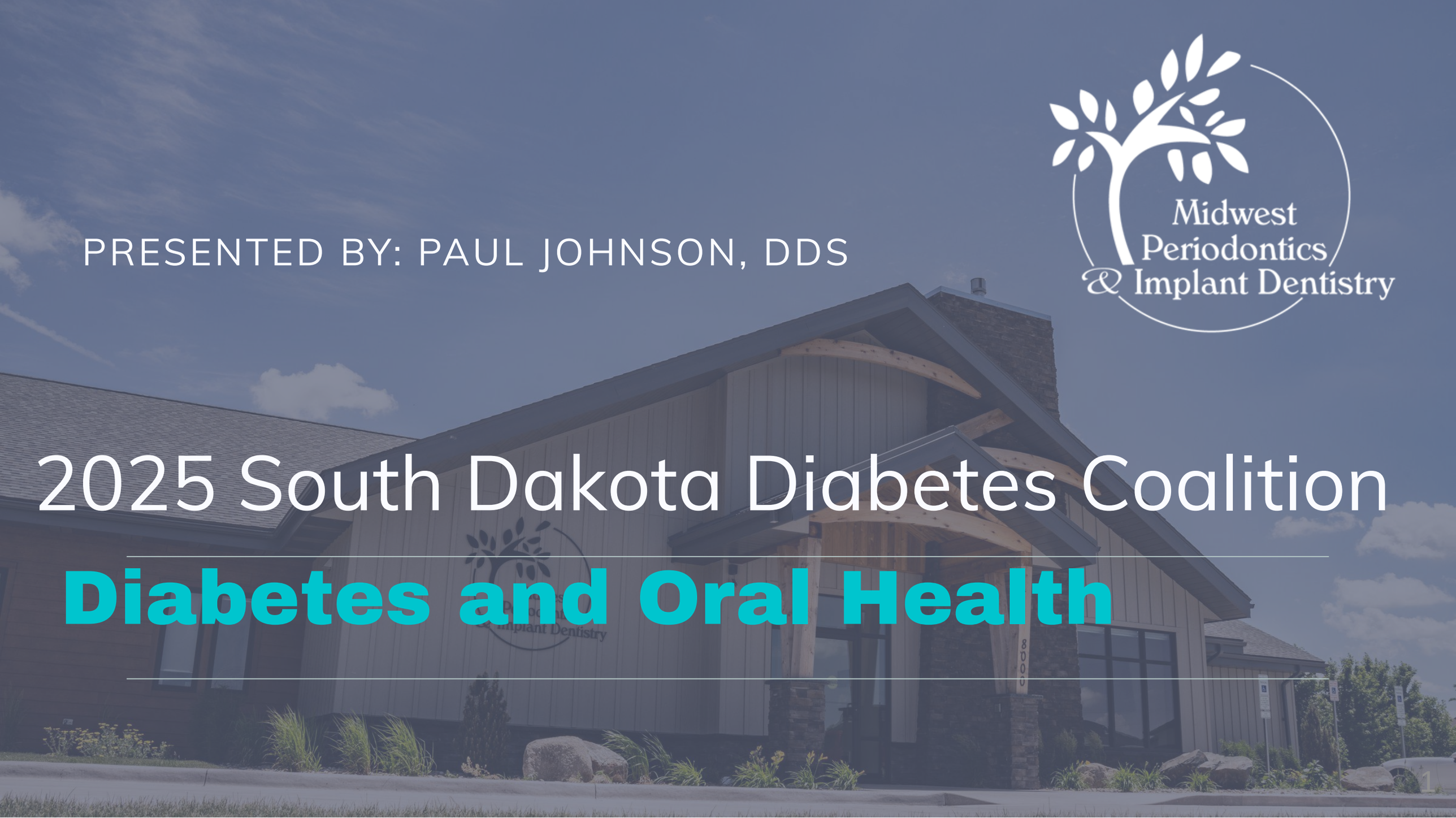


PRESENTED BY: PAUL JOHNSON, DDS

Midwest Periodontics & Implant Dentistry

2025 South Dakota Diabetes Coalition

Diabetes and Oral Health

Paul Johnson, DDS

Midwest Periodontics & Implant Dentistry

Brookings, SD

South Dakota State University

University of Nebraska Medical Center College of Dentistry (4 years)

UNMC Periodontal Residency (3 years)


STRIDER

Objectives

Connections

Relationship between oral health and systemic health

Impact

Poor oral health and glycemic control

Strategies

Promoting oral health and treatment strategies

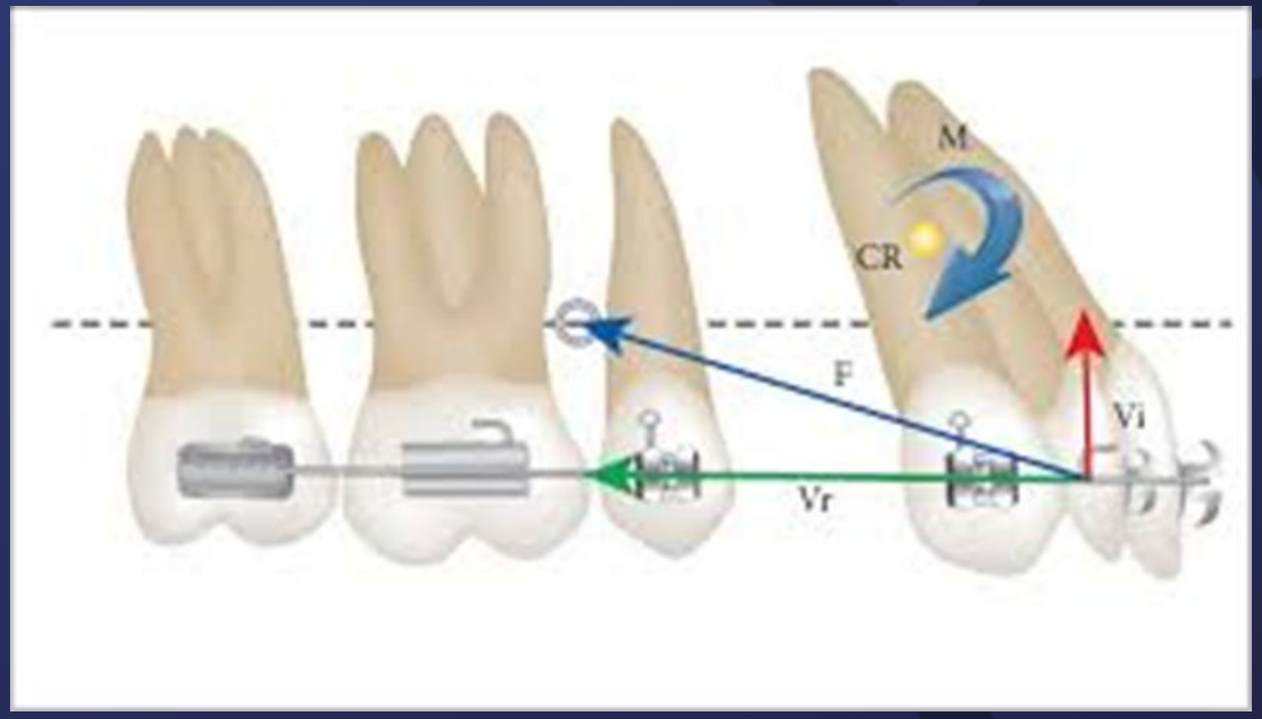
What is a periodontist???

9 ADA Dental Specialties

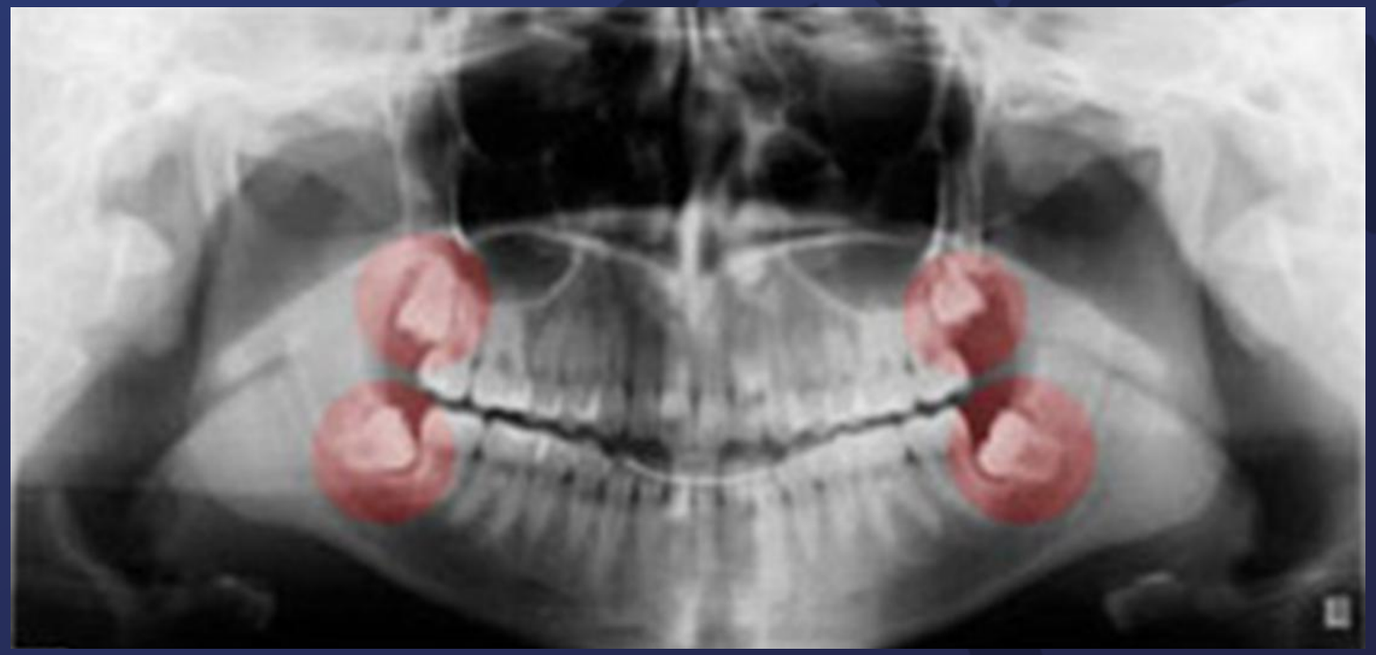
- Dental Public Health
- Endodontics
- Oral and Maxillofacial Pathology
- Oral and Maxillofacial Radiology
- Oral and Maxillofacial Surgery
- Orthodontics
- Pediatric Dentistry
- ⭐ Periodontics ⭐
- Prosthodontics

