2017 World Workshop
A new classification scheme for periodontal and peri-implant diseases and conditions


Jeffery Johnston, DDS, MS
History of Periodontitis Etiology

“Those who don’t know history are destined to repeat it”. (Burke 1729 - 1797)

- Emphasis on Plaque (WD Miller 1876)
- Emphasis on Calculus (GV Black 1886, Riggs 1890)
- Emphasis on Bone/Occlusion (Kyroli Effect)
- Emphasis on the Gingiva (Kronfeld 1935, Waerhaug)
- Emphasis on Plaque (Loe 1965)
1999 AAP Periodontal Disease Classification

- Gingival Diseases
- Chronic Periodontitis
- Aggressive Periodontitis
- Periodontitis as a Manifestation of Systemic Disease
- Necrotizing Periodontitis
- Abscess of the Periodontium
- Periodontitis Associated with Endodontic Lesions
- Developmental or Acquired Deformities and Conditions

Armatige, G 2001
Periodontitis Pathophysiology

1970’s Model

- Bacterial Plaque
- Calculus formation
- Periodontal Pocket Formation
- Bone Loss

Current Model

- Environmental and acquired risk factors
- Connective tissue and bone metabolism
- Clinical signs of disease initiation and progression

Microbial challenge
- Antibody
- PMNs
- Lipopolysaccharide
- Other virulence factors

Genetic risk factors
- Antigens
- Cytokines & prostanoids
- Matrix metallo-proteinases
Key Changes from 1999 Classification

• Clinical distinctions between presence of gingival inflammation and a true gingivitis case
• Clinical distinctions between a reduced periodontium in a non-periodontitis patient and a successfully treated periodontitis case
• Identification of three forms of periodontal disease based on pathophysiology:
  – Necrotizing periodontal diseases
  – Periodontitis as manifestation of systemic disease
  – Periodontitis
    • Replacement of the “chronic” and “aggressive” categorization of periodontitis with the classification of periodontitis dependent on severity, complexity, extent, distribution/pattern, and rate of progression are defined within the staging and grading System
  – Classification of periodontitis as a manifestation of systemic disease and other conditions affecting the supporting periodontal tissues that are not dental plaque biofilm-induced based on the primary systemic disease.
  – A new classification of gingival recession combining interproximal attachment loss, gingival phenotype, ability to identify CEJ, and presence or absence of root concavity
  – Replacement of the term biologic width with supracrestal attached tissues
  – Introduction of a much needed and universally agreed upon classification of peri-implant health and peri-implant diseases
AAP: A New Classification Scheme for Periodontal and Per-implant Disease

The complete proceedings can be found at: perio.org/2017wwdc
# Classification of Periodontal and Per-Implant Diseases and Conditions

## Periodontal Diseases and Conditions

<table>
<thead>
<tr>
<th>Periodontal Health and Gingival Diseases and Conditions</th>
<th>Other Conditions Affecting the Periodontium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peri-Implant Health</td>
<td>Systemic Diseases or Conditions Affecting the Periodontium</td>
</tr>
<tr>
<td>Peri-Implant Mucositis</td>
<td>Other Periodontal Diseases and Conditions:</td>
</tr>
<tr>
<td>Peri-Implantitis</td>
<td>Periodontal Abscesses and Endodontic-Periodontal Lesions</td>
</tr>
<tr>
<td>Periodontitis</td>
<td>Mucogingival Deformities and Conditions</td>
</tr>
<tr>
<td>Necrotizing Periodontal Diseases</td>
<td>Traumatic Occlusal Forces</td>
</tr>
<tr>
<td>Periodontitis as a Manifestation of Systemic Conditions</td>
<td>Tooth and Prosthesis Related Factors</td>
</tr>
<tr>
<td>Periodontitis</td>
<td></td>
</tr>
</tbody>
</table>

## Peri-Implant Disease and Conditions

<table>
<thead>
<tr>
<th>Peri-Implant Health</th>
<th>Peri-Implant Mucositis</th>
<th>Peri-Implantitis</th>
<th>Peri-Implant Soft and Hard Tissue Deficiencies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Periodontal Health and Gingival Diseases and Conditions
- **Gingivitis — Dental Biofilm Induced**
- **Gingival Diseases — Non-dental Biofilm Induced**

