

# Digital Implant Planning and Restoration

Jared Hall - UOP DDS Class of 2021

In conjunction with:  
Steven Sadowsky DDS, FACP  
Eduardo Gonzalez DDS

## Patient Bio

- 60 yo Male
- Commercial landlord, lives in South Bay with family
- UOP patient for 9 years

## Chief Complaints

- Wants to replace missing posterior teeth in upper left and lower left
- Cold sensitivity in upper right

# Med HX

BP/Vitals: 131/77 mm Hg, 61 bpm

5'6" 175 lbs

No hospitalizations

Social drinking (1-2 drinks/week)

No allergies reported

Family hx of diabetes

No medications reported

ASA I

# CRA

## Disease Indicators

Restorations in last 3 years

## Risk Factors

Exposed roots

## Protective Factors

Lives in fluoridated community

Uses fluoride toothpaste at least 1x/day

ATP: 715 Relative Light Units, PH: 7

**Overall Risk - Moderate**

# PERIO

No changes in attachment levels, pocket depths, BOP

Plaque Index: 0.7

Staging/Grading: Stage IV Grade B

Diagnosis: Generally healthy with plaque induced gingivitis on a reduced periodontium

Prognosis: Generally fair, #2, #31 guarded

Perio TXP: SPT, OHI, 4 month recall

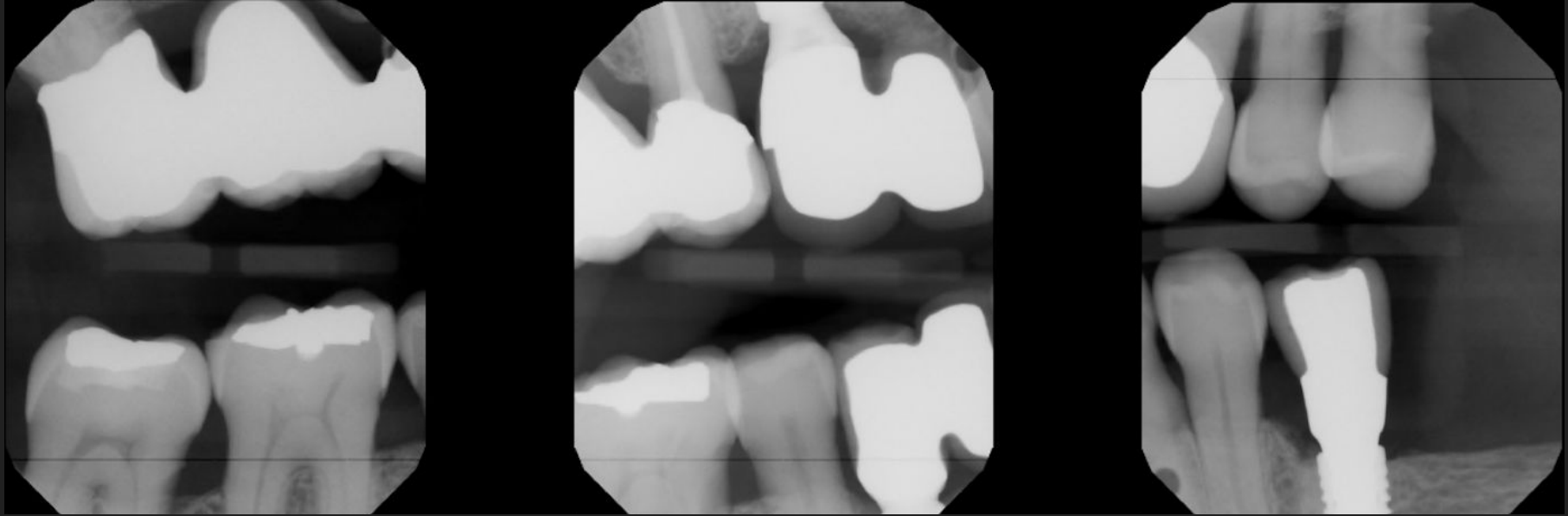
Hygiene Habits: Conventional toothbrush 2x/day, floss 2x/day, OTC mouthwash 1x/day.

