LUIS A. ALICEA DMD, MSD

ESTHETIC REHABILITATION

with Zirconia Dental Implant on a Complex Pathology Patient

Dental 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 a also 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).

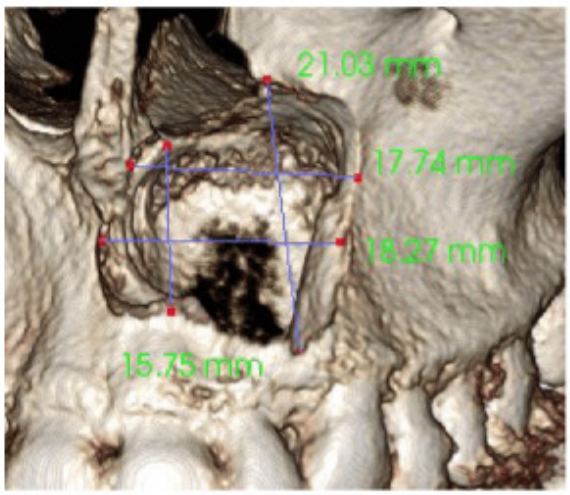
Case Report

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.

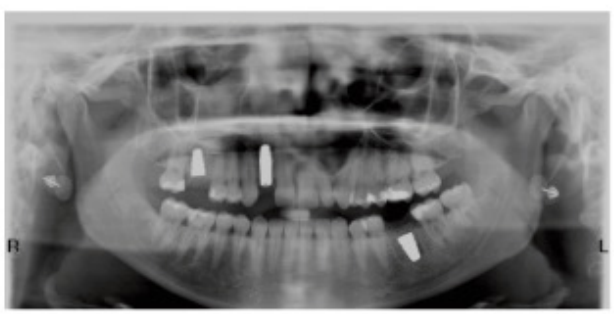
The x-rays and cone beam computer tomography (CBCT) reveal a radiolucent lesion on the area apical to teeth #9,10,11. Note that at the time of the dental evaluation patient wore a nose piercing. Our diagnosis was *Odontogenic keratocyst (OKC)*. The patient was referred to an endodontic specialist, for 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 x 2.1 cm



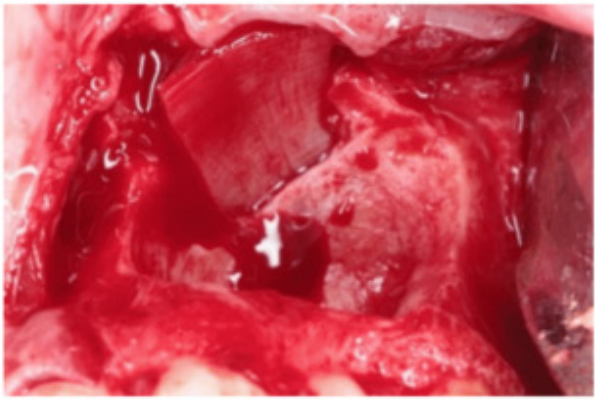
Teeth #3,7,19 were extracted under IV sedation. The areas were decontaminated with surgical curette and piezo surgical instruments with copious normal saline irrigation 0.9%, Chlorhexidine 0.12%, Normal saline 0.12% and 20 gamma of ozone by (30) thirty seconds wait a (1) minute and repeated the procedure. 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 x 10 mm), on area of tooth #7 (4.2 x 14 mm) and on area of tooth #19 (5.5 X 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

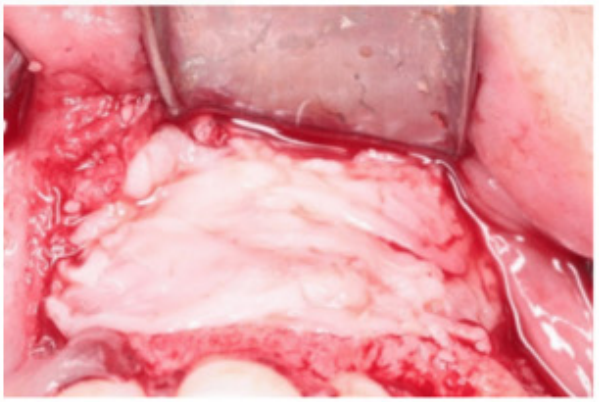
0.12%, Peroxide 3%, Normal saline 0.9%, laser (BioLase Waterlase) and 20 gamma of ozone by (30) thirty seconds wait a (1) minute and repeated the procedure a total of (6) six times. No data show the effect of the laser or ozone in this type of tumor.

