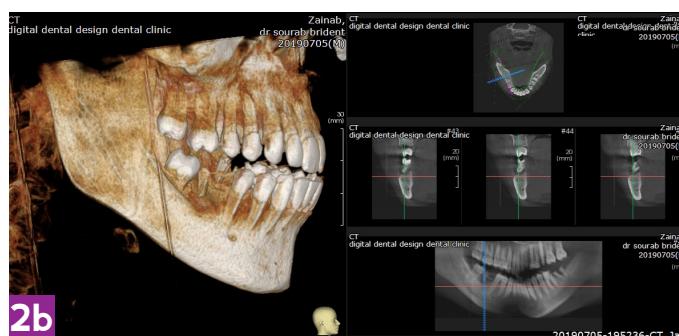
**Meet the Author -** **Saurabh Gupta, BDS, MDS**

Dr. Saurabh Gupta is graduated from Manipal University, India and holds a Master's Degree in Oral & Maxillofacial Surgery from RGUHS, Bangalore, India. He is also trained in multiple allied surgical disciplines including Implantology, Laser and Digital dentistry. Currently, he is working as Clinical Director, Digital Dental Design Clinic & DVG's lab (3M Authorized), Bangalore. He is also a visiting senior consultant at Aarogya Dental and Maxillofacial Center, Delhi.

He lectures nationally and internationally, he is Education Director/ Board Member of International Academy of Ceramic Implantology, which is the first academy in USA dedicated to metal free implantology. He is an active member of ZIRG (Zirconia Implant Research Group), whose objectives are to lead and orient research in metal free implantology and support young and established clinicians in clinical and scientific research. He is also serving the "Bioceramic Division" of "The American Ceramic Society", Ohio, US. He is also involved in Research and Development projects at Indian Institute of Science (IISc), Bangalore. He is also a fellow and ambassador for CleanImplant Foundation, whose mission is to assess production quality and cleanliness of commercially available implant surface. At present, he is involved in several research studies on zirconia implant materials and digital dentistry.

## Initial Situation

A female patient (30 years old) came complaining about her broken infected molar tooth in the lower right jaw [Fig.1]. The patient was quite healthy and a non-smoker. Her tooth was badly infected with surrounding inflamed gingiva. According to clinical assessments there was little pain during percussion. Radiographs were performed to conclude the examination and it revealed an infected root stump [Fig.2 a, b]. The patient was looking for a metal free option and agreed to undergo an extraction followed by an immediate zirconia dental implant placement.



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## Surgical Procedure

Extensive maintenance and ultra-sonic scaling were performed before the tooth extraction and the placement of a zirconia dental implant. Under 1:200000 adrenaline in local anesthetic, atraumatic extraction surgery was performed [Fig.3]. Extraction space was exhaustively debrided with the use of bone curettes. Manufacturer's instructions have been followed in the preparation of the implant bed [Fig.4]. For the preparation and maintenance of a straight vertical position for the zirconia implant, implant indicators have been used. Zirconia implant (Bredent whitesky, Germany) with 4mm diameter and 12mm length and about 4mm abutment height was placed immediately with optimal stability (35N) after the atraumatic extraction and curettage [Fig.5,6]. The site was covered with collagen and was approximated with suture 3-0 black silk material without any bone graft [Fig.7] and a radiograph was taken Fig. [8,9,10]. Prescriptions included pain killers, antibiotics and betadine mouthwash, and homecare postoperative instructions were also given. After seven days, the sutures were then removed, at that time there was sufficient visible wound healing. Additionally, a PMMA tentative restoration was fabricated and given straightaway after the removal of suture [Fig.11a].





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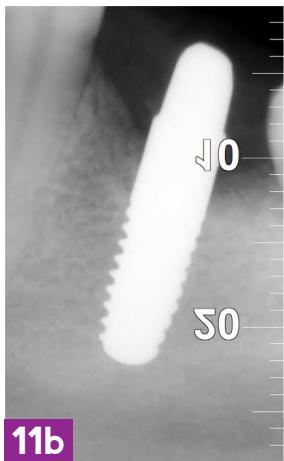
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## Prosthetic Phase

The osseointegration procedure was successful and the implant was planned for the restoration using Lava 3M zirconia crown after 5 months [Fig.11b]. The abutment part was prepared with the use of Magic-Touch burs (Strauss & Co.) and a light body and putty impression was taken. Zirconia implant restoration intaglio surface was cleaned and primed with double coating of Z-Prime plus (Bisco) and cementation was done with 3M ESPE resin self-adhesive cement. Extra cement was carefully removed with the use of dental floss soon after the final crown cementation. The crown occlusion was checked with articulating paper of 12microns thickness.

Appointments of control and maintenance were fixed at six months and a one year follow up. The crown implant remained functional and no technical complications were seen during the said time frames. The soft tissue that surrounds the implant was seen to be quite

healthy. One year after the placement of the zirconia implant the surrounding bone remodelling was normal with a stabilized bone boundary. The patient was satisfied with the treatment procedure with respect to function and aesthetics [Fig.12a,12b,13].



11b



12a



12b



13

## Conclusion

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There was no record of any biological or technical complication one year after the function. Therefore, it has been concluded that zirconia implant usage was a suitable option for a titanium implant alternative. The surrounding soft tissue on the implant crown after placement was stabilized and exhibited superior zirconia bio-ceramics biocompatibility. The vertical position of the zirconia implant is a vital factor for the success of the said implants because the implant's soft tissue collar should be positioned apically at a certain depth that permits for the development and attachment of soft tissue going towards the restorative platform. Since it was a single-piece implant, the restoration process requires cementation, and this means there was possible risk of extra cement to be

retained sub-gingivally, which could lead to complications like bone loss or implant failure. Further clinical studies are needed for the long-term zirconia implant success rate evaluation.

