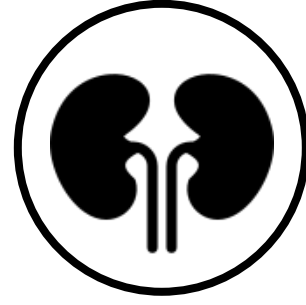
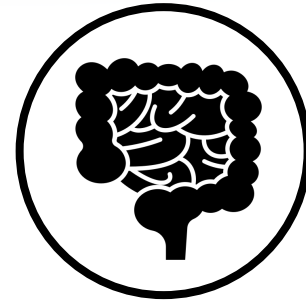
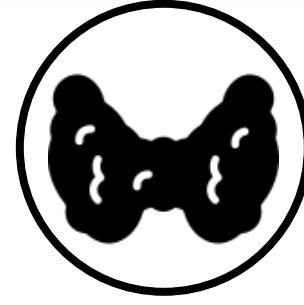
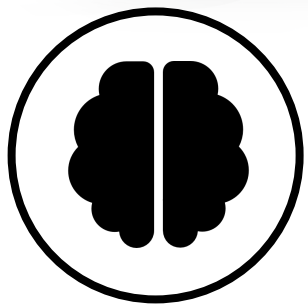


# What is Holistic Dentistry?

A Comprehensive Approach to the Oral Systemic Link



*Nicole Greco, RDH, BSDH, MA*



# About Nicole Greco

**BS: NYU  
MA:  
Columbia**

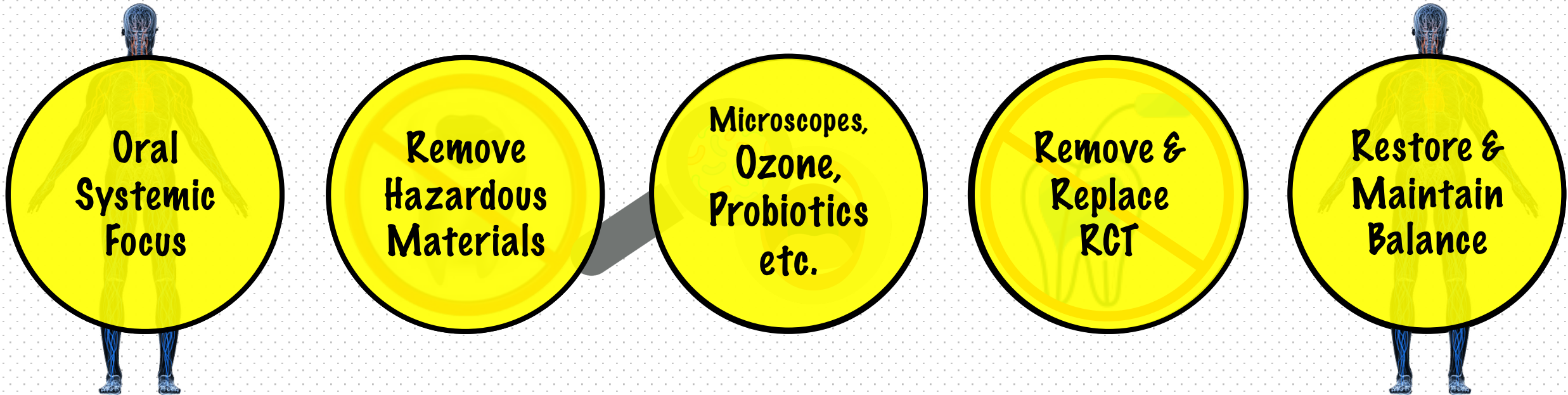
**Former  
Dean of  
Dental  
Hygiene**

**EST. RDH  
2003**

**Cannabis  
& Dental  
Educator**

# What is Holistic Dentistry?

- Holistic dentistry or biological dentistry, considering a person's entire state of physical and emotional health.



# What is Holistic Dentistry?

• Holistic dentists use natural therapies (in combination with conventional ones) to prevent, diagnose, and treat diseases of the oral cavity

A faint background illustration of a microscope inside the yellow circle.


Microscopy

A faint background illustration of a person's head with a lightning bolt symbol inside the yellow circle.

Ozone  
Therapy

A faint background illustration of a chain of links inside the yellow circle.

Probiotics,  
Bacterial  
Reduction

A faint background illustration of a crossed-out 'X' inside the yellow circle.

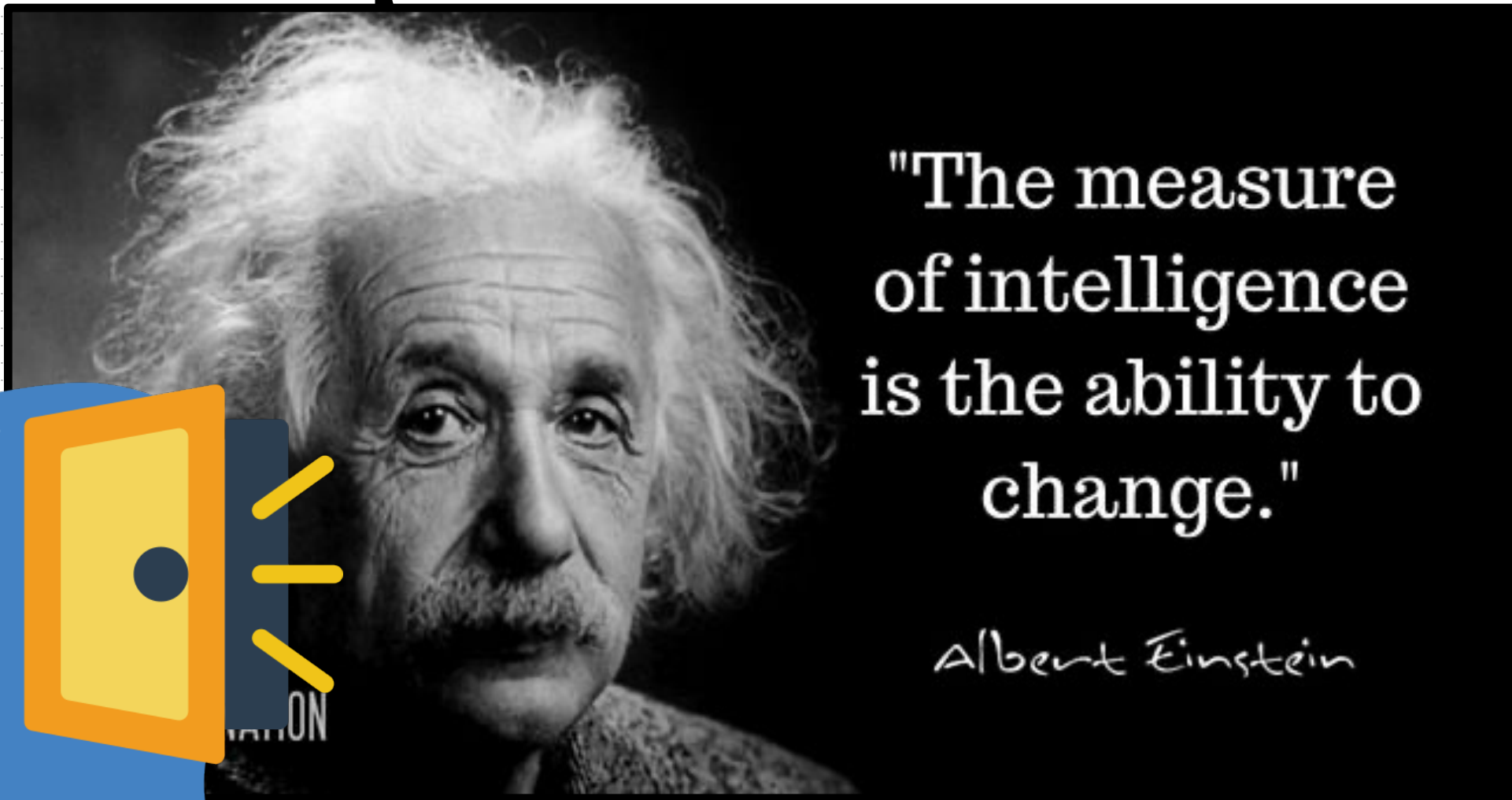
Avoid DYE,  
BPE, Plastics  
etc.

A faint background illustration of a person's face with a smile inside the yellow circle.

Fluoride  
Free: pH  
Focus



# Expand Your Mind!





# Holistic Periodontal Protocol

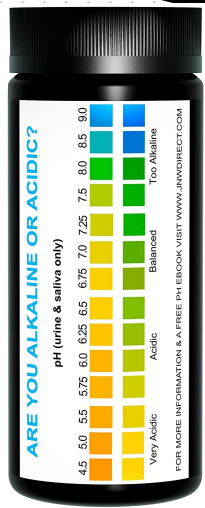
Exam +  
pH strip

FMX +  
CBCT

Micro  
Slide

SCR P+  
Ozone

Laser\*






Reminders!

Review

# Periodontal Health and Systemic Conditions

Glendale Lim <sup>1</sup>, Upasna Janu <sup>1</sup>, Lan-Lin Chiou <sup>1</sup>, Kaveri Kranti Gandhi <sup>1</sup> , Leena Palomo <sup>2</sup>  
and Vanchit John <sup>1,\*</sup>

<sup>1</sup> Department of Periodontology, Indiana University School of Dentistry, Indianapolis, IN 46202, USA;  
glenlim@iu.edu (G.L.); ujanu@iu.edu (U.J.); lchiou@iu.edu (L.-L.C.); kkgandhi@iu.edu (K.K.G.)

<sup>2</sup> Department of Periodontology, Case Western University, School of Dentistry, Indianapolis, IN 46202, USA;



**Abstract:** According to the new classification proposed by the recent 2017 World Workshop on Periodontal and Peri-implant Diseases and Conditions, periodontitis, necrotizing periodontal diseases,



# Holistic Restorative Protocols



**Mercury  
Removal**



**Ozone  
Therapy**



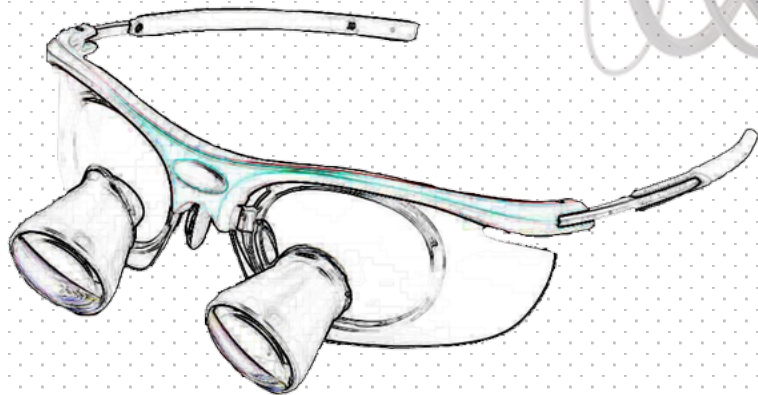
**PRP**  
Platelet  
Rich Plasma



**RCT**  
Removal



**Advanced  
Techniques**



# Holistic Considerations...



Hazardous  
Materials?



Patient  
Safety?



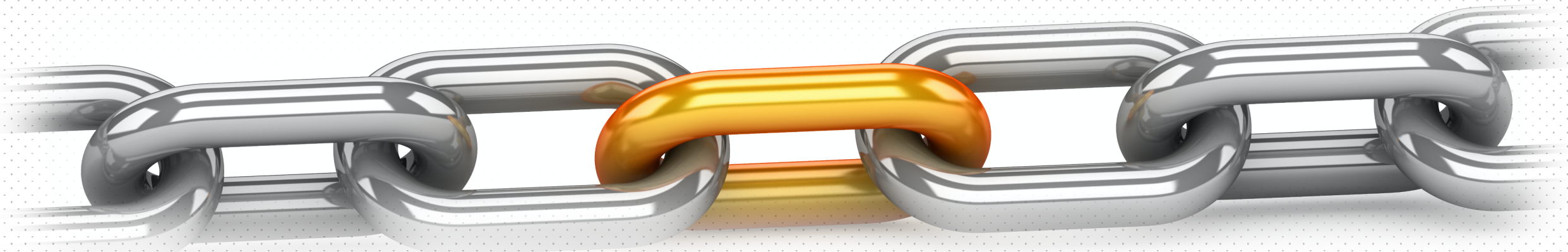
Infection?



Fluoride?



Dental  
Materials?





# Advanced Surgical Protocols

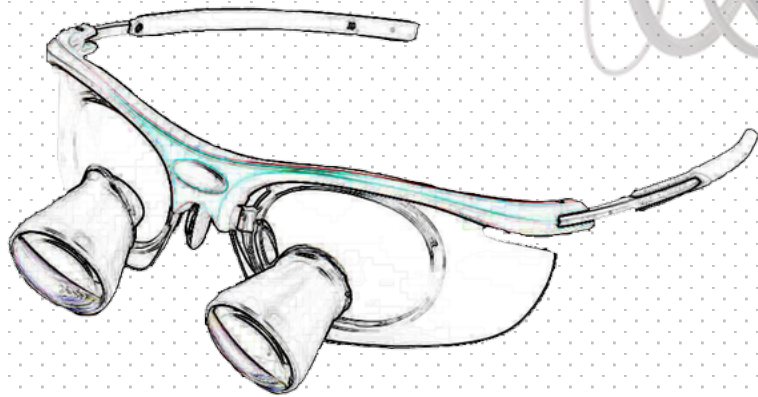
**Ozone  
Therapy**

**Plasma  
Rich  
Fibrin**

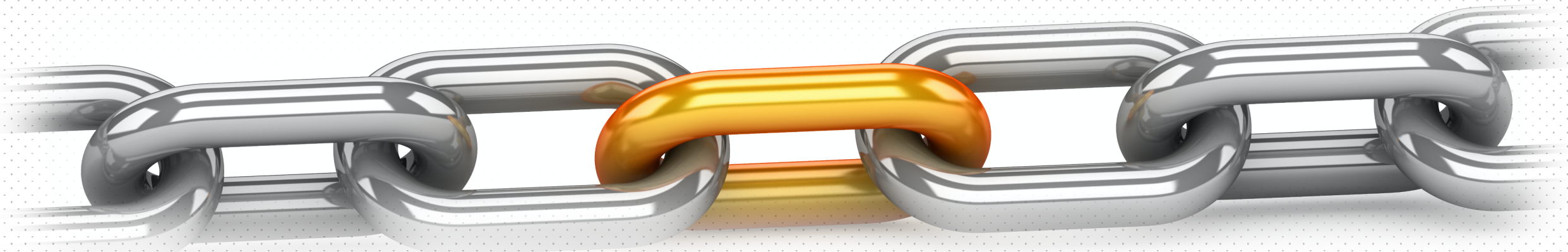
**Pinhole  
Technique**

**LANAP &  
Lasers**

**Infusions,  
Co-Therapy,  
Supplements**



# The Oral Systemic Links



# Periodontal Disease and Neurodegeneration: The Possible Pathway and Contribution from Periodontal Infections

RAJEEV RANJAN<sup>1</sup>, GYANASENI

APADMA

DITA N

SISA M



## ABSTRACT

Neurodegeneration is a process in which the neurons lose its structure, function and ultimately the death of the neurons follows. Neurodegenerative diseases like Alzheimer's, Parkinson's, Huntington's, etc. are thus common interrelated health problems. The pathogenesis of these diseases is still unclear, but it is believed that the pathogenesis involves a complex interplay of genetic, environmental, and lifestyle factors. Periodontal infection is a chronic inflammatory disease of the supporting structures of the teeth, caused by a complex community of bacteria. It is a leading cause of tooth loss and has been linked to various systemic diseases, including cardiovascular disease, diabetes, and neurodegeneration. The current review summarises the role of periodontal infection and the mechanism via which it contributes for neurodegeneration.



**Keywords:** Alzheimer disease, Amyloid-beta, Gingivitis





## TNF- $\alpha$ and antibodies to periodontal bacteria discriminate between Alzheimer's disease patients and normal subjects

Angela R. Kamer<sup>a,\*</sup>, Ronald G. Craig<sup>a,b</sup>, Elizabeth Pirraglia<sup>d</sup>, Ananda P. Dasanayake<sup>c</sup>, Robert G. Norman<sup>c</sup>, Robert J. Boylan<sup>b</sup>, Andrea Nehorayoff<sup>a</sup>, Lidia Glodzik<sup>d</sup>, Miroslaw Brys<sup>d</sup>, Mony J. de Leon<sup>d,e</sup>



### ARTICLE INFO

#### Article history:

Received 6 June 2009

Received in revised form 26 August 2009

Accepted 28 August 2009

### ABSTRACT

The associations of inflammation/immune responses with clinical presentations of Alzheimer's disease (AD) remain unclear. We hypothesized that TNF- $\alpha$  and elevated antibodies to periodontal bacteria would be greater in AD compared to normal controls (NL) and their combination would aid clinical diagnosis of AD.



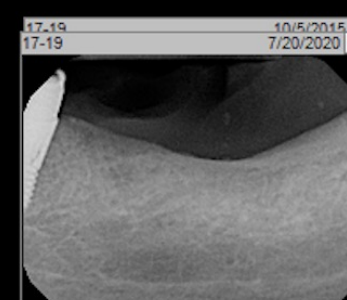
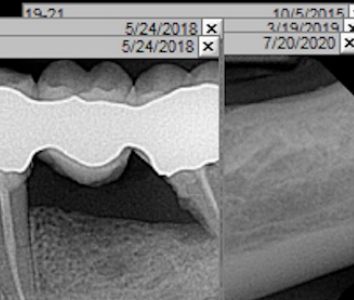
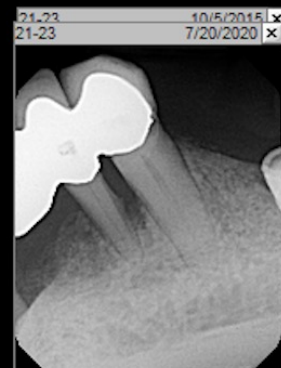
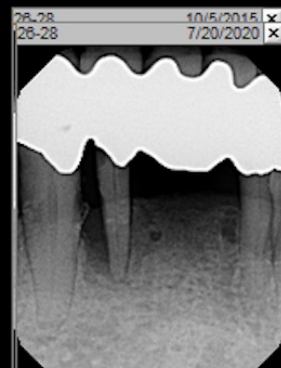
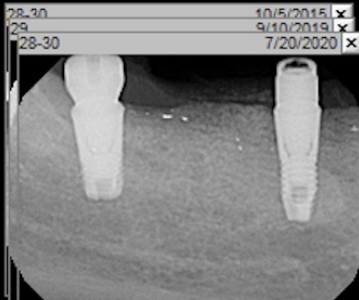
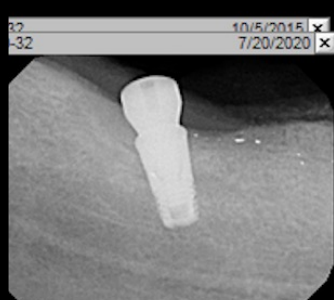
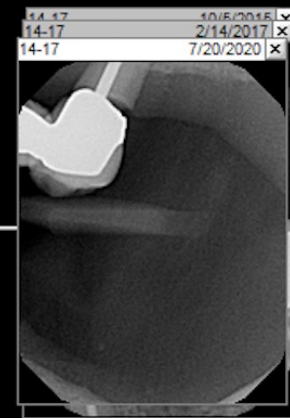
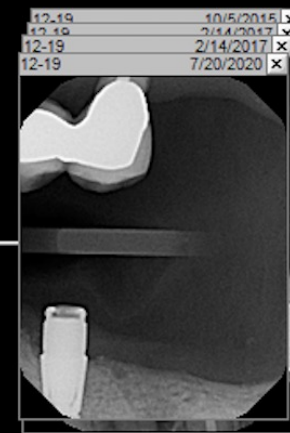
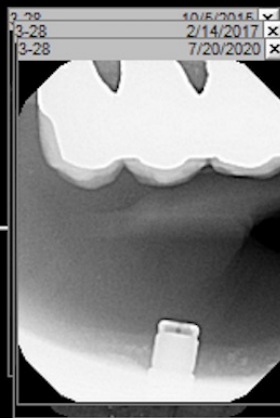
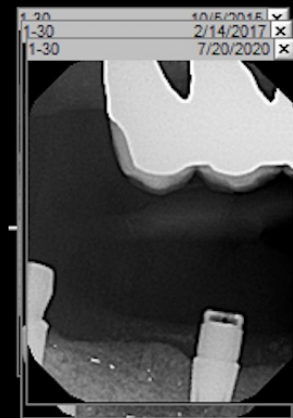
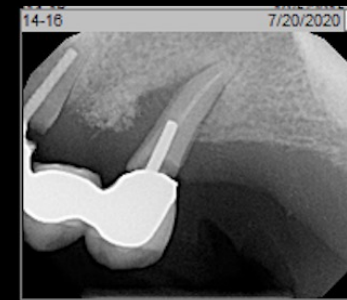
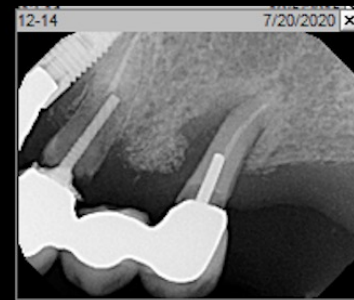
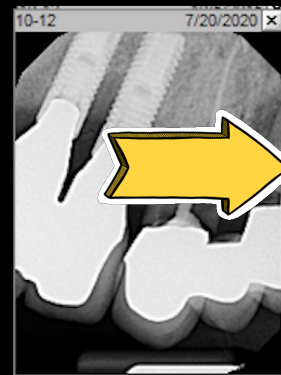
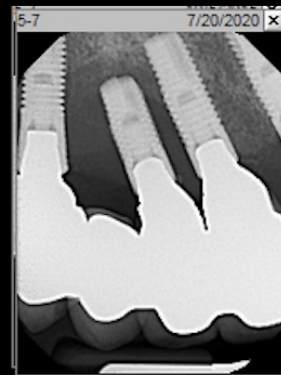
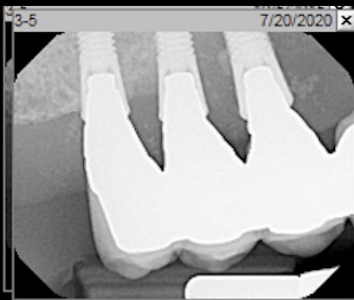
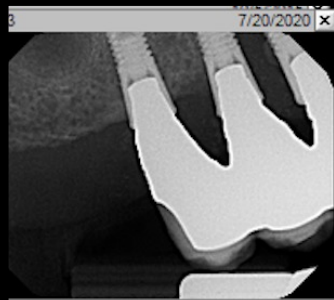


**NEWS**

# The Role of the Oral Microbiota Related to Periodontal Diseases in Anxiety, Mood and Trauma- and Stress-Related Disorders

**María Martínez<sup>1,2\*</sup>, Teodor T. Postolache<sup>3,4,5</sup>, Borja García-Bueno<sup>6,7,8</sup>, Juan C. Leza<sup>6,7,8</sup>, Elena Figuero<sup>1,2</sup>, Christopher A. Lowry<sup>4,5,9,10,11</sup> and Stefanie Malan-Müller<sup>6,8\*</sup>**

<sup>1</sup> Etiology and Pathogenesis of Periodontal Diseases, Department of Periodontology, Universidad Complutense de Madrid, Madrid, Spain, <sup>2</sup> Department of Periodontology, Hospital Clínico, Universidad Complutense de Madrid, Madrid, Spain, <sup>3</sup> Department of Periodontology, University of Maryland School of Medicine, Baltimore, MD, United States, <sup>4</sup> Department of Periodontology, University of Maryland School of Medicine, Baltimore, MD, United States, <sup>5</sup> Department of Periodontology, University of Maryland School of Medicine, Aurora, CO, United States, <sup>6</sup> Department of Periodontology, University of Maryland School of Medicine, Aurora, CO, United States, <sup>7</sup> Department of Periodontology, University of Maryland School of Medicine, Aurora, CO, United States, <sup>8</sup> Department of Periodontology, University of Maryland School of Medicine, Aurora, CO, United States, <sup>9</sup> Department of Periodontology, University of Maryland School of Medicine, Aurora, CO, United States, <sup>10</sup> Department of Periodontology, University of Maryland School of Medicine, Aurora, CO, United States, <sup>11</sup> Department of Periodontology, University of Maryland School of Medicine, Aurora, CO, United States





# Evidence supporting a link between dental amalgams and chronic illness, fatigue, depression, anxiety, and suicide

Janet K. KERN<sup>1</sup>, David A. GEIER<sup>1</sup>, Geir BJØRKLUND<sup>2</sup>, Paul G. KING<sup>3</sup>,  
Kristin G. HOMME<sup>4</sup>, Boyd E. HALLEY<sup>5</sup>, Lisa K. SYKES<sup>3</sup>, Mark R. GEIER<sup>1</sup>

<sup>1</sup> Institute of Chronic Illnesses, Inc., Silver Spring, MD, USA

<sup>2</sup> Council for Nutritional and Environmental Medicine, Mof Rana

<sup>3</sup> CoMeD, Inc., Silver Spring, MD, USA

<sup>4</sup> International Academy of Oral Medicine and Toxicology, Champion

<sup>5</sup> University of Kentucky, Lexington, KY, USA

Correspondence to: Janet K. Kern, PhD.

Institute of Chronic Illnesses, Inc.

14 Redgate Ct., Silver Spring, MD 20905, USA.

TEL: +1(301)989-0548; FAX: +1(301)989-1543; E-MAIL: [jkern@dfwair.net](mailto:jkern@dfwair.net)

**CONTRIVERSY**

# Dental Amalgam Recommendations



Dental amalgam / uh-mal-guhm /, sometimes called "silver-fillings," is a mixture of mercury, silver, copper, tin, and zinc used to fill cavities in teeth. Dental amalgam fillings release small amounts of mercury in the form of a vapor (gas) that can enter the body through inhalation.

## WHAT

### High-Risk Populations



Children,  
especially those  
younger than six



Women who are  
pregnant or planning  
to be pregnant



Nursing  
mothers



People with neurological  
impairment or kidney  
dysfunction



People who are  
sensitive to mercury, silver,  
copper, tin, or zinc

## WHO



While there are no known health risks associated with swallowing small particles of dental amalgam, breathing in mercury vapors may be harmful to certain groups of people.

The FDA recommends that high-risk populations avoid dental amalgam, if possible and appropriate.

- If your filling is in good condition, the FDA recommends you **should not** have your amalgam filling removed, unless medically necessary.
- If you are in a high-risk population, talk to your dental provider about other available treatment options.

## WHY

For more information, please visit [www.fda.gov/dental-amalgam](http://www.fda.gov/dental-amalgam).