Endodontics

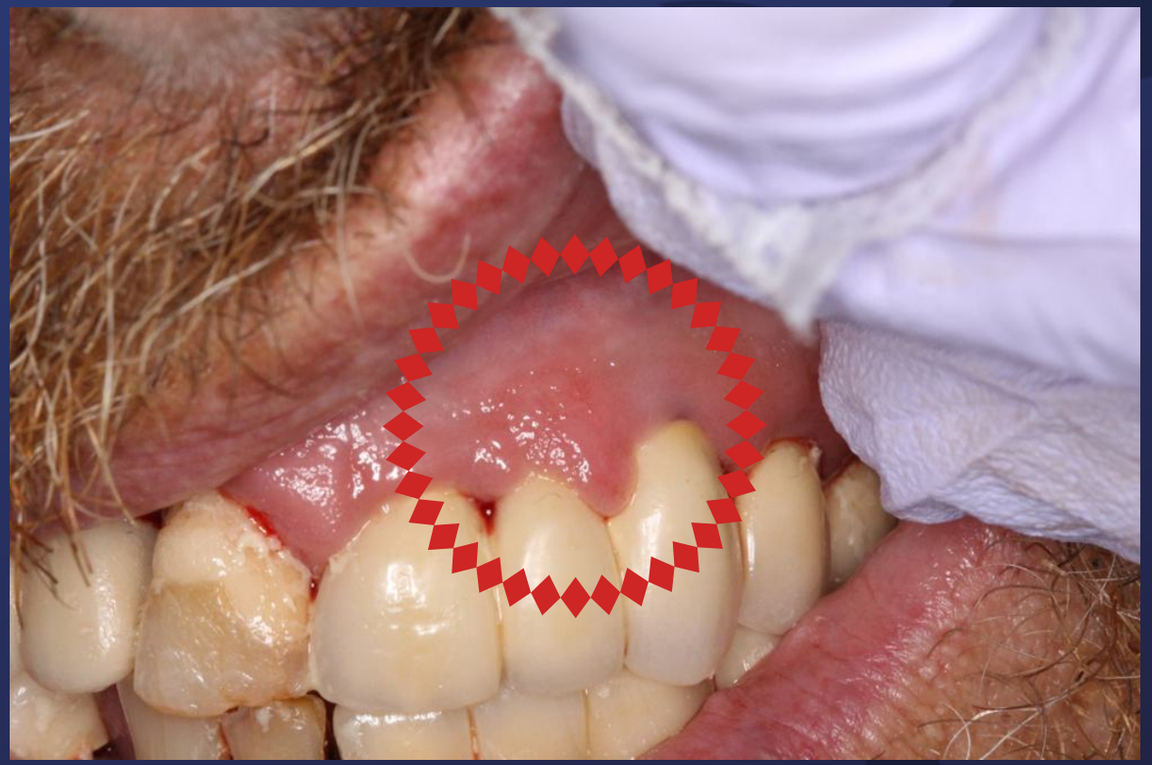
Orthodontics



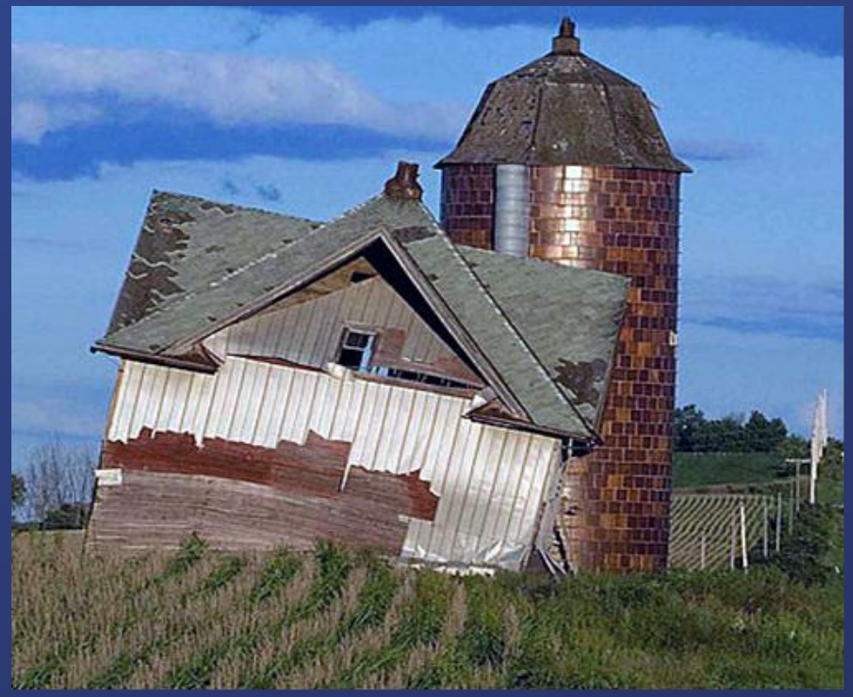
Oral Surgery

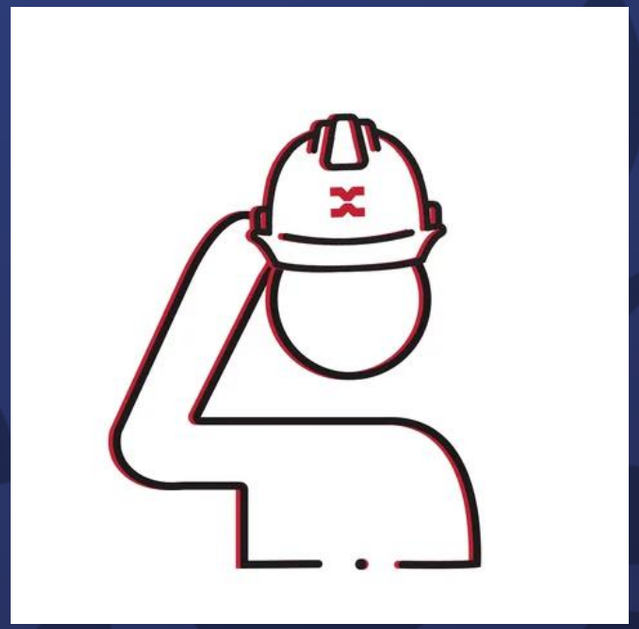


Oral Pathology

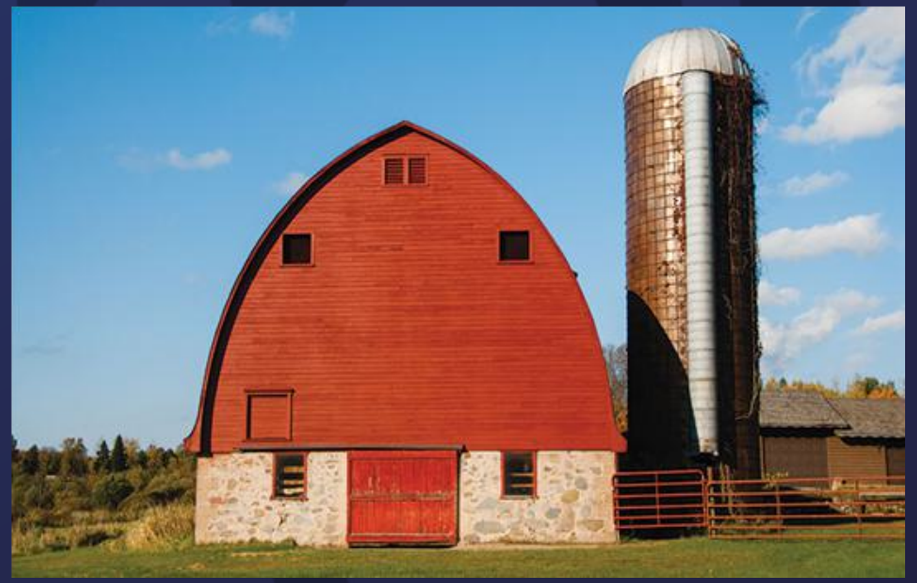


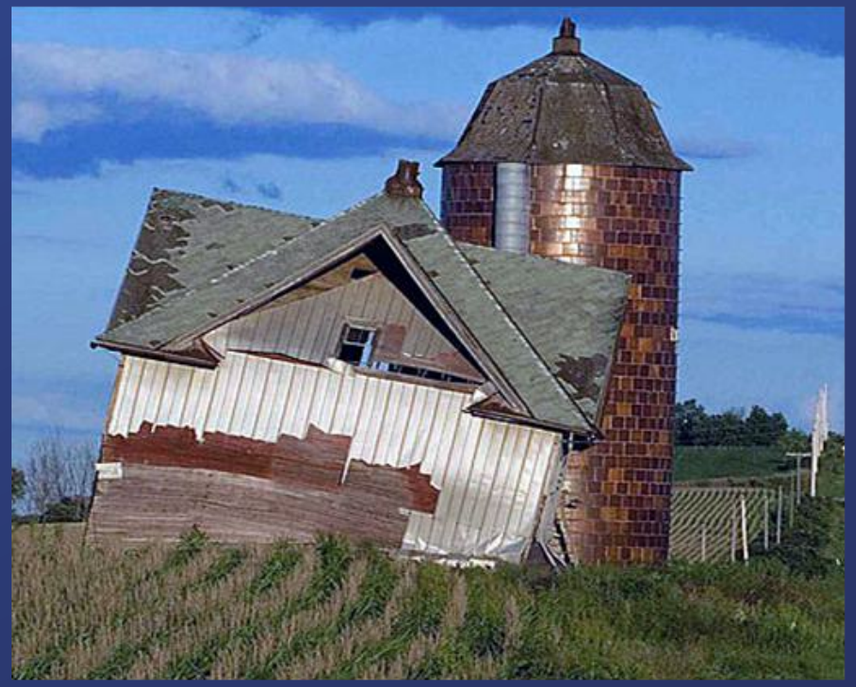
Pediatrics

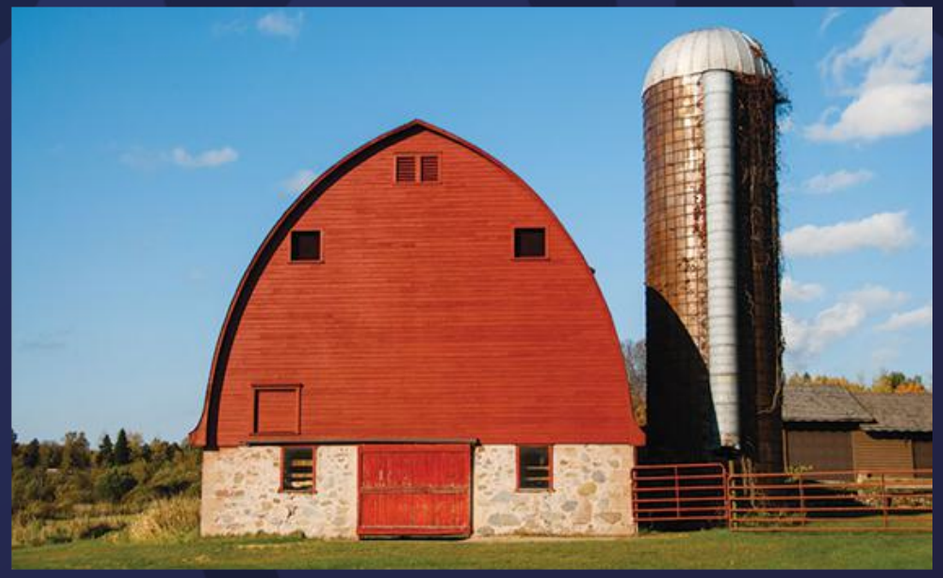




Periodontics







Periodontics

- Periodontics is that specialty of dentistry which encompasses the prevention, diagnosis and treatment of diseases of the supporting and surrounding tissues of the teeth or their substitutes and the maintenance of the health, function and esthetics of these structures and tissues. (ADA, 2018)

Healthy

Gingivitis

ANUG

Periodontitis

Periodontitis

Periodontitis

Edentulous

Periodontal Disease

Periodontal Exam at Midwest Periodonticts

- 1.5 hour appointment
- Medical history review
- Periodontal charting
- Radiographs as needed
- Photos as needed (evaluate for pathology)
- Address patient chief concerns
- Review oral hygiene instructions as needed
- Develop a treatment plan to best control bone loss and minimize inflammation in the mouth
  - Send correspondence letter to the referring office (99% of patients are referred)

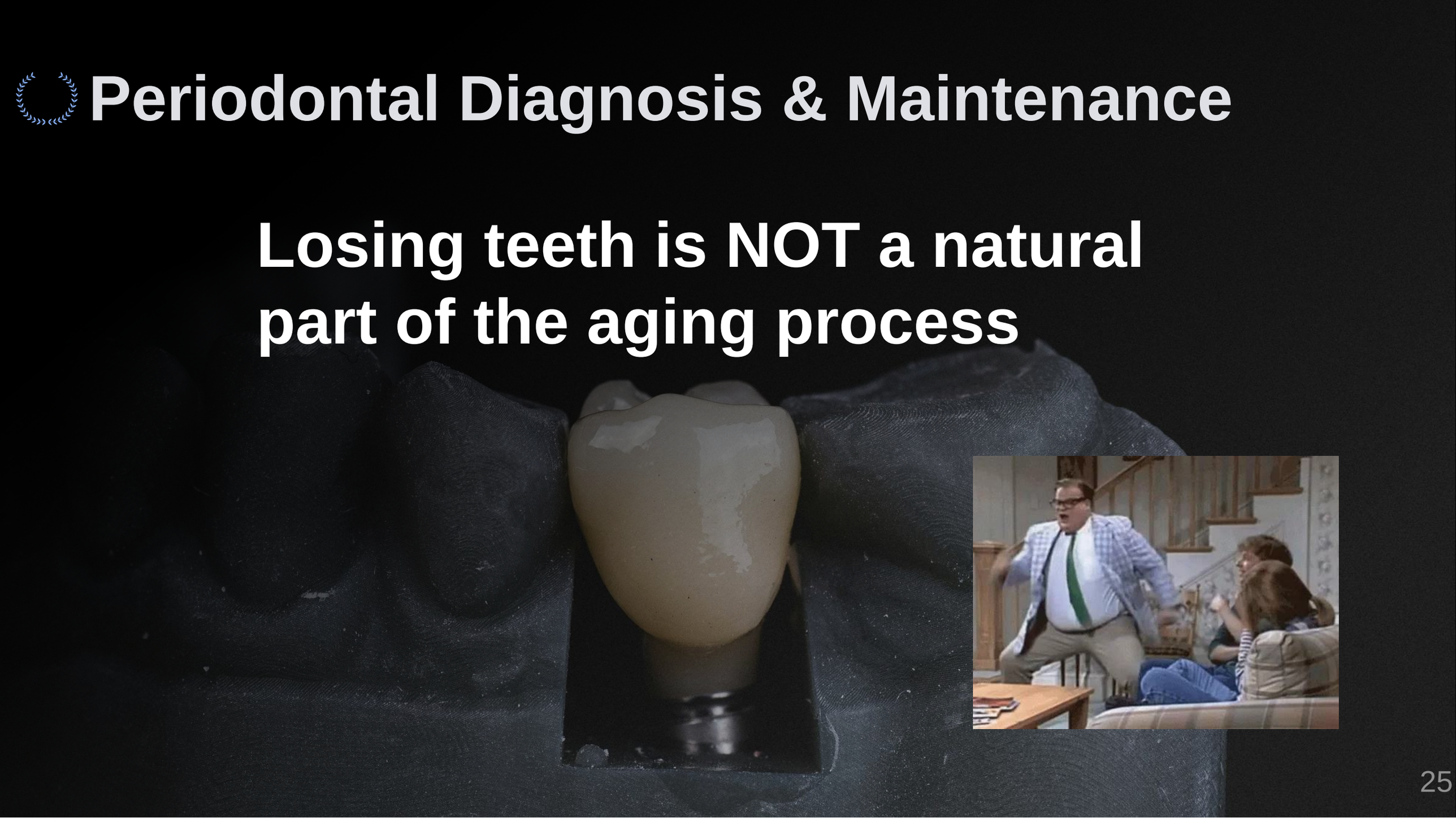
First visit to the periodontist

They told me to come here!

