

Multiple Implant Restorations in the **Aesthetic** Zone

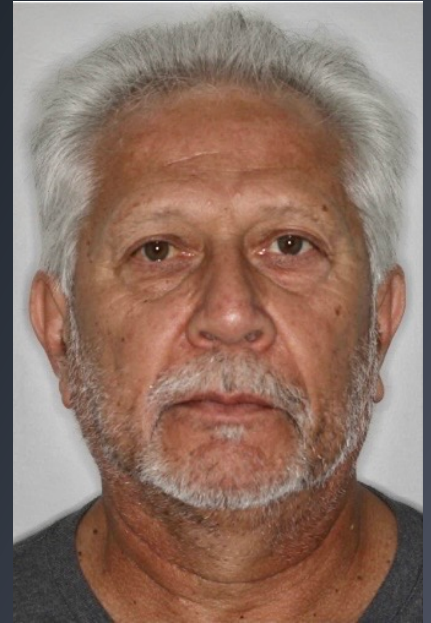
Salma Refaat IDS 2021

University of the Pacific, Arthur A. Dugoni School of Dentistry

Introduction and Social History



- **Age/Sex:** 65/M
- **CC:** “My anterior bridge keeps falling out and I need a permanent solution for the situation.”
- **Social History:**
 - He is retired and lives alone in his home in Sacramento.
 - He became a patient of our school back in 2018
 - Non-smoker, social drinker
 - AARP united health care insurance



Medical History



- **Medical Conditions:** Hypertension, Rheumatoid Arthritis

- **Medications:**

- Metoprolol HTN 200mg QD
- Losartan HTN 200mg QD
- Remicade infusion (Infliximab) RA 100mg injections once/10 weeks
- Azulfidine RA 500mg 4 tabs BID
- Celebrex RA 200mg BID
- Plaquenil (Hydroxichloroquine) RA 200mg QD
- Prednisone RA 5mg QD
- Tramadol 325mg PRN for pain

Medical History



- Dental Implications:

- Metoprolol: infrequent Xerostomia
- Losartan: orthostatic hypotension
- Remicade: delayed wound healing and immunosuppressive effect
- Azulfidine and Plaquenil: none
- Celebrex: xerostomia, stomatitis and abnormal taste
- Prednisone: delayed wound healing
- Tramadol: Xerostomia

- Allergies: NKDA

- ASA Classification: III (uncontrolled HTN)

Hard Tissue Charting



- **Missing #1, 3, 8, 10, 12, 14, 16, 17, 19, 30, 32**
- **Zr FDP #2-4, gold crown on #18 and PFM FDP #29-31, PFM FDP #7-9, PFM FDP #10-13**
- **Defective margins and recurrent caries on #7, 9, 13**
- **Amalgam restorations on #5, 15, 20**
- **Attrition on Md. anterior teeth** (due to bruxism and opposing PFM FDP)
- **RCT on #2, 29**

Dental History



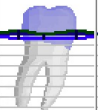

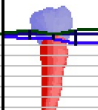



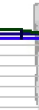

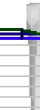



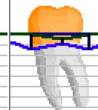
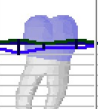

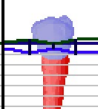
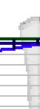


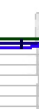

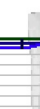

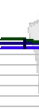
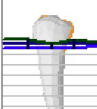

- Patient came in for an ER visit when his Mx. anterior FDP #7-9 fell out and the abutment teeth were extensively broken down beyond repair.
- He came in for 2 ER visits in 2018 and again for ODTP with my big sib in 2020
- He is heavily restored and has a stable lower arch.

Periodontal Dx and CRA

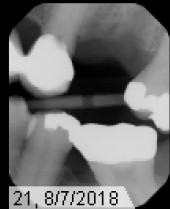
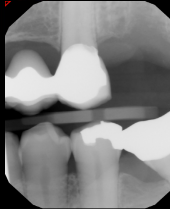
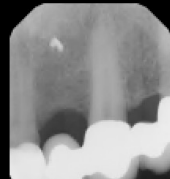


- **Periodontal Diagnosis:** Generalized slight plaque induced gingivitis
- **Plaque Index Score:** 0.8
- **Caries Risk Assessment:** Moderate overall caries risk
 - ATP reading: 699
 - PH Saliva Test: 5.5-6.9

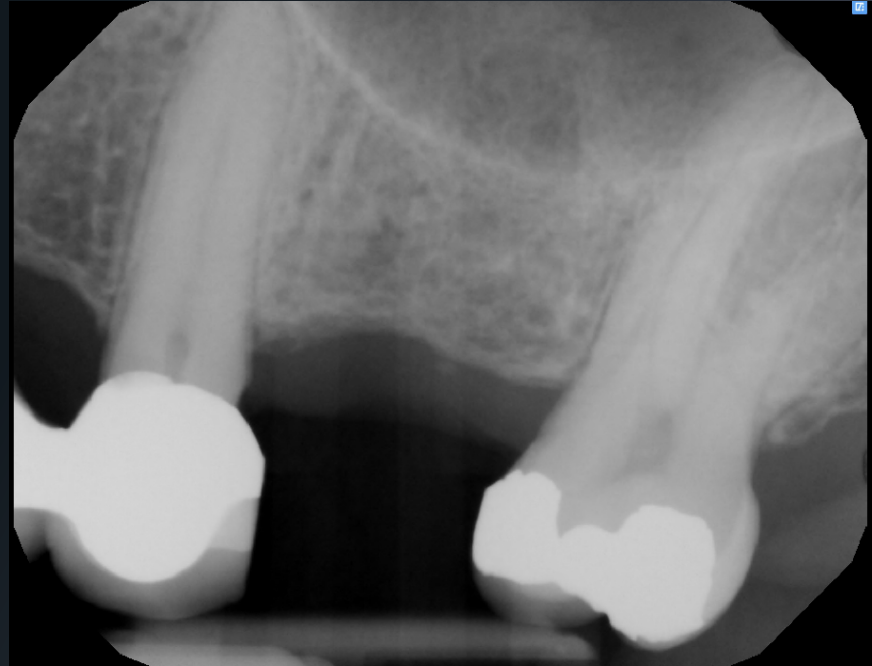
Mandibular Periodontal Findings

Diag																	
Calc																	
MG Inv																	
Furcation																	
Attach		1 1 1		1 1 2	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 2	1 1 1		3 2 3			
FreeGM		1 0 1		1 0 1	1 0 1	1 0 1	1 0 1	1 0 1	1 0 1	1 0 1	1 0 1	1 0 1		0 -1 0			
Bleed					B						B						
PD		2 1 2		2 1 3	2 1 2	2 1 2	2 1 2	2 1 2	2 1 2	2 1 2	2 1 3	2 1 2		3 1 3			
Lingual																	
	M		M											M	M		
		32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Facial																	
	M		M											M	M		
Mobil			0		0	0	0	0	0	0	0	0	0		0		
Calc																	
MG Inv																	
Furcation																	
Attach		2 1 1		2 1 2	1 0 1	1 0 1	1 0 1	1 0 1	1 0 1	1 0 1	1 1 1	1 1 1	1 1 1		3 3 3		
FreeGM		1 0 1		1 0 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 0 1	1 0 1	1 0 1		0 -1 0		
Bleed																	
PD		3 1 2		3 1 3	2 1 2	2 1 2	2 1 2	2 1 2	2 1 2	2 1 2	2 1 2	2 1 2		3 2 3			

