"Contemporary Clinical Periodontics and Oral Implantology2021"

Vermont State Dental Society

Professor Jon B. Suzuki, DDS, PhD, MBA

"Contemporary Clinical Periodontics"

I. Dental Diseases and Epigenetics
II. Microbiome and Clinical Applications
III. Immune (Host) Response
IV. Bisphosponates and Osteonecrosis of the Jaw
V. Periodontal Therapies
VI. Dental Clearance for Physicians
VII. Systemic Diseases related to Periodontitis
VIII. Conclusions

3 MAIN DISEASES DENTISTS TREAT:

1. CARIES

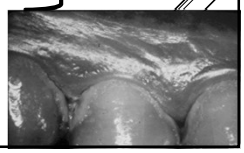
2. PERIODONTAL DISEASES

3. ORAL CANCERS

3 MAIN DISEASES DENTISTS TREAT:

1. CARIES
2. PERIODONTAL DISEASES
3. ORAL CANCERS

Caused by Plaque Biofilm



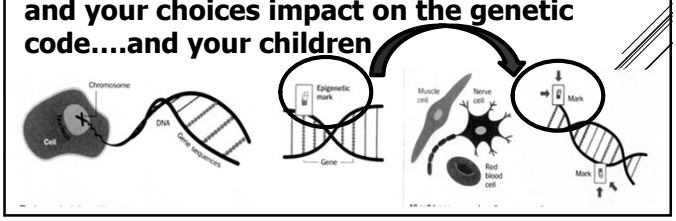
3 MAIN DISEASES DENTISTS TREAT:

1. CARIES
2. PERIODONTAL DISEASES
3. ORAL CANCERS

Caused by Genetics and "Epigenetic Factors" (?)

EPIGENETICS

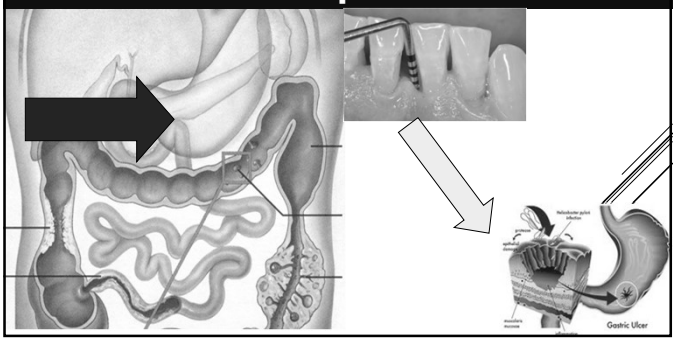
The emerging field of how the environment and your choices impact on the genetic code….and your children



Does Oral Microbiome have an impact on GI tract or Respiratory Flora?

Yes

Oral Microbiome impact on GI tract



Nobel Prize in Medicine 2005

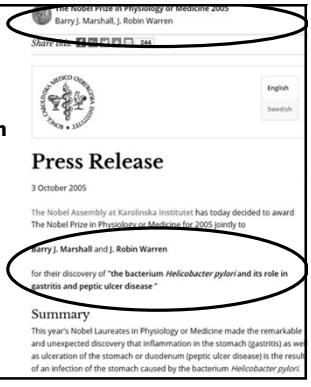
Barry J. Marshall and J.Robin Warren

Discovery of "the bacterium Helicobacter pylori and its role in gastritis and peptic ulcer disease"

Heartburn/GERD > News >

Ulcers Give Scientists Nobel Prize in Medicine

2 Australian Scientists Snag the Prize for Stomach Ulcer Research


The Nobel Prize in Physiology or Medicine 2005
Barry J. Marshall, J. Robin Warren

English
Swedish

Press Release

3 October 2005

The Nobel Assembly at Karolinska Institutet has today decided to award The Nobel Prize in Physiology or Medicine for 2005 jointly to

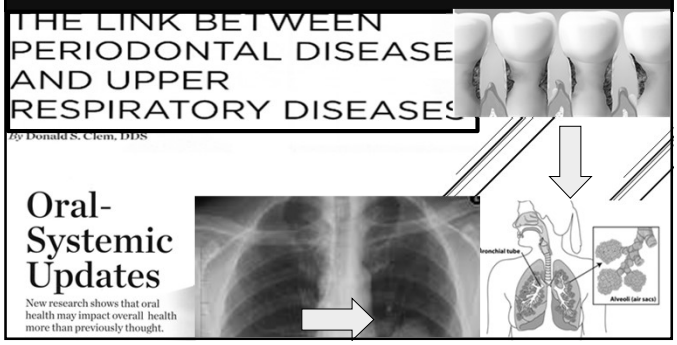
Barry J. Marshall and J. Robin Warren

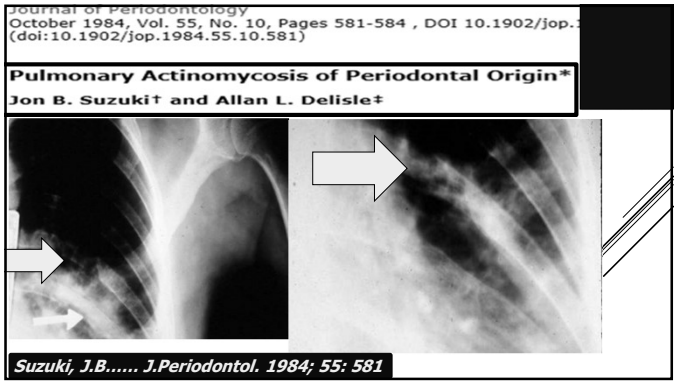
for their discovery of "the bacterium *Helicobacter pylori* and its role in gastritis and peptic ulcer disease"

Summary

This year's Nobel Laureates in Physiology or Medicine made the remarkable and unexpected discovery that inflammation in the stomach (gastritis), as well as ulceration of the stomach or duodenum (peptic ulcer disease) is the result of an infection of the stomach caused by the bacterium *Helicobacter pylori*.

Oral Microbiome impact on Respiratory tract





Suzuki, J.B..... J.Periodontol. 1984; 55: 581

Functions of G.I Tract Microbiome

1. Development, training, and maintenance of Immune Response

Cani, 2018. Gut 67:1716

Singh, 2017. J.Transl.Med.15:73

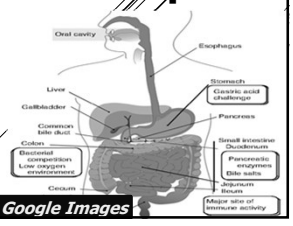


Photo credit: Google Images

Functions of G.I Tract Microbiome

2. Enhance integrity of G.I. barriers

Photo credit: The Ohio State University

Cani, 2018. Gut 67:1716
Singh, 2017. J.Transl.Med.15:73

Functions of G.I Tract Microbiome

3. Promote G.I. Epithelial Repair

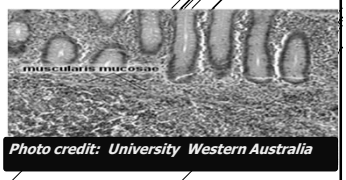


Photo credit: University Western Australia

Roca-Saavedra. 2018; J.Phys.Biochem.74:69

Functions of G.I Tract Microbiome

4. Nutrient Extraction from foods

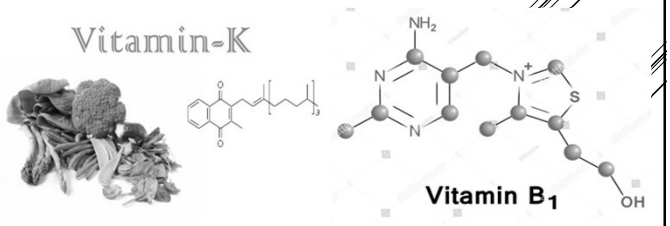
"good" = microbial enzymes help digest carbohydrates, proteins, for absorption.

"bad"= excess extraction and absorption of carbohydrates

Roca-Saavedra. 2018; J.Phys.Biochem.74:69
Iebba. 2016. New Microbiol. 39: 1

Functions of G.I Tract Microbiome

5. Synthesize Vitamins K and B



Prescott. 2018. Biophyschsoc.Med. 12:7

Functions of G.I Tract Microbiome

6. Modify appetite and food intake

Wu.2015;Trends Endocrin.Metabol. 26:758

Effect of Non-Nutritive Sweeteners

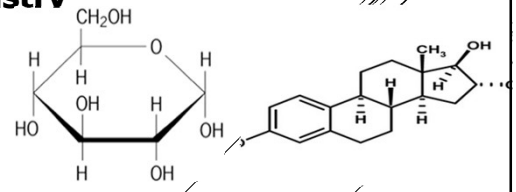
G.I. Microbiome Alterations

Weight Gain (?)
Insulin Resistance (?)

Roca-Saavedra.2018.Physiol.Biochem. 74:69
Zinocker.2018.Nutrients 10:365
Singh. 2017. Gut Microbes 6: 149

Functions of G.I Tract Microbiome

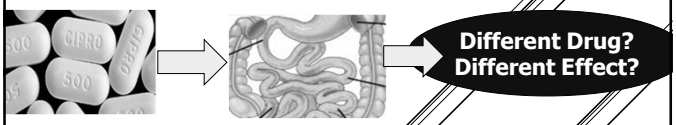
7. Regulate Glucose and Lipid Biochemistry



Schirmer. 2018; Nat.Microbiol. 2018.

