

IMPLANT MAINTENANCE IN THE HYGIENE OPERATORY

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Dental Team Advancement

The History of Dental Implants



As early as 2000 BC, early versions of dental implants were used in the civilization of ancient China. Carved bamboo pegs were originally used to replace the missing teeth at this time.

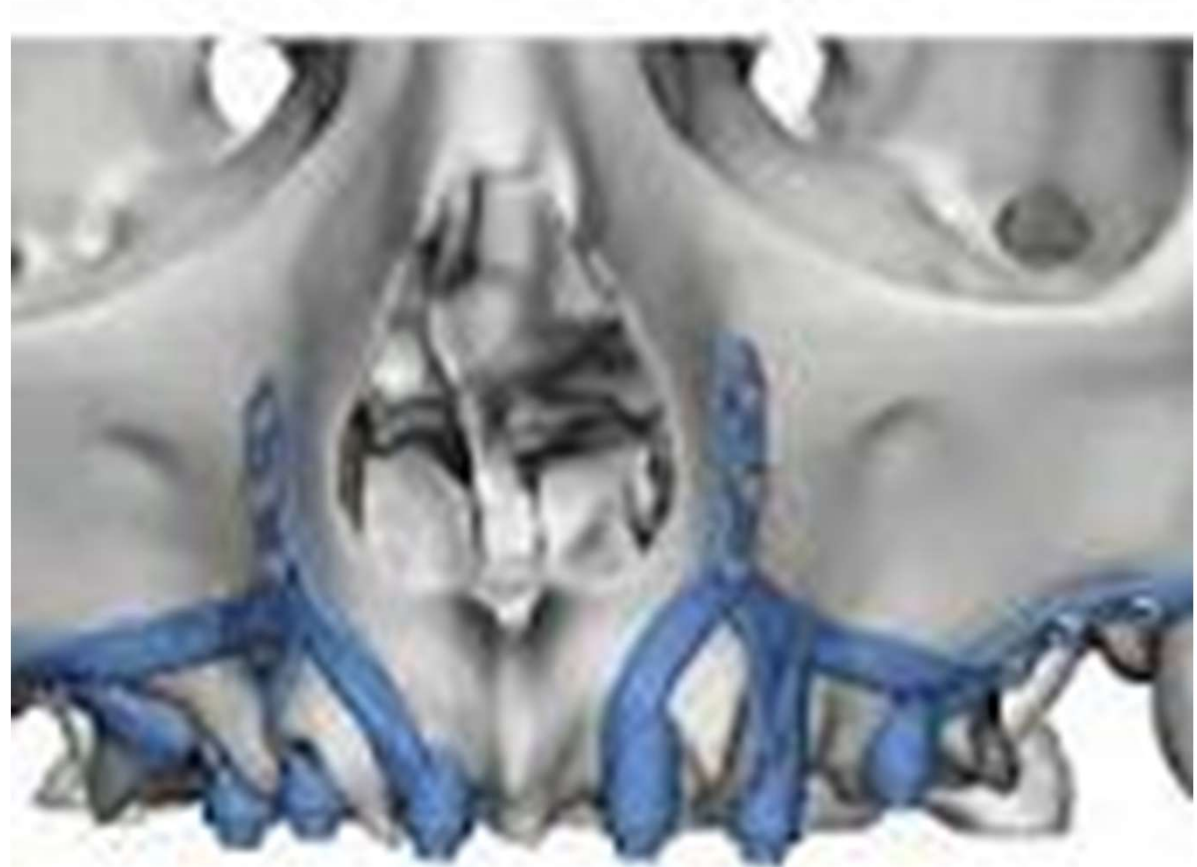
The first recorded case of a replacement tooth made of metal comes from the body of an Egyptian king who lived in approximately 1000 BC. His upper jawbone has a copper peg that has been hammered into it

1942 Dr. Dahl Sweden

Subperiosteal implants were first introduced in 1942 in Sweden and were subsequently used worldwide for the treatment of mandibular and maxillary arches with advanced bone atrophy. However, due to the high complication rates and unsuccessful outcomes, this therapy fell in disuse.

Subperiosteal dental implants: Past or future? A critical review on clinical trials/case reports and future directions

Dantas, Telma A; Vaz, Paula¹; Samuel, Filipe Silva. Subperiosteal dental implants: Past or future? A critical review on clinical trials/case reports and future directions. *Journal of Dental Implants* 13(1):p 35-48, Jan–Jun 2023. | DOI: 10.4103/jdi.jdi_11_21



Subperiosteal Implant

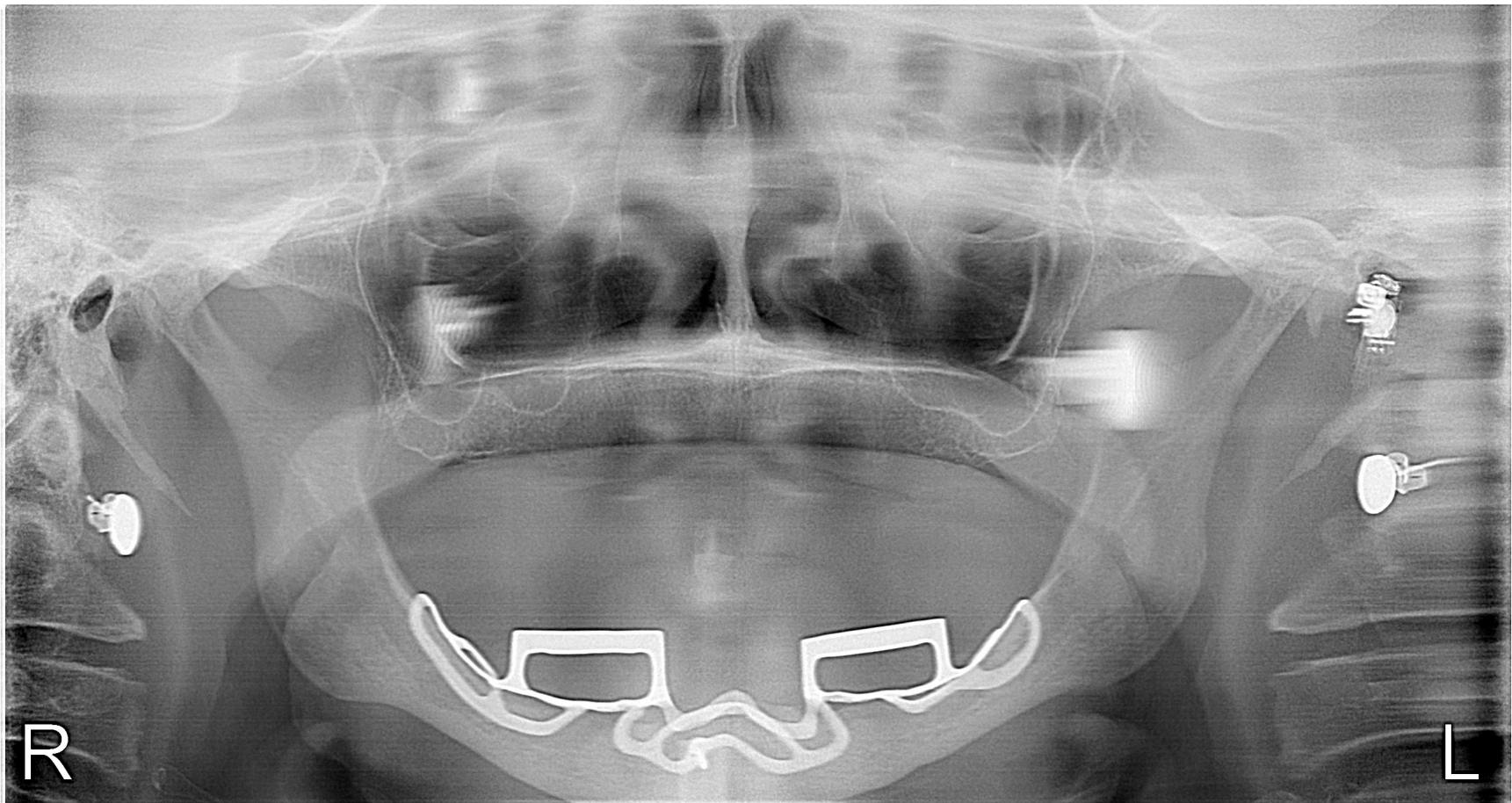
1979 - Lynne



Courtesy of Dr. Paul Binon

Subperiosteal Implant

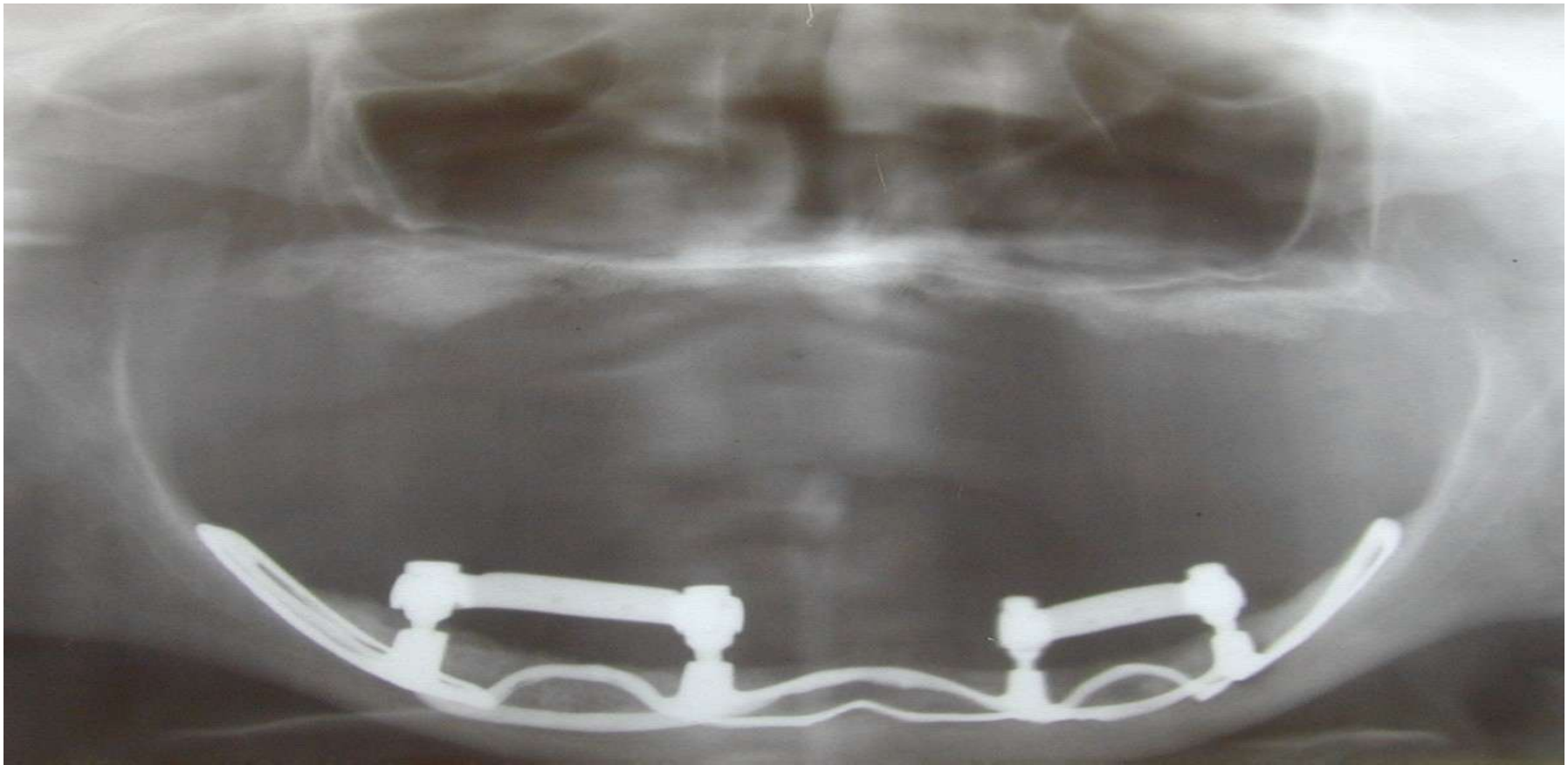
Wendy



Courtesy of Dr. Paul Binon

Subperiosteal Implant

Maxine



Courtesy of Dr. Paul Binon

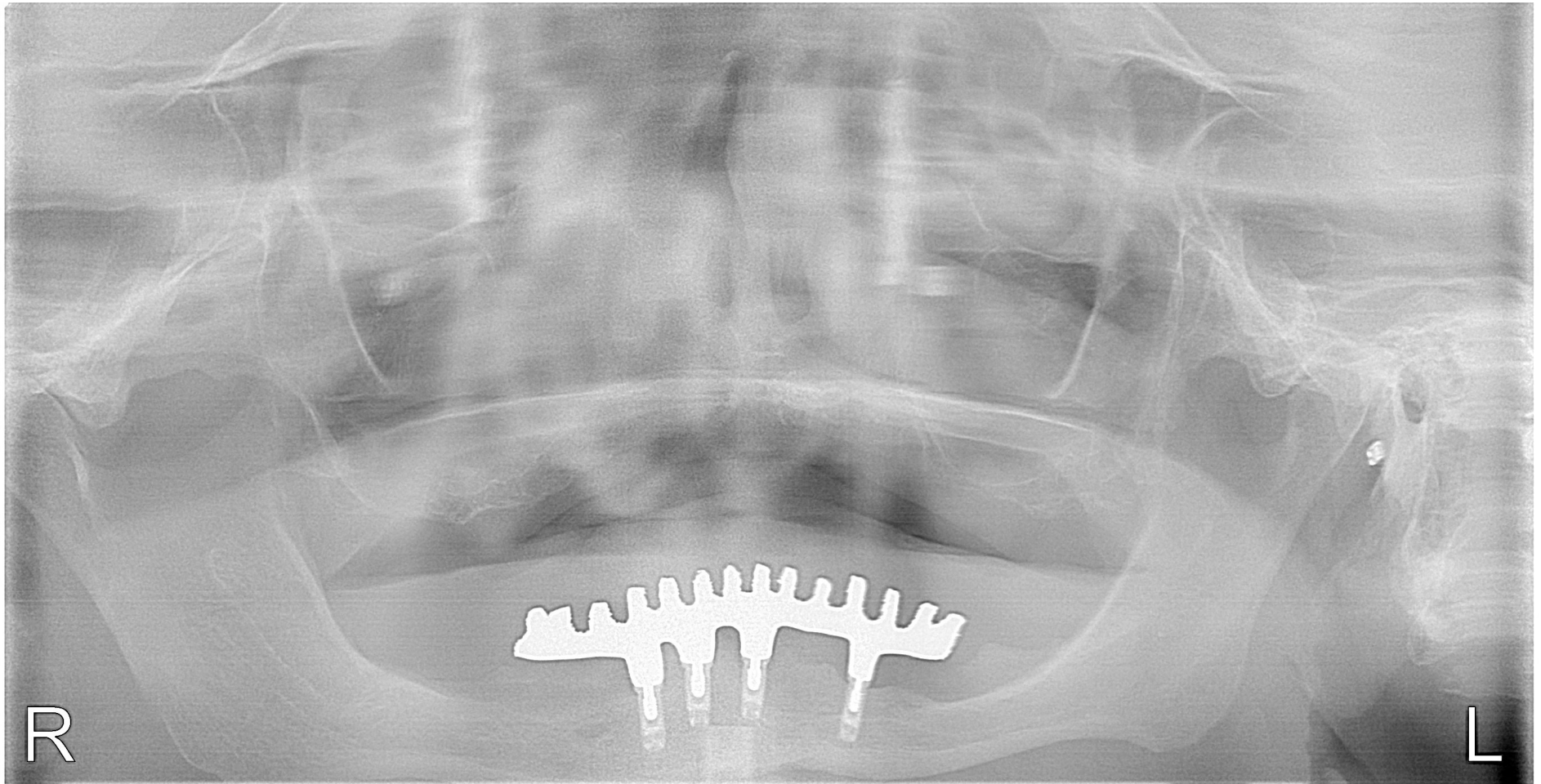
1965 Single Implants

Dr. Per-Ingvar Brånemark

The first titanium dental implant was placed in a human in 1965 by Swedish orthopedic surgeon Dr. Per-Ingvar Brånemark