HX of chronic periodontitis = Strict maintenance care

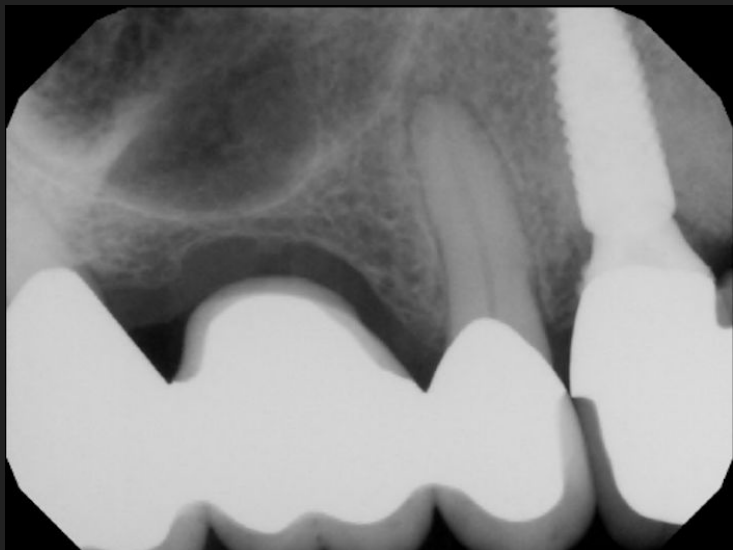
PANO



BWX

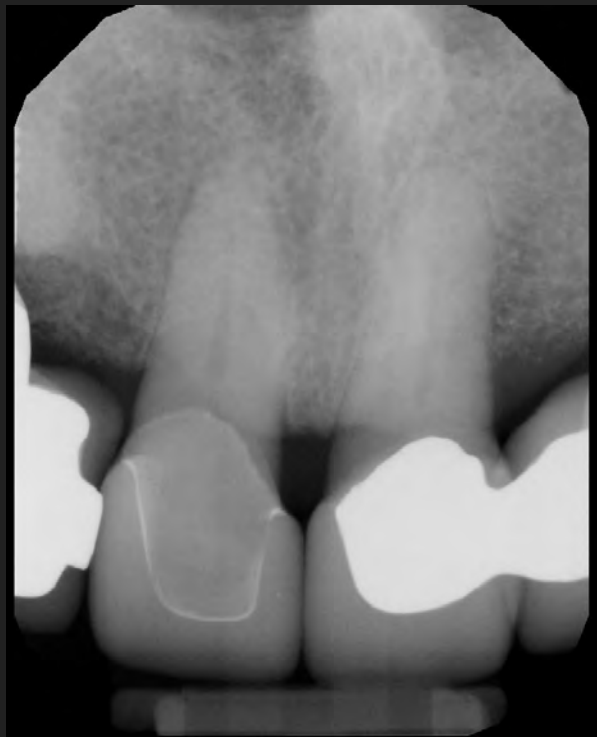


## PAs: 2-4 Bridge

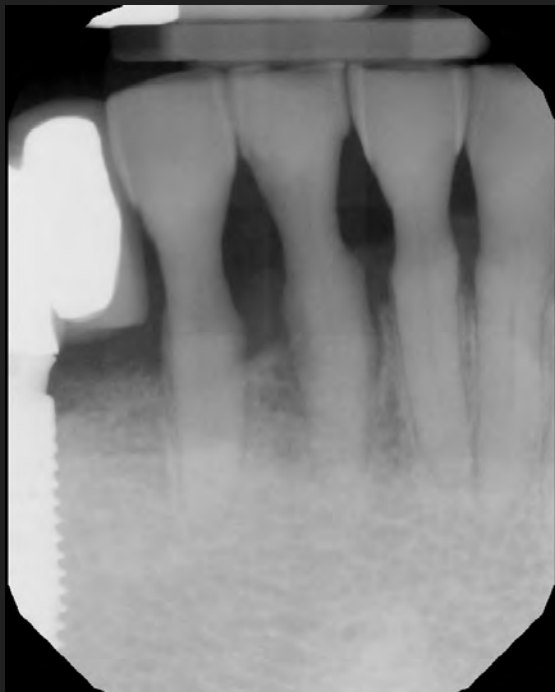




PAs: UA Ant.