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SUSAN WINGROVE, RDH, BS

# WHAT ABOUT CERAMIC IMPLANTS?

## Maintenance and Home-Care

Implants are a proven, successful tooth and root replacement with titanium as the go-to material for implants due to biocompat-

ability and proven mechanical properties. Ceramic, zirconia-based implants have emerged as a metal-free, aesthetic, non-toxic

alternative with a lower plaque affinity as compared to titanium implants.<sup>1,2</sup>

Zirconia ceramic ( $\text{ZrO}_2$ ) is now being used as a restorative biomaterial, for implants and implant abutments. This is primarily due to its tooth-like color and light transmission making it a preferred choice to the gray color of titanium especially in the esthetic zone.

There is still some confusion on how ceramic, zirconia-based implants, are considered metal-free with zirconium in the composition. Zirconium is by definition the metallic form of the element Zr, a grayish-white transition metal. Zirconium dioxide ( $\text{ZrO}_2$ ) by contrast is a white crystalline oxide of zirconium also called zirconoxide and is 100% ceramic material.

Metals are highly reactive and atoms of metal elements such as zirconium collide with atoms of non-metallic element like oxygen forming an ionic compound  $\text{ZrO}_2$ . This allows for property changes such as the white color, minimal electrical conductivity, and barely reactive for an ideal implantology application.

The question then becomes what instruments are safe to debride ceramic implants and are the home-care recommendations different? Biofilm as a major risk factor for peri-implant disease, making removal of plaque, biofilm at time of in-office maintenance visit and home-care recommendations to prevent biofilm formation the cornerstone of implant maintenance.



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### Meet the Author

#### Susan Wingrove, RDH, BS

**>** Susan Wingrove, RDH, BS, International speaker, author, researcher, instrument designer, and 2016 Sunstar RDH Award of Distinction recipient. Susan is member of the American Dental Hygienist's Association, International Federation of Dental Hygienists, Oral-B Global Implant Board (P & G), and Western Society of Periodontology. Published author for multiple journal articles, Scientific Panel for ACP Clinical Practice Guidelines, as well as Implant Maintenance Textbook: [Peri-Implant Therapy for the Dental Hygienist: Clinical Guide to Maintenance and Disease Complications](#). Resides in Missoula MT.

Contact: [sswinrdh@gmail.com](mailto:sswinrdh@gmail.com) / [wingrovedynamics.com](http://wingrovedynamics.com)

Biofilm formation for zirconia-based implants have been compared with titanium and found to be similar in vitro and in vivo.<sup>3</sup> Other studies show no significant differences in initial adhesion, biofilm thickness, or periodontal pathogens in culture between titanium and ceramic implants.<sup>3,4</sup>

Professional implant maintenance protocol for ceramic and titanium should include; removal of biofilm with powder streaming device using erythritol or glycine powder (14 and 25 microns particle size). Followed by assessment and debridement if calculus or residue is present. The use of titanium implant scalers or titanium ultrasonic tips have been shown in scanning electron

microscope (SEM) studies to effectively remove the calculus or residue and not leave residue behind on both ceramic and titanium implants.

For optimal implant maintenance, complete the maintenance protocol with the use of an antimicrobial varnish, Cervitec Plus by Ivoclar Vivadent, which can prevent biofilm formation for up to three months.<sup>5</sup> Schedule in-office maintenance re-care at least every six months based on medical systemic risk factors, previous periodontal disease, general overall health and home-care.<sup>6</sup>

Home-care recommendations are vital with placement of any implants with a focus on biofilm elimination and ceramic implants have been shown to

accumulate less plaque for resulting improved soft tissue management.

American College of Prosthodontists Clinical Practice Guidelines state patients with implant-borne restorations use these oral hygiene aids; dental floss, water flosser, air flossers, interdental cleaners, and electric toothbrushes to disrupt biofilm daily.<sup>6</sup> For healthy implants, a protocol of brushing, floss or use water flosser, rubber tip stimulator for keratinized tissue and rinse with non-alcohol antimicrobial mouth rinse twice daily is recommended.<sup>7</sup>

Ceramic, zirconia-based implants, offer another alternative to titanium implants with positive mechanical and chemical properties, as well as superior choice with low plaque accumulation for long-term implant success.<sup>7</sup>

40



2

> Implant debridement, Titanium Wingrove L3/4 scaler by PDT, Inc.

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**PHOTO CREDITS:** Images by Straumann and Wingrove Dynamics.

SAMMY NOUMBISSI, DDS, MS

# IMMEDIATE PLACEMENT

## of Two One-Piece Ceramic Implants in the Aesthetic Zone

**D**ental implants have revolutionized dentistry and most particularly fixed and removable prosthodontics. Titanium implants have had great success over the last five decades however some challenges have emerged in terms of cosmetic concerns as well as an increasing number of patients requesting less invasive materials and the loss of appeal for implanted metal. The latest research on the long-term stability of titanium and titanium alloys in the body has exposed the vulnerability and the systemic effects of metal alloys when exposed to the oral environment<sup>1</sup>. The breakdown of metals and Titanium alloys are now known to undergo structural breakdown while in the oral environment<sup>2,3</sup> leading to metal ions and particles being found in peri-implant tissues, lymphatic tissues and even distant organs. Most recently clinical reports, immunological research<sup>4</sup> have put into question the widely accepted biocompatibility of titanium and titanium alloy implants.

