Periodontal Diagnosis and Classification

David R Reeves DMD, MS, BS
Diplomate of the American Board of Periodontology

Guidelines For Periodontal Therapy

• Periodontics deals with diagnosis, treatment and prevention of pathologic conditions which affect supporting structures of teeth and implants
• Several forms of periodontal disease
• Goal is to maintain the patient’s dentition in health, function, and comfort

Epidemiology of Periodontal Diseases

• Prevalence of Stage 3 or 4 periodontitis ranges from 5-20%
• Stage 1 or 2 periodontitis affects majority of adults (50% age 30, 70% at age 65)
• Prevalence of gingivitis has reduced overall
• Some studies show periodontitis may have been underestimated by 50% or more in the past.


Classification Information

• Communicate clinical findings accurately and universally to other dental healthcare providers
• Present information to patients about their disease status
• Formulate individualized treatment plans
• Predict treatment outcomes

AAP Classification

• In 2017, an international workshop adopted a new classification system for periodontal diseases and conditions.
• This classification was developed by the American Academy of Periodontology (AAP).

Why Was Change Indicated?

• New research revealed numerous inaccuracies in earlier postulates
  – No specific microbial patterns between different diseases
  – No consistent differences in immune responses
  – No difference in gene expression between specifically chronic and aggressive periodontitis
Old Classification System

- Based solely on clinical presentation
  - Extent and severity
- Failed to capture important biological dimensions of the disease
  - History of progression/risk for further progression
  - Presence/control of risk factors
  - Case complexity
  - Anticipated treatment outcomes
  - Effects of periodontitis or its treatment on general health

Prior and new evidence indicates that patients may be on a variable disease path

- Most respond favorably to standard treatment and maintenance protocols some respond LESS predictably or poorly

Past Terminology Examples

- *Early onset periodontitis* (1989) was called *aggressive periodontitis* (1999) but now just periodontitis.
- Journal articles written prior to the publication of 2017 classification will use the term *early onset periodontitis or aggressive periodontitis*.
- Many classic studies in the dental literature that are still important today refer to older nomenclature
Three Basic States of Periodontium

- Health
- Gingivitis
- Periodontitis

Levels of Periodontal Health

- Pristine periodontal health
  - Total absence of clinical inflammation and normal support
  - Not likely to be observed clinically
- Clinical periodontal health
- Periodontal disease stability in reduced periodontium
- Periodontal disease remission/control in reduced periodontium
Healthy Periodontium

Gingivitis

Gingival Diseases

• Two basic types:
  – Dental biofilm-induced gingivitis
  – Non-biofilm-induced gingival diseases
**Dental Biofilm Induced Gingivitis**

- Associated with bacterial dental biofilm only
- Potential modifying factors of plaque-induced gingivitis
  - Systemic conditions
    - Sex steroid hormones
      - Puberty
      - Menstrual cycle
      - Pregnancy
    - Oral contraceptives
    - Hyperglycemia
    - Leukemia
    - Smoking
    - Malnutrition
  - Oral factors enhancing plaque accumulation
    - Prominent subgingival restoration margins
    - Hyposalivation/xerostomia
- Drug-influenced gingival enlargements

**Gingivitis**

- Localized
  - < 30% of TEETH affected
- Generalized
  - > 30% of TEETH affected

**Gingivitis Associated with Dental Biofilm Only**

- Most common form
- Plaque at gingival margin
- Redness, tenderness
- Swollen margins
- Bleeding upon probing
  - Damage reversible with good patient self-care
  - No attachment loss in the gingivitis
- Radiographs reveal no changes in the height of bone or character of the bone.
Drug Induced Gingival Overgrowth (DIGO)

- Plaque accumulation is not necessary for initiation of gingival enlargement, but it will exacerbate the gingival disease.
- Meticulous plaque control can reduce but will not eliminate gingival overgrowth.
- Type of drugs that precipitate
  - Ca\(^{2+}\) channel blockers
    - Nifedipine, Felodipine, Amlodipine, Diltiazem, Isradipine, Nicardipine, Nimodipine, Nisoldpine, Verapamil
  - Cyclosporin, Dilantin, etc.

