

# Where does dentistry end and medicine begin?

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# Disclosures/Disclaimers

- Employee of Delta Dental MI, OH, IN
- Adjunct Clinical Associate Professor, Periodontology The University of Michigan
- No financial interest in any products or techniques

# Objectives:

- Familiarize the listener with modern dental scope of practice
- Review the mechanisms of periodontal-systemic interactions
- Gain a better understanding dental procedures
- Conditions that require help from our medical colleagues
- Conditions that dentists may help in your practice

# Dentistry

## Definition of Dentistry

Dentistry is defined as the evaluation, diagnosis, prevention and/or treatment (nonsurgical, surgical or related procedures) of diseases, disorders and/or conditions of the oral cavity, maxillofacial area and/or the adjacent and associated structures and their impact on the human body; provided by a dentist, within the scope of his/her education, training and experience, in accordance with the ethics of the profession and applicable law.

(As adopted by the 1997 ADA House of Delegates)

### DDS/DMD Definitions

DDS — doctor of dental surgery

DMD — doctor of dental medicine

“32 teeth and 3 diseases, how complicated can dentistry be?” (Johnston 1978)

# Areas of interest

- Teeth
- Periodontium (Gingiva and alveolar bone)
- Temporomandibular Joint and related musculature
- Oral Manifestation of Systemic disease
- Salivary Glands (Major and Minor)
- Trauma, congenital deformities

# 12 ADA Recognized Dental Specialties

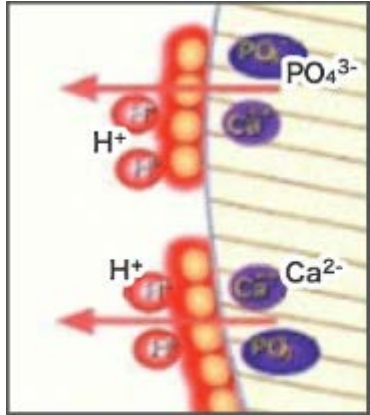
- Endodontics\*
- Periodontology\*
- Orthodontics\*
- Prosthodontics\*
- Pediatric Dentistry\*
- Oral and Maxillofacial Surgery\*
- Oral and Maxillofacial Radiology
- Oral and Maxillofacial Pathology
- Public Health Dentistry
- Dental Anesthesiology
- Orofacial Pain
- Oral Medicine

Clinical Specialties

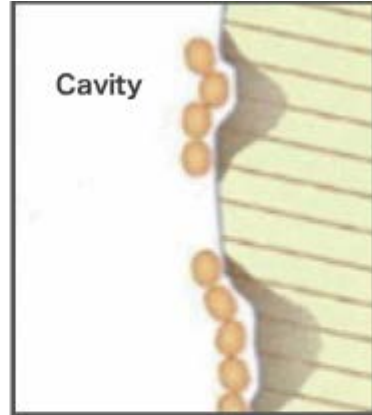
# What do dentists do?

- Cavities (Caries)
- Gum disease (Periodontal Diseases)
- Replace missing teeth
- Straiten misaligned teeth, bite problems (Malocclusions)
- Cosmetic Dentistry
- Diagnose/treat oral lesions and manifestations of systemic disease

# Cavity (Caries)



Decalcification due to acid produced by cariogenic bacteria

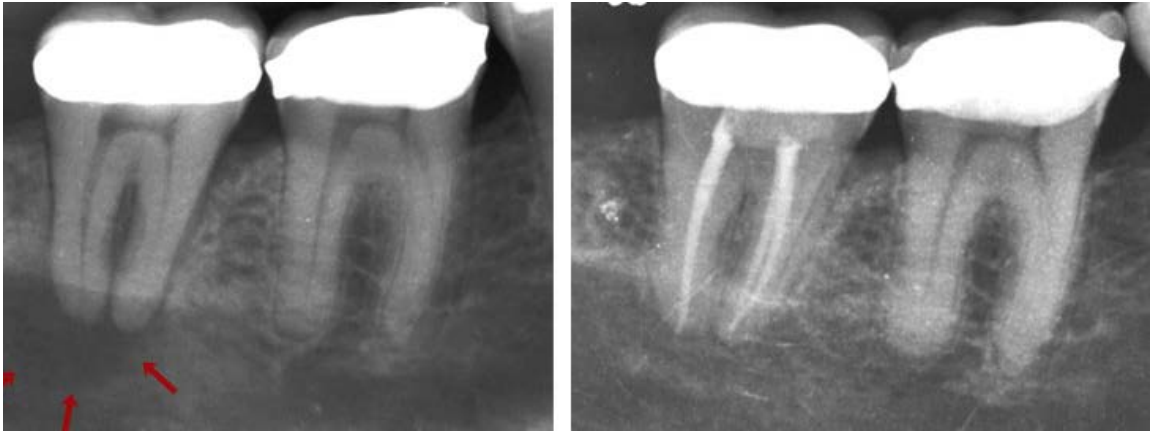
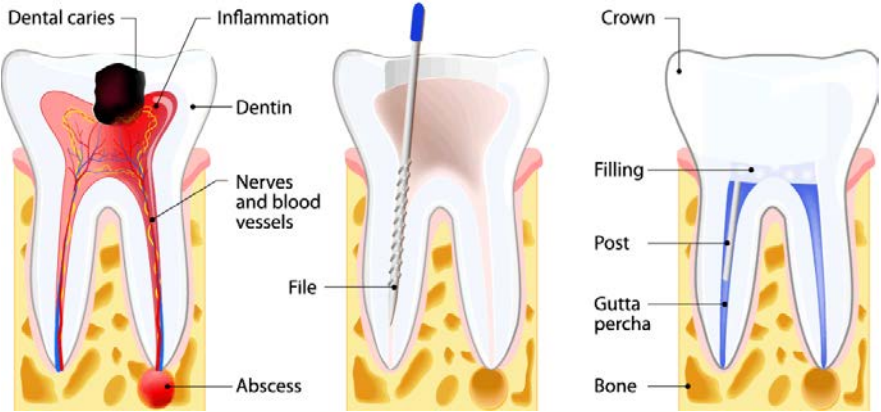


Cavity formation





# Root Canal (Endodontic) Therapy



# Fillings

## Amalgam (silver), Composite (white), Gold

- Amalgam is composed of: 40–60% silver, 27–30% tin, 13–30% copper, 1% zinc in a mercury binder
- Composite is a resin-based oligomer matrix, such as a bisphenol A-glycidyl methacrylate (BISGMA), urethane dimethacrylate (UDMA) or semi-crystalline polyceram (PEX), and an inorganic filler such as silicon dioxide.



All inlays, not onlays



Cusp protection, onlay

## Cosmetic Bonding

- Composite (plastic) bonded to a tooth to replace missing tooth structure or change the shape of a tooth



# Veneers

- Can change the shape and color of teeth
- Made from glass, glued to the tooth
- Once you have a veneer, always have a veneer



# Crowns / Bridges

- Crowns (caps) are metal or ceramic restorations which cover the tooth. Used when there is significant loss of tooth structure.



- Bridges (Fixed Partial Dentures) replace missing teeth



# Evolution of Crowns



Gold Crown



PFM Crown



All Ceramic Crown

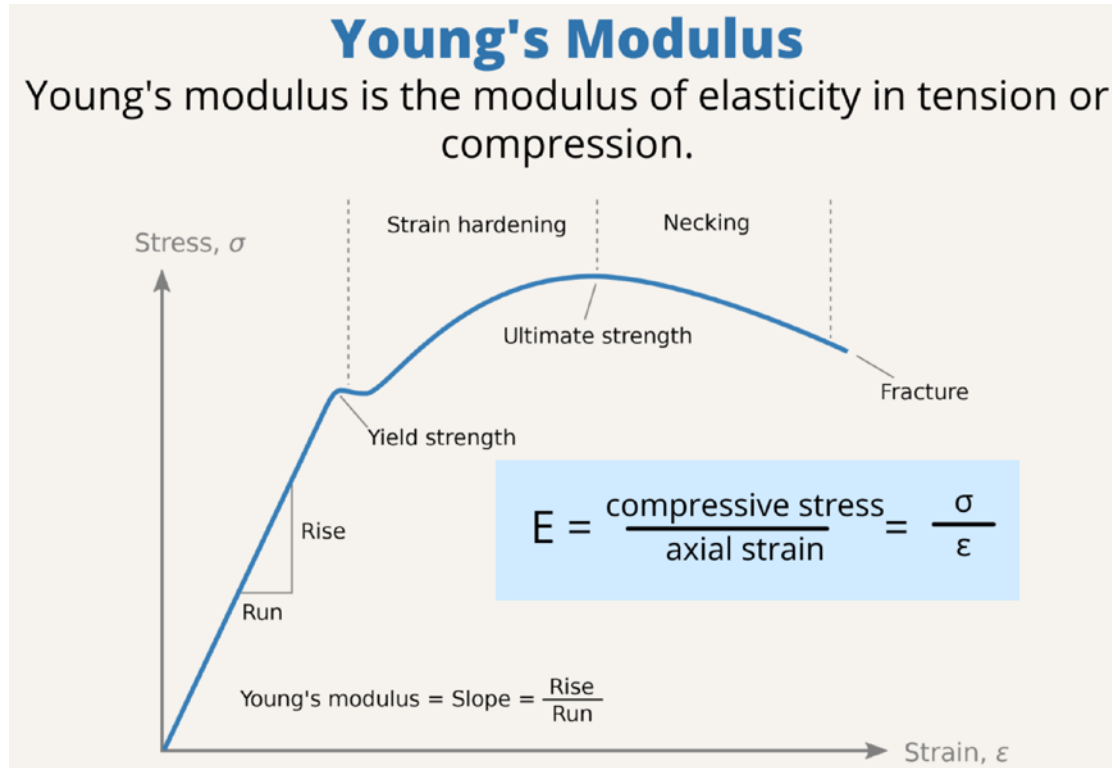


# Porcelain Fused to Metal (PFM)





# Disadvantages of PFM Crowns



$$E = \frac{\sigma}{\epsilon}$$

$E$  = Young's modulus, pressure units

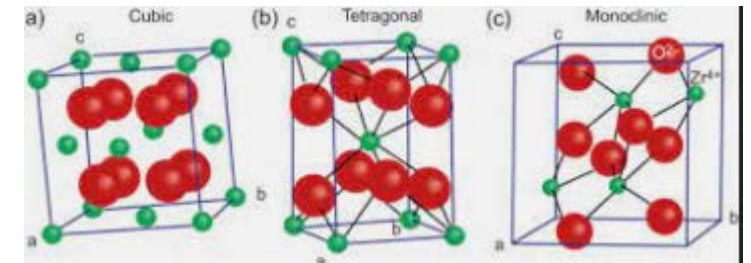
$\sigma$  = uniaxial stress, or uniaxial force per unit surface, pressure units