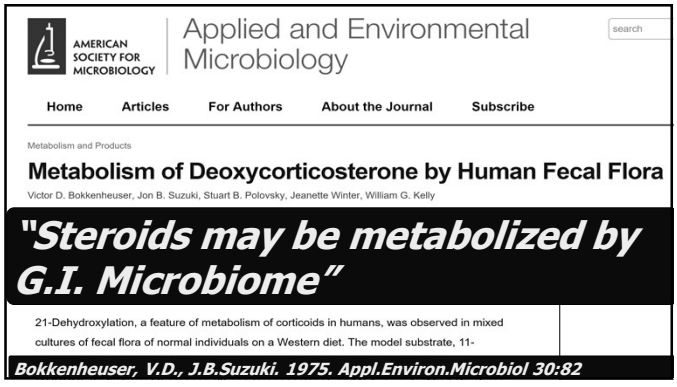
Functions of G.I Tract Microbiome

8. Metabolize drugs.



Prescott. 2018. Biopsychsoc.Med. 12:7

Bokkenhauser, V... Suzuki, J.B. 1975. J. Clin.Micro 30:82



Bokkenheuser, V.D., J.B.Suzuki. 1975. Appl.Environ.Microbiol 30:82

"Do Systemic Antibiotics affect birth control medication"

Yes/ No

Wu.2015;Trends Endocrin.Metabol. 26:758

Miller, D.M. and S.E. Helms. J.Am.Acad.Derm.1994.30:1008

June 1994Volume 30, Issue 6, Pages 1008–1011

A practical approach to antibiotic treatment in women taking oral contraceptives

Daniel M. Miller,
Stephen E. Helms, MD

" ...present a practical approach.... Based on sharing responsibility with an educated patient "

choose oral contraceptives for birth control, the potential for interaction between these drugs frequently has to be considered. We review the available information and present a practical approach for dealing with this situation based on sharing responsibility with an educated patient.

American Journal of Obstetrics and Gynecology
Volume 218, Issue 1, January 2018, Pages 88-97.e14

Systematic Reviews

Drug interactions between non-rifamycin antibiotics and hormonal contraception: a systematic review

"Most women can expect no reduction in hormonal contraceptive effect with the current use of non-rifamycin antibiotics"

Simmons,K.B. 2018. Am.J.Ob.Gyn.218:88

Clinical Recommendation (JBS)

"When prescribing Rx Systemic Antibiotics to females taking birth control medications, advise them to use an alternative form of birth control for 30 days"

"Do Systemic Antibiotics affect G.I. tract microbiome?"

Yes

Wu.2015;Trends Endocrin.Metabol. 26:758

Systemic Antibiotics decrease Vitamin K

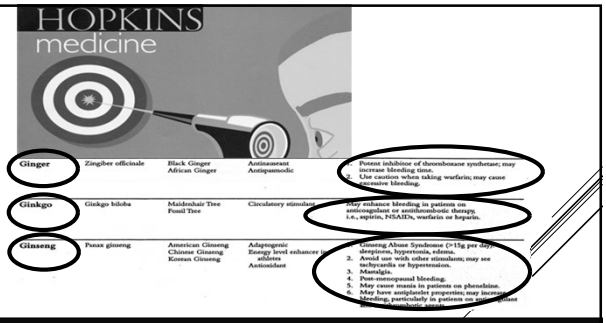
G.I. Microbiome

Photo credit: Google Images

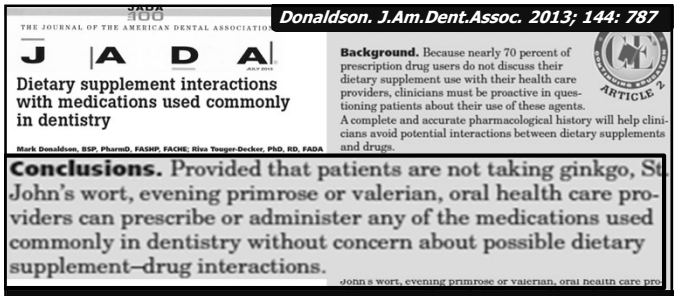
Vitamin K

Post-Sx Bleeding

Conly, J.M. and K.Stein. Am.J.Gastroenterol 1992; 87: 311-6
Wood, G.D and T. Deeble. Dent.Update 1993; 20: 350-3
Buckley, N.A. and A.H.Dawson. Med.J.Austr. 1992; 157:479-83



"Ginger, Ginkgo, Ginseng, may increase bleeding during invasive dental procedures"

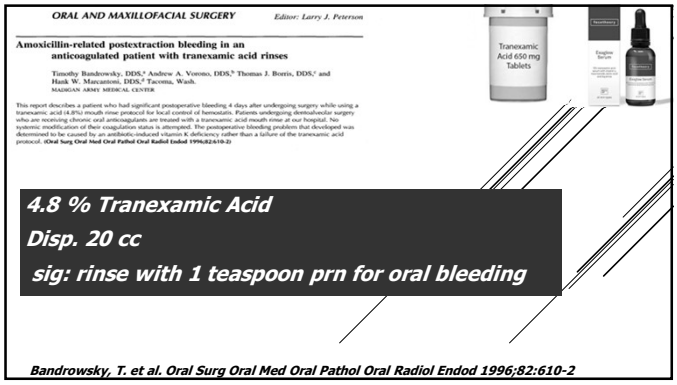


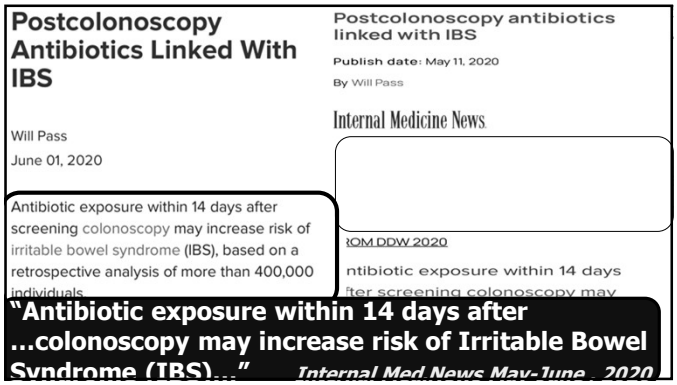
Donaldson. J.Am.Dent.Assoc. 2013; 144: 787

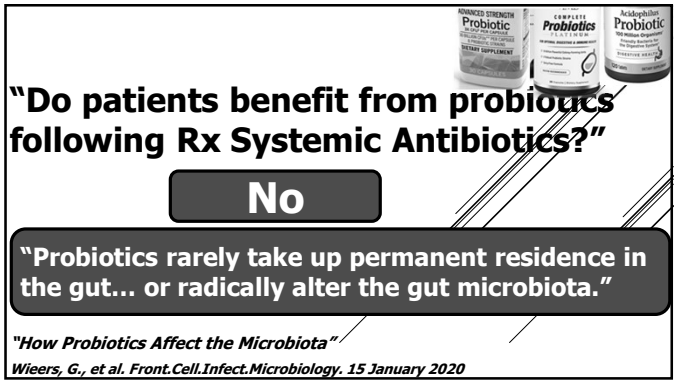
"Ginkgo, St. John's Wort, Primrose, and Valerian may decrease efficacy of Systemic Antibiotics "

Clinical Recommendation

"When updating Medication history with dental patients, ask about herbs and other supplements; they may impact on post-surgical bleeding."


ORAL AND MAXILLOFACIAL SURGERY
Editor: Larry J. Peterson
Amoxicillin-related postextraction bleeding in an anticoagulated patient with tranexamic acid rinses
Timothy Bandrowsky, DDS,* Andrew A. Vorono, DDS,† Thomas J. Borris, DDS,‡ and Hank W. Marcantoni, DDS,§ Tacoma, Wash.
MADIGAN ARMY MEDICAL CENTER
This report describes a patient who had significant postoperative bleeding 4 days after undergoing surgery while using a tranexamic acid (4.8%) mouth rinse protocol for local control of hemostasis. Patients undergoing dentoalveolar surgery who are receiving chronic oral anticoagulants are treated with a tranexamic acid-mouth rinse at our hospital. No systemic modification of their coagulation status is attempted. The postoperative bleeding problem that developed was determined to be caused by an antibiotic-induced vitamin K deficiency rather than a failure of the tranexamic acid protocol. (Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1996;82:610-2)
Tranexamic Acid 650 mg Tablets
4.8 % Tranexamic Acid
Disp. 20 cc
sig: rinse with 1 teaspoon prn for oral bleeding
Bandrowsky, T. et al. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1996;82:610-2


Postcolonoscopy Antibiotics Linked With IBS
Will Pass
June 01, 2020
Antibiotic exposure within 14 days after screening colonoscopy may increase risk of irritable bowel syndrome (IBS), based on a retrospective analysis of more than 400,000 individuals
Postcolonoscopy antibiotics linked with IBS
Publish date: May 11, 2020
By Will Pass
Internal Medicine News
ntibiotic exposure within 14 days
fter screening colonoscopy may
"Antibiotic exposure within 14 days after …colonoscopy may increase risk of Irritable Bowel Syndrome (IBS)…"
Internal Med News May-June , 2020


"Do patients benefit from probiotics following Rx Systemic Antibiotics?"
No
"Probiotics rarely take up permanent residence in the gut… or radically alter the gut microbiota."
"How Probiotics Affect the Microbiota"
Wieers, G., et al. Front.Cell.Infect.Microbiology. 15 January 2020

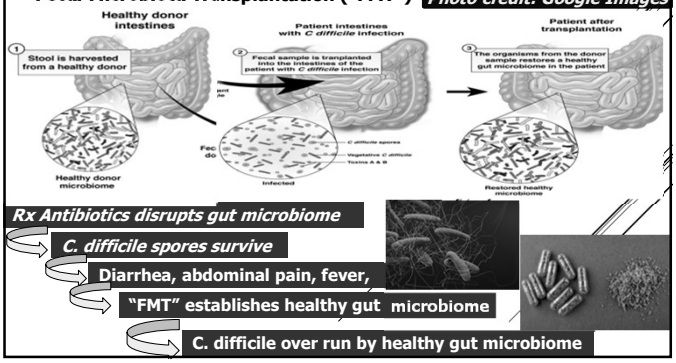
"Do patients benefit from probiotics following Rx Systemic Antibiotics?"