# The Oral Systemic Links



Brain  
Health



Cardiac  
Health



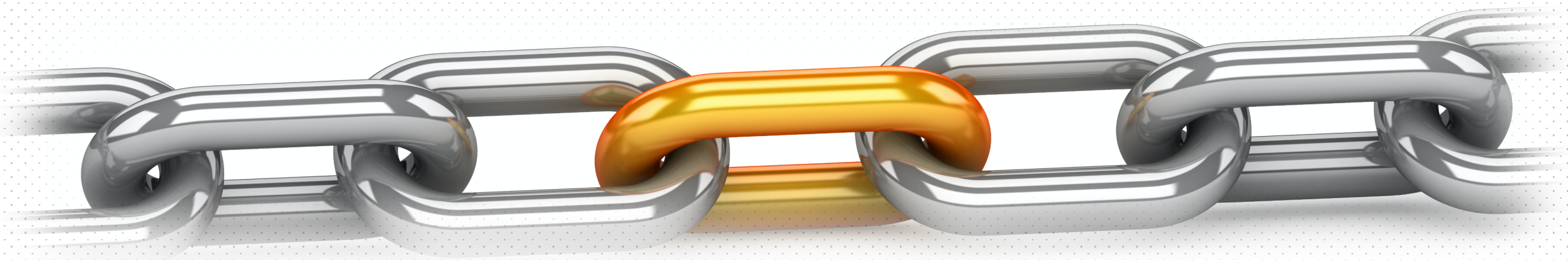
Endocrine  
Health



Digestive  
Health



Reproductive  
Health






ORIGINAL ARTICLE

Journal of Clinical  
Periodontology

WILEY

# Periodontitis and cardiovascular diseases: Consensus report

Mariano Sanz<sup>1</sup>  | Alvaro Marco del Castillo<sup>2</sup> | Søren Jepsen<sup>3</sup>  | Jose R. Gonzalez-Juanatey<sup>4</sup> | Francesco D'Aiuto<sup>5</sup> | Philippe Bouchard<sup>6</sup> | Alain Chapple<sup>7</sup> | Thomas Dietrich<sup>7</sup> | Israel Gotsman<sup>8</sup>  | Filippo Graziani<sup>9</sup>  | David Herrera<sup>1</sup>  | Bruno Loos<sup>10</sup>  | Phoebus Madianos<sup>11</sup>  | Jean-Baptiste Michel<sup>12</sup> | Pablo Perel<sup>13,14</sup> | Burkert Drieske<sup>15,16</sup> | Lior Shapira<sup>17</sup>  | Shechter<sup>18</sup> | Maurizio Tonetti<sup>19</sup>  | Charalambos Vlachopoulos<sup>20</sup> | Gernot Watzinger<sup>21</sup> 

↑  
Coronary  
Artery  
Disease

↑  
Myocardial  
Infarction

↑  
Stroke  
Risk

↑  
Peripheral  
Artery  
Disease

↑  
Heart Failure,  
Atrial  
Fibrillation





# Apical Periodontitis - Is It Accountable for Cardiovascular Diseases?

PARIDHI GARG<sup>1</sup>, CHANDRAKAR CHAMAN<sup>2</sup>

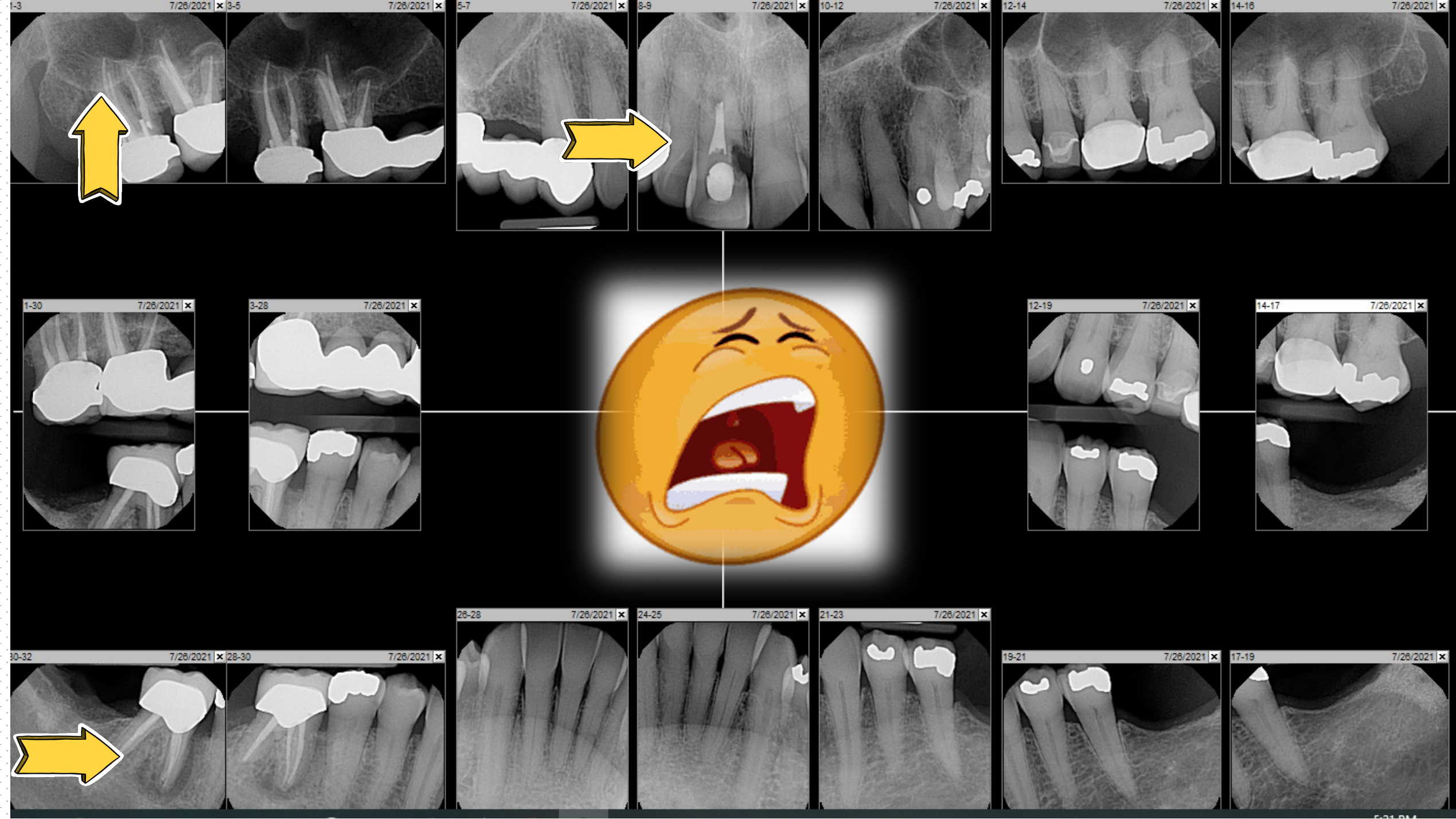
## ABSTRACT

The aim of this review was to assess the relationship between apical periodontitis and cardiovascular diseases and the predictive factors regarding this association. Cross sectional and observational studies have been included, which are mostly retrospective. A comprehensive search was performed in the Systematic Electronic Databases, PUBMED and MEDLINE from 1919 till September 2014. Articles were also hand searched. From 86 studies identified, all were read and 58 articles which were relevant were included in the text. Some articles were excluded as they were not relevant to the topic.

Apical periodontitis is a common dental condition that affects a large number of people. It is a type of infection that occurs at the tip of the root of a tooth. It is caused by bacteria that enter the tooth through a cavity or a crack. The bacteria travel down the root canal and infect the tissue at the tip of the root. This can cause pain, swelling, and pus. If left untreated, it can lead to more serious complications, such as abscesses and bone loss. Apical periodontitis is often treated with root canal therapy, which involves removing the infected tissue and filling the root canal with a special material. In some cases, surgery may be required to remove the infected tissue. It is important to see a dentist if you experience any of the symptoms of apical periodontitis. Early treatment can help prevent complications and save the tooth. Establishing a cause and effect relationship between apical periodontitis and cardiovascular diseases can affect the course of treatment of cardiovascular diseases. It is not only of interest from the scientific point of view but also from public health perspective.









Review

# Cardiovascular Disease and Chronic Endodontic Infection. Is There an Association? A Systematic Review and Meta-Analysis

Despina Koletsi <sup>1,\*</sup>, Anna Iliadi <sup>2</sup> , Giorgos N. Tzavuranakis <sup>4</sup> and Theodore Eliades <sup>1</sup> 

<sup>1</sup> Clinic of Orthodontics,  
CH-8032 Zurich, Switzerland

<sup>2</sup> Department of Dental  
10679 Athens, Greece

<sup>3</sup> Department of Endodontics,  
10679 Athens, Greece

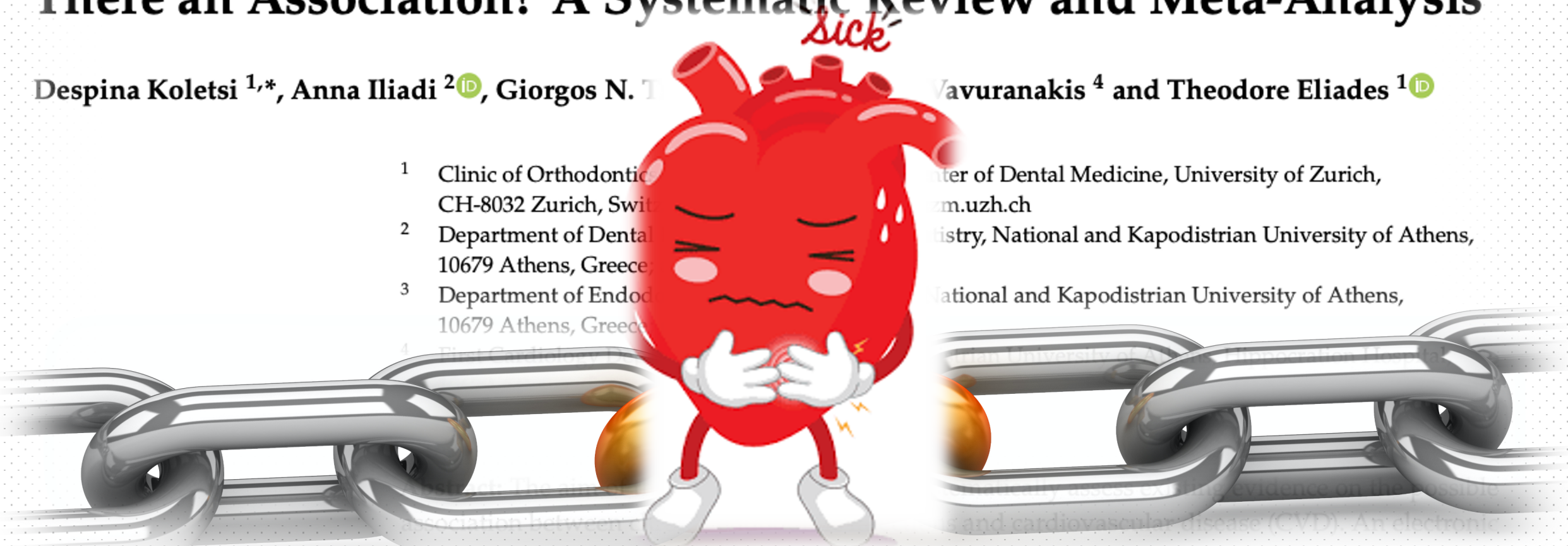
<sup>4</sup> First School of Dentistry,  
10679 Athens, Greece

Center of Dental Medicine, University of Zurich,  
m.uzh.ch

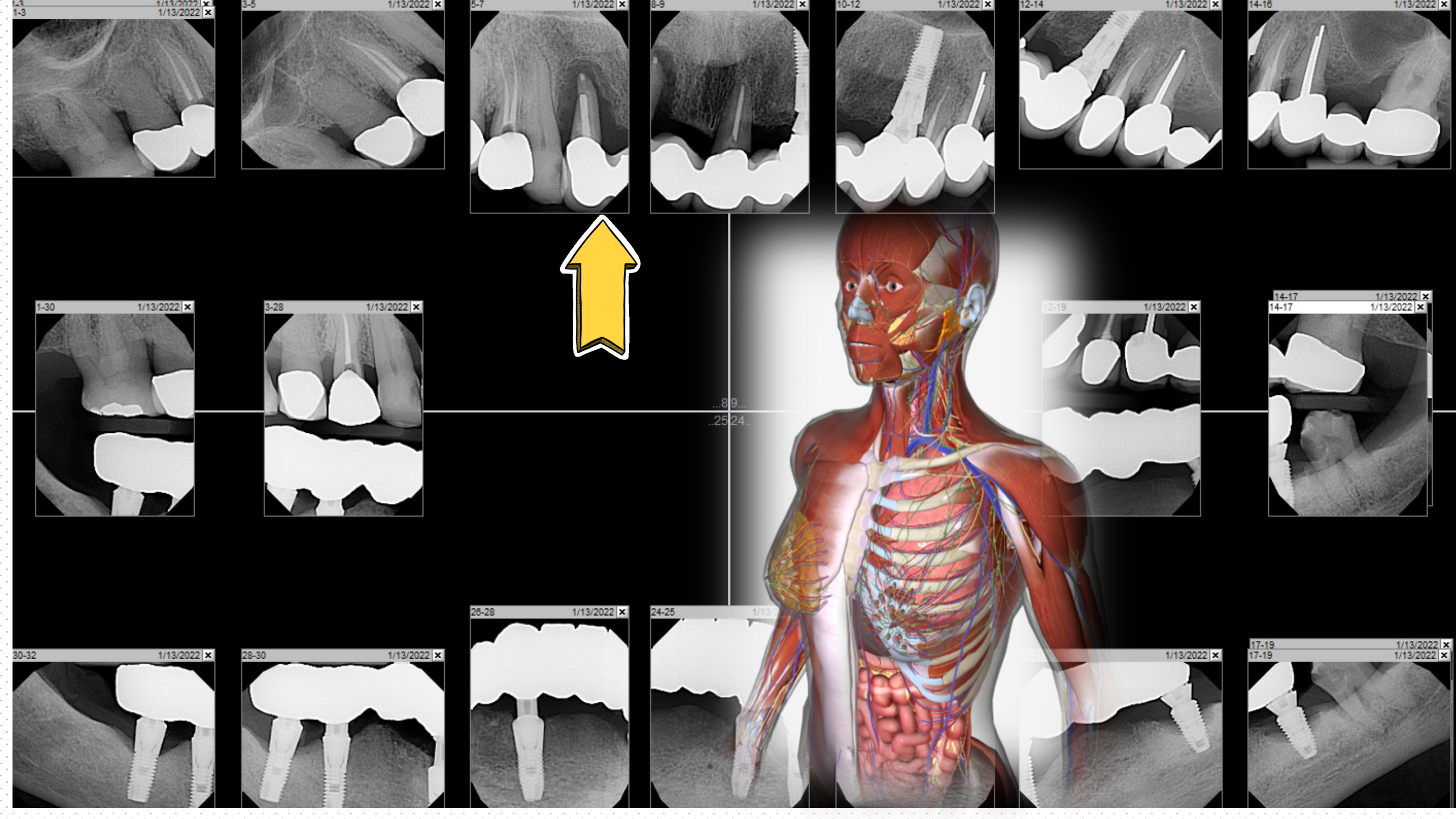
Dentistry, National and Kapodistrian University of Athens,

National and Kapodistrian University of Athens,

University of Athens









# Oral Health and Respiratory Infection

• Philippe Mojon, DMD, PhD •



The relationship between the oral cavity and the lungs is complex. It can be a result of aspiration of oral pathogens into the lungs, or colonization of the lungs by respiratory pathogens followed by aspiration, or facilitation by periodontal pathogens of colonization of the upper airway by pulmonary pathogens. Several anaerobic bacteria from the periodontal pocket have been isolated from infected lungs. In elderly patients living in chronic care facilities, the colonization of dental plaque by pulmonary pathogens is frequent. Notably, the overreaction of the inflammatory process that leads to destruc-

## ETIOLOGY/OTHER

# ARTICLE ANALYSIS & EVALUATION

### ARTICLE TITLE AND BIBLIOGRAPHIC INFORMATION

**Association between periodontal disease and chronic obstructive pulmonary disease: A reality or just a dogma?**

Peter KP, Mute BR, Doiphode SS,  
Bardapurkar SJ, Borkar MS, Raj DV.  
*J Periodontol* 2013;84(12):1717-23.

### REVIEWER

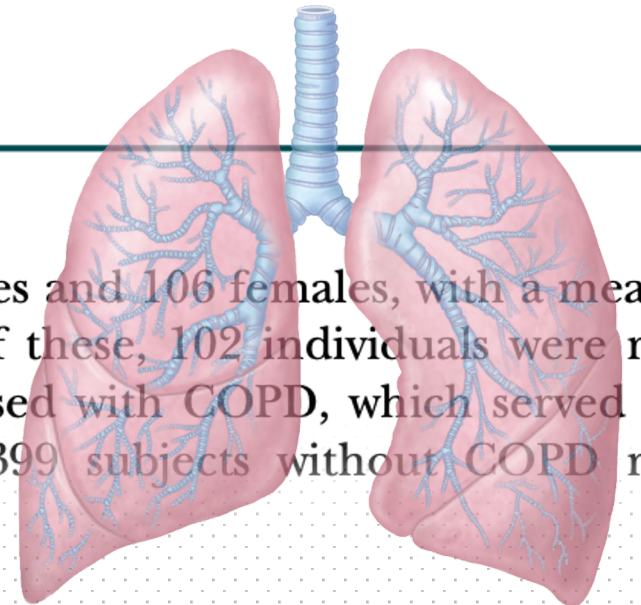
Frank A. Scannapieco, DMD, PhD

## Individuals With Chronic Obstructive Pulmonary Disease (COPD) May Be More Likely to Have More Severe Periodontal Disease Than Individuals Without COPD



### SUMMARY

#### Subjects

A sample of 501 subjects (395 males and 106 females, with a mean age of  $51.68 \pm 11.08$ ) were recruited. Of these, 102 individuals were recruited from a medical clinic and diagnosed with COPD, which served as cases; the control group consisted of 399 subjects without COPD recruited from an outpatient dental clinic.



# Association between periodontitis and severity of COVID-19 infection: A case-control study

Nadya Marouf<sup>1</sup> | Wenji Cai<sup>2</sup>  | Khalid N. Said<sup>1</sup> | Hanin Daas<sup>3</sup> | Hanan Diab<sup>1</sup> |  
Venkateswara Rao Chinta<sup>4</sup> | Ali Ait Hssain<sup>4</sup> | Belinda Nicolau<sup>2</sup> | Mariano Sanz<sup>5</sup>  |  
Faleh Tamimi<sup>3</sup>

<sup>1</sup>Department of Dentistry, Oral Health Institute, Hamad Medical Corporation, Doha, Qatar

<sup>2</sup>Faculty of Dentistry, McGill University, Montreal, QC, Canada

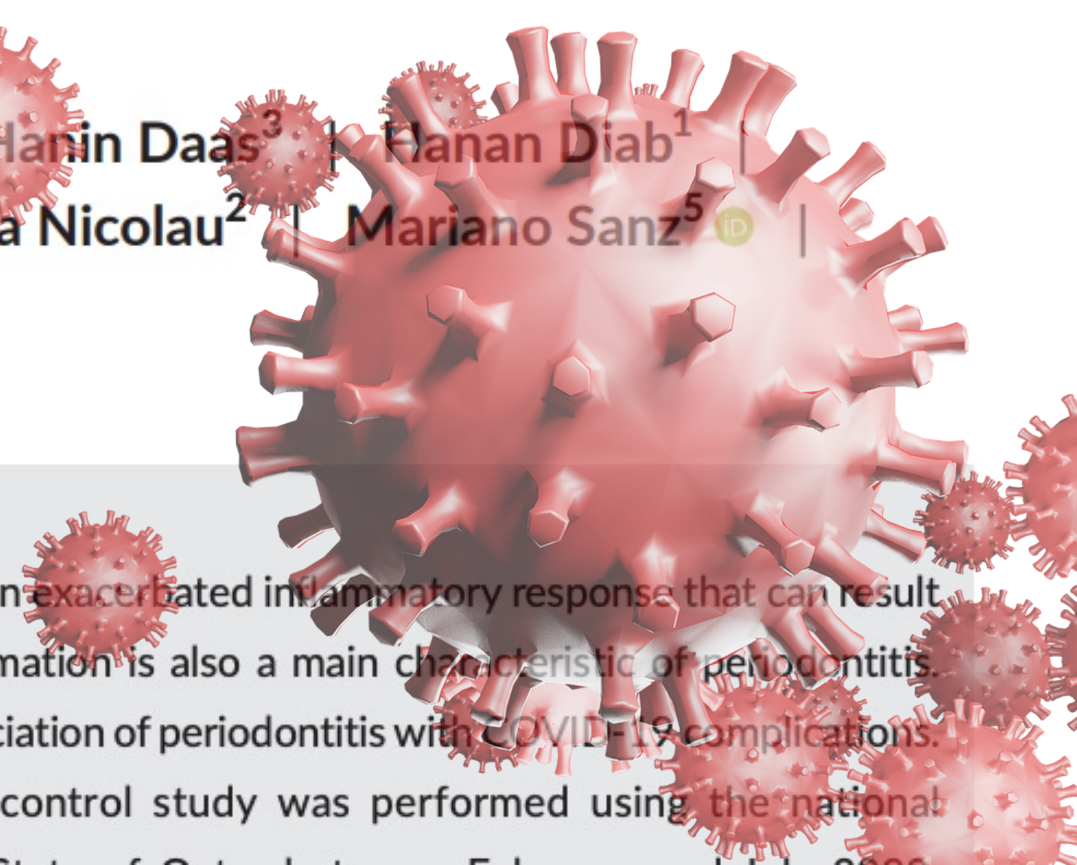
<sup>3</sup>College of Dental Medicine, QU Health, Qatar University, Doha, Qatar

<sup>4</sup>Hamad Medical Corporation, Doha, Qatar

## Abstract

**Aim:** COVID-19 is associated with an exacerbated inflammatory response that can result in fatal outcomes. Systemic inflammation is also a main characteristic of periodontitis. Therefore, we investigated the association of periodontitis with COVID-19 complications.

**Materials and Methods:** A case-control study was performed using the national





## Research Article

# Early Childhood Caries Experience Associated with Upper Respiratory Infection in US Children: Findings from a Retrospective Cohort Study

Albelali A<sup>1,3</sup>, Wu TT<sup>2</sup>, Malmstrom H<sup>1</sup> and Xiao J<sup>1\*</sup>

<sup>1</sup>Eastman Institute for Oral Health, University of Rochester, Medical Center, Rochester, NY, USA

<sup>2</sup>Biostatistics and Computational Biology, University of Rochester, Medical Center, Rochester, NY, USA

<sup>3</sup>Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia

**\*Corresponding author:** Jin Xiao, Associate Professor, Director for Perinatal Oral Health, Eastman Institute for Oral Health, University of Rochester, 625 Elmwood Ave, Rochester, NY, USA

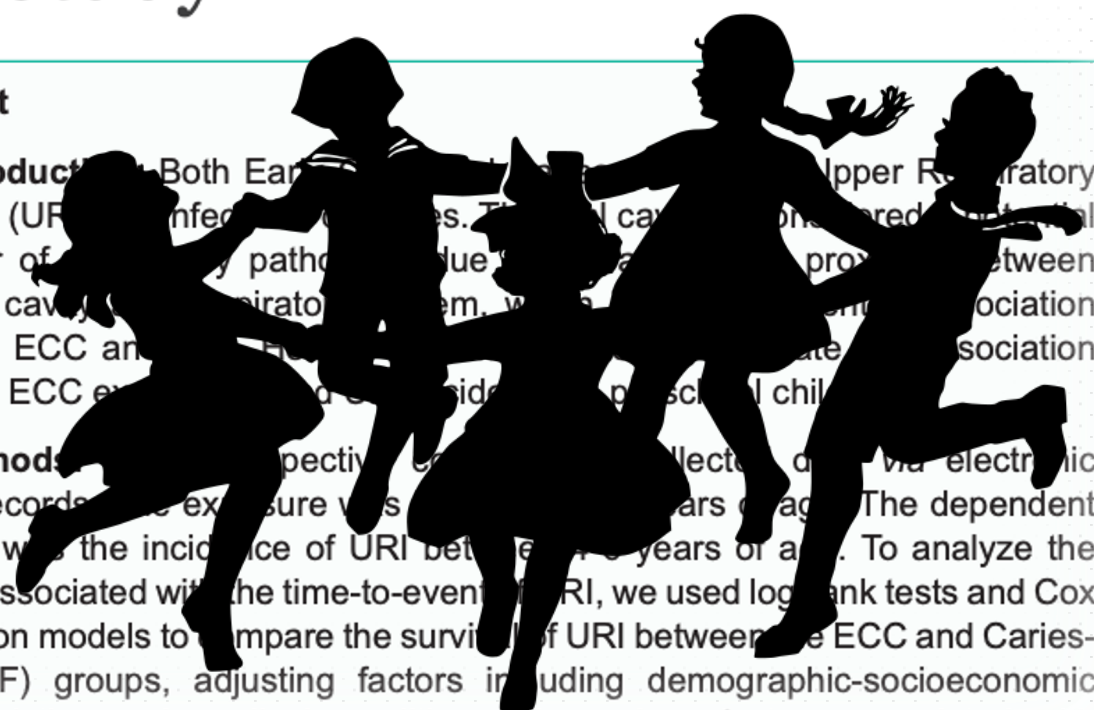
**Received:** June 30, 2021; **Accepted:** July 19, 2021;

**Published:** July 26, 2021

## Abstract

**Introduction:** Both Early Childhood Caries (ECC) and Upper Respiratory Infection (URI) are common childhood conditions. The oral cavity is considered a potential reservoir of many pathogens due to its proximity to the respiratory system. The association between ECC and URI has been studied in cross-sectional studies, but no association between ECC and URI has been found in a longitudinal study of preschool children.

**Methods:** This retrospective cohort study collected data via electronic health records. The exposure was ECC experience in the first 5 years of age. The dependent variable was the incidence of URI between 5 and 10 years of age. To analyze the factors associated with the time-to-event of URI, we used log-rank tests and Cox regression models to compare the survival of URI between the ECC and Caries-Free (CF) groups, adjusting factors including demographic-socioeconomic characteristics and medical conditions. To analyze factors associated with



## RESEARCH ARTICLE

# Mercury Exposure Levels in Children with Dental Amalgam Fillings

<sup>1</sup>Indu Miriam Varkey, <sup>2</sup>Rajmohan Shetty, <sup>3</sup>Amitha Hegde

## ABSTRACT

**Objectives:** Mercury combined with other metals to form solid amalgams has long been used in reconstructive dentistry but its use has been controversial since at least the middle of the 19th century. The exposure and body burden of mercury reviews have consistently stated that there is a deficiency of adequate epidemiological studies addressing this issue. Fish and dental amalgam are two major sources of human exposure to organic (MeHg) and inorganic Hg respectively.