Non-biofilm Induced Gingival Diseases and Conditions
- Genetic origin – Hereditary Gingival Fibromatosis
- Specific infections
- Inflammatory & immune conditions and lesion
- Reactive processes
- Neoplasms
- Endocrine, nutritional and metabolic disease
- Traumatic lesions
- Gingival pigmentation
Lesion of Genetic Origin
- Hereditary gingival fibromatosis

Bacterial Origin Gingival Lesions
- Neisseria gonorrhea
- Treponema pallidum
- Streptococcal
- Mycobacterial infection

  • Referral to physician for treatment and follow up gingival lesions subsequently

Viral Origin Lesions
- Coxsackie virus (hand-foot-mouth disease)
- Herpes simplex (HSV1 and HSV2)
- Varicella-zoster
- Molluscum contagiosum virus
- HPV
  - Squamous cell papilloma, condyloma acuminatum, verruca vulgaris, and focal epithelial hyperplasia
Primary Herpetic Gingivostomatitis

- Primary herpetic gingivostomatitis—the initial oral infection with the herpes simplex type-1 virus (HSV-1)
- Characterized by redness and multiple vesicles (tiny fluid-filled blisters) that easily rupture to form painful ulcers
- Usually affects infants and young children but may affect young adults
Inflammatory & Immune Conditions

- Allergic reactions
  - Contact allergy
  - Plasma cell gingivitis
  - Erythema multiforme
- Mucocutaneous disorders
  - Lichen planus
  - Pemphigoid
  - Pemphigus vulgaris
  - Erythema multiforme
  - Lupus erythematosus
  - Drug-induced

Allergic Reaction to Toothpaste

- Reaction to additive in toothpaste
- Most common in those with history of other allergies
- Tissue sloughing of mucosa

Lichen Planus

- Disease of the skin and mucous membranes
- Characterized by an itchy, swollen rash on the skin or in the mouth
- Exact cause unknown
- May be an allergic or immune reaction
Oral Lichen Planus

- Intense redness of the gingiva
- Ulcerations
- Interlacing white lines may be present.
- Raised white lesions may be present.

Pemphigus Vulgaris

- Rare autoimmune disease that causes painful blistering on the skin and mucous membranes
- Immune system mistakenly attacks patient’s healthy tissues
- Pemphigus vulgaris is the most common type of a group of autoimmune disorders called pemphigus.

Mucocutaneous Disorders

- If don’t respond to traditional steroid therapy then biopsy
  - Formalin
  - Michel’s solution
Pemphigoid

- Cicatricial pemphigoid also known as benign mucous membrane pemphigoid (BMMP) is a rare chronic autoimmune subepithelial blistering disease characterized by erosive skin lesions of the mucous membranes and skin.

Reactive processes

- Epulides
- Fibrous epulis
- Pyogenic granuloma
- Peripheral giant cell granuloma
- Central giant cell granuloma

Pregnancy-Associated Pyogenic Granuloma (“Pregnancy Tumor”)

- A localized mushroom-shaped gingival mass projecting from the gingival margin or gingival papilla during pregnancy.
Pyogenic Granuloma

- It is a mushroom-like growth.
- It is more common in the maxilla and in gingival papillae.
- Growths are not cancerous.
- Growths are usually not painful.
- There is an exaggerated response to an irritation.
- Growth bleeds easily if disturbed.
- Growth usually regresses after giving birth.

Neoplasms

- Premalignant
  - Leukoplakia
  - Erythroplakia
- Malignant
  - Squamous cell carcinoma
  - Leukemia
  - Lymphoma

Traumatic Lesions

- These could be factitious, iatrogenic, or accidental
  - Physical injury
  - Chemical injury
  - Thermal injury
Gingival Pigmentation

- Race pigmentation
- Smoker’s melanosis
- Drug-induced pigmentation
  - Anti-malarials
  - Minocycline
  - Amalgam tattoo

Is it Health, Gingivitis, or Periodontitis?

Periodontitis

- Number 1 cause of tooth loss in adults
  - 50% of adults over 30
- Is a bacterial infection
- Is multi-factorial
- Causes progressive destruction of the periodontal ligament
- Gradual loss of supporting alveolar bone
Periodontitis

- Purplish, red, or pale pink tissue color
- Swollen or fibrotic margin
- Papillae do not fill embrasure spaces
- Bleeding upon gentle probing, may be pus
- Probe depths $\geq 4$ mm because of apical migration of JE
- Bone loss

Patient Complaints

- Red, swollen gingiva
- Bleeding during brushing
- Bad taste in mouth
- Bad breath
- Sensitive teeth
- Loose teeth
- Pus

Clinical Attachment Loss

- Attachment loss—the migration of the attachment apparatus apical to the level of the CEJ due to the destruction of the fibers and bone that supports the teeth
New Classification System