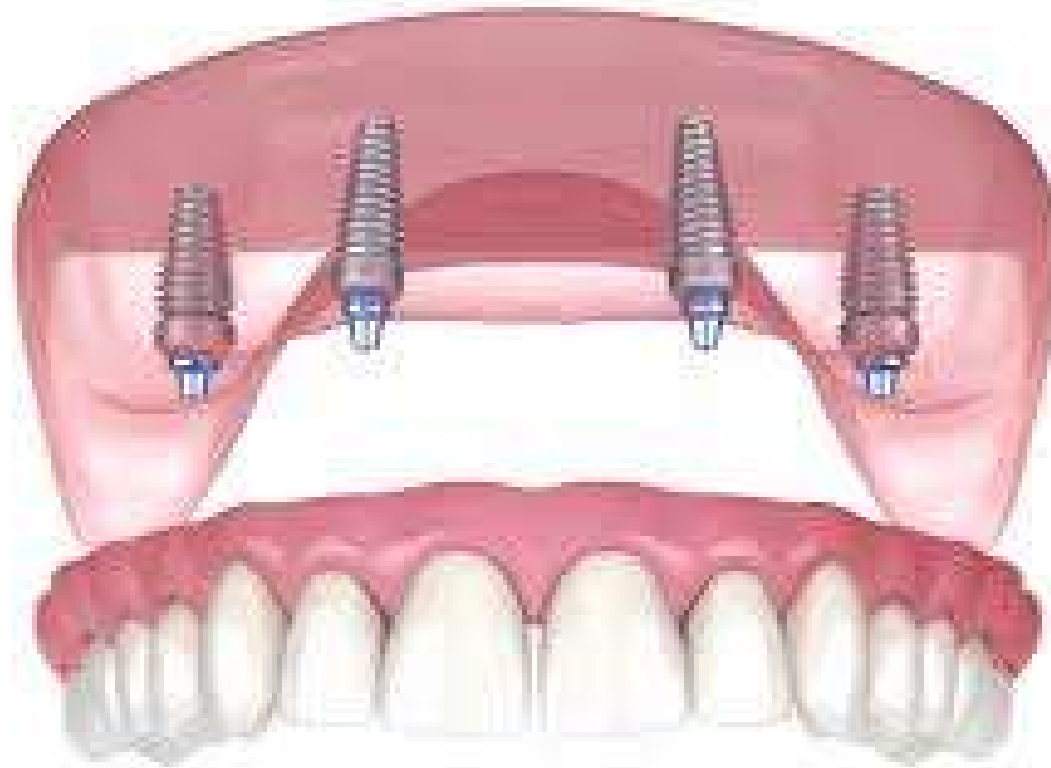
All on X Larry - 1981



Courtesy of Dr. Paul Binon

1993-1998 All-On-4 Dr. Paul Malo

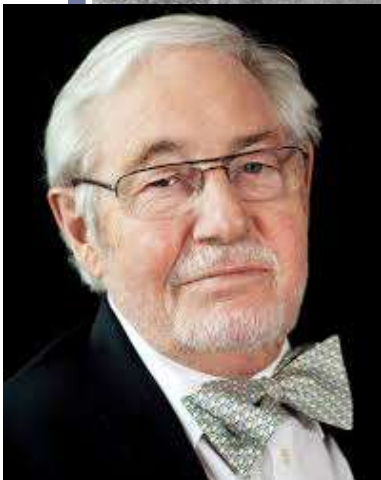
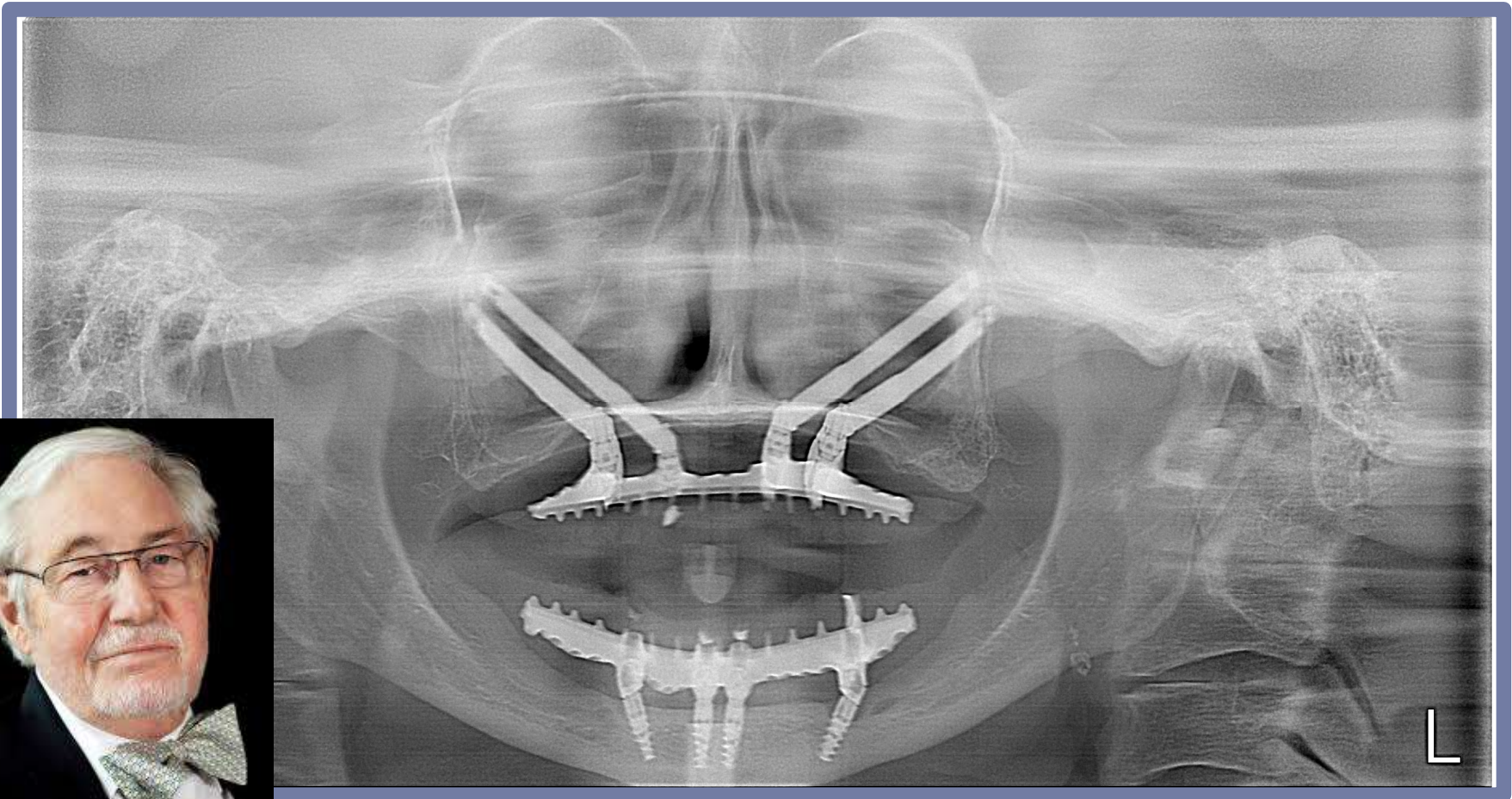
Dr. Paulo Maló is the formal founder of MALO CLINIC, the world-leader in Implantology and Fixed Oral Rehabilitation. He graduated from the [University of Lisbon](#) in 1989 with a degree in Dental Medicine. In 1993, his team of medical and clinical research specialists began the development of the All-on-4 technique. It was successfully implemented in 1998 and further developed to become [one of the most significant advances in the world of implant dentistry](#).



1988 Zygomatic Implants

Dr. Per-Ingvar Brånemark

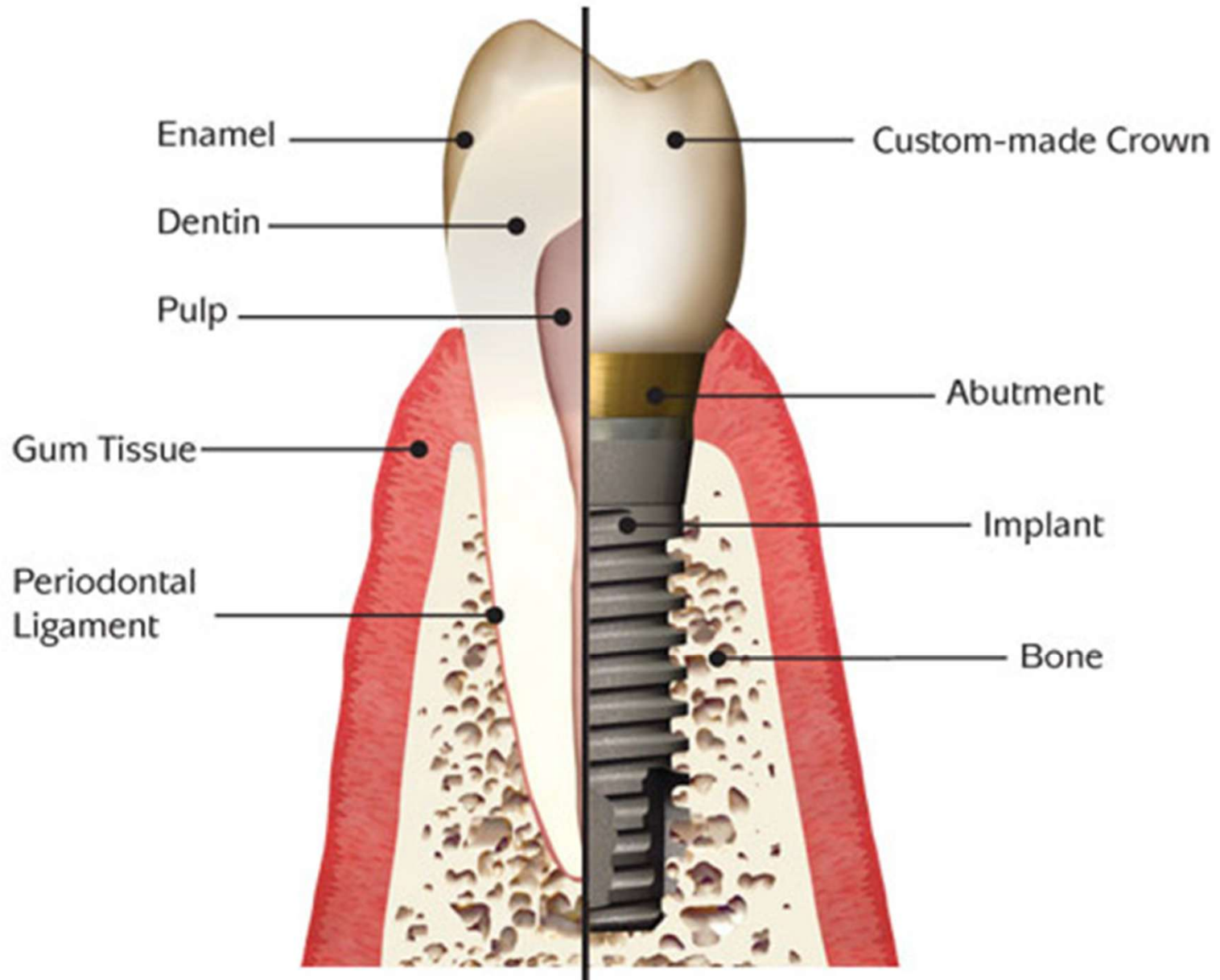
Norma



Effective Implant Treatment

- Hard tissue integration/Architecture
- Soft tissue integration/Architecture
- Assessment
- Maintenance
- Supportive Therapy