Source of supply: Nil

Conflict of interest: None

## INTRODUCTION

The use of mercury amalgam containing other metals in dentistry has been going on for centuries ago. Dental amalgam contains about 50% mercury with the remainder mainly silver. Although alternative dental materials






**ORIGINAL ARTICLE**

WILEY

ORAL DISEASES  
Leading in Oral, Maxillofacial, Head & Neck Medicine

# Association between periodontitis and severe asthma in adults: A case-control study

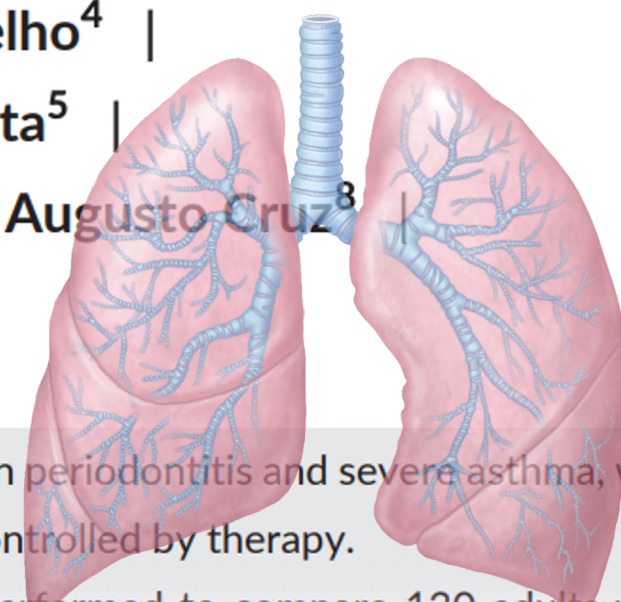
Kaliane Rocha Soledade-Marques<sup>1</sup> | Isaac Suzart Gomes-Filho<sup>1</sup>  |  
Simone Seixas da Cruz<sup>1,2</sup> | Johelle de Santana Passos-Soares<sup>3</sup> | Soraya Castro Trindade<sup>1</sup> |  
Eneida de Moraes Marcílio Cerqueira<sup>1</sup> | Julita Maria Freitas Coelho<sup>4</sup> |  
Maurício Lima Barreto<sup>5,6</sup> | Maria da Conceição Nascimento Costa<sup>5</sup> |  
Maria Isabel Pereira Vianna<sup>3</sup> | Frank A. Scannapieco<sup>7</sup> | Álvaro Augusto Cruz<sup>8</sup> |  
Adelmir Souza-Machado<sup>8,9</sup>

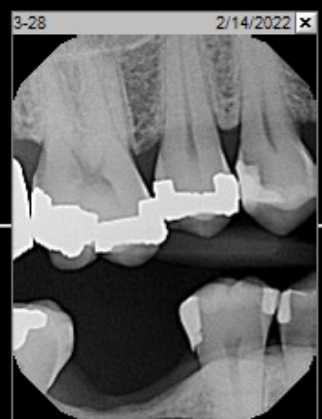
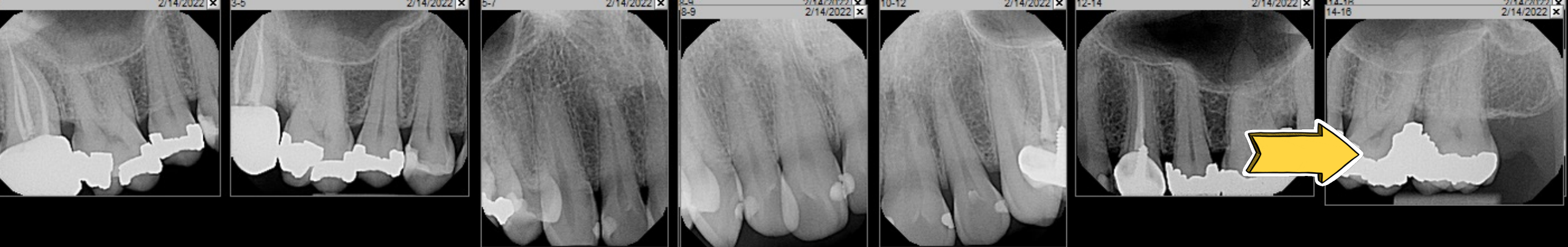
<sup>1</sup>Department of Health, Feira de Santana State University, Feira de Santana Bahia, Brazil

<sup>2</sup>Department of Epidemiology, Federal University of Recôncavo da Bahia, Santo

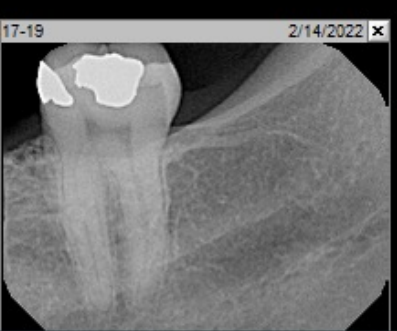
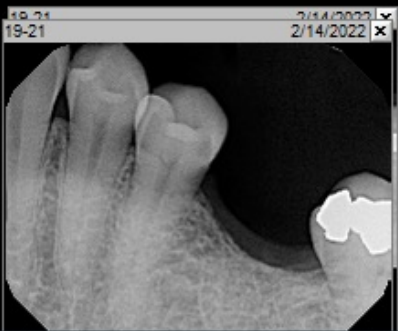
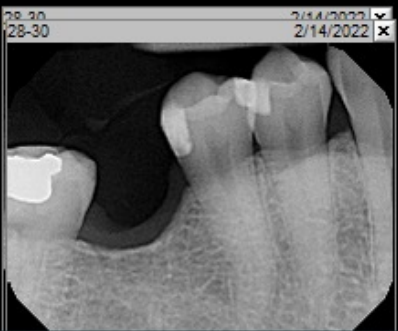
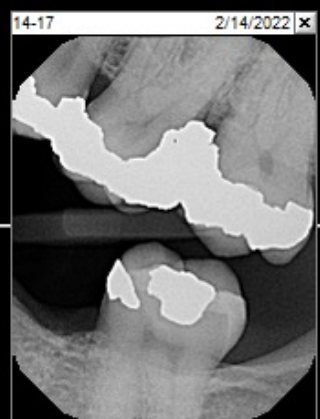
**Objective:** To evaluate the association between periodontitis and severe asthma, with participants in treatment for severe asthma, controlled by therapy.

**Methods:** A case-control investigation was performed to compare 130 adults with





IT TOOK ME  
**35**  
YEARS TO  
LOOK THIS  
GOOD



**NOT**



# The Oral Systemic Links



Brain  
Health



Cardiac  
Health



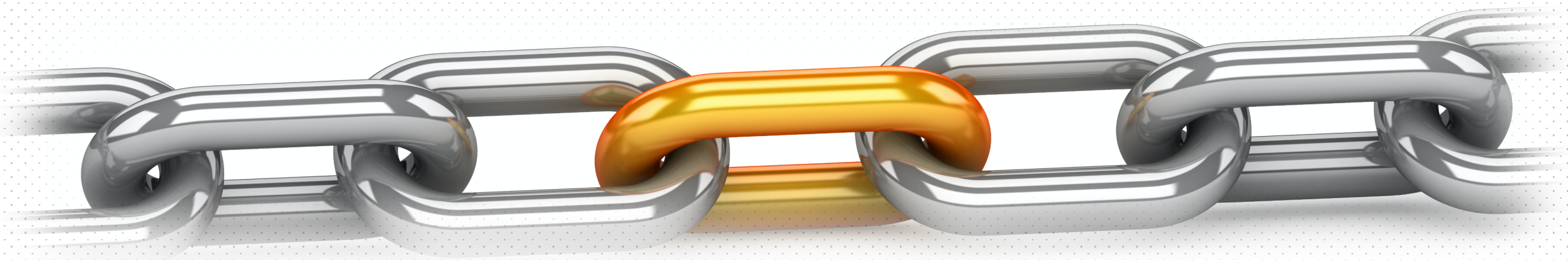
Endocrine  
Health



Digestive  
Health

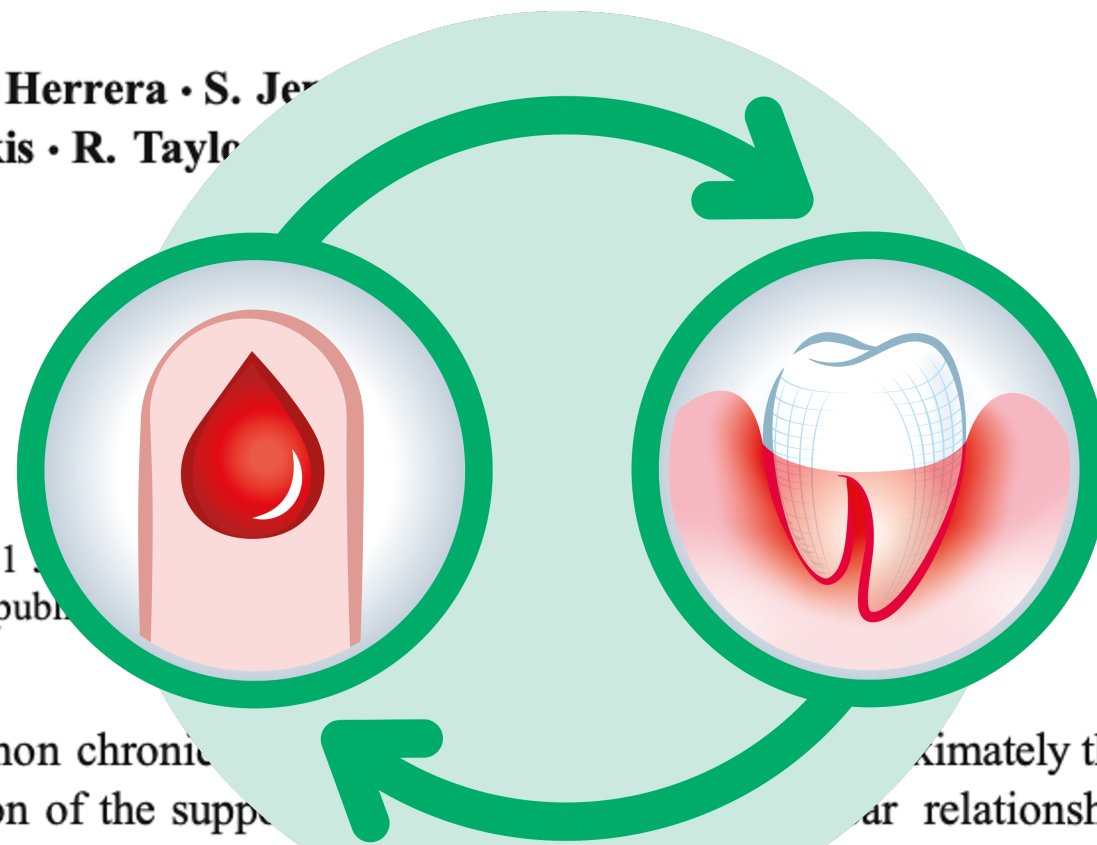


Reproductive  
Health



# Periodontitis and diabetes: a two-way relationship

P. M. Preshaw · A. L. Alba · D. Herrera · S. Jerremi  
A. Konstantinidis · K. Makrilakis · R. Taylor

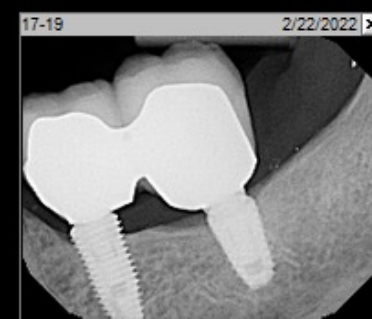
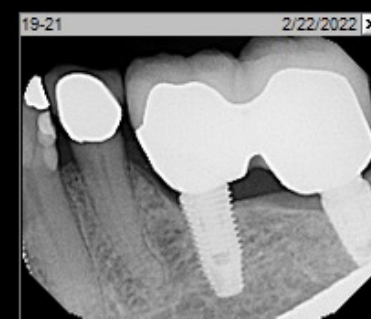
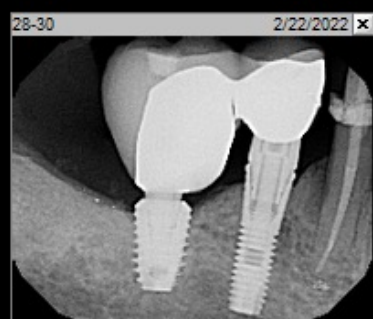
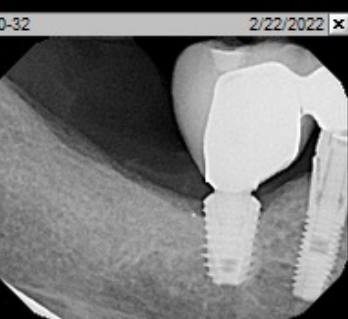
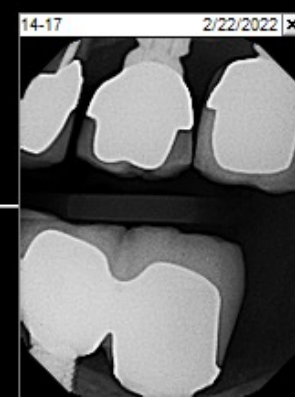
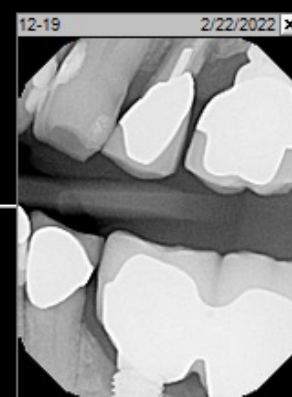
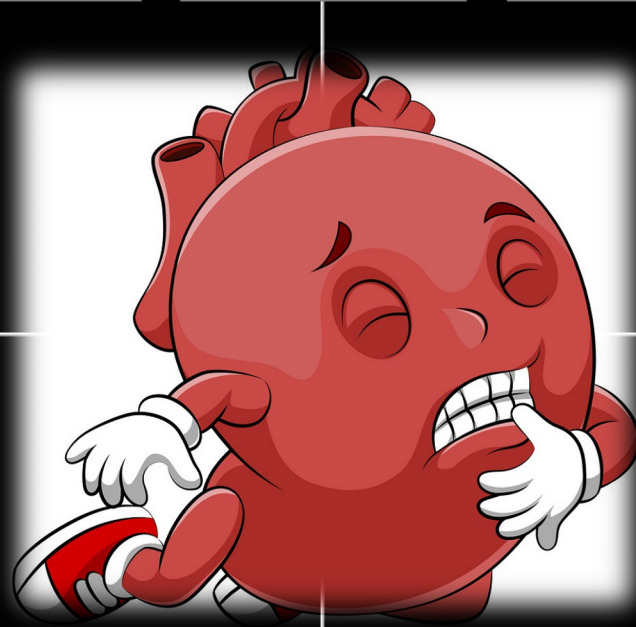
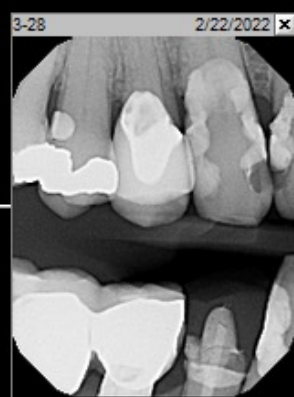


Received: 25 March 2011 / Accepted: 21 June 2011

© The Author(s) 2011. This article is published with open access at [link.springer.com/journal/12225](http://link.springer.com/journal/12225)

**Abstract** Periodontitis is a common chronic inflammatory disease characterised by destruction of the supporting structures of the teeth (the periodontal ligament and alveolar bone). It is highly prevalent (severe periodontitis affects 10–15% of the population). Periodontitis is approximately threefold more prevalent in people with diabetes. There is a clear relationship between degree of hyperglycaemia and severity of periodontitis. The mechanisms that underpin the links between these two conditions are not fully understood.





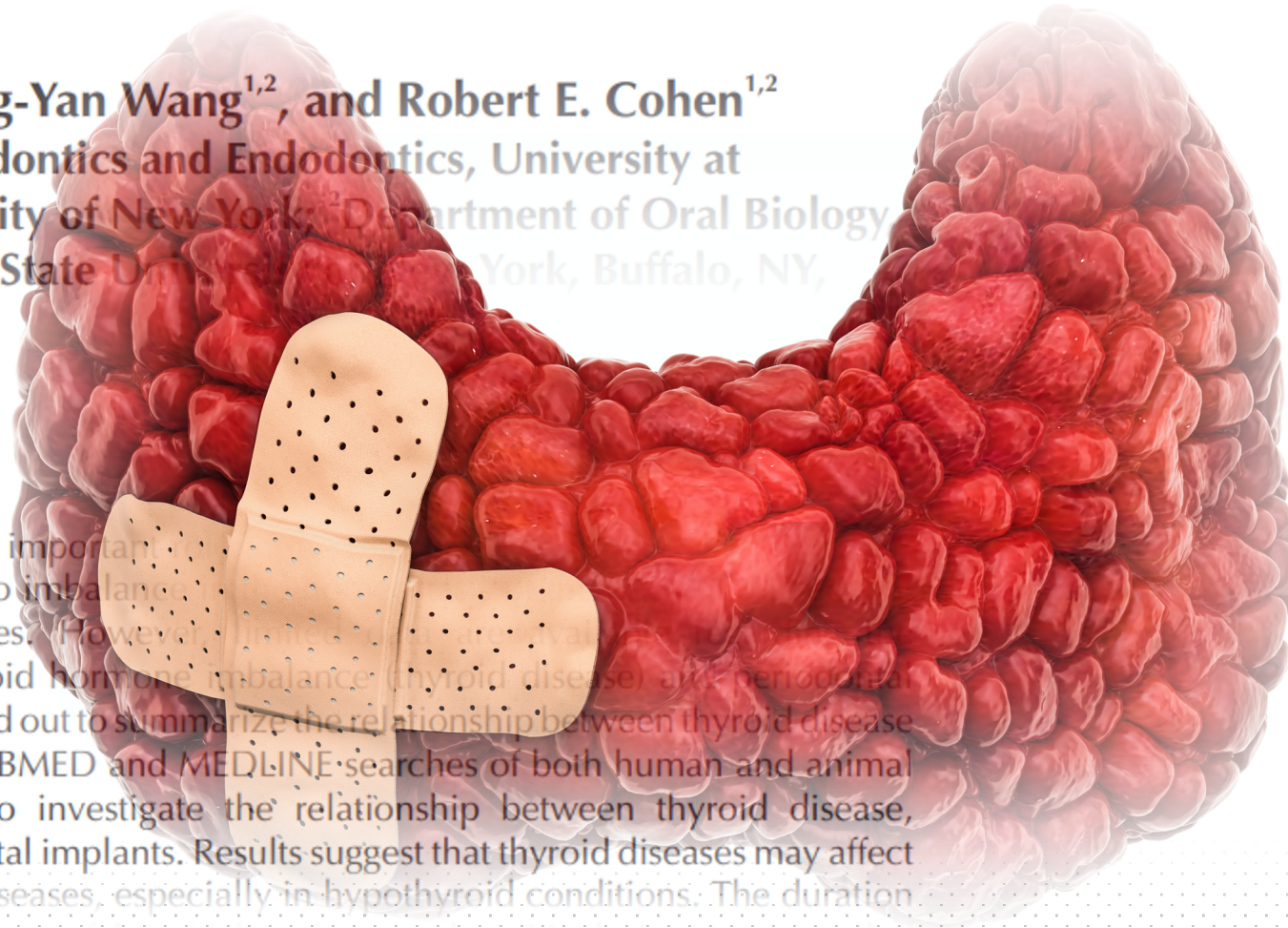
# The Effects of Thyroid Hormone Abnormalities on Periodontal Disease Status

Talal M. Zahid<sup>1</sup>, Bing-Yan Wang<sup>1,2</sup>, and Robert E. Cohen<sup>1,2</sup>

<sup>1</sup>Department of Periodontics and Endodontics, University at Buffalo, State University of New York; <sup>2</sup>Department of Oral Biology, University at Buffalo, State University of New York, Buffalo, NY, USA

## Abstract

Thyroid hormones play an important role in the healing capacity of tissues. Thyroid disease can lead to imbalance in the healing capacity of tissues. However, the relationship between thyroid hormone imbalance (thyroid disease) and periodontal health. This review is carried out to summarize the relationship between thyroid disease and periodontal status. PUBMED and MEDLINE searches of both human and animal studies were performed to investigate the relationship between thyroid disease, periodontal status, and dental implants. Results suggest that thyroid diseases may affect the status of periodontal diseases, especially in hypothyroid conditions. The duration





# The Oral Systemic Links



Brain  
Health



Cardiac  
Health



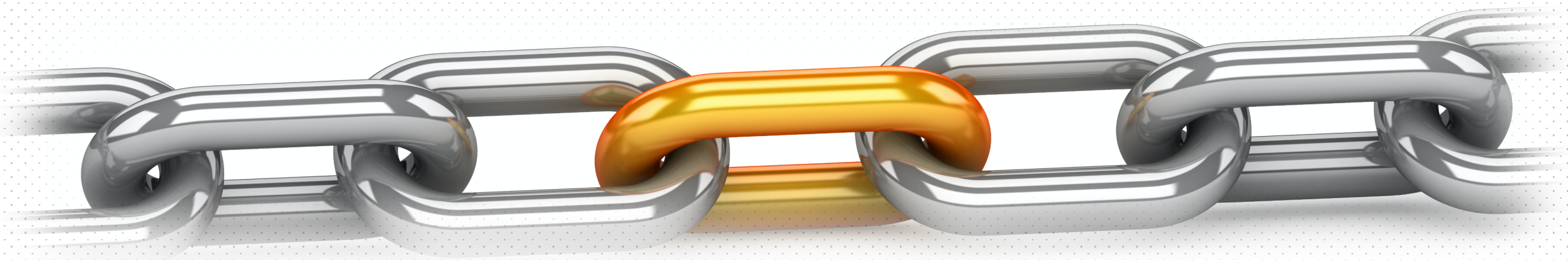
Endocrine  
Health



Digestive  
Health



Reproductive  
Health




RESEARCH ARTICLE

Open Access

# Periodontitis and inflammatory bowel disease: a meta-analysis



Yang-yang She<sup>1†</sup>, Xiang-bo Kong<sup>2,3†</sup>, Ya-ping Ge<sup>1</sup>, Zhi-yong Liu<sup>1</sup>, Jie-yu Chen<sup>1</sup>, Jing-wei Jiang<sup>4</sup>  
Hong-bo Jiang<sup>5\*</sup> and Si-lian Fang<sup>1,6\*</sup> 

## Abstract

**Background:** Periodontitis was reported to be associated with inflammatory bowel disease. However, the association between them has not been firmly established in the existing literature. Therefore, a meta-analysis was conducted to evaluate the relationship between periodontitis and IBD.

**Methods:** Electronic databases were searched for publications up to August 1, 2019 to include all eligible studies. The pooled *odds ratios* (ORs) and *95% confidence intervals* (95% CIs) were estimated to determine the association.

Inflamed  
&  
Untamed



# A potential pathogenic association between periodontal disease and Crohn's disease

Jin Imai,<sup>1,2</sup> Hitoshi Ichikawa,<sup>3,4</sup> Sho Kitamoto,<sup>1</sup> Jonathan L. Golob,<sup>5</sup> Motoki Nagata,<sup>2</sup> Junko Nagata,<sup>3</sup> Miho Takahashi,<sup>6</sup> Merritt G. Gilliland III,<sup>1</sup> Rika Tanaka,<sup>7</sup> Hiroko Nishida,<sup>8</sup> Hiroyuki Hayashi,<sup>1,9</sup> Kohei Sugihara,<sup>1</sup> Shrinivas Bishu,<sup>1</sup> Shingo Tsuda,<sup>3</sup> Hiroyuki Ito,<sup>3</sup> Masashi Matsushima,<sup>2</sup> Takayoshi Suzuki,<sup>3</sup> Katsuto Hozumi,<sup>7</sup> Takayuki Shirai,<sup>3</sup> Hidekazu Suzuki,<sup>2</sup> and Nobuhiko Kamada<sup>1</sup>

<sup>1</sup>Division of Gastroenterology and Hepatology, Department of Internal Medicine, University of Michigan, Ann Arbor, Michigan, USA. <sup>2</sup>Division of Gastroenterology and Hepatology, Department of Internal Medicine, Tokai University School of Medicine, Kanagawa, Japan. <sup>3</sup>Division of Gastroenterology and Hepatology, Department of Internal Medicine, Tokai University School of Medicine Hachioji Hospital, Tokyo, Japan. <sup>4</sup>Center for Preventive Medicine, Tokai University School of Medicine, Tokyo, Japan. <sup>5</sup>Division of Infectious Diseases, Department of Internal Medicine, University of Michigan, Ann Arbor, Michigan, USA. <sup>6</sup>Department of Oral and Maxillofacial Surgery, Tokai University School of Medicine, Kanagawa, Japan. <sup>7</sup>Department of Immunology, Tokai University School of Medicine, Kanagawa, Japan. <sup>8</sup>Department of Oral Medicine, Infection, and Immunity, University of Michigan, School of Dental Medicine, East Ann Arbor, Michigan, USA. <sup>9</sup>Department of Oral Medicine, Infection, and Immunity, University of Michigan, School of Dental Medicine, East Ann Arbor, Michigan, USA.