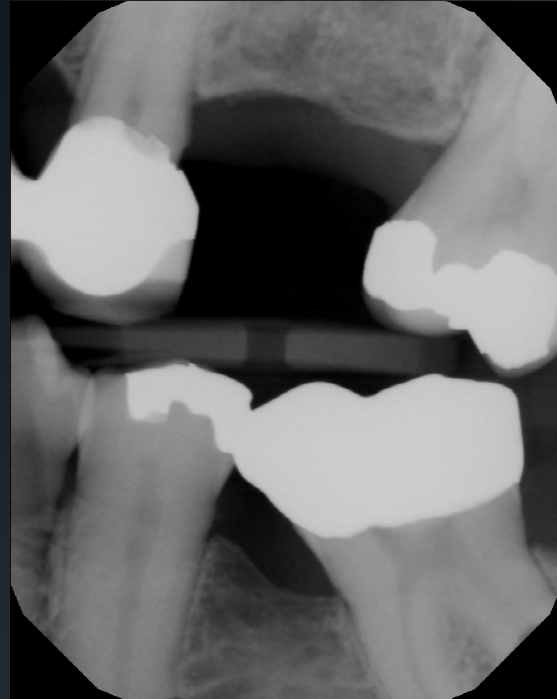
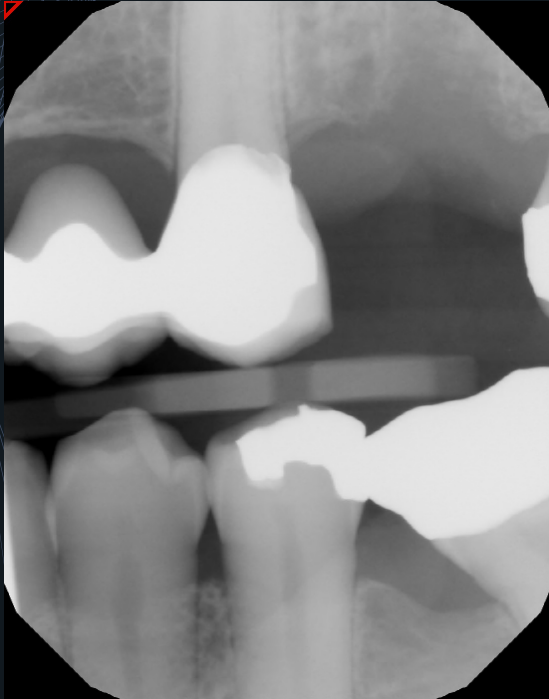
FMX



