

# **Periodontal Disease**

**and**

# **Perio/Systemic Links**

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# Program Objectives

After viewing this program, the attendee should be able to:

- Evaluate the available evidence on the potential association between periodontal disease and systemic links, or the mouth/body connection
- Discuss whether this association is biologically plausible
- Assess the data that support or refute a perio/systemic link
- Understand the perio/systemic links, or the mouth/body connection
- Understand the role C-reactive protein (CRP) has in the immune system response and the relationship to periodontal disease
- Understand treatment modalities and options for treating periodontal disease

# Biofilm

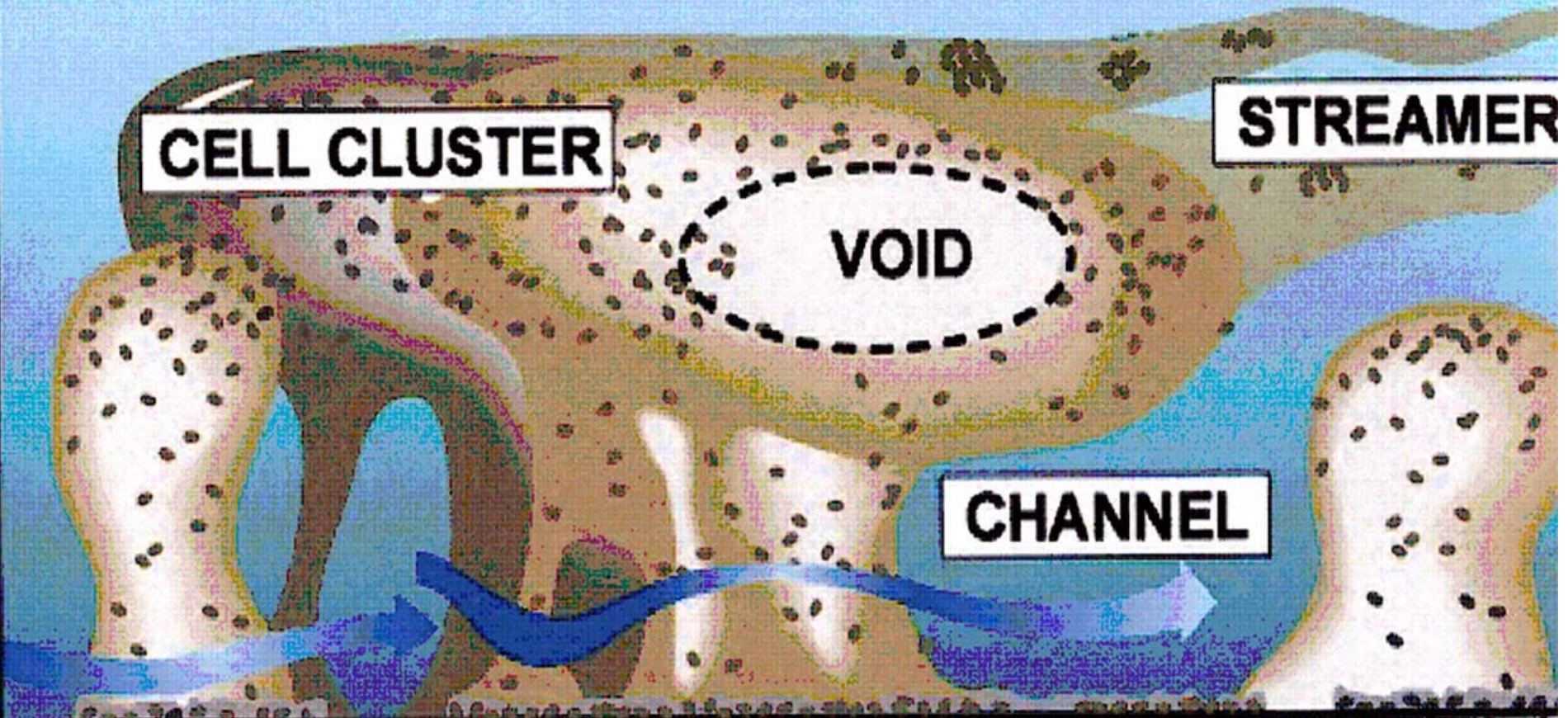
BULK FLUID

CELL CLUSTER

STREAMER

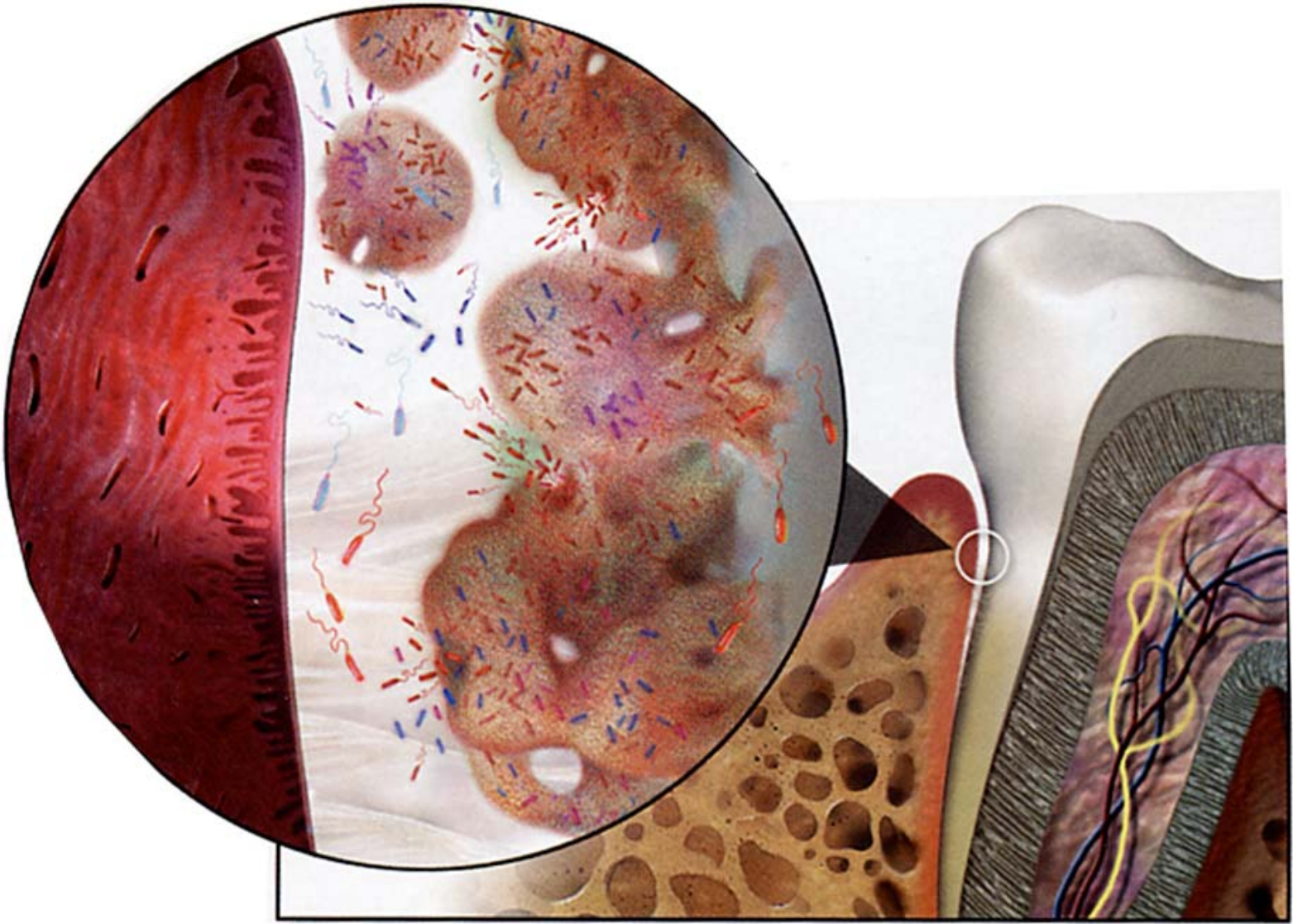
VOID

CHANNEL



# Plaque Facts

- **Not all bacteria are equally capable of causing periodontal disease**
- **Micro-environments within biofilm**
- **Slimy matrix shield**



**Biofilm**



**Bacteremia**

strategies for

resistant bacterial

a systematic approach

# Bacteremia

- Live bacterial cells
- Endotoxins
- Lipopolysaccharide (LPS)

# Inflammatory Response

- **Cytokines, PMNs, T-cells, B-cells**
- **Enzymes: collagenase, gelatinase, elastase, protease**
- **Periodontal tissue destruction**

**Biofilm**



**Bacteremia**



**Inflammatory Response**

# C-reactive Protein (CRP)

- Injury, inflammation, infection
- Elevated CRP → Elevated CV events
- Inflammatory mediator attractor

**Biofilm**



**Bacteremia**



**Inflammatory Response**



**C-reactive Protein**

STRATEGIES FOR  
RESOLVE PERITONITIS

a systematic approach

# CRP Ranges

**CRP Level**

**CV Disease Risk**

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**< 1.0 mg/L**

**Low**

**1.0 – 3.0 mg/L**

**Average**

**> 3.0 mg/L**

**High**

# **CRP participates in the development of clots and plaques**

**“CRP is not only a risk marker but may also be a participant in atherogenesis.”**

**“All recent evidence along with earlier reports support a role for CRP in atherosclerosis.”**

# Periodontal Disease Increases CRP

**“Statistically significant increases in CRP levels were observed in subjects with periodontal disease when compared to healthy controls.”**