# Dental Erosion in Gastroesophageal Reflux Disease

- Robert P. Barron, DMD, BSc, FADSA •
- Robert P. Carmichael, BSc, DMD, MSc, FRCD(C) •
- Margaret A. Marcon, MD, FRCPC •
- George K.B. FACS •



Dentists are often the first health care providers to identify patients with gastroesophageal reflux disease (GERD). Gastroesophageal reflux disease (GERD) is defined as symptoms or complications resulting from reflux of esophageal pH is helpful in diagnosing GERD. Treatment of dental erosion resulting from GERD involves a multidisciplinary approach among family physician, dentist, prosthodontist, orthodontist and gastroenterologist. When possible, dental erosion should be treated with minimal intervention, and such treatment should include control of acid flow, remineralization



# The Oral Systemic Links



Brain  
Health



Cardiac  
Health



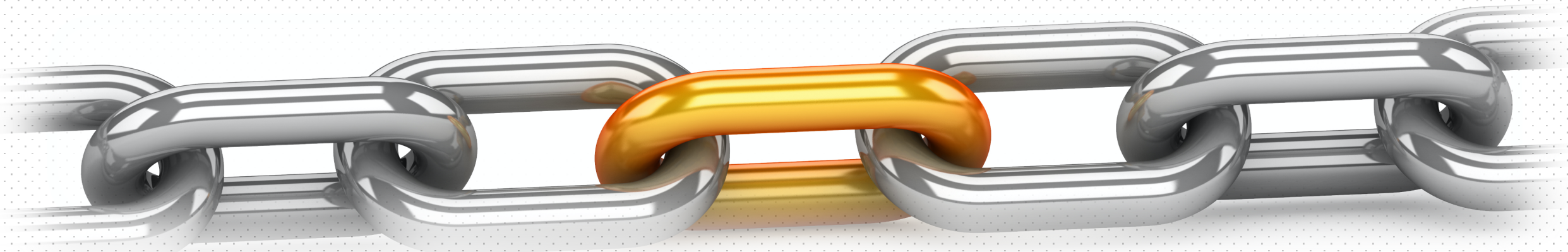
Endocrine  
Health

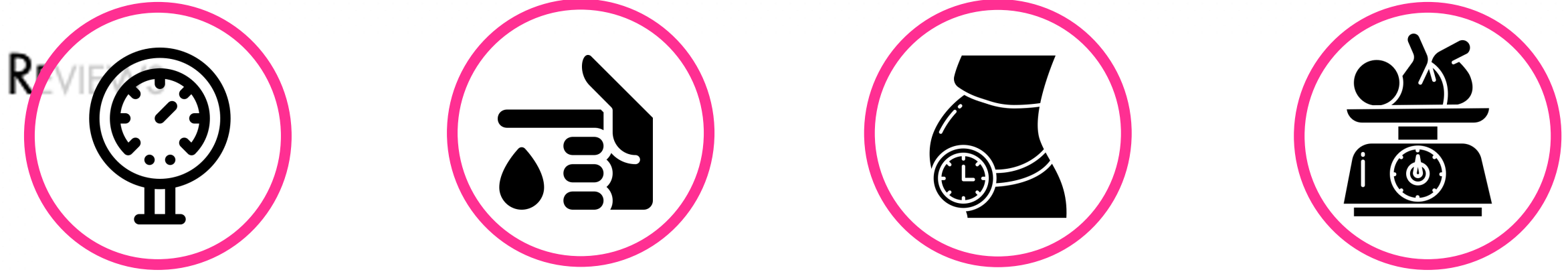


Digestive  
Health



Reproductive  
Health





# Periodontal Disease and Pregnancy Outcomes: Overview of Systematic Reviews

L.A. Daalderop<sup>1</sup>, B.V. Wieland<sup>1</sup>, K. Tomsin<sup>1</sup>, L. Reyes<sup>2,3</sup>, B.W. Kramer<sup>1</sup>, S.F. Vanterpool<sup>1</sup>, and J.V. Been<sup>1,4,5</sup>

Abstract: Periodontal disease is very common in pregnant women and is associated with adverse pregnancy outcomes, including preterm birth and perinatal mortality. Systematic reviews of the literature indicate that pregnant women with



# Placental colonization with periodontal pathogens: the potential missing link



Lori A. Fischer, PhD; Ellen Demerath, PhD; Peter Bittner-Eddy, PhD; Massimo Costalonga, DMD, PhD

**A**dverse pregnancy outcomes (APOs) including preterm birth (PTB), low birthweight (LBW), and comorbid preterm low birthweight (PLBW) occur in a significant number of

women without an apparent etiology, suggesting that undiscovered risk factors for APOs exist. Periodontitis has been proposed as a potential risk factor for APOs.<sup>1</sup>

Disagreement on the association between periodontitis and APOs derives from three sources. First, there is

Observational studies demonstrate that women with severe periodontitis have a higher risk of adverse pregnancy outcomes like preterm birth and low birthweight. Standard treatment for periodontitis in the form of scaling and root planing during the second trimester failed to reduce the risk of preterm or low birthweight. It is premature to dismiss

the association between periodontitis and adverse pregnancy outcomes because one explanation for the failure of scaling and root planing to reduce the risk of adverse pregnancy outcomes is that periodontal pathogens spread to the placenta and cause damage or preterm labor.

Seeding studies demonstrate that periodontal pathogens spread to the placenta and cause damage or preterm labor. Seeding studies demonstrate that periodontal pathogens spread to the placenta and cause damage or preterm labor.

Seeding studies demonstrate that periodontal pathogens spread to the placenta and cause damage or preterm labor. Seeding studies demonstrate that periodontal pathogens spread to the placenta and cause damage or preterm labor.

Periodontal  
Disease



Gram  
Negative  
Bacteria



Bacteria  
Adhere in  
Placenta at  
26 weeks



Late  
Interventions  
may not  
Prevent  
LBW\*



OPEN

# Association between dental caries and adverse pregnancy outcomes

Geum Joon Cho<sup>1\*</sup>, So-youn Kim<sup>2</sup>, Hoi Chang Lee<sup>2</sup>, Ho Yeon Kim<sup>1</sup>, Kyu-Min Lee<sup>3</sup>,  
Sung Won Han<sup>3</sup> & Min-Jeong Oh<sup>1</sup>

Poor oral health is not only associated with diabetes and cardiovascular disease but adverse pregnancy outcomes. However the influence of dental caries on pregnancy is unknown. The aim of this study was to evaluate the association between dental caries and adverse pregnancy outcomes and the effect of treatment for dental caries on adverse pregnancy outcomes. Primiparas who delivered a singleton between January 1, 2010 and December 31, 2014 and underwent both general health examination and oral health examination during a National Korea Health Screening Examination within 1 year of pregnancy were eligible. The data of the women who met the inclusion criteria were linked to the data of their offspring contained within the National Korea Health Screening Program for Infants and Children database. Among



# Association Between Periodontal Disease and Erectile Dysfunction: A Systematic Review

American Journal of Men's Health

2018, Vol. 12(2) 338–346

© The Author(s) 2016

Reprints and permissions:

[sagepub.com/journalsPermissions.nav](http://sagepub.com/journalsPermissions.nav)

DOI: 10.1177/1557988316639050

[journals.sagepub.com/home/ajmh](http://journals.sagepub.com/home/ajmh)



**Sergio Varela Kellesarian, DDS<sup>1</sup>, Tammy Varela Kellesarian, DDS, MPH<sup>2</sup>,  
Vanessa Ros Malignaggi, DDS<sup>3</sup>, Mansour Al-Askar, DDS<sup>4</sup>,  
Alexis Ghanem, DDS<sup>1</sup>, Hans Malmstrom, DDS<sup>1</sup>,  
and Fawad Javed, DDS, PhD<sup>1</sup>**

## Abstract

A limited number of studies have reported an association between erectile dysfunction (ED) and chronic periodontitis (CP). The aim of the present study is to assess the association between CP and ED through a systematic review of published literature. To address the focused question, “Is there a relationship between ED and CP?” indexed databases were searched till December 2015 using various key words “erectile dysfunction,” “periodontal disease,” “periodontitis,” “dental infection,” and “impotence.” Letters to the editor, commentaries, historic reviews, and



# The Oral Systemic Links



Brain  
Health



Cardiac  
Health



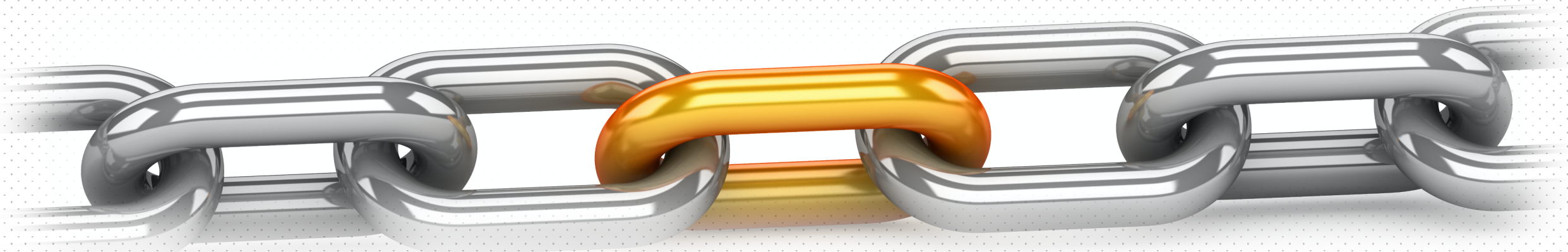
Endocrine  
Health



Digestive  
Health



Reproductive  
Health





RESEARCH ARTICLE

# Is periodontitis a risk indicator for cancer? A meta-analysis

**Stefano Corbella<sup>1,2\*</sup>, Paolo Veronesi<sup>3,4</sup>, Viviana Galimberti<sup>3</sup>, Roberto Weinstein<sup>5</sup>, Massimo Del Fabbro<sup>1,2</sup>, Luca Francetti<sup>1,2</sup>**

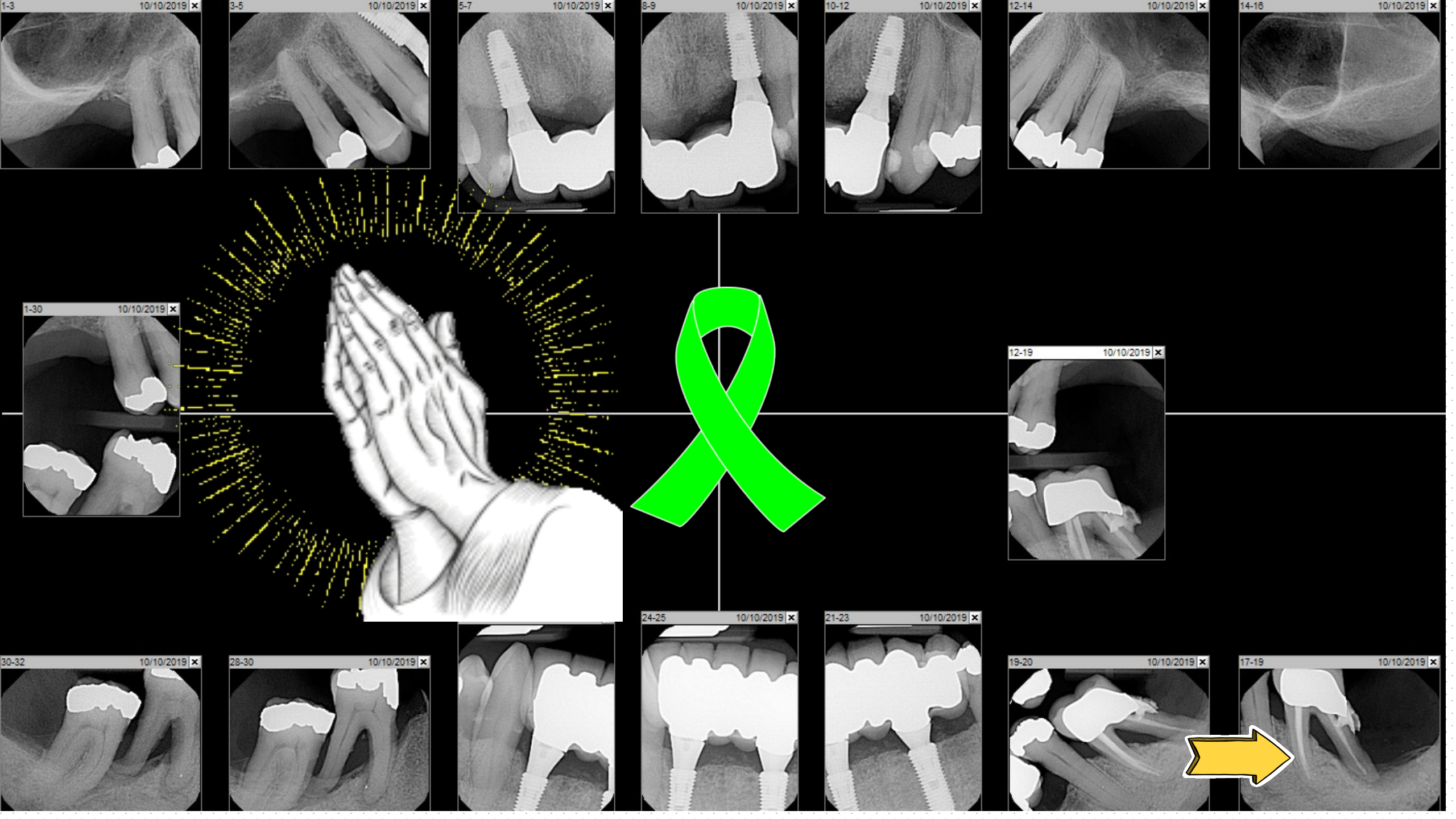
**1** IRCCS Istituto Ortopedico Galeazzi, Milan, Italy, **2** Department of Biomedical, Surgical and Dental Sciences, Università degli Studi di Milano, Milan, Italy, **3** European Institute of Oncology, Division of Senology, Milan, Italy, **4** Università degli Studi di Milano, Milan, Italy, **5** Scientific Director D&S Humanitas Dental Center, Rozzano, Milan, Italy

\* [stefano.corbella@gmail.com](mailto:stefano.corbella@gmail.com)

## Abstract

## Background







Lung Cancer &  
Periodontal  
Disease

Kidney Cancer  
& Periodontal  
Disease

Head & Neck  
Cancer  
& Periodontal  
Disease

Pancreatic  
Cancer &  
Periodontal  
Disease

Hematological  
Cancer &  
Periodontal  
Disease

## Review

# The association between periodontal disease and cancer: A review of the literature

Sarah G. Fitzpatrick\*, Joseph Katz

Department of Oral and Maxillofacial Diagnostic Sciences, University of Florida College of Dentistry, Gainesville, FL, USA

### ARTICLE INFO

### ABSTRACT

1. Wang J, Yang X, Zou X, Zhang Y, Wang J, Wang Y. Relationship between periodontal disease and lung cancer: A systematic review and meta-analysis. *J Periodont Res*. 2020;00:1-13. <https://doi.org/10.1111/jre.12772>

Received 11 June 2009  
Received in revised form

a link between periodontal disease and cancer has been established. The purpose of this paper is to review the literature to explore the evidence to date of a relationship between

# Periodontal Disease and Risk of Head and Neck Cancer: A Meta-Analysis of Observational Studies

Xian-Tao Zeng<sup>1</sup>, Ai-Ping Deng<sup>2</sup>, Cheng Li<sup>1,3</sup>, Liang-Ning Ni<sup>1</sup>, Dong Leng<sup>1\*</sup>

<sup>1</sup> Department of Stomatology, Taihe Hospital and School of Stomatology, Hubei University of Medicine, Yichang, Hubei, People's Republic of China,

<sup>2</sup> Department of Neurosurgery, Taihe Hospital, Hubei University of Medicine, Yichang, Hubei Province, People's Republic of China, <sup>3</sup> Department of Oral and

Maxillofacial Surgery, School and Hospital of Stomatology, Wuhan University, Wuhan, Hubei Province, People's Republic of China

## Abstract

**Background:** Many epidemiological studies have reported a positive association of periodontal disease (PD) with risk of head and neck cancer (HNC), but the results are inconsistent or even contradictory. In this study, we conducted a meta-analysis to ascertain the relationship between PD and HNC risk.

**Methods:** We searched the PubMed, Embase, and Cochrane Library databases for relevant observational studies on the association between PD and HNC risk published up to March 23, 2013. Data from the included studies were extracted and analyzed independently by two authors. The meta-analysis was performed using RevMan 5.2 software.

**Results:** We obtained seven observational studies, including five case-control studies and two cohort studies. The meta-analysis indicated a significant association between PD and HNC risk (odds ratio = 2.6, 95% confidence interval = 1.168 - 4.14;  $p < 0.001$ ), with sensitivity analysis showing that the result was robust. Subgroup analyses based on adjustment for covariates, study design, PD association, site, and ethnicity all revealed a significant association.

**Conclusions:** Based on currently evidence, PD is probably a significant and independent risk factor of HNC.





Review

# The Link between Periodontal Disease and Oral Cancer—A Certainty or a Never-Ending Dilemma?

Zinovia Surlari, Dragoș Ioan Vîrșescu, Elena-Raluca Zacheș \* and Roxana-Ionela Vasluianu \*  
and Dana Gabriela Budală

# ORAL CANCER



Medicine and Pharmacy, 700115 Iasi, Romania;  
(R.-I.V.);

ianu@umfiasi.ro (R.-I.V.)

have a substantial systemic influence on the body that extends beyond the oral cavity and can lead to local inflammation, bone damage, and tooth loss. A growing number of studies suggest that periodontitis and oral cancer are linked, however it is unclear

## REVIEW ARTICLE

Journal of  
PERIODONTAL RESEARCH

WILEY

# Relationship between periodontal disease and lung cancer: A systematic review and meta-analysis

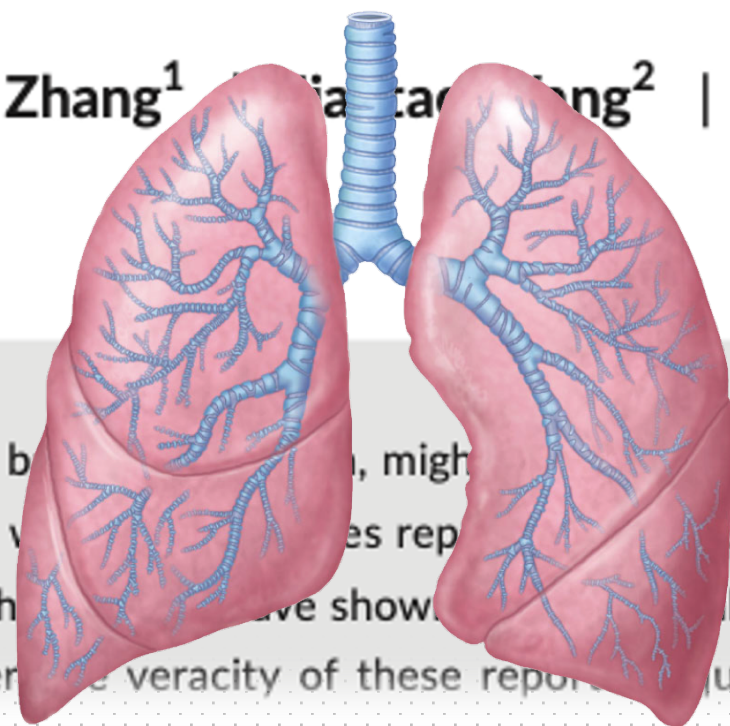
Jiahe Yang<sup>1</sup> | Yu Yang<sup>1</sup> | Xiaolong Zou<sup>1</sup> | Yunhan Zhang<sup>1</sup> | Jiafang Yang<sup>2</sup> |  
Yan V. Wang<sup>2</sup>

<sup>1</sup>State Key Laboratory of  
National Clinical Research  
Disease, West China  
Sichuan University

<sup>2</sup>State Key Laboratory of  
and Department of Lung Cancer  
and Department of Radiation Oncology

## Abstract

Periodontal disease (PD), as a chronic bacterial infection, might be associated with cardiovascular diseases, which are reported to exhibit a bidirectional relationship with lung cancer. Whether systemic diseases, such as PD, exhibit a bidirectional relationship with lung cancer has not been clearly defined. While some studies have shown a positive relationship between PD and lung cancer, others have shown no relationship. The veracity of these reports is questioned.

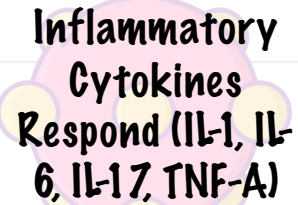




frontiers  
in Oncology



Bacteria  
Initiates a Host  
Response



Inflammatory  
Cytokines  
Respond (IL-1, IL-  
6, IL-17, TNF-A)



Trigger  
Immune &  
Inflammatory  
Response



Inflammation  
Promotes  
Cancer  
Growth

SYSTEMATIC REVIEW  
published: 12 December 2018  
doi: 10.3389/fonc.2018.00801



Chronic  
Inflammation  
Leads to DNA  
Damage &  
Cancer

# Periodontal Disease and Breast Cancer: A Meta-Analysis of 1,73,162 Participants

Jun Shao<sup>1†</sup>, Lan Wu<sup>2,3,4†</sup>, Wei-Dong Leng<sup>5</sup>, Cheng Fang<sup>2,3</sup>, You-Jia Zhu<sup>4</sup>, Ying-Hui Jin<sup>2,3\*</sup> and Xian-Tao Zeng<sup>1,2,3,4,5\*</sup>

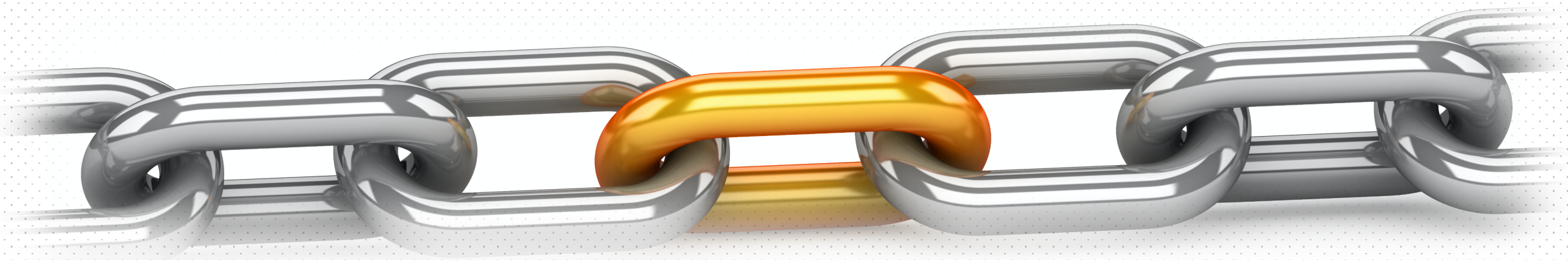
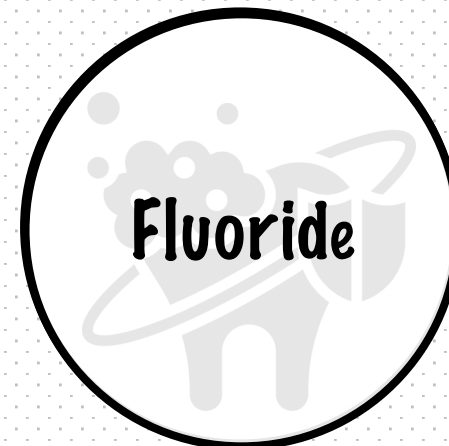
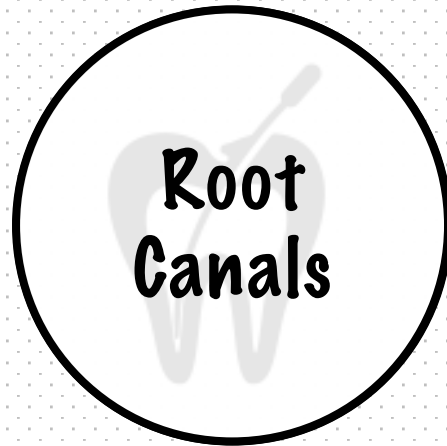
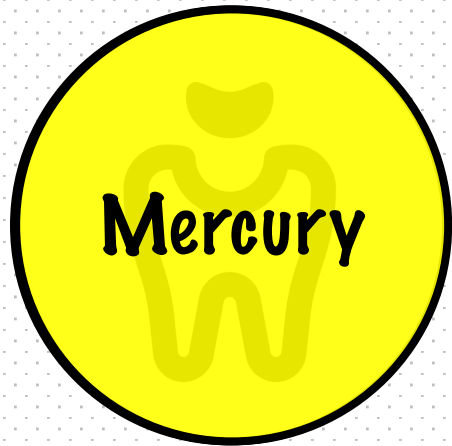
<sup>1</sup> Department of Stomatology, Guangzhou Hospital of Integrated Traditional and West Medicine, Guangzhou, China, <sup>2</sup> Center for Evidence-Based and Translational Medicine, Zhongnan Hospital of Wuhan University, Wuhan, China, <sup>3</sup> Department of Evidence-Based Medicine and Clinical Epidemiology, The Second Clinical College of Wuhan University, Wuhan, China, <sup>4</sup> Department of Stomatology, Zhongnan Hospital of Wuhan University, Wuhan, China, <sup>5</sup> Department of Stomatology, Taihe Hospital, Hubei University of Medicine, Shiyan, China

OPEN ACCESS

**Objective:** To investigate the correlation between periodontal disease and breast cancer.

Edited by

# ...More Oral Systemic Links





## **HAZARDOUS EFFECTS OF METALLIC MERCURY**

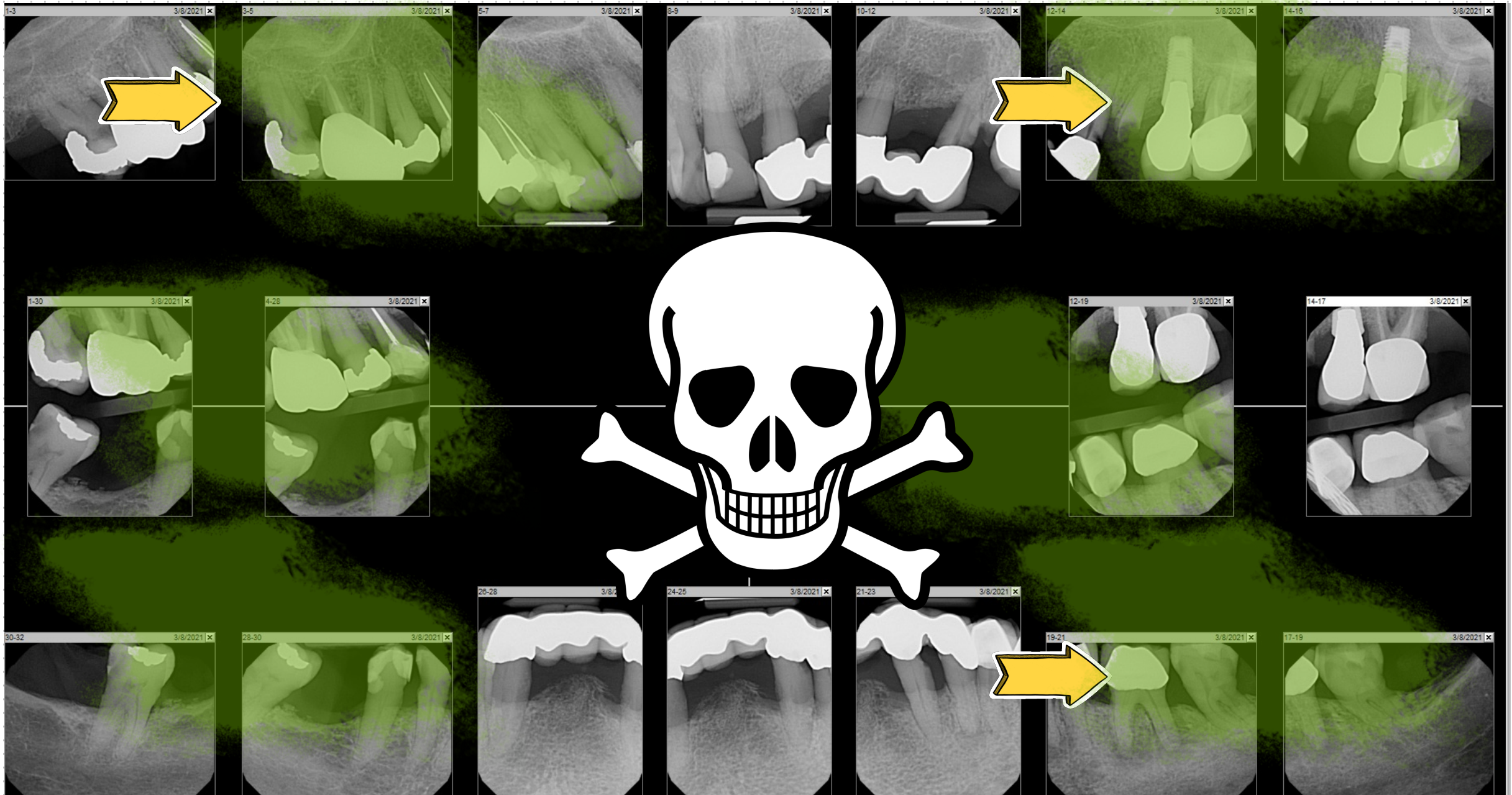
**NUR ATASEVER\***

**SENAY CANAY\***

**NUR ALPAY\*\***

**CONTRADICTORY**

*SUMMARY: Over the past two or three decades, there has been an increasing awareness of the hazards inherent in the use of mercury in dentistry. All aspects of handling the mercury should be given attention. Many potential sources of mercury exposure exist in a dental office. Sources include: accidental spills, poor mercury hygiene, manual mulling to excess mercury from freshly mixed amalgam, mechanical amalgamators, ultrasonic amalgam condensers, failure to use high-vacuum suction while removing old amalgam restorations, and improper dry heat sterilization of amalgam contaminated instruments. Atmospheric mercury vapor resulting from a spill of free mercury is a major cause of contamination in the dental office environment. Occupational exposure to mercury is known to have toxic effects on a wide variety of systems. Inhalation of mercury is a major cause of mercury toxication and will cause severe pulmonary damage and renal injury, and central nervous system disturbances. Many nonspecific signs and symptoms also may*





