Emerging Trends in Periodontics: New Dimensions in the Etiology, Pathogenesis and Treatment of Periodontal Disease

What is the Prevalence of Periodontal Disease?

Prevalence of Periodontitis

What is the prevalence of periodontal disease in the U.S.?

Periodontal diseases affect ~ 47% of the adult population in the U.S.

Prevalence of Periodontitis

- According to CDC as of August 30, 2012, approximately half of American adults aged 30 or over have some form of P.D.
- Estimated 64.7 million Americans have mild, moderate or severe P.D.
- P.D. is higher in men than women, 56.4% and 38.4% respectively

Prevalence of Periodontitis (cont.)

- Prevalence Rate:
  - 64.2% for current smokers
  - 65.4% for adults living below the federal poverty level
  - 66.9% for adults with less than a high school education
- First time ever a survey of this kind included a full-mouth periodontal examination

CONCLUSIONS:

This data supports the need for comprehensive periodontal evaluations performed annually by a member of the dental team including a dentist, dental hygienist or periodontist.

Findings also support a need for public health programs to improve the oral health of adults.

Estimates of the prevalence of periodontitis were derived from a sample of 3742 civilian, non-institutionalized adults 30 years or older with one or more natural teeth.

Prevalence of Periodontitis

CONCLUSIONS:

What's New in the Classification of Periodontal and Peri-Implant Diseases and Conditions?

New Classification of Periodontal and Peri-Implant Diseases and Conditions

Periodontitis: Consensus report of workgroup 2 of the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions
New Classification of Periodontal and Peri-Implant Diseases and Conditions

<table>
<thead>
<tr>
<th>New Classification of Periodontal and Peri-Implant Diseases and Conditions</th>
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<tbody>
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TABLE 1: Classification of periodontal and peri-implant diseases and conditions

<table>
<thead>
<tr>
<th>Group</th>
<th>Classification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Mild Periodontal</td>
<td>mild inflammation of the periodontal tissues</td>
</tr>
<tr>
<td>II</td>
<td>Moderate Periodontal</td>
<td>moderate inflammation of the periodontal tissues</td>
</tr>
<tr>
<td>III</td>
<td>Severe Periodontal</td>
<td>severe inflammation of the periodontal tissues</td>
</tr>
<tr>
<td>IV</td>
<td>Critical Periodontal</td>
<td>critical inflammation of the periodontal tissues</td>
</tr>
</tbody>
</table>

Further details and criteria for each group can be found in the original document.
New Classification of Periodontal and Peri-Implant Diseases and Conditions

### TABLE 3 Classification of endo-peri-periodontal lesions

<table>
<thead>
<tr>
<th>Endo-peri-periodontal lesion with root damage</th>
<th>Root fracture or cracking</th>
<th>Root canal or pulp chamber perforation</th>
<th>External root resorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endo-peri-periodontal lesion in periodontitis patient</td>
<td>Grade 1 – narrow deep periodontal pocket in 1 tooth surface</td>
<td>Grade 2 – wide deep periodontal pocket in 1 tooth surface</td>
<td>Grade 3 – deep periodontal pockets in &gt; 1 tooth surface</td>
</tr>
<tr>
<td>Endo-peri-periodontal lesion in non-periodontitis patient</td>
<td>Grade 1 – narrow deep periodontal pocket in 1 tooth surface</td>
<td>Grade 2 – wide deep periodontal pocket in 1 tooth surface</td>
<td>Grade 3 – deep periodontal pockets in &gt; 1 tooth surface</td>
</tr>
</tbody>
</table>

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New Classification of Periodontal and Peri-Implant Diseases and Conditions

### TABLE 4 Classification of periodontal abscesses based on the etiologic factors involved

<table>
<thead>
<tr>
<th>Periodontal abscesses to Peri-implantitis, peri-integrated implants</th>
<th>Acute exacerbations</th>
<th>Late complications</th>
<th>Peri-implant disease or inflammation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute exacerbations</td>
<td>Acute exacerbations</td>
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<tr>
<td>Late complications</td>
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</tbody>
</table>

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We Need to Understand This Disease!

