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Benjamin M. Wu, DDS, PhD

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Peri-implantitis: Updates for the Practicing Clinician

Tara Aghaloo DDS, MD, PhD
Professor
Oral and Maxillofacial Surgery
Assistant Dean for Clinical Research
UCLA School of Dentistry



Peri-implant mucositis



- Reversible inflammation of the soft tissues surrounding an implant in function with no loss of supporting bone
- Bleeding and/or suppuration on probing and increased probing depths (4-5mm)

Albrektsson T, Isidor F. Consensus report of session IV. In: Lang N, Karring T, eds. Proceedings of the 1st European Workshop on Periodontology. Switzerland: Quintessence, 1994:365.

Peri-implantitis



- Inflammatory process affecting the tissues around an osseointegrated implant in function resulting in loss of supporting bone
- Deep probing depths (>5mm), bleeding and/or suppuration on probing
- Usually circumferential defect

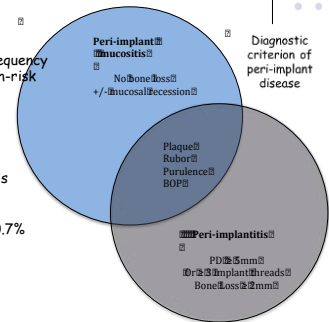
Albrektsson T, Isidor F. Consensus report of session IV. In: Lang N, Karring T, eds. Proceedings of the 1st European Workshop on Periodontology. Switzerland: Quintessence, 1994:365.

Atieh et al. The Frequency of Peri-Implant Diseases: A Systematic Review and Meta-Analysis. *Journal of Periodontology*. 2012



Purpose: Estimate overall frequency of peri-implant disease in high-risk groups

Results: 9 studies
 • Minimum follow up - 5 years
 • 1497 participants
 • 6283 implants
 • Peri-implant mucositis - 30.7%
 • Peri-implantitis - 9.6%



Peri-implantitis: Prevalence



- Variable range
- 6.4% (Albrektsson et al., 1994)
- 12-43% (Berglundh et al., 2002)
- 9.6% (Atieh et al., 2012)

Confounding Variables



- Occlusal forces
- Cement or other contaminants
- Standardized radiographs
- Tools for diagnosis and maintenance
 - Plaque assessment, bleeding index, suppuration
 - Access for oral hygiene
 - Mucosal condition
 - Probing/pocket depth
 - Keratinized tissue width
 - Gingival fluid analysis
 - Radiographs
 - RFA/implant stability
 - Maintenance schedule and compliance

Risk Factors

- Previous Periodontal Disease
- Poor Plaque Control/Inability to Clean
- Residual Cement
- Smoking
- Genetic Factors
- Diabetes
- Occlusal Overload
- Potential Emerging Risk Factors
 - Rheumatoid arthritis, increased time of loading, and alcohol

J Periodontol 2013;84:436-43.

Implant Position



Implant Position vs. Peri-implantitis



Bacteria around healthy vs. diseased peri-implant tissues

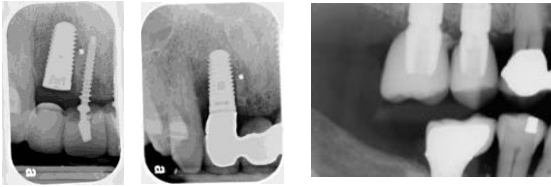
- Gram-positive facultative cocci and rods
- Gram-negative anaerobic rods at sites with clinical signs of peri-implantitis
- Similar to periodontitis (*Porphyromonas gingivalis*, *Treponema denticola*, *Tannerella forsythia*, *Fusobacterium sp.*, *Prevotella intermedia*, *Aggregatibacter actinomycetemcomitans*)
- Occasional staphylococcus aureus (deep pockets), enteric rods and *Candida albicans*

Heitz-Mayfield LJ, Lang NP. Periodontol 2000 2010;53:167-81.