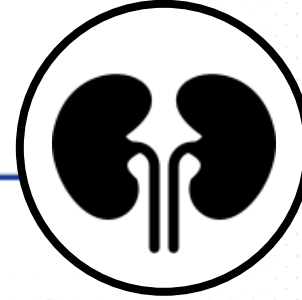
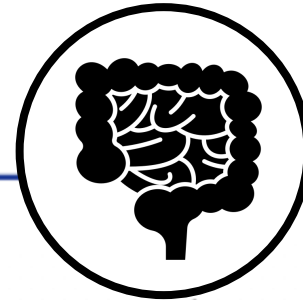
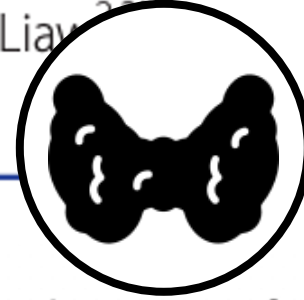
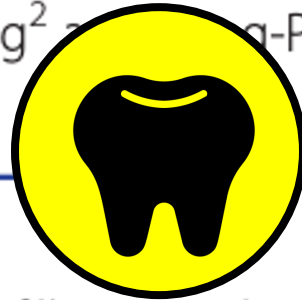
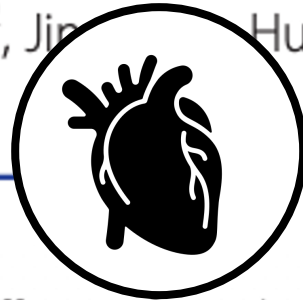
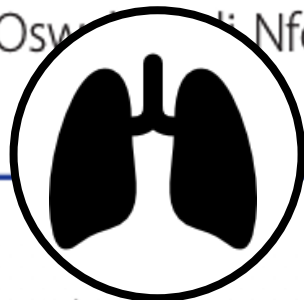
RESEARCH

Open Access



# Association between dental amalgam fillings and Alzheimer's disease: a population-based cross-sectional study in Taiwan

Yi-Sun<sup>1</sup>, Oswaldo Nfor<sup>2</sup>, Jin-Hong Huang<sup>2</sup> and Qing-Po Liaw<sup>2\*</sup>



**Introduction:** The potential effects of amalgam fillings on the development of Alzheimer's disease (AD) are not well understood. The aim of the study was to evaluate the association between dental amalgam fillings and Alzheimer's disease in Taiwanese population aged 65 and older.

## Review

# The impact of genetic variation on metabolism of heavy metals: Genetic predisposition?

Zeinab Joneidi<sup>a</sup>, Yousef Mortazavi<sup>a</sup>, Fatemeh Memari<sup>b</sup>, Amir Roointan<sup>c</sup>, Bahram Chahardouli<sup>d</sup>,  
Shahrbano Rostami<sup>d,\*</sup>

<sup>a</sup> Department of Genetics, Biotechnology and Molecular Medicine, Zanjan University of Medical Sciences, Zanjan, Iran

<sup>b</sup> Department of Medical Biotechnology, Faculty of Advanced Medical Sciences, Tabriz University of Medical Sciences, Tabriz, Iran

<sup>c</sup> Transplant Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

<sup>d</sup> Hematology-Oncology and Stem Cell Transplantation Research Center, Tehran University of Medical Sciences, Tehran, Iran

## ARTICLE INFO

### Keywords:

Single nucleotide polymorphism

Genetic variation

Genetic predisposition

## ABSTRACT

Genetic variations can be considered as internal components in susceptibility of individuals to heavy metals related toxicities. However, the exact mechanism of the inherent factors in body response to toxic materials, as well as their potential role in susceptibility factors are remaining to be more



# Impact of heavy metals on the female reproductive system

Piotr Rzym ski<sup>1</sup>, Katarzyna Tomczyk<sup>2</sup>, Paweł Rzym ski<sup>2</sup>, Barbara Poniedziół<sup>2</sup>,  
Maciej Wilczak<sup>3</sup>

<sup>1</sup> Department of Biology and Environmental Protection, Poznań University of Medical Sciences, Poznań, Poland

<sup>2</sup> Department of Mother's and Child's Health, Poznań University of Medical Sciences, Poznań, Poland

<sup>3</sup> Department of Educational Medicine, Poznań University of Medical Sciences, Poznań, Poland

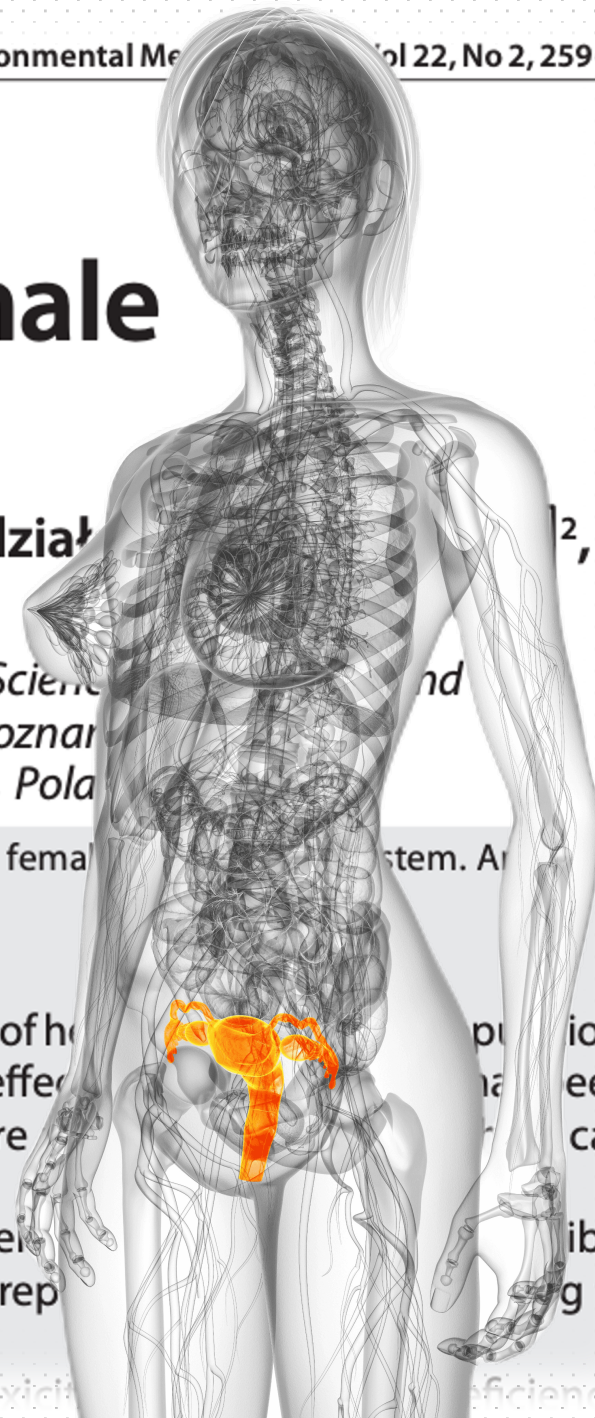
Rzym ski P, Tomczyk K, Rzym ski P, Poniedziół B, Opala T, Wilczak M. Impact of heavy metals on the female reproductive system. *Ann Agric Environ Med*. 2015; 22(2): 259–264. doi: 10.5604/12321966.1152077

## Abstract

**Introduction.** It has been recognized that environmental pollution can affect the quality of human health. Heavy metals are among the group of highly emitted contaminants and their adverse effects have been widely studied in recent decades. Lifestyle and quality of the ambient environment are the main factors that can mainly contribute to the heavy metals exposure in humans.

**Objective.** A review of literature linking heavy metals and the female reproductive system. The aim of the study was to present associations with emission and exposure of heavy metals and impairments of female reproductive system according to current knowledge.

**Results.** The potential health disorders caused by chronic or acute heavy metals toxicity are discussed. The main focus is on the reproductive system efficiency.





# Maternal amalgam dental fillings as the source of mercury exposure in developing fetus and newborn

LUBICA PALKOVICOVA<sup>a</sup>, MONIKA URSINYOVA<sup>a</sup>, VLASTA MASANOVA<sup>a</sup>, ZHIWEI YU<sup>b</sup> AND IRVA HERTZ-PICCIOTTO<sup>b</sup>

<sup>a</sup>Department of Environmental Medicine, Slovak Medical University, Bratislava, Slovakia

<sup>b</sup>Department of Public Health Sciences, University of California at Davis, Davis, California, USA

Dental amalgam is a mercury-based filling containing approximately 50% of metallic mercury ( $\text{Hg}^0$ ). Human placenta does not represent a real barrier to the transport of  $\text{Hg}^0$ ; hence, fetal exposure occurs as a result of maternal exposure to Hg, with possible subsequent neurodevelopmental disabilities in infants. This study represents a substudy of the international NIH-funded project “Early Childhood Development and polychlorinated biphenyls Exposure in Slovakia”. The main aim of this analysis was to assess the relationship between maternal dental amalgam fillings and exposure of the developing fetus to Hg. The study subjects were mother–child pairs ( $N = 99$ ). Questionnaires were administered after delivery, and chemical analyses of Hg were performed in the samples of maternal and cord blood using atomic absorption spectrometry with amalgamation technique. The median values of Hg concentrations were  $0.63 \mu\text{g/l}$  (range  $0.14$ – $2.9 \mu\text{g/l}$ ) and  $0.80 \mu\text{g/l}$  (range  $0.15$ – $2.54 \mu\text{g/l}$ ) for maternal and cord blood, respectively. None of the cord blood Hg concentrations reached the level considered to be hazardous for neurodevelopmental effects in children exposed to Hg *in utero* (EPA reference dose for Hg of  $5.8 \mu\text{g/l}$  in cord blood). A strong positive correlation between maternal and cord blood Hg levels was found ( $\rho = 0.79$ ;  $P < 0.001$ ). Levels of Hg in the cord blood were significantly associated with the number of maternal amalgam fillings ( $\rho = 0.46$ ,  $P < 0.001$ ) and with the number of years since the last filling ( $\rho = -0.37$ ,  $P < 0.001$ ); these associations remained significant after adjustment for maternal age and education. Dental amalgam fillings in girls and women of reproductive age should be used with caution, to avoid increased prenatal Hg exposure.

Journal of Exposure Science and Environmental Epidemiology (2008) 18, 326–331; doi:10.1038/sj.jes.7500606; published online 12 September 2007





RESEARCH

Open Access

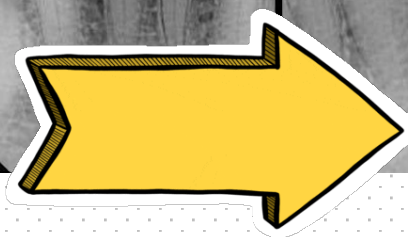
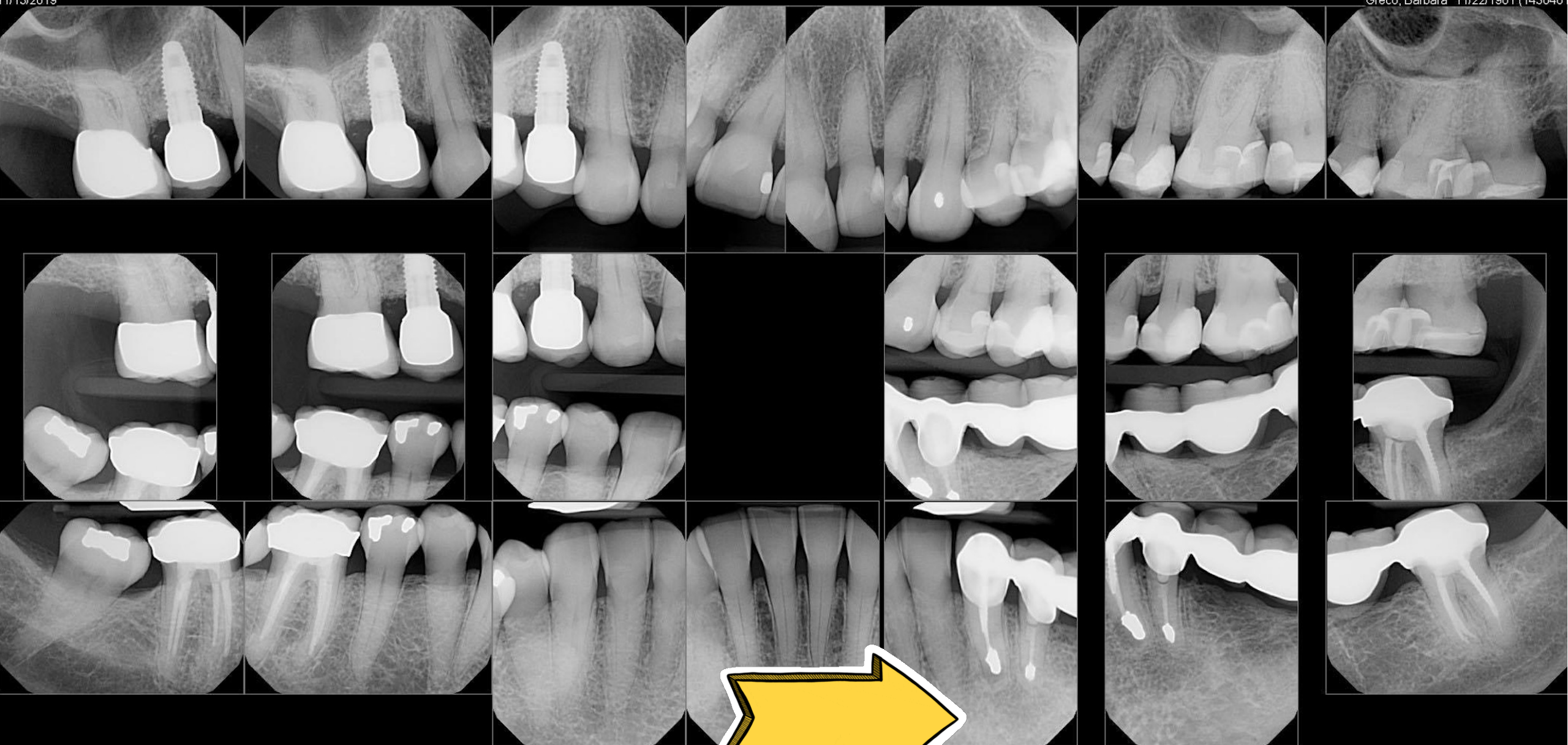
# Longitudinal analysis of the association between removal of dental amalgam, urine mercury and 14 self-reported health symptoms

Jennifer D Zwicker<sup>1\*</sup>, Daniel J Dutton<sup>1</sup> and John Charles Herbert Emery<sup>1,2</sup>

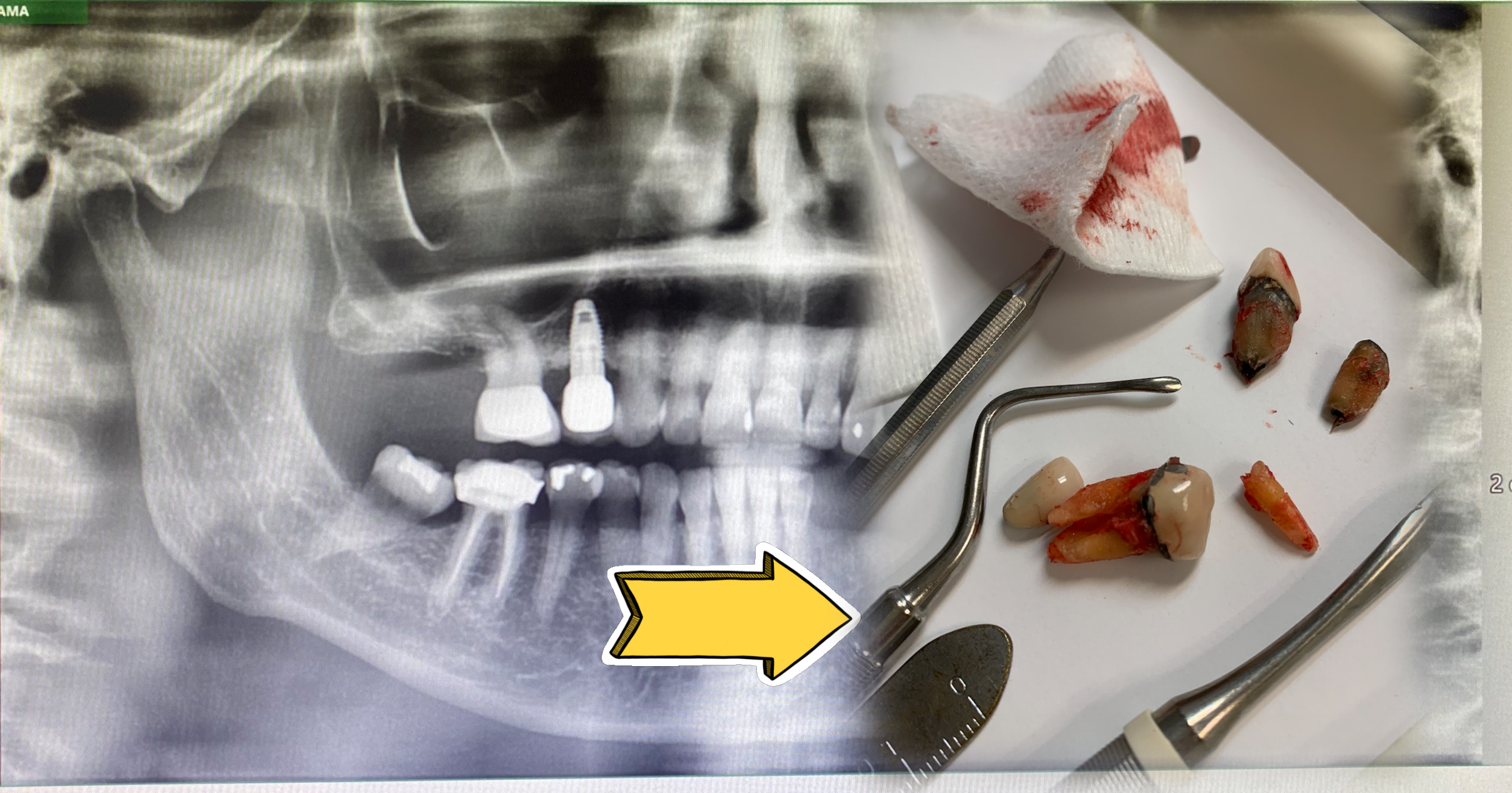
## Abstract

**Background:** Mercury vapor poses a known health risk with no clearly established safe level of exposure. Consequently there is debate over whether the level of prolonged exposure to mercury from dental fillings, combining approximately 50% mercury with other metals, is sufficiently high to cause health effects. The objective of our study is to determine if mercury exposure from amalgam fillings is associated with health effects.

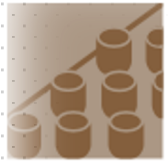












Review

# Titanium Allergy Caused by Dental Implants: A Systematic Literature Review and Case Report

Pier Paolo Poli <sup>1,\*</sup> , Fábio Vieira de Miranda <sup>2</sup> , Tárík Ocon Braga Polo <sup>2</sup>, Isael Ferreira Santiago Júnior <sup>3</sup> ,  
Tiburtino José I <sup>4</sup>,  
Carlo Maiorana <sup>5</sup>



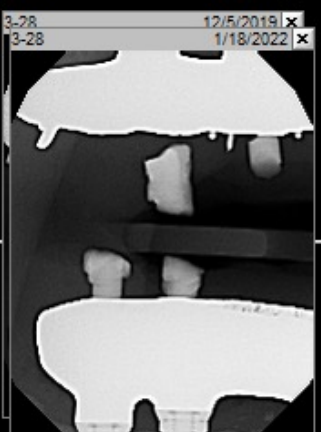
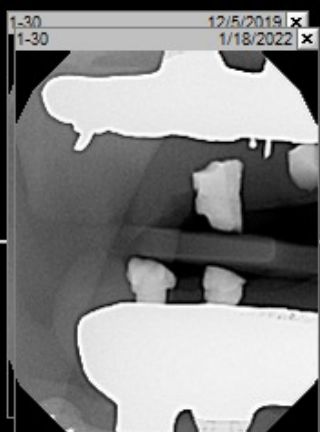
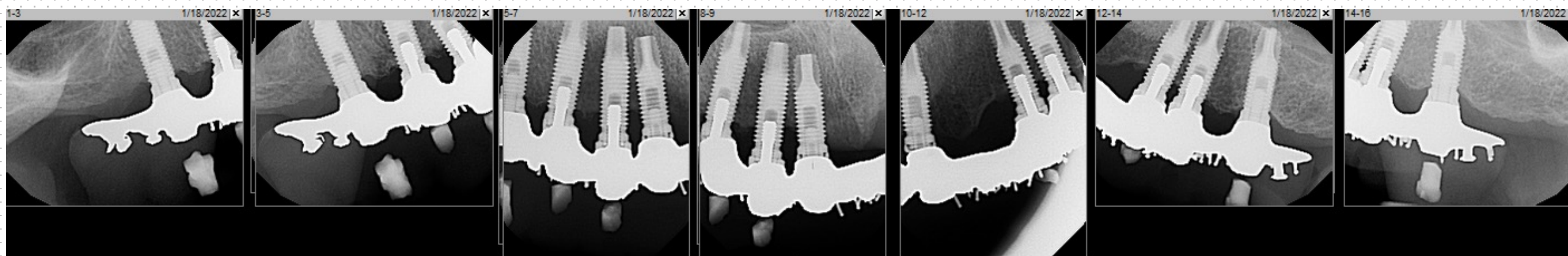
Stomatology Unit,  
2 Milan, Italy;

Implantology,  
;

unesp.br (L.P.F.)