....and nothing hurts!

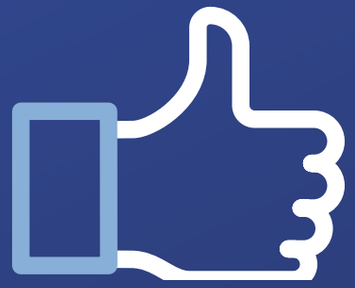
Periodontal Diagnosis & Maintenance

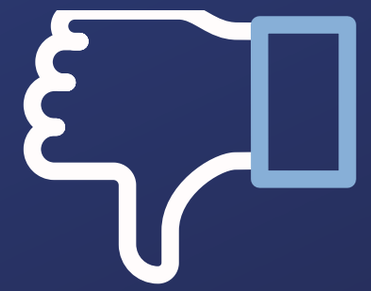
Losing teeth is NOT a natural part of the aging process

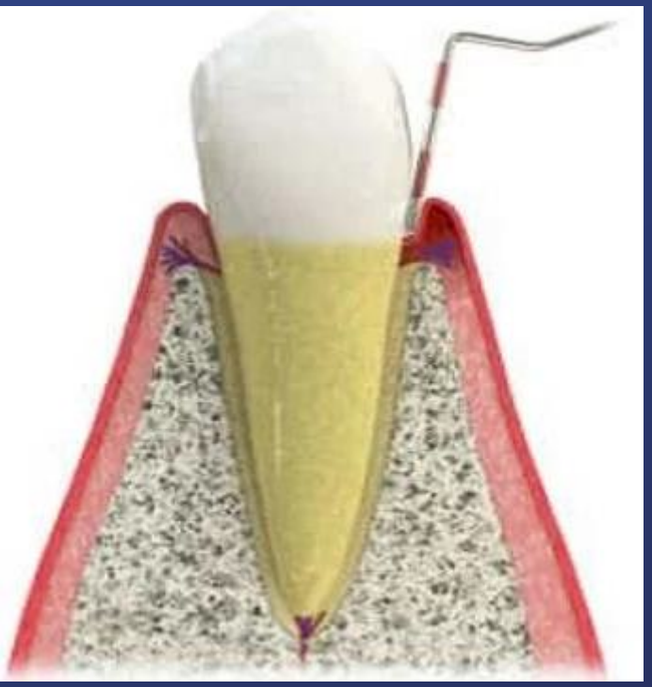


Periodontal Diagnosis

Periodontal disease is often a "silent disease."

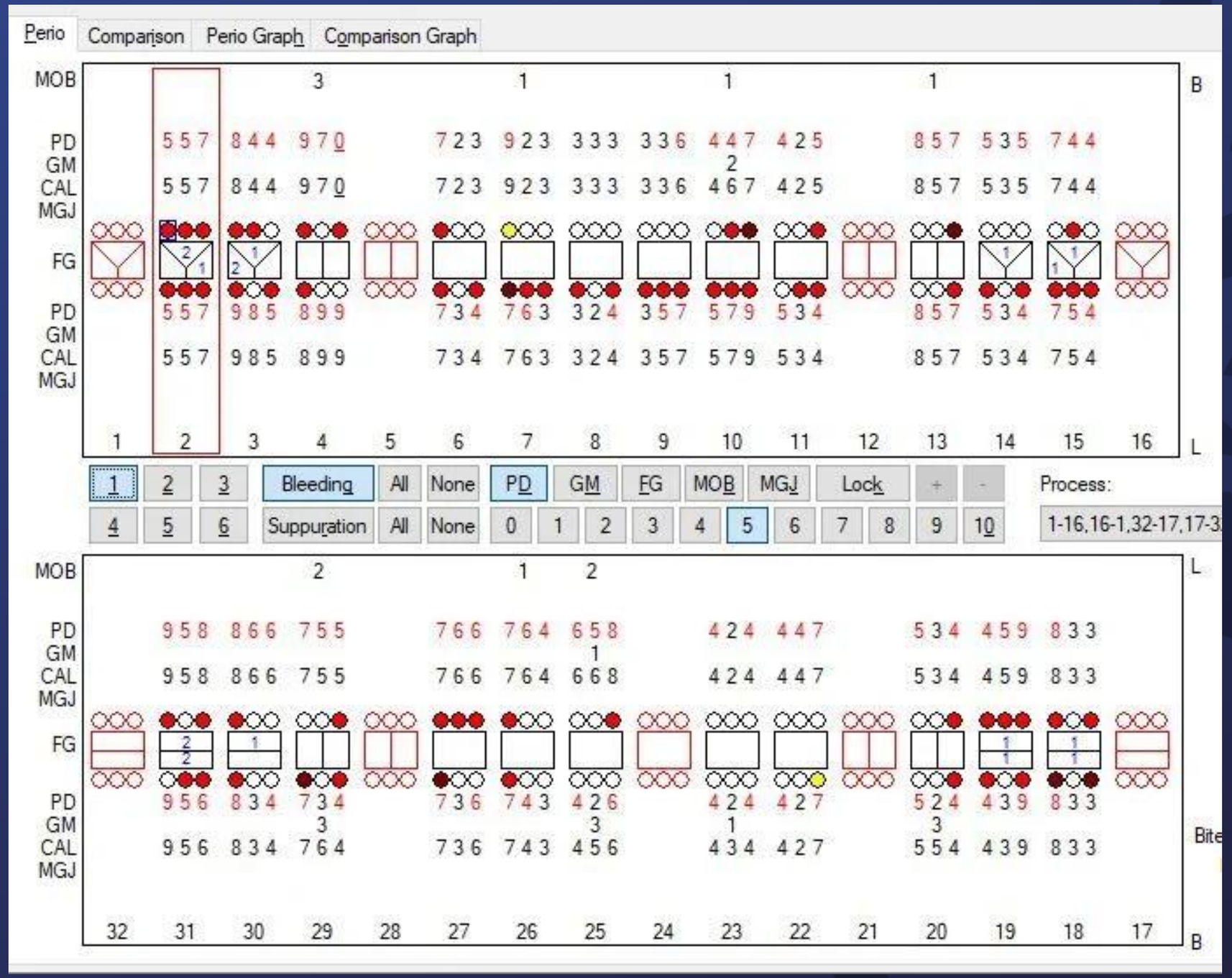


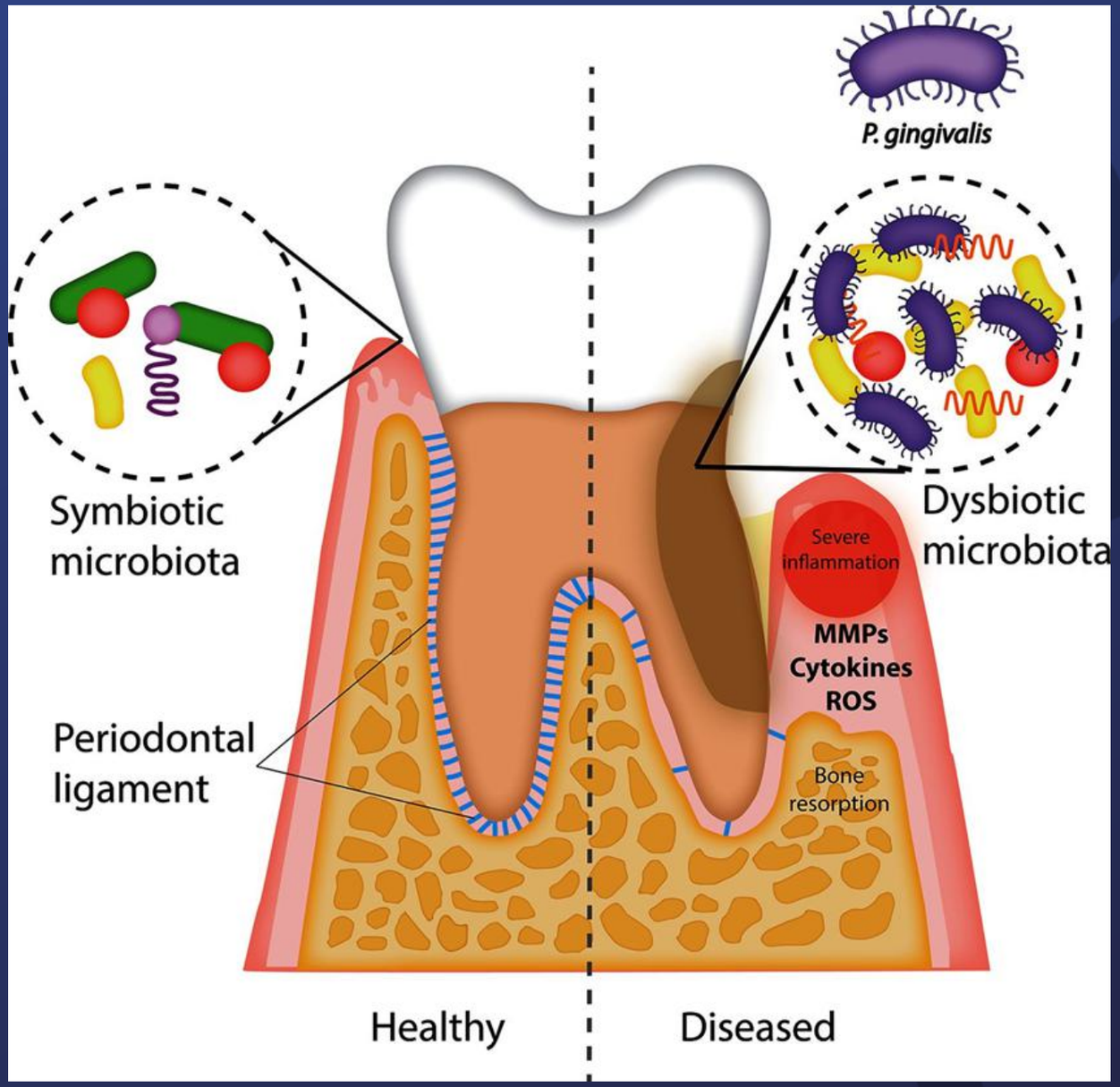




Starts with a comprehensive periodontal exam

AKA: periodontal probing


Perio
Comparison
Perio Graph
Comparison Graph
MOB
PD
GM
CAL
MGJ
FG
B
L
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Bleeding
Suppuration
All
None
PD
GM
FG
MOB
MGJ
Lock
Process:
1-16,16-1,32-17,17-3
Bite
32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17


P. gingivalis
Symbiotic microbiota
Dysbiotic microbiota
Severe inflammation
MMPs
Cytokines
ROS
Bone resorption
Periodontal ligament
Healthy
Diseased

› mSphere. 2017 Nov 29;2(6):e00527-17. doi: 10.1128/mSphereDirect.00527-17.
eCollection 2017 Nov-Dec.