Cantilever PFM FDP #10-13 PA



Cantilever PFM FDP #10-13 BW



After Anterior FDP Removal

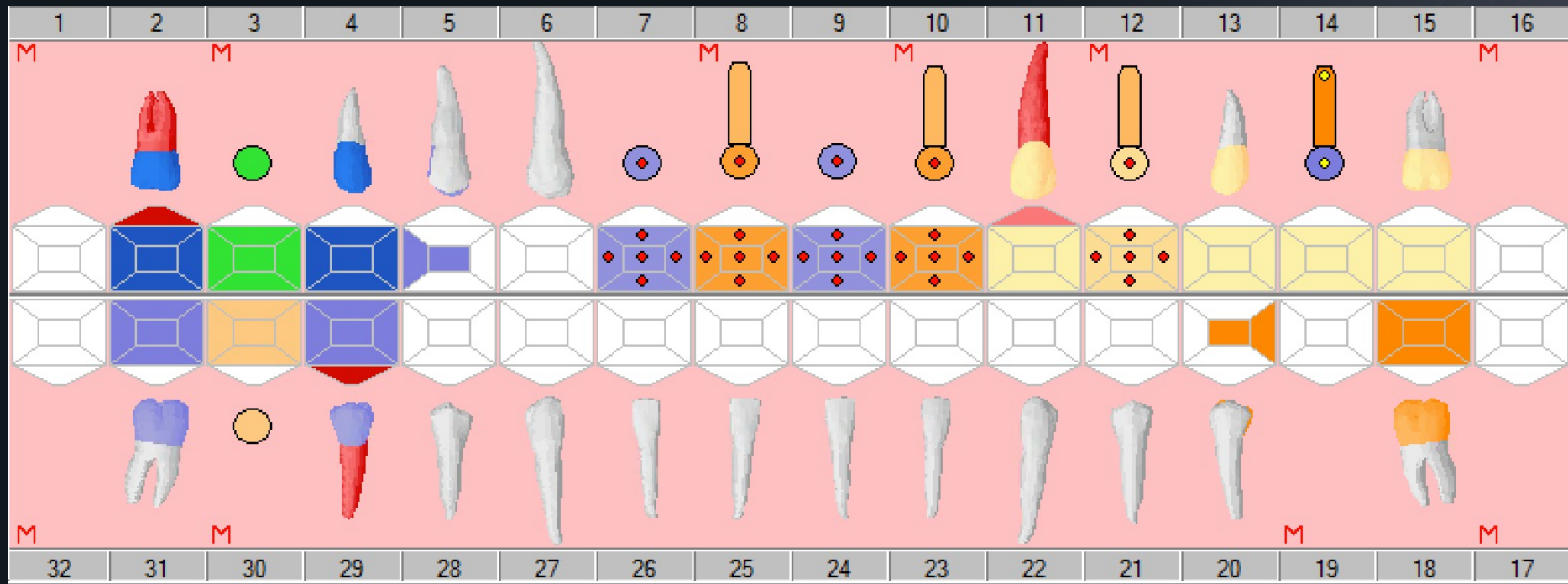
#7



#9



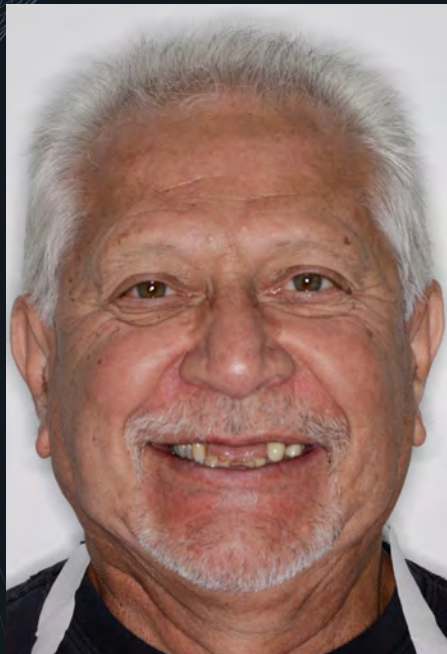
Odontogram



Extraoral Images



Extraoral Images



Extraoral Close-up Images



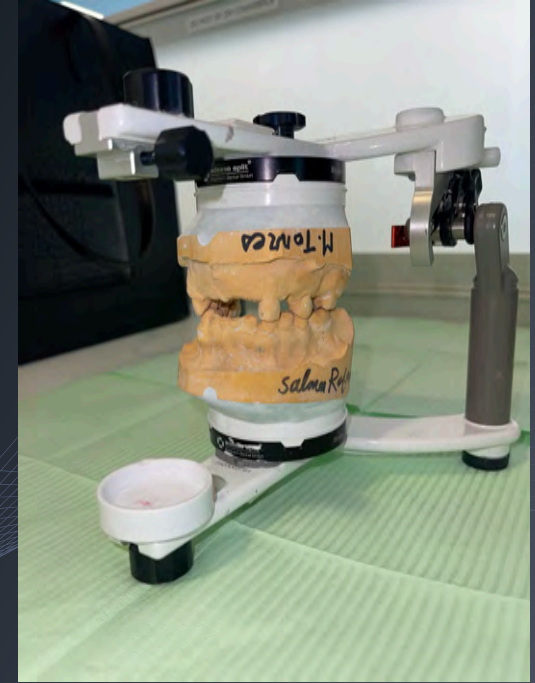
Intraoral Images



Occlusal Images



Mounted Study Casts



Study Models After Removing Anterior FDP



Treatment Plan Options



Removable Option

- Extraction #7 and 9
- Core Build-ups and single crowns on #11, 13
- Survey Zr crown on #15
- Maxillary cast metal RPD

Fixed Option

- Extraction #7 and 9
- Implants on #8, 9, 14
- Implant cantilever FDP #7-8 and #9-10, implant single crown on #14
- Zr FDP on #11-13

Change of Plans



- After sectioning and removal of cantilever bridge #10-13 patient came back next visit with a broken provisional with **broken #11 at gum line**.
- It was determined that #11 would need RCT, fiber post, core build-up and crown lengthening to be restorable and functional
- #11 was too **compromised** to become an **abutment** for the planned **FDP #11-13**
- Patient didn't want to add the **cost** of another implant on #12
- I suggested to place a **single crown on #11, implant on #12 and a 3-unit FDP on #13-15**
- Faculty approved new treatment plan and patient accepted

Definitive Tx Plan



Urgent: Re-cementation of FDP #7-9 then making an acrylic RPD after extraction/implants surgery

Preventative/Disease control: OHI, Prophy, CTX 3, sectioning PFM FDP #10-13, recurrent caries control (#15 MO, #13 D)

Restorative: RCT, post, core build-up and crown lengthening #11, core build-ups #13 and 15

Reconstructive:

- Single PFZ crown #11, MZ FDP #13-15
- Extraction of #7 and 9
- Implants on #8 and 10 to ensure implants are vertically placed on the same bone level followed by implants supported 4-unit FDP #7-10
- Implant on #12 followed by a single implant crown

Maintenance: OHI, orthotic device (occlusal guard), 6-months periodontal recalls, implants recalls

Wear of Different Dental Materials Against Tooth Structure



- Patient suffered severe **attrition** on mandibular anterior teeth because of bruxism and the opposing PFM FDPs but didn't want to do anything about it (no pain or aesthetic problem)
- Habib, et al 2019 conducted a study to analyze the effect of different dental materials on human enamel wear. It was found that **PFM** caused the **most severe** wear compared to Zr¹
- Janyavula, et al 2013 conducted another study to measure the roughness and wear of polished and glazed Zirconia against human enamel antagonists. It was concluded that **polished zirconia is wear-friendly to the opposing teeth**. Glazed zirconia on the other hand, caused more material and antagonist wear than polished zirconia²

FDP Supported by Two or Three Implants



- Yi et al (2013) conducted a **retrospective study** to compare clinical outcomes of three-unit FDP supported by **two** and **three** implants³
- **48** implants placed in **23** patients (group 1) and **132** implants placed in **40** patients (group 2)
- Both groups had **100% survival rate**
- Group 1 (two implants) had **higher success rates** than group 2 (3 implants)
- **82%** marginal bone loss in group 1 and **86%** in group 2
- Plaque index was significantly **greater** in group 2

Periapical Lesion #2

- CBCT report noted the presence of a PA lesions related to #2
- Patient reported having symptoms 2 years ago and he was given antibiotics by his previous dentist
- Patient currently wishes to wait before RCT retreatment