PAAs: LA



Left Side



# HTE

1 - missing

2 - PFM retainer

3 - PFM pontic

4 - PFM retainer

5 - missing

6 - Implant PFM retainer

7 - PFM pontic

8 -  $\frac{3}{4}$  porcelain crown

9 - PFM retainer

10 - PFM pontic

11 - PFM retainer

12 - NSF

13 - NSF

14 - missing

15 - missing

16 - missing

17 - missing

18 - missing

19 - missing

20 - Implant PFM crown

21 - NSF

22 - NSF

23 - NSF

24 - NSF

25 - NSF

26 - NSF

27 - PFM pontic

28 - Implant PFM retainer

29 - NSF

30 - OB amalgam

31 - OB amalgam

32 - missing

## Problems:

2 - necrotic pulp, chronic AAP

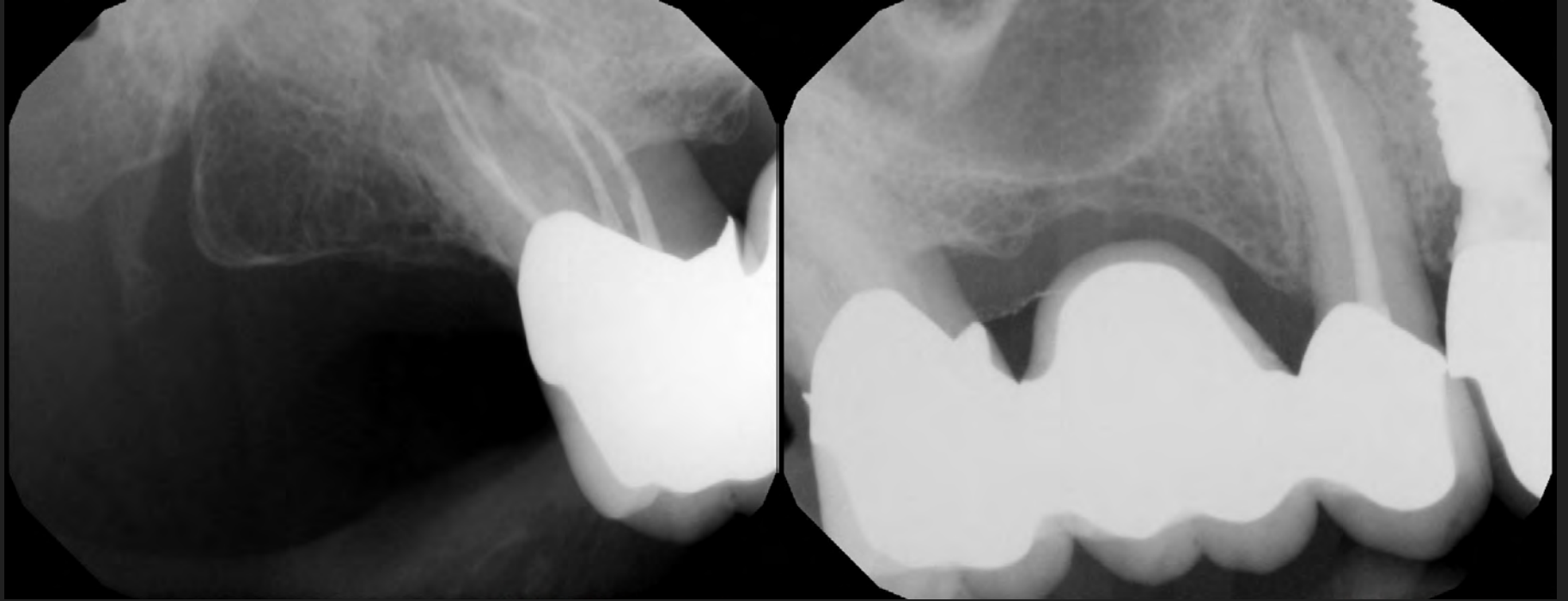
4 - necrotic pulp, chronic AAP

14, 15, 18, 19 - missing

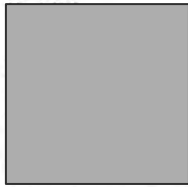
# TXP

- SPT
- OHI
- RCT #2
- RCT #4
- CBCT
- Surgical index UA
- Surgical index LA
- Implant placement #14
- Implant placement #18
- Implant crown retainer #14
- Implant crown pontic #15
- Implant crown retainer #18
- Implant crown pontic #19
- Implant crown retainer #20

ENDO



# Records & Planning



On [redacted] 2015, I placed implants in the position of #s 6 and 20, extracted tooth #28, and did a bone allograft in the area of #s 27-28 in preparation for future implant placement for [redacted]. The implant in the position of #6 will be restored with a mesial cantilever replacing #7. There is significant vertical bone deficiency in this area; therefore, there will be a lack of interproximal papillae around the implant and the pontic. The bone in the area of #20 was still soft; this implant is embedded in grafted bone. I placed the following implant(s):

