

***Restoring smile,
confidence, and
function: a dental
rehabilitation
journey***

STONE MAO

DDS CANDIDATE 2023



UNIVERSITY OF THE
PACIFIC
Arthur A. Dugoni
School of Dentistry

Patient profile: EF

- 42 YO Male
- **CC:** “I want to get back a smile.” Pt wanted something presentable while looking for employment. Pt does not report any pain
- Last dental visit was in 2012
- **Med hx:** Non-contributory
- Pt is a **smoker** 1 pack a day for > 5 years. Pt denies using any recreational drugs or alcoholism.
- **SH:** Pt originally from Reno, NV. Pt has been unemployed for many years. Pt moved to SF with his sister to find a new job. Pt came in for screening on 3/14/22.

EF'S FMX 3/14/22





Periodontal Diagnosis

- **Plaque score:** 2.3
- No mobility surprisingly
- **Dx:** Generalized moderate with localized severe periodontitis
 - Stage IV Grade C
- **Prog:** Generalize guarded with hopeless #6-10, 12, 14, 15

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“It is advocated that smoking may lead to a **shift in the composition of the subgingival biofilm** with an increase in the prevalence of periodontal pathogens. Moreover, smoking has been implicated in the **delay of neutrophils recruitment** and migration into periodontal tissues, thus **compromising the acute immune response.**”

Hard Tissue

1 - unerupted

2 - x

3 - L cervical caries (D4), O ICDAS 4, DO shadowing

4 - ICDAS 30, D and M caries D3

5 - ICDAS 3 O, D D3 caries, M D2 caries

6 - root tip grossly carious → ext

7 - endo treated root tip, carious unrestorable → ext

8 - endo treated root tip, carious unrestorable → ext

9 - DIL comp, deep caries MIFL, unrestorable → ext

10 - endo treated root tip, carious unrestorable → ext

11 - cervical caries MFLD

12 - root tip grossly carious → ext

13 - cervical caries DB, carious MI

14 - root tip grossly carious → ext

15 - root tip grossly carious → ext

16 - unerupted

17 - unerupted

18 - x

19 - X

20 - MOD comp. B comp. B staining

21 - B comp recurrent caries, MOD M D2 caries

22 - attrition, large B caries, caries subg

23 - caries subg

24 - B comp, caries subg

25 - B comp, caries subg

26 - B comp fractured

27 - B comp fractured, caries MD

28 - MO comp. M caries

29 - x

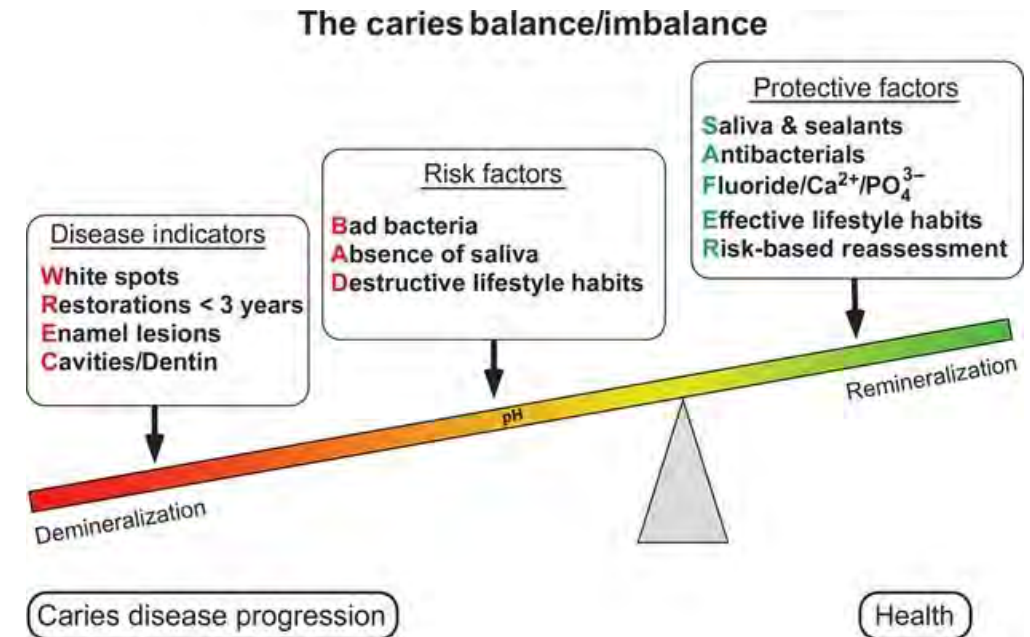
30 - x

31 - x

32 - unerupted

Caries Risk Assessment

- **Initial ATP Meter Reading:** 7721
- **Saliva pH:** between 5.5 and 6.9
- **Saliva flow:** adequate when stimulated, however patient notices that his mouth is dry (“cottonmouth”) after he smokes
- **Patient’s caries risk:** Extreme caries risk