Tooth #2
Sagittal view

Periapical Lesion #11



RCT #11



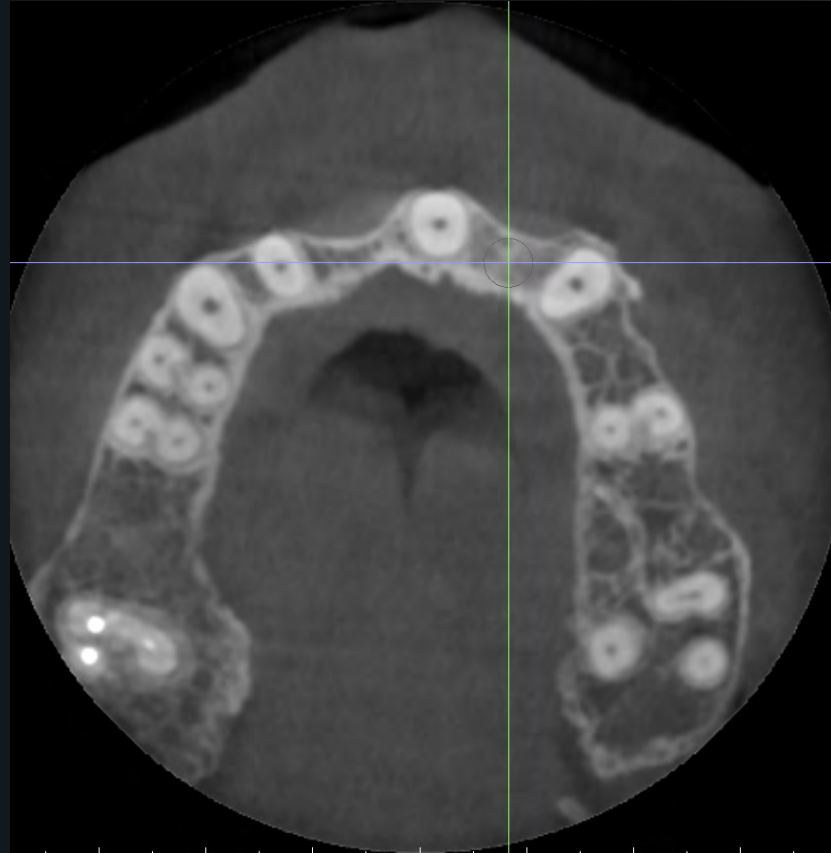
#13-15 MZ FDP



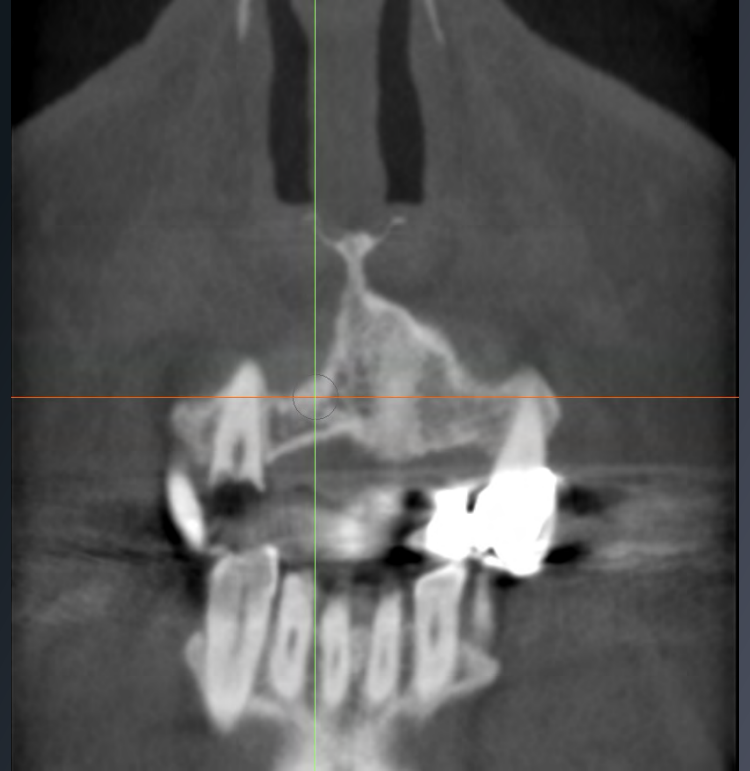
Implant Tx Plan

- **Atraumatic surgical extraction #7 and 9**
- **Endosteal implant placement on #8, 10 and 12**
- **Xenograft and Allograft with L-PRF, PRF, Collagen and Cytoplast membranes at implant site stabilized by tent screws**

CBCT (Axial View)



CBCT (Coronal View)



Past Medical Hx Considerations



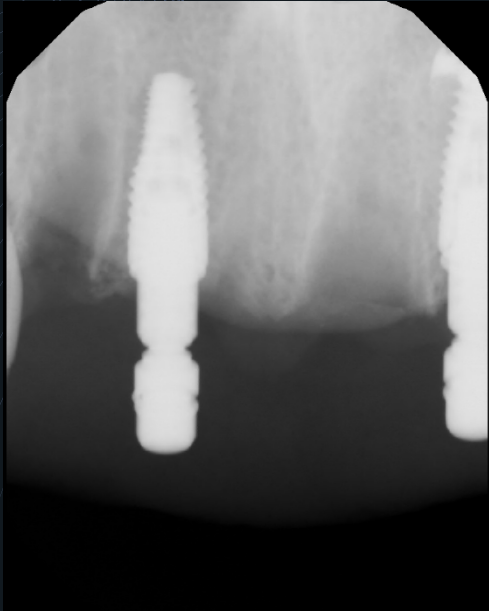
Infliximab (**Remicade**) infusions for Rheumatoid Arthritis and Risk of Developing MRONJ:

- Medication-related osteonecrosis of the jaw (**MRONJ**) is a severe adverse drug reaction defined by the American Association of Oral and Maxillofacial Surgeons (AAOMS) as “the presence of exposed necrotic bone or bone that can be probed through an intraoral or extra-oral fistula in the maxillofacial region, that has persisted for longer than eight weeks, occurring in patients undergoing treatment with antiresorptive or antiangiogenic agents with no history of radiation therapy or obvious metastatic disease to the jaws”⁴
- Further studies are required to confirm the role of infliximab in MRONJ occurrence. Prevention of MRONJ by dental check-up before and during infliximab therapy is vital to prevent MRONJ occurrence, or to detect lesion at earlier stages, thus requiring less invasive treatments, and possibly manifesting lower recurrence rates⁴
- We sent a **medical consult** to the patient’s treating physician requesting temporarily discontinuing the infusions before and after the implant surgery. Dr recommended to space out the Remicade infusions and cleared patient to proceed with the dental surgery.