Implant Architecture



Proper Soft Tissue Architecture

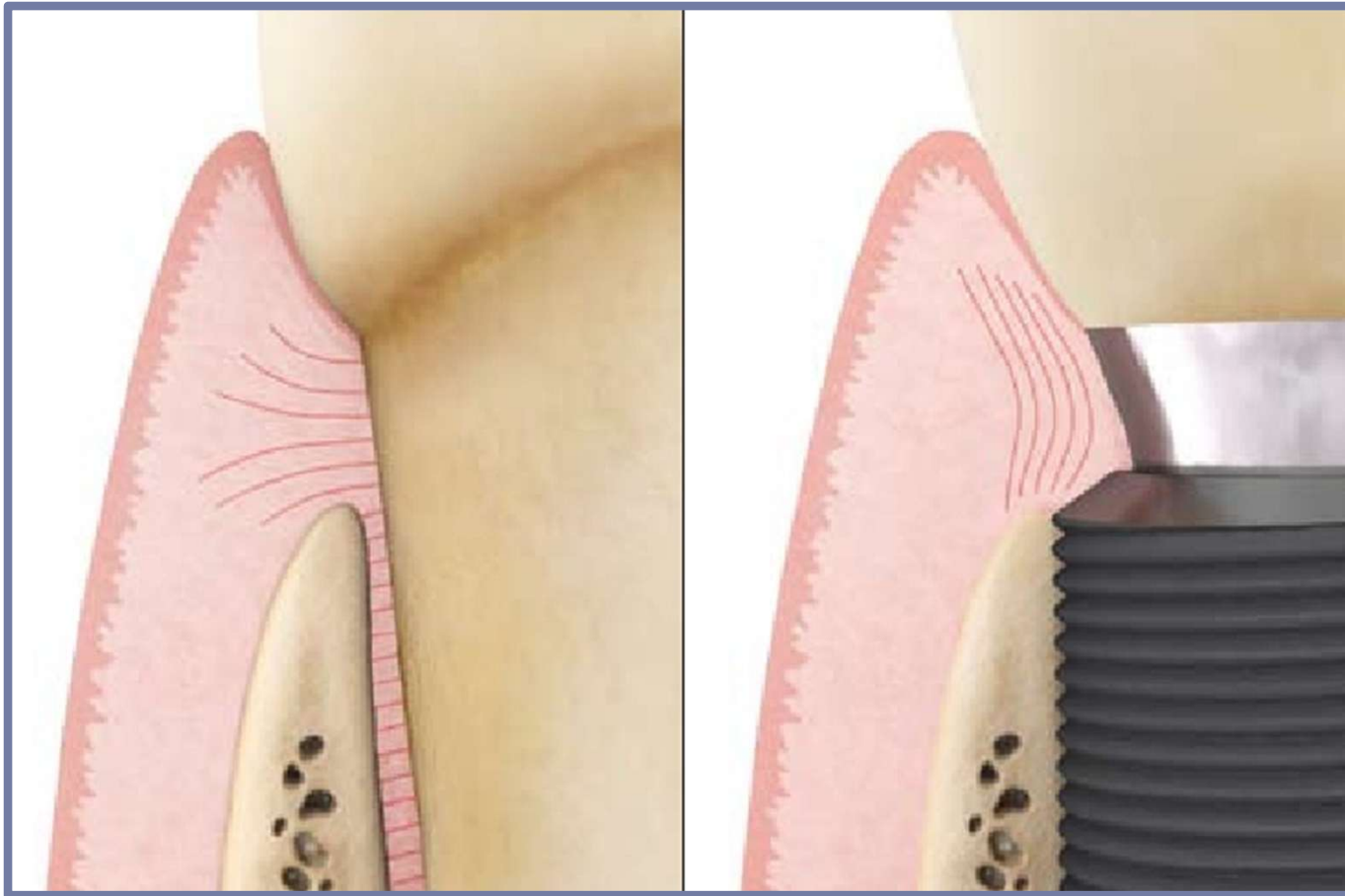


Photo Courtesy of Dentsply

Proper Bony Architecture

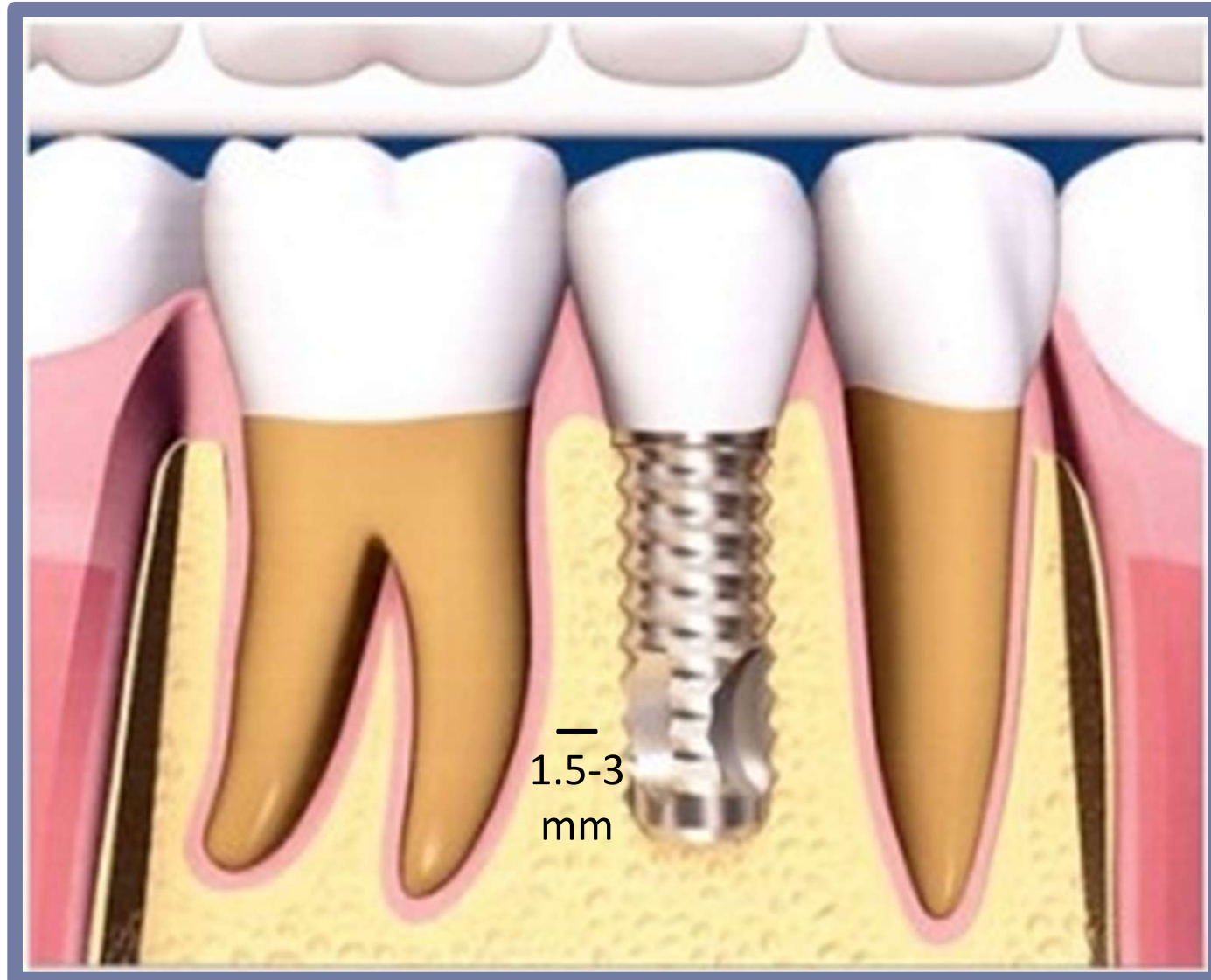


Photo Courtesy of Morgan Dental Care

Why do implants fail?

- **Implant Related Factors**
- **Surgical Related Factors**
- **Implant Site Related Factors**
- **Prosthetic related Factors**
- **Patient Related Factors**

Why do implants fail?

Implant Related Factors

Design and Surface Characteristics

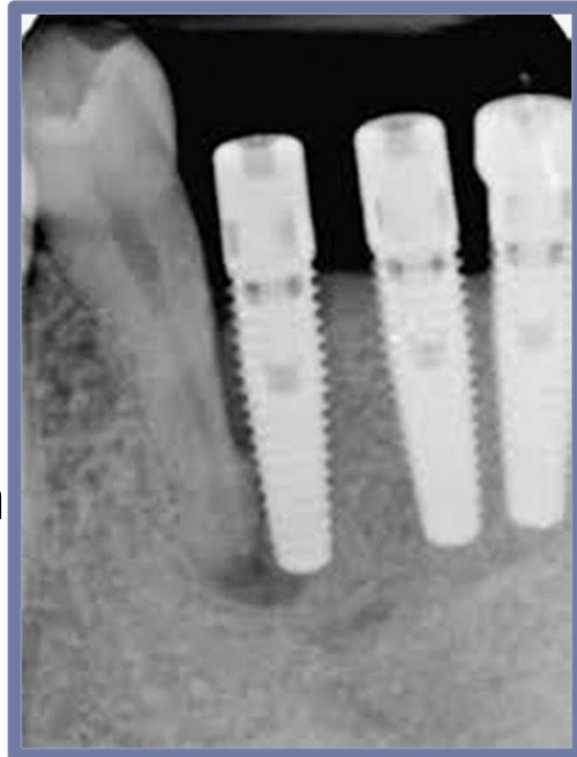


Why do implants fail?

Surgical Related Factors

Improper Surgical Protocols
Post Operative Healing Mispositioning

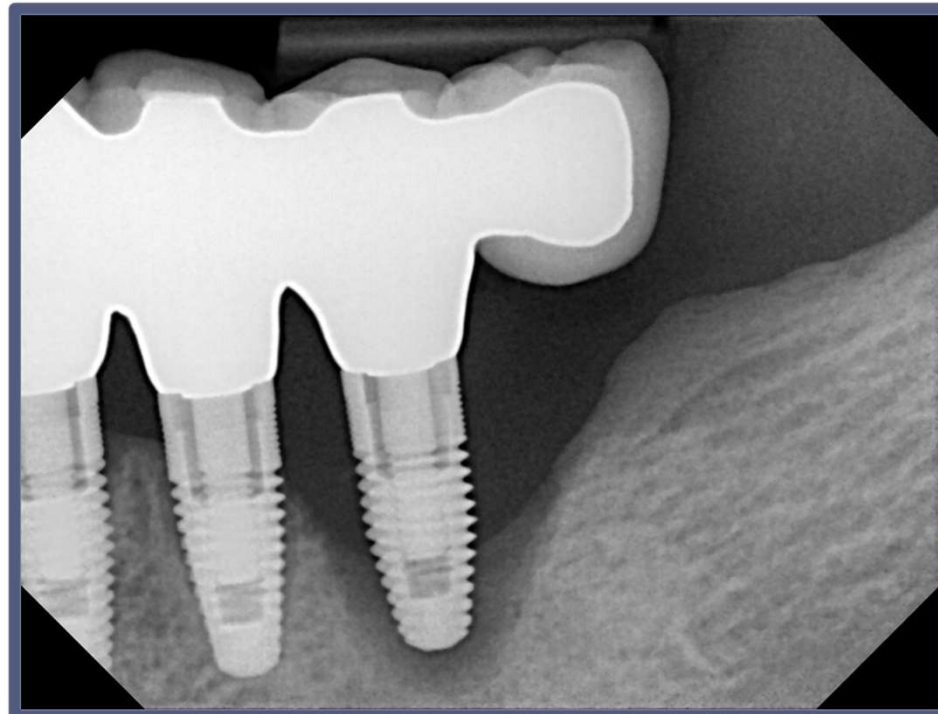
STATISTICALLY,
INADEQUATE
TREATMENT
PLANNING IS THE
#1 CAUSE OF
IMPLANT FAILURE
– Occlusal forces a
close second.
-Suzuki 2014



Why do implants fail?

Implant Site Related Factors

Unresolved Infection Previous Failure
Periodontal Phenotype



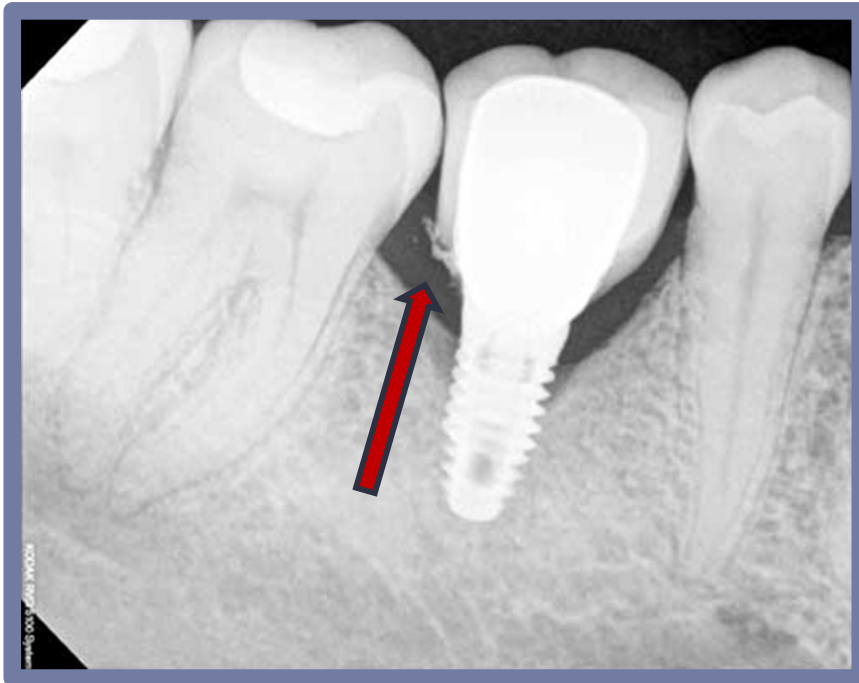
Why do implants fail?

Prosthetic related Factors

Occlusal Overload

Prosthetic Contours

Residual Cement



Why do implants fail?

Improper Spacing



Proper Spacing



Why do implants fail?

Patient Related Factors

- Medical Conditions
- Medications
- Social History
- Dental History – Why were teeth lost?

RDH - Implant Maintenance Experts

“Long term success depends upon preventing disease therefore **preserving all the supporting tissues**”

Suzuki 2012

“**Maintenance is critical** to long term success. It is dependent on frequency of professional care, instruments and skills used for prophylaxis and dedication to home care”

Shuman 2016

“It is essential that the RDH understand how to properly **monitor and maintain** the health of peri-implant tissue. Natural and implants differ not only in the surrounding anatomy, but also in the surrounding disease; the traits of which require a keen awareness to distinguish. Failure to make these distinctions can result in practices that contribute to crown loosening, bone loss and even the loss of the implant itself. “

Abt 2015

RDH's Role

1. Assessment (& Plan with DDS)
2. Treatment &/or Maintenance
3. Supportive Therapy

1. ASSESSMENT

Gathering and Interrupting data
related to current implant health

Initial Implant Assessment

Important for **Baseline** Comparisons

- Tissue Assessment
- No Probing For 6-12 Months?
- No Subgingival Scaling For 9-12 Months?
- Radiographs & Photos

Routine Implant Assessment

- A. Visual Tissue Assessment
- B. Pocket depths
- C. Recession
- D. Bleeding
- E. Suppuration
- F. Mobility
- G. Radiographs & Photos
- H. Check Occlusion