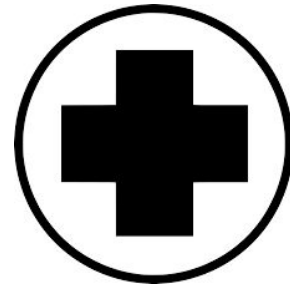


Social Determinants of Health Involved



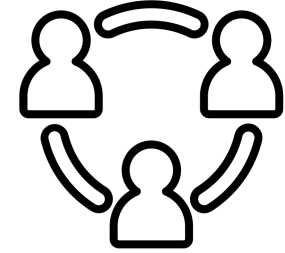
Economic Stability

- Patient was unemployed
- Patient didn't initially have a stable income to afford dentistry
- Patient might move back to Reno if he did not find a job in SF



Healthcare Access and Quality

- Patient did not have access to dentist in Reno
- Patient did not have any dental insurance
- Patient did not know about the Medi-Cal or government subsidy programs



Social and Community Context

- Patient had a rough childhood upbringing

EF's Tx Plan

Pt was unsure that he was going to find employment here in SF and plans to leave state to find a job if he doesn't find it by June 2022. We prepared two treatment plan in case he leaves the state and see another dentist.

Fast (Alternative) Tx Plan

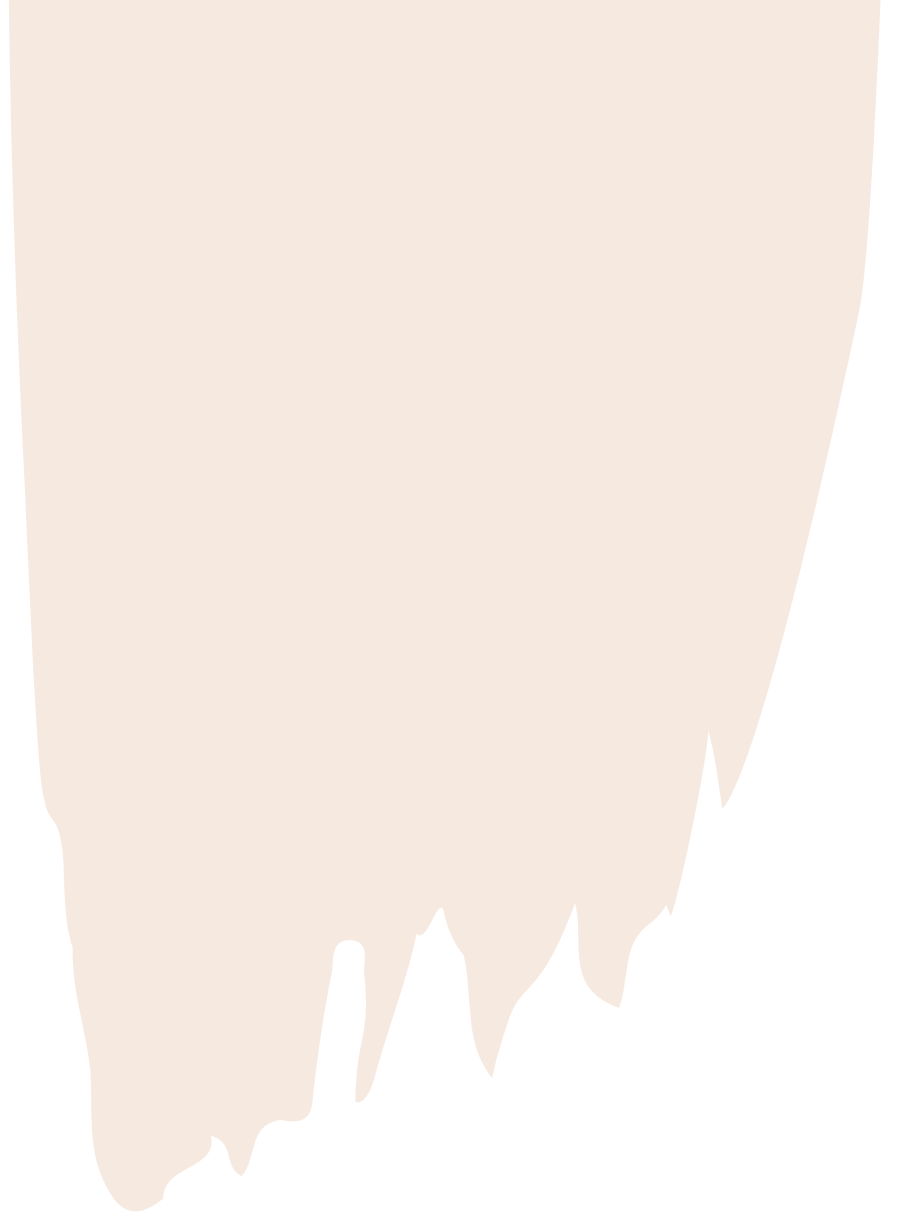
- Urgent
 - **SDF**: #3-5, 11, 20-22
 - **Ext** 6-10, 12-15
 - **Immediate upper stayplate** (right after ext)
 - CTX 4 rinse
- Disease Control
 - **Limited SRP** UR, LR, LL, #11, #13
 - **Composite** #21 MODc, 24-26 Bc, 27 MFDc, 28 MOc (Using Glass Ionomer)
- Reconstructive
 - None → plan for hand-off for next provider for RPDs
- Maintenance
 - CTX 4, CTX 3 rinses
 - 3 mo. recall