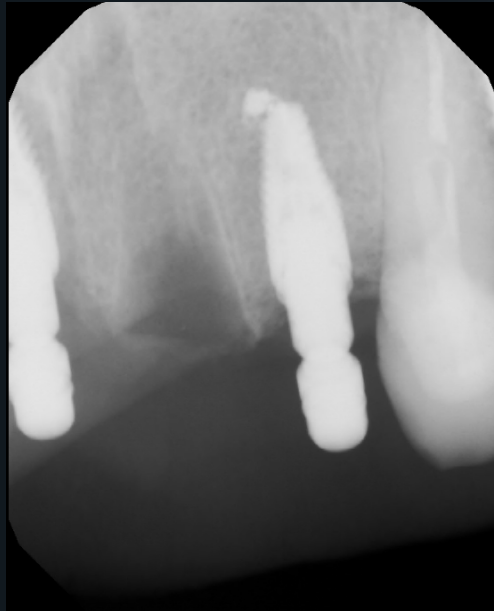
Implants Placement



Strauman Bone Level



Strauman Bone Level



Strauman Tissue Level



Implant Surgery



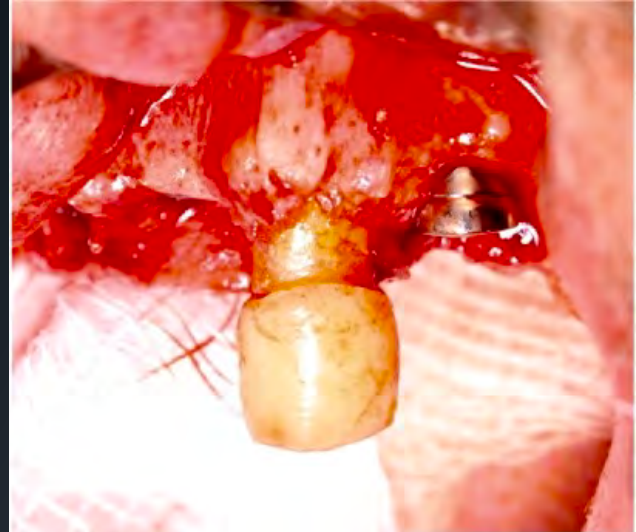
- Unfortunately, most pictures taken during the surgery by the assistant student dentist turned out completely black! Those are the only ones I could save
- Best quality editing I could do given the original quality of the images
- **Lesson learned:** Always double check after capturing photos



Implant Surgery



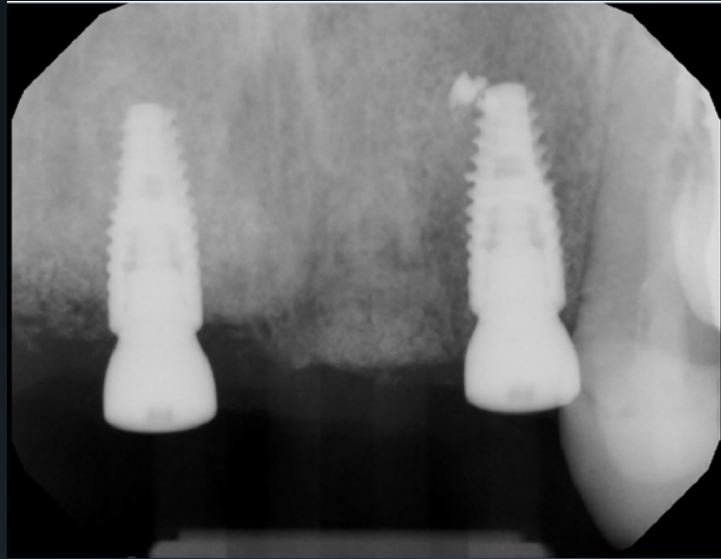
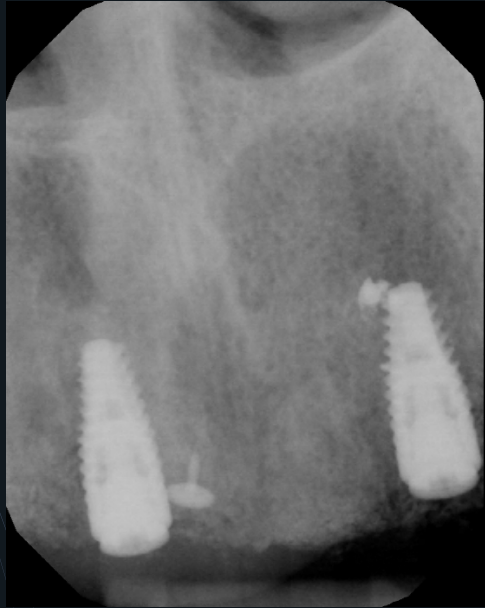
- Image captured during surgery shows the bone level around #11
- It was decided there will be **no need for crown lengthening** procedure before placing the crown



Bone Graft and L-PRF



Implant Phase II #8 and 10



Implant Phase II #12



Blue Sky Plan Software



SPECIAL OFFER! \$13,999 INTRAORAL SCANNERS! GET ONE ADDITIONAL FREE BONUS ITEM!

SprintRay Pro95 Printer



SprintRay
Pro 3D Printers
In-office Dental Manufacturing has Arrived



Fast
Rapidly respond to changing patient needs with flexible in-office manufacturing.

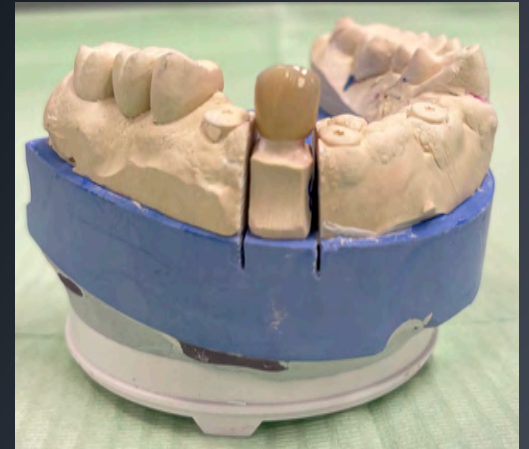
Accurate
Print confidently with repeatable, accurate results backed by university research.

Easy
Spend more time with patients with easy-to-use software and hardware.

Mounted Diagnostic 3-D Printed Cast Generated From Digital Wax-up



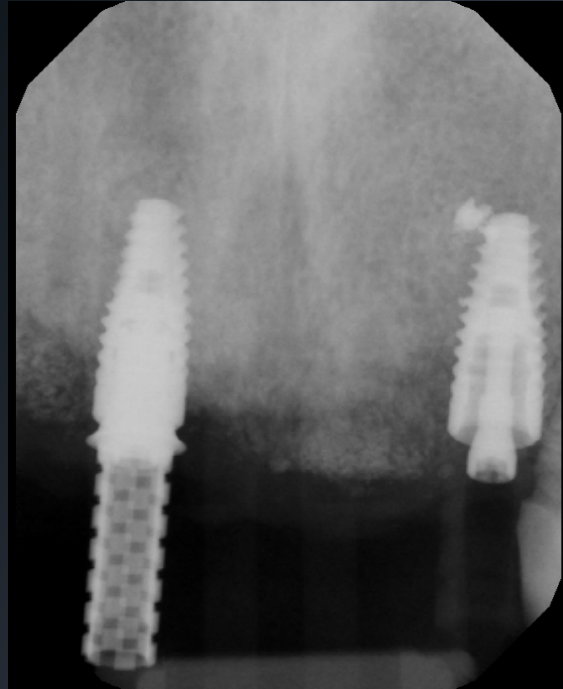
PFZ Crown #11



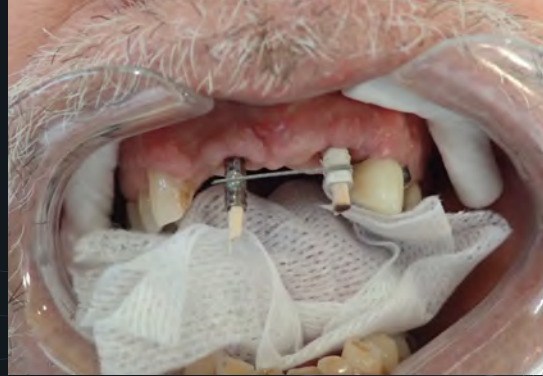
Implants FDP Provisionalization



We used a **scan body** on #10 implant because the correct temporary cylinder was not available and thankfully it worked! Pt reported no loosening throughout the provisionalization period (6 weeks)