$\epsilon$  = strain, or proportional deformation (change in length divided by original length), dimensionless



# Enter Zirconia

- Zirconium dioxide (Yttria Stabilized Zirconia, Y2O3, ZrO2)
  - Discovered in early 1800 by Klaproth
  - 1972 Garvie alloyed with oxides (Yttria) to stabilize
- Used in medicine since 1960, Dentistry since 1990
- Stronger than composites, PFM
- Biocompatible
- Modulus closer to natural tooth than porcelain
- Shading more difficult than porcelain



# Considered a ceramic however it is a metal

Periodic Table

Legend:

- Alkali metals
- Alkaline earth metals
- Transition metals
- Post-transition metals
- Metalloids
- Reactive nonmetals
- Noble gases
- Lanthanides
- Actinides
- Unknown properties

91.224	40
640.07	1.33
<b>Zr</b>	
Zirconium	
[Kr] 5s <sup>2</sup> 4d <sup>2</sup>	
Transition Metal	

# Digital Scanning



# Milling



# Digital Scanning





# Removable Partial Dentures





# Implant Supported Prosthesis

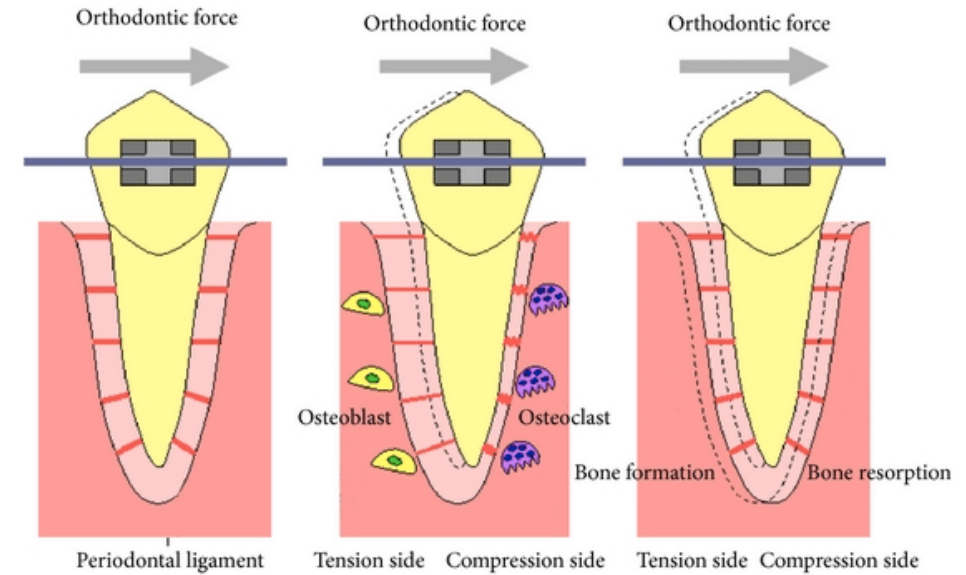
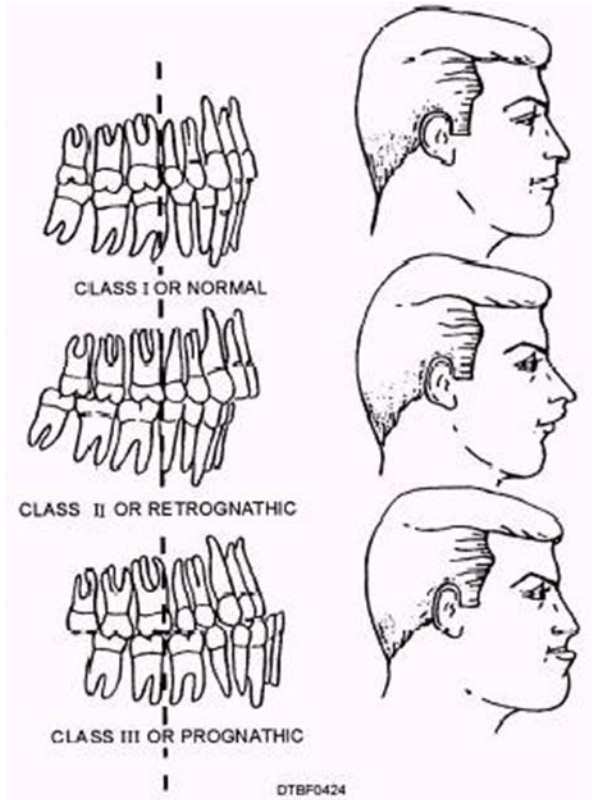


D-6110–D-6113, **removable**



D6114–6117, **fixed** (hybrid)