Full Tx Plan

- Urgent
 - Same as fast tx plan
- Disease Control
 - In addition to the fast tx plan:
 - #3 MODBLc, #4 MODc, #5 MODc, #11 MFLDc, #13 MODBc
- Reconstructive
 - #3 **survey crown**, #5 **crown**
 - UA and LA **RPD**
- Maintenance
 - CTX 4, CTX 3 rinses
 - 3 mo. recall

Phase I

- Extractions of all non-restorable teeth
- Immediate stayplate
- Caries control and composite fillings





1-week post EXT with stayplate
Beautiful smile!!



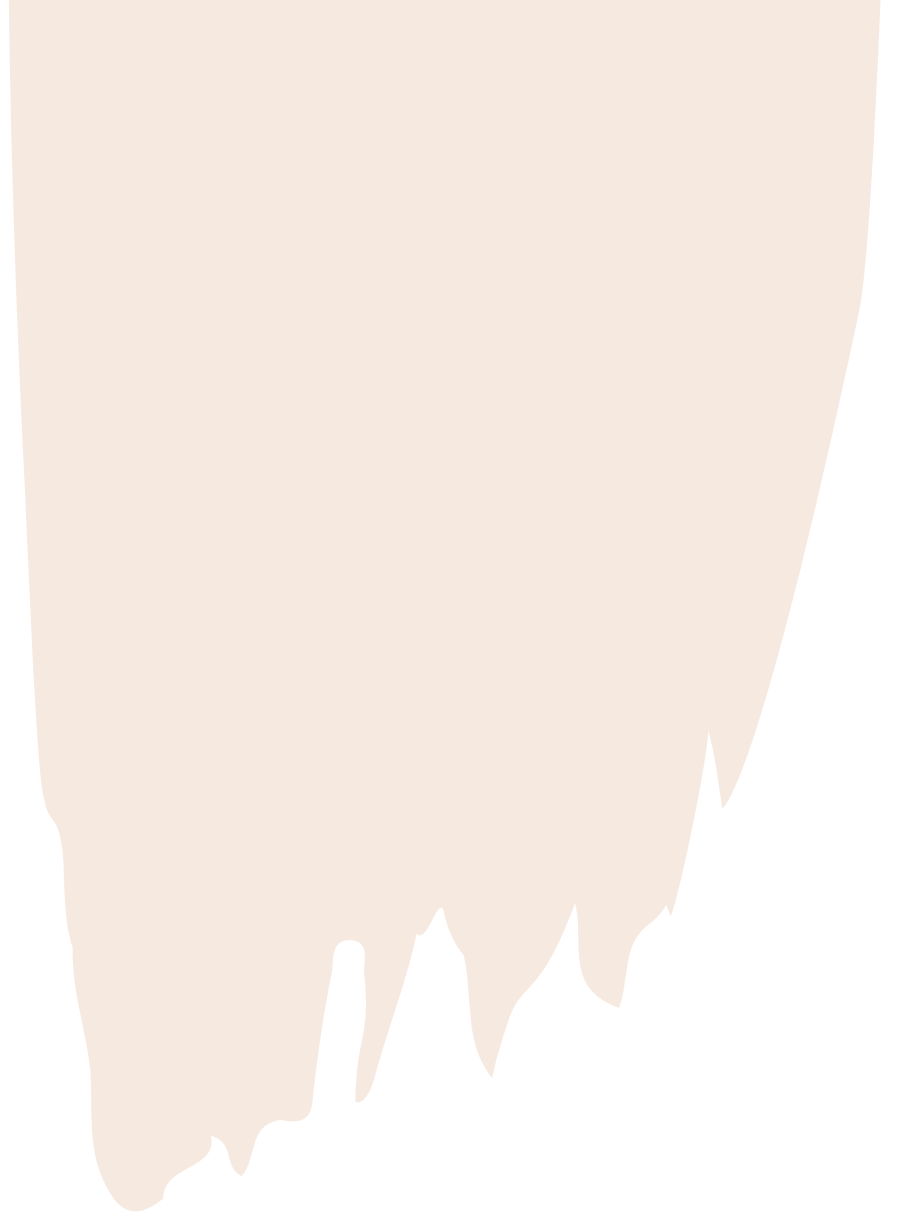


All Composite Fillings Completed
(10/2022)