The clinical situation presented here is one where metal sensitivity was a concern and although the patient never received dental implants in the past, there was concern on his part in having metal alloy implants in his jaws. Furthermore, in this instance the patient had a history of rashes when exposed to metals or non-precious jewellery therefore the request was made to replace the non-restorable teeth with metal free dental implants.

### Clinical Case

A 36 year old male presented with extensive decay in the anterior maxilla and a previous experience with restorative dentistry. The anterior maxillary six teeth had deep cervical decay which extended below the gingival level. Upon clinical and radiographic examination, teeth #8

and #9 were determined to be non-restorable. (Figure #1) A Cone Beam CT scan was obtained and reviewed to assess bone levels and anatomy in the areas of planned implant placement. The clinical findings were confirmed upon review of the sagittal sections of the CBCT scan. (Figure #2 and #3)



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### Meet the Author

#### Sammy Noumbissi, DDS, MS



- Private Practice Silver Spring MD, USA
- Professor Department of Biomedical Sciences and Dental Surgery University of Milan, Italy
- President and Founder, International Academy of Ceramic Implantology (IAOCI), USA
- Chair and Interim Director, Zirconia Implant Research Group, ZIRG, USA
- Ambassador & Fellow, Clean Implant Foundation, Germany



The patient reported a history of metal sensitivity and requested a metal free fixed solution to replace the unrestorable teeth as well as the crowns on his natural teeth. Alternative treatment options were presented including a removable partial denture and a six-unit fixed bridge. The patient opted for extraction of the two maxillary central incisors to be replaced with zirconia ceramic implants. A two-phase treatment plan was established and presented to the patient. The first step would be to prepare, and buildup of the lateral incisors and canines followed by the extraction of the central incisors with immediate placement of two one-piece ceramic implants during the same visit. The second phase was allowing the implants to osseointegrate but also adjust and update the temporary appliance in order to optimize gingival contours. Thirdly was the restorative of the implants and teeth with porcelain fused to zirconia crowns.

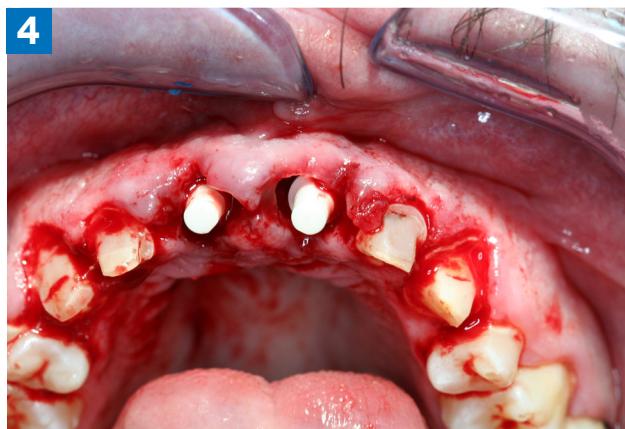
The implants selected were from Z-systems both 4.1 mm diameter and tapered. Complete blood work of the patient was done, and particular attention was given to vitamin D3 Levels, RBC Mg (Red blood cell Magnesium), blood cholesterol (HDL/LDL) and HbA1C. Vitamin D3 plays an important role in bone healing and bone formation around dental implants<sup>5,6</sup> and RBC Mg is an activator of Vitamin D3<sup>7</sup>. Furthermore, elevated cholesterol has been well documented to interfere with osteoblastic activity and is often correlated to low Vitamin D3 levels. Vitamin D3 levels were initially found at 14 ng/ml and the patient was placed on a weekly intake of 50,000 IU of Vitamin D3 for 6 weeks along with Vitamin K2 and retested. RBC Mg, HbA1C and HDL/LDL cholesterol ratio were all within normal ranges.

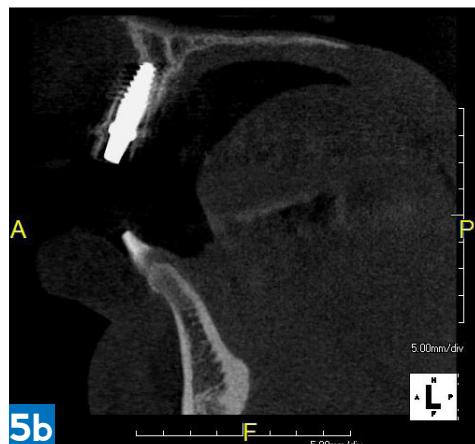
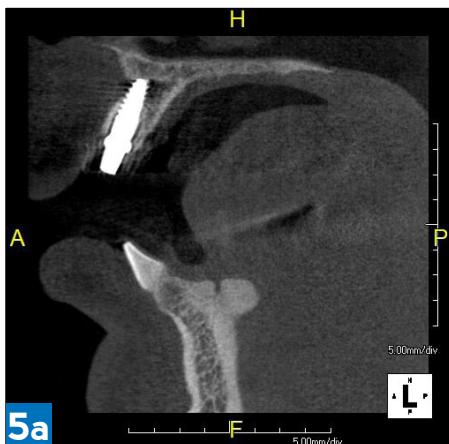
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After six weeks the patient was retested only for Vitamin D3 which was measured at 45 ng/ml and was asked to continue for another 4 weeks post-surgery. The patient returned for surgery, consents were obtained, local anaesthesia was administered across the anterior maxilla by infiltration. Extractions of the central incisors was done as minimally atraumatic as possible using manual periotomes and piezo surgery all the while taking care to preserve the buccal plate on both sites.