# Orthodontics



# Orthognathic Surgery

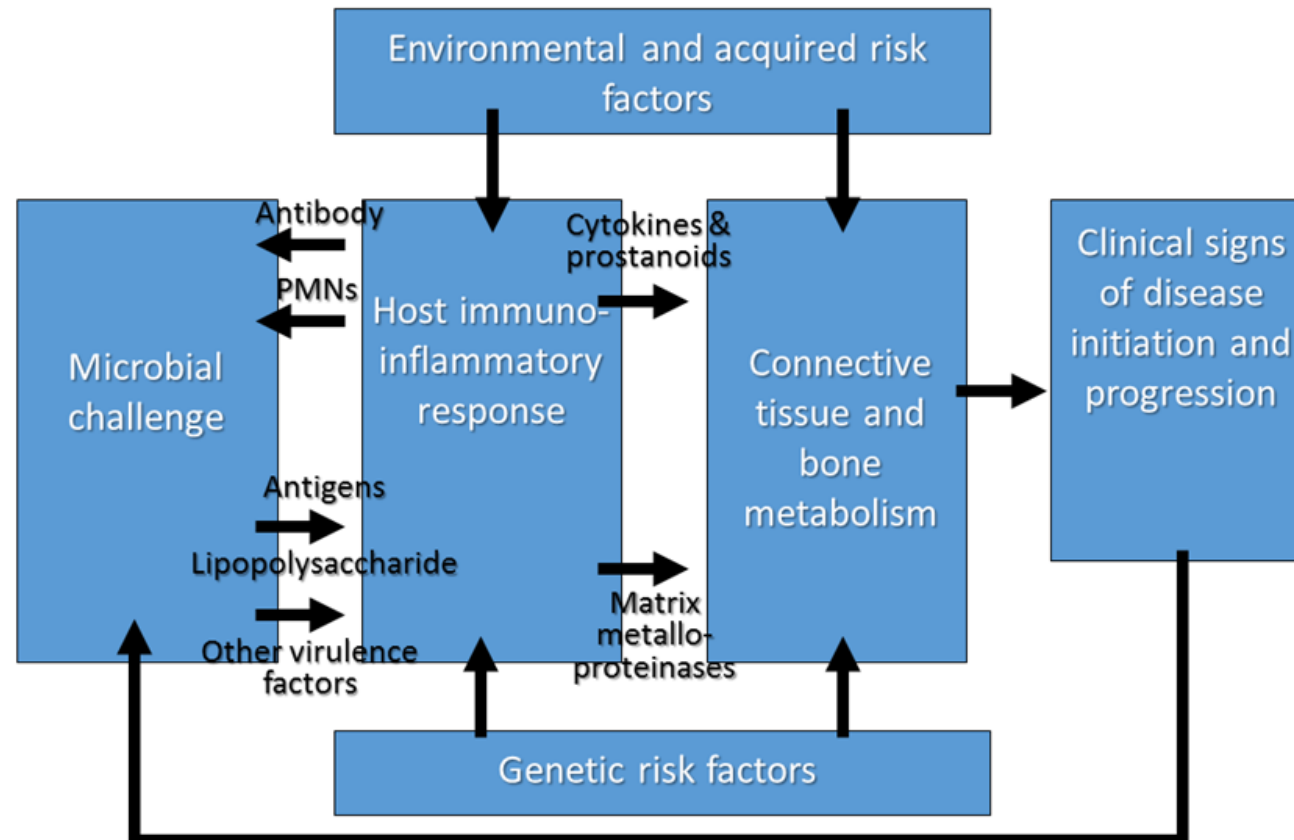


# Gum Disease (Periodontitis)

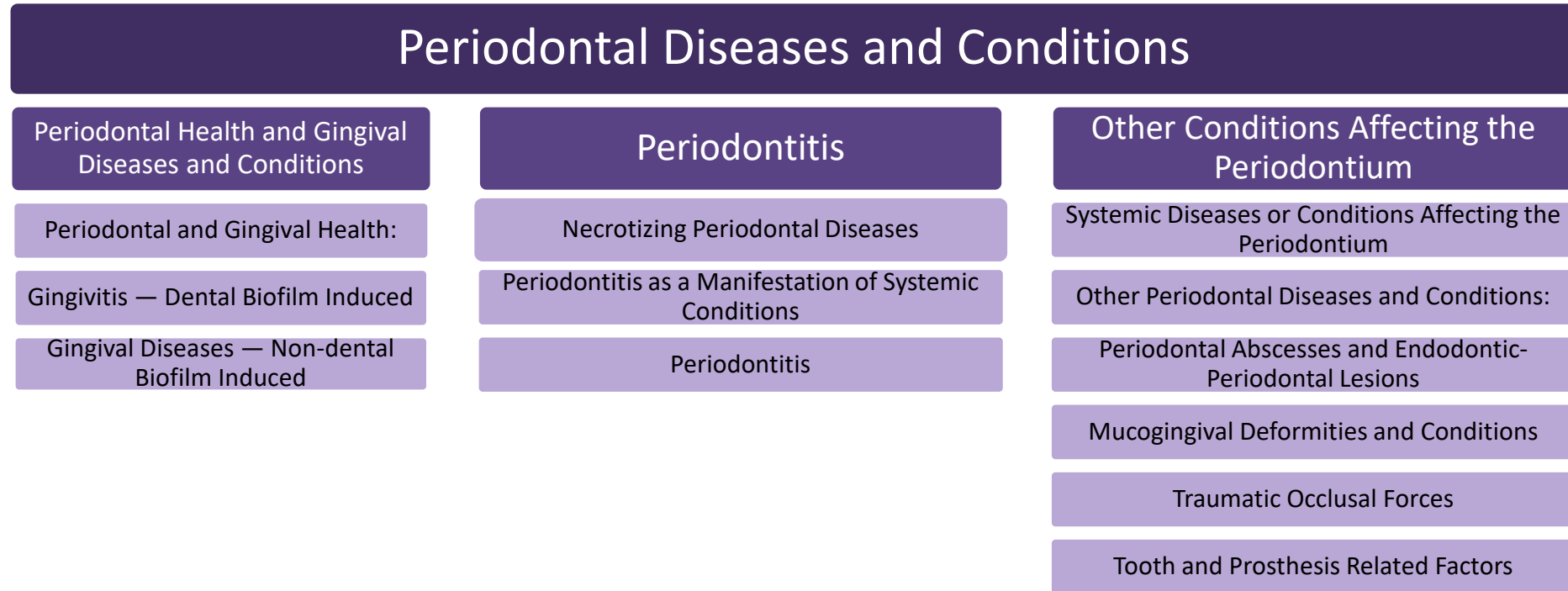




# Pathophysiology of Periodontitis

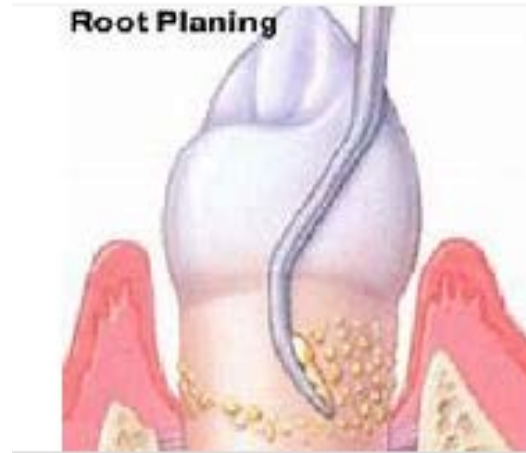


# Periodontal and Peri-implant diseases 2017



# Treatments

- Scaling and root planning (Deep cleaning)
- Surgical Therapy

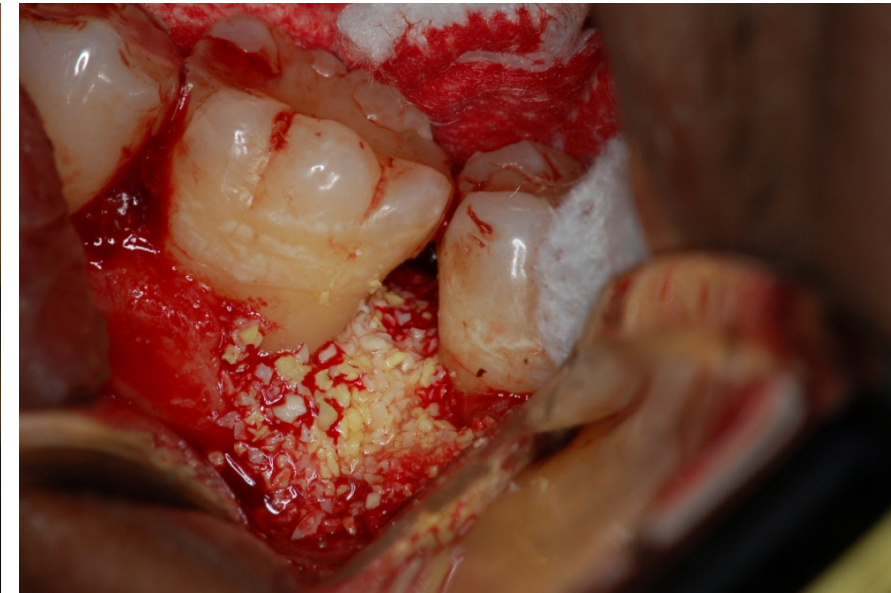
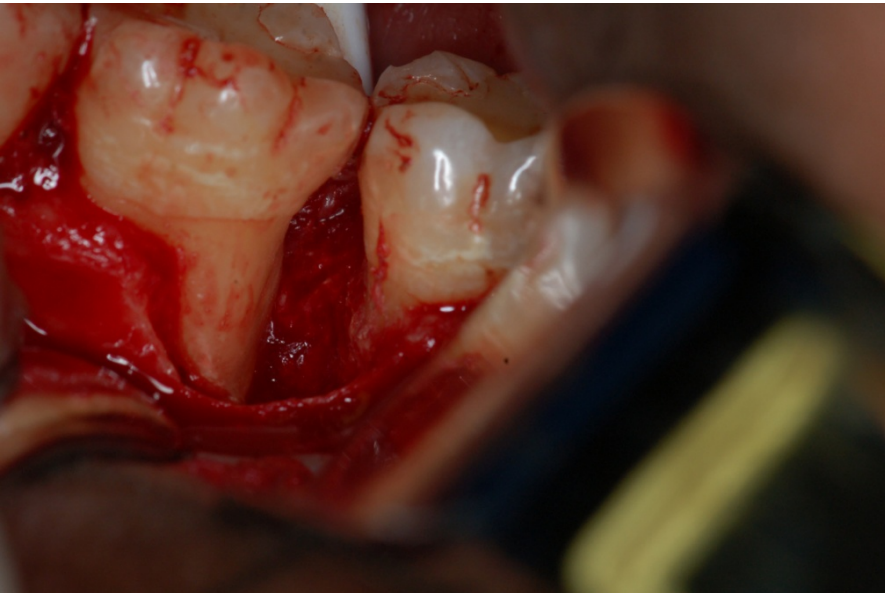
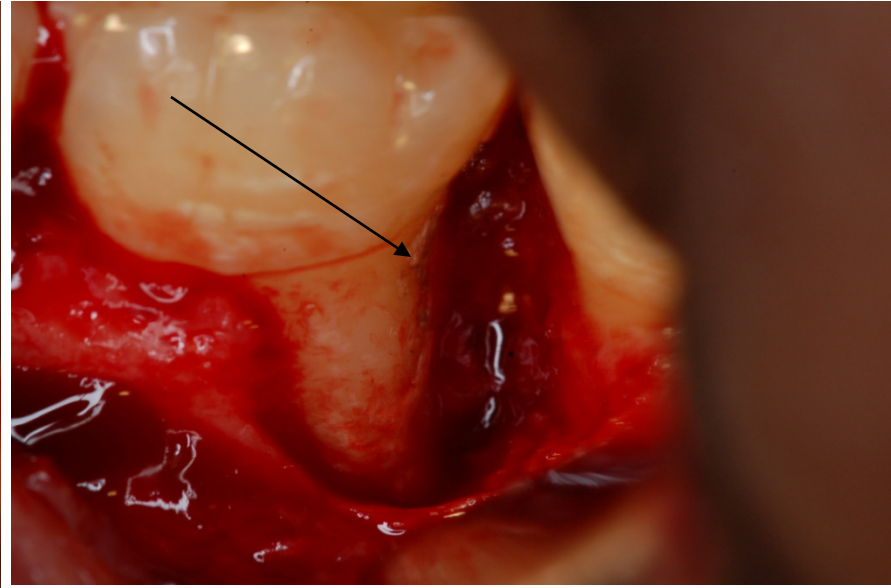
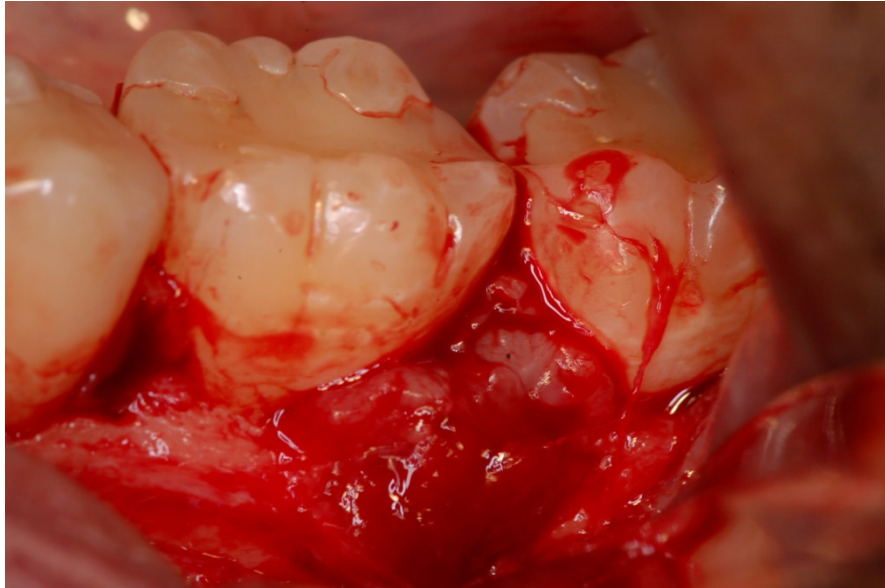




# Regenerative Surgery: Bone Grafts



# Periodontal Regeneration



# Periodontal Regeneration



# Regenerative Surgery: Soft tissue grafts



Before



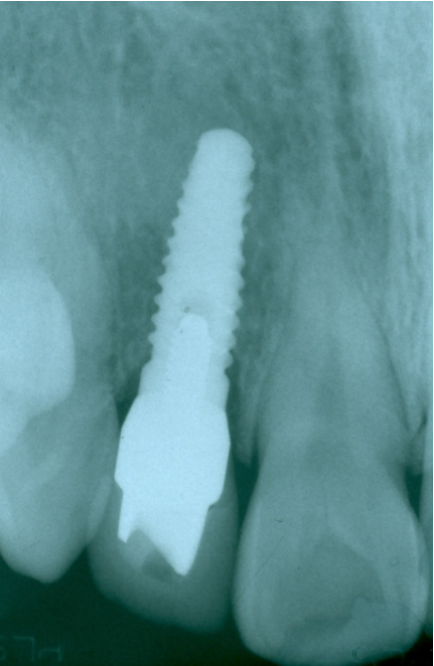
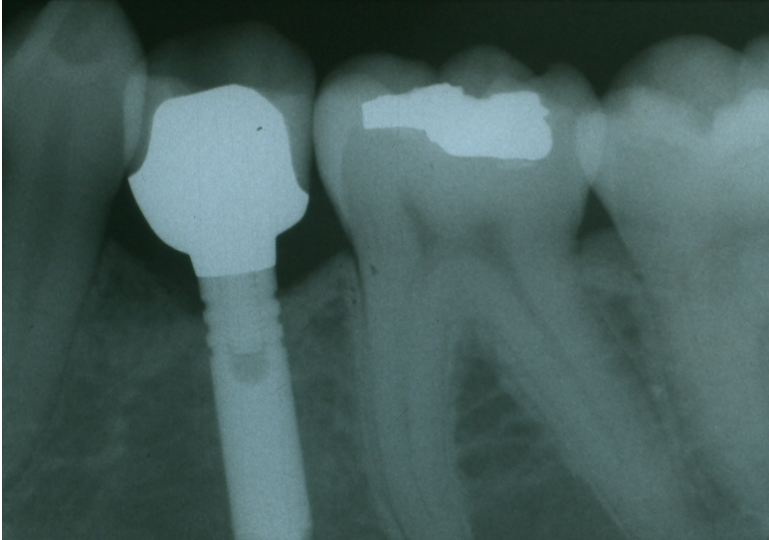
8-Weeks Post-Op