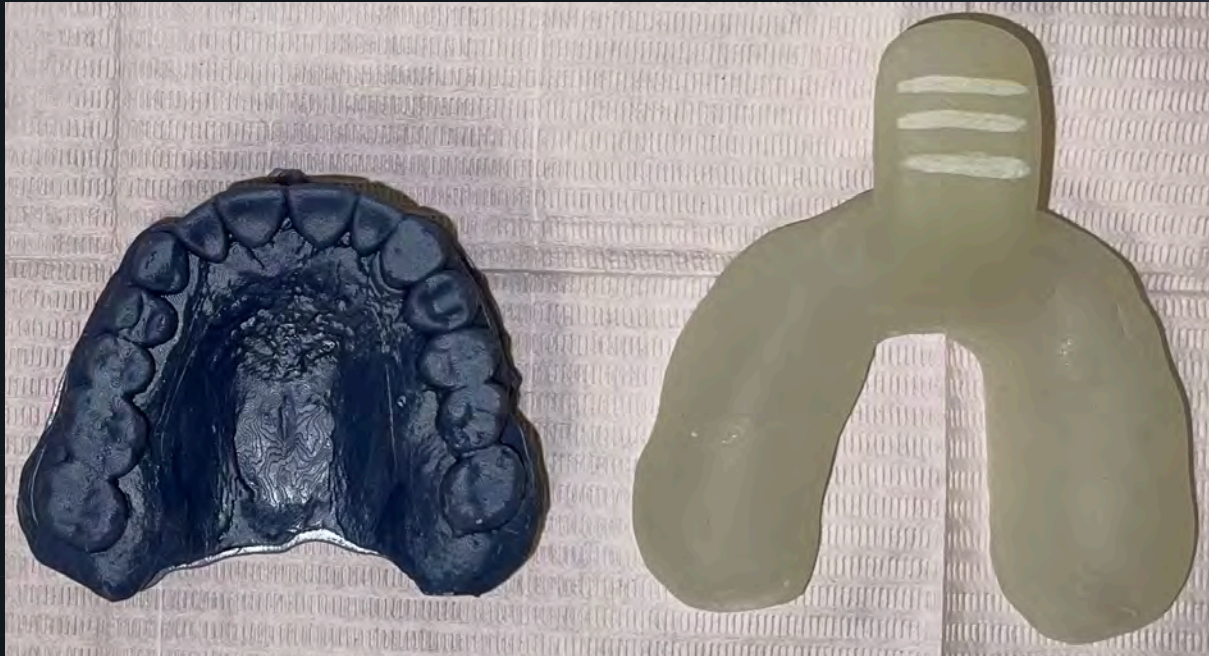
Implants FDP Provisionalization



Implants FDP Provisionalization

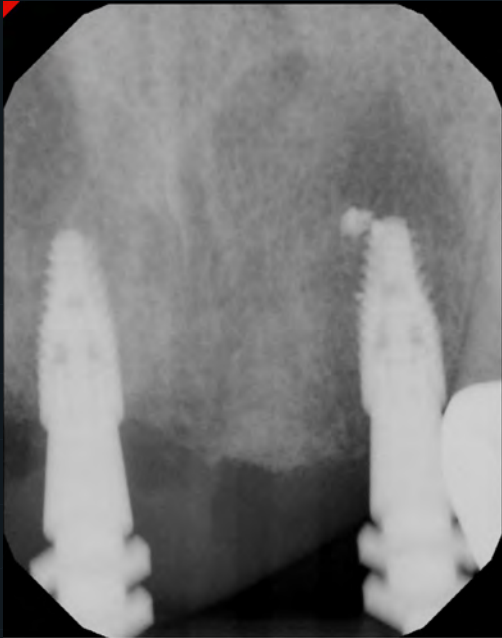


Custom Made Tray Fabrication

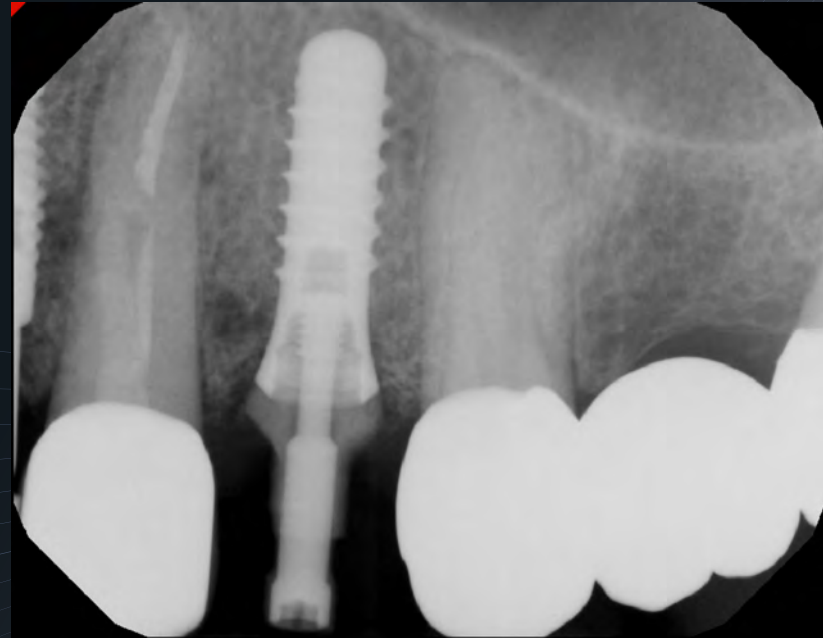


Impression Copings

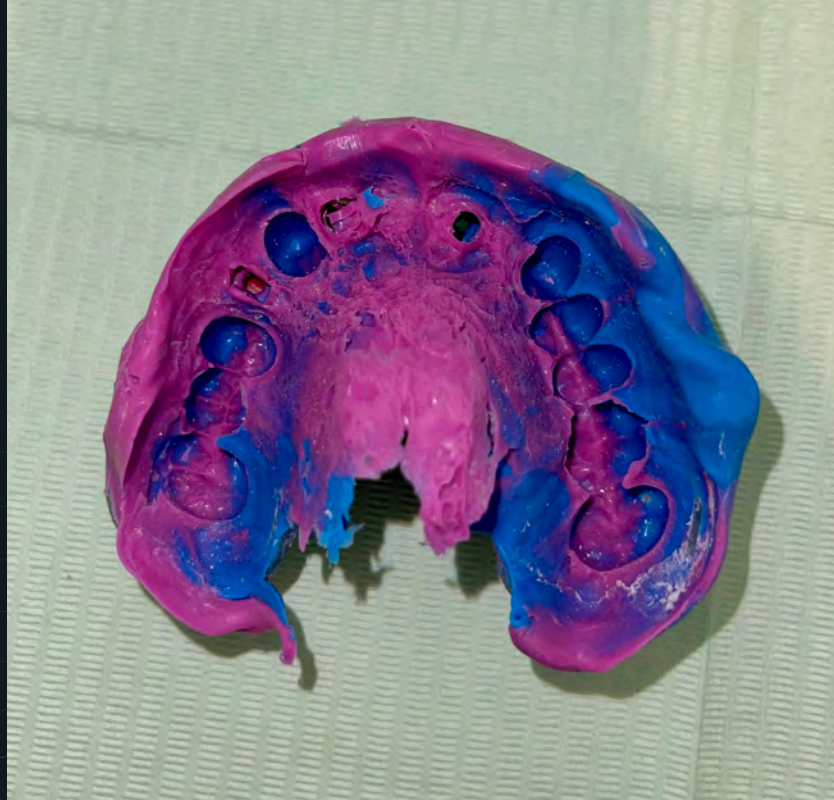
Open Tray



Closed Tray