Prevention and maintenance strategies

- Patient factors
 - Smoking, periodontal disease, diabetes, genotype
- Iatrogenic factors
 - Cement, prosthesis design, diagnostic tools, implant surface, occlusal trauma, implant position
- Maintenance factors
 - Biofilm, home care, regular hygiene visits

Cement related periimplantitis



Peri-implant bone loss in cement- and screw-retained prostheses



No evidence to support differences in marginal bone loss through between cement and screw-retained restorations.

de Branda, et al. J Clin Perio, 2013

Prevention and maintenance strategies

- 61 patients maintenance program every 6 months x 2 years, then yearly x 4 years
- Chlorhexidine twice daily for 10 days (mucositis)
- Systemic and local antibiotics with surgery to decontaminate and debride (implantitis)
- <10% mucositis and 1.4% implantitis

Corbella, S et al. Int J Dent Hygiene, 2011

Prevention and maintenance strategies

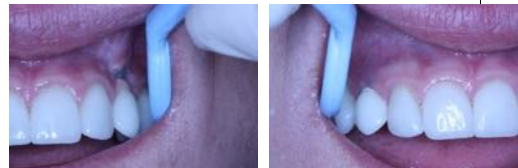
- 112 healthy and periodontally compromised patients in supportive periodontal therapy
- Increased implantitis and implant loss in severe periodontally compromised patients
- Lack of maintenance was associated with higher implant loss and implantitis

Rocuzzo M, et al. Clin Oral Imp Res, 2010

Prevention and maintenance strategies: mucositis

- Peri-implant assessment, oral hygiene, plaque index, mechanical debridement
- One visit per year x 5 years
- Control group- 43.9% mucositis, 19.5% implantitis
- Treatment group- 18% mucositis, 1.7% implantitis

Costa FO, et al. J Clin Perio, 2012



Ten Years Later



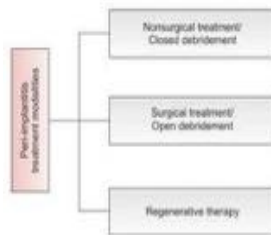
Atieh et al., 2012

- High occurrence of peri-implant disease which may persist for years
- Long term maintenance care for high risk groups is essential
 - Smokers - 31 x more likely
 - Small ↑ among participants with h/o periodontitis
 - Regular maintenance care ↓ number of participants presenting with peri-implantitis.

Treatment Modalities: Peri-implantitis

Key factors to consider

- ❖ Decrease bacterial plaque
- ❖ Decontaminate surface
- ❖ Improve patient OH
- ❖ Regenerate bone



Current management: mucositis

- Scaling or mechanical debridement with oral hygiene instructions to disrupt biofilm (Lang, 1997)
- Antimicrobial gel- no additional benefit (Heitz-Mayfield, 2011; Thone-Mukling, 2010)
- Generally reversible (Heitz-Mayfield, 2004)

Current management: peri-implantitis

- Debridement and decontamination
- Non-surgical
 - Mechanical (titanium, plastic, rubber), sonic, ultrasonic, lasers, air powered abrasives
 - Saline, chlorhexidine, citric acid, H₂O₂, lasers, local antibiotics
- Surgical
 - Debridement, pocket elimination, bone recontouring, bone grafting +/- membranes, implantoplasty

Antibiotics: Systemic vs. Local

- Local application of tetracycline fibers showed clinical improvement and decreased periodontal pathogens
- Minocycline hydrochloride microspheres showed clinical benefits when combined with supra and subgingival debridement

Renvert et al. J Perio 2008.