Two one-piece ceramic implants were placed at #8 and #9 (Figure #4). The length of the implant was selected so that it would extend beyond the apex of the extracted roots (Figure #5a and 5b). This was done in order to engage fresh bone and achieve the highest possible primary stability. The manufacturer surgical kit was used, and the prescribed osteotomy protocol closely followed. Insertion torque values for both implants were recorded at 35 Ncm and all implants showed good initial clinical primary stability. A periotest device (Figure #6) was used to assess the stability of the implants immediately after placement.





“ Dental implants have revolutionized dentistry. ”

The values recorded were PTV=-4.8 for #8 and PTV=-4.4 for #9 on a scale of 0 to -8 with the latter being the highest achievable stability value. This modality has been well proven and documented to assess implant stability as well as biological readiness for implants to be restored<sup>8</sup>.

No bone grafting was necessary as the implant filled the sockets. The initial fixed temporary acrylic bridge was delivered with the crowns on # 8 and #9 not connected to the implant abutments (Figure #7). This was done in order not to exert any premature load on the implants during osseointegration.

Two months after surgery as the soft tissue healed there was some retraction (Figure #8). Impressions were made and a new fixed temporary with improved aesthetics was made milling a PMMA block. The soft tissue was further allowed to mature and conform to the new temporary healing prosthesis. (Figure #9).





The PMMA temporary prosthesis was worn for another four months. The patient returned for the final prosthetics phase, the PMMA temporary fixed bridge was removed and analog impressions were made using polyvinylsiloxane heavy and light body using the closed tray technique. Single crowns were made for each tooth and implant and were cemented using a resin modified glass ionomer cement (Figure #10). The behavior of the soft tissue was evaluated periodically for a year after permanent crowns cementation and was observed to be stable and most notably to improve further around the implants (Figure #11).

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The patient was satisfied with aesthetics of the prostheses. He was returned to his dentist for restorative on the other teeth as well as oral hygiene counselling and maintenance. The patient has been followed up periodically for the last forty-eight months and there have been no complications to date.



## Conclusion

Replacement of consecutive teeth with tapered one-piece ceramic implants is an option. One-piece ceramic implants when placed in the proper environment are successful. However, it should be noted that case selection and rigorous treatment planning are crucial for the success of such rehabilitations.

An organized review study recently conducted showed survival rate of 95% of one and two piece zirconia implants [8]. Based on this assessment, the marginal bone loss and survival values of one and two-piece zirconia implants are quite acceptable. Also, it must be highlighted that there is lack of data specifying the outcome of the zirconia dental implants in the long run research studies. Thus, with time it has become essential to conduct more research and clinical studies for obtaining additional information and long-term data. In this context, a case study is also valuable for identification of risk factors for biological and technical complications.

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### Topics to be covered:

- Drawing of Surgical Flaps and Suture Techniques
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- Insertion of Prosthetically Guided Implant
- Biomechanics of Tilted Implants
- Atrophic Mandible Rehabilitation without Bone Graft & Alternatives to the Maxillary Sinus Lift using Tilted Implants
- Prosthetic Management from Immediate loading to finalization of the case
- Management of complications
- Implant Maintenance Protocols

### Location : TBD

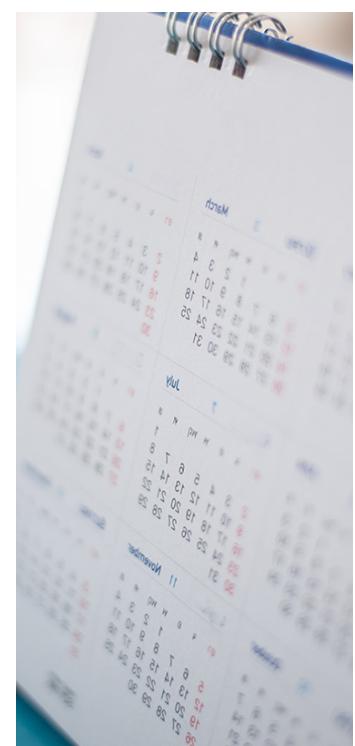
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#### Dr. Angelo Cardarelli

Specialist in Oral Surgery  
 Scientific Advisor at San Raffaele Hospital  
 Adjunct Professor at Vita Salute University  
 In Milan, Italy  
 Author of Many Publications  
 Speaker in International Congresses on  
 Implantology and Oral Surgery



PACIFIC IMPLANT ACADEMY

## CONTRIBUTOR SPOTLIGHT

# CHRIS NEVAREZ



Chris Nevarez started in Dealer Sales and Service in 2000, currently, Chris is an Independent Prexion CBCT Dealer Representative for Symphony MedDent Solutions, a Prexion Reseller and Mobile Radiology Provider and has consulted Select Equity Group LLC on Dental 3D Futures. In 2014 Chris Started Patient to Patient Dental Consulting specializing in Business of Dentistry Consulting, Associate Buy-In Transitions and 3D Technology Integrations as well as Medical E-Claim Training. Pt2Pt offers 5 Basics to Medical E-Claims Dental Implants for Private Practices, Group Workshops and Dental Societies.  
**[patient2patientdentalimplants@gmail.com](mailto:patient2patientdentalimplants@gmail.com)**



As a territory rep for a major dental dealer for 15 years and now as a medical billing and practice transitions specialist over the last 6, I've been a student of the 3D dental implant and CAD/CAM ceramics market.

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This market has a direct effect on overall practice growth and has had a direct effect on my ability to grow my client's businesses and my territory over the last 21 years.

Early in Ceramic Implant and CAD/CAM Dentistry Morphology it was very clear that the final restoration process would need to have the ability correlate the surgical guide, the custom abutment and implant via the CAD/CAM protocol, this would lead to the ability to control all aspects of the full mouth rehab process which includes 3D planning, placements and final CAD/CAM restoration with complete control and predictability.