Final Impression

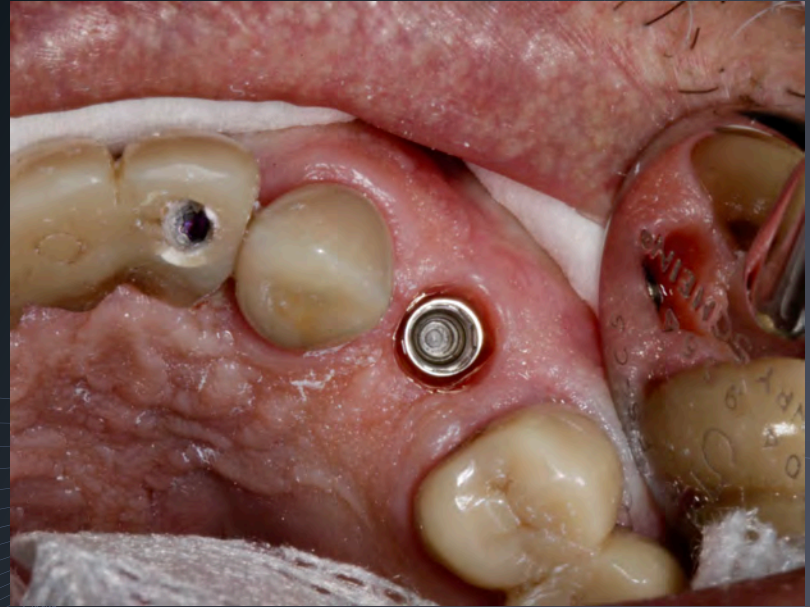
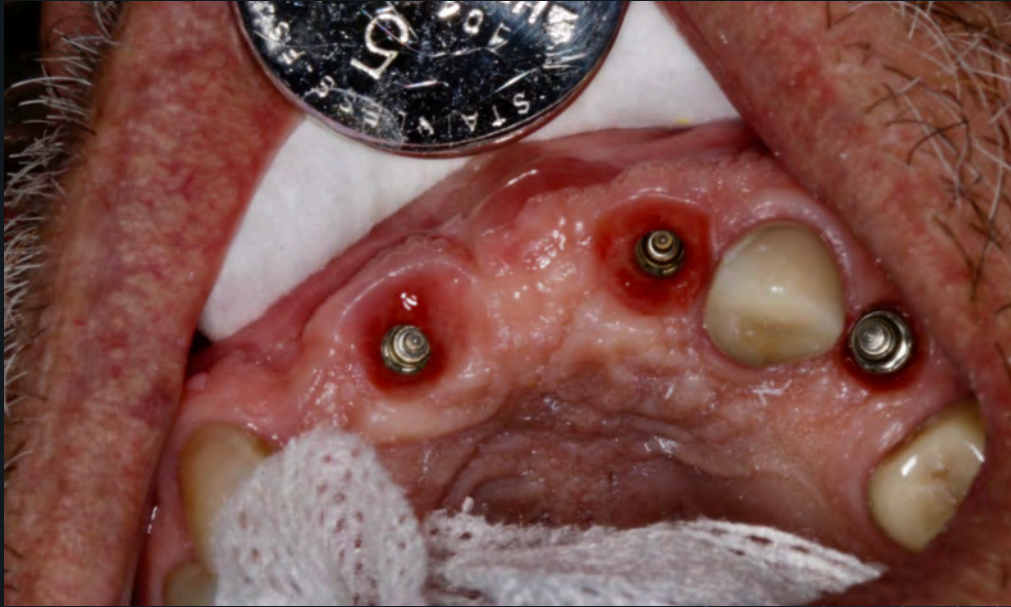


Mounted Final Restorations

Angled screw channel abutments. Screw retained design



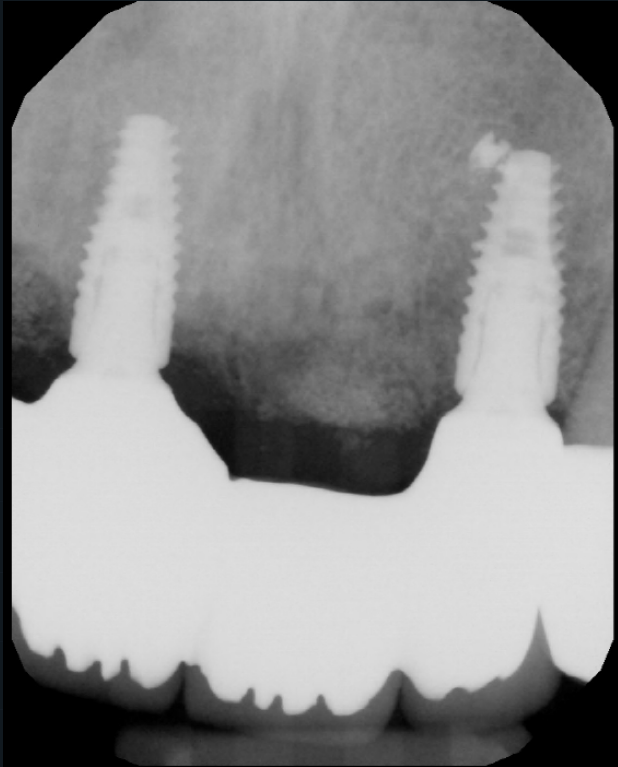
Emergency Profile Occlusal View



Emergency Profile Facial View



PA (Full Seating Confirmation)