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.

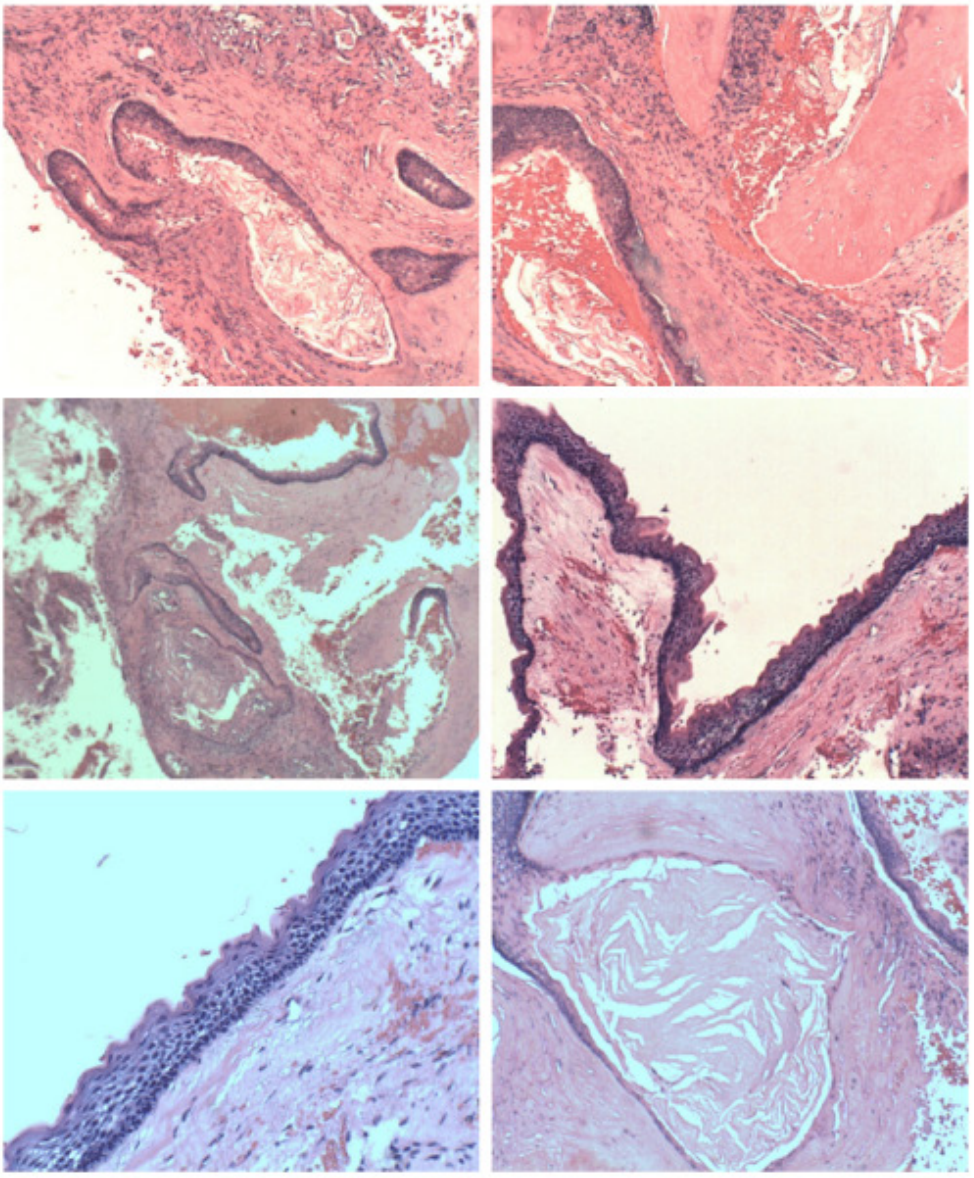


Protein Rich Fibrin (PRF) membrane is made by drawing patient's blood and spinning it in a centrifuge. L-PRF or A-PRF is a yellow "jello-like" mixture of white blood cells, fibrin, platelets, stem cells and bone morphogenic proteins. Other authors define PRF as Autologous Blood Concentrates.

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.
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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.