No

"Post-antibiotic gut mucosal microbiotic reconstitution is impaired by probiotics and improved by autologous FMT (Fecal Microbiota Transplantation

Suez, J. et al. Cell. 2018; 174: 1406-1423

Fecal Microbiota Transplantation ("FMT") ***Photo credit: Google Images***



Rx Antibiotics disrupts gut microbiome

C. difficile spores survive

Diarrhea, abdominal pain, fever,

"FMT" establishes healthy gut microbiome

C. difficile over run by healthy gut microbiome

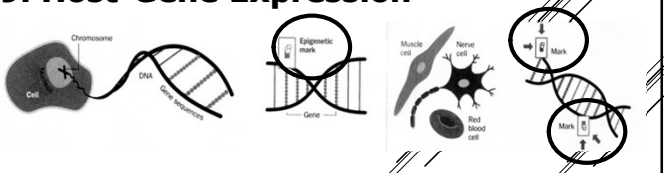
Clinical Recommendation (JBS)

"Prior to performing dental extractions, periodontal surgeries, implant surgeries, update your patient's medical and Rx history"

"Adjust surgical treatment plan accordingly when systemic antibiotics have been used by the patient in the past 14 days"

Functions of G.I Tract Microbiome

9. Host-Gene Expression

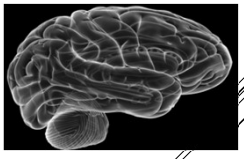


Kodukula. 2017; Biores.Open Access 6:123

Lima-Ojeda. 2017; Front.Psych. 8: 154

Functions of G.I Tract Microbiome

10. Development, Health, Functions of the Brain



Schirmer. Cristiano. 2018; Frontiers Phys. 9:184
Cemit. 2017. World J. Gastro. 23:5486
Cani. 2016. Molecular.Metab.5: 5:743

Dementia "Potential" Microbial Pathogenesis

G.I. Microbiome

⇩

Brain

Zheng.2016.Mol.Psychiatry 21:786
Lina Lojeda. 2017. Front.Psych.8:153
Kelly.2016. J.Psychiatr.Res 82:109

Alzheimer's Disease *"Potential"* Microbial Pathogenesis

G.I. Microbiome

⇩

***Helicobacter, Chlamydia, Herpes Simplex,* Others**

⇩

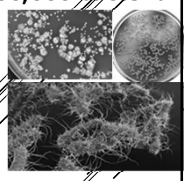
Brain

Hu.2016.Sci.China Life Sci.59:1006

What Shapes the Microbiome?

"We swallow approximately 10,000,000,000,000 bacteria per day into our GI tract"

Atarshi. 2017. Science 58:359



Influences Alzheimer's Disease

Harding.2017.Neuroscience 9:398.

Gao.2018. Protein & Cell 9:488.

Influences Other Systemic Diseases

Gao.2018. Liro-Junior.2018.Mucosal Immunol. 11:316

What Shapes the Microbiome?

Photo credit: Google Images

Pregnancy, in utero

Gigliardi. 2018. Int.J.Ent.Trd. 15: 1679

Lima-Ojeda. 2017

Birth, Vaginal vs C-section

Friedman. 2018

Mohareri. 2018

What Shapes the Microbiome?

Adult :

- **Diet** ***Lerner. 2017***
- **Stress** ***Prescott. 2018. Mayer. 2016***
- **Circadian Rhythm** ***Deaver. 2018; Kaxz Marek 2017***
- **Aging** ***Mohajari. 2018***
- **Oral Microbiome (Periodontal Diseases, Caries)**

Sudhakara. 2018; Marsh. 2015; Gao. 2018; Kilian. 2016

What Shapes the Microbiome?

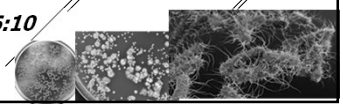
Influences Immune Response

Atarashi.2017.Science 58:359

Influences Brain

Sochocka.2018,2019.Mol Neurobiol.2019;56(3):1841.

Sudhakara.2018.Dentistry J. 6:10



IMMUNOLOGY IN DAILY PRACTICE

- **1. Aggressive Periodontitis Patients (EOP, RP, JP, PP)**
- **2. Genetics of Immune Dysfunctions** (e.g. Autoimmune disorders, Crohn's, Sjogren's, etc)
- **3. Antineoplastic Cancer Meds**
- **4. Anti Organ Transplant Rejection Meds**
- **5. Diabetics and relatives of Diabetics**
- **6. Steroid Therapies**
- **7. Stress**
- **8. Anyone over age 65 years**

INFLAMMATION AND SYSTEMIC DISEASES

Gram Negative Periodontal Pathogens

↓

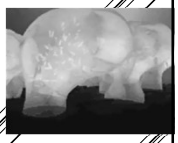
Lipopolysaccharides

↓

G.I. Inflammation

↓

Systemic Inflammation



DeGroot.2017.Gut Microbes 8:253

Rudzki. 2018. Front.Psychiatry 9: 205

Gram Negative Periodontal Pathogens

↓

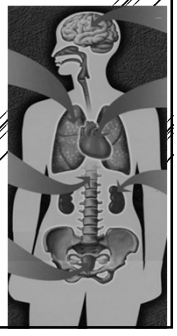
Lipopolysaccharides

↓

Inflammation

↓

Remote Organs



Lerner. 2017. Microorg. 5:66

Clinical Recommendation

" Periodontitis, as an oral infection, may contribute to risk factors for Systemic Diseases

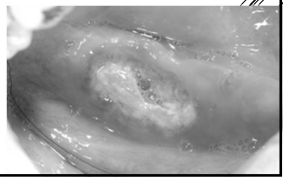
Periodontal therapy should reduce the risk for selected systemic diseases "

PRIMARY INDICATIONS FOR BISPHOSPHONATES

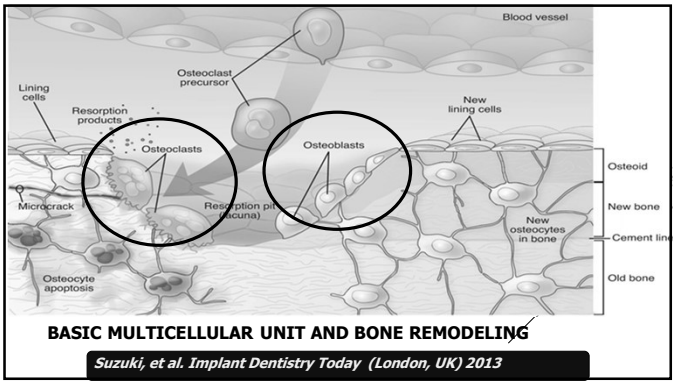
Osteoporosis
Osteopenia
Multiple Myeloma
Paget's Disease
Breast CA Therapies
Prostate CA ADT

CLINICAL PRESENTATION OF ONJ *

- **Pain (Variable)**
- **Periodontal Swelling, Infections**
- **Mobility of Teeth**
- **Purulence**
- **Exposed Bone**

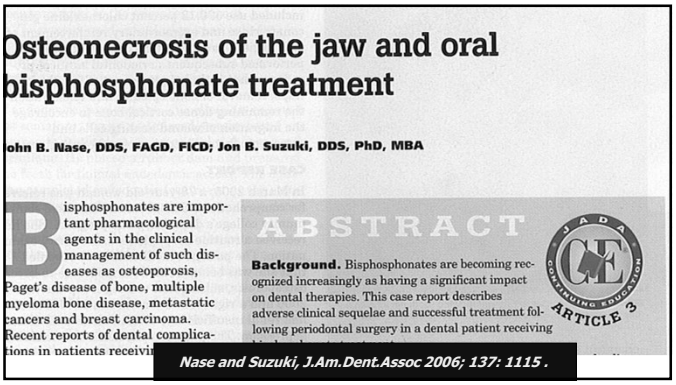


** ADA Council on Scientific Affairs. J. Am. Dent. Assoc. 2008*



BASIC MULTICELLULAR UNIT AND BONE REMODELING

Suzuki, et al. Implant Dentistry Today (London, UK) 2013



Osteonecrosis of the jaw and oral bisphosphonate treatment

John B. Nase, DDS, FAGD, FICD; Jon B. Suzuki, DDS, PhD, MBA

Bisphosphonates are important pharmacological agents in the clinical management of such diseases as osteoporosis, Paget's disease of bone, multiple myeloma bone disease, metastatic cancers and breast carcinoma. Recent reports of dental complications in patients receiving

ABSTRACT

Background. Bisphosphonates are becoming recognized increasingly as having a significant impact on dental therapies. This case report describes adverse clinical sequelae and successful treatment following periodontal surgery in a dental patient receiving

JADA CE CONTINUING EDUCATION ARTICLE 3

Nase and Suzuki, J.Am.Dent.Assoc 2006; 137: 1115 .

OSTEOPOROSIS DRUGS- ORAL (USA FDA APPROVED, 2021)

- **Fosamax**
- **Fosamax with Vit D**
- **Actonel**
- **Actonel with Calcium**
- **Boniva**
- **Atelvia***

** "OK" after meals*

OSTEOPOROSIS DRUGS- IV
(FDA APPROVED,2021)

- **Aredia (30 mg iv/ mo)***
- **Zometa (30 mg iv/ mo)***
- **Reclast (5 mg iv/ yr)****

** Rx for Multiple Myeloma, Ca*
*** Rx for Osteoporosis*

Lee, C and J.B. Suzuki. Implant Dentistry 2015; 24: 227

"... combined history of oral antiresorptive therapy and now taking IV Zoledronic acid (Reclast). All 4 cases developed Medication - related Osteonecrosis of the Jaw after Implant Surgeries."

Clinical Recommendation

"Patients on IV bisphosphonates treatment planned for invasive dental procedures, should be referred to a specialist or hospital dental clinic"

A Decade of Bisphosphonate Bone Complications: What It Has Taught Us About Bone Physiology

Robert E. Marx, DDS[1]

1. BISPHOSPHONATES ½ LIFE IN BONE = 11 YEARS

2. IV Bisphosphonates accrue in bone 142.8 X Oral Bisphosphosphonates

INT J ORAL MAXILLOFAC IMPLANTS 2014;29:e247–e258.