Understanding the medical model of periodontitis, as well as the microbial aspects:

1. **Focus treatment on reducing medical risks**
2. **Reduce/eliminate triggering bacteria**
3. **Down-regulate disease mechanisms**
4. **Must be based on sound basic and clinical research/clinical trials**
Current Understanding of the Pathogenesis of Periodontal Disease

- Must have the presence of bacteria/bacterial byproducts and a susceptible host
- Disease may be limited and treated, however, not curable
- Disease may progress with subsequent attachment and bone loss

Periodontal Disease Strategies for the 21st Century

- Bacterial Burden Reduction
- Risk Factor Management
- BEST CHANCE For Clinical Improvements
- Modulation of Host Response “Enzyme Suppression”

A New Dimension to Understanding the Pathogenesis of Periodontal Disease: What’s Old, What’s New, and Changes in Treatment Strategies
Emerging Trends in the Understanding of the Pathogenesis of Periodontal Disease – What's New?

Recently discovered novel mechanisms underlying the breakdown of periodontal host-microbe homeostasis include the presence of keystone microbes, pathobiants* (any potentially pathological organism) and the host response.

Precipitation of dysbiosis* (a microbial imbalance inside the body) and periodontitis in susceptible hosts is now acknowledged.
Risk Assessment: What's the Emerging Trend?

Genetic Risk Assessment of Periodontal Disease: An Emerging Trend

Introduction:
- The risk for periodontal disease is not uniform for all individuals
- Genetics controls the host activated inflammatory and immunological cascades (Nibali L et al., 2007)
- There is now evidence that a genetic basis exists for periodontitis
Prospective clinical trials are needed to determine the risk of developing chronic periodontitis or peri-implantitis when the above alleles are present.
Salivary diagnostics offers several advantages compared to other testing methods:

- Non-invasive
- Unlimited supply
- Cost effectiveness
- Patient comfort

Early diagnosis of several diseases and conditions

Current research is ongoing in the identification of salivary biomarkers for a variety of cancers including lung, breast and oral cancers

Currently salivary testing is available for the identification of periodontal pathogens

Other systemic diseases being investigated for salivary biomarkers:

1) Diabetes mellitus
2) Lung cancer
3) Oral squamous cell carcinoma

Javaid MA et al. 2016; Srinivasan M et al. 2015; Yakub M et al. 2014
How do dental plaque biofilms affect general health?


4. Demmer RT, Desvarieux M. Periodontal infections and cardiovascular disease: the heart of the matter. JADA. 2006;137(10 suppl):14S-20S.


Biofilms and Their Role in Human Life

- Biofilms are medically important, accounting for OVER 80% of microbial infections in the body
- Unfortunately, the oral cavity is a PRIMARY SITE!

Emerging Trend:
Filling the Gap in Prevention Strategies:
Toothbrushes, Toothpastes and Oral Antiseptics

No trap door at the neck:
- Oral biofilm can travel to other parts of the body (e.g., trachea, lungs, heart, liver, brain)

Control of oral biofilm is important for:
- Reduction of plaque and management of oral conditions
- Significant role in systemic health
Two Way Bluetooth Interactivity

Brush Customization
- Personal brushing target
- Preferred modes
- Preferred signaling

Brushing Feedback
- Time
- Quadrant
- Excess pressure
- Brushing mode
- Battery status

INTRODUCING THE WORLD'S FIRST BLUETOOTH CONNECTED TOOTHBRUSH: PRO 5000

Toothpaste and Fluoride

Fluoride Benefits

- Sodium Fluoride: Anti-Caries Benefit
- Sodium Monofluorophosphate: Anti-Caries Benefit
- Stannous Fluoride: Anti-Plaque, anti-gingivitis, anti-sensitivity and advanced protection against dental erosion
Summary: Biofilm

Plaque biofilm can be managed through effective oral hygiene measures (brush and floss), including twice-daily rinsing with an ADA/CDA accredited antimicrobial mouthrinse:
Whole Mouth Cleaning

What are Emerging Trends in the Treatment of Periodontal Disease

Host Modulation: Does It Play a Role in the Treatment of Periodontal Disease?
Host Modulation
3 Pillars for Successful Treatment of Chronic P.D.: 

1. Aggressive Management of Risk Factors
2. Intensive Modulation of the Clinical Presentation
3. Integrated Management of Host Cellular & Cellular

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Matrix Metalloprotease (MMP) Inhibition

- Clear evidence that MMPs play an important role in breakdown of bone and other connective tissues in periodontitis
- Accordingly, MMP inhibitors are being developed to stop periodontal breakdown