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Laboratory Director

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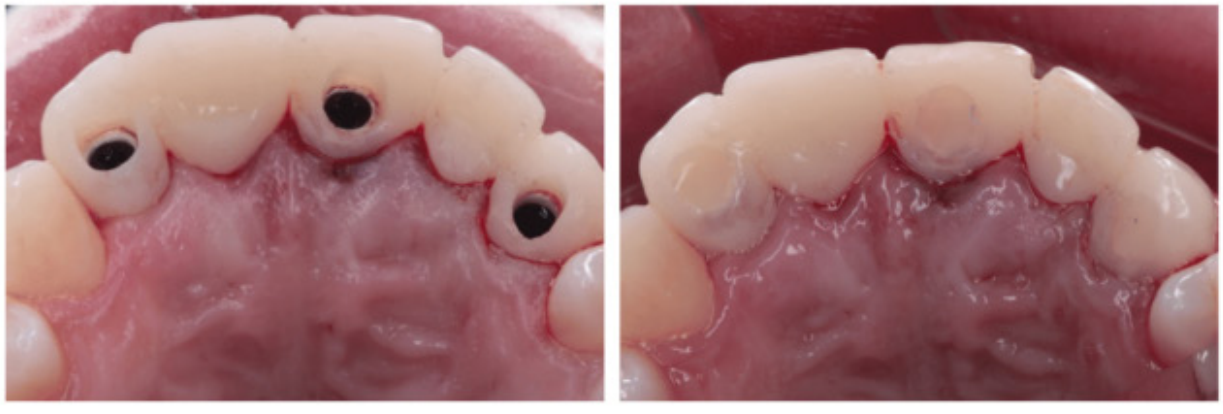
The patient was referred to an endodontic specialist, for proper evaluation of teeth #8, #9, #10, #11 & #12. Teeth #9 to #11 are non-vital, she started to report mobility and pain. The patient declined root canal treatment alternatives and agreed on dental extractions. However, the patient declines to 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.

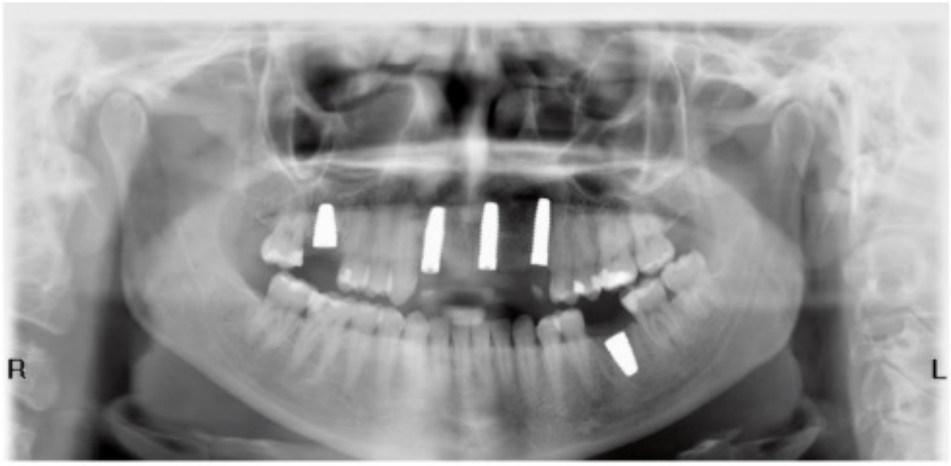
Temporary abutment (AG Dental Point, Switzerland "Xeramex XT & Nobel Pearls") was placed and prefabricated PMMA (Poly-methyl-methacrylate, Ivoclar Vivadent, USA) milled temporary fixed bridge was relined with PMMA material shade A-1, (Anaxdent, USA). The bridge was polished, and the internal connections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

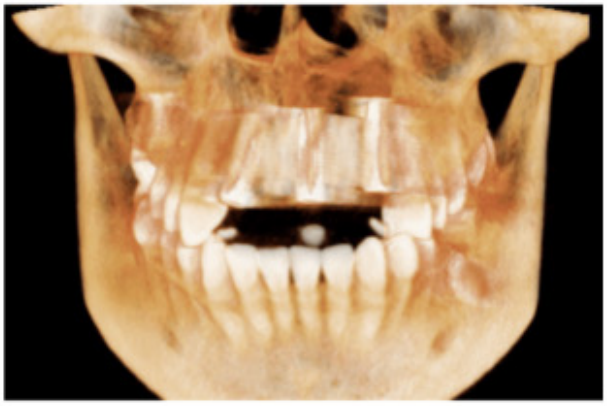


The screwable implant bridge was torqued to 15 Ncm. Teflon material and composite were used to cover the screw access. The lingual surface was polished with finishing burs and a composite rubber polishing kit (Brasseler, USA). The bridge was designed out of occlusion.

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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