The oral surgical ceramic markets have expanded their ability to show a proven reliability, functionality and efficacy which has also led to a true acceptance in the Medicare/PPO/HMO billing markets.

Medical Device Adjudication has a clinical viability baseline of 2 years for new procedural technology, this is no different for oral surgery. This 3D Non-Titanium technology now has over 5 years of insurance coverage as well as proven, reliable, clinical data and is now an easily adjudicated necessity medical benefit.

I assist many patients obtain medial reimbursements for their implant treatment due to low or nonexistent, private practices who offer medical billing options, with this being said and because it's absolutely imperative to have a singe billing provider for the entire implant treatment protocol, to insure a simple and unified claim submission process. I only recommend CAD/CAM and 3D Implant practices who can complete the whole treatment plan from diagnoses, surgery and restoration to 12 months post op recovery and maintenance.

Their ability to manage the treatment all under one roof, leads to faster recovery, less cost and higher patient satisfaction. The single treatment provider claim process allows for a quicker claim adjudication and less denials when submitting unified provider claims for patients' reimbursements. It has also led to several, single, lump sum direct deposit (ACH) reimbursements.



Pt2Pt Dental Consulting

# 5 Basics of Medical E-Billing for Dental Implants-Clinical and Office Management Events and Study Clubs.



**Chris Nevarez**  
President / Speaker  
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[provenbackup.com](http://provenbackup.com) reseller/cloud based back up, network contingency planning and hipaa compliant data storage

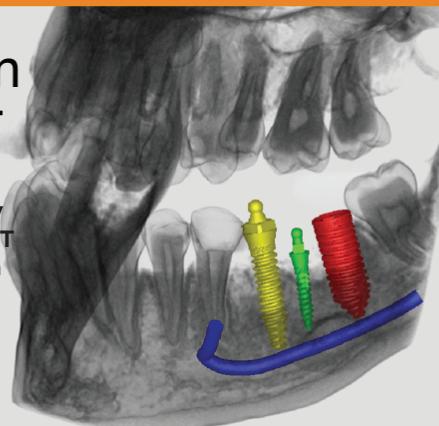
## 5 Basics to Medical E-Claims for Oral Surgery Tele- Training:

- ➡ Learn The 5 Medical Claim Basics. 1. Pecos/CMS Registration, 2. Physicians Referral/Preadmission, 3. ICD10 Medical Necessity Diagnoses, 4. ICD10 Necessity Letter, 5. Clearinghouse Submissions
- ➡ Learn Medical Claim Terminology and Nomenclature, learn how the **Pre-Assessment ICD10 Diagnoses Qualifiers** that meet the minimum necessity for submitting the CMS 1500/837 E-Claim form, starting with **the \$1000 CBCT/Cancer Screening Exam**, commonly given away during the initial Exam, Coverd @100% by PPO's and Medicare
- ➡ Learn how to register for your CMS# (Center for Medicare Service) via the [PECOS.CMS.HHS.Gov](http://PECOS.CMS.HHS.Gov) website and utilize a medical specific Clearinghouse like [ClaimMD.com](http://ClaimMD.com) for obtaining **Pre-Authorizations**, E-Submissions and **ACH Payments**.
- ➡ Medical E-Billing will increase Revenue and Case Compliance for **Oral Surgery, Implants, Fixed Prosthetics, Laser/LANAP Perio Tx, TMD, Sleep Rx and Orthodontics**.
- ➡ Prior to Tele-Training I will help arrange a **Free Demo/Trial of an E-Form Provider** for sending and receiving **Health/New Patient Forms to Pre-Qualify Patients** as well as a **Medical Specific Clearinghouse for E-Submissions**.
- ➡ A 1 week pre-training call is required to assess the practices needs, obtain and cross code the 10 most common medical/dental procedures, meet the Front Office Coordinator and prepare for **Immediate CBCT Diagnosis E-Claim Implementation**.

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**Chris Nevarez has been a Dental Supply Distributer, Speaker and Trainer since 2000. Chris moved into General Business of Dentistry Consulting, Dental Markets Analysis and Medical E-Claims Training in 2014. Chris is available for Study Clubs, group private practices and dental society meetings.**

# ON THE SCENE



DDHK Magazine board member, Dr. Hugh Flax of Flax Dental was on FOX 5 Atlanta spreading knowledge about his book, "A Smile is Always in Style," oral health and nutrition. He also shared some great resources for those seeking to find qualified skilled dentists.

Check out the interview at: <https://www.fox5atlanta.com/video/643156>



## DDHK Board Members are Co-authors!

Board Members Dr. Mayra Vasques, Dr. Sahaban Burgoa, and Dr. Alan Costa have co-authored "Implantodontia Digital"!



## Dr. Angelo Cardarelli lecturing at WADE

Dr. Angelo Cardarelli lectured and provided hands-on demonstrations at WADE – World Academy of Dental Education!



**Philippe De Moyer and Kristy Montoya at the CAI event in Italy**



< Dr. Brian J. Jackson - Board Certified Implantologist



## DDHK at AAID Annual Conference

Thank you AAID Conference for the special invite of DDHK Magazine! We had an exciting time interacting and celebrating your 68th Annual Conference in #LasVegas!