Suarez F, et al. Implant Dent, 2013

Perio-Flow

- Airborne-particle abrasion
- Thin disposable plastic nozzle in pocket
- Biofilm removed using glycine-based powder irrigation
- Safe and provides clinical results comparable to subgingival debridement of teeth



Moene R, et al. J Periodontol, 2010

Er:YAG laser

- Laser therapy as a treatment option for peri-implantitis
- Er:YAG laser may be preferable to traditional mechanical treatment
- Bactericidal effect
- Effectively and safely degranulate and debride implant surface



Takasaki AA, et al. Laser Med Sci, 2007

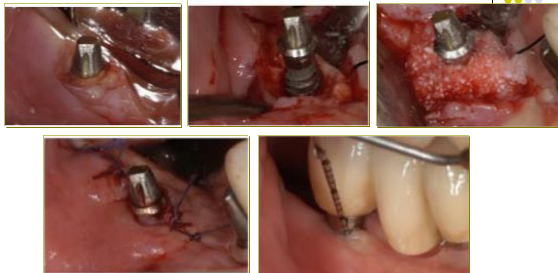
Er:YAG Laser vs. Air Abrasion



- Outcome - Mean PD reduction 0.9 mm vs. 0.8mm; Mean radiograph bone level loss -0.1 mm vs. -0.3mm
- Clinical treatment results were limited and similar between the two methods

Roos-Jansåker et al, J Clin Periodontol 2011

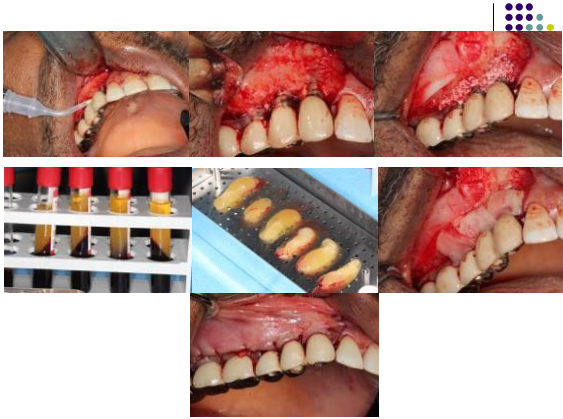
Surgical Debridement



Rocuzzo M. J Clin Periodontol 2011

- 64 yo male with implants placed 25 years ago
- Long span FPD tooth to implants

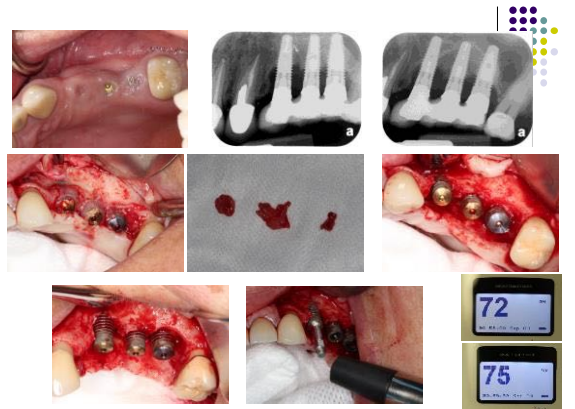
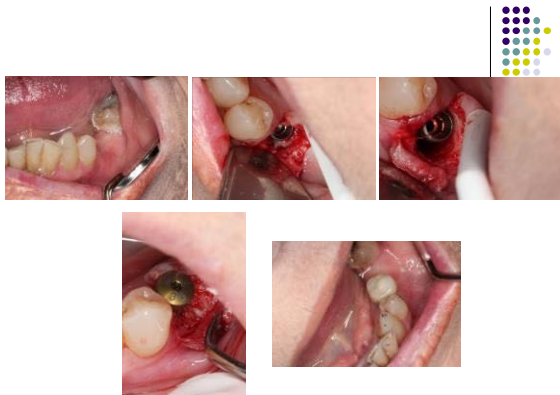