### Periodontitis
- **Necrotizing Periodontal Diseases**
- **Periodontitis as a Manifestation of Systemic Conditions**
- **Periodontitis**

### Other Conditions Affecting the Periodontium
- **Systemic Diseases or Conditions Affecting the Periodontium**
- **Other Periodontal Diseases and Conditions:**
  - Periodontal Abscesses and Endodontic-Periodontal Lesions
  - Mucogingival Deformities and Conditions
  - Traumatic Occlusal Forces
  - Tooth and Prosthesis Related Factors

### Mucogingival Deformities and Conditions

### Traumatic Occlusal Forces

### Tooth and Prosthesis Related Factors

### Periodontal and Gingival Health:
- **Gingivitis — Dental Biofilm Induced**
- **Gingival Diseases — Non-dental Biofilm Induced**
Periodontal Health and Gingival Diseases and Conditions

Periodontal and Gingival Health

- Clinical gingival health on an intact periodontium
- Clinical gingival health on a reduced periodontium
  - Stable periodontitis patient
  - Non-periodontitis patient

Periodontal and Gingival Health:

- Associated with dental biofilm alone
- Medicated by systemic or local risk factors
- Drug-influenced gingival enlargement

Gingival Diseases — Non-dental Biofilm Induced:

- Genetic/developmental disorders
- Specific infections
- Inflammatory and immune conditions
- Reactive processes
- Neoplasms
- Endocrine, nutritional and metabolic diseases
- Traumatic lesions
- Gingival pigmentation
<table>
<thead>
<tr>
<th>Intact periodontium</th>
<th>Health</th>
<th>Gingivitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probing attachment loss</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Probing pocket depths (assuming no pseudo pockets)</td>
<td>&lt; 3 mm</td>
<td>&lt; 3 mm</td>
</tr>
<tr>
<td>Bleeding on probing</td>
<td>&lt; 10%</td>
<td>Yes (&gt;10%)</td>
</tr>
<tr>
<td>Radiological bone loss</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Reduced periodontium Non-periodontitis patient</td>
<td>Health</td>
<td>Gingivitis</td>
</tr>
<tr>
<td>Probing attachment loss</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Probing pocket depths (all sites and assuming no pseudo pockets)</td>
<td>&lt; 3 mm</td>
<td>&lt; 3 mm</td>
</tr>
<tr>
<td>Bleeding on probing</td>
<td>&lt; 10%</td>
<td>Yes (&gt;10%)</td>
</tr>
<tr>
<td>Radiological bone loss</td>
<td>Possible</td>
<td>Possible</td>
</tr>
<tr>
<td>Successfully treated stable periodontitis patient</td>
<td>Health</td>
<td>Gingivitis with history of perio. dx</td>
</tr>
<tr>
<td>Probing attachment loss</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Probing pocket depths (all sites and assuming no pseudo pockets)</td>
<td>&lt; 4 mm (no site &gt; 4 mm with BOP)</td>
<td>&lt; 3 mm</td>
</tr>
<tr>
<td>Bleeding on probing</td>
<td>&lt; 10%</td>
<td>Yes (&gt;10%)</td>
</tr>
<tr>
<td>Radiological bone loss</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Periodontitis

Necrotizing Periodontal Diseases

• Necrotizing Gingivitis
• Necrotizing Periodontitis
• Necrotizing Stomatitis

Periodontitis as a Manifestation of Systemic Conditions:

Classification of these conditions should be based on the primary systemic disease according to the International Statistical Classification of Diseases and Related Health Problems (ICD) codes

Periodontitis:

• **Stages**: Based on Severity and Complexity of Management
  - Stage I: Initial Periodontitis
  - Stage II: Moderate Periodontitis
  - Stage III: Severe Periodontitis with potential for additional tooth loss
  - Stage IV: Severe Periodontitis with potential for loss of the dentition

• **Extent and distribution**: localized generalized; molar-incisor distribution

• **Grades**: Evidence or risk of rapid progression, anticipated treatment response
  - Grade A: Slow rate of progression
  - Grade B: Moderate rate of progression
  - Grade C: Rapid rate of progression
## Three Steps to Staging and Grading a Patient

### Step 1: Initial Case Overview to Assess Disease

**Screen:**
- Full mouth probing depths
- Full mouth radiographs
- Missing teeth

Mild to moderate periodontitis will typically be either Stage I or Stage II
Severe to very severe periodontitis will typically be either Stage III or Stage IV