## IDIA 2019 Winter Symposium

Dr. Angelo Cardarelli Oral Surgeon lectured at the IDIA 2019 Winter Symposium in San Francisco offering a hands-on course. What a fantastic time sharing his expertise on the use of Piezosurgery for the extraction of impacted teeth. WAY TO SHARE KNOWLEDGE! Photo credit Ray Diaz



**SAM BAKURI, DMD, MSD**

# CERAMIC IMPLANTS

Titanium has been the metal of choice for dental implants for the last few decades. However, the subject of metal allergy has gained much attention in recent years, as we start to understand the effects of metal on the human body.

When the titanium implant was first introduced, it was strongly asserted that titanium was totally biocompatible, with no incidence of allergic reaction. However, these claims have proved to be inaccurate.

Titanium implants are great and I do place hundreds of them every year, but more and more patients are asking for ceramic implants. It is important that both dentists and specialists can answer questions pertaining to the ceramic implants and that we make them available to those who are concerned about metal allergy. Importantly, patients that want ceramic implants should not be labeled as "hypochondriacs". Ceramic implants should be an option for all patients and we need to be prepared to answer questions about the latest advancement in biological dentistry.

When I first heard about ceramic implants, I was hesitant to add them to my implant inventory. However, after

meeting some holistic dentists that introduced me to biological dentistry, I started reading more about it. Still resistant, I didn't make the decision to buy ceramic implants and get training until I met Mrs. X.



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Mrs. X 52 years old white female

Mrs. X was a patient of another periodontist who placed two titanium implants in her upper right quadrant. The very next day Mrs. X called the office complaining of burning pain in the area of the implants. The treating periodontist tried putting her on a number of different



**Meet the Author ->  
Sam Bakuri,  
DMD, MSD**

- Owner, Full-time Fee for service Private practice limited to Periodontics Pittsburgh, United States.
- BDS Bachelor of Dentistry University of Baghdad 2002.
- DMD Doctorate of Dental Medicine University of Pennsylvania (IVY League School) 2011.
- Periodontics residency Virginia Commonwealth University 2014.
- MSD Master of Science in Dentistry Virginia Commonwealth University 2014.
- Assistant professor University of Pittsburgh School of Dental Medicine.
- Board certified Periodontist and national speaker 17 years of Dental experience.
- Attending Periodontist, UPMC GPR residency program.
- Director, Pittsburgh Institute of Dentistry Seattle Study Club.
- Fellow International team of implantology (ITI).
- He has published abstracts and articles in peer-reviewed dental journals and lectures internationally.

antibiotics, but got no improvement. After one week she presented again and the photos below were taken.



Titanium implants on sites of #4, #5 one week after implant placement.

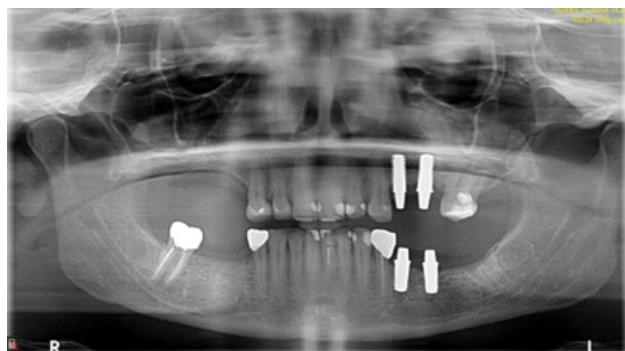
The implants came out, along with the bone. Her periodontist told her that this may have been caused by a high level of cholesterol or a vitamin deficiency in her blood. He even suggested that it may be "all in her mind" and perhaps she should see a psychiatrist!

When Mrs. X came to my office in tears, I recommended that she have extensive blood work done, which she readily agreed to do. The only abnormal finding in those test results was an allergic reaction to metals!

It was such a bad experience for Mrs. X that it took me a full year to convince her to try ceramic implants. We scheduled her on a Friday and needless to say she was very nervous. The next day I called her and she reported that she felt absolutely fine and asked when she could have more ceramic implants placed!



Day of ceramic implant placement on sites of #12, #13, #19, and #20.



Panoramic x-ray of Ceramic implants on sites of #12, #13, #19, and #20.



Three months after implant placement on sites of #12, #13, #19, and #20.