A. Visual Tissue Assessment

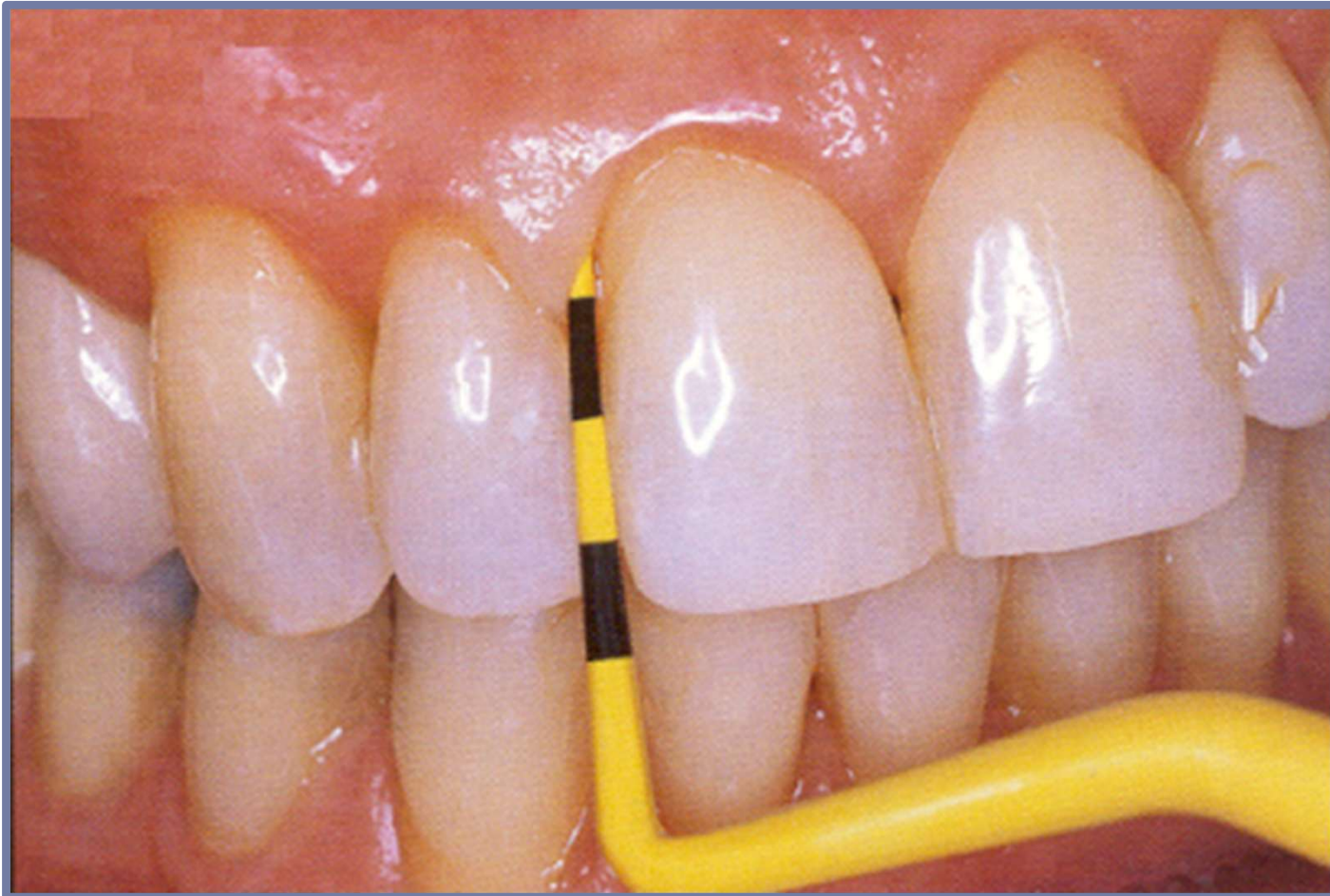
Frank



Eugene

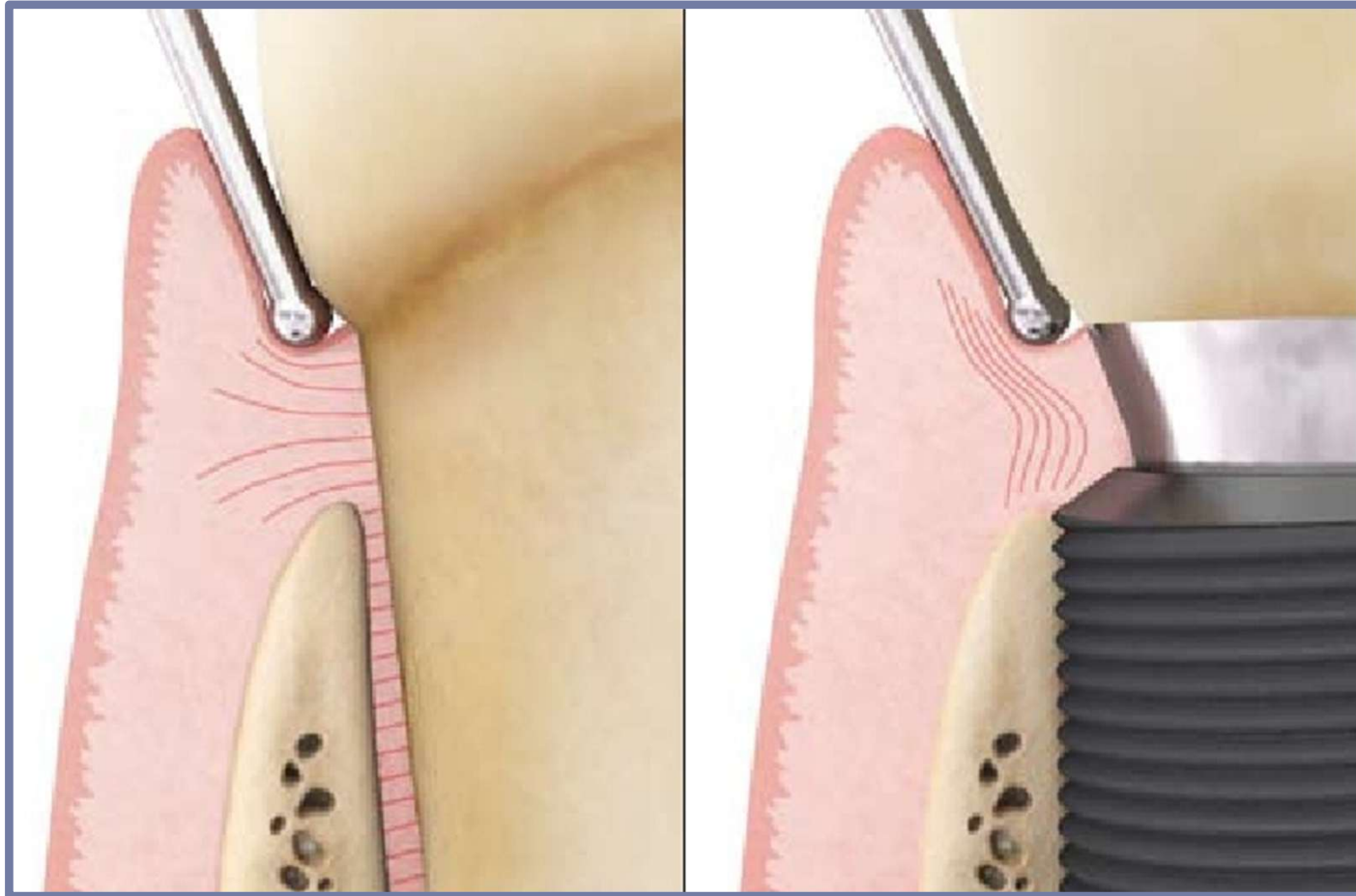


B. Periodontal Probing



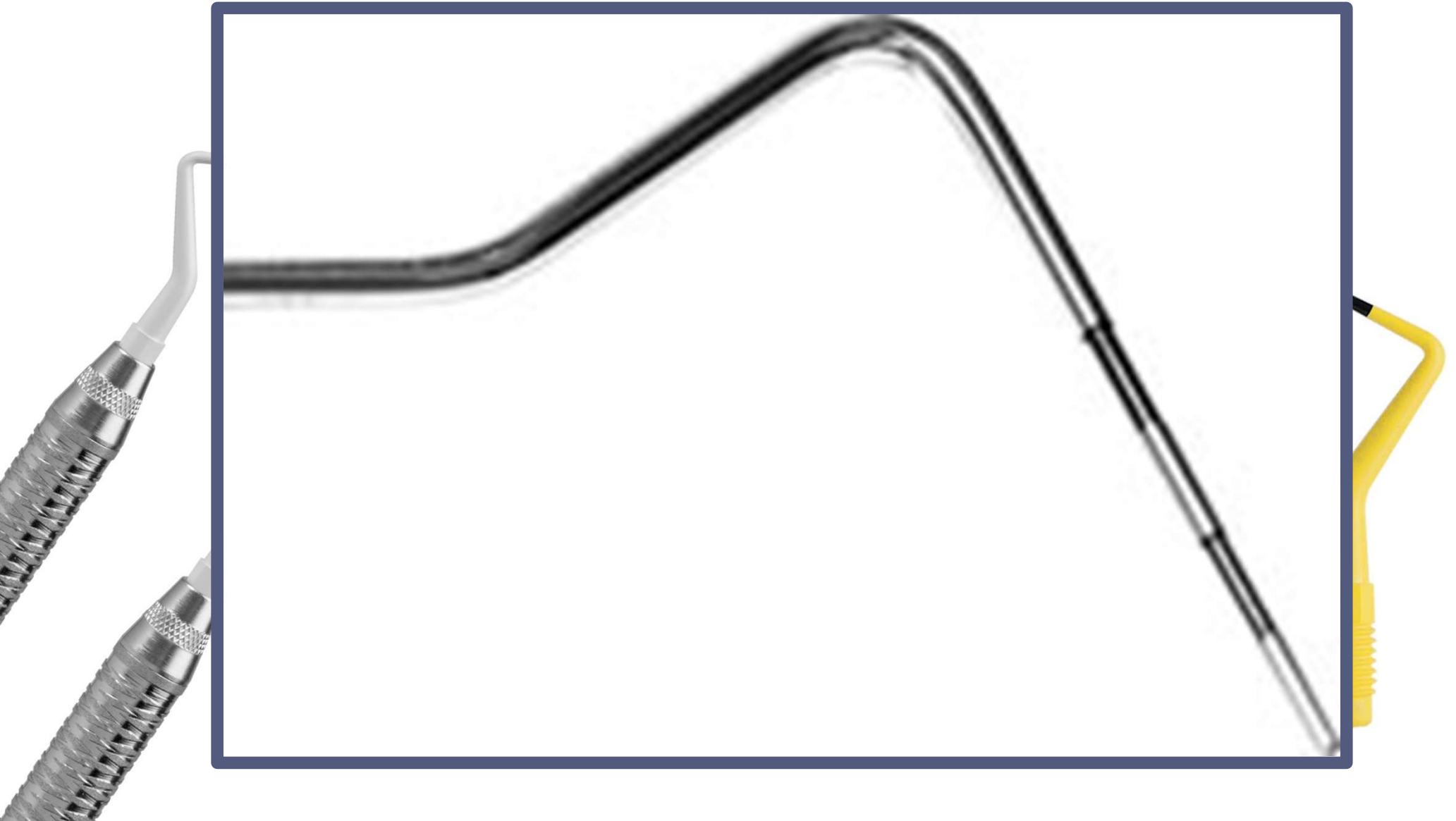
Slides Courtesy of Hu-Freidy

Probe: Technique

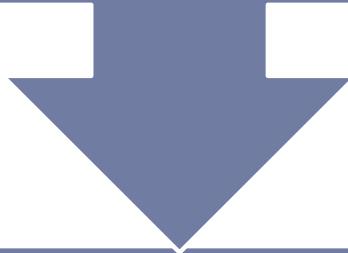


Slide Courtesy of Dentsply

Probe: Options



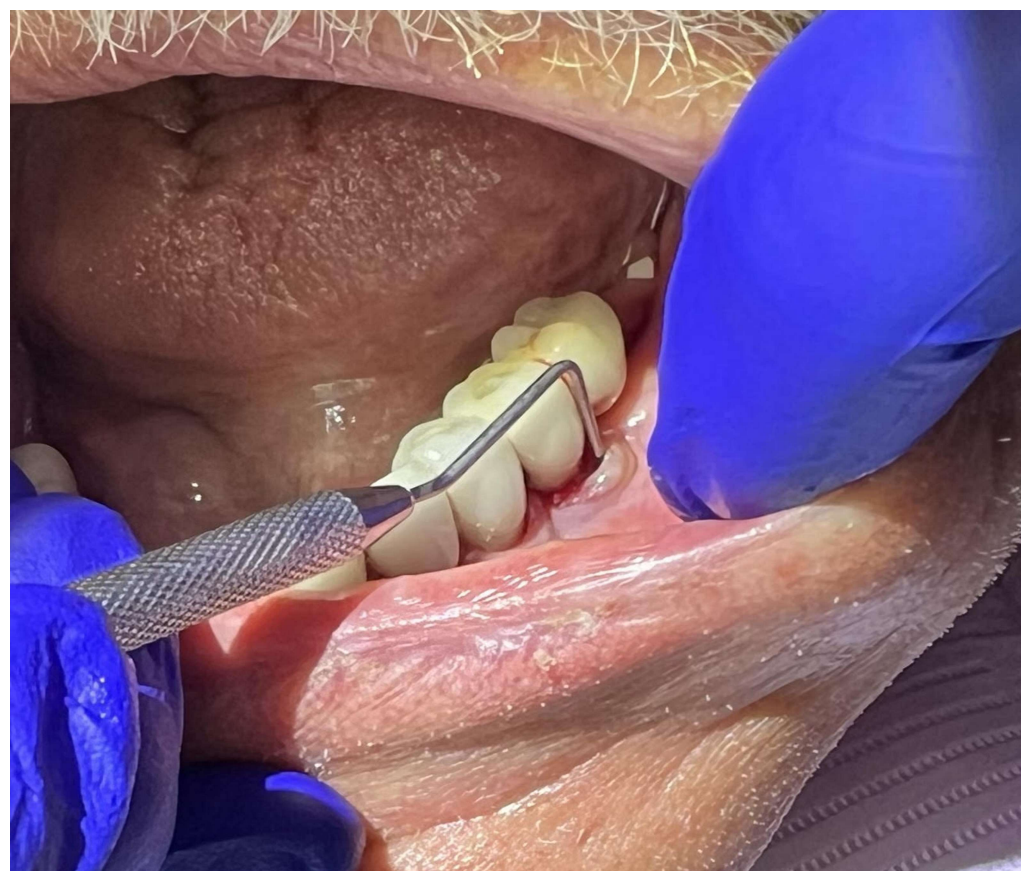
Purpose: To investigate surface roughness on the apical collar of implant abutments caused by probing and scaling instruments.



Conclusions: Probing around implant abutments with a metal probe seems to have no effect on abutment surfaces. In contrast, instrumentation with scalers (stainless and plastic) may cause surface roughness.

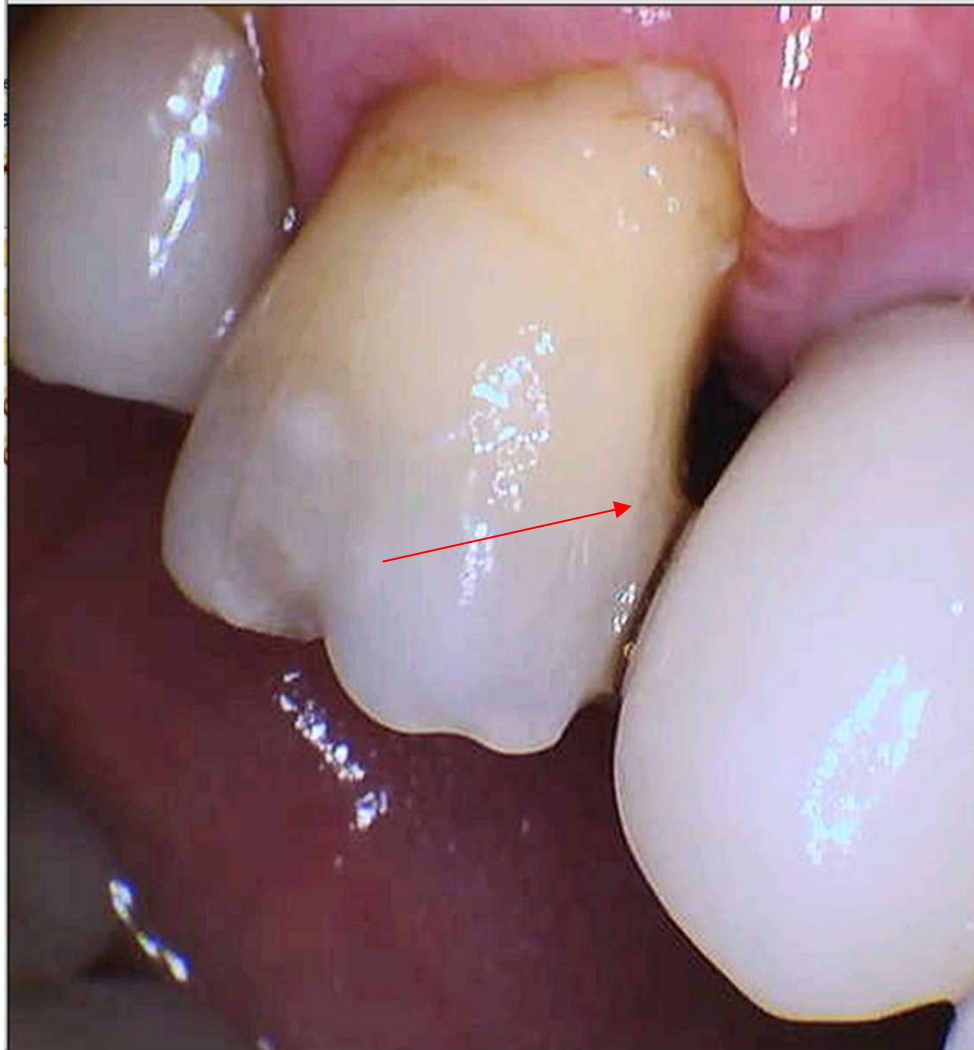
Probing and Scaling Instrumentation on Implant Abutment Surfaces: An In-vitro Study. Fakhrafar, Suzuki

Frank



Eugene

1/15/2025 Paul Binon DDS



	1	2	3	4	5	6	7	8	9	10	11	12	13	14											
F																									
PD		3	3	3	4	6	3	4	3	3	3	3	3	3	2	3	3	2	3	4	3	4			
GM		2		2			2		2					2	2		2		2		2				
CAL		3	5	3	5	4	6	3	4	3	5	3	3	5	3	3	2	3	3	2	3	4	5	4	
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PMB																									
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GM		4		3											3		3		3		3		3		3
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PD		3	3	3	3	3	3	2	3	3	2	3	3	2	3	2	3	3	2	3	3	2	4	3	2