### Step 2: Establish Stage

**For mild to moderate periodontitis (typically Stage I or Stage II):**
- Confirm clinical attachment loss (CAL)
- Rule out non-periodontitis causes of CAL (e.g., cervical restorations or caries, root fractures, CAL due to traumatic causes)
- Determine maximum CAL or radiographic bone loss (RBL)
- Confirm RBL patterns

**For moderate to severe periodontitis (typically Stage III or Stage IV):**
- Determine maximum CAL or RBL
- Confirm RBL patterns
- Assess tooth loss due to periodontitis
- Evaluate case complexity factors (e.g., severe CAL frequency, surgical challenges)

### Step 3: Establish Grade

- Calculate RBL (% of root length x 100) divided by age
- Assess risk factors (e.g., smoking, diabetes)
- Measure response to scaling and root planing and plaque control
- Assess expected rate of bone loss
- Conduct detailed risk assessment
- Account for medical and systemic inflammatory considerations
PERIODONTITIS: STAGING

Staging intends to classify the severity and extent of a patient's disease based on the measurable amount of destroyed and/or damaged tissue as a result of periodontitis and to assess the specific factors that may attribute to the complexity of long-term care management.

Initial stage should be determined using clinical attachment loss (CAL). If CAL is not available, radiographic bone loss (RBL) should be used. Tooth loss due to periodontitis may modify stage definition. One or more complexity factors may shift the stage to a higher level. See perio.org/2017/wrde for additional information.

<table>
<thead>
<tr>
<th>Severity</th>
<th>Periodontitis</th>
<th>Stage I</th>
<th>Stage II</th>
<th>Stage III</th>
<th>Stage IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interdental CAL (at site of greatest loss)</td>
<td>1 – 2 mm</td>
<td>3 – 4 mm</td>
<td>≥5 mm</td>
<td>≥5 mm</td>
<td></td>
</tr>
<tr>
<td>RBL</td>
<td>Coronal third (&lt;15%)</td>
<td>Coronal third (15% - 33%)</td>
<td>Extending to middle third of root and beyond</td>
<td>Extending to middle third of root and beyond</td>
<td></td>
</tr>
<tr>
<td>Tooth loss (due to periodontitis)</td>
<td>No tooth loss</td>
<td>≤4 teeth</td>
<td>≥5 teeth</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Complexity**

- **Local**
  - Max. probing depth ≤4 mm
  - Mostly horizontal bone loss
- **Complexity**
  - In addition to Stage II complexity:
    - Probing depths ≥6 mm
    - Vertical bone loss ≥3 mm
    - Furcation involvement Class II or III
    - Moderate ridge defects

**Extent and distribution**

- Add to stage as descriptor:
  - For each stage, describe extent as:
    - Localized (<30% of teeth involved);
    - Generalized; or
    - Molar/incisor pattern

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DELTA DENTAL
Staging of periodontitis

**Stage I (initial)**
(minimal bone loss and pocketing-no previous tooth loss from periodontal disease)

**Stage II (moderate)**
(maximum bone loss <33 % ; PD < 6 mm-no previous tooth loss from periodontal disease)
Staging of periodontitis

**Stage III**
(bone loss < 33 %; PD > 5 mm class II/III furcations. < 5 teeth lost due to periodontal disease)

**Stage IV**
(bone loss > 33 %; PD > 5 mm class II/III furcations. > 4 teeth lost due to periodontal disease)
PERIODONTITIS: STAGING

Staging intends to classify the severity and extent of a patient's disease based on the measurable amount of destroyed and/or damaged tissue as a result of periodontitis and to assess the specific factors that may attribute to the complexity of long-term care management.

Initial stage should be determined using clinical attachment loss (CAL). If CAL is not available, radiographic bone loss (RBL) should be used. Tooth loss due to periodontitis may modify stage definition. One or more complexity factors may shift the stage to a higher level. See peri.org/2017wwdc for additional information.