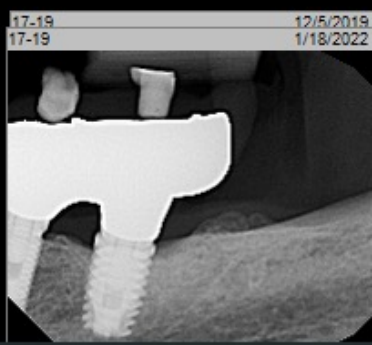
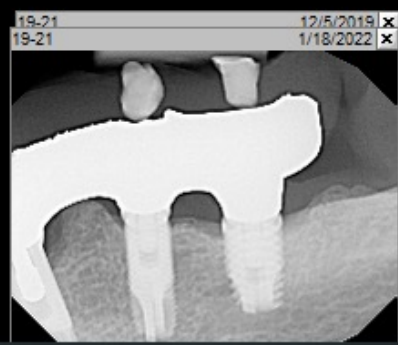
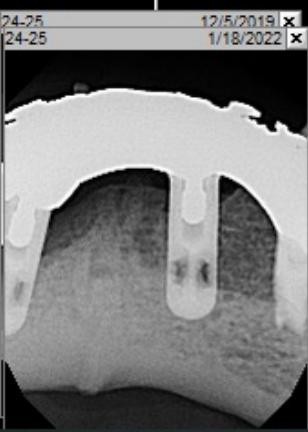
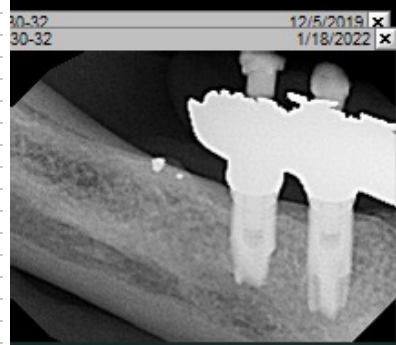
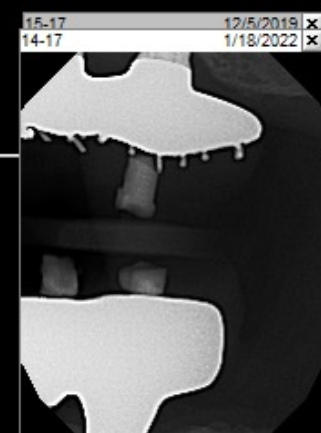
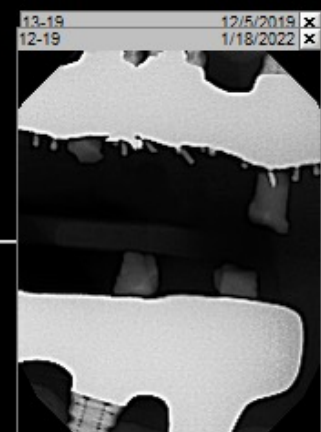
University—UNESP



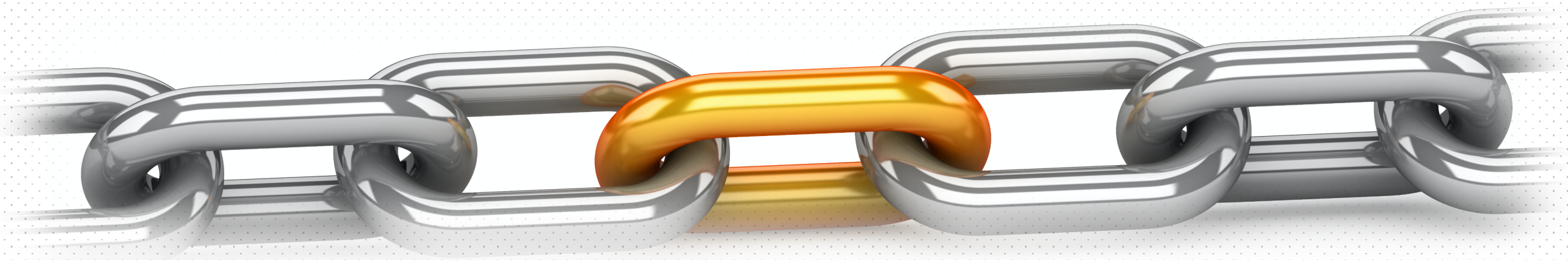
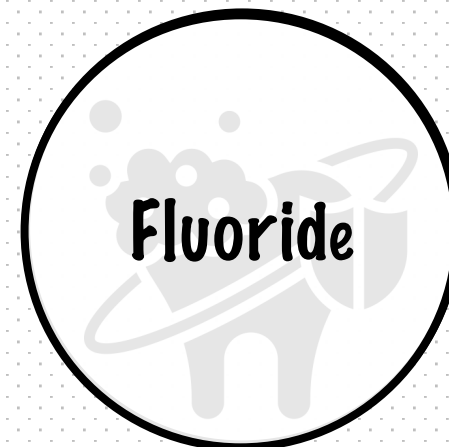
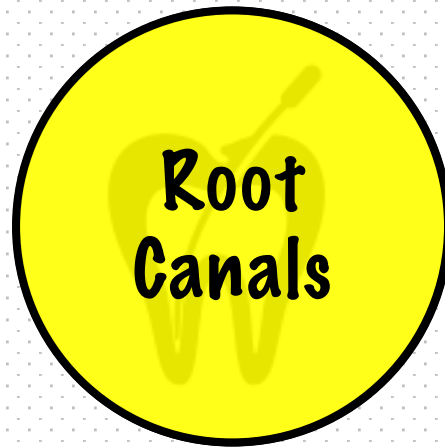
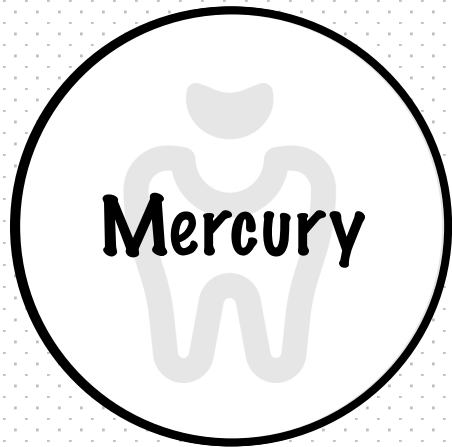


Patient Reported Medications

Description	Status
amlodipine	Active
tamsulosin	Active
carvedilol	Active
Ezetrim/simvas	Active
Hyoscyamine	Active



# ...More Oral Systemic Links





# Clinical Implications and Microbiology of Bacterial Persistence after Treatment Procedures

*José F. Siqueira Jr, PhD, and Isabela N. Rôças, PhD*

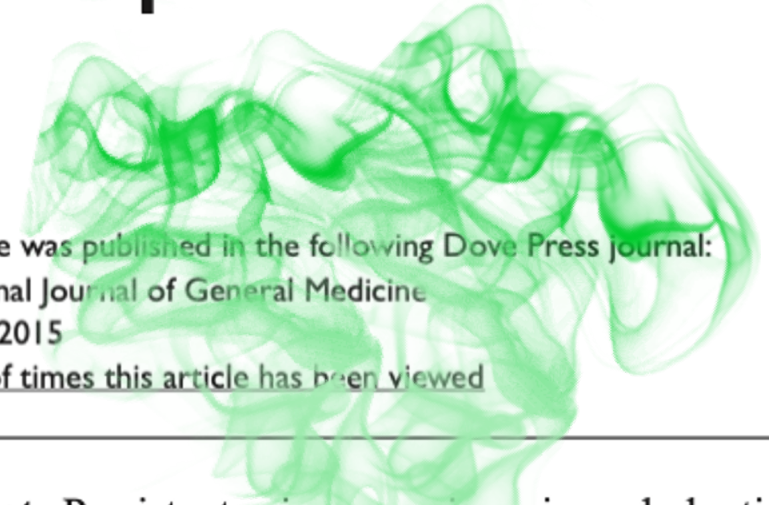
## Abstract

Apical periodontitis is an infectious disease caused by microorganisms colonizing the root canal system. For an optimal outcome of the endodontic treatment to be achieved, bacterial populations within the root canal should be ideally eliminated or at least significantly reduced to levels that are compatible with periradicular tissue healing. If bacteria persist after chemomechanical preparation supplemented or not with an intracanal medication, there is an increased risk of adverse outcome of the endodontic treatment. Therefore, bacterial presence in the root canal at the time of filling has been shown to be a risk factor for posttreatment apical periodontitis. About 100 species/phenotype have been

The influence of bacterial persistence in the root canals on treatment outcome is an important issue in endodontics because bacteria have been shown to play a major role in persistence or emergence of apical periodontitis lesions after root canal treatment (1–9). Indeed, studies have revealed that the outcome of the endodontic treatment is significantly influenced by the presence of bacteria in the root canals at the time of filling (10–14). This indicates that persisting bacteria can survive in treated canals and are able to induce or sustain periradicular tissue inflammation, underpinning the concept that the eradication of bacteria from the root canal system should be the ultimate goal of the endodontic treatment of teeth with apical periodontitis.

This review article focuses on the microbiology and clinical implications of bacterial persistence after treatment procedures. For reviews about the microbiological aspects of posttreatment apical periodontitis associated with root canal–treated teeth, the reader is referred to other articles in the literature (15–19).

# Stimulation of proinflammatory cytokines by volatile sulfur compounds in endodontically treated teeth



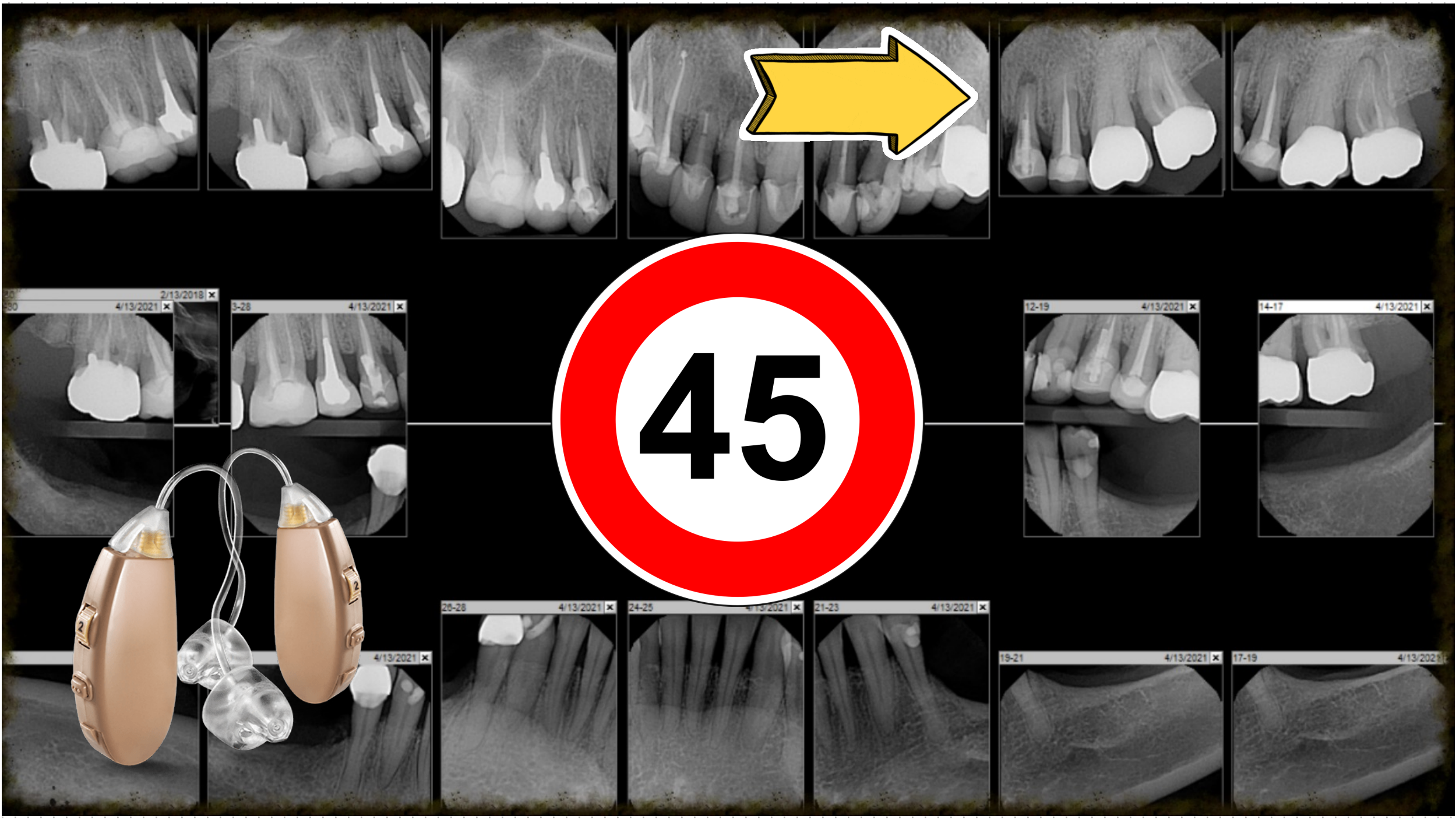
This article was published in the following Dove Press journal:  
International Journal of General Medicine  
10 March 2015  
[Number of times this article has been viewed](#)

Johann Lechner<sup>1</sup>  
Volker von Baehr<sup>2</sup>

<sup>1</sup>Clinic for Integrative Dentistry, Munich, Germany; <sup>2</sup>Compartment of Immunology and Allergology, Institute for Medical Diagnostics, Berlin, Germany

**Abstract:** Persistent microorganisms in endodontically treated teeth produce volatile sulfur compounds (VSC) such as methyl mercaptan, hydrogen sulfide, and thioether. In this retrospective study, we evaluated the ex vivo immune response of peripheral blood mononuclear cells to sulfur compounds in 354 patients with systemic diseases. These systemic findings are correlated with semiquantitative values of a VSC indicator applied directly on endodontically treated teeth. Data elucidate the role of VSC in patients with immunologic diseases and the





## Research Article

## Open Access

# Impact of Endodontically Treated Teeth on Systemic Diseases

Johann Lechner<sup>1\*</sup> and Volker von Baehr<sup>2</sup>

<sup>1</sup>Department of Integrative Dentistry, Grünwalder Str. 10A, 81547, München, Germany

<sup>2</sup>Department of Immunology and Allergology at the Institute for Medical Diagnostics in MVZ GbR, Nicolaistr 22, 12247, Berlin, Germany

## Abstract

**Background:** This study compares the radiographic distribution of apical periodontitis (AP) in root-filled and endodontically treated teeth among healthy controls and patients with systemic diseases; the incidence of AP was almost twice as high in the latter group.

**Objective:** The question arises as to whether the biogenic amines (mercaptan/thioether/hydrogen sulfide) originating from endodontically treated teeth have systemic, subtoxic immunological effects. In order to determine this, local hydrogen sulfide measurements of endodontically treated teeth were combined with laboratory serum analyses of modified proteins to assess the relationship of these compounds with type I immune reactions.

**Results:** It was found that 12.5% of the group with systemic diseases showed immunological disturbance as a result of root-filled teeth. Furthermore, the presence of AP was almost three times higher than in the control group (17.2% versus 5.9%, respectively).

Traditional  
X-rays May  
Not Show  
Infection

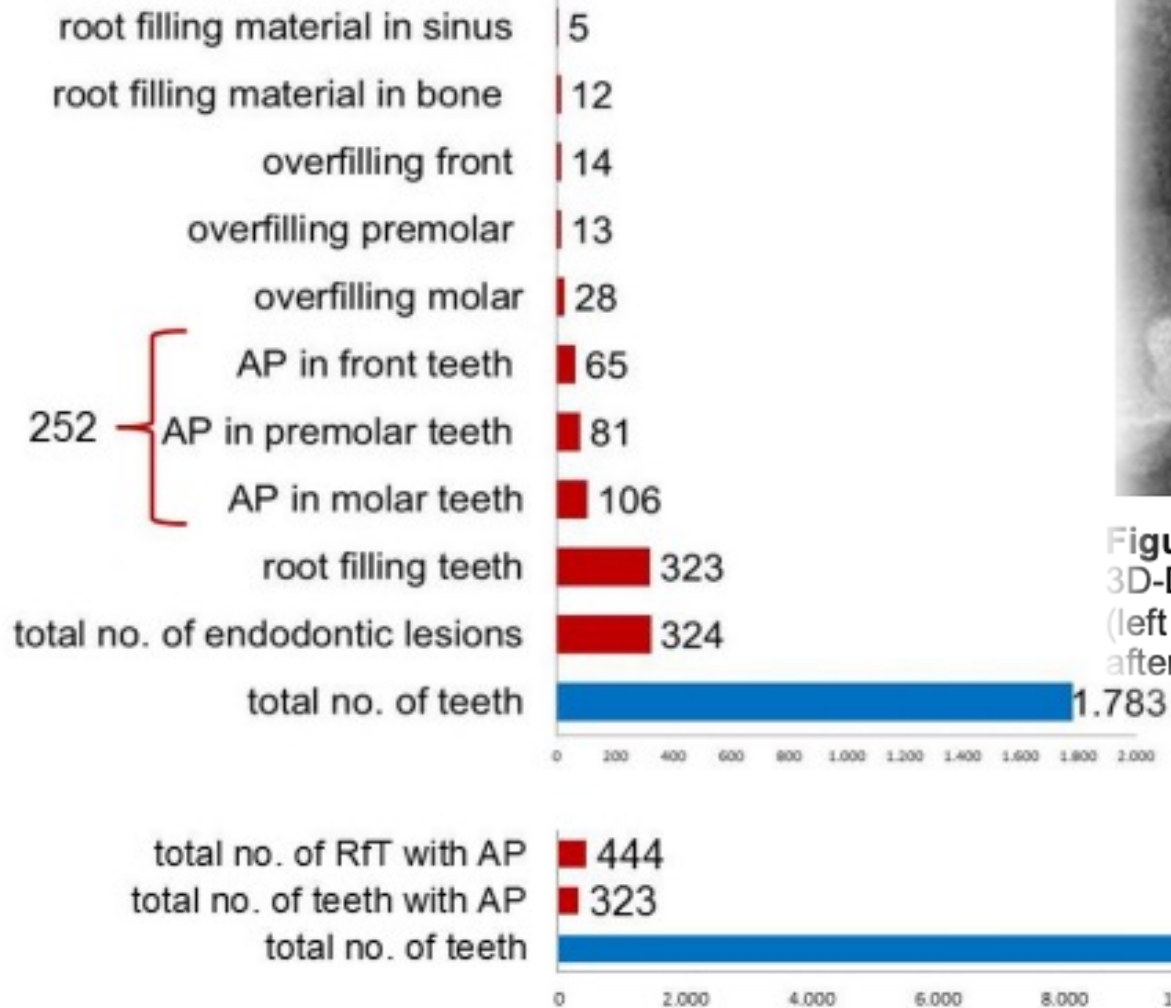
Bacteria are  
not visible on  
ANY  
Radiograph

CBCT Detects  
Apical  
Periodontitis  
& Infections

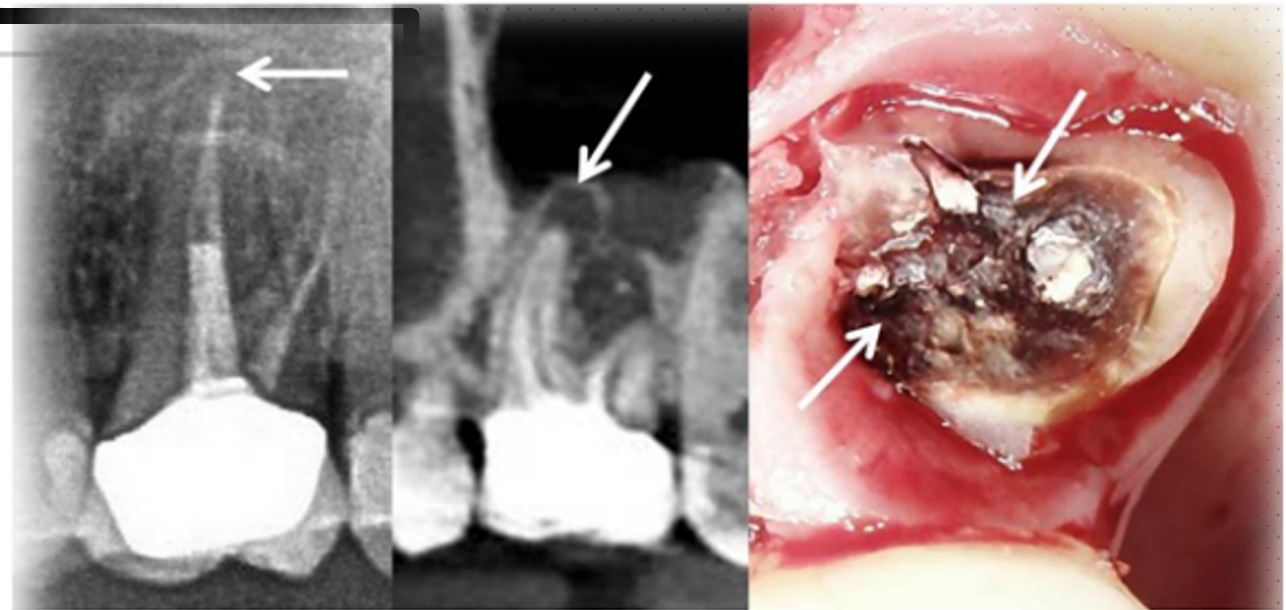
Chronic  
Infections  
may be linked  
to Systemic  
Diseases

Patients with  
CFS, Trigeminal  
Neuralgia, ALS,  
Cancer should  
have CBCT





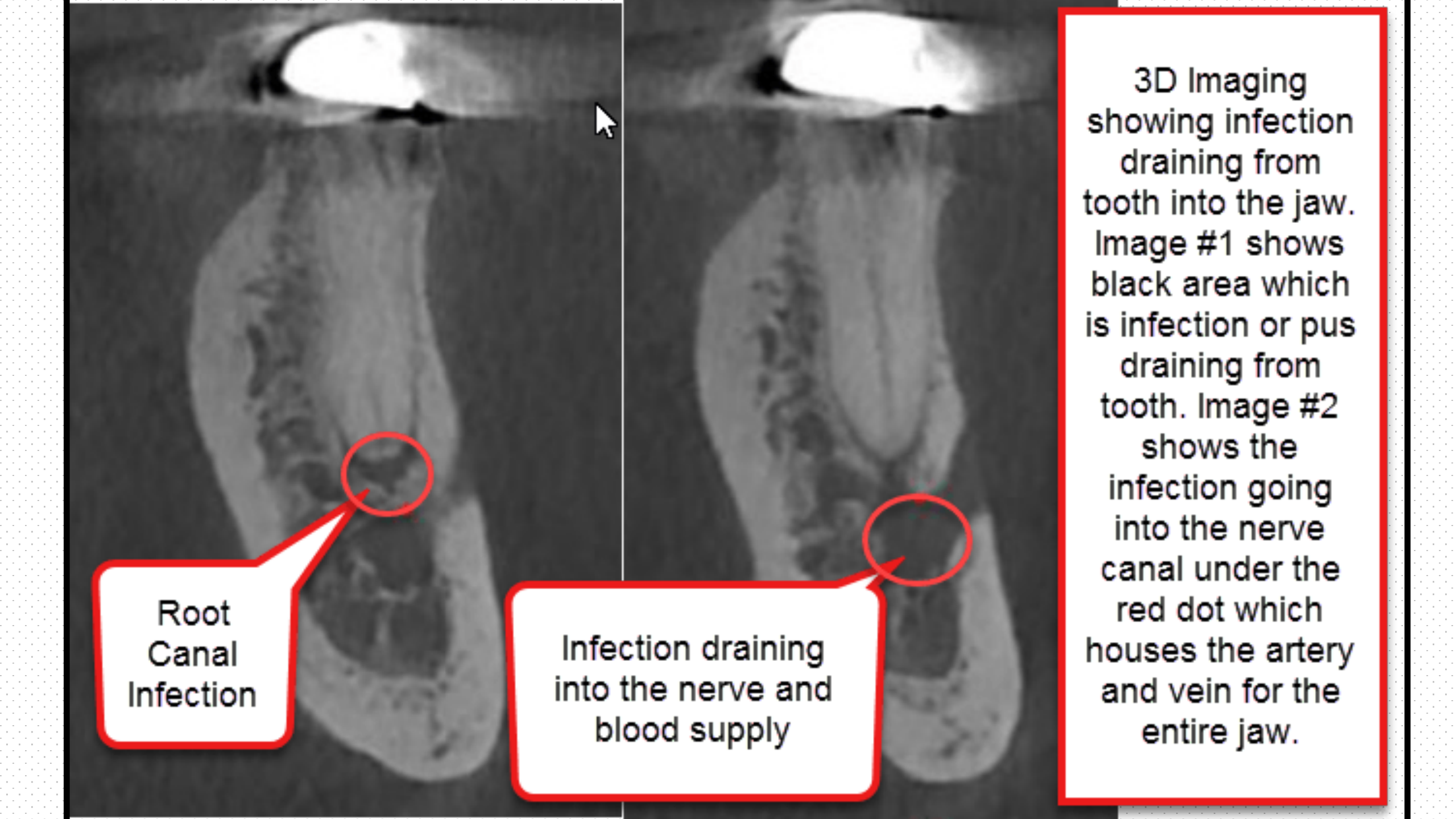
**Figure 3:** Upper panel shows CBCT findings in the group of patients with systemic diseases (n=98). Lower panel shows CBCT findings in the control group.



**Figure 1:** Comparison of two techniques: 2D-OPG and 3D-DVT/CBCT. 3D-DVT/CBCT clearly shows AP (centre panel) when compared to the 2D-OPG (left panel). Right panel shows dentine blackening caused by biogenic amines after removal of the crown.

## CBCT Found:

- RCT overfilling
- Filling into Sinus
- Apical Periodontitis

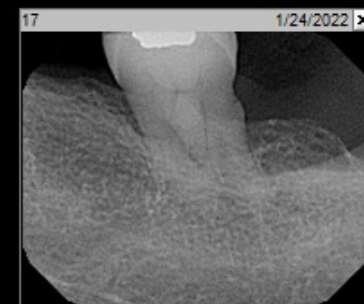
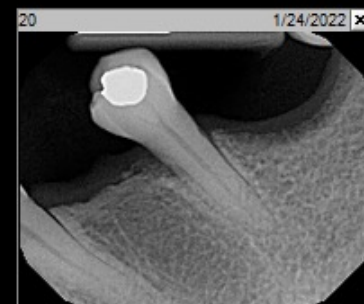
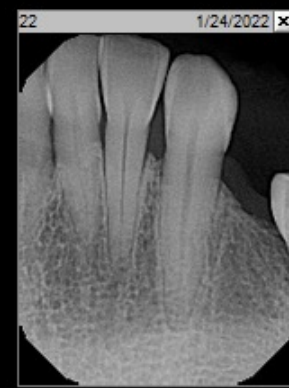
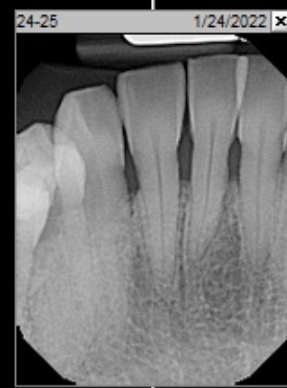
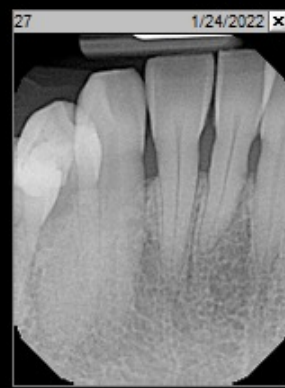
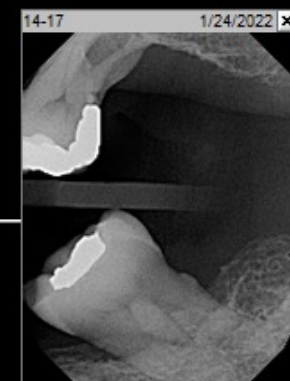
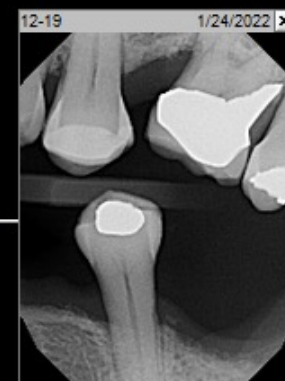


Root  
Canal  
Infection

Infection draining  
into the nerve and  
blood supply

3D Imaging  
showing infection  
draining from  
tooth into the jaw.  
Image #1 shows  
black area which  
is infection or pus  
draining from  
tooth. Image #2  
shows the  
infection going  
into the nerve  
canal under the  
red dot which  
houses the artery  
and vein for the  
entire jaw.





...89...  
...25/24...