# Periodontal Treatment Reduces CRP

**“Improvement in all clinical periodontal parameters were accompanied with significant reductions in CRP.”**

# Salivary CRP

- **Direct evidence provided that chronic perio disease may be associated with higher levels of CRP in the saliva**

**Biofilm**



**Bacteremia**



**Inflammatory Response**



**C-reactive Protein**



**Vascular Effects**

# Perio/Systemic Links

strategies for  
feature benefit  
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# Periodontal Disease and Coronary Artery Disease (CAD)

- Periodontitis was revealed to be a significant risk factor for CAD, with the level of association increasing with the extent of the perio lesions

# Periodontal Pathogens and Heart Disease

**2004 study provides serological evidence that an infection caused by the perio pathogen, *P. gingivalis*, increases the risk for MI**

**2005 study finds major perio pathogens associated with subclinical, prevalent and future incidence of CHD**

Pussinen PJ et al. *Eur J Cardiovasc Prev Rehabil.* 2004;11(5)408-411.

Pussinen PJ et al. *Arterioscler Thromb Vasc Biol.* 2005;25(4):833-838. Epub February 3, 2005.

# **Study points to an association between CV disease and periodontal bacteria**

**High proportion of perio pathogens,  
thicker carotid artery walls, may be a  
“predictor of stroke and heart  
attack.”**

**Atherosclerotic plaque contains  
*Actinobacillus* and  
*Porphyromonas* bacteria**

# Periodontal Pathogens on Coronary Balloon Catheters

- Following cardiac catheterization of patients with moderate and severe periodontitis, presence of
  - *P. gingivalis*
  - *B. forsythus*
  - *A. actinomycetemcomitans*
  - *F. nucleatum*

## **Possible relationship between electrocardiographic abnormalities and periodontal disease: the Hisayama Study**

**This study demonstrates a possible “relationship between periodontitis and ECG abnormalities, which are important predictors of CVD.”**

## **Periodontitis as a potential risk factor for CVA**

- **Infection caused by major periodontal pathogens may be associated with future stroke**

# Periodontal Disease and Adverse Pregnancy Events

- **Women with periodontitis are 7 to 8 times more likely to have a premature, low-birth-weight baby**
- **Oral microbes can cross the placenta and expose the fetus to infection**

# Periodontal Disease and Adverse Pregnancy Events

**“Untreated moderate to severe periodontitis may increase the risk for adverse pregnancy outcomes.”**

**“Performing SRP in pregnant women with periodontitis may reduce pre-term births.”**

# Mechanism of Adverse Pregnancy Events

- The inflammatory mediators such as IL-1, TNF-alpha, and MMPs may cross the placenta causing fetal toxicity, resulting in pre-term, low birth weight

# Periodontal Disease and Diabetes

- **Suggestion of a bi-directional relationship**
  - **Diabetics are predisposed to perio disease**
  - **Perio disease predisposes to poor glycemic control**
  - **Comprehensive treatment of perio disease may temporarily improve glycemic control** (note: only when certain systemic antibiotics are given, which makes one think that it's the antibiotics that are having an effect)

# Periodontal Disease and Respiratory Conditions

- There is evidence of a possible relationship between perio disease and respiratory conditions such as pneumonia and COPD

**Biofilm**



**Bacteremia**



**Inflammatory Response**



**C-reactive Protein**

**Systemic Events**

# Treatment

- **Surgical therapy**
- **Non-surgical therapy**
  - **Scaling and root planing (SRP)**

# Antibiotics

- **Systemic antibiotics**
- **Host modulation**
  - **Periostat<sup>®</sup>**
- **Locally applied anti-microbials**
  - **ARESTIN<sup>®</sup>**
  - **Atridox<sup>®</sup>**
  - **PerioChip<sup>®</sup>**

# Systemic Antibiotics

- **There are at least 46 different combinations of perio pathogens, and at least 10 different antibiotic regimens might be required to specifically target them**

# Treatment of perio disease by SRP or surgery results in significant clinical improvement

- Longevity of results?
  - Attachment loss/bone loss
- Perio pathogens present after active treatment?

# Program Objectives

- **Perio/systemic links**
- **C-reactive protein**
- **Treatment**

**Increased awareness of the role of  
inflammation in systemic conditions**

**The most common chronic infection in  
the US is periodontal disease**

**What will you do  
differently tomorrow?**

STRATEGIES FOR  
MEASURE PERFORMANCE  
a systematic approach