C. Recession

Document On Periodontal Charting
To Help You Evaluate Level of Infection



D. Bleeding

Document On Periodontal Charting
To Help You Evaluate Level of Infection

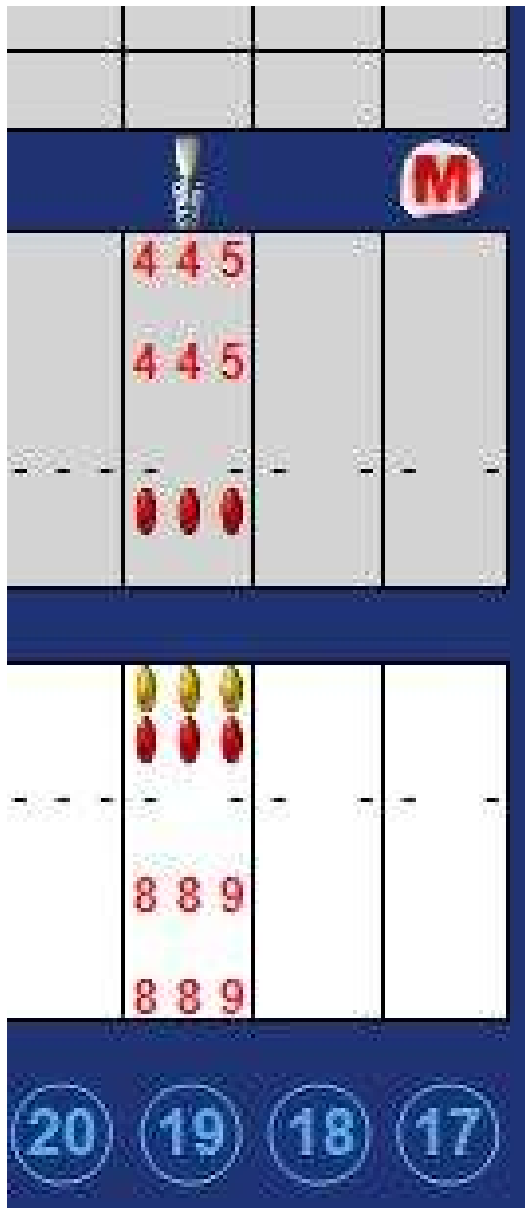


E. Suppuration check

Document On Periodontal Charting
To Help You Evaluate Level of Infection



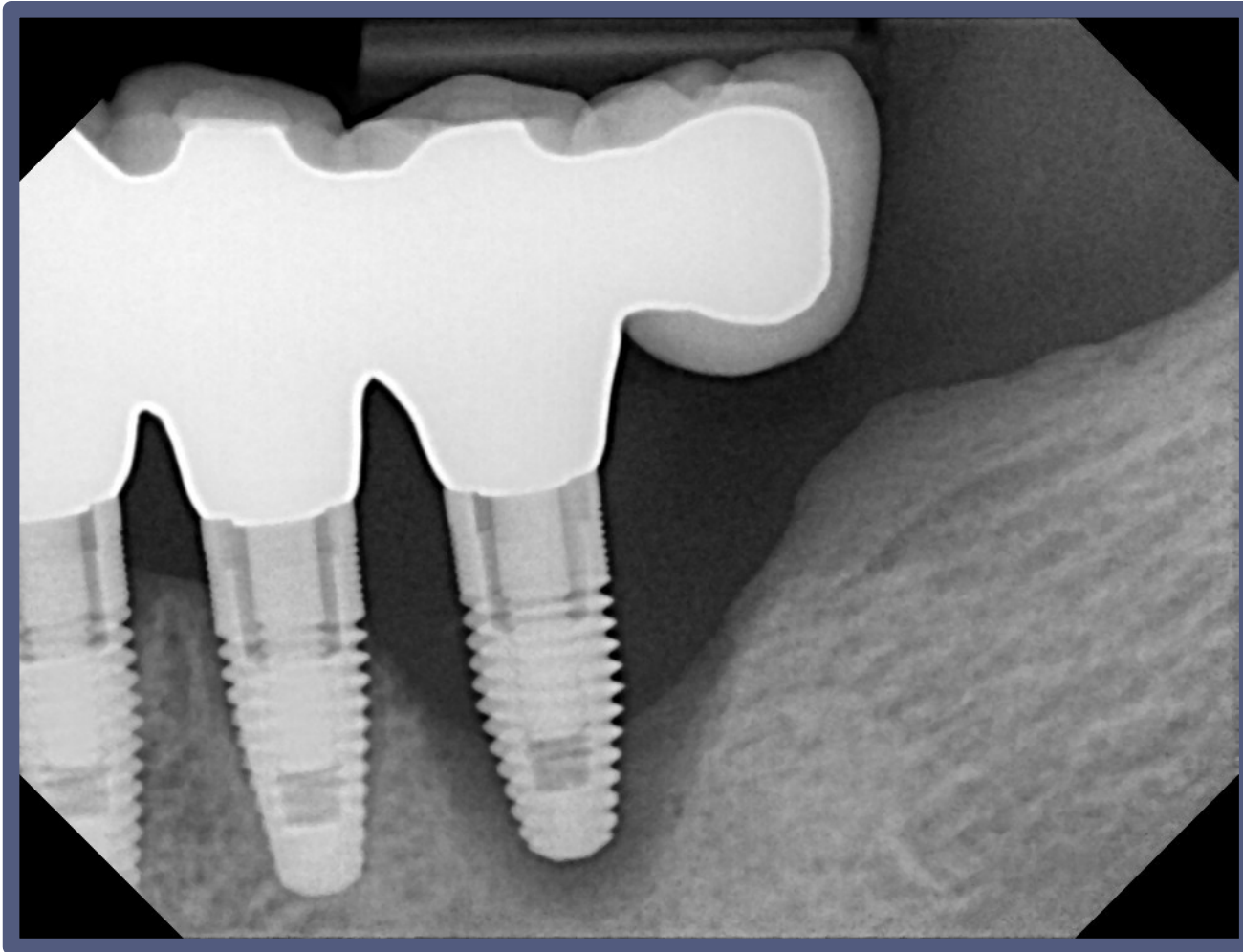
E. Suppuration check



Dolly's
Initial
Assessment

September 2024

F. Mobility



G. Radiograph Assessment

Films must be appropriate to assess prosthesis fit and bone levels

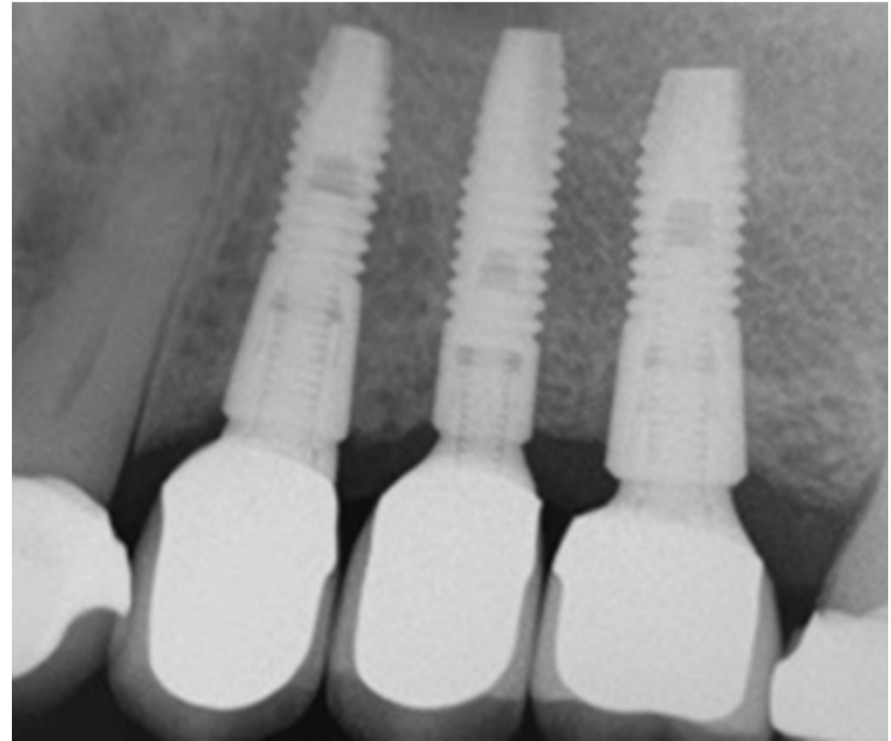
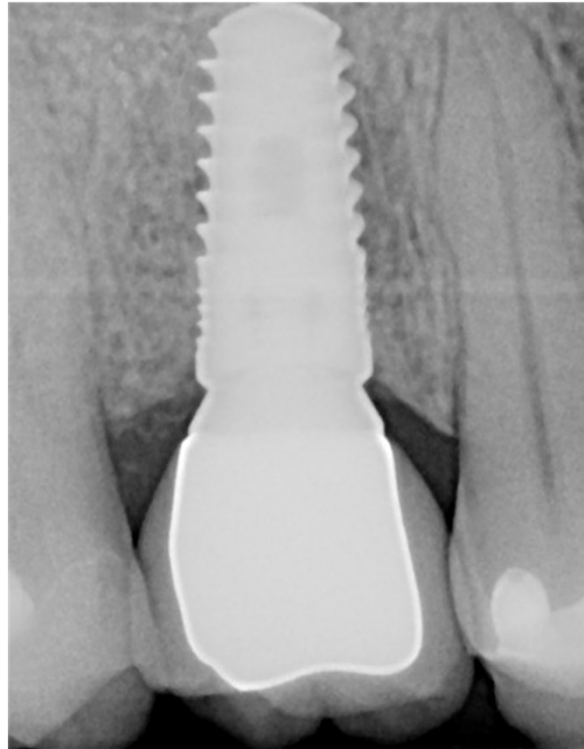
- At placement
- 3-12 Months post placement
- Routinely every 12months
- Any Sign of Possible Pathology!

Add Radiographs

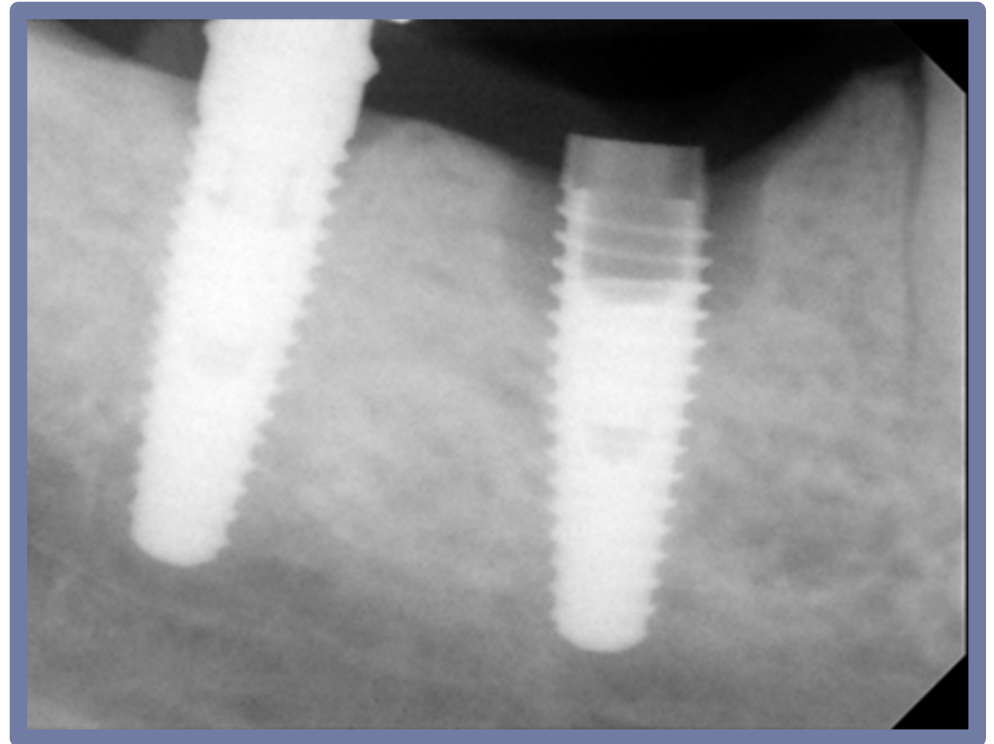
WHEN SIGNS OF PATHOLOGY PRESENT

- Inflammation
- Redness
- Bleeding
- Suppuration
- Mobility
- >6mm probing depth?
- Occlusal trauma

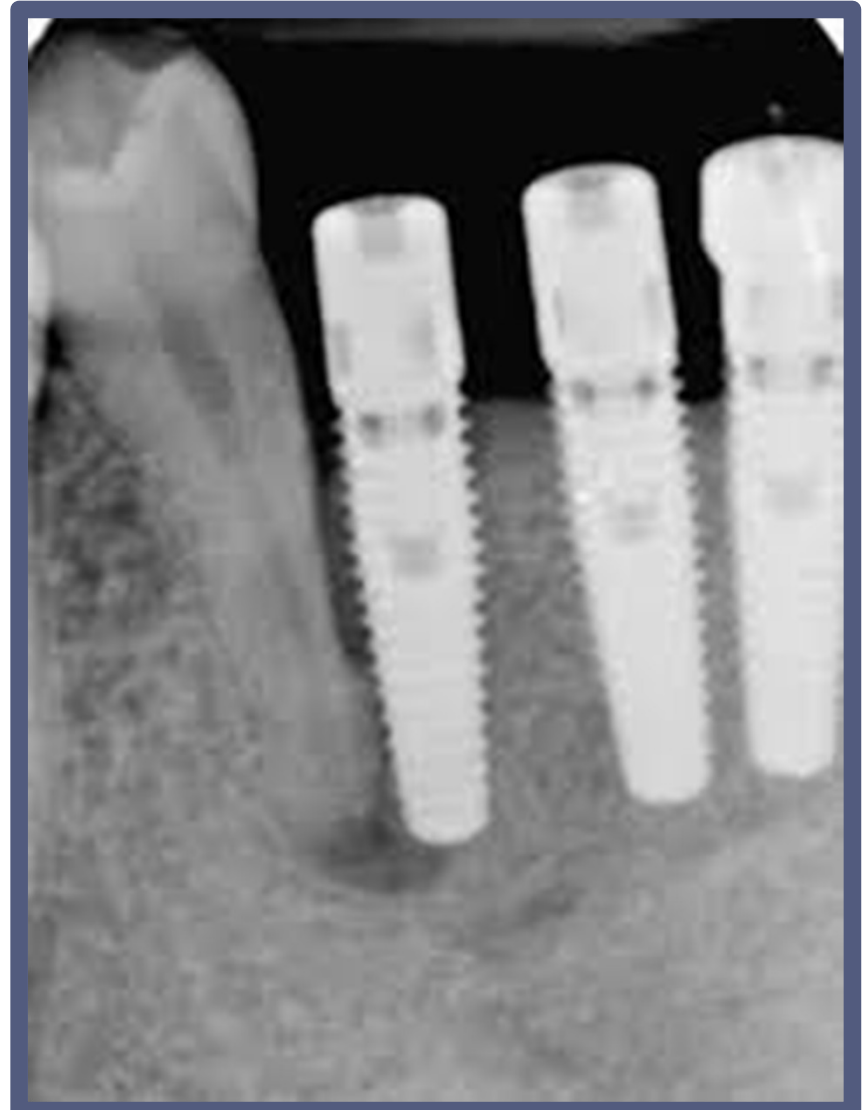
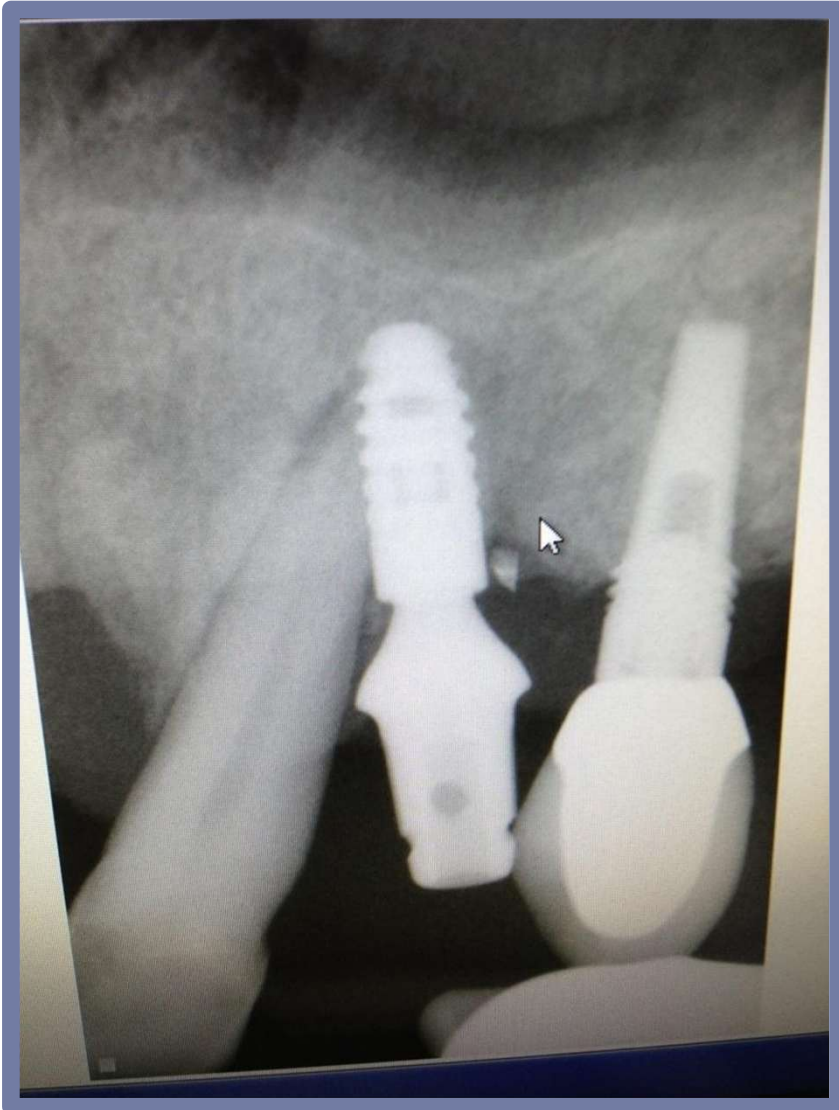
Positive Radiographic Findings