Article

# Bacteria Residing at Root Canals Can Induce Cell Proliferation and Alter the Mechanical Properties of Gingival and Cancer Cells

Łukasz Suprewicz <sup>1,†</sup>, Grażyna Tokajuk <sup>2,3,†</sup>, Mateusz Cieśluk <sup>1</sup>, Piotr Deptuła <sup>1</sup>,  
Teresa Sierpińska <sup>4</sup>, Przemysław Wolak <sup>5</sup>, Tomasz Wollny <sup>6</sup>, Joanna Tokajuk <sup>1,5</sup>,  
Stanisław Głuszek <sup>5</sup>, Ewelina Piktel <sup>1</sup> and Robert Bucki <sup>1,5,\*</sup>

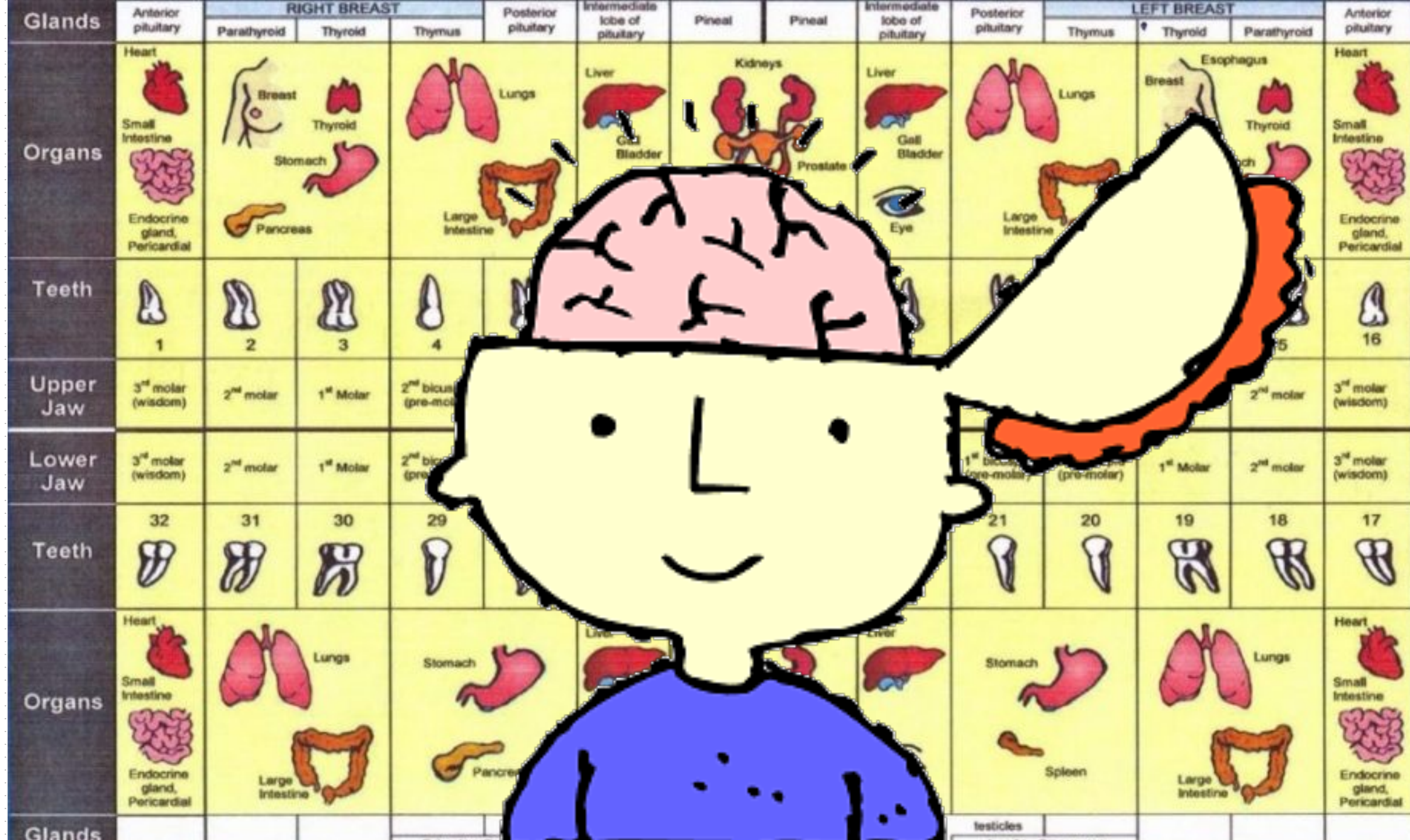
<sup>1</sup> Department of Medical Microbiology and Nanobiomedical Engineering, Medical University of Białystok, Mickiewicza 2c, 15-222 Białystok, Poland; lukaszsuprewicz@gmail.com (Ł.S.); mtcv1@gmail.com (M.C.); piotr.deptula@umb.edu.pl (P.D.); asgiewajna@gmail.com (A.T.); ewelina.piktel@vp.pl (E.P.)

<sup>2</sup> Department of Integrated Dentistry, Medical University of Białystok, M. Skłodowskiej-Curie 24a, 15-276 Białystok, Poland; grazyna.tokajuk@gmail.com

<sup>3</sup> Dentistry and Medicine, Tokajuk Żelazna 9/1, 15-297 Białystok, Poland

<sup>4</sup> Department of Prosthetic Dentistry, Medical University of Białystok, Waszyńskiego 3,





# Holistic Periodontal Protocol

Exam +  
pH strip

FMX +  
CBCT

Micro  
Slide

SCRP+  
Ozone

Laser\*





# Salivary flow rate and pH in patients with oral pathologies

P.L. FOGGIO-BONDA<sup>1</sup>, K. BRILLANTE<sup>2</sup>, M. TARINO<sup>3</sup>, A. FOGGIO-BONDA<sup>3</sup>

<sup>1</sup>Department of Translational Medicine,

<sup>2</sup>Dental Clinic, University of Eastern Piedmont,

<sup>3</sup>Department of Pharmaceutical Sciences

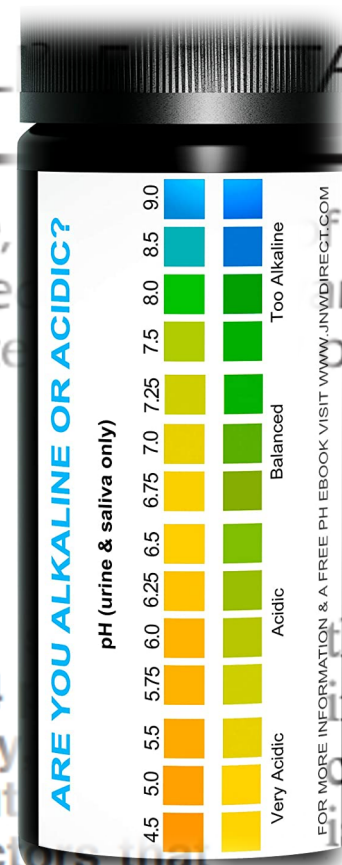
University of Eastern Piedmont, Novara, Italy

Novara, Italy

University of Eastern Piedmont, Novara, Italy

**Abstract.** – **OBJECTIVE:** Determine pH and flow rate (FR) in a sample of 164 patients who came to Oral Pathology ambulatory suffering from oral lesions and 80 without lesions. Another aim was to evaluate factors that

the amount of saliva produced by salivary glands in the time unit, expressed in mL/min or g/min. It can be divided into unstimulated (USFR) which is independent of the presence of stimuli (food, chewing, etc.) and stimulated (SSFR) secreted



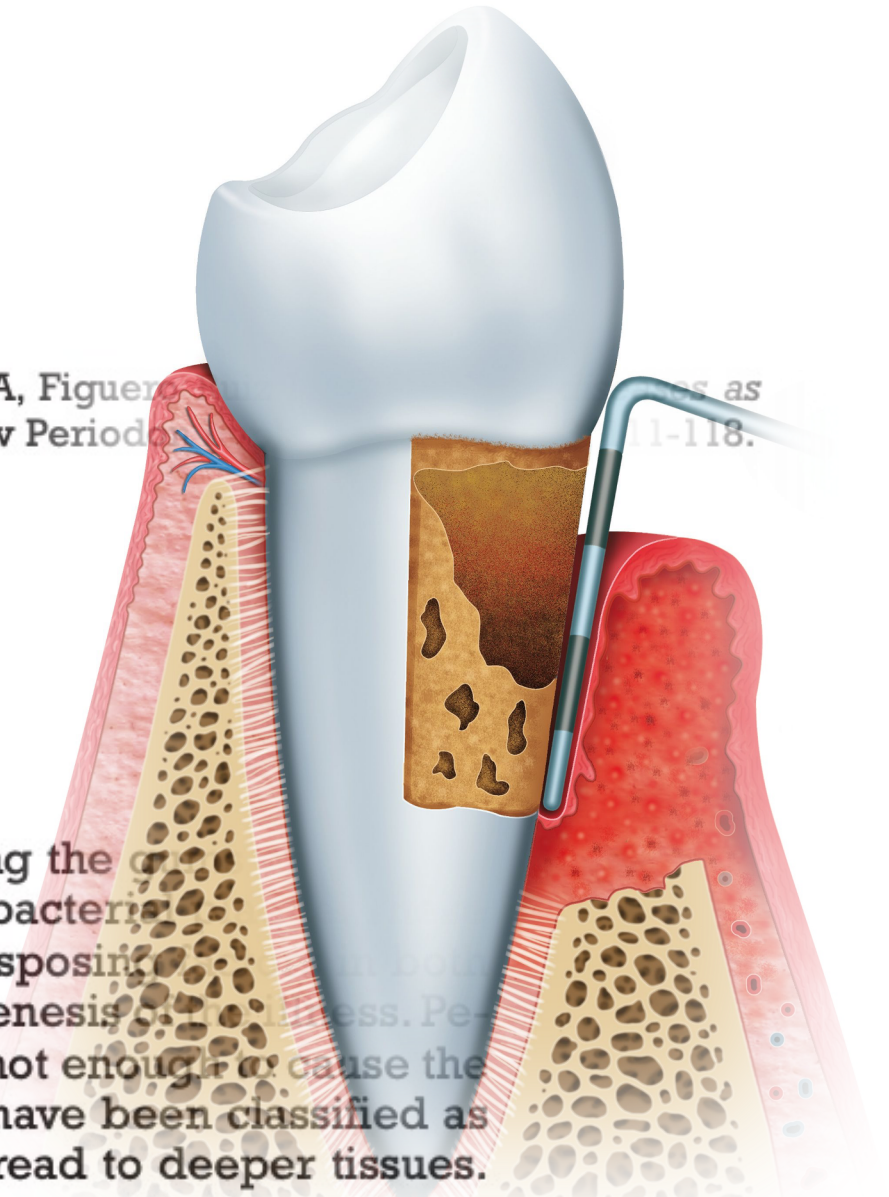
# Periodontal diseases as bacterial infection

**BASCO**  
**FIGUE**

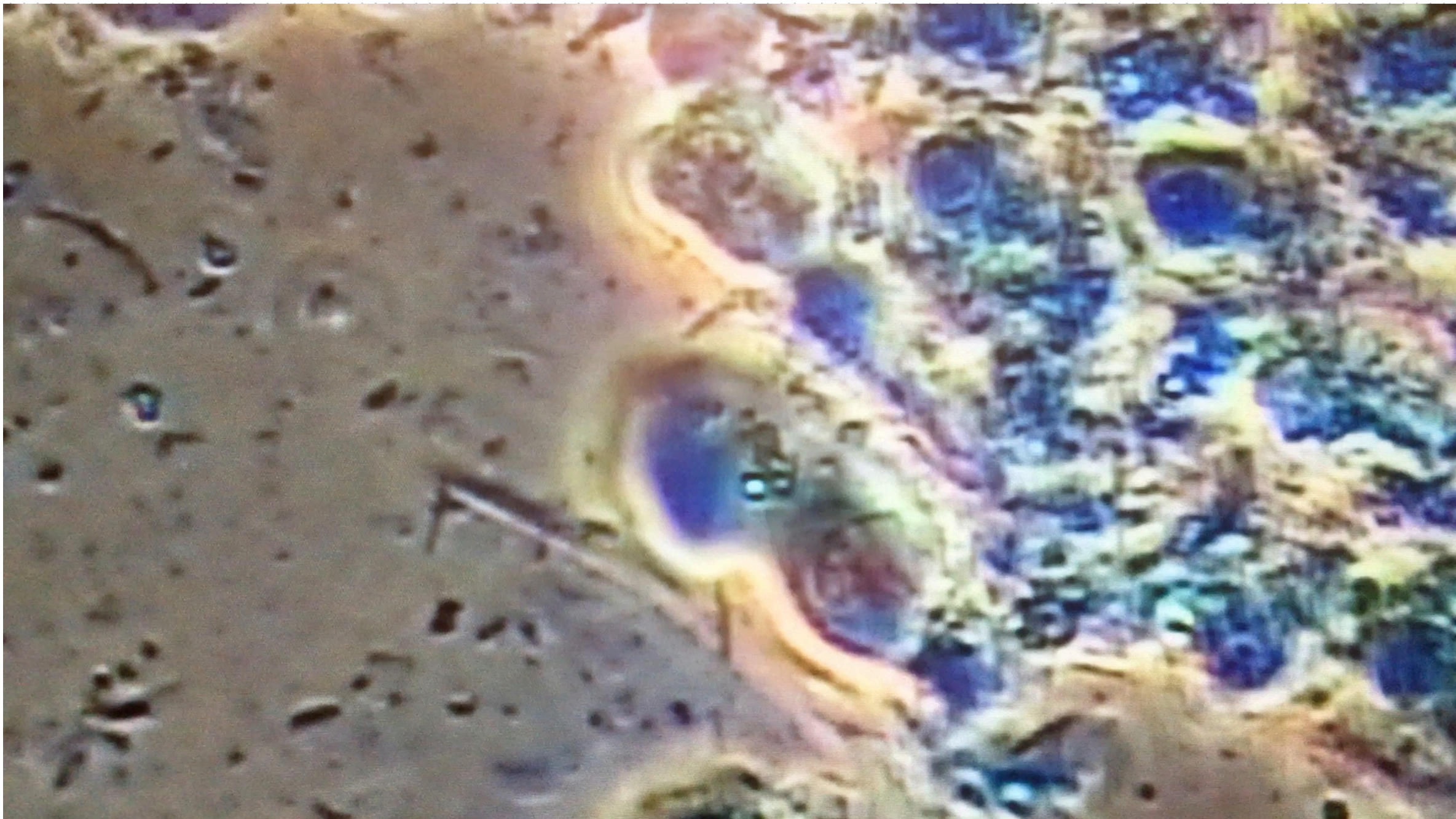
Martínez A, Figuero Ruiz E  
*Periodontal diseases as bacterial infection. Av Periodontol 2011;11:111-118.*

**AB**

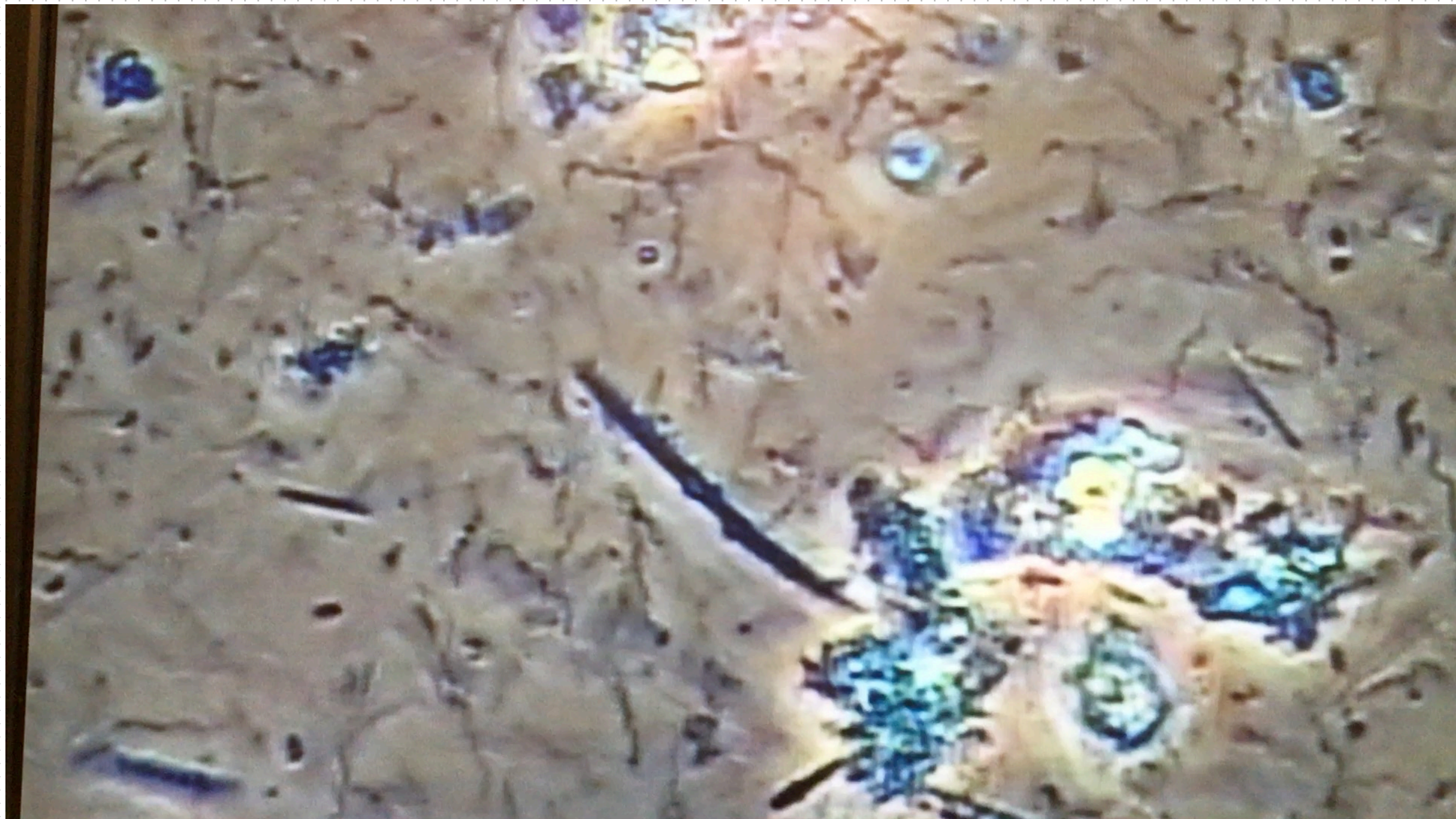
The supragingival bacterial biofilm is the main predisposing factor in the pathogenesis of periodontal disease. Periodontopathogenic bacterial microbiota is needed, but by itself, it is not enough to cause the illness, requiring the presence of a susceptible host. These diseases have been classified as gingivitis, when limited to the gums, and periodontitis, when they spread to deeper tissues.













# Ozone Therapy

**Kill  
Bacteria,  
Virus,  
Fungi**

**Promote  
Immunity**

**Analgesic**

**Promote  
Healing**

**Economical  
& Safe**



# Ozone therapy in dentistry: A strategic review

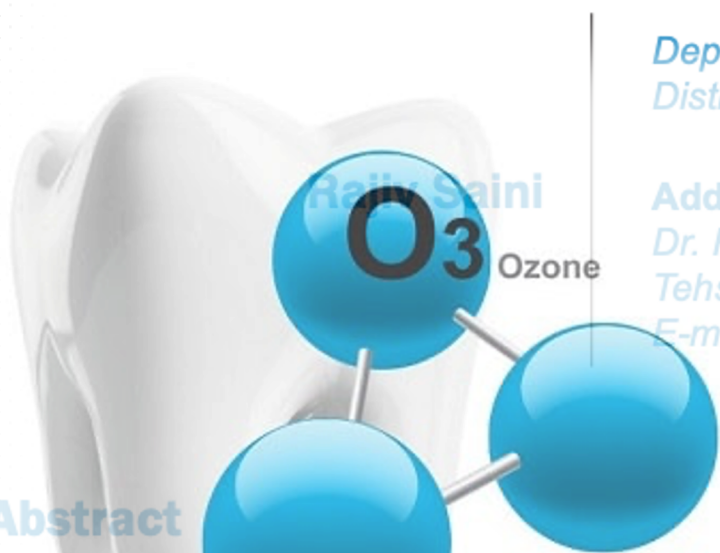
Department of Periodontology and Oral Implantology, Rural Dental College - Loni, Tehsil - Rahata, District - Ahmednagar, Maharashtra, India

**Address for correspondence:**

Dr. Rajiv Saini, Department of Periodontology,  
Rural Dental College - Loni, Tehsil - Rahata, District - Ahmednagar,  
Maharashtra, India  
E-mail: drperiodontist@yahoo.co.in

## Abstract

The oral cavity appears as an open ecosystem, with a dynamic balance of microbial flora, host defenses aimed to their removal: To avoid elimination of the microbial flora or epithelial surfaces. The oral biofilm formation and development, which is closely correlated with the most common oral pathologies, such as dental caries, periodontitis, and oral cancer. The mechanical removal of the biofilm and adjunctive use of antibiotic disinfectants or various antibiotics have been the conventional methods for periodontal therapy. Ozone ( $O_3$ ) is a triatomic molecule, consisting of three oxygen atoms, and its application in medicine and dentistry has been reported for the treatment of 260 different pathologies. The ozone therapy has been more beneficial than





# Management of Chronic Periodontitis Using Subgingival Irrigation of Ozonized Water: A Clinical and Microbiological Study

ANNIE V. ISSAC<sup>1</sup>, JAYAN JACOB MATHEW<sup>2</sup>, MAJO AMBOOKEN<sup>3</sup>, ARUN JOSE KACHAPPILLY<sup>4</sup>,  
AJITHKUMAR PK<sup>5</sup>, THOMAS JOHNY<sup>6</sup>, LINITH VK<sup>7</sup>, ANJU SAMUEL<sup>8</sup>

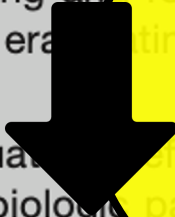
## ABSTRACT

**Introduction:** Adjunctive use of professional subgingival irrigation with scaling and root planing (SRP) has been found to be effective in eradicating subgingival microorganisms. The objective of this study was to evaluate the effect of ozonized water subgingival irrigation on microbiologic parameters and clinical parameters namely Gingival index, probing pocket depth, and clinical attachment level.

**Plaque Index, Gingival Index, probing pocket depth, clinical attachment level. Microbiologic sampling was done for the test at the baseline, after scaling, immediately after ozonized water subgingival irrigation and after 4 weeks in control sites.** The following observations were made after 4 weeks. The results were statistically analysed using independent t-test and paired t-test.

**Result:** Test sites showed a greater reduction in pocket depth and gain in clinical attachment compared to control sites. The

SCRP +  
OZONE



Pocket  
Depth



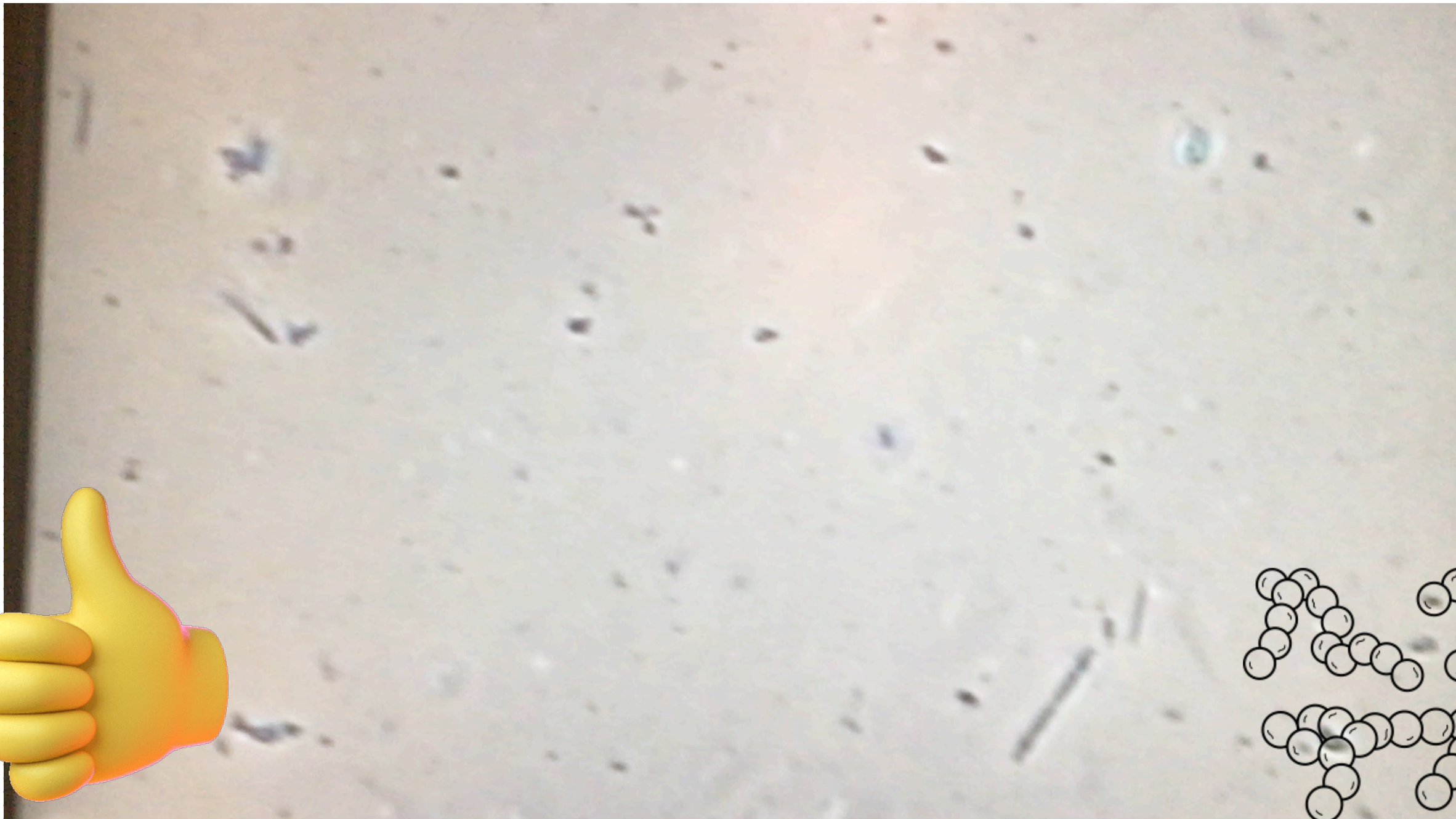
+ Clinical  
Attachment



Bacteria



Health







Contents lists available at ScienceDirect

# Journal of Traditional and Complementary Medicine

journal homepage: <http://www.elsevier.com/locate/jtcme>



Review article

## Oil pulling for maintaining oral hygiene – A review

Vagish Kumar L. Shanbhag\*

Department of Oral Medicine and Radiology, Yenepoya Dental College and Hospital, Yenepoya Research Centre, Yenepoya University, Mangalore 575001, Karnataka, India

### ARTICLE INFO

#### Article history:

Received 1 February 2016

Received in revised form

27 February 2016

Accepted 10 May 2016

Available online xxx

#### Keywords:

Oil pulling

Emulsification

Sesame oil

Saponification

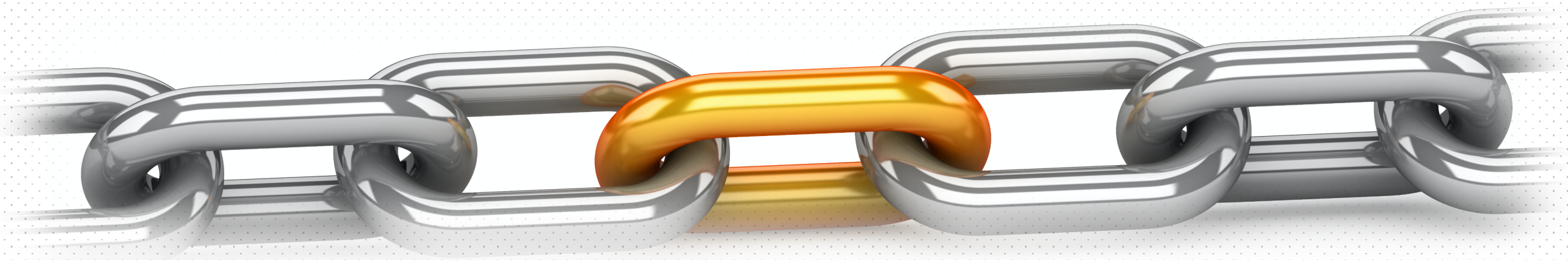
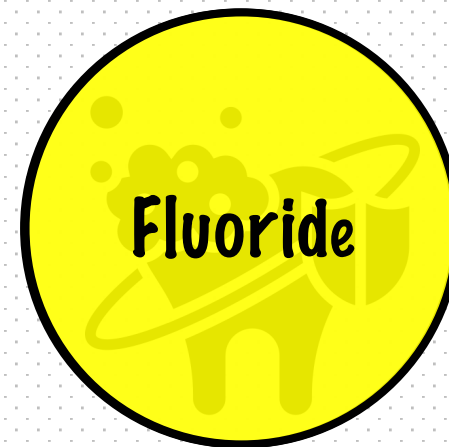
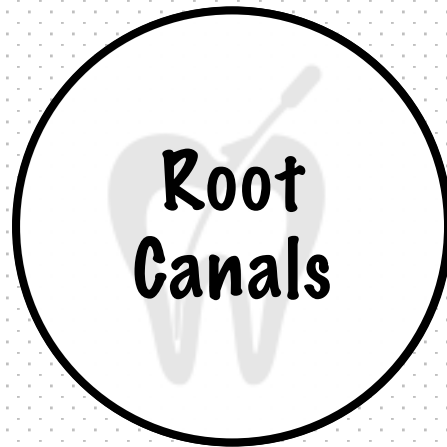
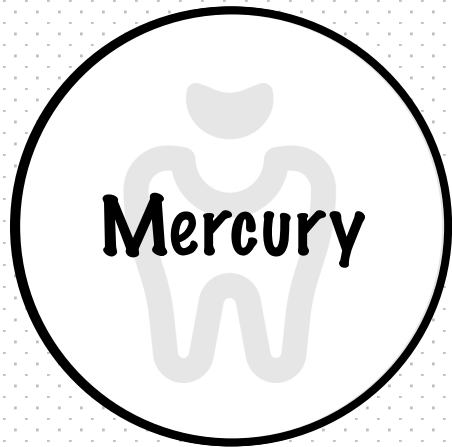
### ABSTRACT

Oil pulling is a traditional folk remedy practiced in ancient times for various systemic diseases when practiced regularly and as directed. With the increasing use of medicines and oral hygiene products, people are increasingly turning to traditional practices. Oil pulling in addition to offering various health effects on overall health. The present article attempts to review the effects of oil pulling on oral hygiene and overall health.