Phase II

- Evaluating teeth for fixed restoratives
- Preparing for the RPDs
- CAMBRA products



Update to the tx plan

- Pt found a job in San Francisco and can stay long term now
 - Working late night shifts
- Pt applied to Denti-Cal in the middle of Phase I and has full benefits and has full coverage on composite fillings, crowns, and CAMBRA products



#5 MODBL prep after caries control

- To conserve tooth structure, Dr. Tiller and I determined that an **onlay** would be a better option than a crown

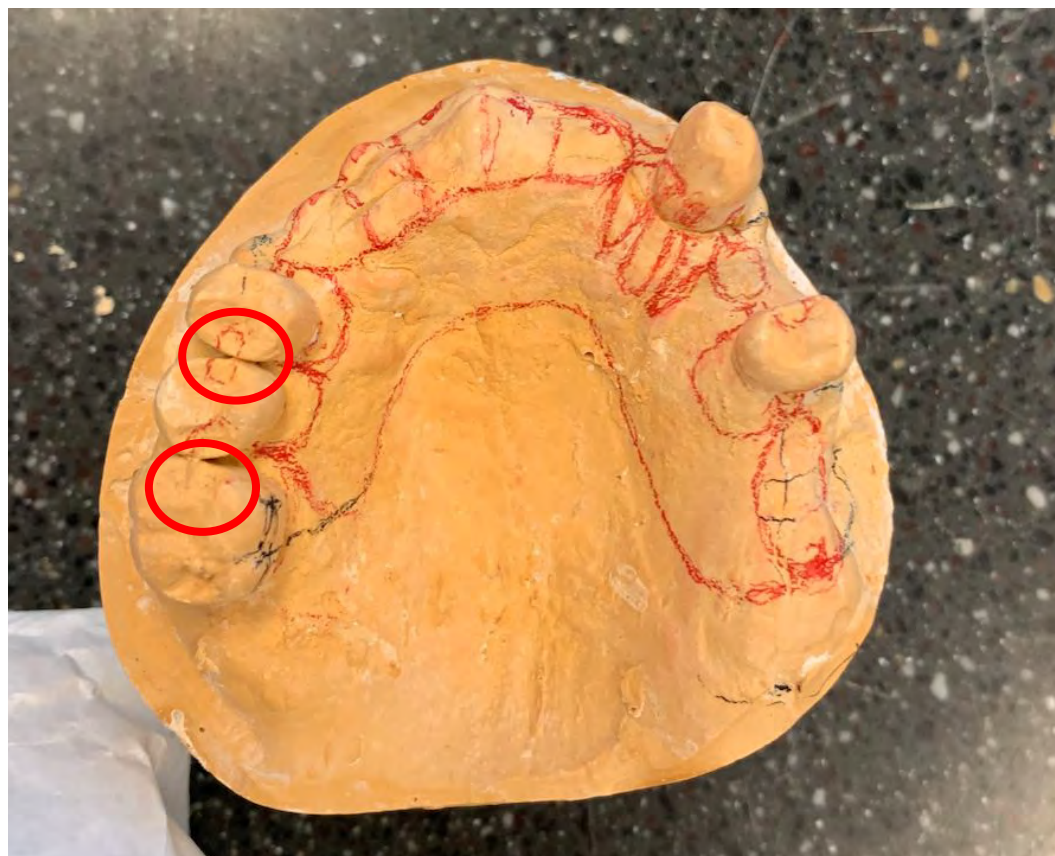


#3 MODBL filling

- The margins of the composite were not optimal. Pt wants maxillary RPD. Determined that survey crown will be needed

Working RPD design

Maxillary



Mandibular



CAD/CAM Survey Onlay #5

- Chosen to avoid the excess removal of tooth structure
- **Prep design:**
 - Only needed to reduce enough tooth structure to expose enamel for bonding and to have enough thickness for the material (lithium disilicate / e.max)
 - Modified preparation without shoulder margin design

Lima et al., 2018

- Modified preparation without shoulder margin onlays have **smooth transitions** between the mesial/distal boxes and buccal/lingual cusp
 - Leads to **superior CAD/CAM scanning** and allows the burs of the milling machine to **easily reproduce the internal features** of the onlay
 - Marginal adaptation is acceptable but not as superior as conventional shoulder

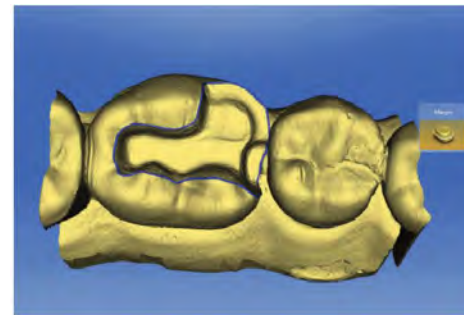


Figure 1. Conventional preparation with shoulder margin.