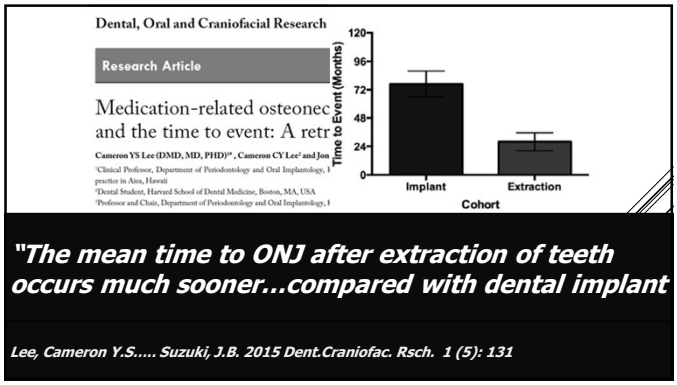
HOW LONG FOR RX TO REACH MAXIMUM EFFICACY? (BONE BIOPSY)

- **Alendronate (Fosamax) = 2-3 years normal mineralization**
- **Risendronate (Actonel, Atelvia)= 3-5 years normal mineralization**

Erickson. Bone 2002; 15: 613
Ste-Marie. Calcif.Tissue Int 2004; 75: 469
Roschger. Bone 2001; 29: 185

IS THERE A DIFFERENCE IN TIME FOR ONJ TO DEVELOP BETWEEN EXTRACTIONS AND IMPLANTS?

YES



"The mean time to ONJ after extraction of teeth occurs much sooner…compared with dental implant

Lee, Cameron Y.S..... Suzuki, J.B. 2015 Dent.Craniofac. Rsch. 1 (5): 131

RX ANTIBIOTICS FOR OSTEONECROSIS OF THE JAW

- **Rx Amoxicillin, 500 mg, #24, tid, X 30 days**
  OR **(if pen allergy)**
- **Rx Metronidazole, 500 mg, #24, tid**
- **Rx Clindamycin, 150 mg, #16, bid**
- **Rx Ciprofloxicin, 500 mg, #24, tid**
- **Rx Azithrocin ("Z Pack"), 5 days x 5 packs**

RX ANTIBIOTICS POTENTIAL ADVERSE EFFECTS

Rx Amoxicillin, 500 mg, #24, tid
or **if pen allergy**

- **Rx Metronidazole** **(Antabuse analogue)**
- **Rx Clindamycin** **(Ulcerative colitis)**
- **Rx Ciprofloxicin** **(Tendon ruptures)**
- **Rx Azithrocin** **(Gastic upset)**

Clinical Recommendation

"Post Extraction, take a Periapical or Occlusal film to dx bone spicules in the extraction socket.

If spicules are present, debride and irrigate socket to improve po wound healing

Rx CHX or CPC rinses X 2-3 weeks "

Hugo Gaêta-Araujo, André Ferreira Leite, Karla de Faria Vasconcelos, Ruxandra Coropciuc, Constantinus Politis, Reinhilde Jacobs, Christiano Oliveira-Santos

INTERNATIONAL JOURNAL OF ORAL IMPLANTOLOGY

ICOI

01/21

Why do some extraction sites develop medication-related osteonecrosis of the jaw and others do not? A within-patient study assessing radiographic predictors

Araujo, et al. Int. J.Oral Implant. 2021

ABSTRACT

Purpose: To compare radiographic predictors of medication-related osteonecrosis dental extraction sites.

Materials and methods: Forty-one oncological patients undergoing intravenous or subcutaneous antiresorptive treatment, with a history of dental extraction visualised by panoramic imaging, were included in this retrospective study. Age-, sex- and extracted tooth-matched healthy patients

Conclusions: "Radiographic predictors of further development of MRONJ in extraction sites include heterogeneous bone pattern, angular bone loss and furcation involvement..."

Conclusions: Radiographic predictors of further development of medication-related osteonecrosis of the jaw in extraction sites include heterogeneous bone pattern, angular bone loss and furcation involvement. Extraction sites with underlying bony changes related to endodontic and endodontic-periodontal disease are more prone to development of medication-related osteonecrosis of the jaw.

"ODDS RATIOS FOR ONJ INCREASE WITH*..."

- **Hx of Oral Bisphosphonates (3+ yrs)**
- **Hx of IV Bisphosphonates (6+ mos)**
- **One or more Co-Morbidities**

** Suzuki, J.B. Unpublished Data. 2021*

FOSAMAX HAS EXTENDED BENEFIT FOR 5 YEARS

- 1,100 female pts, 55-81 years
- 10 years on Rx Fosamax
- Osteoporosis protection for 5 years after stopping drug
- Conclusion: "Protective benefit for at least 5 yrs"

Black, D. J. Am. Med. Assoc 2006

CLINICAL

Dental management of patients receiving antiresorptive therapy

Jon Suzuki, Eddie Scher, Cemal Ucer, and *Cameron L*
guidance on bisphosphonates in full

Introduction

Bisphosphonates belong to a class of drugs referred to as antiresorptive medications.

Although they are the standard treatment of choice for skeletal problems such as osteoporosis, other bone disorders and certain forms of malignancy, the use of antiresorptive therapy has been implicated in

CPD

Aims and

The aim of this artic
patients receiving a
Readers will:
• Learn the process
• See how the effec
implant treatment
• Understand the di

Surgical management

In cases of advanced ONJ or cases that have proven to be refractory to conservative treatment, a more surgically aggressive approach is indicated, which includes surgical resection of all infected and necrotic bone to permit wound healing in the form of primary closure of soft tissues (Abu-Id et al, 2008; Pautke et al, 2009; Carlson & Basile, 2009; Stockmann et al, 2010; Curi et al, 2011; Wilde et al, 2011).

The mainstay of surgical management involves debridement, sequestrectomy and in some instances, resection (Stage 3) for

Suzuki, et al. Implant Dentistry Today (London, UK). July-August 2013

POTENTIAL "CO-MORBIDITIES" FOR ONJ

- A. Periodontitis *(Oral Oncol.2008)*
- B. Extractions *(Oral Oncol 2008)*
- C. Rx Steroids *(J.Clin.Endocr.Metab. 2005; 90: 1294)*
- D. Diabetes mellitus *(J.Clin.Endocr.Metab.2007; 92: 1172)*
- E. Smoking *(Osteoporos.Int. 2007)*

DENTAL CO-MORBIDITIES*

- Periodontal diseases
- Caries
- Infrabony infections
- Failed Endo lesions
- Extractions
- Pressure necrosis (dentures)
- Periodontal/ Endo Surgery

Ruggiero, 2004
Marx, 2005, 2007;
Wade and Suzuki 2007
Nase and Suzuki, 2006

"In general, oral and iv bisphosphonates have a distinct benefit to health and improvement of mineral bone density."

"Dental professionals should not recommend discontinuation of these medications for any reason."

Jon B. Suzuki

Journal of Clinical and Experimental Dentistry

J Clin Exp Dent. 2017 Jan; 9(1): e141–e149. PMCID: PMC5268104
Published online 2017 Jan 1. doi: 10.4317/jced.53372 PMID: 28149479

Prophylaxis and antibiotic therapy in management protocols of patients treated with oral and intravenous bisphosphonates

Elena-Beatriz Bermúdez-Bejarano,[1] María-Ángeles Serrera-Figallo,[2] Aida Gutiérrez-Corrales,[1] Manuel-María Romero-Ruiz,[1] Raquel Castillo-de-Oyagüe,[3] José-Luis Gutiérrez-Pérez,[4] and Daniel Torres-Lagares[4]

"...Amoxicillin, amoxicillin/clavulanic acid, metronidazole, and/or a combination..."
(If the patient is allergic to penicillin or amoxicillin, Rx Clindamycin)

Bemodez-Bejarano, E. J.Clin.Exp.Dentistry 2017; 9 (1): e141-e149
Vescovi, P. et al. J Craniofac Surg. 2015; 26:696–9
Ferlito, S, et al. J Oral Maxillofac Surg. 2011; 69: e1–4.

Clinical Recommendation

"If patients with osteoporosis are taking Rx Bisphosphonates, reduce risk of ONJ with preventive strategies and inform patient of increased risk"

1.Update Med and Rx Hx
2.Dental cleaning/scaling 7-10 days a Dental Sx
3.CHX or CPC rinses bid X 7 days a Dental Sx
4.Rx Amoxicillin 500 mg # 24 tabs tid
5. Post op appts q 7 days x 3 wks

Reasons for Non-Surgical Periodontal Therapies*

1. **Patients respond to Scaling and Root Planing**
2. **Local Drug Delivery therapies**
3. **Medical issues prohibit Periodontal Surgery**
   (e.g. Selected Autoimmune Diseases, Cancer Chemo or Radiation therapies)
4. **Medication issues prohibit Periodontal Surgery**
   (e.g. IV Bisphosphonates, Steroids)
5. **Poor Oral Hygiene**
6. **Patient refuses Surgery**

**Suzuki,J.B. in Orban's Textbook of Periodontics, C.V.Mosby. 1994*

Reasons for Periodontal Surgery*

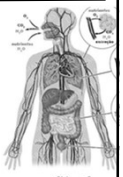
1. **Pockets over 5 mm (Inflammation persists)**
2. **Resective Periodontal Surgery**
3. **Regeneration Periodontal Surgery**
4. **Periodontal Plastic Surgery (MGS)**
5. **Periodontal Abscess**
6. **Other Clinical Situations**