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<tr>
<td>Interdental CAL</td>
<td>1 – 2 mm</td>
<td>3 – 4 mm</td>
<td>≥5 mm</td>
<td>≥5 mm</td>
</tr>
<tr>
<td>(at site of greatest loss)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RBL</td>
<td>Coronal third (&lt;15%)</td>
<td>Coronal third (15% - 30%)</td>
<td>Extending to middle third of root and beyond</td>
<td>Extending to middle third of root and beyond</td>
</tr>
<tr>
<td>Tooth loss</td>
<td>No tooth loss</td>
<td>≤4 teeth</td>
<td>≥5 teeth</td>
<td></td>
</tr>
<tr>
<td>(due to periodontitis)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Complexity</th>
<th>Stage I</th>
<th>Stage II</th>
<th>Stage III</th>
<th>Stage IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>Max. probing depth ≤4 mm</td>
<td>Max. probing depth ≤5 mm</td>
<td>In addition to Stage II complexity:</td>
<td>In addition to Stage III complexity:</td>
</tr>
<tr>
<td></td>
<td>Mostly horizontal bone loss</td>
<td>Mostly horizontal bone loss</td>
<td>• Probing depths ≥6 mm</td>
<td>• Need for complex rehabilitation due to:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>In addition to Stage II complexity:</td>
<td>- Masticatory dysfunction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Vertical bone loss ≥3 mm</td>
<td>- Secondary occlusal trauma (tooth mobility degree ≥2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Furcation involvement Class II or III</td>
<td>- Severe ridge defects</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Moderate ridge defects</td>
<td>- Bite collapse, drifting, flaring</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt; 20 remaining teeth</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(10 opposing pairs)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Extent and distribution</th>
<th>Add to stage as descriptor</th>
<th>For each stage, describe extent as:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• Localized (&lt;30% of teeth involved);</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Generalized; or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Molar/incisor pattern</td>
</tr>
</tbody>
</table>
## PERIODONTITIS: GRADING

Grading aims to indicate the rate of periodontitis progression, responsiveness to standard therapy, and potential impact on systemic health. Clinicians should initially assume grade B disease and seek specific evidence to shift to grade A or C. See perio.org/2017wwdc for additional information.

<table>
<thead>
<tr>
<th>Progression</th>
<th>Grade A: Slow rate</th>
<th>Grade B: Moderate rate</th>
<th>Grade C: Rapid rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary criteria</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct evidence of progression</td>
<td>No loss over 5 years</td>
<td>&lt;2 mm over 5 years</td>
<td>≥2 mm over 5 years</td>
</tr>
<tr>
<td>Indirect evidence of progression</td>
<td>&lt;0.25</td>
<td>0.25 to 1.0</td>
<td>&gt;1.0</td>
</tr>
<tr>
<td>Case phenotype</td>
<td>Heavy biofilm deposits with low levels of destruction</td>
<td>Destruction commensurate with biofilm deposits</td>
<td>Destruction exceeds expectations given biofilm deposits; specific clinical patterns suggestive of periods of rapid progression and/or early onset disease</td>
</tr>
<tr>
<td><strong>Grade modifiers</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk factors</td>
<td>Smoking</td>
<td>Non-smoker</td>
<td>≥10 cigarettes/day</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Normoglycemic/no diagnosis of diabetes</td>
<td>HbA1c &lt;7.0% in patients with diabetes</td>
<td>HbA1c ≥7.0% in patients with diabetes</td>
</tr>
</tbody>
</table>
Other Conditions Affecting the Periodontium

Systemic Diseases or Conditions Affecting the Periodontium

Other Periodontal Conditions

- Periodontal Abscesses
- Endodontic-Periodontal Lesions

Mucogingival Deformities and Conditions around teeth

- Gingival phenotype
- Gingival/soft tissue recession
- Lack of gingiva
- Decreased vestibular depth
- Aberrant frenum/muscle position
- Gingival excess
- Abnormal color
- Condition of the exposed root surface

Traumatic Occlusal Forces

- Primary occlusal trauma
- Secondary occlusal trauma
- Orthodontic forces

Prostheses and Tooth-Related Factors that Modify or Predispose to Plaque-induced Gingival Diseases/Periodontitis

- Localized tooth-related factors
- Localized dental protheses-related factors
### Classification of Periodontal Abscesses Based on the Etiologic Factors Involved