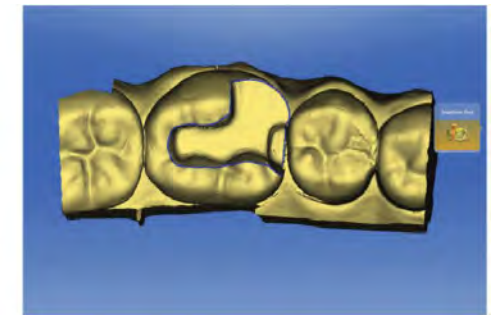
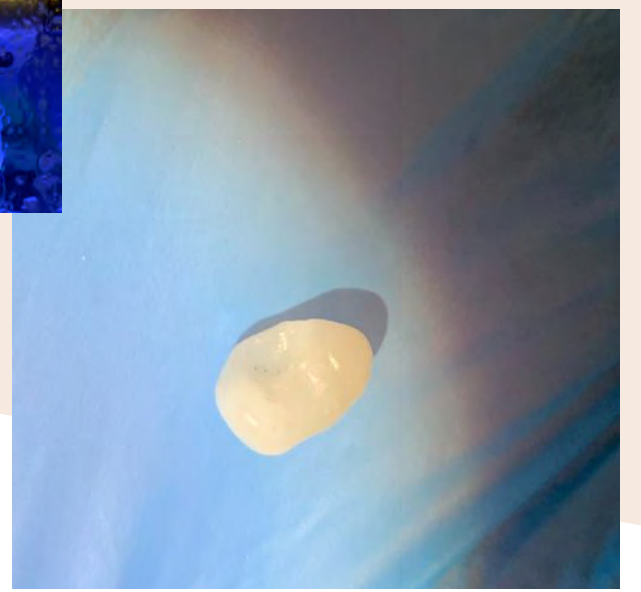
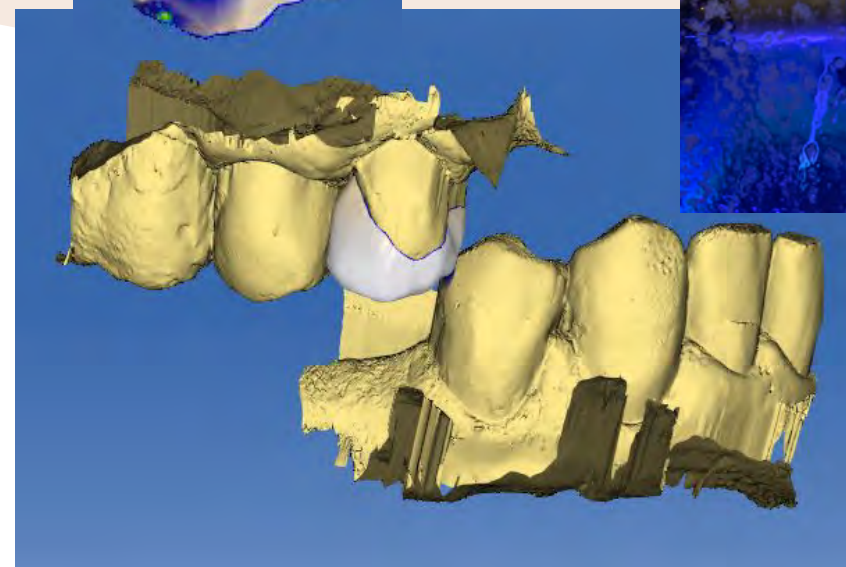
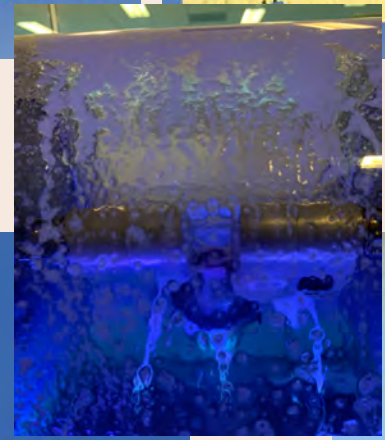
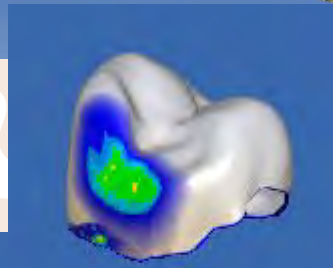