**Suzuki,J.B. in Orban's Textbook of Periodontics, C.V.Mosby. 1994*

Periodontal Surgery Treatment Planning

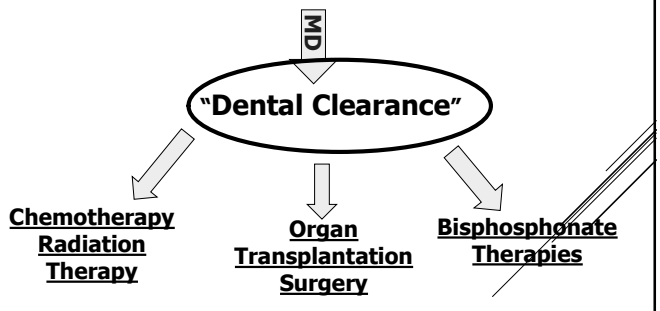
Patient's Chief Complaint
Medical – Medication Hx
Classification of Pockets
Single, Multirooted Tooth
Extent of Subgingival Caries, Fracture
Anterior vs Posterior Dentition (Esthetics?)
Type of Restoration/Prosthesis

MEDICAL ISSUES FOR DENTAL SURGERIES



- **BP: excess bleeding**
- **Liver: excess bleeding**
- **Heart: Rx Antibiotics**
- **Lungs: coughing during sx**
- **Diabetes mellitus: impaired wound healing**
- **CT diseases: impaired wound healing**
- **Arthritis (Rheum or Osteo): Oral Hygiene**

Diagnosis of Neoplasia or Organ Transplanation



Clinical Situations requiring "Dental Clearance" for MD, DO

1. Patient diagnosed with Cancer and Chemotherapy and/or Radiation Therapies Scheduled
2. Patient Diagnosed with Multiple Myeloma and Rx Aredia or Zometa (IV Bisphosphonates) Treatment Planned
3. Patient is on Organ Transplantation Wait List
4. Patient Diagnosed with Severe Osteoporosis and IV Bisphosphonates Treatment Planned
5. Other Clinical Situations

**Suzuki,J.B. 2006. Grand Rounds in Clinical Dentistry.*

Clinician Responsibilities for "Dental Clearance" for MD, DO

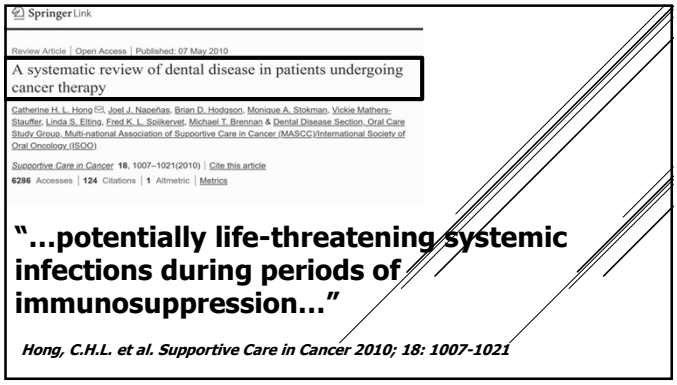
1. Medical History Updated
2. Medications Updated
3. Full Mouth Radiographs with BW
4. Full Mouth Probings with Recession
5. Caries including Pre Carious lesions Restored

**Suzuki,J.B. 2006. Grand Rounds in Clinical Dentistry.*

Clinician Responsibilities"Dental Clearance" for MD, DO

6. Endodontics prn
7. Periodontal Pockets over 7 mm; Teeth extracted (?)
8. Third Molars Removed (?)
9. Oral Hygiene must be Excellent
10. Rx Antimicrobial Rinses 7 days a Sx; Rx Systemic Antibiotics prn 24 hrs a Sx

**Suzuki,J.B.. 2006. Grand Rounds in Oral-Systemic Med.*



"…potentially life-threatening systemic infections during periods of immunosuppression…"

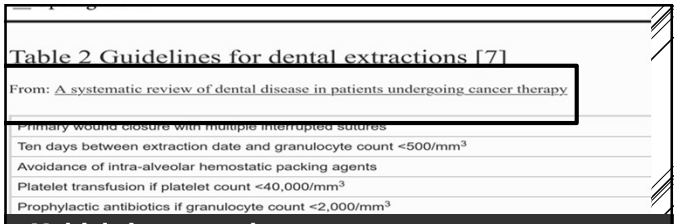
Hong, C.H.L. et al. Supportive Care in Cancer 2010; 18: 1007-1021

"Prevention of bacteremia from dental treatment in chemotherapy patients"

National Institutes of Health (1989) Oral complications of cancer therapies: diagnosis, prevention, and treatment. National Institutes of Health Consensus Development Conference Statement, 17-19 April 1989, Vol. 7, pp 1–11

Peterson DE (1990) Pretreatment strategies for infection prevention in chemotherapy patients. NCI Monogr 9:61–7

Greenberg MS (1990) Prechemotherapy dental treatment to prevent bacteremia. NCI Monogr 9:49–50



1. **Multiple interrupted sutures (primary wound closure)**
2. **No Socket hemostatic packs; No Bone Grafts**
3. **No Dental Tx if Platelets are below 40,000/mm**
4. **No Dental Tx if PMNs are below 2,000/mm**

Clinical Recommendation (JBS)

"When a physician requests the dentist for Dental Clearance for Chemotherapy, Organ Transplant, or Bisphosphonate Patients , follow a strict protocol before submitting the yes/no response in writing"

PERIODONTAL DISEASES AND SYSTEMIC DISEASES

- 1. CVD (MI)
- 2. CVA (Stroke)
- 3. Respiratory Diseases
- 4. Preterm lowbirth wt babies
- 5. Osteoporosis
- 6. Rheumatoid Arthritis
- 7. Gastric Ulcers
- 8. Diabetes Mellitus
- 9. Obesity
- 10. Pancreatic Cancer, Other Cancers
- 11. Oral Cancers
- 12. Alzheimer's Disease, Dementia (?)

Cardiovascular Diseases

"Periodontitis could be a significant risk for CVD especially in those with high CRP, long standing chronic infection and elevated serum antibodies to periodontal pathogens"

Mattila K. Dental Infections and Cardiovascular Disease: A Review. J. Periodontology 2005

Coronary heart disease patients with no teeth have nearly double risk of death

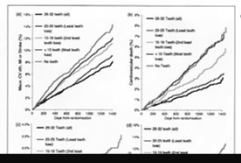
Researchers connect levels of tooth loss (due primarily to poor dental hygiene that leads to periodontal disease) with increasing rates of death and stroke

Coronary heart disease patients with no teeth have nearly double the risk of death as those with all of their teeth, according to research recently published in the European Journal of Preventive Cardiology. The study with more than 15,000 patients from 39 countries found that levels of tooth loss were linearly associated with increasing death rates.

"The relationship between dental health, particularly periodontal disease, and cardiovascular disease has received increasing attention over the past 20 years," said lead author Dr. Ola Vedin, cardiologist at Uppsala University Hospital and Uppsala Clinical Research Center in Uppsala, Sweden. "However it has been insufficiently investigated among factors and socioeconomic status, every increase in category of tooth loss was associated with a 6 percent increased risk of major cardiovascular events, 17 percent increased risk of cardiovascular death, 16 percent increased risk of all-cause death and 14 percent increased risk of stroke.

346 patients had a myocardial infarction during the study

Compared with those with all of their teeth, after adjusting for risk factors and socioeconomic status, the group with no teeth had a 27 percent increased risk of major cardiovascular events, 85 percent increased risk of cardiovascular death, 81 percent increased risk of all-cause death and 67 percent increased risk of stroke.



"Levels of tooth loss are linearly related to increasing death rates"

Veldin. European J. Preventive Cardiology. 2016

The NEW ENGLAND JOURNAL of MEDICINE

HOME | SUBSCRIBE | CURRENT ISSUE | PAST ISSUES | COLLECTIONS | HELP | Search NEJM GO Advanced Search

Institution: TEMPLE UNIVERSITY LIBRARIES | Sign In as Individual | Contact Subscription Administrator at Your Institution | FAQ

ORIGINAL ARTICLE

◂ Previous **Volume 356:911-920 March 1, 2007 Number 9** Next ▸

Treatment of Periodontitis and Endothelial Function

Maurizio S. Tonetti, D.M.D., Ph.D., Francesco D'Aiuto, D.M.D., Ph.D., Luigi Nibali, D.M.D., Ph.D., Ann Donald, Clare Storry, B.Sc., Mohamed Parkar, M.Phil., Jean Suvan, M.Sc., Aroon D. Hingorani, Ph.D., Patrick Vallance, M.D., and John Deanfield, M.B., B.Chir.

ABSTRACT

Background Systemic inflammation may impair vascular function, and epidemiologic data suggest a possible link between periodontitis and cardiovascular disease.

Methods We randomly assigned 120 patients with severe periodontitis to community-based periodontal care (59 patients) or intensive periodontal treatment (61). Endothelial function, as assessed by measurement of the diameter of the brachial artery during flow (flow-mediated dilatation), and inflammatory biomarkers and markers of coagulation and

Tonetti, M. New England Journal of Medicine 2007

Chronic periodontitis correlated to heart attack prognosis and severity

Researchers have demonstrated for the first time that chronic periodontitis is closely related to the severity of acute myocardial infarction.

In research published in the Journal of Dental Research, titled "Acute myocardial infarct size is related to periodontitis extent and severity" a team from the Uni

rez's doctoral dissertation, which was directed by UGR professors Francisco Mesa Aguado (stomatology department), José Antonio Ramírez Hernández (medicine department) and Andrés Catena Martínez (experimental psychology department). The research analyzed 112 patients who

nosis of acute myocardial infarction."

The researchers said it will be necessary to conduct follow-up checks with periodontal patients who have suffered myocardial infarction to monitor their clinical evolution (new coronary events, cardiac failure or even death).

1. "Chronic periodontitis is a death risk factor and plays an important role in the prognosis of acute myocardial infarction"
2. "Acute myocardial infarct size is related to periodontitis extent and severity"

Alvarez, et al. J.Dental Research 2015.

WHY ULTRASONICS FIRST?

1. Monitor wound healing
2. Monitor OH
3. Antibiotics (prn) work better
4. Accurate probing
5. Reduce risk factors for systemic diseases

"full mouth debridement involves the preliminary removal" of plaque and calculus—the patient may or may not have periodontal disease.

