

Peri-implant Disease: Diagnosis, Management, and Maintenance

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Disclaimer: each program attendee must always use his/her own personal and professional judgment when considering further application of this information, particularly as it may relate to patient diagnostic or treatment decisions including, without limitation, FDA-approved uses and any off-label uses.

- Defining success
- Defining Peri-implant disease entities
- Etiology and Pathogenesis
- Diagnostic Parameters
- Treatment
- Patient Case Examples
- Maintenance Strategies
 - -home care
 - -office
- The desired outcome of successful implant therapy is maintenance of a stable, functional, esthetically acceptable tooth replacement for the patient.

Variations from the desired outcome of implant placement include:

- 1. Implant mobility or loss
- 2. Persistent pain and/or loss of function
- 3. Progressive bone loss
- 4. Persistent peri-implant radiolucency
- 5. Persistent uncontrolled inflammation/infection
- 6. Inability to restore the implant
- 7. Increased probing depths
- 8. Implant fracture

Implant Success Criteria

- Clinically immobile
- Vertical bone loss <0.2mm annually after 1st year
- No: radiographic radiolucency
- No: Violation of anatomic structures
- No: Pain, Infection, Neuropathy, Paresthesia

What we Know?

- Difficulty defining Peri-implantitis
- No perfect understanding of root cause
- Inflammatory
- Hard and soft tissue, progressive
- Similar to periodontitis
- Risk indicators

CLASSIFICATION OF PERIODONTAL AND PERI-IMPLANT DISEASES AND CONDITIONS 2017

Periodontal Diseases and Conditions										
Periodontal Health, Gingival Diseases and Conditions			Periodontitis			Other Conditions Affecting the Periodontium				
Chapple, Mealey, et al. 2018 Consensus Rept link			Papapanou, Sanz et al. 2018 Consensus Rept link			Jepsen, Caton et al. 2018 Consensus Rept link				
Trombelli et al. 2018 Case Definitions link			Tonetti, Greenwell, Kornman. 2018 Case Definitions link			Papapanou, Sanz et al. 2018 Consensus Rept link				
Periodontal Health and Gingival Health	Gingivitis: Dental Biofilm-Induced	Gingival Diseases: Non-Dental Biofilm-Induced	Necrotizing Periodontal Diseases	Periodontitis	Periodontitis as a Manifestation of Systemic Disease	Systemic diseases or conditions affecting the periodontal supporting tissues	Periodontal Abscesses and Endodontic-Periodontal Lesions	Mucogingival Deformities and Conditions	Traumatic Occlusal Forces	Tooth and Prosthesis Related Factors
Peri-Implant Diseases and Conditions										
Berglundh, Armitage et al. 2018 Consensus Rept link										
Peri-Implant Health			Peri-Implant Mucositis			Peri-Implantitis			Peri-Implant Soft and Hard Tissue Deficiencies	

Peri-Implant Health:

Diagnosis:

1. Visual inspection = absence of inflammation (erythema, edema, enlarged tissues)
2. Lack of BOP
3. Probing depths depend on soft tissue height
 - Increasing = health change
4. Absence of further bone loss following initial healing (<2 mm).

Peri-Implant Mucositis:

- Inflammatory lesion of the mucosa surrounding an endosseous implant without loss of supporting peri-implant bone.
- Clinically: BOP, erythema, swelling, and/or suppuration
- Converting health to mucositis: Cause-and-effect relationship: experimental biofilm accumulation and inflammatory response in human studies.
- REVERSIBLE (may take > 3 weeks)

Peri-implant Mucositis Risk Indicators

- Biofilm accumulation (oral hygiene)
- Cigarette smoking
- Radiation therapy
- Diabetes
- Excess Cement
- Hormonal Changes
- Menopause
- Chemotherapy
- Thyroid alterations
- Cardiac problems

- Alcohol Use

PERI-IMPLANTITIS DEFINITION

- Pathological condition occurring in tissues around dental implants...inflammation in peri-implant mucosa and progressive loss of supporting bone.
- Clinically detected by Probing (BOP)
- Radiographic progressive bone loss
- Peri-implantitis may commence early
- Progression Implants > Teeth
- Incidence: Subjects enrolled in maintenance (18%) vs. patients without maintenance (43%)

Peri-Implantitis Case definitions

- 1. Visual: inflammation, BOP and/or suppuration
- 2. Increasing probing depths
- 3. Progressive bone loss
- **In absence of initial radiographs and probing depths:
- radiographic bone level ≥ 3 mm and/or probing depths ≥ 6 mm with profuse bleeding

Peri-Implantitis Risk Indicators:

- History of periodontitis*
- Smoking
- Diabetes
- Poor plaque control/lack of maintenance*

Hard-tissue deficiencies prior to implant placement

- TOOTH LOSS
- TRAUMA FROM TOOTH EXTRACTION
- PERIODONTITIS
- ENDODONTIC INFECTIONS
- LONGITUDINAL ROOT FRACTURES
- GENERAL TRAUMA
- POSTERIOR MAXILLA BONE HEIGHT
- SYSTEMIC DISEASE

Hard-tissue deficiencies after implant placement

- DEFECTS IN HEALTHY SITUATIONS
- MALPOSITIONING OF IMPLANTS
- PERI-IMPLANTITIS
- MECHANICAL OVERLOAD
- SOFT-TISSUE THICKNESS
- SYSTEMIC DISEASES

Soft-Tissue Deficiencies Prior to Implant Placement

- TOOTH LOSS
- PERIODONTAL DISEASE
- SYSTEMIC DISEASE

Soft-Tissue Deficiencies After implant Placement

- LACK OF BUCCAL BONE
- PAPILLA HEIGHT
- KERATINIZED TISSUE
- MIGRATION OF TEETH AND LIFE-LONG SKELETAL CHANGES

Diagnosis:

- Probing
- Bleeding
- Suppuration
- Mobility
- Radiographs
- Pain
- Percussion
- Keratinized gingiva
- Crestal bone loss

Clinical Implications:

- Identify peri-implant disease risk factors
- Baseline radiographs: surgery, prosthesis
- Baseline radiographs prosthesis delivery
- Monitor implant health & determine inflammatory complications
- Establish early diagnosis and intervention
- Peri-implant mucositis can be successfully treated early non-surgically

Peri-implantitis Treatment:

- Not predictable
- Complex
- Difficult to perform
- Non-surgical therapy = ineffective
- Multiple modes therapy

Balance Risk vs. Prevention:

Risk Factors

- Periodontitis history
- Poor home care
- Chronic inflammatory disease
- Diabetes
- Poor prosthetic fit
- Smoking

Positive Factors

- Cement removal
- Screw retained
- Ideal occlusion
- Keratinized dimension
- Cleansable contours
- Case selection

Peri-Implantitis Treatment Goals:

- Arresting further bone loss

- Reestablish healthy peri-implant mucosal seal
 - Shallow pocket depths
 - Eliminate osseous defects
- Or
- Bone regeneration

Implant Quality Scales	Clinical Conditions	Management
Success (optimal health) Osseointegration/Stage 0 osseoseparation	No pain or tenderness upon function 0 mobility <2 mm radiographic bone loss from initial surgery PD <4 mm No suppuration No BOP	Normal maintenance
Survival (satisfactory health) Stage I osseoseparation Peri-mucositis	No pain 0 mobility <2 mm radiographic bone loss from initial surgery Peri-mucosal inflammation PD \pm 4 mm (bleeding and/or suppuration on probing)	Frequent SPT Nonsurgical debridement (hand, machine, air powder, lasers, etc) Patient self-administered care Adjunct local and systemic antimicrobials Soft tissue and/or prosthetic corrections if required
Survival (potentially compromised) Stage II osseoseparation Early peri-implantitis	No pain 0 mobility 2–4 mm radiographic bone loss PD \pm 4 mm (bleeding and/or suppuration on probing) Perimucosal inflammation Bone loss <25% of the implant length	Treatment as above plus surgical reentry and revision Laser Implant surface decontamination Regeneration
Survival (compromised health) Stage III osseoseparation Moderate peri-implantitis	Variable pain 0 mobility Peri-mucosal inflammation PD \geq 6 mm (bleeding and/or suppuration on probing) Bone loss 25% to 50% of the implant length	Surgical reentry and revision Lasers Removal of implant
Failure (clinical failure) Stage IV osseoseparation Advanced peri-implantitis	Peri-mucosal inflammation Pain upon function PD >8 mm (bleeding and/or suppuration on probing) Bone loss >50% of the implant length Mobility Uncontrolled exudate Maybe no longer in mouth	Surgical reentry and revision or removal of implant
Others (such as retrograde peri-implantitis)	Variable perimucosal inflammation Radiographically: periapical lesion around implant Clinical: pain, tenderness, fistula formation or swelling	

Cement-induced Peri-Implant disease:

- **81% Peri-implant disease associated with excess dental cement**
- **74% resolved with excess removal**
- **Excess cement associated with peri-implant disease should be removed by whatever methods necessary**
- **Surgical justification**

Treatment Options:

Non-surgical Tx

Surgical-nonregenerative

Surgical-regenerative

Implant removal

Laser surgery

MAINTENANCE:

Probing

- 9 months post implant placement
- Every 6 months
- Plastic-coated probes?

Maintenance program:

- After successful treatment, tailor program to patient needs
- Examination, reevaluation, diagnosis of problems
- *PROBE IMPLANTS
- Factors of success include:
 - Motivation
 - Oral Hygiene education
 - Instrumentation (enough time for appt)
- Treat infected sites immediately
- Determine interval based upon:
 - -Risk factors
 - -Systemic health
 - -Home care effectiveness
 - -Motivation
 - -Local factors
- Do not let insurance dictate maintenance protocol
- If patients NEED to be seen every 3 or 2 months, then they MUST come that often
- Antimicrobials: Chlorhexidine
- Phenolic compounds
- Cetylpyridium Chloride
- Sodium Hypochlorite (dilute) rinse

Hypochlorite dilute rinse:

- Dilution of regular Clorox bleach
- Mix 2 teaspoon bleach + 8oz water.
- Rinse 30 sec and spit out

*for pts intolerant of CHX, CPC, Listerine

- *"Low cost periodontal therapy"* , Jorgen Slots, Periodontology 2000, vol. 60, 2012, pp. 110-137.

Home Care:

- Toothbrushes
- Tufted brushes
- Floss
- Interdental brushes
- Antimicrobials
- Oral irrigators
- Tongue Scrapers

Povidone Iodine:

- Povidone Iodine
 - Rosling et al. 1986

- Christersson et al. 1988
- Rosline et al. 2001

Cost effective for SRP and maintenance only (not at home)

Buy generic povidone iodine, dilute 1:3 for ultrasonic or 1:2 for syringe

*use adequate suction

*Not for thyroid disease patients

- Metallic ultrasonic, sonic scalers = detrimental
- Stainless steel tipped instruments = detrimental
- Ultrasonic Plastic/rubber sleeves = safe
- Air polishers = safe
- Non-metallic: plastic, graphite, nylon, Teflon, titanium scalers = safe
- Rubber cup, points, untufted rotary brushes (light pumice) = safe