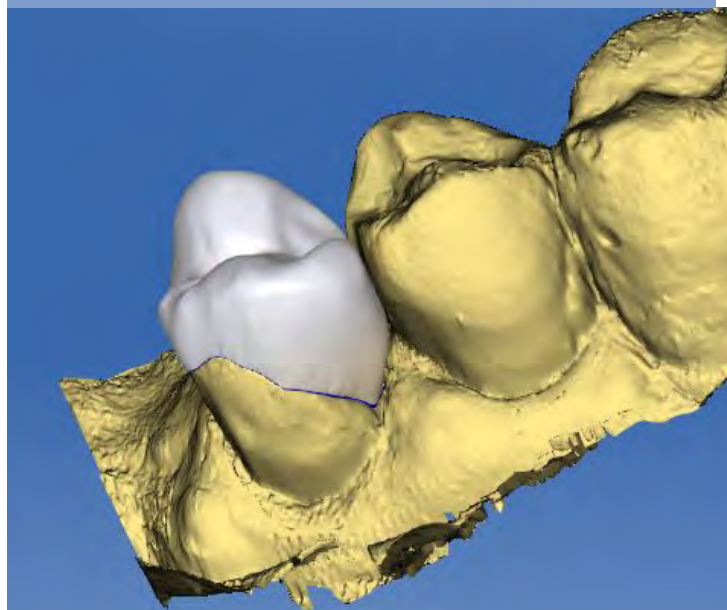
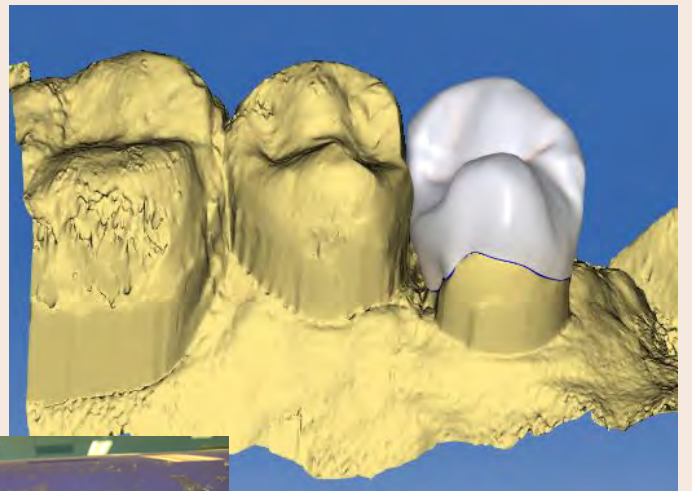
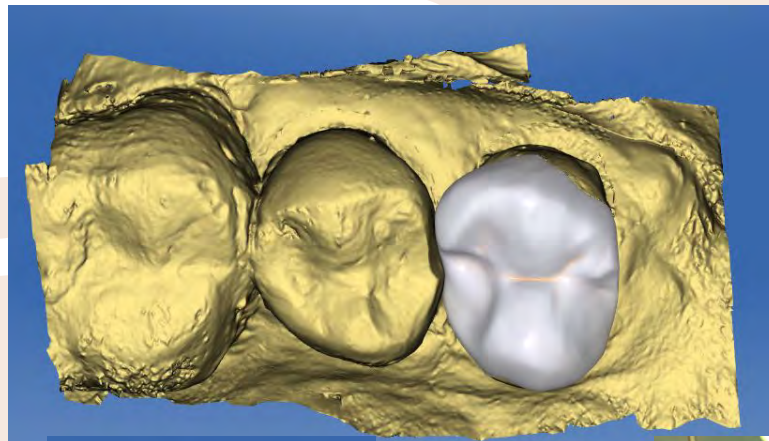
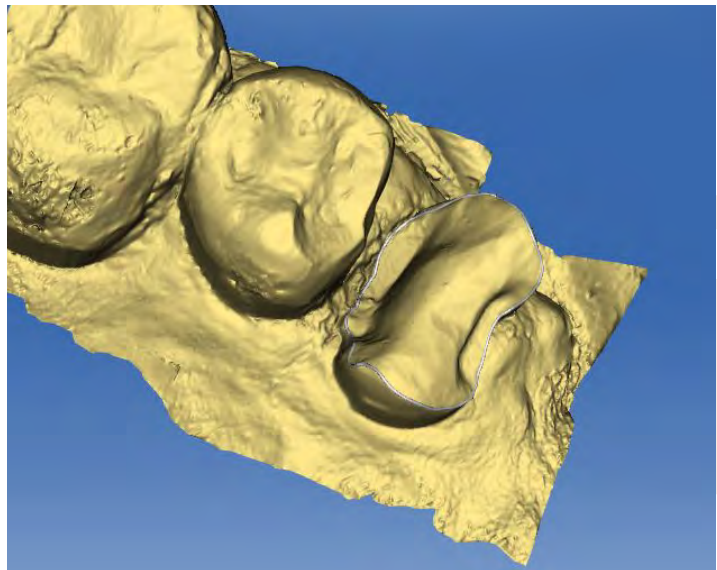