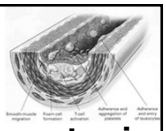
American Dental Association 2018

FULL MOUTH DISINFECTION WORKS

- **"Favorable clinical improvements with Full Mouth Disinfection over S/RP ***
- **"Improvement of diabetic pts with Full Mouth Disinfection over S/RP ****
- **"Improvement of Vascular Endothelial Patency with Periodontal Therapies (full mouth)" *****

** Koshy 2001*
*** Schara, et al 2006*
Koshy. Periodontol 2000; 2004: Vol 36* * Tonetti N.Eng.J.Med. 2007*

Cardiovascular Diseases



"Periodontal inflammation triggers a systemic inflammatory state… periodontal pathogens and toxins can interact with the blood vessel wall promoting plaque *(vascular)* development and progression"

Carrizales-Sepulveda 2018.
Makkar,H. Reynolds, M.A.et al. 2018. Periodontal,metabolic,and cardiovascular disease: Exploring the role of inflammation and mental health. Pteridines.2018; 29(1): 124
Janket, S. et al. Meta-analysis of periodontal disease and risk of coronary heart disease and stroke. Oral Surg.Oral Med. Oral Path. Oral RadiolEndo.2003; 95: 559

Journal of
PERIODONTAL RESEARCH

Periodontitis-associated up-regulation of systemic inflammatory mediator level may increase the risk of coronary heart disease

T. Nakajima, T. Honda, H. Domon, T. Okui, K. Kajita, H. Ito, N. Takahashi, T. Maekawa, K. Tabeta, K. Yamazaki

Nakajima, T. et al. J.Periodontol : 2010 45: 116

Journal of
PERIODONTAL RESEARCH

ORIGINAL ARTICLE

Periodontal condition in Japanese coronary heart disease

"Increased Periodontal Infection was found in Japanese CHD patients compared to non-CHD patients"

Conclusion

Increased periodontal infection was found in Japanese CHD patients compared to non-CHD patients.

Aoyama,N. et al. J.Periodontol Res; 2019; 54: 259

ORIGINAL ARTICLE

Inflammation of the periodontium associates with risk of future cardiovascular events

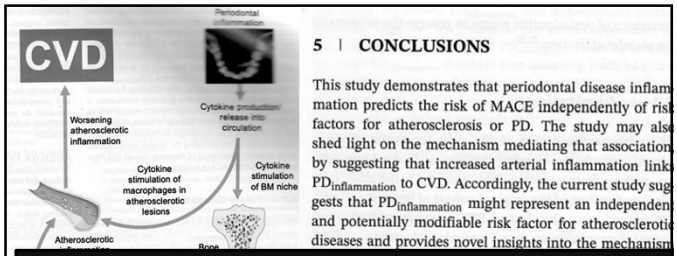
Thomas E. Van Dyke[1,2] | Karim El Kholy[1,2] | Amorina Ishai[1] | Richard A.P. Takx[3] |

Van Dyke, et al. J. Perio. 2021

JOURNAL OF

Conclusions: "Periodontal inflammation is independently associated with Major Adverse Cardiovascular Events (MACE) via a mechanism that may involve arterial inflammation."

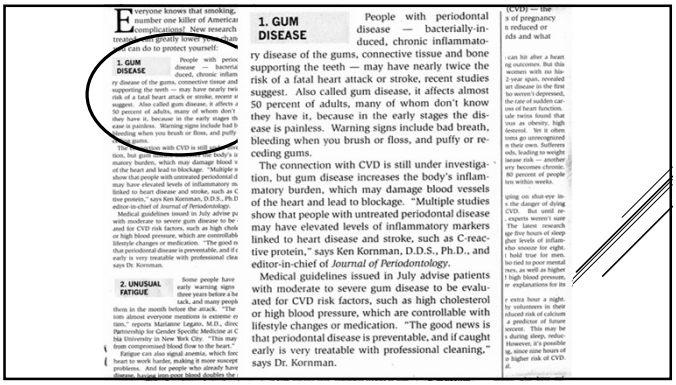
anism that may involve increased arterial inflammation. These findings provide important support for an independent relationship between $PD_{inflammation}$ and CVD.



5 | CONCLUSIONS

This study demonstrates that periodontal disease inflam mation predicts the risk of MACE independently of risk factors for atherosclerosis or PD. The study may also shed light on the mechanism mediating that association by suggesting that increased arterial inflammation links $PD_{inflammation}$ to CVD. Accordingly, the current study suggests that $PD_{inflammation}$ might represent an independent and potentially modifiable risk factor for atherosclerotic diseases and provides novel insights into the mechanism

Conclusions: "This study demonstrates that periodontal disease inflammation predicts the risk of MACE (Major Adverse Cardiovascular Events) independently of risk factors for atherosclerosis or periodontal disease"



Everyone knows that smoking, number one killer of American complications? New research treated, can greatly lower your chan can do to protect yourself:

1. GUM DISEASE

People with perio disease — bacteria duced, chronic inflam ry disease of the gums, connective tissue and supporting the teeth — may have nearly twice the risk of a fatal heart attack or stroke, recent studies suggest. Also called gum disease, it affects a 50 percent of adults, many of whom don't they have it, because in the early stages the ease is painless. Warning signs include bad b bleeding when you brush or floss, and puffy or receding gums.

The connection with CVD is still under investigation, but gum disease increases the body's inflammatory burden, which may damage blood v of the heart and lead to blockage. "Multiple s show that people with untreated periodontal d may have elevated levels of inflammatory m linked to heart disease and stroke, such as C tive protein," says Ken Kornman, D.D.S., Ph.D editor-in-chief of *Journal of Periodontology*.

Medical guidelines issued in July advise pa with moderate to severe gum disease to be ated for CVD risk factors, such as high chole or high blood pressure, which are controllable lifestyle changes or medication. "The good n that periodontal disease is preventable, and if c early is very treatable with professional clea says Dr. Kornman.

2. UNUSUAL FATIGUE

Some people have early warning signs three years before a he tack, and many peopl them in the month before the attack. "The tom almost everyone mentions is extreme e tion," reports Marianne Legato, M.D., direc Partnership for Gender Specific Medicine at C bia University in New York City. "This may from compromised blood flow to the heart."

Fatigue can also signal anemia, which forc heart to work harder, making it more suscept problems. And for people who already have disease, having into poor blood doubles the

1. GUM DISEASE

People with periodontal disease — bacterially-induced, chronic inflammatory disease of the gums, connective tissue and bone supporting the teeth — may have nearly twice the risk of a fatal heart attack or stroke, recent studies suggest. Also called gum disease, it affects almost 50 percent of adults, many of whom don't know they have it, because in the early stages the disease is painless. Warning signs include bad breath, bleeding when you brush or floss, and puffy or receding gums.

The connection with CVD is still under investigation, but gum disease increases the body's inflammatory burden, which may damage blood vessels of the heart and lead to blockage. "Multiple studies show that people with untreated periodontal disease may have elevated levels of inflammatory markers linked to heart disease and stroke, such as C-reactive protein," says Ken Kornman, D.D.S., Ph.D., and editor-in-chief of *Journal of Periodontology*.

Medical guidelines issued in July advise patients with moderate to severe gum disease to be evaluated for CVD risk factors, such as high cholesterol or high blood pressure, which are controllable with lifestyle changes or medication. "The good news is that periodontal disease is preventable, and if caught early is very treatable with professional cleaning," says Dr. Kornman.

(CVD) — the s of pregnancy n reduced or rds and what

can hit after a heart ng outcomes. But this women with no his 2-year span, revealed ort disease in the first ho weren't depressed, the rate of sudden car ons of heart function. ale twins found that ous as obesity, high ioterol. Yet it often toms go unrecognized n their own. Sufferers ods, leading to weight isease risk — another ery becomes chronic. 80 percent of people ten within weeks.

ping on shut-eye in s the danger of dying CVD. But until re experts weren't sure The latest research ge five hours of sleep gher levels of inflam who snooze for eight. hold true for men. ho tied to poor mental ners, as well as higher high blood pressure, or explanations for its

e extra hour a night. by volunteers in their duced risk of calcium a predictor of future ercent. This may be s during sleep, reduc However, it's possible ng, since nine hours of o higher risk of CVD. al.

PERIODONTITIS ⇨ STROKE (CVA)

NHANES I Sample, 9,962 pts*

***Hx MI, CVA, Cancer excluded**

"2 x Risk of CVA with Periodontitis"

Wu. Arch.Int.Med. 2000; 160: 2749

PERIODONTITIS ⇨ STROKE (CVA)

NHANES I Sample, 9,962 pts*
***Hx MI, CVA, Cancer excluded**
"2 x Risk of CVA with Periodontitis"

Plaque:
a. Cytokines↑, Inflamm↑ ,Clotting↑ → Thromboembolism

b. Platelet aggregation → Thromboembolism

c. Lipids↑,Fibrinogen↑,C-reactive protein↑→ CVA/CVD

Wu. Arch.Int.Med. 2000; 160: 2749

PERIODONTAL DISEASES AND INCIDENCE OF LUNG CANCER

"Periodontal disease diagnosis is associated with lung cancer in postmenopausal women" (n = 77,485)

Conclusions:

Periodontal Disease was positively associated with lung cancer risk after adjusting for smoking hx.

Mai X, …Genco RJ Cancer Causes Control 2014; 25: 1045

PERIODONTAL DISEASES AND INCIDENCE OF LUNG CANCER

Conclusions:

Positive additive interactions between Periodontal Disease and *Pack-Years* of smoking.