Subgingival Microbiome Colonization and Cytokine Production during Early Dental Implant Healing

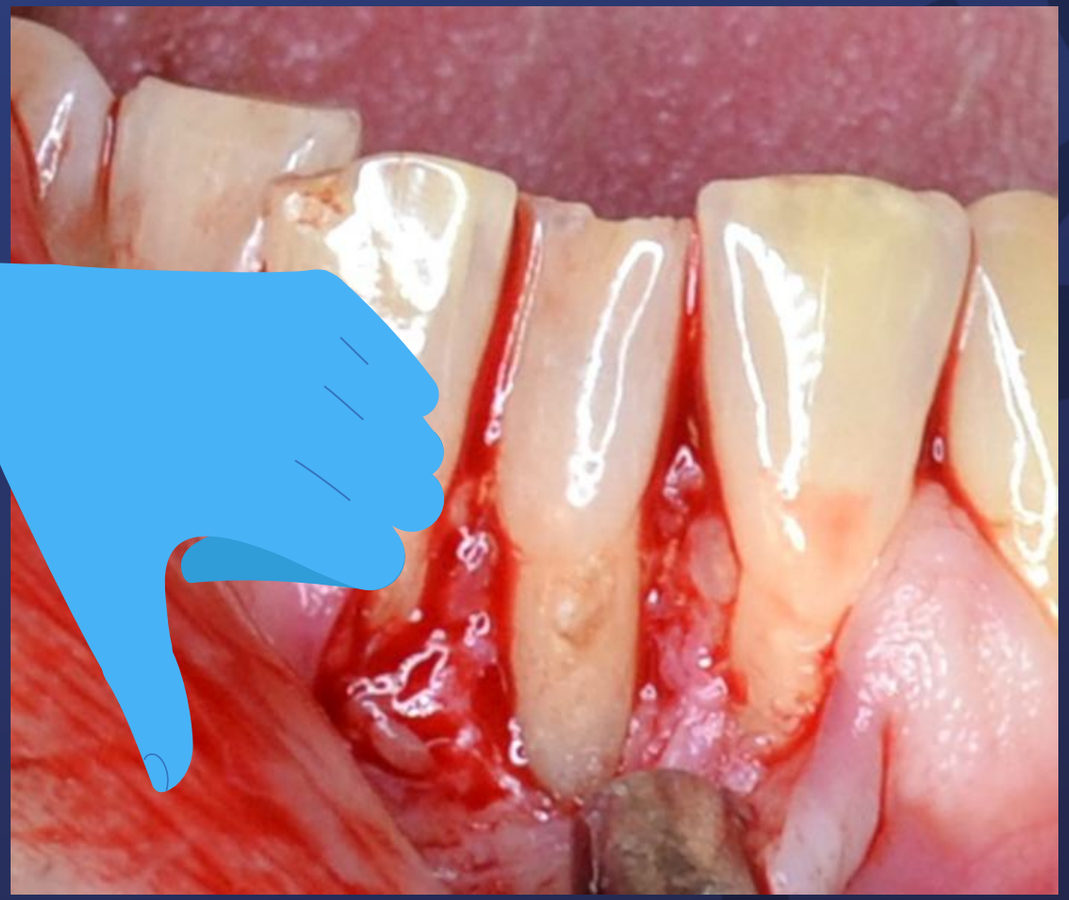
Jeffrey B Payne [1] [2], Paul G Johnson [1], Car Reen Kok [3], João C Gomes-Neto [3],
Amanda E Ramer-Tait [3], Marian J Schmid [1], Robert W Hutkins [3]

Affiliations + expand

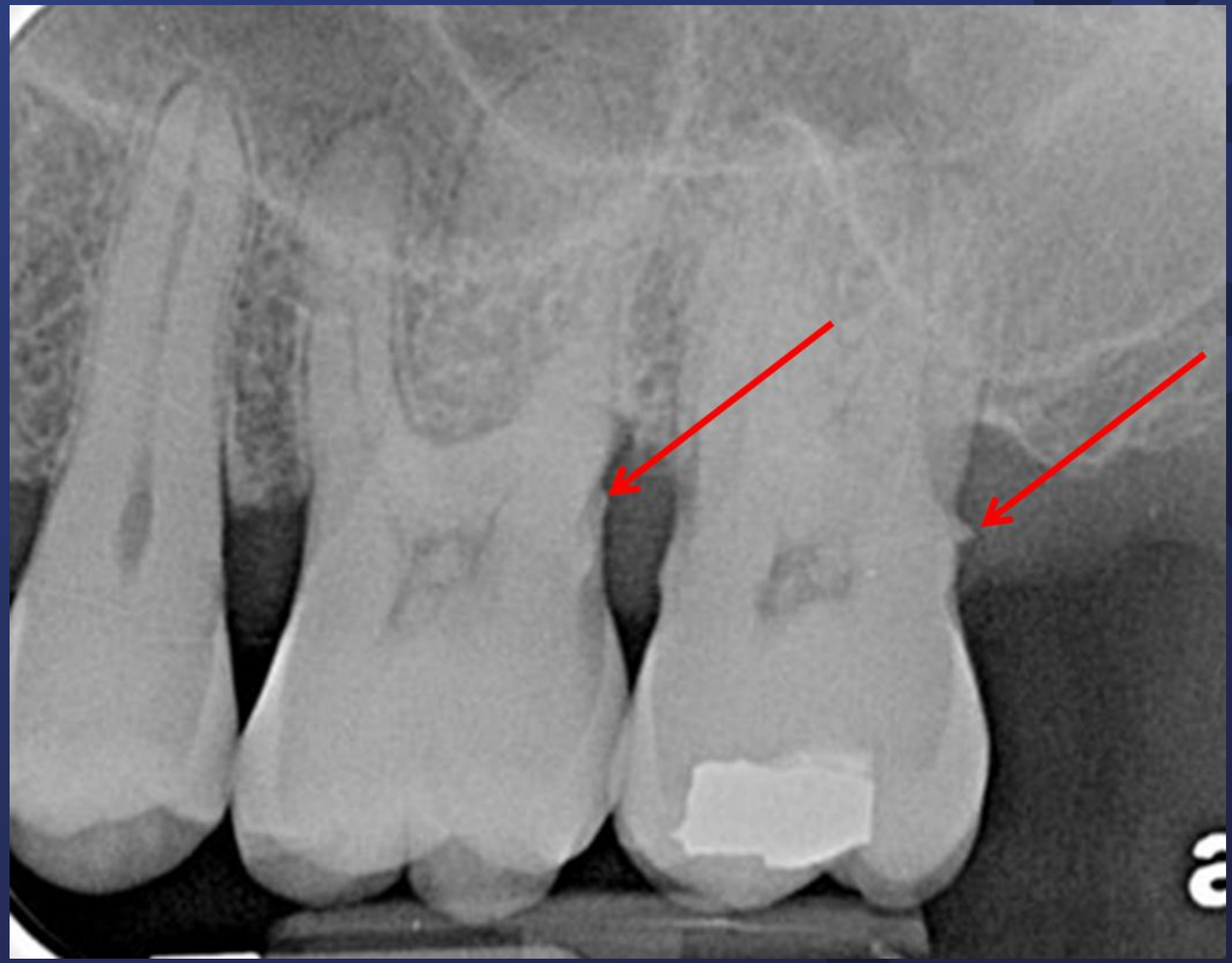
PMID: 29202047 PMCID: PMC5705808 DOI: 10.1128/mSphereDirect.00527-17

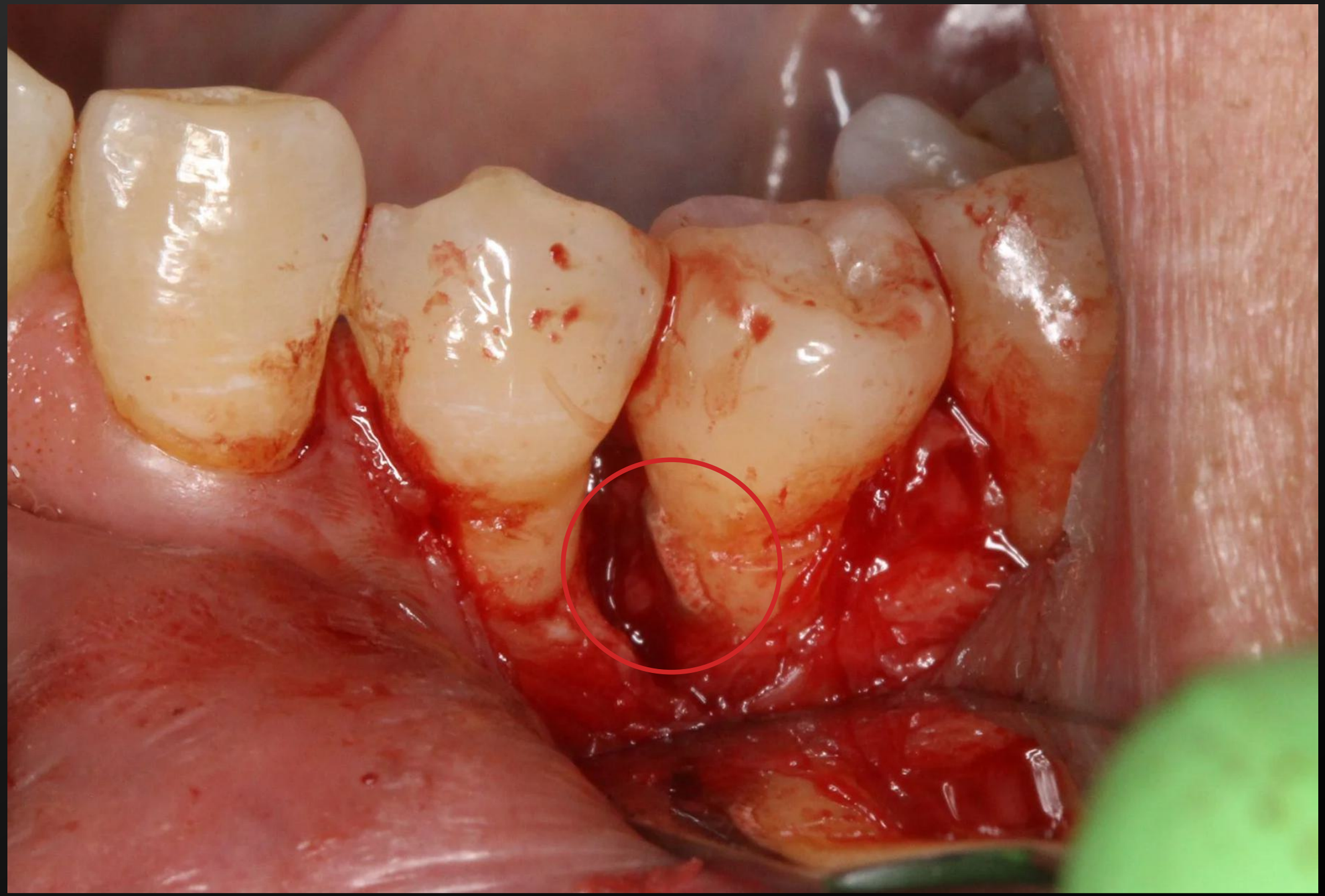
Abstract

Little is known about longitudinal development of the peri-implant subgingival microbiome and cytokine production as a new sulcus forms after dental implant placement. Therefore, the purpose of



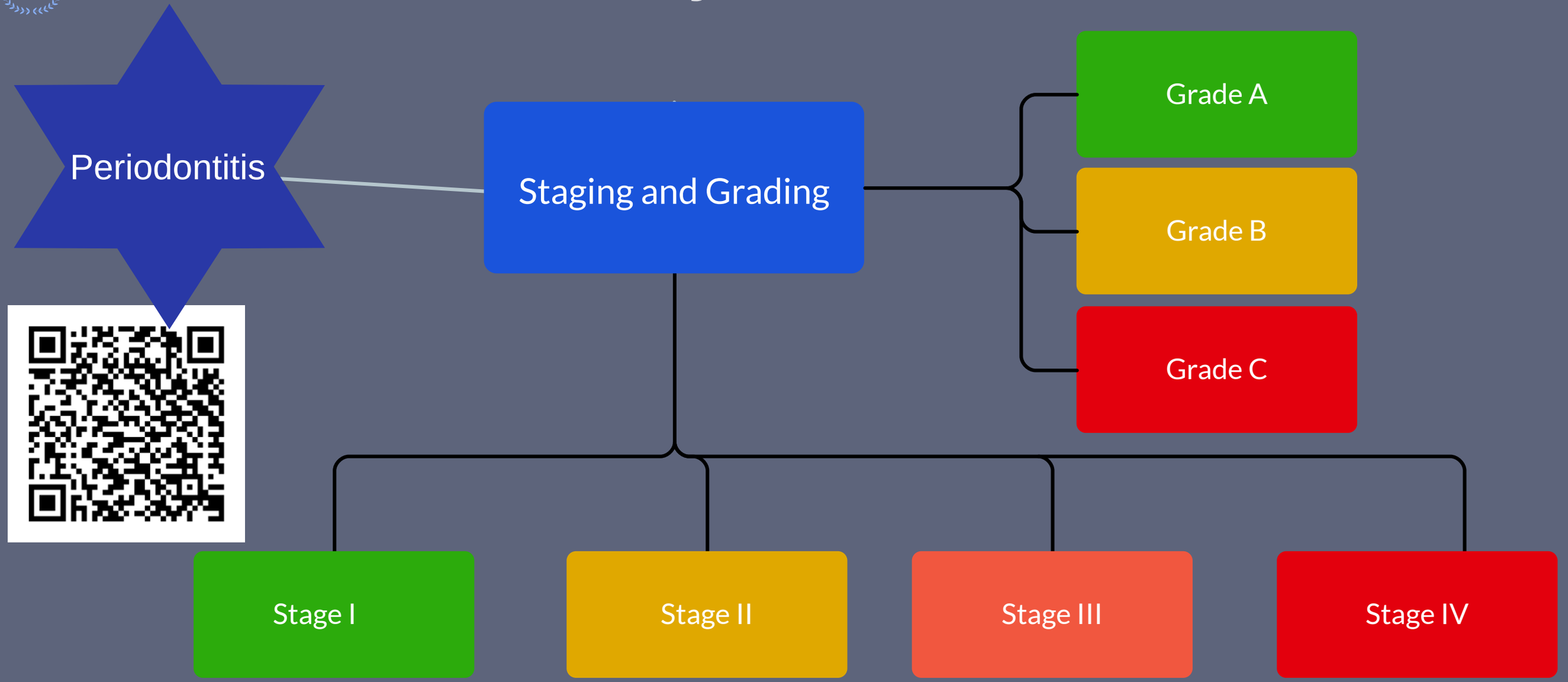
Calculus (enemy #1)





How do we measure the severity of periodontal disease????