<table>
<thead>
<tr>
<th>Periodontal abscesses in periodontitis patients (in a pre-existing periodontal pocket)</th>
<th>Acute Exacerbation</th>
<th>After Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated Periodontitis</td>
<td>Non-responsive to therapy periodontitis</td>
<td>Supportive periodontal therapy</td>
</tr>
<tr>
<td>Post-scaling</td>
<td>Post-Surgery</td>
<td>Systemic antimicrobials</td>
</tr>
<tr>
<td>Post-medication</td>
<td>Other drugs: nifedipine</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Periodontal abscesses in non-periodontitis patients (not mandatory to have a pre-existing periodontal pocket)</th>
<th>Impaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental floss, orthodontic elastic, toothpick, rubber dam, or popcorn hulls</td>
<td></td>
</tr>
<tr>
<td>Harmful habits</td>
<td>Wire or nail biting and clenching</td>
</tr>
</tbody>
</table>

| Orthodontic factors | Orthodontic forces or a cross bite |

<table>
<thead>
<tr>
<th>Gingival Overgrowth</th>
<th>Alteration of root surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe Anatomic alterations</td>
<td>Invaginated tooth, dens evaginatus or odontodyplasia</td>
</tr>
<tr>
<td>Minor anatomic alterations</td>
<td>Cement tears, enamel pearls, or developmental grooves</td>
</tr>
<tr>
<td>Iatrogenic conditions</td>
<td>Perforations</td>
</tr>
<tr>
<td>Severe root damage</td>
<td>Fissure or fracture cracked tooth syndrome</td>
</tr>
<tr>
<td>External root resorption</td>
<td></td>
</tr>
</tbody>
</table>
Endo-Periodontal Lesions

Endo-Periodontal Lesions with Root Damage

- Root fracture
- Root canal or pulp chamber perforation
- External root resorption

Endo-Periodontal Lesions without root damage

In Periodontitis Patients

- Grade 1: narrow deep periodontal pocket in one tooth surface
- Grade 2: wide deep periodontal pocket in 1 tooth surface
- Grade 3: deep periodontal pockets in > 1 tooth surface

In Non-Periodontitis Patients

- Grade 1: narrow deep periodontal pocket in one tooth surface
- Grade 2: wide deep periodontal pocket in 1 tooth surface
- Grade 3: deep periodontal pockets in > 1 tooth surface
Peri-Implant Disease and Conditions

Peri-Implant Health
Peri-Implant Mucositis
Peri-Implantitis
Peri-Implant Soft and Hard Tissue Deficiencies
## Peri-implant Health and Peri-implant Diseases

<table>
<thead>
<tr>
<th>Clinical Signs of Inflammation</th>
<th>Peri-Implant Health</th>
<th>Peri-Implant Mucositis</th>
<th>Peri-Implantitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of Previous Examination</td>
<td>+/-</td>
<td>+/-</td>
<td>+/-</td>
</tr>
<tr>
<td>Absence of Previous Examination</td>
<td>+/-</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bleeding on Probing/Suppuration</th>
<th>Peri-Implant Health</th>
<th>Peri-Implant Mucositis</th>
<th>Peri-Implantitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of Previous Examination</td>
<td>+/-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Absence of Previous Examination</td>
<td>+/-</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Increase in Probing Depth Compared to Previous visits</th>
<th>Peri-Implant Health</th>
<th>Peri-Implant Mucositis</th>
<th>Peri-Implantitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of Previous Examination</td>
<td>+/-</td>
<td>+/-</td>
<td>+</td>
</tr>
<tr>
<td>Absence of Previous Examination</td>
<td>+/-</td>
<td>+</td>
<td>Probing Depth &gt; 6mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bone Loss Beyond the Initial Remodeling</th>
<th>Peri-Implant Health</th>
<th>Peri-Implant Mucositis</th>
<th>Peri-Implantitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of Previous Examination</td>
<td>- (no BL &lt; 2mm)</td>
<td>- (no BL &lt; 2mm)</td>
<td>+</td>
</tr>
<tr>
<td>Absence of Previous Examination</td>
<td>+ (no BL &gt; 2mm)</td>
<td></td>
<td>&gt; 3mm from the most coronal part of the intraosseous portion of the implant</td>
</tr>
</tbody>
</table>
New Vocabulary

• Periodontal biotype → Periodontal phenotype
• Excessive occlusal force → Traumatic occlusal force
• Biologic width → Supracrestal tissue attachment
• Chronic periodontitis, aggressive periodontitis → periodontitis
Download the AAP Paper and Classification

Questions?