Potential synergistic effect between Periodontal Disease and *Smoking Intensity*

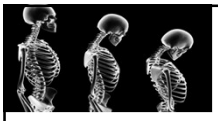
Mai X, …Genco RJ Cancer Causes Control 2014; 25: 1045

PERIODONTAL DISEASES AND INCIDENCE OF LUNG CANCER

- **Association between Periodontal Disease and lung cancer was stronger in former smokers**

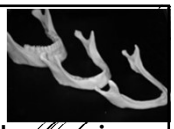
"Smoking + Periodontal Disease increases lung cancer risk "

Mai X, …Genco RJ. Cancer Causes Control 2014; 25: 1045



OSTEOPOROSIS

NHANES II (women)

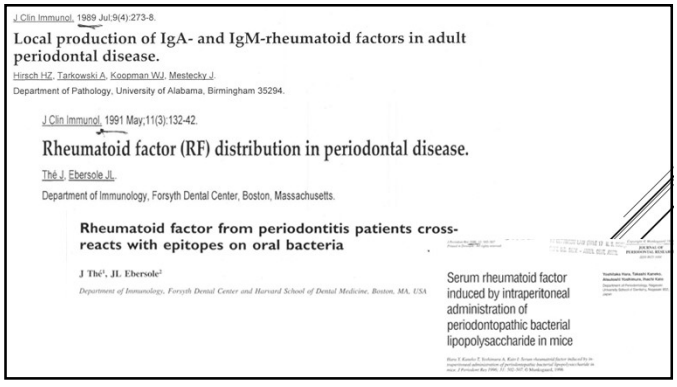


13-18% of women over age 45 yrs have Osteoporosis
47-50% of women over age 45 yrs have Osteopenia

Systemic osteoporosis was associated with mandibular osteoporosis

"Osteoporosis is associated with increased tooth loss"

LaMonte MJ…. Genco RJ. J.Periodontol. 2014



J Clin Immunol. 1989 Jul;9(4):273-8.

Local production of IgA- and IgM-rheumatoid factors in adult periodontal disease.

Hirsch HZ, Tarkowski A, Koopman WJ, Mestecky J.

Department of Pathology, University of Alabama, Birmingham 35294.

J Clin Immunol. 1991 May;11(3):132-42.

Rheumatoid factor (RF) distribution in periodontal disease.

Thé J, Ebersole JL.

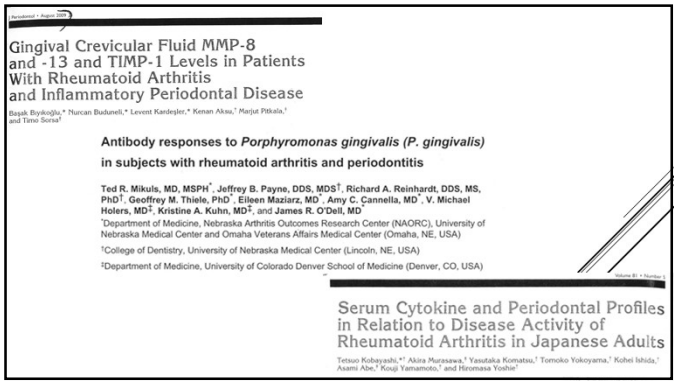
Department of Immunology, Forsyth Dental Center, Boston, Massachusetts.

Rheumatoid factor from periodontitis patients cross-reacts with epitopes on oral bacteria

J Thé[1], JL Ebersole[2]

Department of Immunology, Forsyth Dental Center and Harvard School of Dental Medicine, Boston, MA, USA

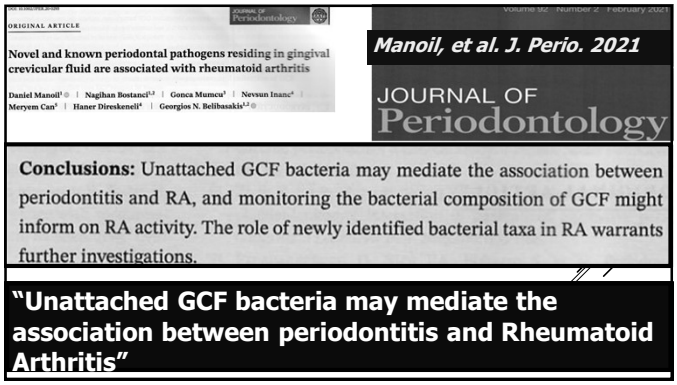
Serum rheumatoid factor induced by intraperitoneal administration of periodontopathic bacterial lipopolysaccharide in mice



Gingival Crevicular Fluid MMP-8 and -13 and TIMP-1 Levels in Patients With Rheumatoid Arthritis and Inflammatory Periodontal Disease

Antibody responses to *Porphyromonas gingivalis (P. gingivalis)* in subjects with rheumatoid arthritis and periodontitis

Serum Cytokine and Periodontal Profiles in Relation to Disease Activity of Rheumatoid Arthritis in Japanese Adults



ORIGINAL ARTICLE

Novel and known periodontal pathogens residing in gingival crevicular fluid are associated with rheumatoid arthritis

Manoil, et al. J. Perio. 2021

JOURNAL OF Periodontology

Conclusions: Unattached GCF bacteria may mediate the association between periodontitis and RA, and monitoring the bacterial composition of GCF might inform on RA activity. The role of newly identified bacterial taxa in RA warrants further investigations.

"Unattached GCF bacteria may mediate the association between periodontitis and Rheumatoid Arthritis"

PERIODONTAL DISEASES AND SYSTEMIC DISEASES

- **1. CVD (MI)**
- **2. CVA (Stroke)**
- **3. Respiratory Diseases**
- **4. Preterm lowbirth wt babies**
- **5. Osteoporosis**
- **6. Rheumatoid Arthritis**
- **7. Gastric Ulcers**
- **8. Diabetes Mellitus**
- **9. Obesity**
- **10. Pancreatic Cancer, Other Cancers**
- **11. Oral Cancers**
- **12. Alzheimer's Disease, Dementia (?)**

Hemoglobin A 1C

Hemoglobin A1c	Classification/Use	Mean Blood Glucose
4%	Normal	65 mg/dL
5%		100 mg/dL
6%		135 mg/dL
6.5%	American Diabetes Association	154 mg/dL
	Goal for Diabetic patient	
7%	American Association of Clinical Endocrinologists	170 mg/dL
8%	Action Suggested	205 mg/dL
9%		240 mg/dL
10%		275 mg/dL
11%		310 mg/dL
12%		345 mg/dL

Source American Association of Clinical Endocrinologists and American Diabetes Association

HEMOGLOBIN A 1C AND DIABETES MELLITUS

HgA1C between 5.7 – 6.4 = "potential" Diabetic;

confirm with additional tests

HgA1C 6.4 ⇧ = Diabetes Mellitus

"BIDIRECTIONAL RELATIONSHIP BETWEEN DIABETES MELLITUS AND PERIODONTITIS"

Prospective Study:

11 % Diabetic patients glycemic control worsened with periodontal health

vs

37% Diabetic patients glycemic control worsened with periodontitis

Genco, R. 2014. "Oral-Systemic Health Relations" Quintessance.

"BIDIRECTIONAL RELATIONSHIP BETWEEN DIABETES MELLITUS AND PERIODONTITIS"

Prospective Study:

Death rate 10/1,000 Diabetic patients with periodontal health

vs

Death rate 28/1,000 Diabetic patients with periodontitis

Genco, R. Feb 7-8, 2014. "Oral-Systemic Health Relations" Quintessance.

PANCREATIC CANCER AND PERIODONTITIS

- **51,000 male physicians**
- **Periodontitis increases risk for Pancreatic Cancer by 64%**
- **"Periodontitis infections may trigger generalized inflammation"**

Michaud, Dominique. J.Nat'l Cancer Inst. 2007; 99: 171-175.

PANCREATIC CANCER AND PERIODONTITIS

- **51,000 male physicians**
- **Periodontitis increases risk for Pancreatic Cancer by 64%**
- **"Periodontitis infections may trigger generalized inflammation"**

Michaud, Dominique. J.Nat'l Cancer Inst. 2007; 99: 171-175.

THE LANCET On

Volume 9, Issue 6, June 2008, Pages 510-512

Article | Figures/Tables | References

doi:10.1016/S1470-2045(08)70138-4 Copyright © 2008 Elsevier Ltd All rights reserved

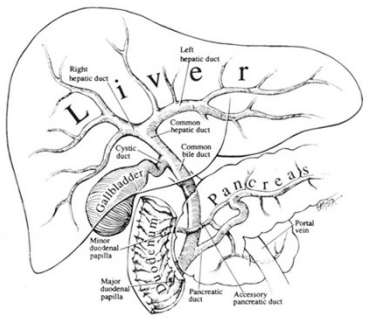
Reflection and Reaction

Periodontal diseases and canc

Cesar A Migliorati[a], ✉

[a]Department of Diagnostic Sciences, College of I
Fort Lauderdale, FL 33328, USA

Available online 27 May 2008.



Migliorati. Lancet Oncology 2008; 9: 510

Migliorati. Lancet Oncology 2008; 9: 510

Study Urges Men to Brush Up on Their Oral Health

New research finds that men with gum disease have a higher risk of certain cancers.