2017 Classification system!!!!



Staging

	Periodontitis	Stage I	Stage II	Stage III	Stage IV
Severity	**Interdental CAL** *(at site of greatest loss)*	1 – 2 mm	3 – 4 mm	≥5 mm	≥5 mm
	RBL	Coronal third (<15%)	Coronal third (15% - 33%)	Extending to middle third of root and beyond	Extending to middle third of root and beyond
	Tooth loss *(due to periodontitis)*	No tooth loss		≤4 teeth	≥5 teeth
Complexity	**Local**	• Max. probing depth ≤4 mm • Mostly horizontal bone loss	• Max. probing depth ≤5 mm • Mostly horizontal bone loss	In addition to Stage II complexity: • Probing depths ≥6 mm • Vertical bone loss ≥3 mm • Furcation involvement Class II or III • Moderate ridge defects	In addition to Stage III complexity: • Need for complex rehabilitation due to: – Masticatory dysfunction – Secondary occlusal trauma (tooth mobility degree ≥2) – Severe ridge defects – Bite collapse, drifting, flaring – < 20 remaining teeth (10 opposing pairs)
Extent and distribution	**Add to stage as descriptor**	For each stage, describe extent as: • Localized (<30% of teeth involved); • Generalized; or • Molar/incisor pattern			

Grading

	Progression		Grade A: Slow rate	Grade B: Moderate rate	Grade C: Rapid rate
Primary criteria *Whenever available, direct evidence should be used.*	Direct evidence of progression	Radiographic bone loss or CAL	No loss over 5 years	<2 mm over 5 years	≥2 mm over 5 years
	Indirect evidence of progression	% bone loss / age	<0.25	0.25 to 1.0	>1.0
		Case phenotype	Heavy biofilm deposits with low levels of destruction	Destruction commensurate with biofilm deposits	Destruction exceeds expectations given biofilm deposits; specific clinical patterns suggestive of periods of rapid progression and/or early onset disease
Grade modifiers	Risk factors	Smoking	Non-smoker	<10 cigarettes/day	≥10 cigarettes/day
		Diabetes	Normoglycemic/no diagnosis of diabetes	HbA1c <7.0% in patients with diabetes	HbA1c ≥7.0% in patients with diabetes

Grading

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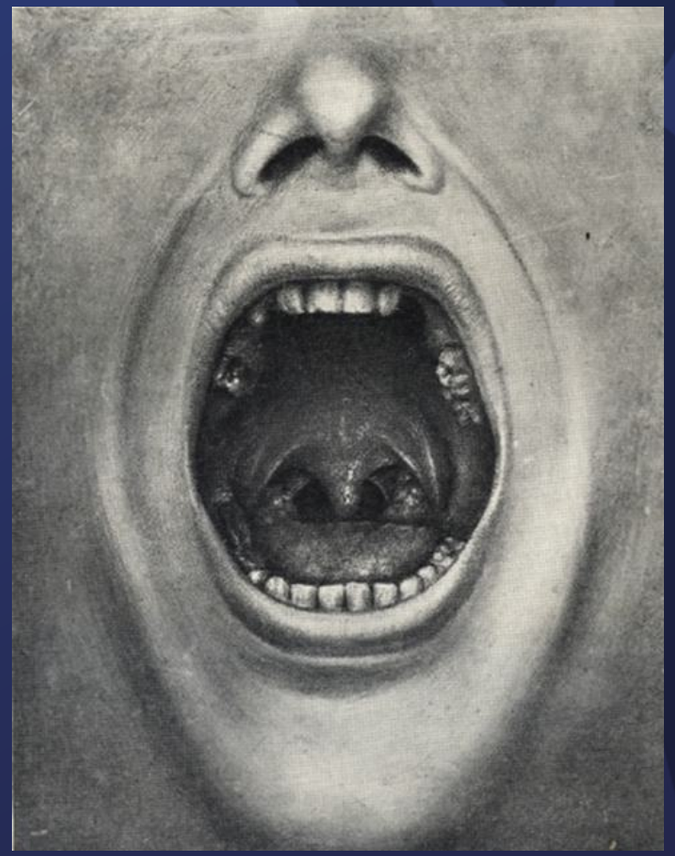
		Diabetes	Normoglycemic/no diagnosis of diabetes	HbA1c <7.0% in patients with diabetes	HbA1c ≥7.0% in patients with diabetes

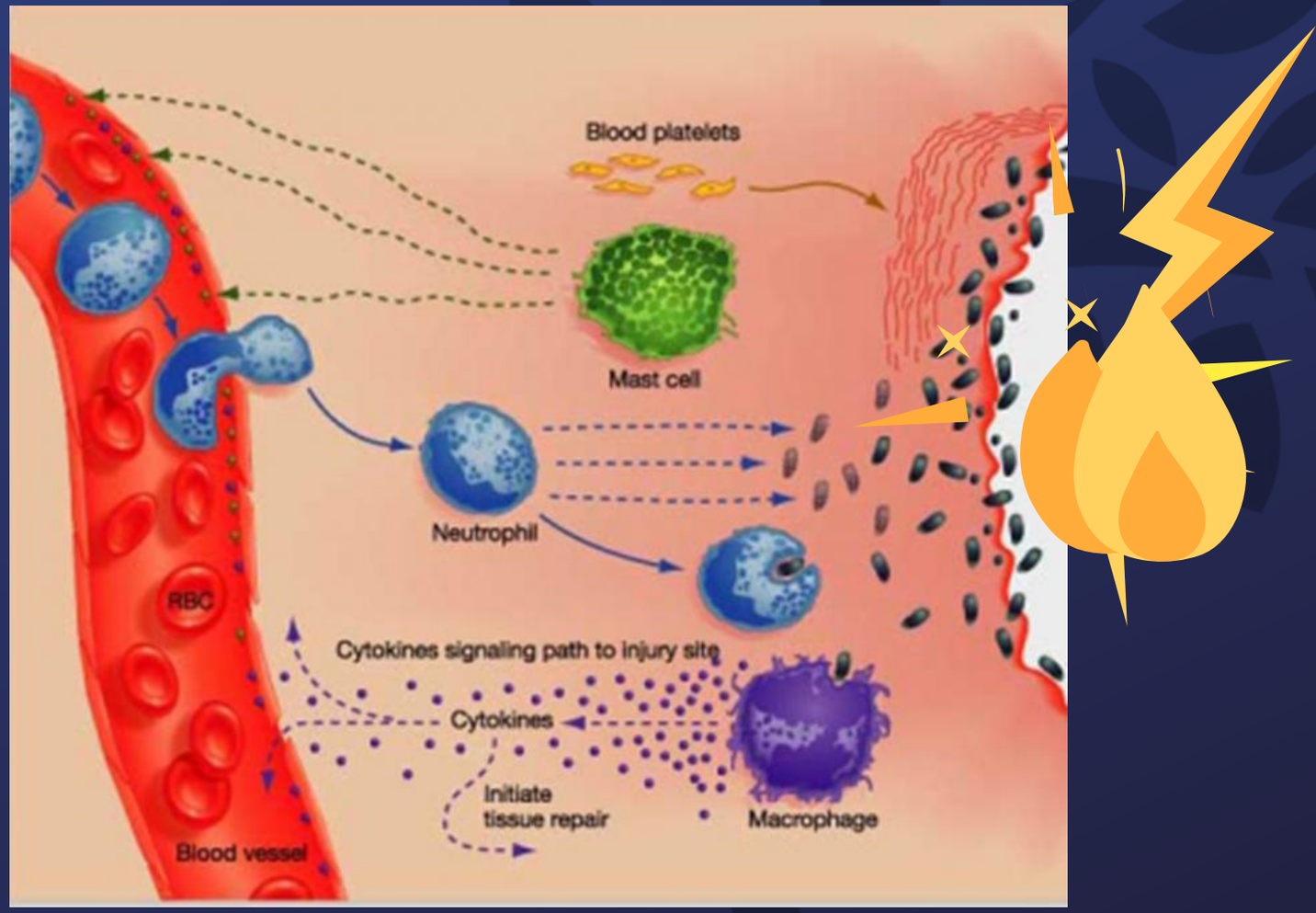
Periodontal diesase is a potential risk for other systemic diseases