# Implants

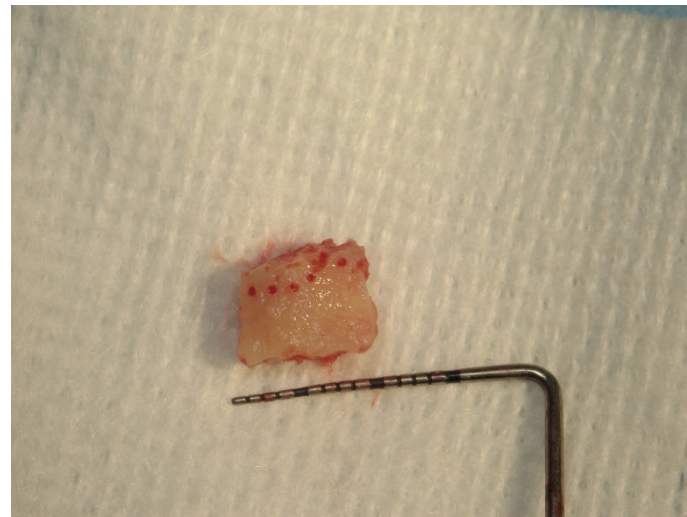
- An artificial root used to support a crown, a bridge or a removable prosthesis to replace missing teeth

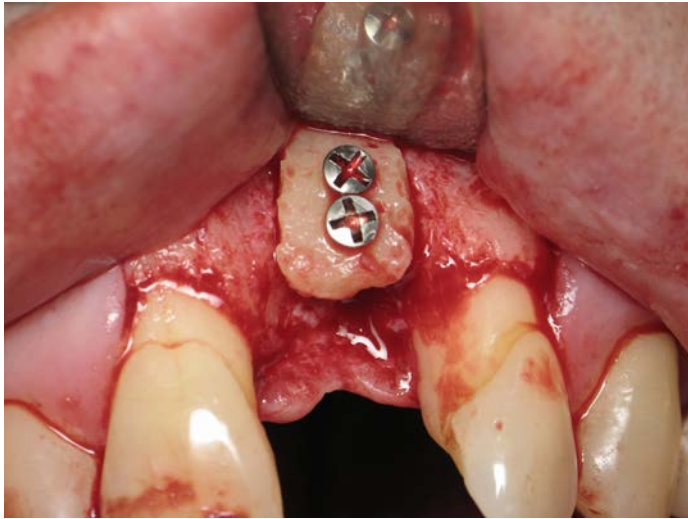


# Implant esthetics



# Regenerative Bone Graft (GBR)

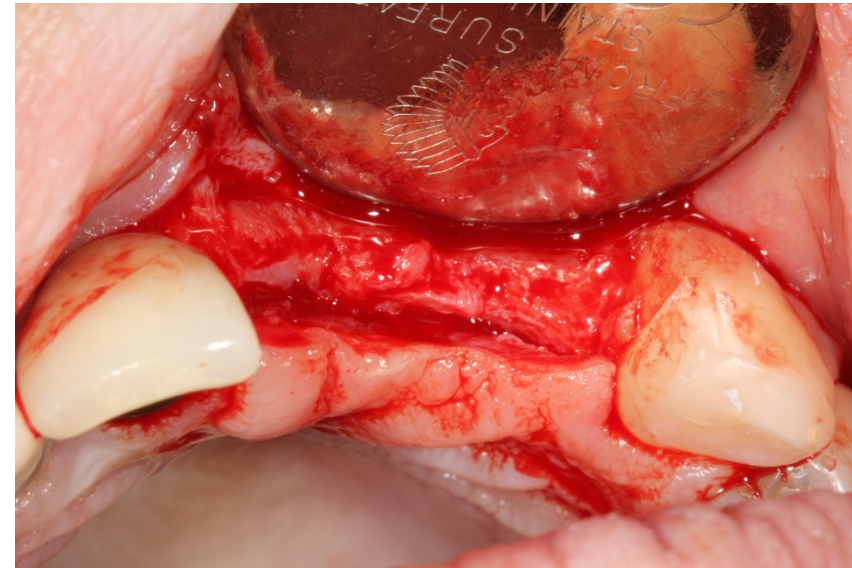
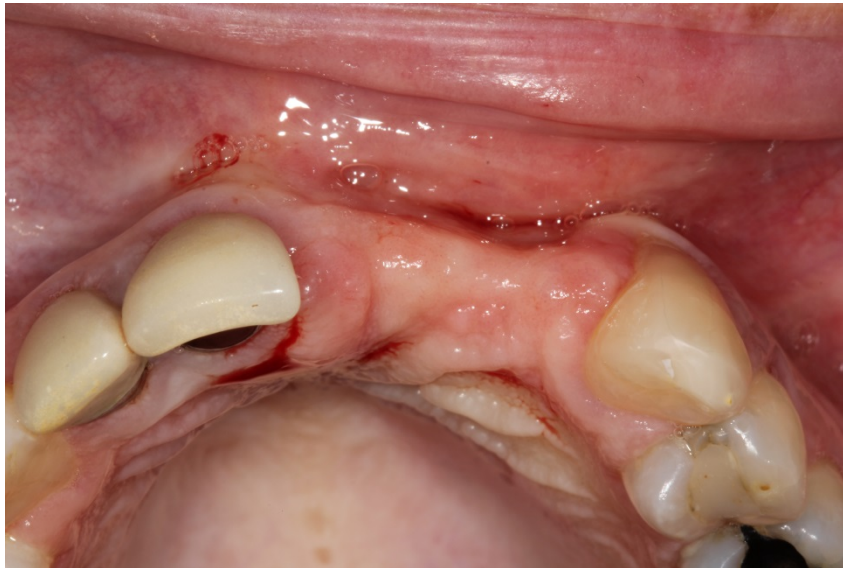