CHICAGO—June 4, 2008—Most people already know that maintaining oral health is a vital component of achieving overall health, but a recent study reveals why it is especially crucial that men pay close attention to their teeth and gums. Research published in the June issue of *The Lancet Oncology* found that men with a history of gum disease are 14 percent more likely to develop cancer than men with healthy gums. In fact, researchers uncovered that men with periodontal disease may be:

- 49 percent more likely to develop kidney cancer
- 54 percent more likely to develop pancreatic cancer
- 30 percent more likely to develop blood cancers

THE JOURNAL OF PROFESSIONAL EXCELLENCE

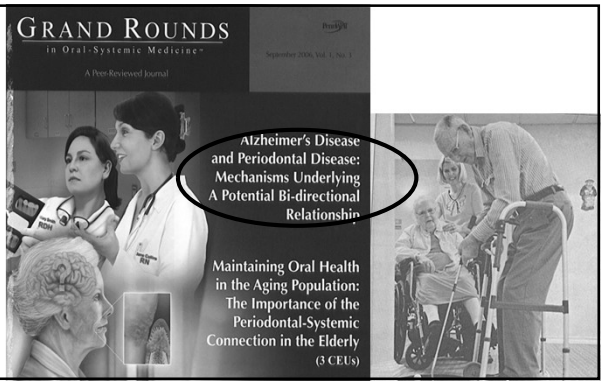
Dimensions OF DENTAL HYGIENE

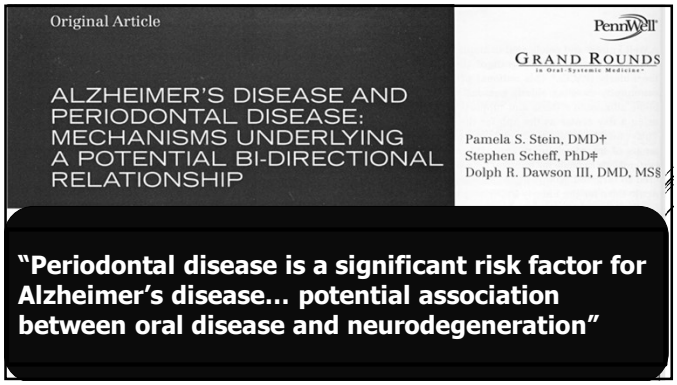
Oral Bacteria May Be Linked to Increased Cancer Risk

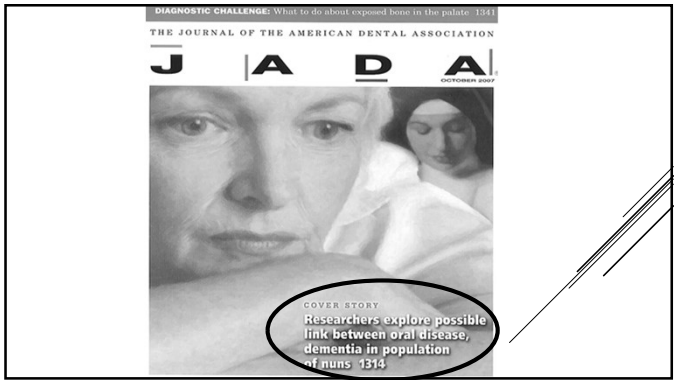
59 % greater risk of pancreatic cancer if P.gingivalis in oral microbiome
50 % greater risk of pancreatic cancer if A.actinomycetemcomitans in oral microbiome

The researchers looked for links between bacteria known to cause oral disease and bacteria found in patients with pancreatic cancer. They found that individuals—regardless of gender—who had *P. gingivalis* in their oral microbiomes were at a 59% greater risk of developing pancreatic cancer than those without the oral bacteria. Individuals whose oral microbiomes included *A. actinomycetemcomitans* were 50% more likely to develop pancreatic cancer than those without the bacteria. Both *P. gingivalis* and *A. actinomycetemcomitans*, the

Perlmutter, I. Amer. Assoc. Cancer Research. 2016


GRAND ROUNDS
in Oral-Systemic Medicine
A Peer-Reviewed Journal
Alzheimer's Disease and Periodontal Disease: Mechanisms Underlying A Potential Bi-directional Relationship
Maintaining Oral Health in the Aging Population: The Importance of the Periodontal-Systemic Connection in the Elderly
(3 CEUs)


Original Article
ALZHEIMER'S DISEASE AND PERIODONTAL DISEASE: MECHANISMS UNDERLYING A POTENTIAL BI-DIRECTIONAL RELATIONSHIP
PennWell
GRAND ROUNDS
in Oral-Systemic Medicine
Pamela S. Stein, DMD†
Stephen Scheff, PhD‡
Dolph R. Dawson III, DMD, MS§
"Periodontal disease is a significant risk factor for Alzheimer's disease… potential association between oral disease and neurodegeneration"


DIAGNOSTIC CHALLENGE: What to do about exposed bone in the palate 1341
THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION
J A D A
OCTOBER 2007
COVER STORY
Researchers explore possible link between oral disease, dementia in population of nuns 1314

Tooth loss, dementia and neuropathology in the Nun Study

Pamela Sparks Stein, DMD; Mark Desrosiers, PhD; Sara Jean Donegan, SSND, DDS; Juan F. Yepes, DDS, MD, MPH; Richard J. Kryscio, PhD

Many cross-sectional studies[1-14] and some longitudinal studies[15,16] have shown that patients with dementia are more likely to have poor oral health. Few investigators,[17-19] however, have attempted to relate oral disease to the subsequent risk of developing cognitive impairments and dementia. Such an association is biologically plausible.[20] Potential mechanisms include inflammatory mediators

ABSTRACT

Background. Numerous studies have linked dementia to the subsequent deterioration of oral health. Few investigators, however, have examined oral disease as a potential risk factor in the development of dementia. The authors conducted a study to investigate a potential association between a history of oral disease and the development of dementia.

Methods. Longitudinal dental records supplemented data collected from 10 annual cognitive assessments of 144 Milwaukee participants in the Nun Study, a longitudinal study of aging and Alzheimer disease, who

ABSTRACT

Background. Numerous studies have linked dementia to the subsequent deterioration of oral health. Few investigators, however, have examined oral disease as a potential risk factor in the develop-

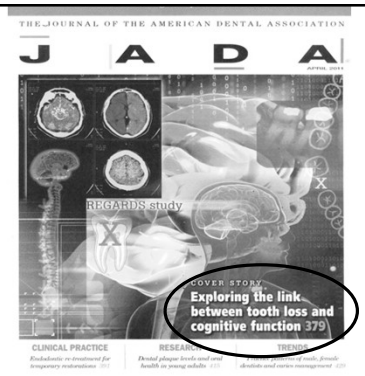
"Participants (nuns) with the fewest teeth had the highest risk of prevalence and incidence of dementia"

Results. A low number of teeth increased the risk of higher prevalence and incidence of dementia.

Conclusion. Participants with the fewest teeth had the highest risk of prevalence and incidence of dementia.

Clinical Implications. Edentulism or very few (one to nine) teeth may be predictors of dementia late in life.

Key Words. Epidemiology; periodontal disease; Alzheimer disease.
JADA 2007;138(10):1314-22.



The association between self-reported tooth loss and cognitive function in the REasons for Geographic And Racial Differences in Stroke study

An assessment of potential pathways

**"Tooth loss may be associated with cognitive function;
this association is mediated by age and SES"**

Conclusion. Tooth loss may be associated with cognitive function; however, this association is mediated by age and SES.

Clinical Implications. Tooth loss due to periodontal disease may be a marker for low SES, and the interplay of these factors with advanced age may confer risk of having poorer cognitive function. Further studies are needed to clarify these associations.

Classification of Periodontal and Peri-Implant Diseases and Conditions

Proceedings of the World Workshop Jointly Held by the American Academy of Periodontology and European Federation of Periodontology

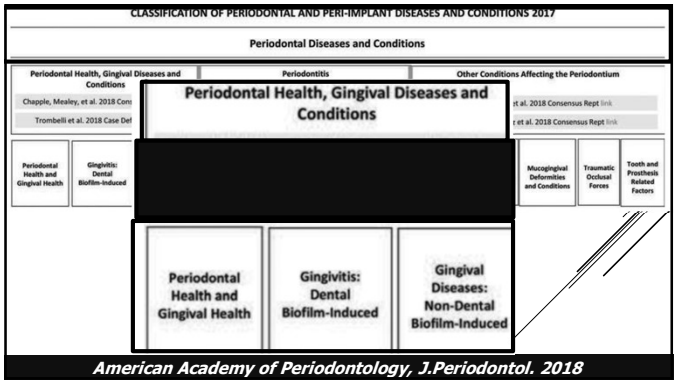
Co-edited by Kenneth S. Korman and Maurizio S. Tonetti

JOURNAL OF Periodontology

Journal of Clinical Periodontology

EFP

American Academy of Periodontology, J.Periodontol. 2018



American Academy of Periodontology, J.Periodontol. 2018

How may we use this new Classification System in Periodontal and Implant Treatment Planning?

Classification of Periodontal and Peri-Implant Diseases and Conditions

Proceedings of the World Workshop Jointly Held by the American Academy of Periodontology and European Federation of Periodontology

Co-edited by Kenneth S. Komman and Maurizio S. Tonetti

JOURNAL OF Periodontology

Official Journal of the American Academy of Periodontology Since 1930

perio.org

Journal of Clinical Periodontology

EFP

Official scientific Journal of the European Federation of Periodontology and its member National Societies

wileyonlinelibrary.com/journal/jcpe

"Biologic Principles should guide the treatment planning process and supersede a mechanically based restorative driven rationale …"

"Periodontitis staging and grading used in dental implant therapy as a means to ensure maximum conservation of teeth and maximum preservation of alveolar bone?"

Greenwell, H. et al. J.Periodontol. 2019;90:441

JOURNAL OF Periodontology

Official Journal of the American Academy of Periodontology Since 1930

perio.org

Application of AAP New Classification System for Implant Treatment Planning

1. **Assess Medical and Medication issues for Implant Treatment planning**
2. **Diagnosis and Staging (1,2,3,4) of Periodontitis**
3. **Determine Long Term Prognosis of Teeth; especially key abutment teeth**
4. **Project Implant placement and Site Preparation (if necessary)**

"Contemporary Clinical Periodontics"

I. Dental Diseases and Epigenetics
II. Microbiome and Clinical Applications
III. Immune (Host) Response
IV. Bisphosponates and Osteonecrosis of the Jaw
V. Periodontal Therapies
VI. Dental Clearance for Physicians
VII. Systemic Diseases related to Periodontitis
VIII. Conclusions

"Contemporary Clinical Periodontics"

I. Dental Diseases and Epigenetics
II. Microbiome and Clinical Applications
III. Immune (Host) Response
IV. Bisphosponates and Osteonecrosis of the Jaw
V. Periodontal Therapies
VI. Dental Clearance for Physicians
VII. Systemic Diseases related to Periodontitis
VIII. Conclusions