Acute Inflammation

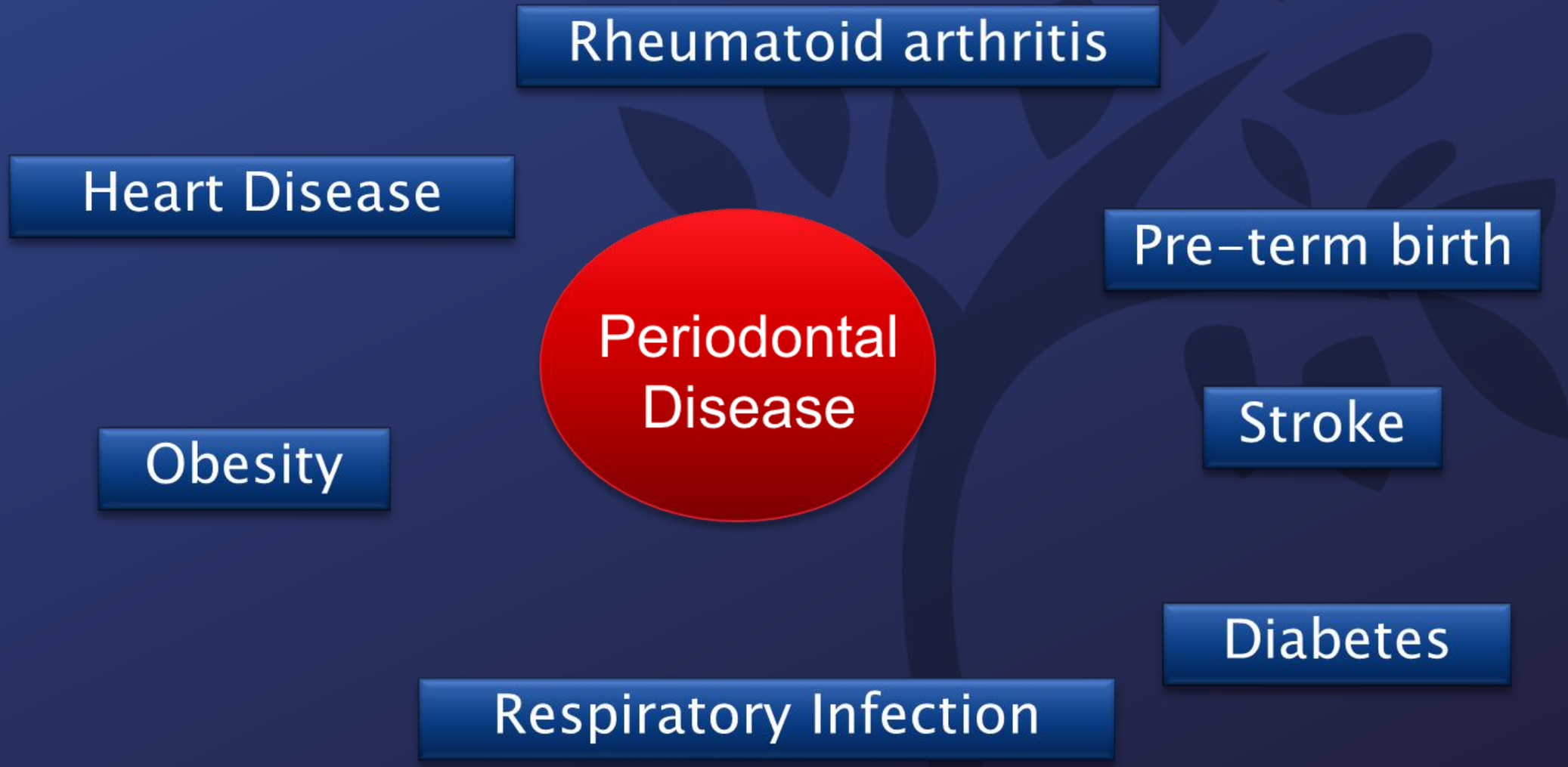
Chronic Inflammation

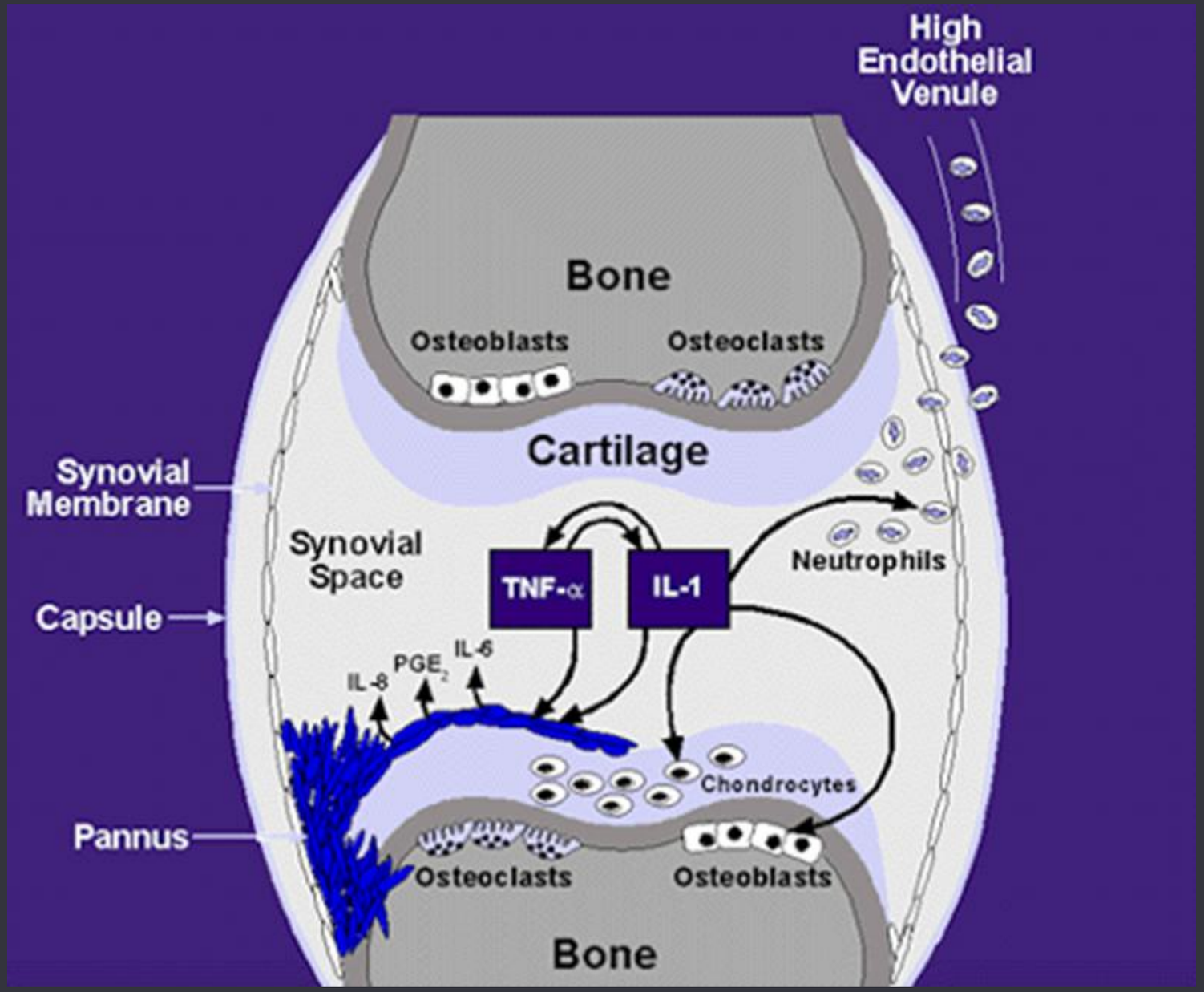
Cellular response to injury = inflammation



Inflammation is like a wild fire. It does not stay localized and its effects travel throughout the body

Proposed systemic relationships:





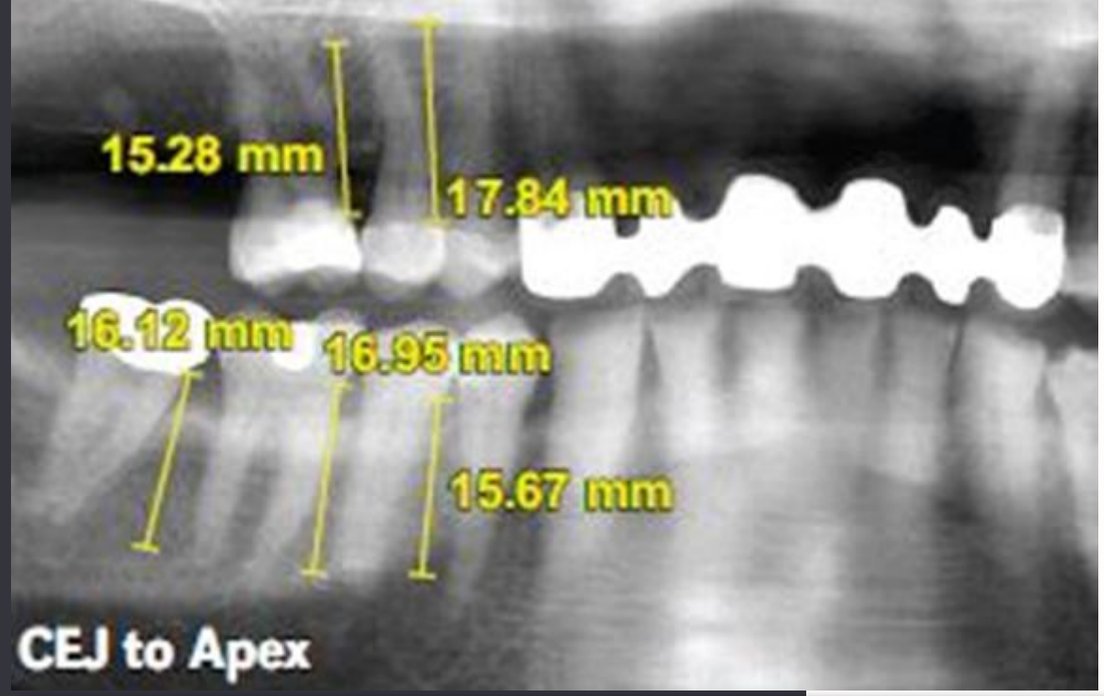
Rheumatoid Arthritis

A chronic inflammatory disorder affecting the joints and supporting structures (bone and tissue)

- P. GINGIVALIS OFTEN FOUND WITHIN AFFECTED JOINTS
- DENTAL CLEARANCE OFTEN NEEDED PRIOR TO ORTHOPEDIC SURGERY

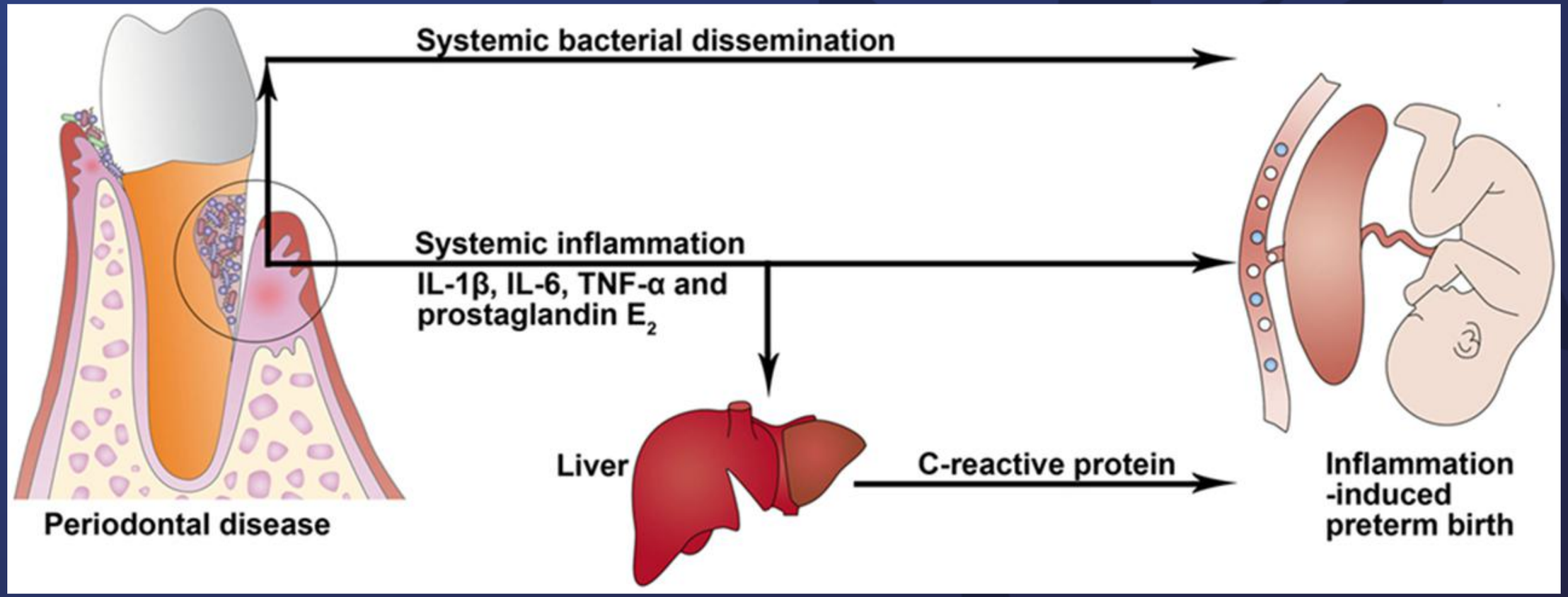
Alveolar Bone Loss in Subjects with Rheumatoid Arthritis and Osteoarthritis

Johnson PG[1], Payne JB[1], Gonzalez SM[1], Schmid MJ[1], Sayles HR[2], Yu F[2], and Mikuls TR[3]