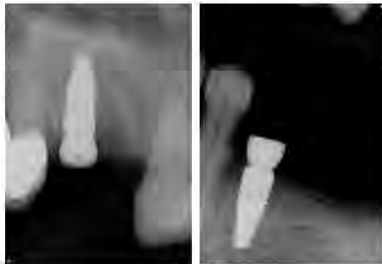
- #6: 4.1 x 12mm RC BLT TiZr SLActive Straumann implant
- #20: 4.1 x 10mm RC BLT TiZr SLActive Straumann implant

The procedures went well and the implants were stable and in good position. I anticipate that these implants will be ready for restorative treatment in 3½ months. I will be seeing [redacted] during the next weeks for a postoperative follow up. Please do not hesitate to contact me if you have any questions.

Sincerely,

[redacted]

*Diplomate of the American Board of Periodontology*



# Records & Planning

Implant parts selected and ordered (Straumann 4.1 RC BLT)

Shade (1M2) and material (zirconia) selected and approved by patient

Shimstock “map” recorded to aid in delivery

SIC VS IFDP - Cost, Circumventing anatomical limitations

UA: Engaging, LA: #18 Non-engaging, #20 Engaging

UA - cFDP: reduced cost, predictable when cantilever is less than 8mm mesiodistal length

## Platform Switching Implants

1. Microgap more distant from bony margin
2. Biologic width enhanced
3. Stress medialized

Vandeweghe S, et al. Eur J Oral Implantol 2012;5:253-62, Gupta S, et al. Ann Afr Med 2019;18:1-6.

## IFDP vs. Single-Implant Crowns

5-yr Prosthetic Survival Rate  
IFDP 96.4%  
SIC 97.2%

Pjetursson BE, et al. Int J Oral Maxillofac Implants 2014;29(SUPPL):308-24.

## Engaging Vs. Non-engaging

The use of 1 engaging and 1 non-engaging in non-parallel implants may improve handling and decrease prosthetic screw complications for short-span FPDs

Schoenbaum T, et al. J Prosthet Dent 2018;120:17-19.

## cFDP - 8mm or less

Kim, Paul et al. Clin Oral Implants Res 2014;25(2):175-84

cFDP - High patient satisfaction and success, but with most common complication of screw loosening

Palmer RM, et al. Clin Oral Implants Res 2012;23:35-40.



# CBCT/Intraoral Scan



Adequate space in maxilla for single implant without sinus augmentation (1.5mm)

More favorable implant surface structures have led to higher survival rate in Type 4 bone and a minimally invasive approach

Thoma DS et al. J Periodontal Implant Sci 2017;47:2-12.