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Sequence of Events

Risk Factors Amplify Host Response

- Bacteria
- Host Cells
- PGE2
- MMPs

Host Response Component
- Pocket Formation
- Loss of Attachment
- Tooth Mobility
- Tooth Loss

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Host Modulation

ADA Guidelines:

Scientific Studies:

Systemic Antibiotics: Emerging Trend
As Part of Non-Surgical Therapy or As Part of Periodontal Surgery??
Smoking and Periodontal Disease

“Puff, Not the Magic Dragon…
The Cost of America’s Tobacco Use”

Tobacco use remains the single largest preventable cause of death in the U.S. (Wilkins, E. 2012; CDC, 2011)

Cigarettes remain the predominant form of tobacco use in the U.S. (CDC, 2011; CDC, 1999-2008)

Cigarettes contain at least 45 ingredients classified as carcinogens including carbon monoxide, ammonia, acetylene, nicotine, cyanide, benzene, formaldehyde, tar, etc. (Lewis, S. 2007)

Smoking and Periodontal Disease

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Smoking and Periodontal Disease

BOTTOM LINE:

Cigarette smoking has been shown in numerous publications to have deleterious effects on the periodontium, contribute to delayed healing and result in less than ideal outcomes following periodontal treatment.
E-Cigarettes: An Emerging Trend  
A Potential Health Risk ??

**Smoking and Periodontal Disease**

E-cigarettes: What we do know and what we don't know

- E-cigarettes are known as electronic cigarettes or personal vaporizers

**What is Snus?**

- Snus is a Swedish term for "tobacco" where it was developed in the 18th century
- Small tea bag like pouch placed under the upper or lower lip for extended periods of time
Sugar is the New Tobacco, should we Treat it any Differently??

Lasers in Periodontics: What is the Latest Consensus

Lasers in Periodontics: What is the Latest Consensus?
American Academy of Periodontology best evidence consensus statement on the efficacy of laser therapy used alone or as an adjunct to non-surgical and surgical treatment of periodontitis and peri-implant diseases

Michael P. Mills1+ | Paul S. Rosen2,3,4 | Leandro Chambone4 | Henry Greenwell5 | Richard T. Kao5,6 | Perry R. Klokkevold7 | Bradley S. McAllister8,9 | Mark A. Reynolds11 | Georgios E. Romangos12,13 | Hon-Lay Wang14

*J Periodontol. 2018;89:737-742.*
Oral Probiotics: An Emerging Trend in Oral Health?

Oral probiotics reduce inflammation to reduce gingivitis and PD by recolonizing the oral cavity with healthy bacteria.

Oral probiotics boost the immune system, help to balance the pH in the oral cavity to restore natural and healthy saliva flow.


Emerging Trends in Periodontal Surgery
What's New and Emerging in Membranes for GTR and GBR?

New Dimensions in Plastic Periodontal Surgery: An Alternative to the Autogenous Free Gingival Graft

New Dimensions in Treatment of Periodontal Disease - Surgery

Centrifuge- CGF

Piezosurgery- Perio Surgery, Extractions, Bone Grafting.
Regeneration:
Emerging Trends

Medication Related Osteonecrosis of the Jaws (MRONJ): What’s New?

What’s New?
- Check AAOMS and ADA/CDA websites for updates
- Two new sets of risk factors have been added:
  - Genetic
  - Preventative
What's New?

Reference: Dr. Robert E. Marx, Quintessence Publication, 2011

Medication Related Osteonecrosis of the Jaws (MRONJ)

Diagnosis:
Identification of the Following:
(1) Exposed bone in the maxillofacial region over a period of 8 weeks
(2) Current or previous treatment using BPs and related drugs
(3) No prior history of radiation therapy to the jaw region

Bisphosphonates:
1. Etidronate (Didronel)
2. Tiludrinate (Skelid)
3. Residronate (Actonel)
4. Alendronate (Fosamax)
5. Ibandronate (Boniva)
6. Pamidronate (Aredia)*
7. Zolendronate (Zometa)*
8. Zolendronate (Reclast)*

* Intravenous bisphosphonates
Medication Related Osteonecrosis of the Jaws (MRONJ)

What has the FDA proposed?

- Every woman on BPs for osteoporosis must be re-examined after 3 years
- No one needs to take BPs for osteoporosis for more than 5 years

Antiseptic Mouth Rinses: What Works and What Doesn't?

Emerging Treatment for Aggressive Forms of Periodontal Disease
Periowave®

Commercially Available PDT System

Thank You