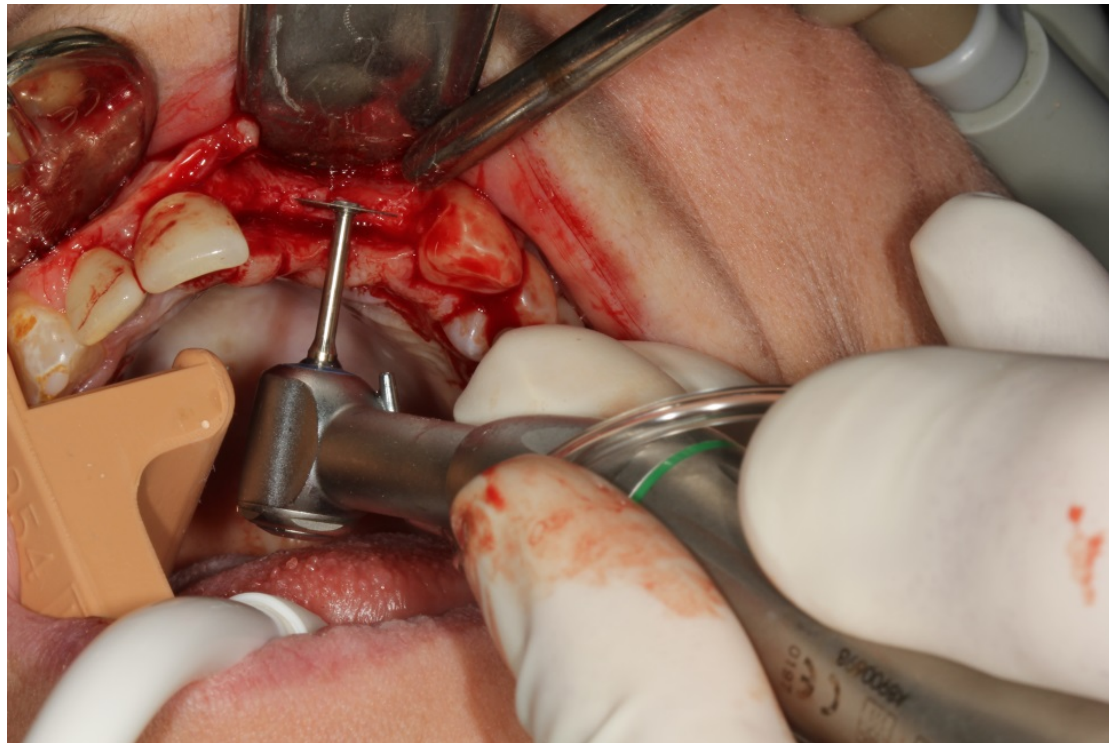
# Bone Modification prior to implants

## Insufficient Ridge

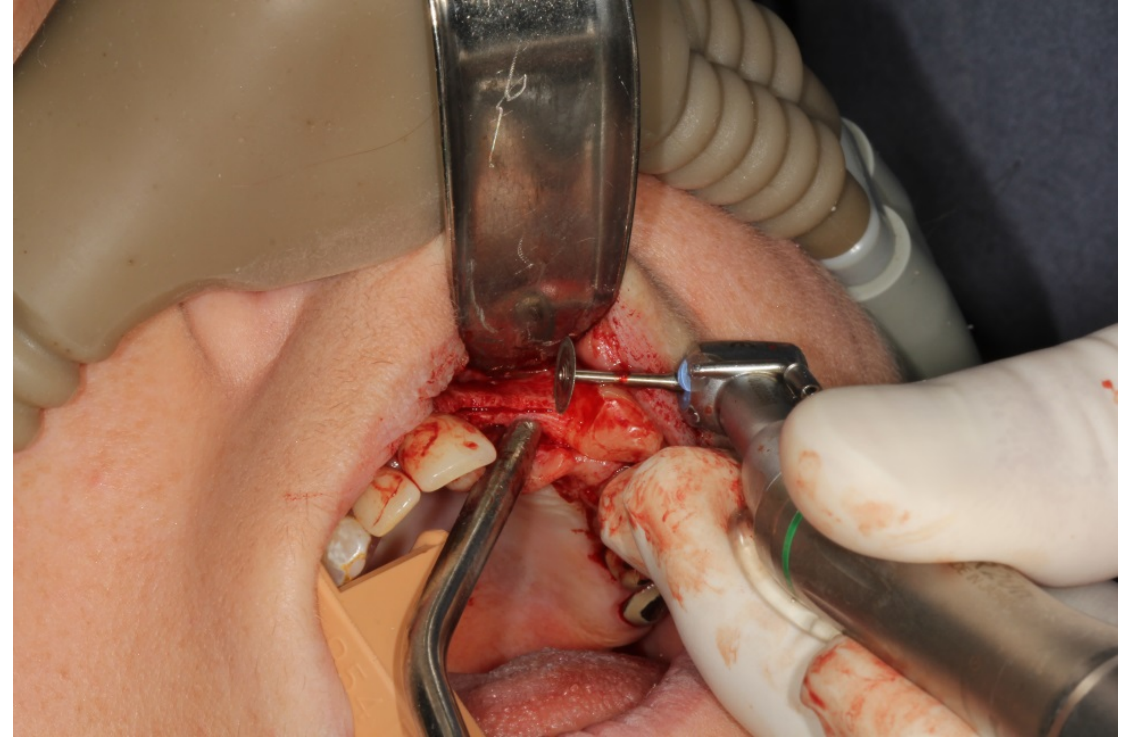


# Bone Spreading using Intra-oral saw

**Horizontal Cut**

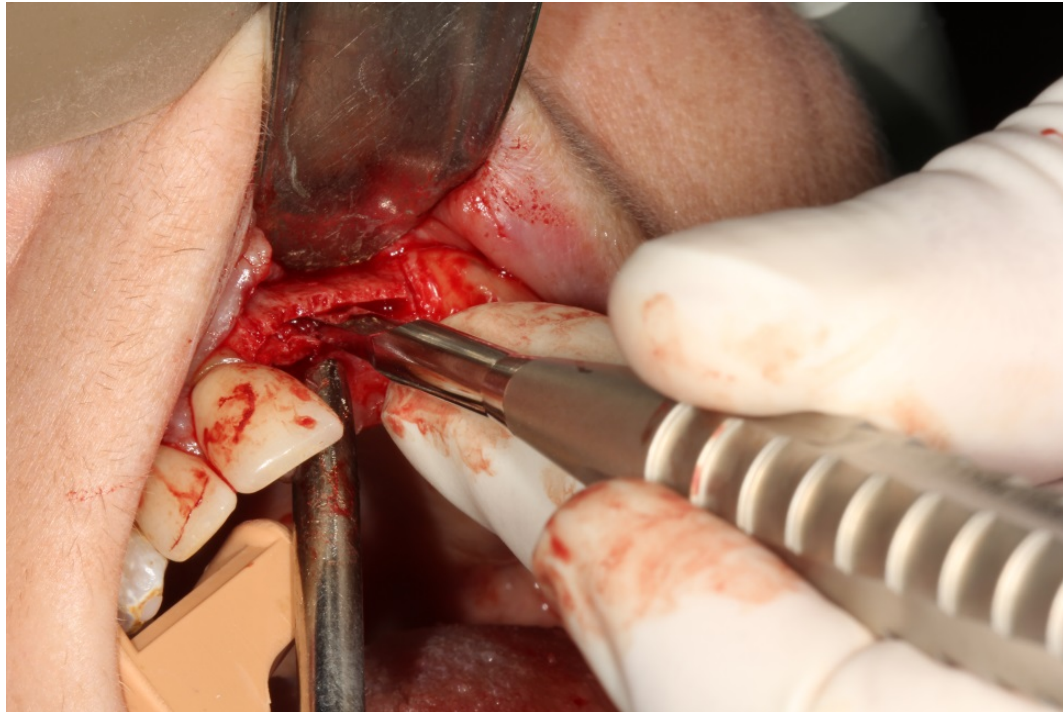


**Vertical Cut**

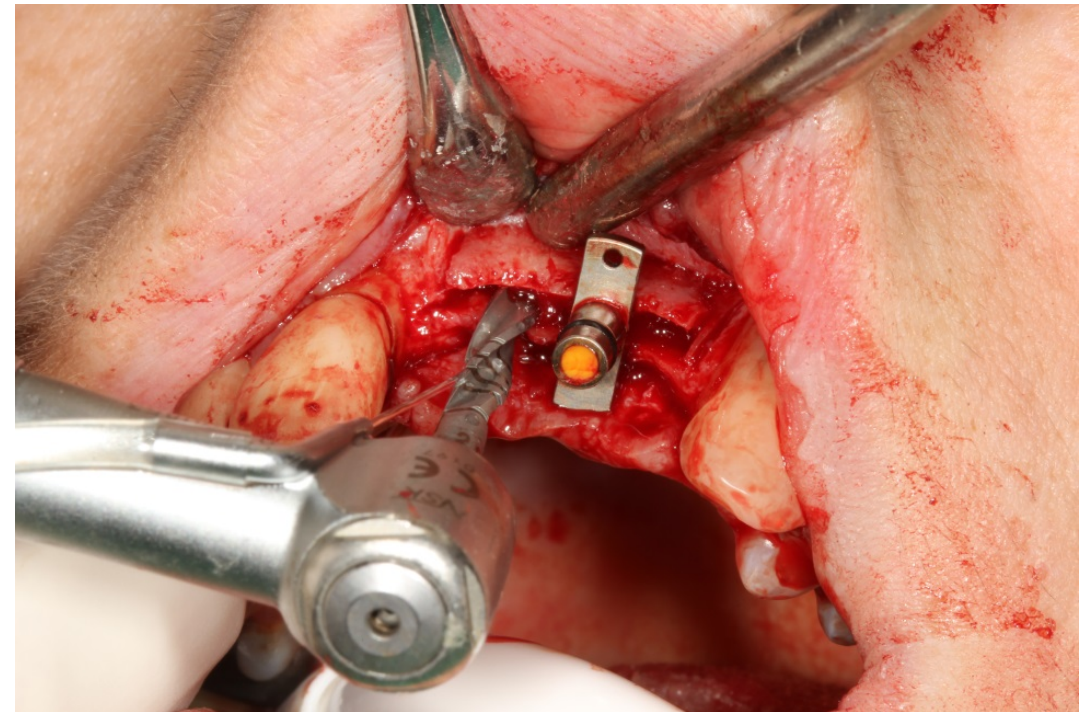


# Ridge Splitting

**Spreading**

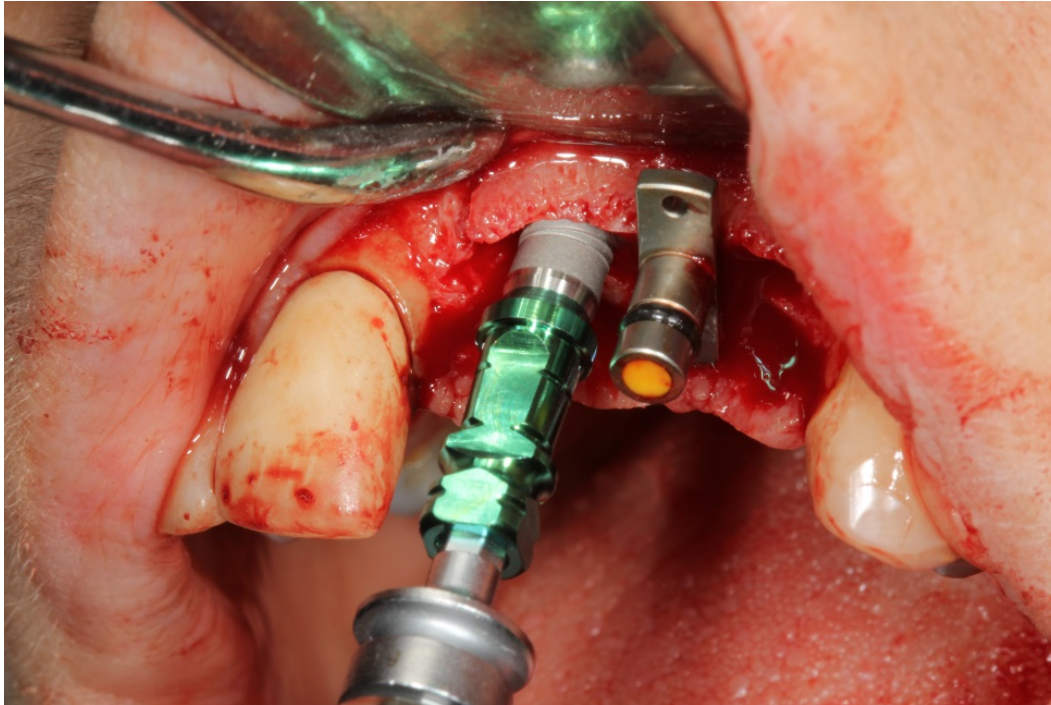


**Wedge and Osteotomy**

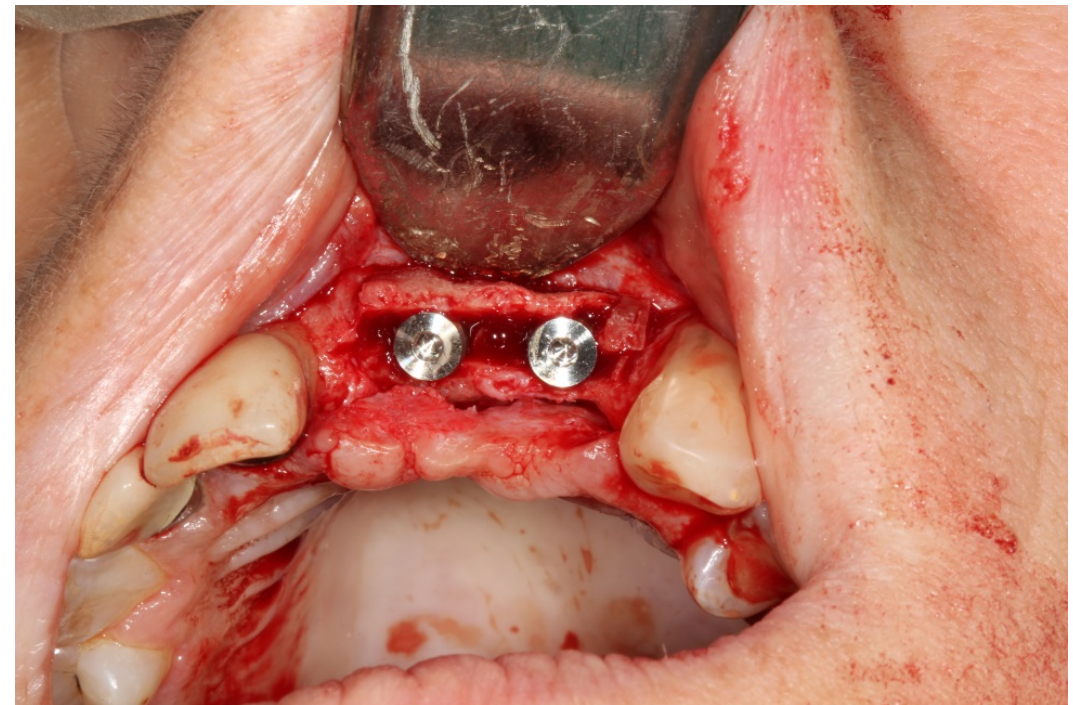


# Ridge Splitting

**Implant Insertion**



**Two Completed Implants**



# Ridge Splitting

**6 Months Post-op**



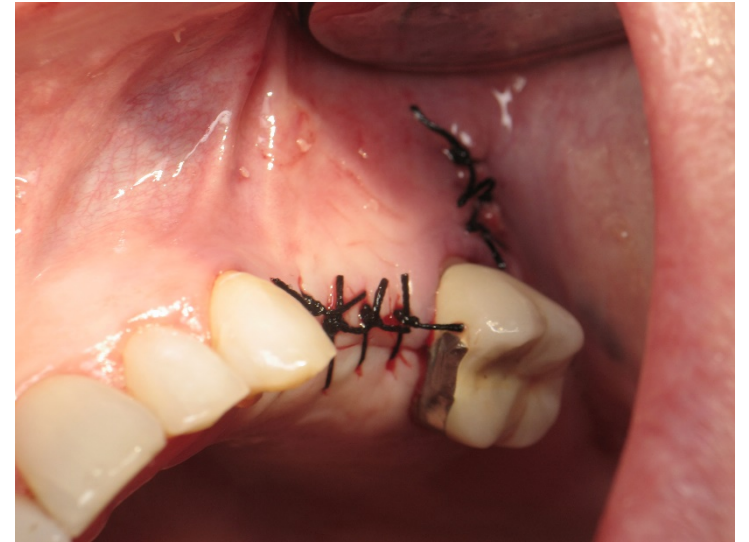
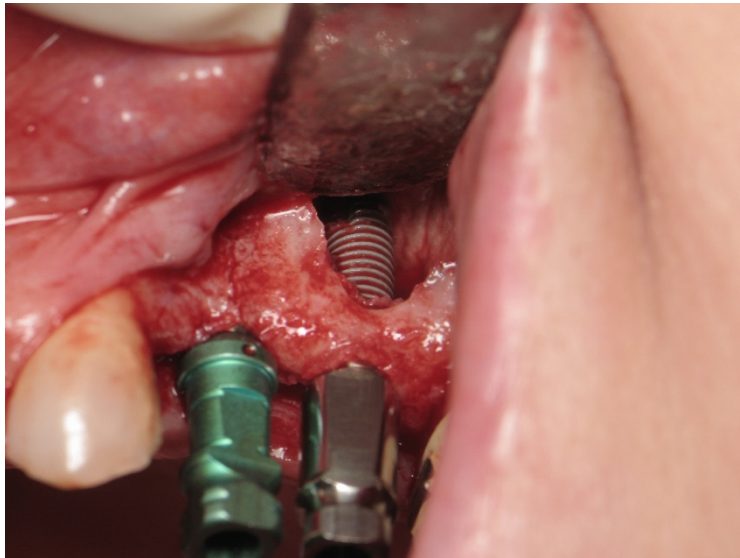
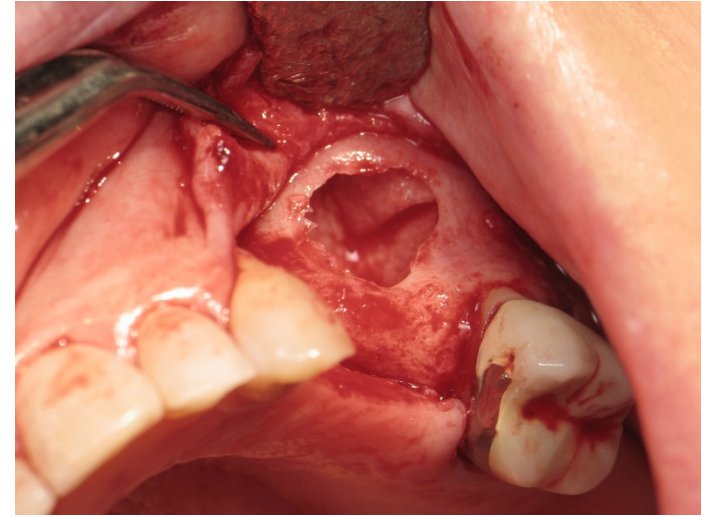
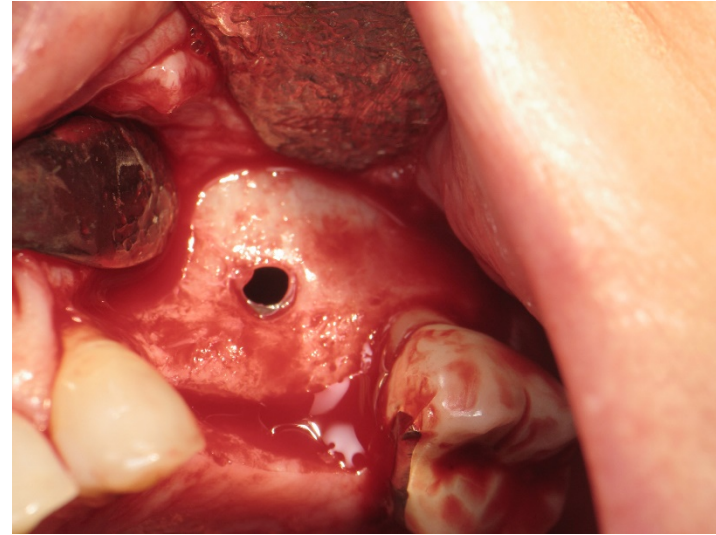
**Uncovery**



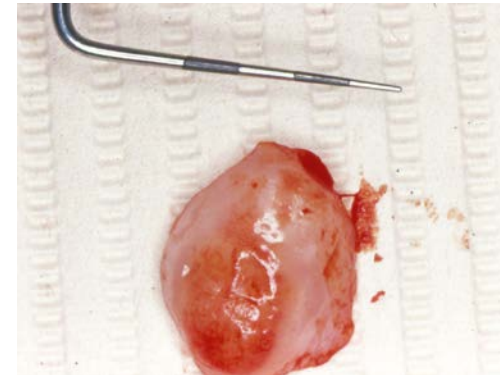
# Completed Prosthesis



# Sinus Lift



# Lumps and Bumps





# Lichen Planus



# Treatment Complications

Cyclosporine



Post irradiation xerostomia and Coca-Cola



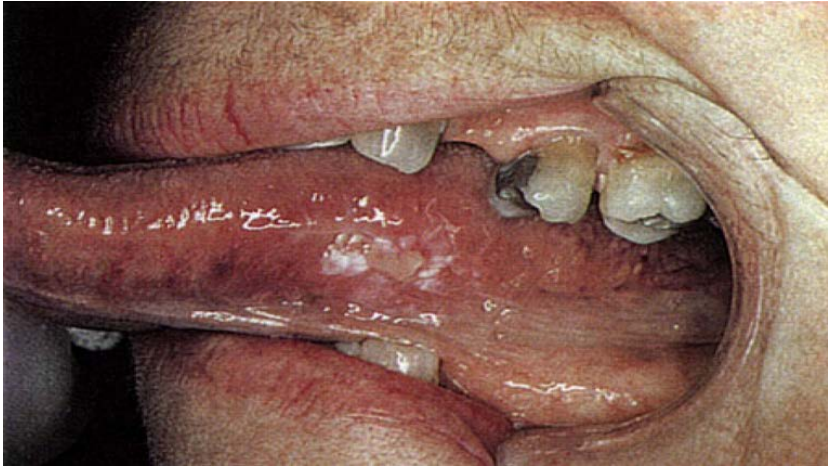