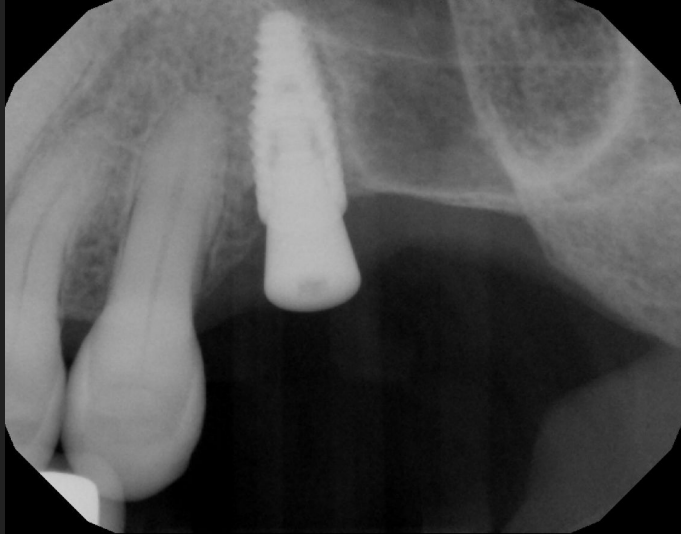


# Surgical Guides



Designed on 3Shape Implant Studio and 3D printed on Formlabs printers at UOP

# Osseointegration



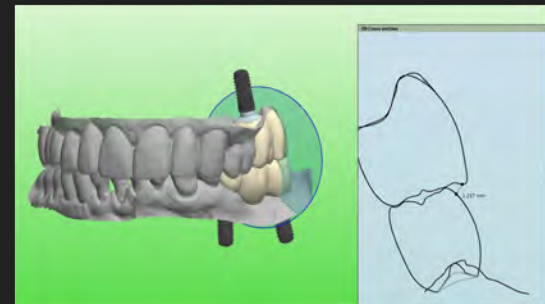
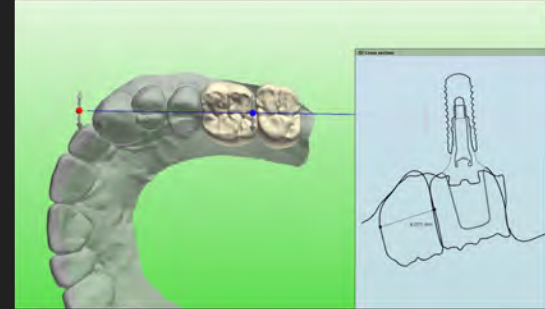
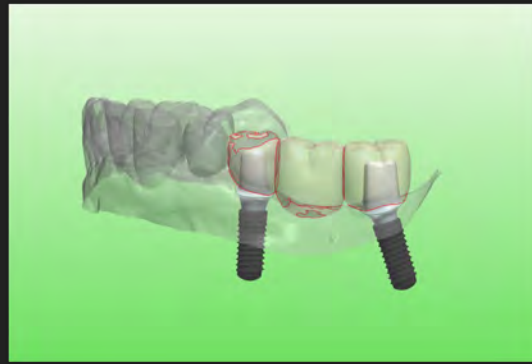
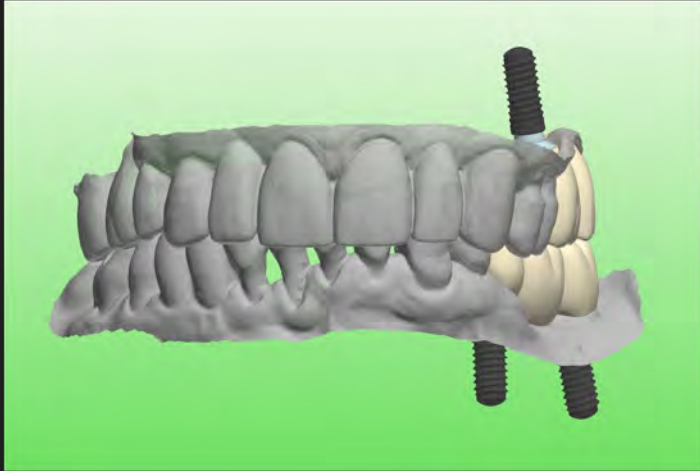
Single stage with tissue level healing abutment  
5 months after surgery

# Scan/Impression



Scan bodies communicate implant position to lab

# Prosthetic Design



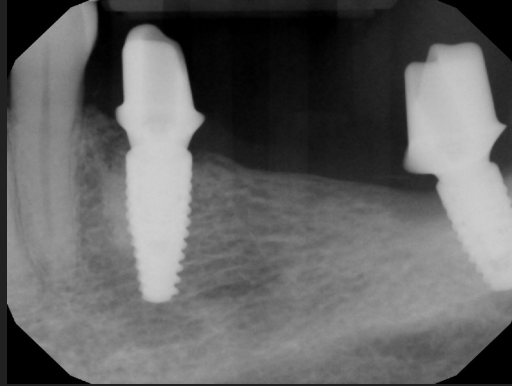
Screwmentable design ( $\geq 7\text{mm}$  interocclusal space)

UA: Engaging, LA: #18 Non-engaging, #20 Engaging

$\geq 1\text{ mm}$  overjet to prevent cheek biting

$\leq 8\text{ mm}$  mesiodistal length of cantilever pontic

# Delivery



Lower FDP not fully seated  
Open mesial contact  
Open occlusion

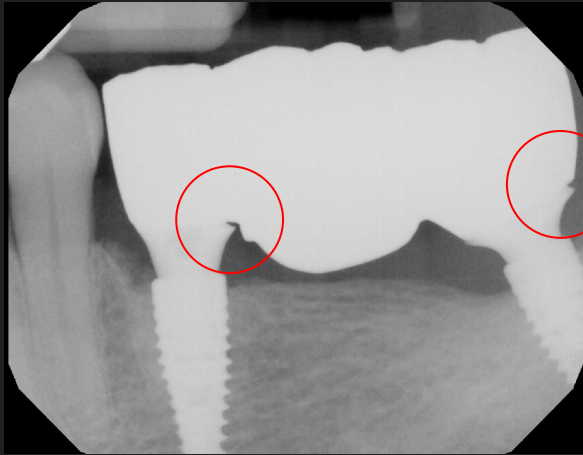
Alginate impression with  
delivered upper cFDP poured,  
mounted against lower master  
cast and sent to lab for remake  
of 18-20 FDP