- Should encompass 3 dimensions:
  - Definition of a periodontitis case based on detectable CAL loss at two non-adjacent teeth
  - Identification of the form of periodontitis: necrotizing periodontitis, periodontitis as a manifestation of systemic disease or periodontitis
  - Description of the presentation and aggressiveness of the disease by stage and grade

Types of Periodontitis

- Periodontitis
- Necrotizing periodontal diseases
- Periodontitis as manifestation of systemic diseases

Periodontitis

- A patient is a periodontitis case in the context of clinical care if:
  - Interdental CAL is detectable at 2 or more non-adjacent teeth
  - Buccal or oral CAL ≥3 mm with pocketing ≥3 mm is detectable at 2 or more teeth
Periodontitis

- And the observed CAL cannot be ascribed to non-periodontal causes such as:
  - 1) Gingival recession of traumatic origin;
  - 2) Dental caries extending in the cervical area of the tooth
  - 3) The presence of CAL on the distal aspect of a second molar and associated with malposition or extraction of a third molar
  - 4) An endodontic lesion draining through the marginal periodontium

Other Conditions Affecting the Periodontium

- Systemic diseases or conditions affecting the periodontal supporting tissues
- Periodontal and Endodontic-Periodontal Lesions
- Mucogingival deformities and conditions
- Traumatic occlusal forces
- Tooth and prosthesis related factors

Ground Rules for Staging

- Establish seriousness/extent of the disease determined by rate of disease progression over time
- Defined on basis of most severe finding
- Defined on patient level NOT individual tooth level
- Assigned before treatment and typically doesn’t revert to lesser after therapy but can advance
- Deliberate process that necessitates holistic evaluation of multiple findings
Ground Rules for Grading

- Primarily defined on basis of observed or inferred rate of periodontitis progression
- Heavily influenced by presence and/or control of risk factors that influence further progression and treatment outcomes
- May revert to a lower level after therapy if risk profile improves significantly and sustainably
- When unsure assign Grade B and modify as risk profile becomes clearer

Stage 1 Periodontitis

- Borderline between gingivitis and periodontitis and represents early stages of attachment loss
- If show CAL at an early age may have increased susceptibility to disease onset.
- May require more than probing to diagnose
  - Salivary biomarker testing
  - New imaging technology

Stage II Periodontitis

- Established periodontitis with damage
- Management remains simpler
  - Remove bacteria and monitor
  - SC/RSD plus regular maintenance/recare
- Response to treatment critical and grading helps to determine long term outcomes
Stage III Periodontitis

• Significant damage present
• Without treatment tooth loss may occur
• Deep periodontal lesions extending to the mid-root and where management is complicated by deep intrabony defects, furcation involvement, history of tooth loss, defects that complicate implant tooth replacement

Stage IV Periodontitis

• Considerable damage has occurred, and significant tooth loss may occur with loss of function
• Without treatment dentition at risk of being lost
• Deep periodontal lesions extending to the apical portion of the root and history of multiple tooth loss
• Hypermobility frequently present

Grade of Periodontitis

• Disease progresses at different rates for different patients
• May respond less predictably for some patients
• May or may not influence systemic health
• Pathophysiology same for all forms of periodontitis
• Risk factors play a big role in progression rates
### Staging and Grading Periodontitis

**PERIODONTITIS: STAGING**

Staging periodontitis involves the grading and extent of the disease based on the severity and extent of the damage caused. This classification is used to guide treatment planning.

<table>
<thead>
<tr>
<th>Periodontitis</th>
<th>Stage I</th>
<th>Stage II</th>
<th>Stage III</th>
<th>Stage IV</th>
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</thead>
<tbody>
<tr>
<td>Activity</td>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
<td>Very High</td>
</tr>
<tr>
<td>Extent and distribution</td>
<td>Localized</td>
<td>Periodontal pocketing</td>
<td>Generalized</td>
<td>Severe generalized</td>
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<tr>
<td>Outcome</td>
<td>Recovery</td>
<td>Stability</td>
<td>Progression</td>
<td>Severe progression</td>
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#### FAQ

**FAQ**

- What are the common signs and symptoms of periodontitis?
- How is periodontitis treated?
- Is periodontitis preventable?
- How is periodontitis staged and graded?
Attachment Levels

- Loss of attachment (LOA)
  - Best indicator of historical damage to the periodontium
  - Measured by consecutive recordings over time of clinical attachment levels (CAL)
  - CAL (clinical attachment level)
    - Probing depth, Gingival margin to CEJ
    - PD + (GM to CEJ) = CAL