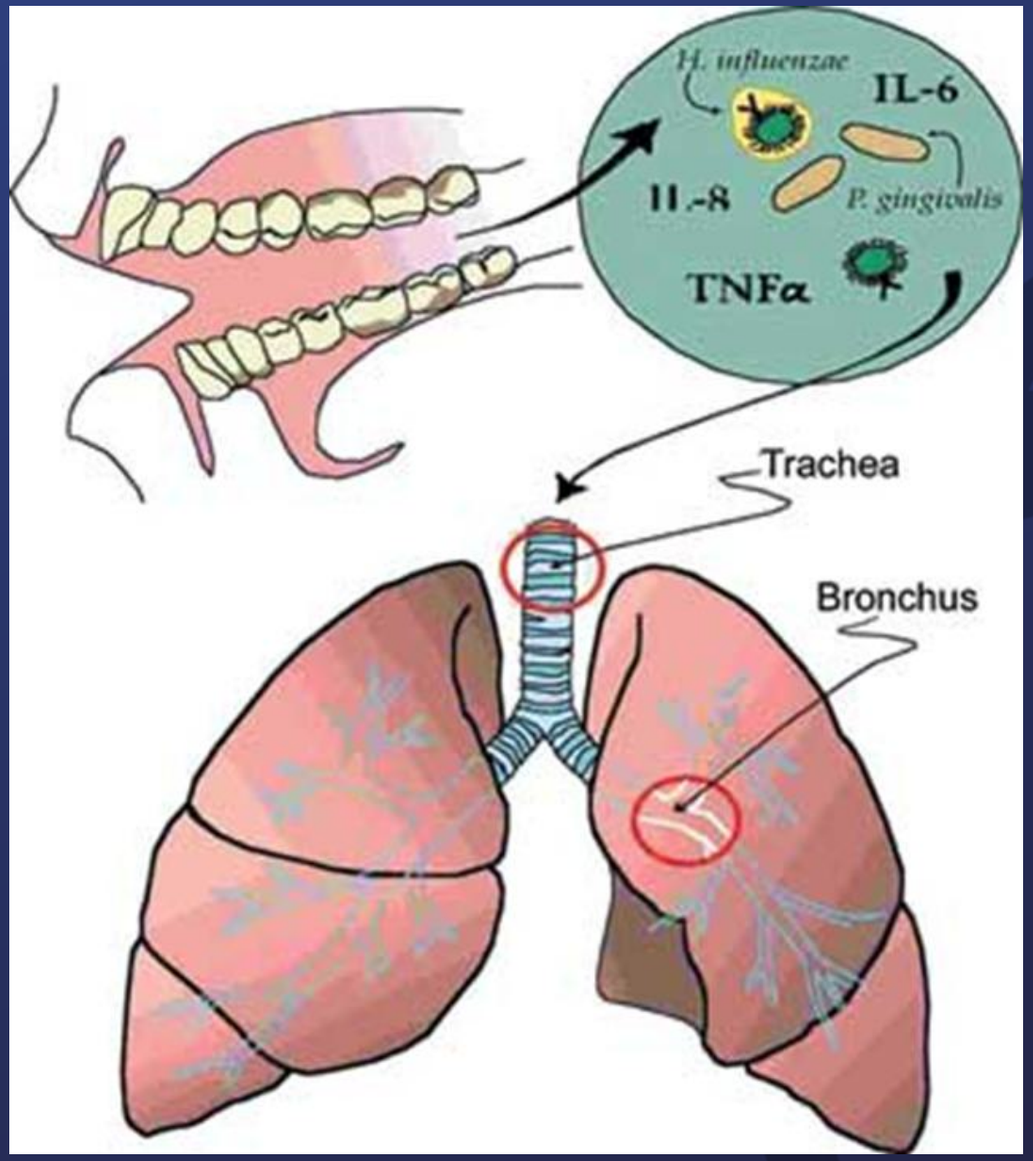


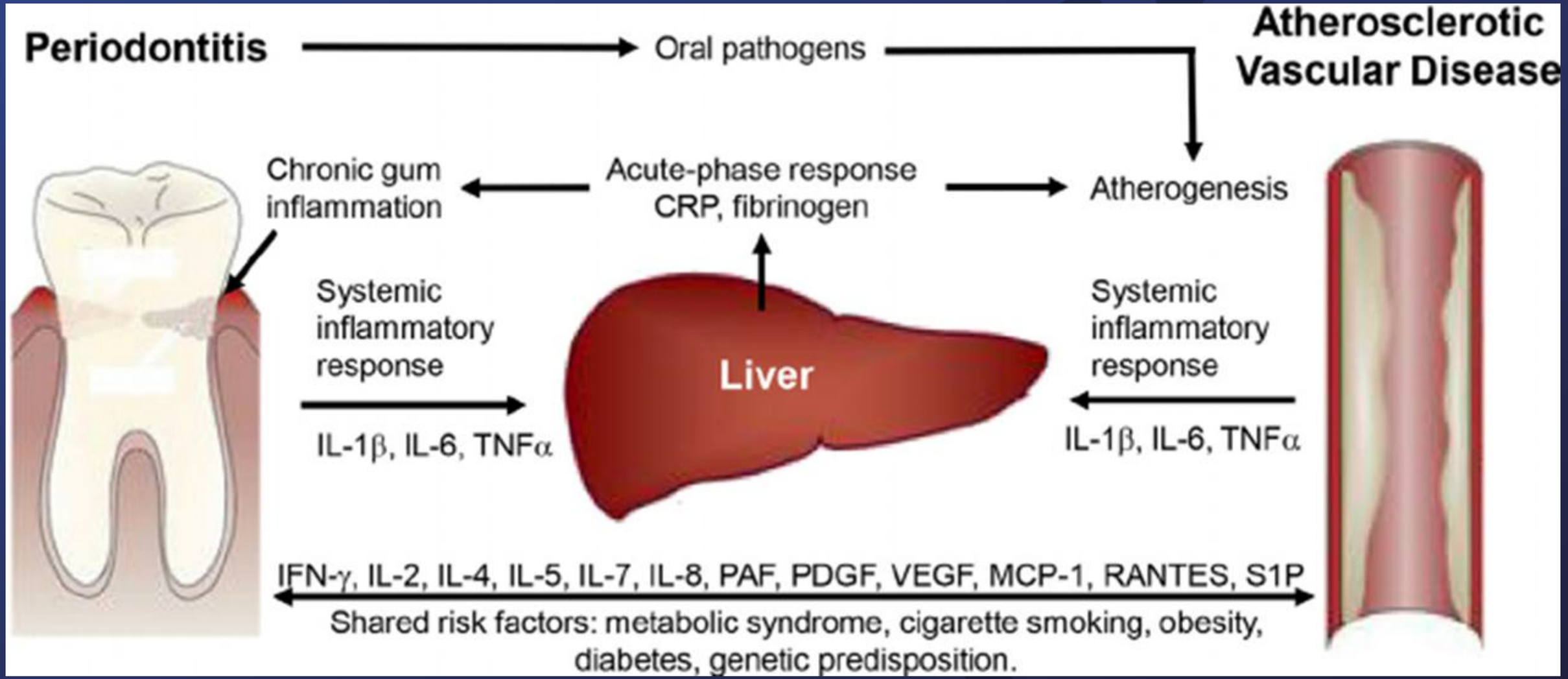
Conclusions

- Patients with RA had a higher proportion of sites with severe alveolar bone loss than controls
- Periodontal bone loss was strongly associated with RA disease activity
- Evidence suggests RA may be a risk factor in the progression and severity of periodontitis


Systemic bacterial dissemination
Systemic inflammation
IL-1β, IL-6, TNF-α and
prostaglandin E_2
Liver
C-reactive protein
Periodontal disease
Inflammation
-induced
preterm birth

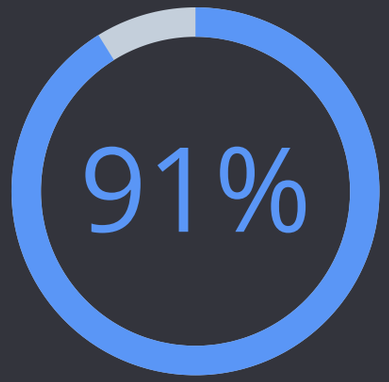
Asthma



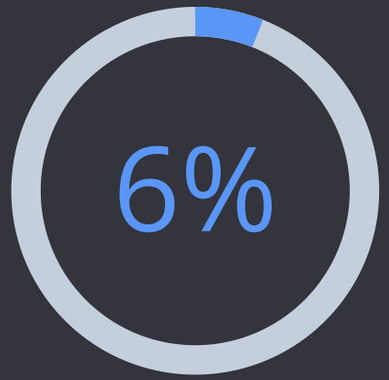

Periodontitis
Oral pathogens
Atherosclerotic Vascular Disease
Chronic gum inflammation
Acute-phase response CRP, fibrinogen
Atherogenesis
Systemic inflammatory response
IL-1β, IL-6, TNFα
Liver
Systemic inflammatory response
IL-1β, IL-6, TNFα
IFN-γ, IL-2, IL-4, IL-5, IL-7, IL-8, PAF, PDGF, VEGF, MCP-1, RANTES, S1P
Shared risk factors: metabolic syndrome, cigarette smoking, obesity, diabetes, genetic predisposition.

Diabetes and Periodontal Health

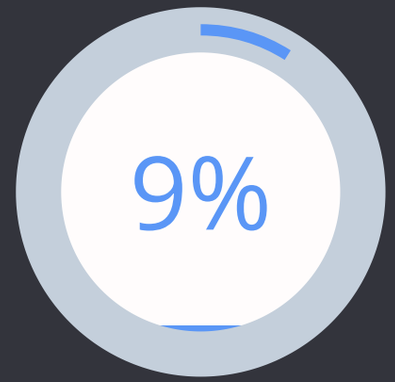
Type I and Type II Diabetes Prevalence



Type II



Type I



Prevalence among US population

Bullard KM, Cowie CC, Lessem SE, et al. Prevalence of Diagnosed Diabetes in Adults by Diabetes Type — United States, 2016. MMWR Morb Mortal Wkly Rep 2018;67:359–361.

Proposed Mechanisms

Diabetes and Periodontal Disease

Host inflammatory response is altered in diabetics

A

Impaired neutrophil chemotaxis

Mealey, 2006 A1C value/inflammation
Sakurai, 2003 AGE/RAGE
Leeper, 1985 PMN function is inhibited

Proposed Mechanisms

Diabetes and Periodontal Disease

Host inflammatory response is altered in diabetics

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A1C values greater than 8% had 2x more pro-inflammatory mediators than values below 8%

B

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Proposed Mechanisms

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Hyperglycemic state causes inhibition of osteoblast proliferation and collagen production (delayed wound healing)

C

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Sakurai, 2003 AGE/RAGE
Leeper, 1985 PMN function is inhibited

Proposed Mechanisms

Diabetes and Periodontal Disease

Host inflammatory response is altered in diabetics

A

A1C values greater than 8% had 2x more pro-inflammatory mediators than values below 8%

B

Hyperglycemic state causes inhibition of osteoblast proliferation and collagen production (delayed wound healing)

C

Advanced glycation end products; Proteins that become irreversibly glycated in hyperglycemic states

D

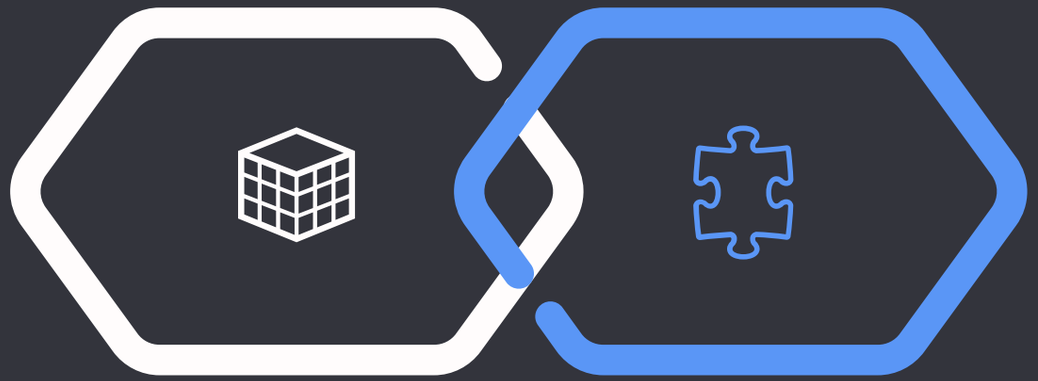
Mealey, 2006 A1C value/inflammation
Sakurai, 2003 AGE/RAGE
Leeper, 1985 PMN function is inhibited

Overview of Literature

Number of bleeding sites improved as glycemic control improved (Mealey, 2006)

LESS INFLAMMATION =- LESS BLEEDING

Diabetes and Perio



No stat signficance regarding the amount of plaque, bleeding, calculus present in diabetics vs. non-diabetics (Khader, 2006)

DIABETICS RESPOND DIFFERENTLY TO THE PRESENCE OF 'LOCAL FACTORS

Diabetes and Perio

Average pocket depth was significantly different among diabetics versus non-diabetics (Khader, 2006)

REPAIR PROCESS IS IMPAIRED

Diabetes and Perio

6-fold increased risk of worsening glycemic control over time compared to subjects without periodontal disease (Taylor, 1996)

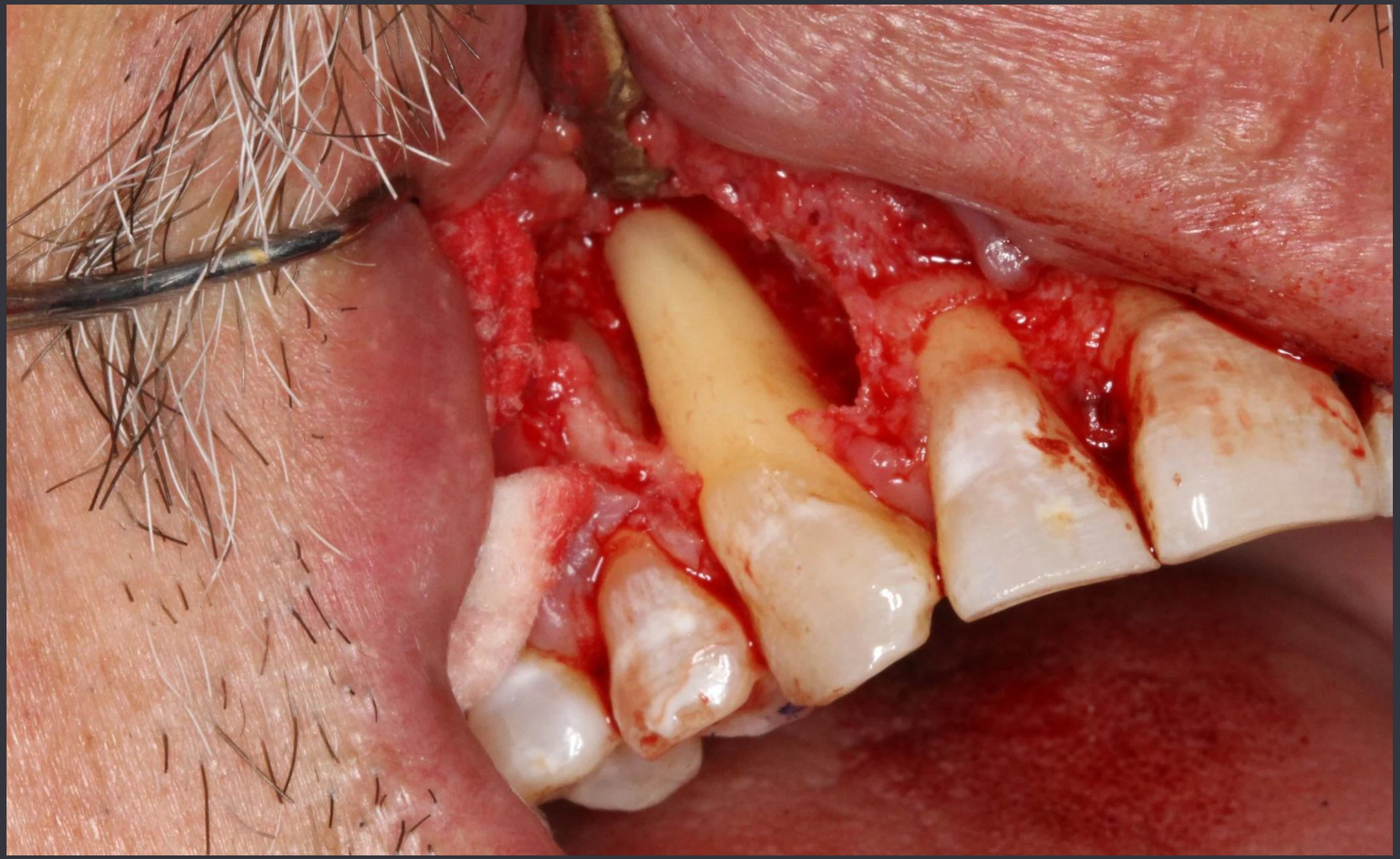
INCREASED ORAL INFLAMMATION =
WORSE GLYCEMIC CONTROL

Diabetes and Perio

Periodontal disease may induce elevated systemic inflammation. Evidence shows increased insulin resistance with greater viral and bacterial loads. Treating perio may aid in restoring insulin sensitivity