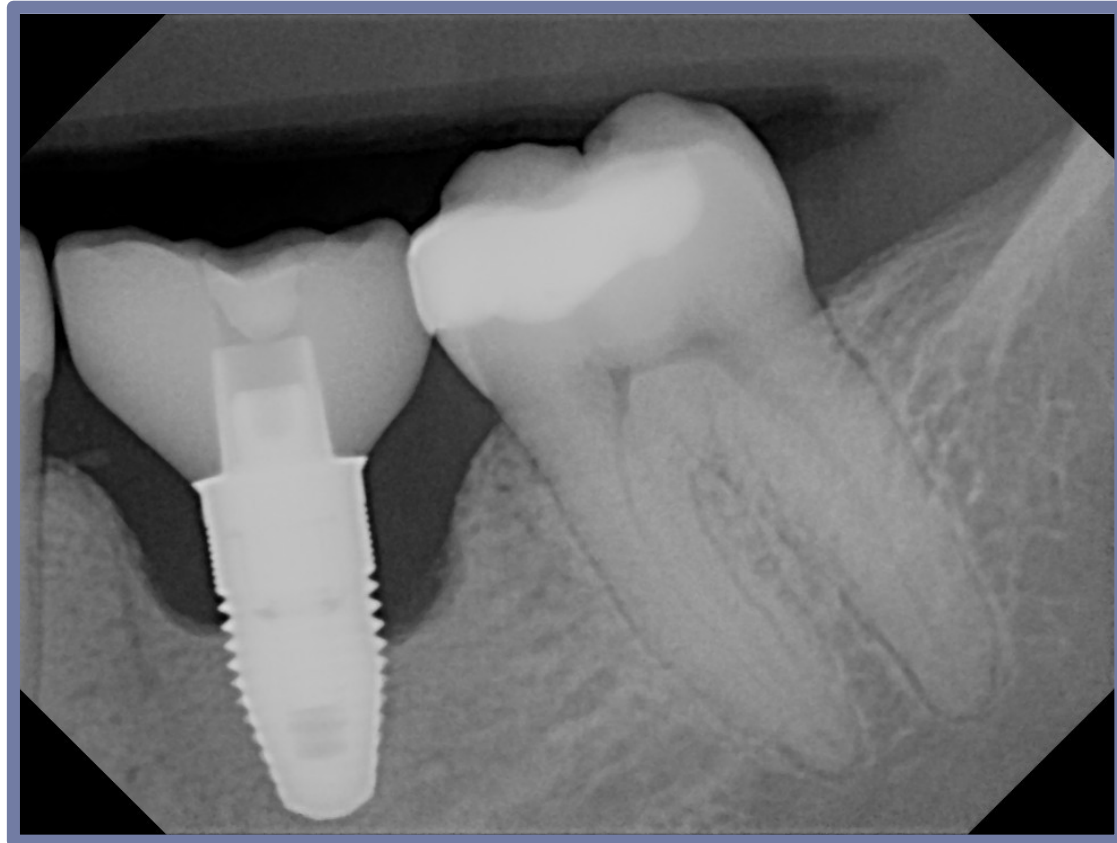
Problematic Findings



Problematic Findings



Dolly Radiograph Assessment



Dolly's Initial Visit September 2024

H. Check Occlusal Forces



#1 cause of failure post-integration

2. TREATMENT

CLINICAL REMOVAL OF BIOFILM
AND CALCULUS, ADJUNCTS

CLINICAL REMOVAL OF BIOFILM AND CALCULUS

Hand Scalers

Power Scalers

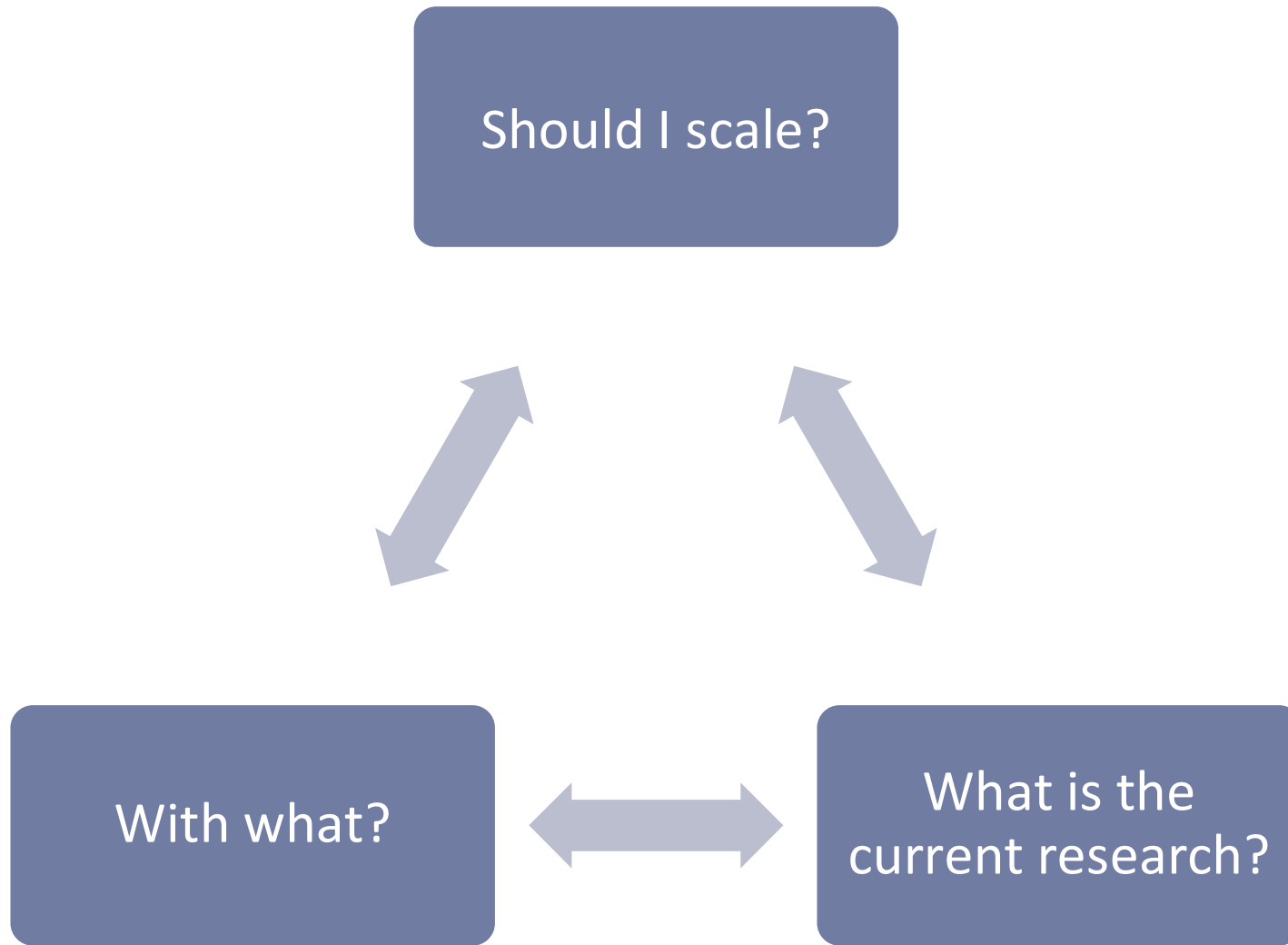
Air-Polishers

Irrigation

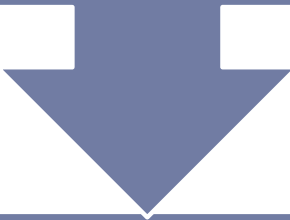
Anti-Microbials

Laser Therapy

Safe Instrumentation



Scratches and gouges may affect the titanium-oxide layer, reducing the corrosion-resistant nature of a titanium implant



Surface can become contaminated with trace elements from cement or scaler material left behind which can compromise the long-term success of the implant.*

Klauber C, LenzIJ, HenryPJ. Oxide thickness and surface contamination of six endosseous dental implants determined by electron spectroscopy for chemical analysis; a preliminary report. *International Journal of Oral and Maxillofacial Implants.* 5:264-271.

Titanium implant scalers are recommended on implants coated with hydroxyapatite or titanium plasma spray (TPS). Plastic curettes leave deposits on the titanium implant surface, especially those with surface coating and this has been confirmed on multiple studies*



***Wingrove**

Reference: Ramaglia L. Di Lauro AE, Morgese F, Squilace A., Profilometric and standard error of the mean analysis of rough implant surfaces treated with different instrumentations. Implant Dent. 2006;15:77-82.

Plastic Instruments



Hu-Freidy



Nordent

Graphite Instruments

Implant Scaler



Universal (Columbia 4L/4R)

2 pack • 9061401
5 pack • 9061400



Facial (Goldman-Fox 5)

2 pack • 9061402
5 pack • 9061403



Implant surface after treatment with a metal curette



Implant surface after treatment with a Premier Implant Scaler

Premier Implant Scalers

Made of a revolutionary material which is engineered to be sharper, yet safe enough for use on Titanium Implants. Autoclavable, and can be re-sharpened.

Dental Siam by Premier

Titanium Instruments

PDT



American Eagle



Hand-Instrumentation Technique

- Short strokes
- Controlled strokes
- Smooth strokes
- Horizontal strokes
- Light touch

Hand Instrument Selection



Narrow based implants

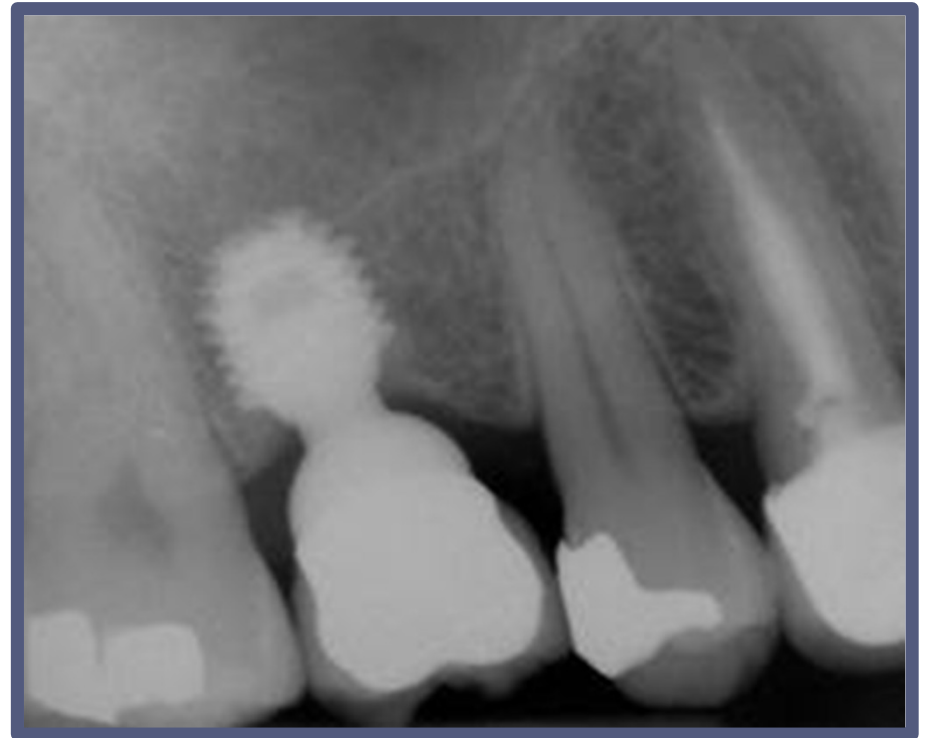


Wide based implants



Specialty areas

Narrow Based Implants



Select a longer blade instrument to stretch under the more bulbous-shaped crowns and under framework of a high water bridge or full arch retained prosthesis.

Wide Based Implants



Use a universal posterior scaler

Dolly Calculus Removal

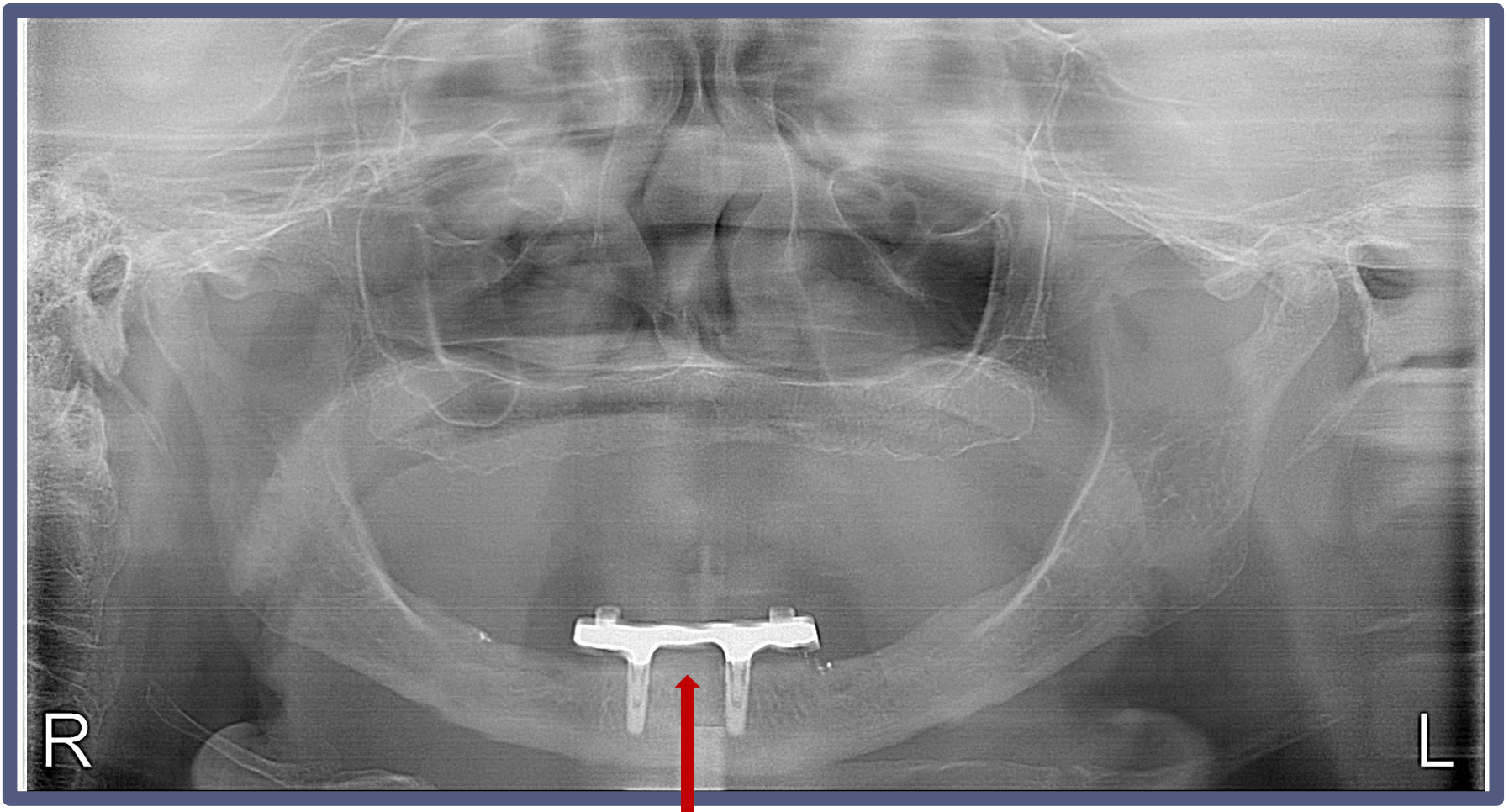


Specialty Areas



Use Win N128 end with short horizontal strokes to dislodge the cement and to sweep under the Hadar bar to dislodge any calculus if present.