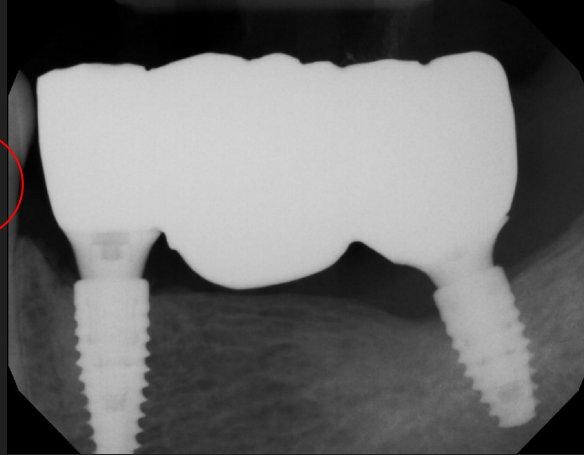
# 2nd Delivery

2nd FDP would not seat fully. Evidence of an Inaccurate master cast. Suspicious of discrepancy in scan. Difficulty of soft tissue image stitching could be the cause.

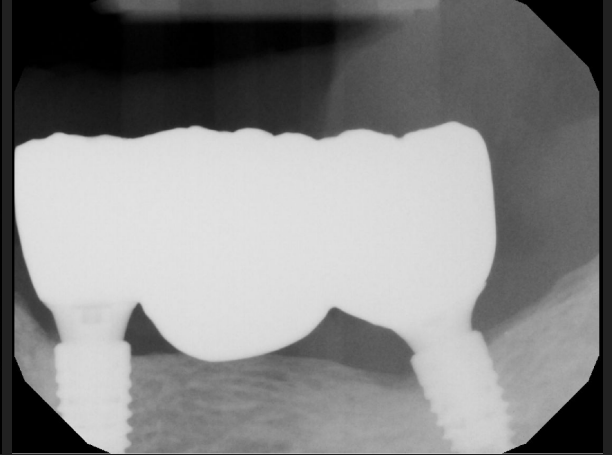
Will take open tray impression and remake. Will attempt second scan and compare with open tray cast.



Initial



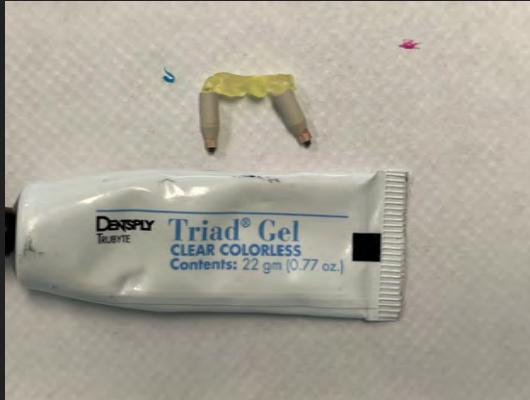
With some adjustment of abutment



Best we could manage adjusting abutment, but contact now open and still catching margin with explorer.

# Scanning Problem Solving

First obtained open tray impression. Then placed scan bodies to attempt second scan. The distance between scan bodies too great for scanner to accurately capture without relying on soft tissue.



Overcome scanner limitations by splinting scan bodies, scanning, trimming scan, and rescanning scan bodies.

Precision of scan decreases with increase in edentulous distance.  
Lee, Jae-Hyun et al. Journal of clinical medicine 2019; 8,9 1187.



# Variation in Impression Methods



Scan #1 (no splint)  
11.75 mm



Open Tray Impression  
12.17 mm

Scan #2 (splint)  
Arriving from lab 5/24/21

Discrepancy: 0.42 mm

Discrepancy: X mm

# Delivery

Lower prosthesis currently being re-made in the lab

# Maintenance

Strict 4 Mo Recall w/ SPT

Scale implants w/ plastic curette