Clinical Attachment Level

- CAL = PD + CEJ to GM (recession)
- CAL = PD - CEJ to GM (normality)
- GM → CEJ, PD=2
- CAL = 0
- CAL = 7

Phases of Passive Eruption

Gottlieb and Orban
Diagnosis

- Clinical findings
  - Necrosis and ulceration of interdental papilla
  - “Punched out papilla”
  - Gingival bleeding
  - Pain
  - Pseudomembrane formation
  - Significant malodor
  - Lymphadenopathy and fever when systemic
  - Malaise when systemic

Necrotizing Periodontal Disease

- NUG and NUP may represent different stages of the disease
- Patients often susceptible to future recurrence
- Prevalence/incidence of NPD 0.51-3.3%
- Higher in military personnel
- Infectious conditions but must have susceptible host

Necrotizing Periodontal Diseases

- Necrotizing ulcerative gingivitis (NUG)
  - Not always HIV/AIDS related
- Necrotizing ulcerative periodontitis (NUP)
  - Usually HIV/AIDS related
- NUG is an acute infection of the gingiva. Once NUG has progressed to cause attachment loss it is referred to as NUP
Alternate Terminology

- Trench mouth (soldiers in WWI)
- Vincent infection
- Acute necrotizing ulcerative gingivitis (ANUG)
- Necrotizing ulcerative gingivostomatitis

Predisposing Factors for NPD

- Systemic diseases which impair immunity
- Poor oral self-care
- Emotional stress
- Inadequate sleep, fatigue
- Tobacco and alcohol use
- Caucasian background
- Poor nutrition, low protein intake

Systemic Diseases and Conditions That Affect Periodontium

- Genetic disorders
  - Diseases associated with immunologic disorders
  - Diseases affecting oral mucosa and gingival tissues
  - Diseases affecting connective tissues
  - Metabolic and endocrine disorders
- Acquired immunodeficiency diseases
- Inflammatory diseases
- Other systemic disorders that influence the pathogenesis of periodontal diseases
Diseases Associated With Immunologic Disorders

- Down syndrome
- Leukocyte adhesion deficiency
- Papillon-Lefevre syndrome
- Haim-Munk syndrome
- Chediak-Higashi syndrome
- Severe neutropenia
  - Congenital neutropenia
  - Cyclic neutropenia
- Primary immunodeficiency diseases
  - Chronic granulomatous disease
  - Hyperimmunoglobulin E syndromes
- Cohen syndrome

Diseases Affecting Connective Tissues

- Ehlers-Danlos syndrome
- Angioedema
- Systemic lupus erythematosus

Metabolic And Endocrine Disorders

- Glycogen storage disease
- Gaucher disease
- Hypophosphatasia
- Hypophosphatemic rickets
- Hajdu-Cheney syndrome
- Diabetes mellitus
- Obesity
- Osteoporosis
Acquired Immunodeficiency Diseases

- Acquired neutropenia
  - Drugs
- HIV infection
- AIDS

Linear Gingival Erythema (LGE)

- A gingival manifestation of immunosuppression
- Clinical appearance—a distinct linear red band that is limited to the free gingiva
- Does NOT respond well to improved self-care or periodontal instrumentation
Other Disorders that Influence Periodontal Diseases

- Multi factorial considerations:
  - Emotional stress
  - Depression
  - Smoking (nicotine dependence)
  - Medications

Developmental or Acquired Deformities and Conditions

- Localized tooth-related factors
  - Anatomic factors, restorations, fractures, tears
- Mucogingival deformities and conditions
  - Recession, lack of keratinized gingiva (< 2 mm keratinized, 1 mm attached), decreased vestibular depth, aberrant frenum/muscle position, gingival excess, abnormal color
- Occlusal trauma
  - Primary
  - Secondary

Localized Tooth-related Factors
Possible Causes Of Recession

- Malposition
- Periodontal disease
- Trauma
  - Toothbrush
  - Tobacco
- Orthodontics
- Prosthetics

Gingival Recession
Free Tissue Allograft

AlloDerm
Autologous dermal graft for tissue transplantation
Facts About Occlusal Trauma

- Occlusal trauma and excessive occlusal forces DO NOT initiate periodontitis
- With plaque induced periodontitis and occlusal trauma accelerated attachment loss may occur
- Occlusal therapy helps decrease mobility
- Abrasion does not cause gingival recession

Signs and Symptoms of Occlusal Trauma

- Widening of PDL
- Vertical destruction of interdental septum
- Radiolucency and condensation of alveolar bone
- Root resorption
- Mobility
- Discomfort
Abscesses of the Periodontium