Specialty Areas – Brenda



Specialty Areas – Brenda Before



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
F																
PD																
GM																
CAL																
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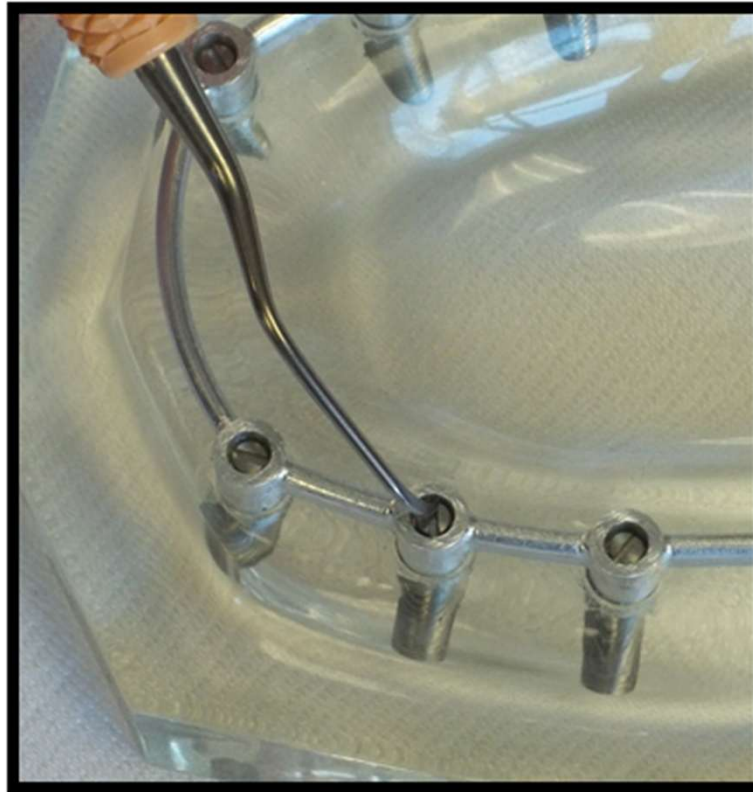
Specialty Areas – Brenda Before



Specialty Areas – Brenda



Specialty Areas



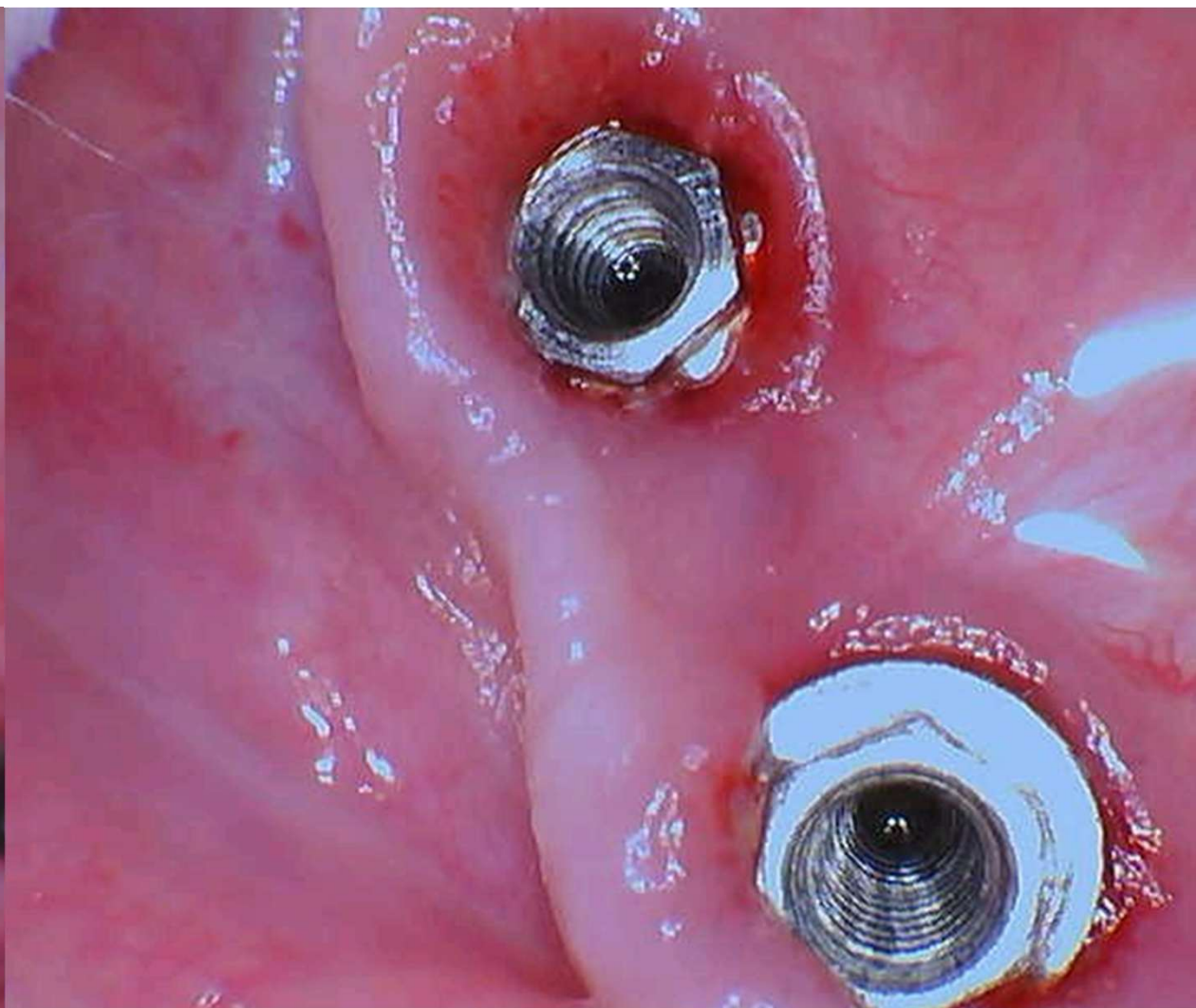
Check exposed screw indentations (e.g. bar retained & locator implants) and carefully remove deposits with shorter radius tip.

Specialty Areas



Should fixed dentures be removed yearly?

Jim 43 years old - Before and After



Jim - Before and After



Ultrasonic Scalers



Acteon



Tony
Riso

Kavo



Hu-Freidy



Ultrasonic Technique

Power scalers can be used with caution. Do not risk damaging the perimucosal seal, scratching the implant surface, prosthesis, or patient aspirating the plastic sleeve. (Suzuki, et, el)

- Light strokes
- Short strokes
- Smooth strokes
- Controlled strokes

Check Your Work



Explorer

Superfloss

Air-Polishing vs Coronal Polish

AIM:

To evaluate the safety and efficacy of glycine powder in comparison with sodium bicarbonate powder and hand instrumentation on gingival epithelium in vivo, using histological analysis

CONCLUSION:

Glycine powder air-polishing is safe and causes less gingival erosion than hand instrumentation and sodium bicarbonate air-polishing



Air-Polishing Research

INFLUENCE OF DIFFERENT AIR-ABRASIVE POWDERS ON CELL VIABILITY AT BIOLOGICALLY CONTAMINATED TITANIUM DENTAL IMPLANTS SURFACES

*Schwarz F, Ferrari D, Popovski K, Hartig B, Becker J
Journal Biomed Mater Res B Appl Biomater, 2009 January; 88(1):83-91*

AIM:

To evaluate the influence of different types of air-polishing powder on cell viability on biologically contaminated titanium surfaces

CONCLUSION:

Cell viability on biologically contaminated titanium surfaces is mainly influenced by the type and particle size of the powder. **Glycine-based powders have proven to be efficient without altering the titanium surfaces**

Anti-Microbial Adjuncts

- Irrigation
- Laser Biostimulation
- Localized Antibiotics

Irrigation Options

- Chlorhexadine?
- Chlorine Based
- Iodine Based
- Essential Oils

Diode Lasers

NONSURGICAL PERIODONTAL MANAGEMENT OF IATROGENIC PERI-IMPLANTITIS: A CLINICAL REPORT

“The use of both traditional protocols of nonsurgical periodontal therapy and the diode laser seems to be an effective alternative treatment modality for peri-implantitis. By the application of laser-assisted non-surgical peri-implant therapy the periodontal pocket depth was reduced.”

[J Biol Regul Homeost Agents](#). 2015 Jul-Sep;29(3 Suppl 1):164-9

[Roncati M](#), [Lauritano D](#), [Tagliabue A](#), [Tettamanti L](#)

Dolly – Laser Therapy / PBM



Localized Antibiotics

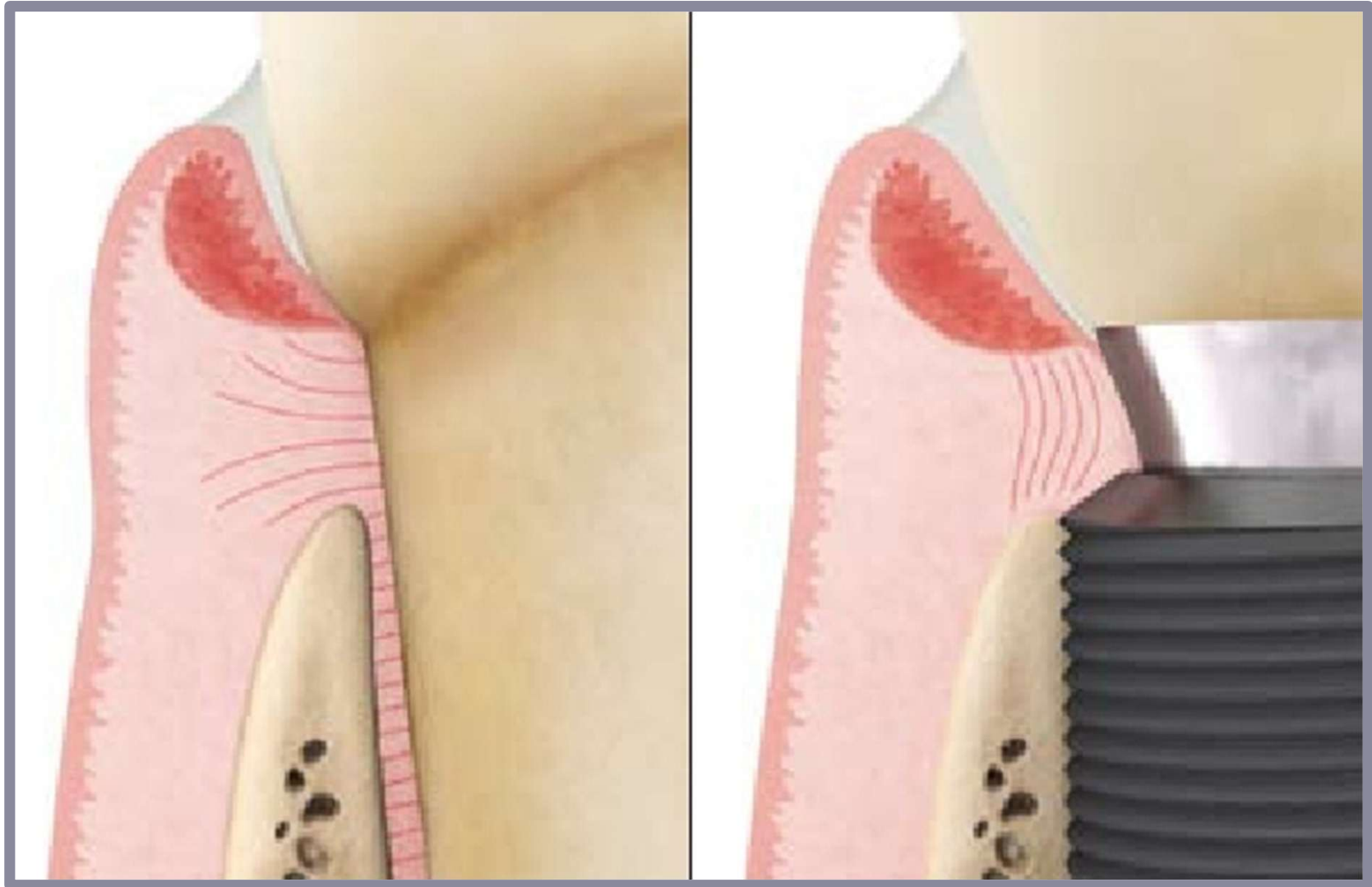
- Arestin
- Actisite
- Atridox
- Periostat

TREATMENT
RECOMMENDATIONS
WHEN DISEASE IS PRESENT
Peri-Implant Mucositis vs Peri-Implantitis

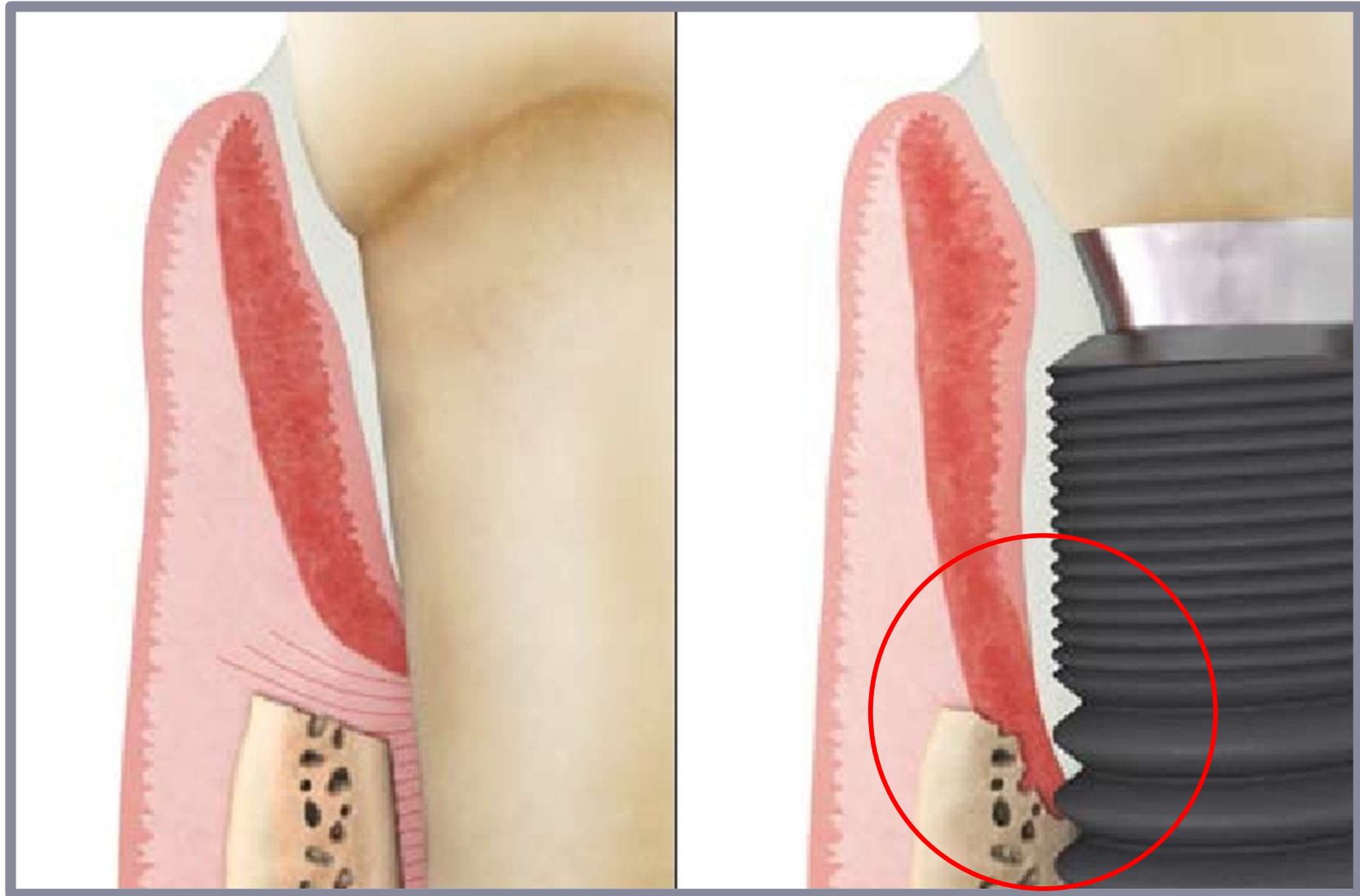
Peri-Implant Mucositis vs. Peri-Implantitis

<u>Disease site</u>	<ul style="list-style-type: none">• Inflammation• No loss of supporting hard-tissues	<ul style="list-style-type: none">• Inflammation• Loss of supporting hard-tissues
Natural Dentition	Gingivitis	Periodontitis
Implant Dentition	Peri-implant mucositis	Peri-Implantitis

Peri-implant mucositis

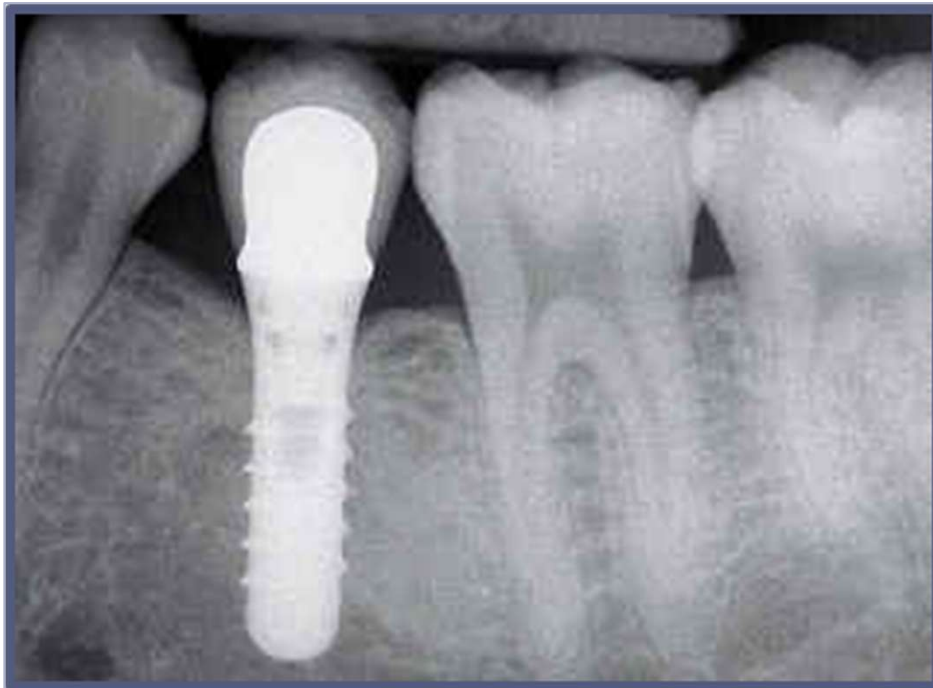


Peri-implantitis



Peri-implant mucositis

- Inflammation
- No loss of supporting tissues
- Radiograph



Treatment:

- Stress Reduction
- Anti-microbial
- Pocket Therapy
- ↑ Maintenance
- ↑ OH
- Add An Adjunct?
- ↑ Radiographs?
- 2-12 Week Evaluation

Peri-implantitis

- Inflammation
- Slight loss of supporting tissues
- Radiograph



Treatment:

- Stress Reduction
- Anti-microbial
- Pocket Therapy
- **Remove Source If Present**
- ↑ Maintenance
- ↑ OH
- Add Adjunct
- PD Reduction - Diode
- 6 Week Evaluation

Peri-Implantitis

Surface can become contaminated with trace elements from cement or scaler material left behind which can compromise the long-term success of the implant.*



Klauber C, LenzIJ, HenryPJ. Oxide thickness and surface contamination of six endosseous dental implants determined by electron spectroscopy for chemical analysis; a preliminary report. International Journal of Oral and Maxillofacial Implants. 1990;5:264-271.