# Hemangioma



# BMMP



# Cancer



# Complications

## The importance of a medical history (just a partial list....)

- Anticoagulant Therapy / Coagulopathies
  - Bleeding problems
- Diabetes mellitus
  - Medical emergencies, infection, wound healing
- Cardiovascular Disease
  - Anesthetic considerations
- Blood Dyscrasia (Leukemia, Neutropenia)
  - Poor wound healing, bleeding, infection, death
- MONJ
  - (Bisphosphonates)
- Medication induced hyperplasia
  - (Dilantin, Cyclosporine, Calcium Channel Blockers)
- Drug Allergies / Interactions



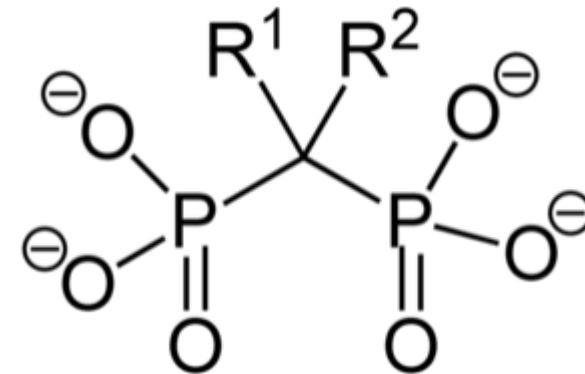
# Osteoporosis

- Systemic disease with low bone mass and micro- architectural changes that compromise bone strength leading to pathologic fractures.
- Goal of Tx is to prevent pathologic fractures



# Bisphosphonates and Osteonecrosis

- Bisphosphonates widely used as fertilizers
- Synthetic analogs of inorganic pyrophosphates
- Used to treat osteoporosis and metastatic bone CA, Paget's Disease
- Bp binds to minerals in bone, reducing osteoclastic activity however exact mechanism is unknown
  - Antiangiogenesis? Disruption of remodel cycle?