Figure 2. Modified preparation without shoulder margin.



Designed with CEREC BlueCam

Onlay after staining and glazing

Survey Crown #3

- **Material used:** Monolithic zirconia
- **Rest carved:** mesial marginal ridge 1.5 mm depth round

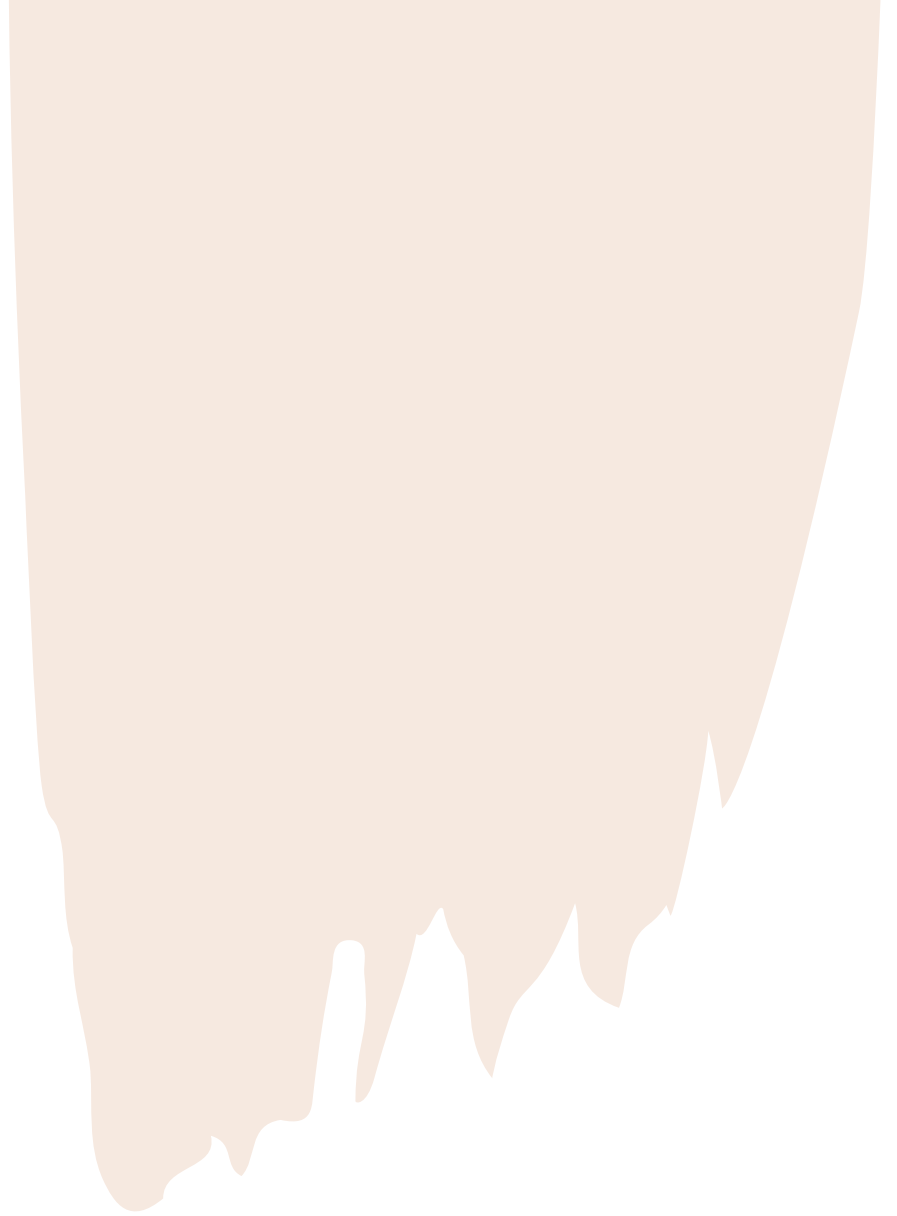
Chaturvedi et al., 2021

- Maximum force load for materials:
 - **Zirconia:** 3476.1 ± 285.97 N
 - **Lithium disilicate:** 1309.3 ± 283.9 N
 - **Maximum biting force:** 575.6 N
- Surveyed crowns with narrow base occlusal rest seat design had statistically significantly higher fracture resistance than surveyed crowns with wide occlusal rest seat design