Peri-implantitis

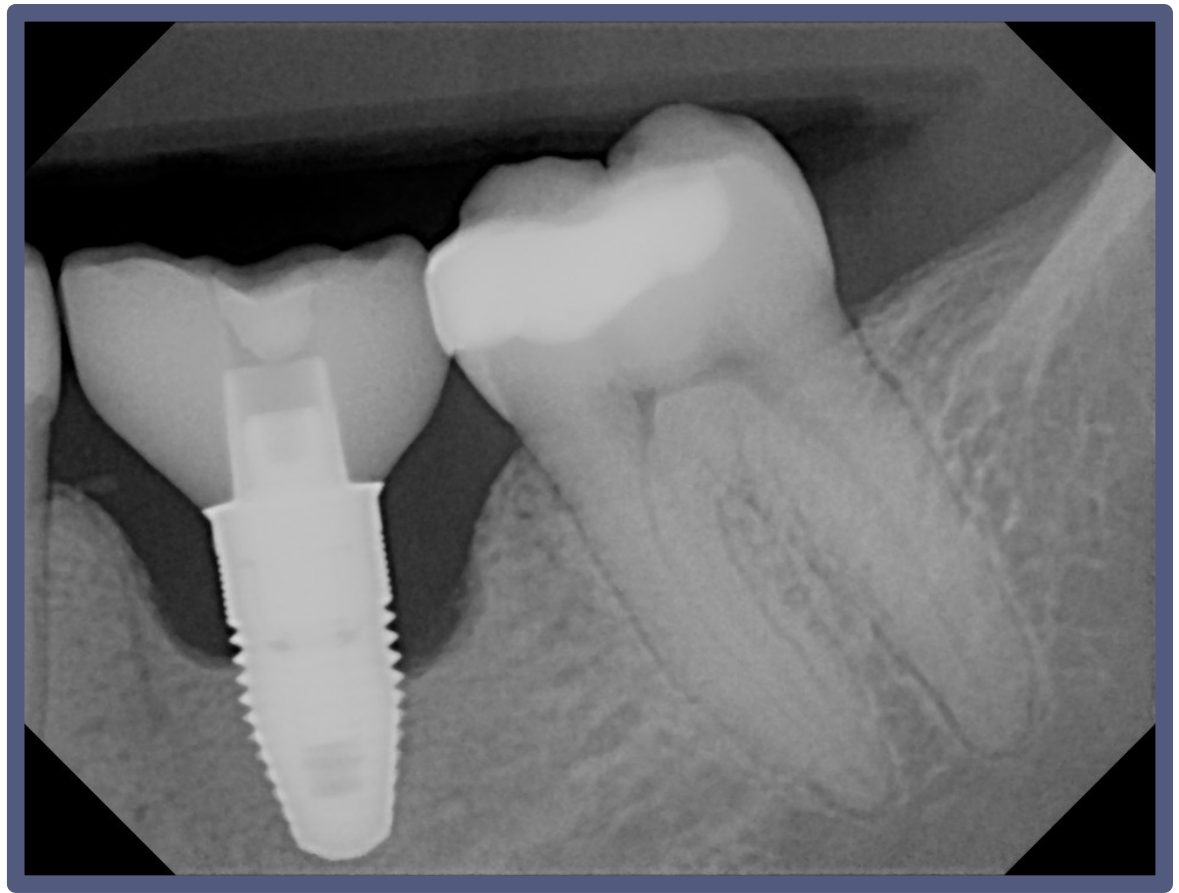
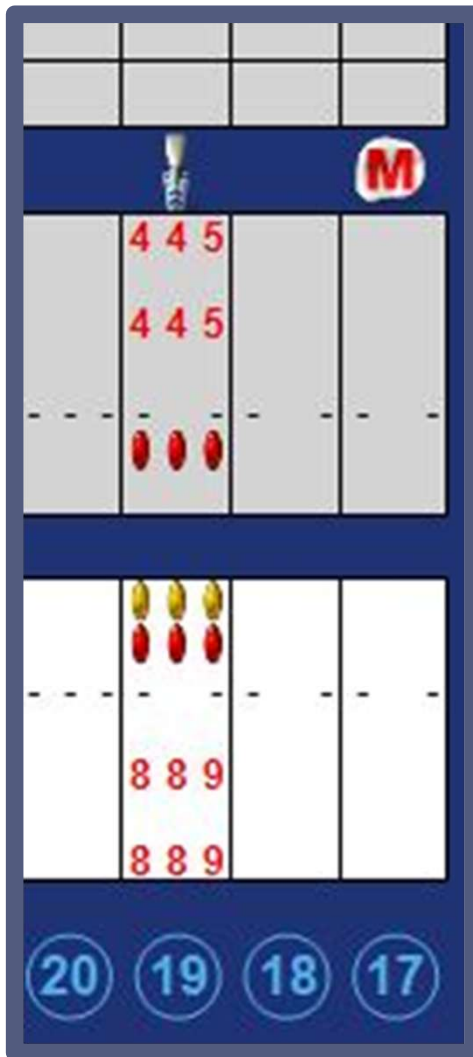
- Inflammation
- Moderate+ loss of supporting tissues

TREATMENT OPTIONS

- Stress reduction
- Remove source
- Add an adjunct
- Consult surgeon
- Drug therapy
- Sx re-entry
- Change prosthesis
- Removal



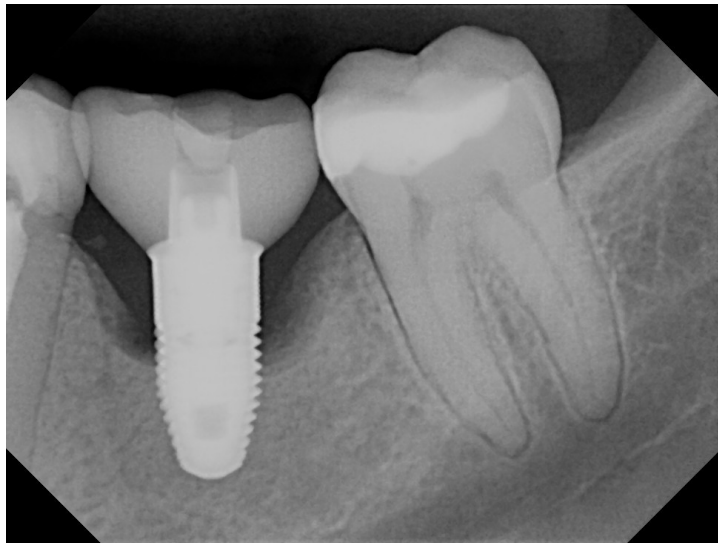
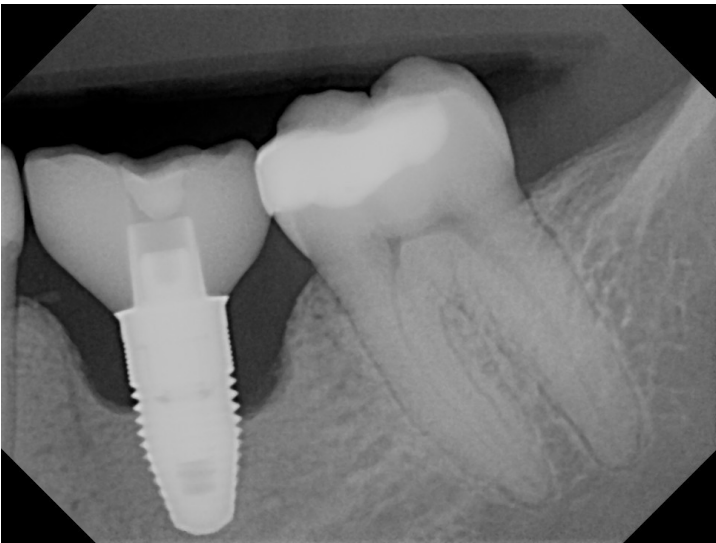
Dolly September 2024



Dolly Treatment Plan

1. PBM, Mechanical debridement, OHI
2. In 2 weeks – FM Assessment, PBM, OHI
3. Repeat in 2 weeks
4. Repeat in 2 weeks Radiograph
5. Repeat in 2 weeks,
6. Repeat in 2 weeks, Radiograph, Arestin
7. 4-6 week Evaluation, Maintenance, PBM & New Treatment Plan

Dolly along the way...



M				
	4	4	5	
	4	4	5	
	● ● ●			
	● ● ●			
	8	8	9	
	8	8	9	
20	19	18	17	

M				
3	3	4	4	4
4	4	5	4	3
4	3	4	4	5
4	3	4	4	3
	4	3	4	4
	9	5	4	3
	4	3	4	4
	9	5	4	3
	4	3	4	4
20	19	18	17	

M				
3	3	4	4	4
4	4	5	4	3
4	3	4	4	5
4	3	4	4	3
	4	3	4	4
	6	5	4	3
	4	3	4	4
	6	5	4	3
	4	3	4	4
20	19	18	17	

PATIENT PARTICIPATION



Minimal Oral Hygiene

- Power brush
- Floss
- Waterpic
- One additional OH aid

Additional OH Aids

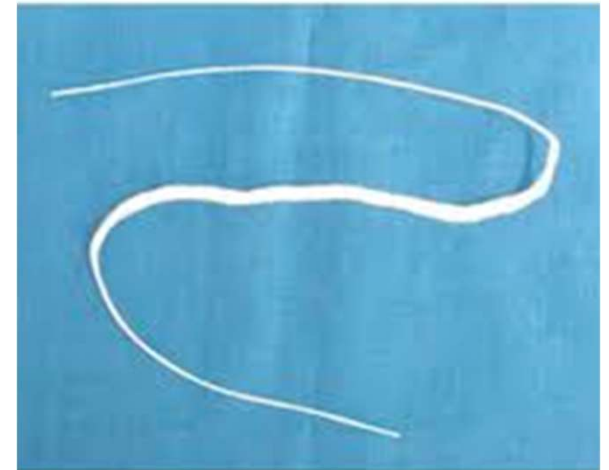
- Custom floss
- Proxy brush
- Rubber tip
- Water Pic
- ?



Custom Floss



Reach Woven



Thornton



Superfloss

Proxy Brushes



Rubber Tips



Oral-B

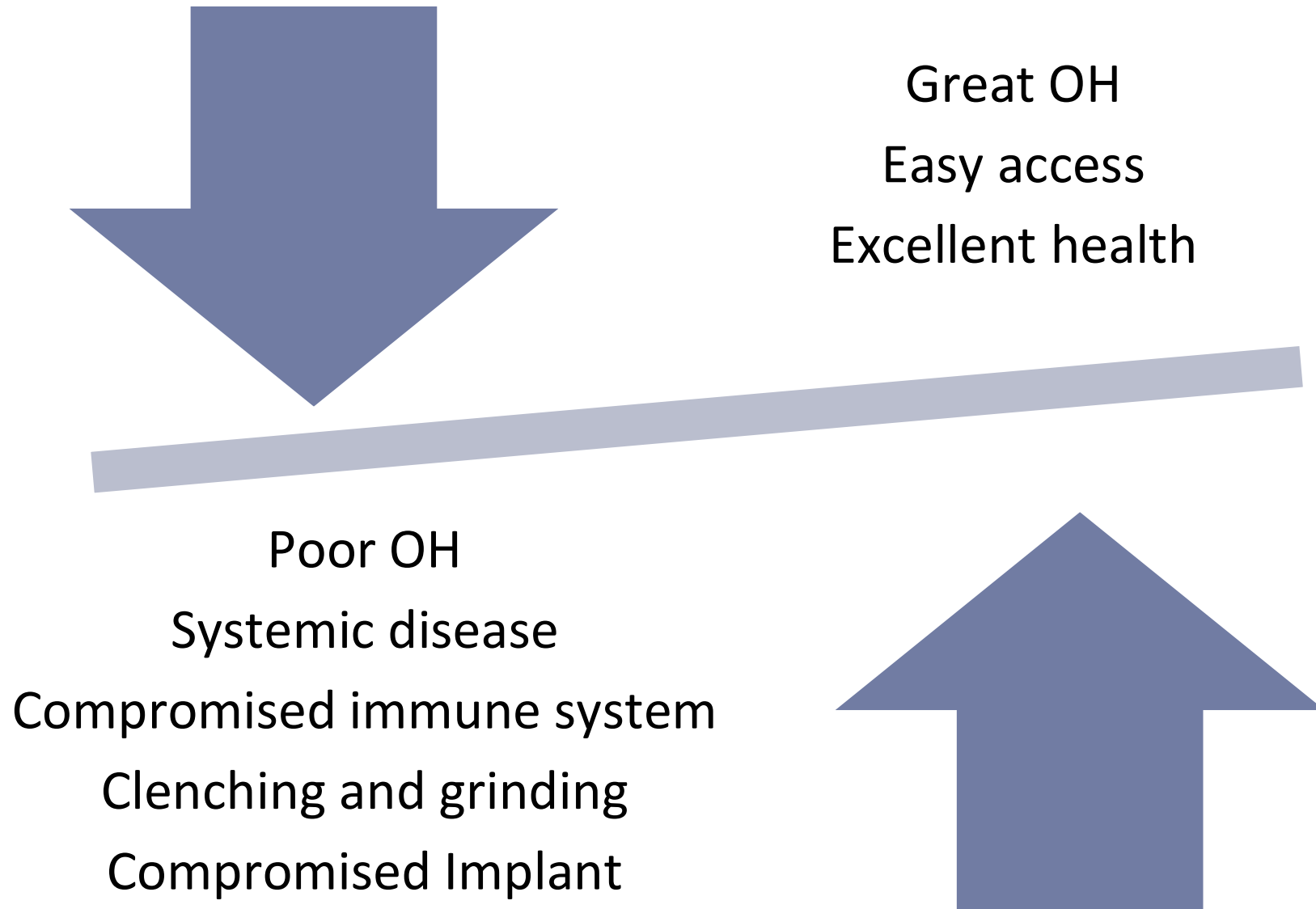


Tip-a-dent

MAINTENANCE SCHEDULE



Maintenance Schedule



Conclusions

- Maintenance Schedule Should Be Designed According To Risk Factors* 2-6 Months
- Thorough Assessment Initially And At Re-care Appointments
- Update Your Repertoire
- Alter Your Scaling Technique
- Prompt Treatment When Disease Is Present
- Customized OHI And Maintenance

Resources:

- Paul Binon DDS, MSD, FAO
- Jon Suzuki DDS, PhD
- Behnam Fakhravar DMD, MS
- Carl E. Misch DDS, MDS, Ph.D
- Susan Wingrove, RDH
- Dentsply International
- Paradise Dental Technologies (PDT)
- Hu-Friedy

Thank you!



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