

**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 1<sup>st</sup> 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										
<b>Periodontal Health, Gingival Diseases and Conditions</b> Chapple, Mealey, et al. 2018 Consensus Rept <a href="#">link</a> Trombelli et al. 2018 Case Definitions <a href="#">link</a>			<b>Periodontitis</b> Papapanou, Sanz et al. 2018 Consensus Rept <a href="#">link</a> Jepsen, Caton et al. 2018 Consensus Rept <a href="#">link</a> Tonetti, Greenwell, Kornman. 2018 Case Definitions <a href="#">link</a>				<b>Other Conditions Affecting the Periodontium</b> Jepsen, Caton et al. 2018 Consensus Rept <a href="#">link</a> Papapanou, Sanz et al. 2018 Consensus Rept <a href="#">link</a>			
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 <a href="#">link</a>										
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  $\geq 3$  mm and/or probing depths  $\geq 6$  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 Lasers Removal of implant
Others (such as retrograde peri-implantitis)	Variable perimucosal inflammation Radiographically: periapical lesion around implant Clinical: pain, tenderness, fistula formation or swelling	Surgical reentry and revision or removal of implant

#### 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