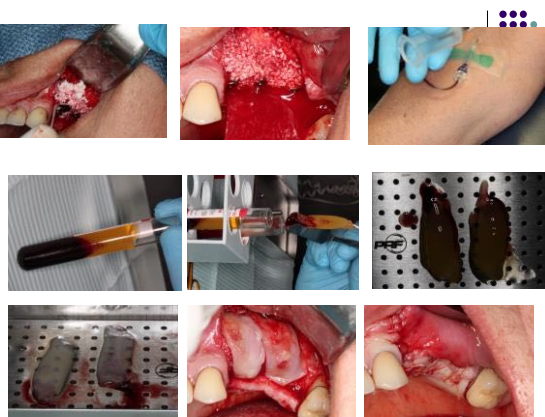
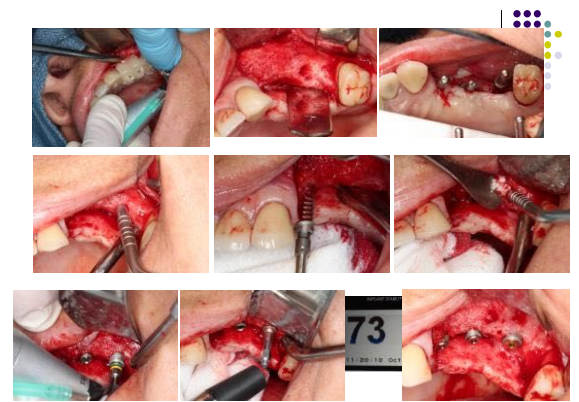
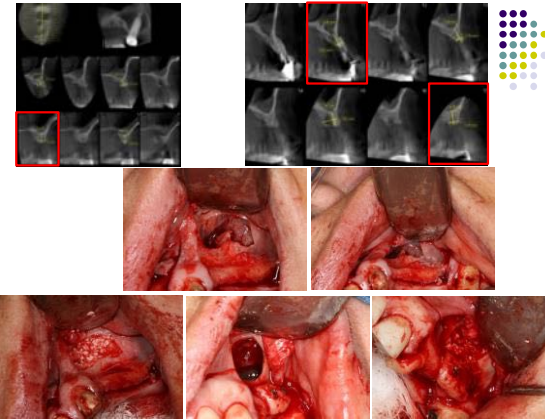
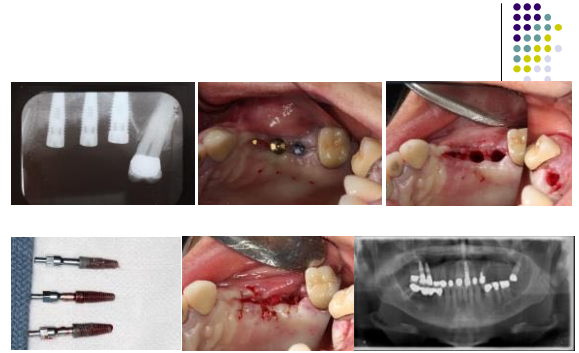
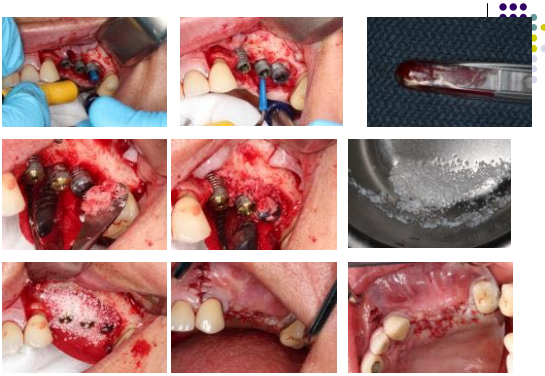


Dehiscence: Is this periimplantitis?



Mobile or malpositioned implants are removed





Take home points

- Rule out non-inflammatory conditions
- Identify susceptible patients
- Appropriate implant and prosthesis design
- Reinforce maintenance and hygiene
- Prevention rather than treatment
- Large multicenter trials to evaluate important questions in diagnosis, prevention, and treatment
- Consider removing implants if cannot maintain

Take home points



- Intervene with prophylactic measures when mucositis (bleeding) is noted
- Pocket \geq 6 mm harbors anaerobic bacteria and requires treatment
- Baseline radiograph and follow-up at regular intervals
- Do not intervene surgically without prior conservative, antibacterial therapy
- Maintain optimal oral hygiene standards after peri-implantitis