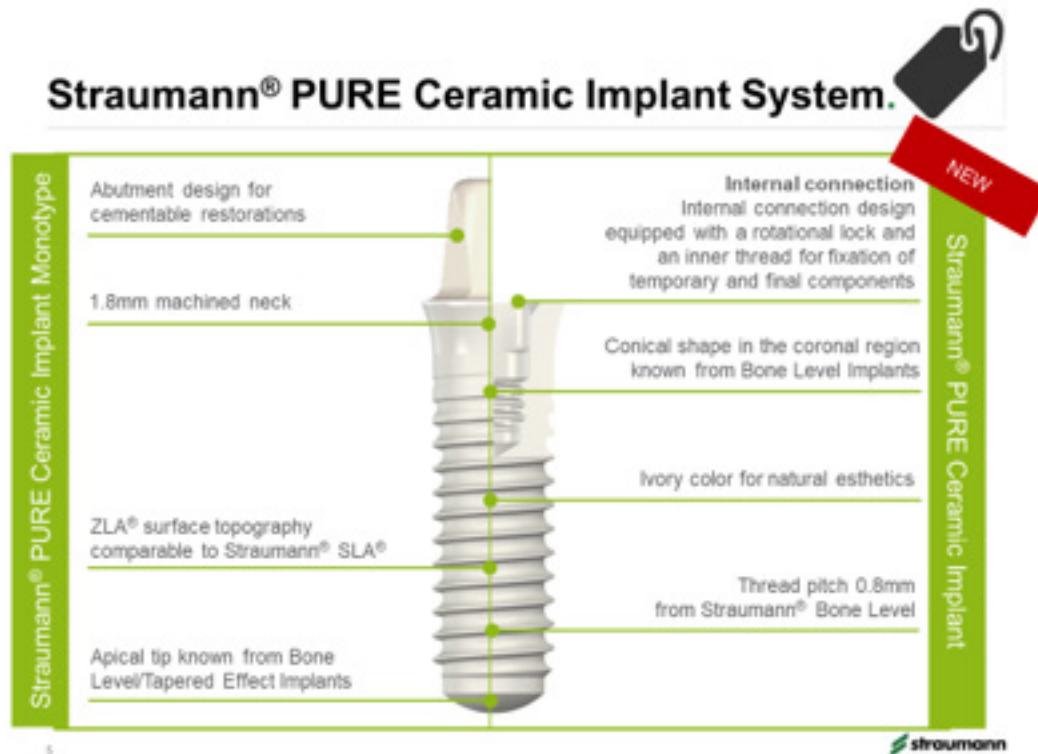


Final restoration on sites of #12, #13, #19, #20 (patient showed up with fractured #20 months after final restoration).

Titanium implants come with a number of disadvantages including discoloration, corrosion and allergic reactions. Zirconia, tetragonal zirconia polycrystal (TZP) are gaining increased popularity due to their mechanical, esthetic and biocompatible attributes.



Currently, there are two types of ceramic implants. The first is a 1-piece fixture (the abutment and implant is one piece). The second is two pieces (it looks like a titanium implant in shape). There are pros and cons for both. Note: With the 1-piece ceramic implant you don't have to worry about implant connection stability or the presence of bacteria along the connection line. However, restoration of the 1-piece can be challenging, especially if the placement is less than ideal. Prepping the abutment piece is not the easiest procedure, nor is it recommended by the implant company (I use Straumann).



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Illustration of Straumann Ceramic implants, the one piece implant that includes the abutment (on the left side) and the two piece tissue level implant (on the right side).

I am sure there are many Mrs. X's out there and one of them may show up in your office. Don't dismiss a patient's concern about putting metal in their body. Remember amalgams? Prepare to include ceramic implants in your biological dental arsenal.

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# PLACES TO EAT & SEE IN NEW ORLEANS

Hugh Flax DDS, AAACD, MICOI DABAD

**M**any, many years ago, during my GPR, I had the opportunity to watch Dr. Jack Kent, the legendary implantologist, pioneer and open my eyes to the possibilities of replacing teeth without damaging others. As a two-year resident of the Big Easy and 20-time visitor of Jazz Fest, I have had a chance to sample the fun, food, and music of the Crescent City. Without a doubt, the culture embeds your soul like nothing else on the entire planet! Hopefully, the following will give you a head start on planning for venturing around N'Awlins. Another great resource is [www.neworleansonline.com](http://www.neworleansonline.com)

#### Remember these tips:

- Make reservations
- Plan on waiting too – things are more relaxed, so take your time
- Be brave and try some of the local delicacies (crawfish, alligator, po-boys, beignets, etc.)
- Leave me some leftovers (just kidding....sort of)
- Watch where you park (recovering a towed car is not fun. Don't ask me how I know)
- Refer to Offbeat Magazine ([www.offbeat.com](http://www.offbeat.com)) for the latest listings in music
- If you are ever in town early May, try to go to Jazz Fest the weekend before. It is the best musical, food, and cultural experience ever invented! Visit [www.nojazzfest.com](http://www.nojazzfest.com).

#### TOP RESTAURANTS (all area code 504)

Look on the web for details (\* favorites of mine)

- **Acme Oyster House\*** 522-5973 (some people like Felix's better)
- **Antoine's\*** 581-4422 – local institution for over 167 years; birthplace of Oyster's Rockefeller
- **Arnaud's** 523-5433 – storied Creole French Quarter restaurant
- **Bon Ton Café\*** 524-3386 – local Uptown seafood joint; 24 hours Th-Sat
- **Café Du Monde\*** 587-0835 – beignet institution at Jackson Square

- **Cafe Giovanni** 529-2154 – near the Marriott with outstanding New World Italian cuisine
- **Café Maspero** 523-6250 – generous portions
- **Camellia Grill** 309-2679 – breakfast fave of Tulane crowd
- **Cochon** 588-2123 – hotspot for great cooking; even serves moonshine at the bar
- **Cooter Brown's** 866-9104 – sports bar with large selection of beer; cheese fries are a must
- **Deanie's\*** 581-1316 – great local crawfish, softshell crab, and seafood; they ship too in the French Quarter and Metarie
- **Dick and Jenny's\*** 894-9880 – funky and cool cottage serving great Louisiana food
- **Domilise's** 899-9126 – local institution; one of a kind place
- **Drago's (at the Hilton)\*** 561-0500 – charbroiled oysters! Just miraculous!
- **Emeril's** 528-9393 – Lagasse flagship that is world famous
- **Galatoire's** 525-2021 – French Quarter Creole grand dame ;Crabmeat Sardou a must
- **Gumbo Shop** 525-1486 – fine traditional Louisiana cooking; go for combo plate
- **GW Fins** 581-FINS – freshest seafood from around the world
- **Jacques-imo's\*** 861-0886 – funky and lively atmosphere; very creative
- **K-Paul's** 524-7394 – Paul Prudhomme's landmark in the Quarter





Dr. Hugh Flax is internationally known for his leadership in cosmetic dentistry. A Past President of the American Academy of Cosmetic Dentistry, he has lectured and authored in Europe, Japan, Canada, and the United States on lasers, smile design, and advanced restorative techniques to enhance the skills of dental teams in making their care world class for their patients.