# Bisphosphonate Drugs

<b>Name (Generic)</b>	<b>Route</b>	<b>Usage</b>
Actonel(Risedronate)	Oral	Osteoporosis
Fosmax (Alendronate)	Oral	Osteoporosis
Boniva (Ibandronate)	Oral, IV	Osteoporosis
Bonefos (Clodronate)	Oral, IV	CA
Zometa(Zoledronic acid)	Oral, IV	Osteoporosis, CA
Aredia (Pamidronate)	IV	CA, Paget's
Ostac (Clodronate)	Oral, IV	CA
Skelid (Tiludronate)	Oral	Paget's
Didronel (Etidronate)	Oral	Paget's

Let's look at a patient w/o the benefit of a medical history



# Medical History

- 29 y.o. W Male
- No history of Alcohol abuse, No smoking
- Sore, burning mouth for months. Lips forming crusts
- Dysphagia, dysgeusia with rapid weight loss
- Malaise
- Febrile







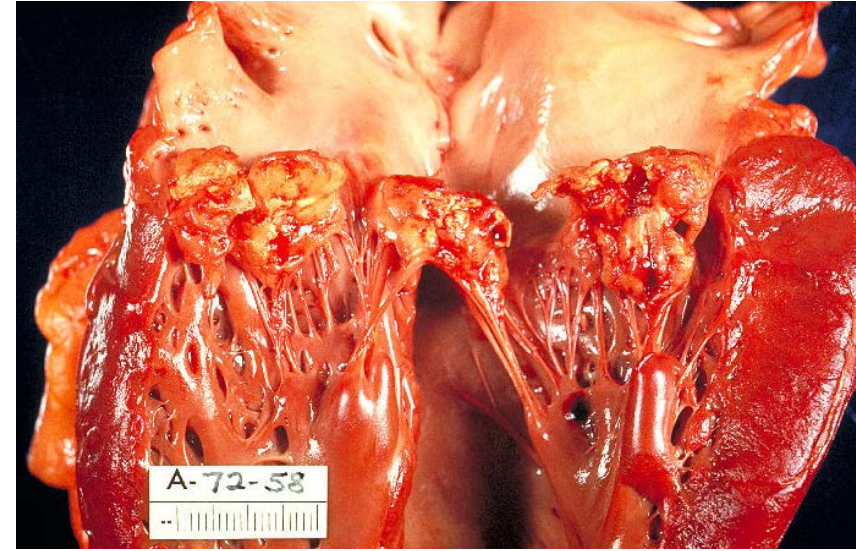






# Infective Endocarditis

- Cost \$54,281.00
- 2.7 to 7.9 per 100,000
- Incidence higher in elderly population
- 25% death rate (range 16 – 45%)



<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5015881/>

<https://www.cdc.gov/mmwr/volumes/66/wr/mm6622a1.htm>

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0060033>

Ambrosioni J, Hernandez-Meneses M, Téllez A, Pericàs J, Falces C, Tolosana JM, Vidal B, Almela M, Quintana E, Llopis J, Moreno A, Miro JM (May 2017). "The Changing Epidemiology of Infective Endocarditis in the Twenty-First Century". *Current Infectious Disease Reports*. 19 (5): 21. doi:10.1007/s11908-017-0574-9. PMID 28401448.

Habib G, Hoen B, Tornos P, et al. Guidelines on the prevention, diagnosis, and treatment of infective endocarditis (new version 2009): the Task Force on the Prevention, Diagnosis, and Treatment of Infective Endocarditis of the European Society of Cardiology (ESC). *Eur Heart J*. 2009;30(19):2369–2413

# Prosthetic Joint Infection (PJI)

- Average cost is \$50,822.00
- The incidence of PJI is 1–2.5% for primary hip or knee replacements and 2.1 – 5.8% for revision surgeries
- Treatment of gum disease lowers risk by 31%



Advancedorthosports.com

- Tai TW, Lin TC, Ho CJ, Kao Yang YH, Yang CY. Frequent Dental Scaling Is Associated with a Reduced Risk of Periprosthetic Infection following Total Knee Arthroplasty: A Nationwide Population-Based Nested Case-Control Study. PLoS One 2016;11(6):e0158096
- Lentino JR. Prosthetic joint infections: bane of orthopedists, challenge for infectious disease specialists. Clin Infect Dis. 2003;36(9):1157–61.
  - Blom AW, Brown J, Taylor AH, et al. Infection after total knee arthroplasty. J Bone Joint Surg Br. 2004;86(5):688–91.
- Blom AW, Taylor AH, Pattison G, et al. Infection after total hip arthroplasty. The Avon experience. J Bone Joint Surg Br. 2003;85(7):956–9. [PubMed]
  - Berbari EF, Hanssen AD, Duffy MC, et al. Risk factors for prosthetic joint infection: case-control study. Clin Infect Dis. 1998;27(5):1247–54.
- <https://www.ada.org/en/science-research/science-in-the-news/frequent-dental-scaling-was-associated-with-decreased-risk-of-periprosthetic-joint-infection>
  - <https://onlinelibrary.wiley.com/doi/full/10.1111/j.1469-0691.2011.03758.x>
- <https://www.ada.org/en/science-research/science-in-the-news/frequent-dental-scaling-was-associated-with-decreased-risk-of-periprosthetic-joint-infection>

# Case Presentation

## This is what Dentists do.....



## Chief Complaint

- I can't chew



## History of Present Illness

- Episodic dental treatment only
- Existing prosthesis . 7 years old
- >15 pack year smoker
- Low dental IQ



# Existing Prosthesis











# FMR

2/24/2020

Odom, Glesdia T \*7/24/1962 (7518/Jeffrey T. Baker)



# CBCT Pan View



# 3-D Frontal View



# CBCT Sagittal View



# Diagnosis

- Partial Edentulism / Faulty Restorations
- Caries
- Leukoedema, bilateral
- Periodontitis , Stage I, Grade B
- Smoker >15 pack years
- Fibroma maxillary midline
- Primary occlusal trauma #11
- Pathologic Migration

# Treatment Plan

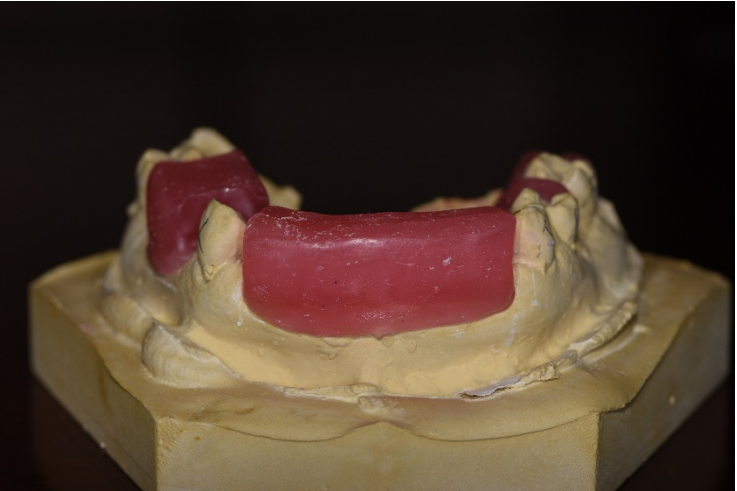
- Systemic Phase
  - No contraindications to dental tx
  - Smoking cessation consultation
- Hygienic Phase
  - OHI, Patient education
  - CBCT Maxilla and Mandible
  - Extraction of #'s 1, 5, 6, 11, 15, 20, 32
  - Fabrication of maxillary and mandibular interim appliances
  - Scaling and root planning remaining lower teeth

# Treatment Plan

- Corrective phase
  - Placement of 4 endosteal implants #19, #21, #28, #30
  - Autogenous osseous graft #21 implant site
  - Deliver interim prosthesis
  - 3 months healing time
  - Uncover implants
  - Fabricate FPD #19- P- #20-P, #28-P-#30
  - Fabricate Maxillary CD
  - Odontoplasty lower anterior teeth for esthetics / plane of occlusion
- Maintenance phase
  - Maintenance Prophylaxis Q3-4M,