Extraoral Close-up Images of the Final Restorations



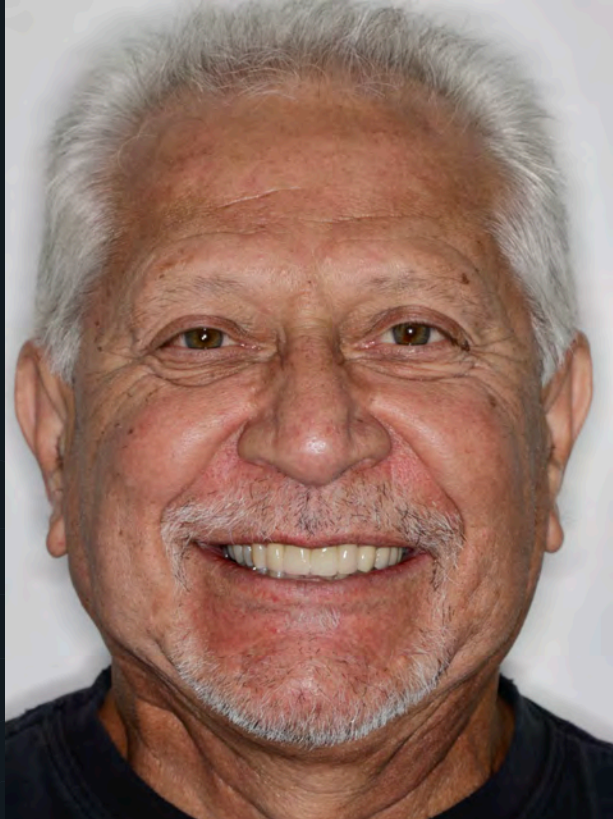
Intraoral Images



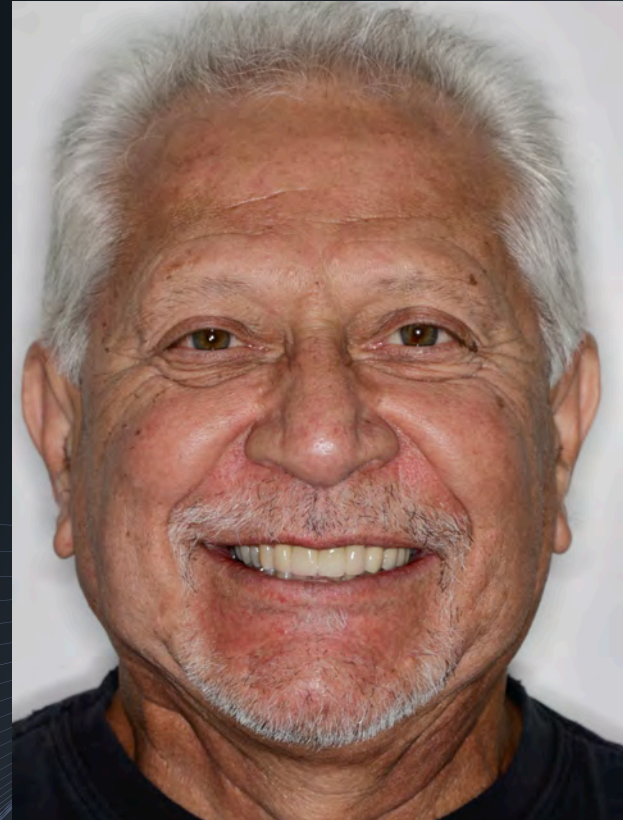
Postoperative Occlusal Images



Postoperative Extraoral Images



The Before and After



What's Next ?

- An **orthotic device** is required to protect all the dental work done
- Patient was demotivated because of the **financial cost**
- GPL graciously gave the patient a **discount**
- Occlusal guard will be fabricated by the next student dentist
- Meanwhile I will fabricate an **Essex retainer** as a temporary occlusal guard until the lab one is made

Acknowledgments

- Thank you Dr Steven **Sadowsky** for your mentorship, your constant help and guidance with this case and many others and for all your encouragement and constructive feedback.
- Thank you Dr Fatima **Mashkoor** for putting your heart and soul into any case you work on. I admire your passion and dedication to your profession.
- Thank you, **Carlos** Correa, and the whole PSL team for their help in customizing the aesthetics and communicating our vision to the lab who did a great job with the case.
- Thank you to my GPL Dr Brian **Kenyon** for entrusting me with this case and for always being there for guidance and advice. 3B is so lucky to have you!
- Thank you for the **Excellence day committee** for accepting my case and for allowing me to participate in this yearly event

References

1. Habib, S. R., Ansari, A. S., Alqahtani, M., Alshiddi, I. F., Alqahtani, A. S., & Hassan, S. H. (2019). Analysis of enamel and material wear by digital microscope: an in-vitro study. *Brazilian Oral Research*, 33. <https://doi.org/10.1590/1807-3107bor-2019.vol33.0121>
2. Janyavula, S., Lawson, N., Cakir, D., Beck, P., Ramp, L. C., & Burgess, J. O. (2013). The wear of polished and glazed zirconia against enamel. *The Journal of Prosthetic Dentistry*, 109(1), 22–29. [https://doi.org/10.1016/s0022-3913\(13\)60005-0](https://doi.org/10.1016/s0022-3913(13)60005-0)
3. Yi, Y.-J., Lee, J.-Y., & Kim, Y.-K. (2013). Comparative Clinical Study of Three-Unit Fixed Partial Prostheses Supported by Two or Three Implants. *The International Journal of Oral & Maxillofacial Implants*, 28(4), 1110–1115. <https://doi.org/10.11607/jomi.2940>
4. Favia, Gianfranco, et al. "A Case of Osteonecrosis of the Jaw in a Patient with Crohn's Disease Treated with Infliximab." *American Journal of Case Reports*, vol. 18, 2017, pp. 1351–56. *Crossref*, doi:10.12659/ajcr.905355.

THANK YOU!