• Gingival abscess
• Periodontal abscess
• Odontogenic
  – Pericoronal abscess

Gingival Abscess

• Involves only gingival tissues
• Etiology
  – Toothbrush bristle
  – Popcorn hull
• Treatment
  – Scale and irrigate to remove etiology
  – Monitor for healing

Periodontal Abscess

• An acute lesion characterized by localized accumulation of pus within the gingival wall of the periodontal pocket/sulcus, rapid tissue destruction and are associated with risk for systemic dissemination.
Periodontal Abscess

- Treatment
  - Scale and root debridement or possibly extraction
  - Local chemotherapy?
  - Systemic chemotherapy
    - Lymphadenopathy
    - Fever
    - Other systemic involvement
    - Amoxicillin 500 mg tid X 30 + Metronidazole 250 mg tid X 30

Pericoronal Abscess

- More now considered an odontogenic abscess
- Common in younger populations
- Treatment options
  - Extract opposing tooth
  - Irrigation
  - Extract tooth in question if no worry of systemic involvement/infection
  - Occlusal adjustment
    - Opposing tooth
  - Antibiotics if systemic involvement

Endodontic-periodontal Lesions

- Pathological communication between the pulpal and periodontal tissues at a given tooth, occur in either an acute or a chronic form, and are classified according to signs and symptoms that have direct impact on their prognosis and treatment
Treatment of Endo-Perio

- All categories except primary perio
  - Treat endo first
  - Allow 4-6 months healing
  - Re-assess perio for possible therapy
- Rationale
  - Don’t want to disturb attached Sharpey’s fibers
  - Don’t want necrotic debris in area to regenerate

Peri-Implant Diseases and Conditions

- Peri-implant health
- Peri-implant mucositis
- Peri-implantitis
  - Smoking and uncontrolled diabetes may increase chance of implantitis
  - Retained cement
- Peri-implant soft and hard tissue deficiencies
  - Lack of peri-implant keratinized mucosa and position of implant may contribute

Periodontal comprehensive evaluation

- PFS – plaque free surfaces; OFD – open flap debridement; BOP – bleeding on probing
Systemic Links

• Why is treatment of periodontitis important?
• Links between systemic disease and periodontitis increasing yearly.

H5455

• 36 year old African American female
• SFC in the Army just returned from deployment
• Smokes 1 ppd for 20 years
• SC/RSD few years back but no maintenance
• History of Thalassemia minor
• Tx plan?
Generalized Stage 4 Grade C Periodontitis
2LT Jane Doe

- 24 year old African American
- Just entered Army and no care in over a decade and then only emergencies
- Probing depths range from 1-14 mm
- No risk factors present except biofilm
- Non-smoker; BMI = 18; A1C = 5.5
- Several teeth lost because of “bad gums” like her mom
Generalized Stage 4 Grade C Periodontitis

What now? Referral?

- Plaque control dependent
- Finances dependent
- DOCUMENT recommendation
- Practice doctor skill dependent
Why Do Surgery??

• Gain access to roots
• Regenerate deeper areas
• Decrease probing depths
  – Patient can clean at home
  – Hygienist can predictably access and manage
Sally Subgingival

- 46 year old female had #32 removed 2 decades ago.
- Distal #31 8 mm probing depth but all other probing depths 1-2 mm
- No pertinent medical history/risk factors
Sylvia Sillyness

Sylvia

- 40 year old African-American
- Limited access to dental care in the past
- Smokes 1 pack/day
- Diabetic with A1C of 8.5%
- Lost a couple of teeth because of “gums”
- Wisdom teeth extracted at age 21 with parents’ dental insurance
Generalized Stage III Grade C Periodontitis

- More than 30% of teeth involved
- Probing depths range from 1-12 mm
- Risk factors present
- Less than 4 teeth lost because of periodontal disease including #31

Perkins

- 32 year old Asian female
- Smokes 12 cigarettes/day
- Meds only for hypertension and cholesterol
- Lost teeth because of “bad gums”
Generalized Stage 3 Grade C Periodontitis

Harry Happy

- 62 year old retired veteran
- Hasn’t had regular care but only emergency care since military retirement
- Lost some teeth because of “gums and cavities”
- Not diabetic and not a smoker
- Brushes every week when he bathes
Generalized Stage IV Grade B Periodontitis

- > 30% of the teeth involved
- Probing depths 2-12 mm
- Greater than 4 teeth lost to periodontitis (including ones to be extracted prior to definitive treatment)
- Plaque control consistent with expected
- No risk modifiers noted
Questions / Comments?