BACTEREMIA IS COMMON. DISEASE BEHAVES LIKE AN OPEN WOUND

Case Example



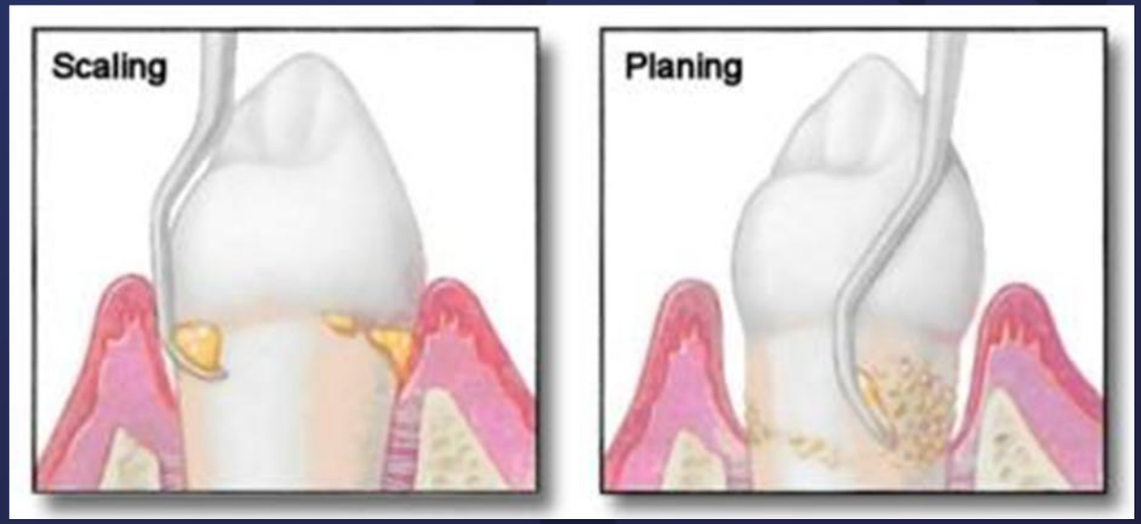
Strategies used to manage inflammation

Managing inflammation is the key to oral and systemic health

How aggressively that inflammation needs to be managed can be determined through the help of the hygienist, dentist, and periodonttist

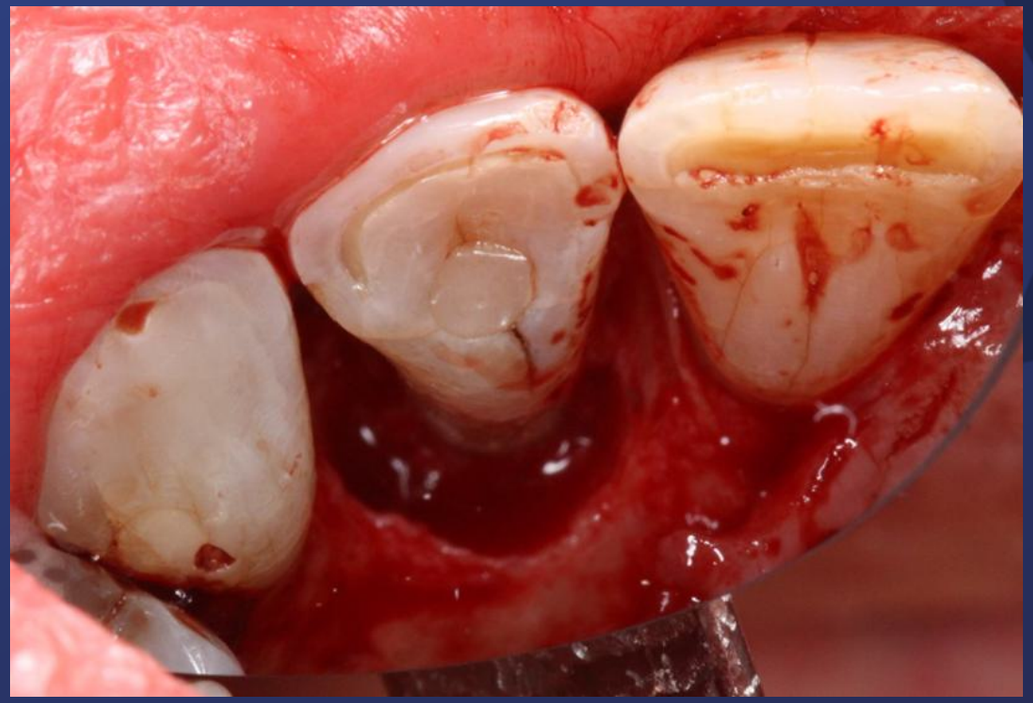
Periodontist's Tool Chest

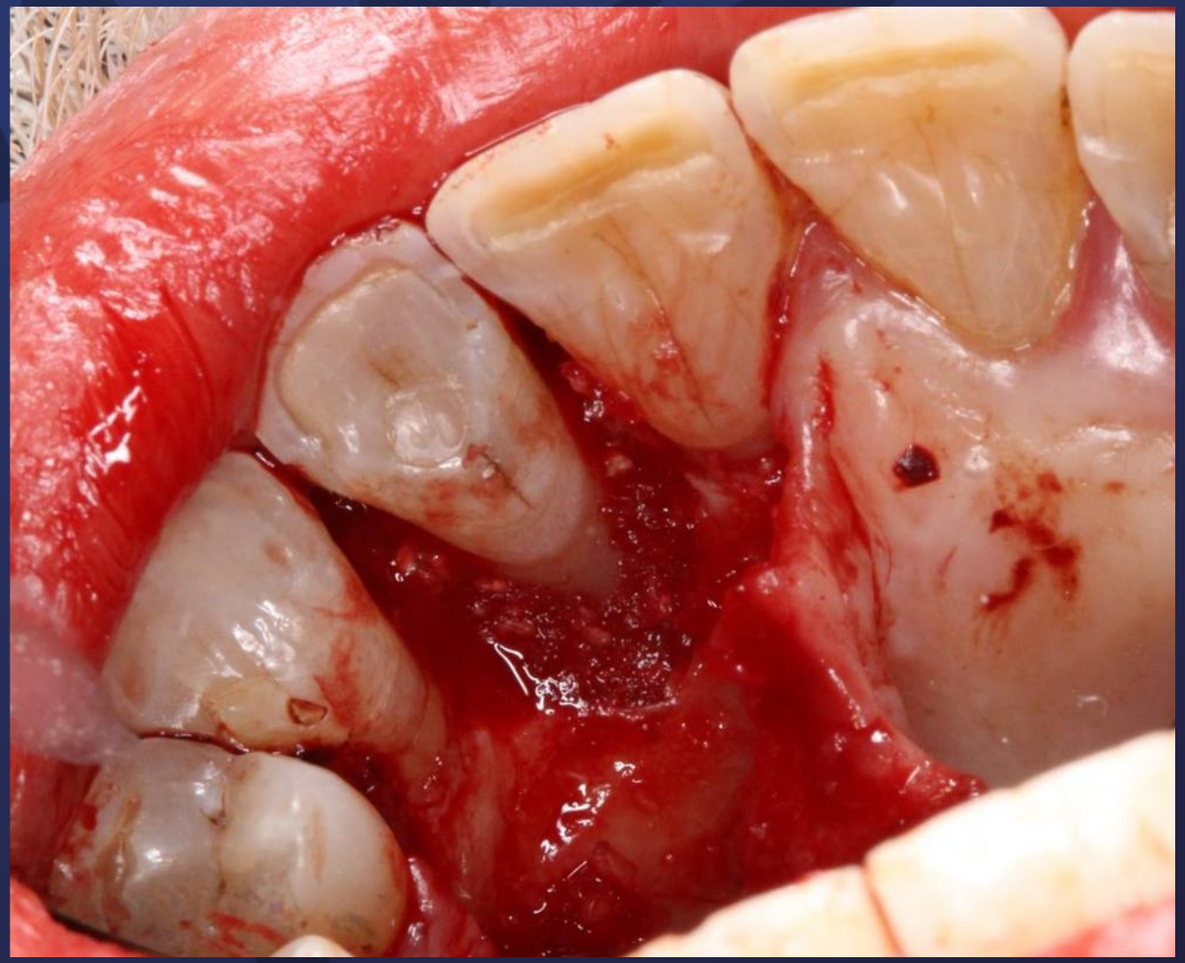
Scaling and Root Planing



Tissue Grafting

Bone Grafting

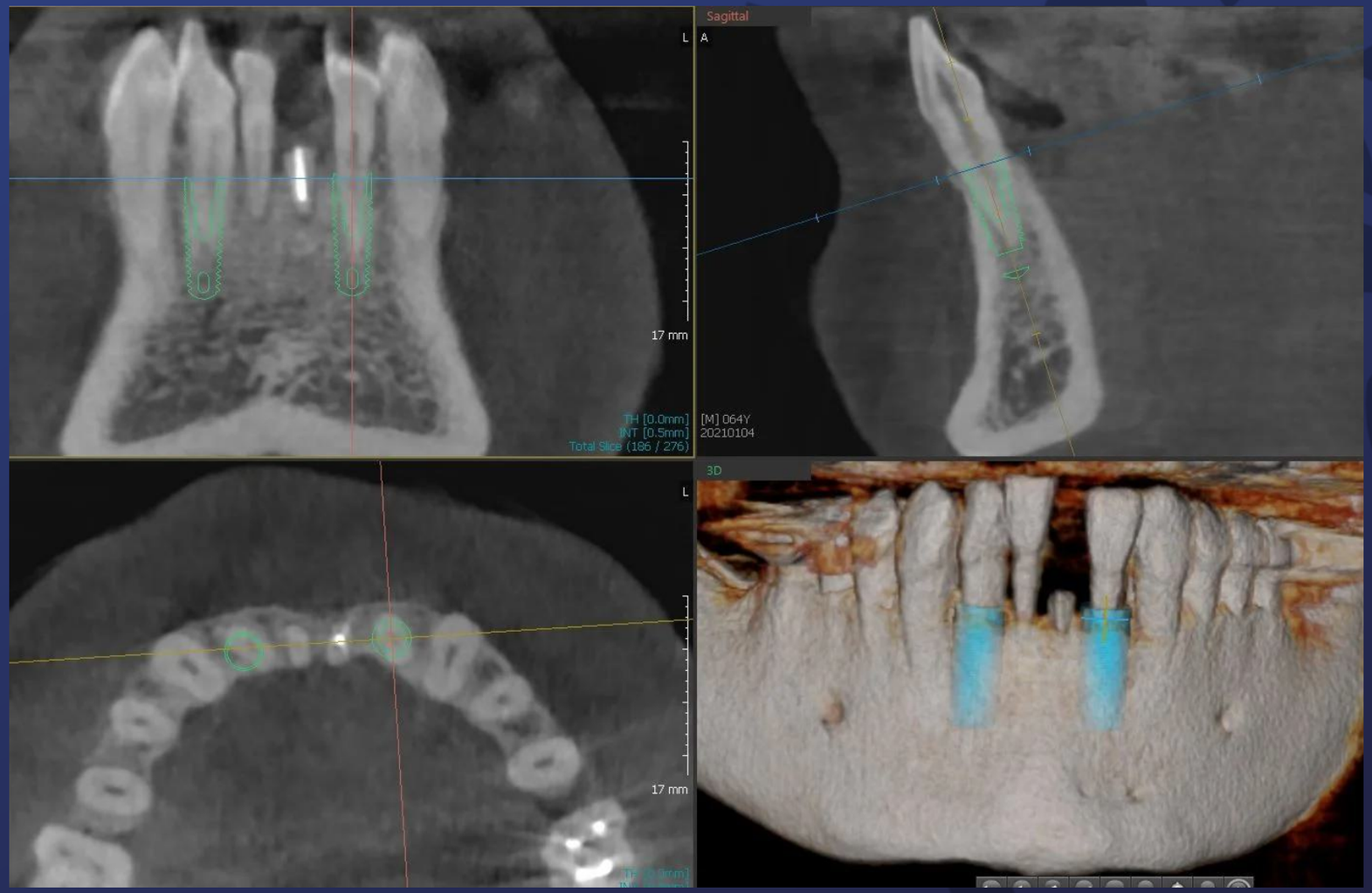




Flap Surgery

Flap Surgery

Implant Placement



Implant Placement

Dental considerations for diabetic patients

"Who's your dentist?"

Periodontal disease is often asymptomatic. Seeing your general dentist is the first step in determining the health of your gums and teeth.

Diabetic patients are at a much greater risk for tooth loss

Hygiene Basics

Plaque is a sticky, colorless substance that forms on the teeth, especially above and below the gums. It's very similar to mayonnaise in consistency.

Removing plaque will reduce the chances of gingivitis, cavities, and periodontal disease

Hygiene Basics

Mechanical removal of plaque

Oral hygiene never takes a holiday!!!

THANK YOU!

DO YOU HAVE ANY QUESTIONS?

Email: drpaul@midwestperiollc.com

Paul Johnson, DDS - Midwest Periodontics