Phase III

Fabricating the maxillary and mandibular removable partial dentures



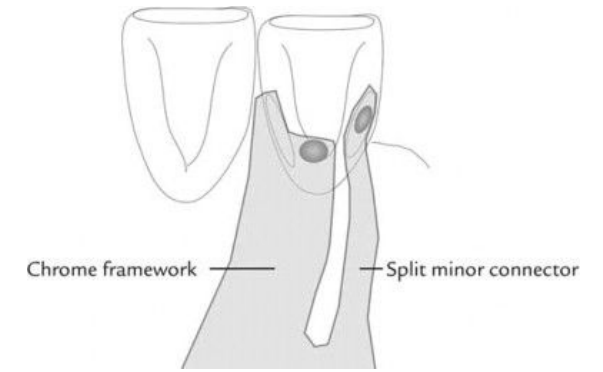
Design of the RPD

Function

- Designed RPD's in a way that if any teeth were lost, it would be easier to replace
 - Mandibular lingual plate
 - Maxillary embrasure clasps

Esthetics

- Hide as many clasps as possible
 - R2D2 clasp design near the anteriors
 - Involves a small proximal dimple on the abutment teeth and a lingualized flexible arm
 - A great alternative to traditional clasping for small toothbound space
 - Tran et al., 2009



R2D2 clasp design (Tran et al. 2009)

Opening up the Vertical Dimensions

- It was noticed at the first ODTP appointment that the **vertical dimension of occlusion (VDO)** has been lost due to the lack of molar support
 - VDO supported by #11 & #22 as well as marginal ridge of #13 and #20
- Open VDO by **1 mm**
 - Support group function of RPD
 - Relieve #11 canines from intercuspation
 - Canine still the first contact when in lateral excursion



Unsupported & supraerupted molars and premolars

Canine heavily hitting the opposing canines when in MI

Opening up the Vertical Dimensions

- Systematic review done by Kulkarni et al. (2017) support that occlusal vertical dimensions (OVD) should be as minimal as possible to support prosthetic function.
 - Maximum opening of OVD without significant TMJ discomfort is around **5 mm**
 - Should be done with fixed appliances if possible but removable appliances are great transition devices.
- Occlusal design of the RPD should be harmonious with the patient's natural dentition and support the RPD from wobbling
 - For most cases, prosthetic teeth should have balanced occlusion (**group function**)
 - Goodacre and Goodacre, 2021



Trying out patient's new VDO with wax rims (opened by 1 mm)



Patient's original VDO



RPD Design

- Embrasure clasp between 3-4
- R2D2 clasp #11
- RPC clasp #13
- RPC clasp #20
- RPC clasp #28



***Final RPD
Delivery***

Final Treatment Plan

- **Urgent**

- **SDF:** #3-5, 11, 20-22
- **Ext** 6-10, 12-15 & **Immediate upper stayplate**

- **Disease Control**

- **Limited SRP** UR, LR, LL, #11, #13

- **Composite**

- #20 MOc
- #21 MODc
- #24-26 Bc
- #27 MFDc
- #28 MOc
- #3 MODBLc
- #4 MODc
- #5 MODBLc,
- #11 MFLDc,
- #13 MODBc

- CTX 4 rinse

- **Reconstructive**

- #3 Monolithic Zirconia Survey Crown
- #5 MODBL Lithium Disilicate Onlay
- Maxillary & Mandibular Removable Partial Denture

- **Maintenance**

- CTX 4, CTX 3 rinses
- CTX 2
- 3 mo. recall

Number of CAMBRA products provided:

- **CTX 4 treatment rinse:** 3
- **CTX 4 Gel:** 1
- **CTX 3 maintenance rinse:** 2
- **CTX 2 Boost Spray:** 1















Acknowledgement

- Faculty
 - Restorative floor faculties
 - Dr. Mike Tiller
 - Dr. Christine Boyer
 - Dr. Angela An
 - Dr. Armando Chang
 - Dr. Trang Nguyen
 - Prosthodontics faculties
 - Dr. Steve Curtis
 - Dr. Chi Tran
 - Dr. Eugene LaBarre
 - Dr. Rex Hoover
 - Dr. Rebecca Moazzez
 - Diagnostic faculties
 - Dr. Parvati Iyer
 - Dr. Alan Budenz
 - Oral surgeons
 - Dr. Fatima Mashkooor
 - Dr. Greg Polonsky
- Student Peers
 - Jane Lim
 - Ethan Madison
 - Aaron Liu
 - Max Liu
 - Rachel Min
- Supporting Faculties
 - Gigi Maranan
 - Carlos Correra
 - Olga Matveyeva
 - Alfredo Riley
 - Satomi Kobayashi
 - Kamika Brown

Sources and Research

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