- **Mandina's** 482-9179 – quintessential New Orleans neighborhood restaurant
- **Morton's Steakhouse** 566-0221 – top quality Chicago steak at Canal Place
- **Mosca's\*** 436-9942 – family style Italian for huge appetites across the River
- **Mother's\*** 523-9656 – long lines for great po-boys, jambalaya, and breakfast
- **NOLA** 522-6652 – Emeril restaurant in the Quarter
- **Palace Café** 523-1661 – a Brennan's eatery that serves many N'Awlins favorites
- **Pascal Manale's\*** 895-4877 – vintage New Orleans tradition with BBQ shrimp
- **Port of Call\*** 523-0120 – huge meaty burgers and great drinks; very popular
- **Stella!** 587-0091 – award winning food that's creative and flavorful
- **Tujaque's** 525-8676 – landmark Creole cooking near Jackson Square

**"I'm not sure, but I'm almost positive,  
that all music came from New Orleans."**

- Ernie "Mother-in-Law" K-Doe, 1979

#### GREAT MUSIC VENUES

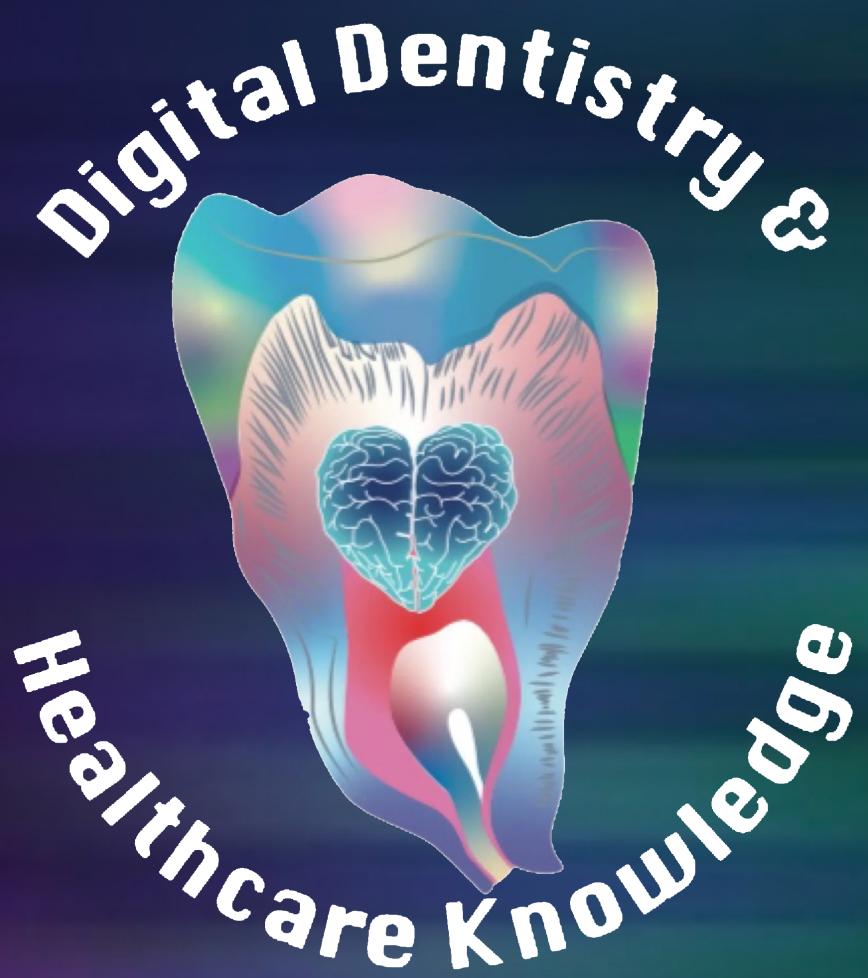
- **D.B.A.** – 942-3731 – cool venue in the Quarter
- **The Maple Leaf\*** – 866-9359 – classic blues and funk in Uptown (next to Jacques-imos)

- **Tipitinas\*** – 875-TIPS – legendary venue for over 30 years
- **House of Blues** – 310-4999 – many national acts
- **Midcity Lanes (aka the Rock n' Bowl)\*** – 482-3133 - cajun, swing, zydeco, funk...all in a functioning bowling alley.... only in N.O.
- **The Howlin' Wolf** – 522-WOLF – blues and funk
- **Mulate's** – 522-1492 – legendary king of Cajun food and dance
- **Dos Jefes** – 891-8500 – cigar bar and music in Uptown
- **Snug Harbor** – 949-0696 – great jazz club in the Quarter
- **Preservation Hall** – famous Dixieland spot
- **Louisiana Music Factory** – on Frenchmen St. (music store dedicated to Louisiana)

#### FAMILY ORIENTED ACTIVITIES

- **Louisiana Children's Museum** – 586-0725 – play & learn!
- **Aquarium of the Americas and IMAX\*** – 581-4629 – state-of-the-art next to the river
- **National World War II Museum** – 527-6012 –must see for history lovers
- **Audubon Zoo\*** – 581-4629 – among this country's best zoos
- **The Blue Dog Gallery** – George Rodrique's amazing artwork on display and to purchase
- **Blaine Kern's Mardi Gras World** – 361-7821–where most of the floats are made
- **Take a ride on the mighty Mississippi.** Float back in time on the Paddlewheeler Creole Queen. – 524-0814.
- **Musee Conti Wax Museum** – 525-2605. – Who says that history can't be fun-especially the history of this eccentric city?
- **Jean Lafitte Swamp Tours** – 592-0560 – Chat with the gators – just 15 minutes from downtown





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