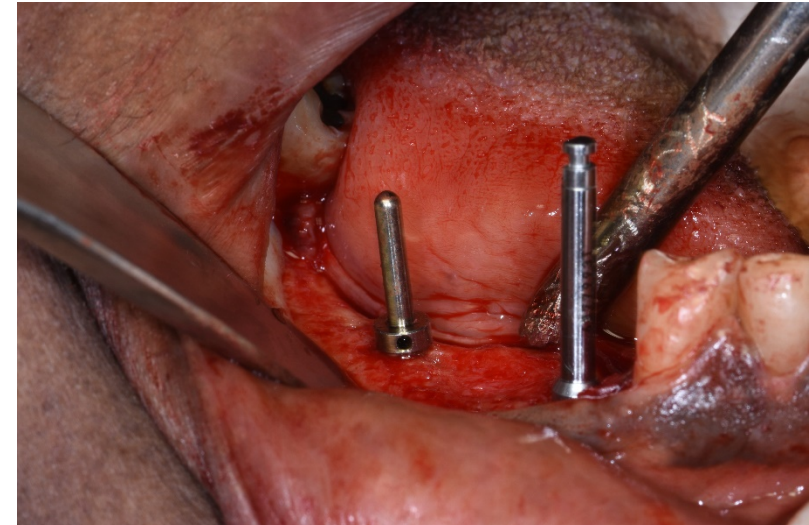
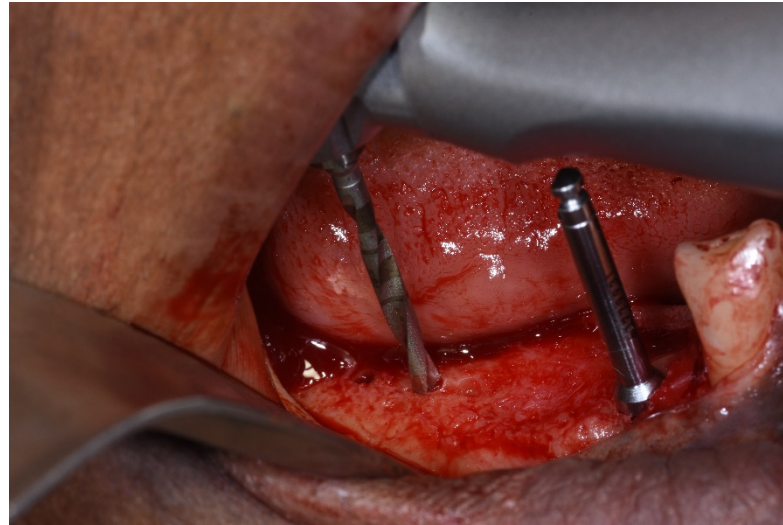
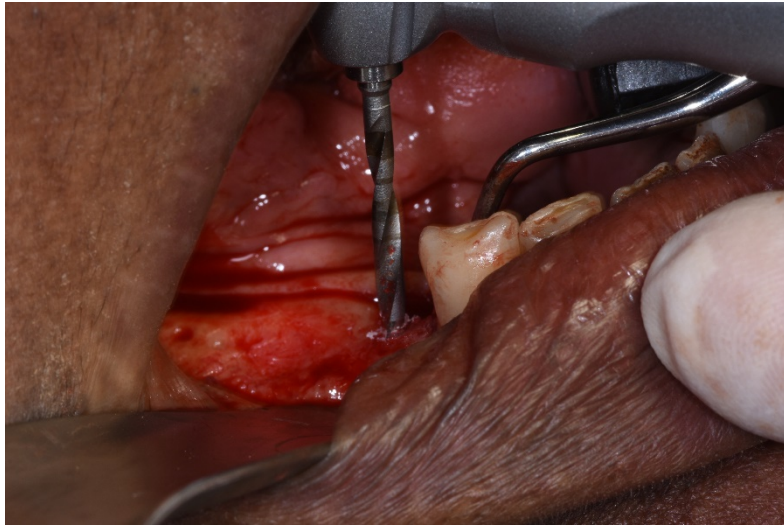
Baseplates  
Re-establish VD



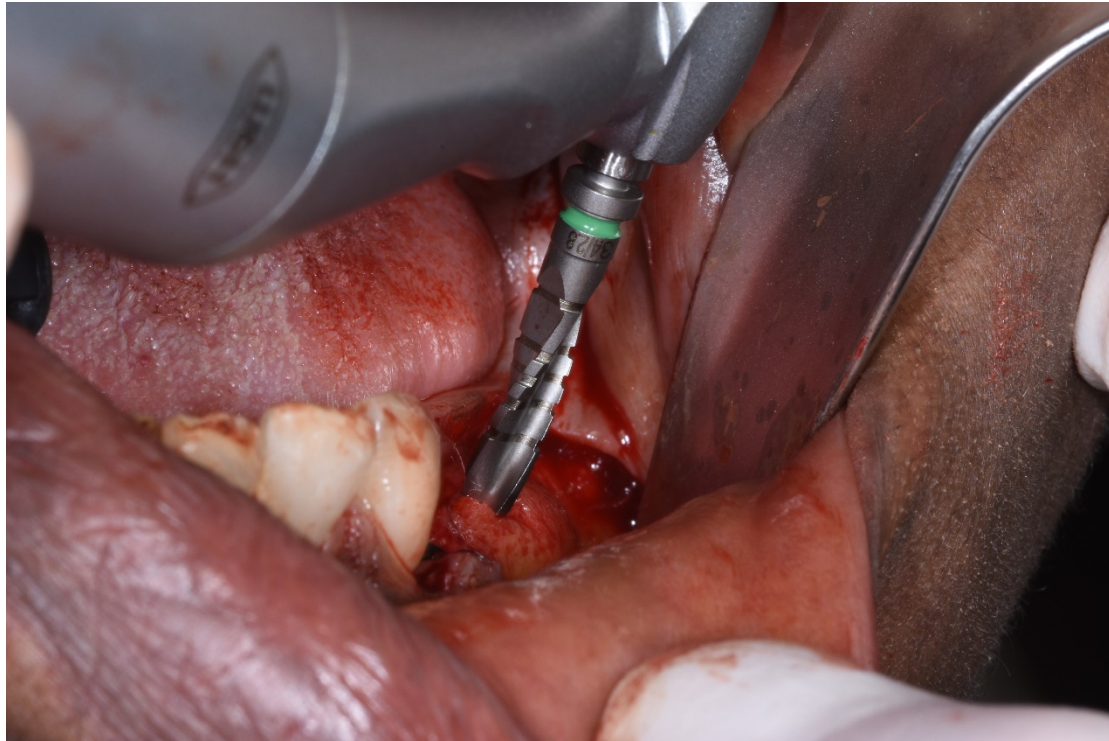
# Diagnostic Wax-up



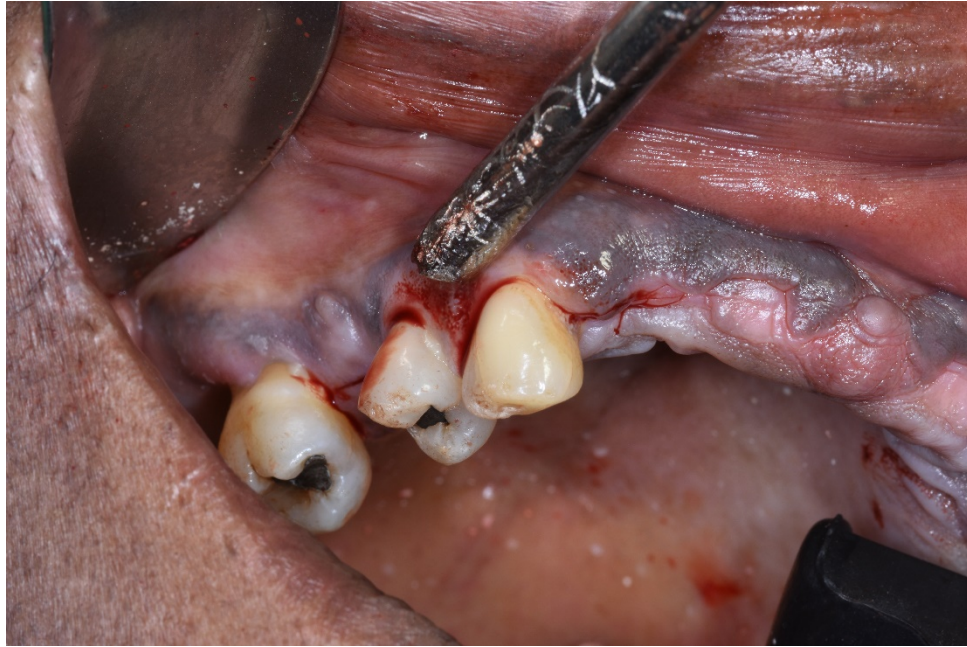
# Guide pins



# Implant insertion



# Maxillary Edentulation



# Post Insertion Panoramic Radiograph



R PaX-i3D Green

R

## Interim CD

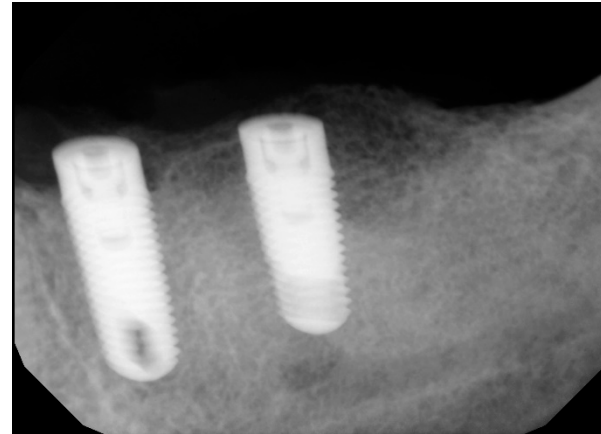
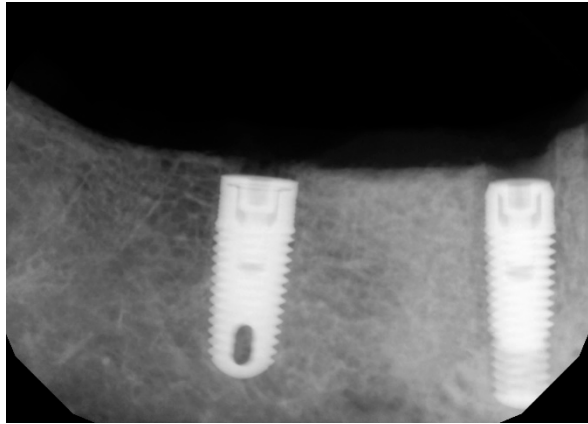


1-week Post-op





## 3 Months Post op



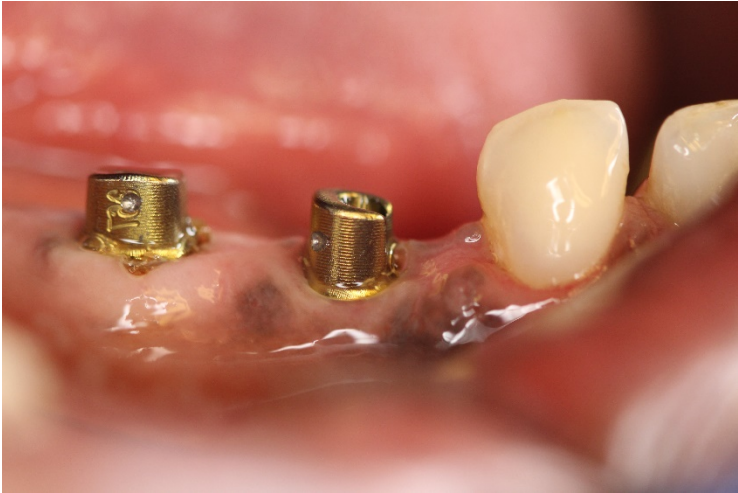
## Healing collars



## Transfer Carriers



# Placement of Milled Custom Abutments



# Completion of prosthesis



## Delivery of Prosthesis



Case Completed



# Thank you for your attention