Copyright © 2016, Center for Food and Biomolecules, National Central University, Taiwan. This is an open access article under the CC BY-NC-ND 4.0 International license.



# ...More Oral Systemic Links





## Fluoride Exposure in Early Life as the Possible Root Cause of Disease In Later Life

Tetsuo Nakamoto \*/ H Ralph Rawls\*\*

May  
Lower IQ  
Scores

Linked to  
Autism  
Risk

Calcifies  
Pineal  
Gland

Linked to  
Bone  
Diseases

Linked to  
Cancer  
Risk

## Thyroid function, intelligence, and low-moderate fluoride exposure among Chinese school-age children



Mengwei Wang<sup>a</sup>, Ling Liu<sup>a</sup>, Huijun Li<sup>b</sup>, Yonggang Li<sup>c</sup>, Hongliang Liu<sup>d</sup>, Changchun Hou<sup>d</sup>, Qiang Zeng<sup>d</sup>, Pei Li<sup>a</sup>, Qian Zhao<sup>a</sup>, Lixin Dong<sup>a</sup>, Guoyu Zhou<sup>a</sup>, Xingchen Yu<sup>e</sup>, Li Liu<sup>e</sup>, Qirong Shun Zhang<sup>a,\*</sup>, Aiguo Wang<sup>a,\*</sup>

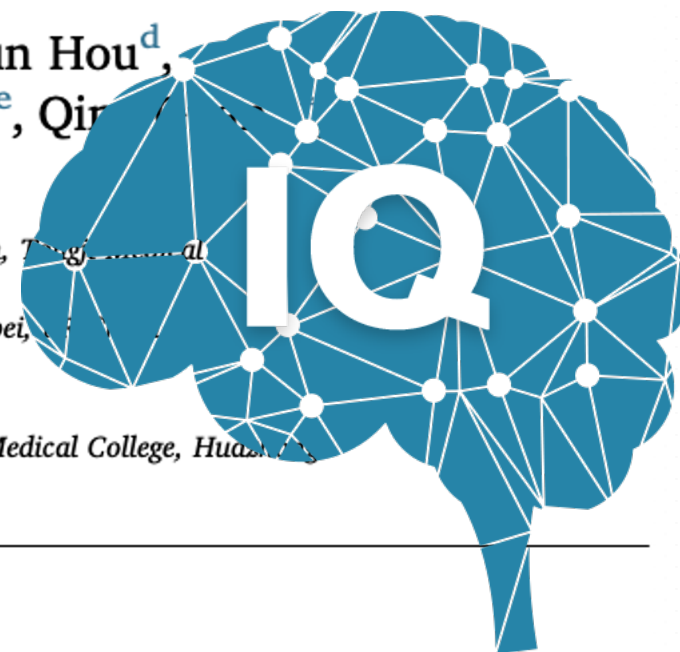
<sup>a</sup> Department of Occupational and Environmental Health, Ministry of Education Key Lab of Environment and Health, School of Public Health, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, Hubei, PR China

<sup>b</sup> Department of Laboratory Medicine, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, Hubei, PR China

<sup>c</sup> Institute of Environment and Health, Ministry of Education Key Lab of Environment and Health, School of Public Health, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, Hubei, PR China

<sup>d</sup> Institute of Environment and Health, Ministry of Education Key Lab of Environment and Health, School of Public Health, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, Hubei, PR China

<sup>e</sup> Institute of Environment and Health, Ministry of Education Key Lab of Environment and Health, School of Public Health, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, Hubei, PR China



### ARTICLE INFO

### ABSTRACT



# SCIENTIFIC REPORTS

OPEN

## Impact of Drinking Water Fluoride on Human Thyroid Hormones: A Case- Control Study

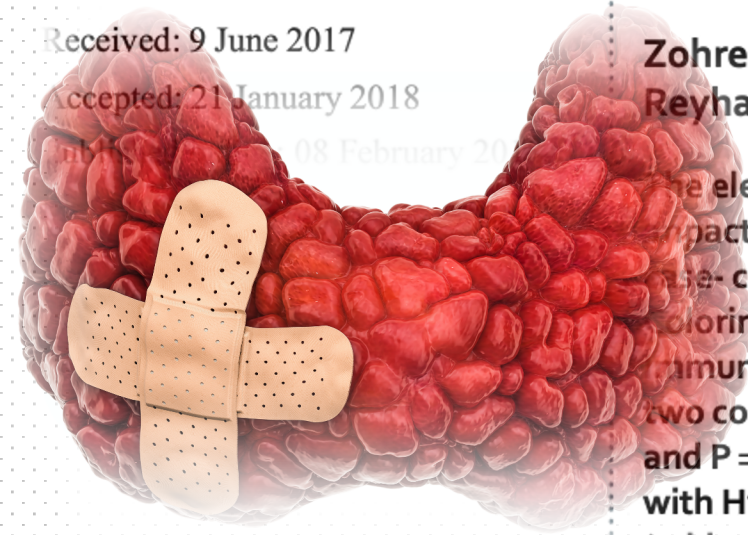
Received: 9 June 2017

Accepted: 21 January 2018

08 February 2018

Zohreh Kheradpisheh<sup>1</sup>, Masoud Mirzaei<sup>2</sup>, Amir Hossein Mahvi<sup>3,4</sup>, Mehdi Mokhtari<sup>1</sup>, Reyhane Azizi<sup>5</sup>, Hossein Fallahzadeh<sup>6</sup> & Mohammad Hassan Ehrampoush<sup>1</sup>

The elevated fluoride from drinking water impacts on  $T_3$ ,  $T_4$  and TSH hormones. The aim was study impacts of drinking water fluoride on  $T_3$ ,  $T_4$  and TSH hormones in YGA (Yazd Greater Area). In this case- control study 198 cases and 213 controls were selected. Fluoride was determined by the SPAD Colorimetric Method.  $T_3$ ,  $T_4$  and TSH hormones tested in the Yazd central laboratory by RIA (Radio Immuno Assay) method. The average amount of TSH and  $T_3$  hormones based on the levels of fluoride two concentration levels 0–0.29 and 0.3–0.5 (mg/L) was statistically significant ( $P = 0.001$  for control and  $P = 0.001$  for cases). In multivariate regression logistic analysis, independent variable associated with Hypothyroidism were: gender (odds ratio: 2.5, CI 95%: 1.6–3.9), family history of thyroid disease





Contents lists available at ScienceDirect

Environment International

journal homepage: [www.elsevier.com/locate/envint](http://www.elsevier.com/locate/envint)



# Fluoride exposure and kidney and liver function among adolescents in the United States: NHANES, 2013–2016

Ashley J. Malin<sup>a,\*</sup>, Corina Lesseur<sup>a</sup>, Stefanie A. Busgang<sup>a</sup>, Paul Curtin<sup>a</sup>, Robert O. Wright<sup>a</sup>,  
Alison P. Sanders<sup>a,b</sup>

<sup>a</sup> Department of Environmental Medicine and Public Health, Icahn School of Medicine at Mount Sinai, New York, NY, USA

<sup>b</sup> Department of Pediatrics, Icahn School of Medicine at Mount Sinai, New York, NY, USA

## ARTICLE INFO

Handling Editor: Lesa Aylward

## ABSTRACT

**Background:** Hepato- and nephrotoxicity of fluoride have been demonstrated in animal studies





Review

# Fluoride and Pineal Gland

Dariusz Chlubek <sup>1,\*</sup>  and Maciej Sikora <sup>1,2</sup> 

<sup>1</sup> Department of Biochemistry and Medical Chemistry, Pomeranian Medical University, Powstańców Wlkp. 72, 70-111 Szczecin, Poland; sikora-maciej@wp.pl

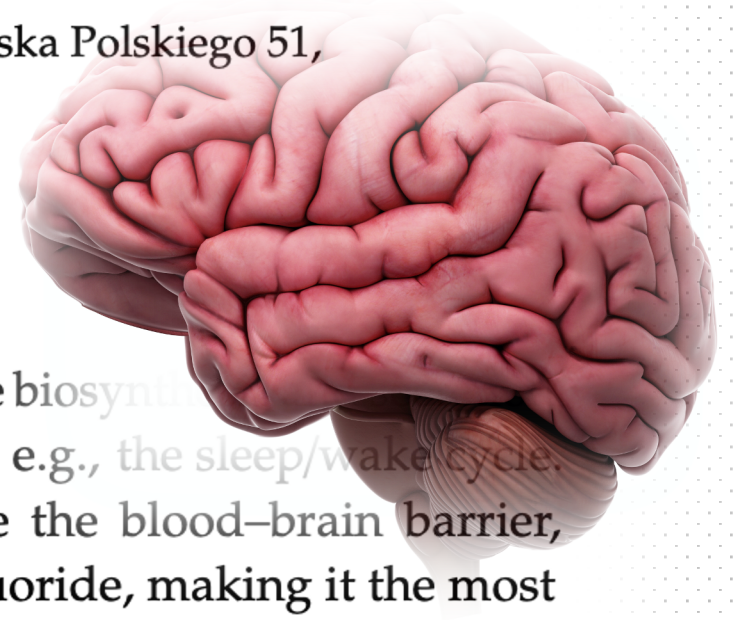
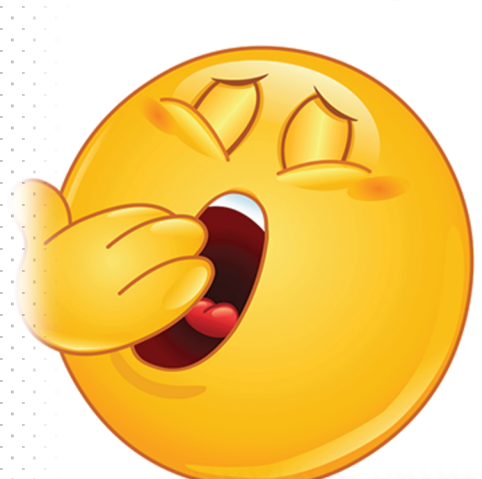
<sup>2</sup> Department of Maxillofacial Surgery, Hospital of the Ministry of Interior, Wojska Polskiego 51, 25-375 Kielce, Poland

\* Correspondence: dclubek@pum.edu.pl

2020; Accepted: 20 April 2020

April 2020

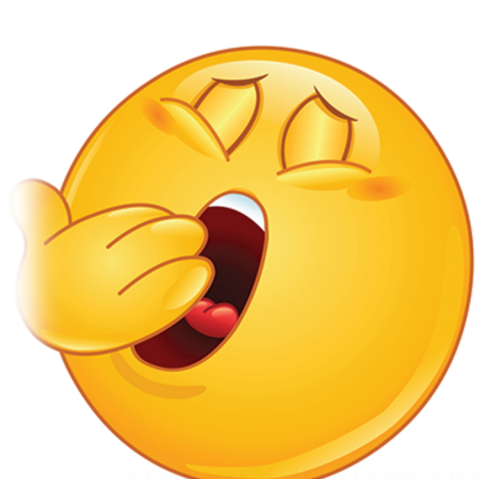
The pineal gland is an endocrine gland. Its main function is the biosynthesis of melatonin, a hormone responsible for regulating circadian rhythms, e.g., the sleep/wake cycle. Due to its location outside the blood–brain barrier, it may accumulate significant amounts of calcium and fluoride, making it the most fluorinated organ of the human body. Bioaccumulation and accumulation of fluoride may



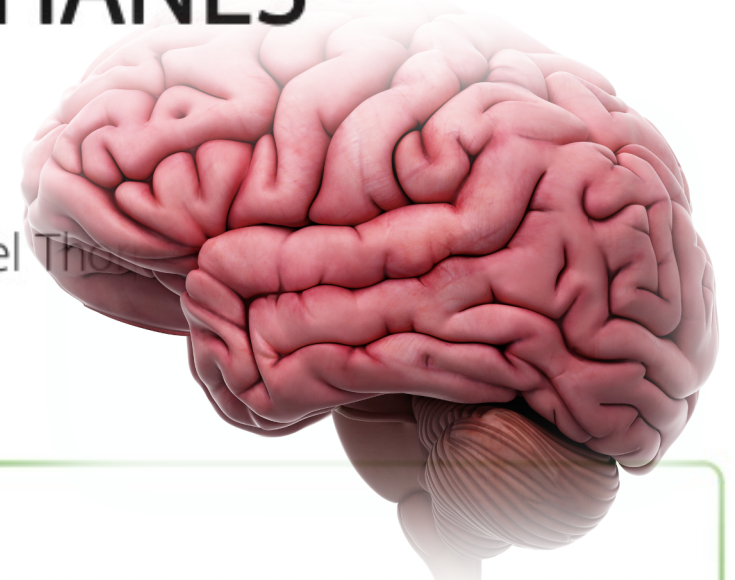
RESEARCH

Open Access

# Fluoride exposure and sleep patterns among older adolescents in the United States: a cross-sectional study of NHANES 2015–2016



Li Bose<sup>2,3</sup>, Stefanie A. Busgar<sup>1</sup>, Michael Thomsen<sup>1</sup>, Manish Arora<sup>1</sup>



from environmental sources and is stored preferentially in the pineal gland which produces melatonin, a hormone that regulates the sleep-wake cycle. However, the effects of fluoride on sleep regulation



# Fluoride levels and osteosarcoma

Simmi Kharb, Ravindra Sandhu, Zile Singh Kundu<sup>1</sup>

### Abstract

**Context:** Osteosarcoma is a rare malignant bone tumor, commonly occurring in the age group of 10 to 24 years. Recent reports have indicated that there is a link between fluoride exposure and osteosarcoma. **Aim:** The present study was planned to analyze serum levels of fluoride in patients of osteosarcoma and fluoride content of their drinking water. **Settings and Design:** The present study was a case-control study involving 10 patients of osteosarcoma and 10 healthy volunteers (who served as controls). **Material and Methods:** Serum fluoride levels were measured using a fluoride-selective electrode. **Statistical Analysis:** The data were analyzed using SPSS version 16.0. **Results:** The mean serum fluoride levels in patients of osteosarcoma were significantly higher than in healthy controls (P < 0.05). **Conclusion:** The study suggests that there is a link between fluoride exposure and osteosarcoma.

**Keywords:** Osteosarcoma, fluoride, serum, drinking water.

### Introduction

Osteosarcoma is a rare malignant bone tumor, commonly occurring in the age group of 10 to-24 years. Bone is

controls. 2 ml venous blood was collected aseptically from antecubital vein, and serum was separated by centrifugation. Also, 10 ml drinking water samples brought



Review

# Chronic Fluoride Exposure and the Risk of Autism Spectrum Disorder

Anna Strunecka \* and Otakar Strunecky

The Institute of Technology and Business

otakar.strunecky@gmail.com

\* Correspondence: anna.strunecka@tbr.cz

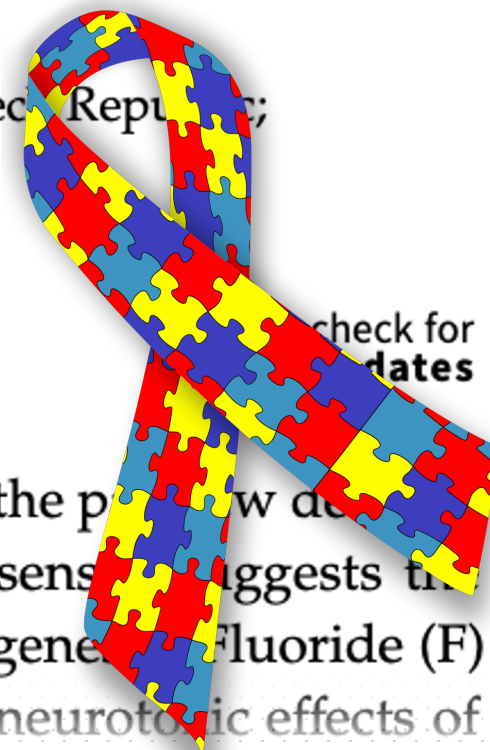
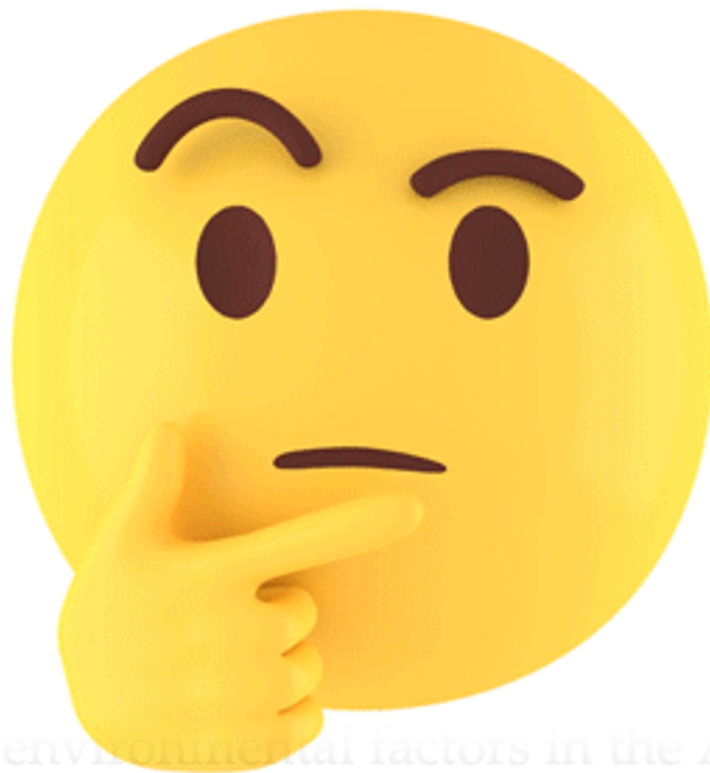
Received: 12 September 2019; Accepted: 12 September 2019

**Abstract:** The continuous rise of Autism Spectrum Disorder (ASD) prevalence is a public health concern. A consensus suggests the involvement of both genetic and environmental factors in the ASD etiopathogenesis. Fluoride (F) is recognized among the environmental risk factors of ASD, since the neurotoxic effects of

Budějovice, Czech Republic;

September 2019

check for  
updates



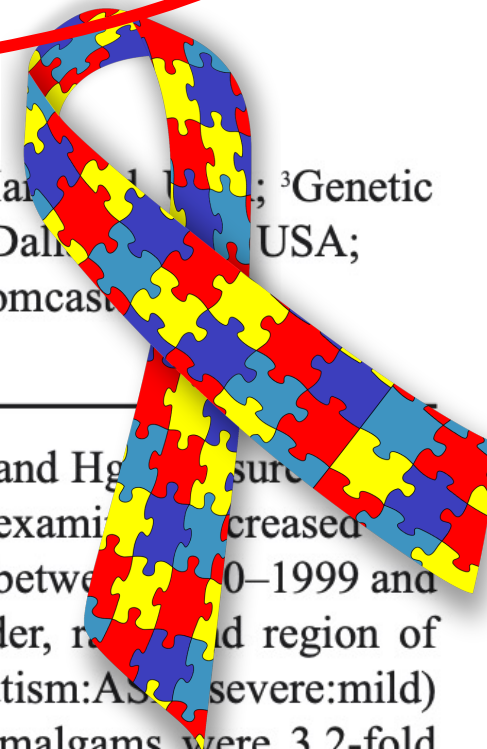


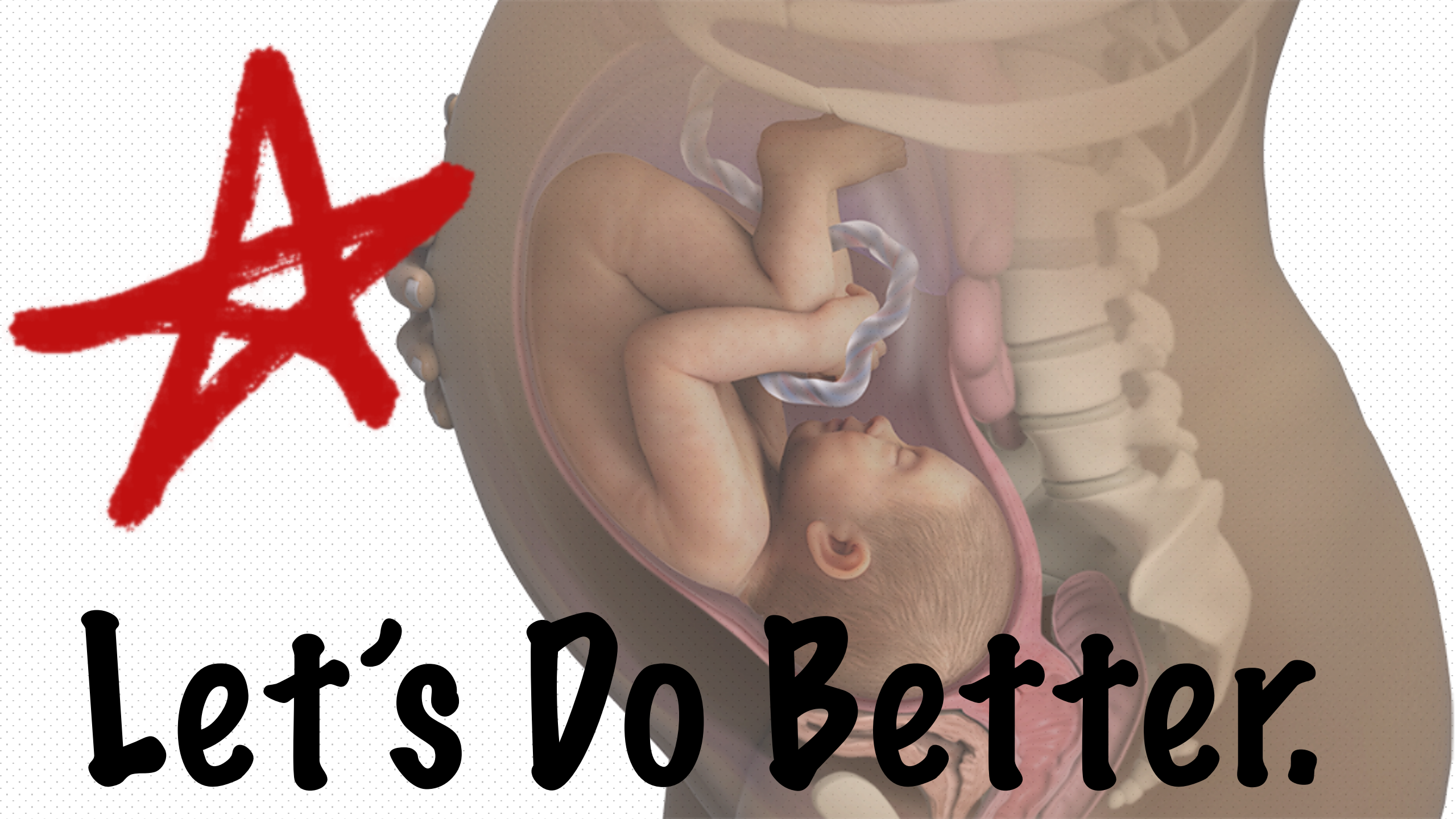
# A prospective study of prenatal mercury exposure from maternal dental amalgams and autism severity

David A. Geier<sup>1,2</sup>, Janet K. Kern<sup>3,4</sup>, and Mark R. Geier<sup>5\*</sup>

<sup>1</sup>Institute of Chronic Illnesses, Inc., Silver Spring, Maryland, USA; <sup>2</sup>CoMeD, Inc., Silver Spring, Maryland, USA; <sup>3</sup>Genetic  
Allien, Texas, USA; <sup>4</sup>University of Texas Southwestern Medical Center, Dallas, Texas, USA; <sup>5</sup>Centers of America, Silver Spring, Maryland, USA, \*Email: mgeier@comcast.net

...g 50% mercury (Hg) have been used in dentistry for the last 150 years, and Hg exposure was associated with autism spectrum disorders (ASDs). This study examined increased prenatal amalgams during pregnancy among 100 qualifying participants born between 1980–1999 and diagnosed with DSM-IV autism (severe) or ASD (mild). Logistic regression analysis (age, gender, race, and region of residency adjusted) by quintile of maternal dental amalgams during pregnancy revealed the ratio of autism:ASD (severe:mild) were about 1 (no effect) for  $\leq 5$  amalgams and increased for  $\geq 6$  amalgams. Subjects with  $\geq 6$  amalgams were 3.2-fold





**Let's Do Better.**



# Advanced Surgical Protocols

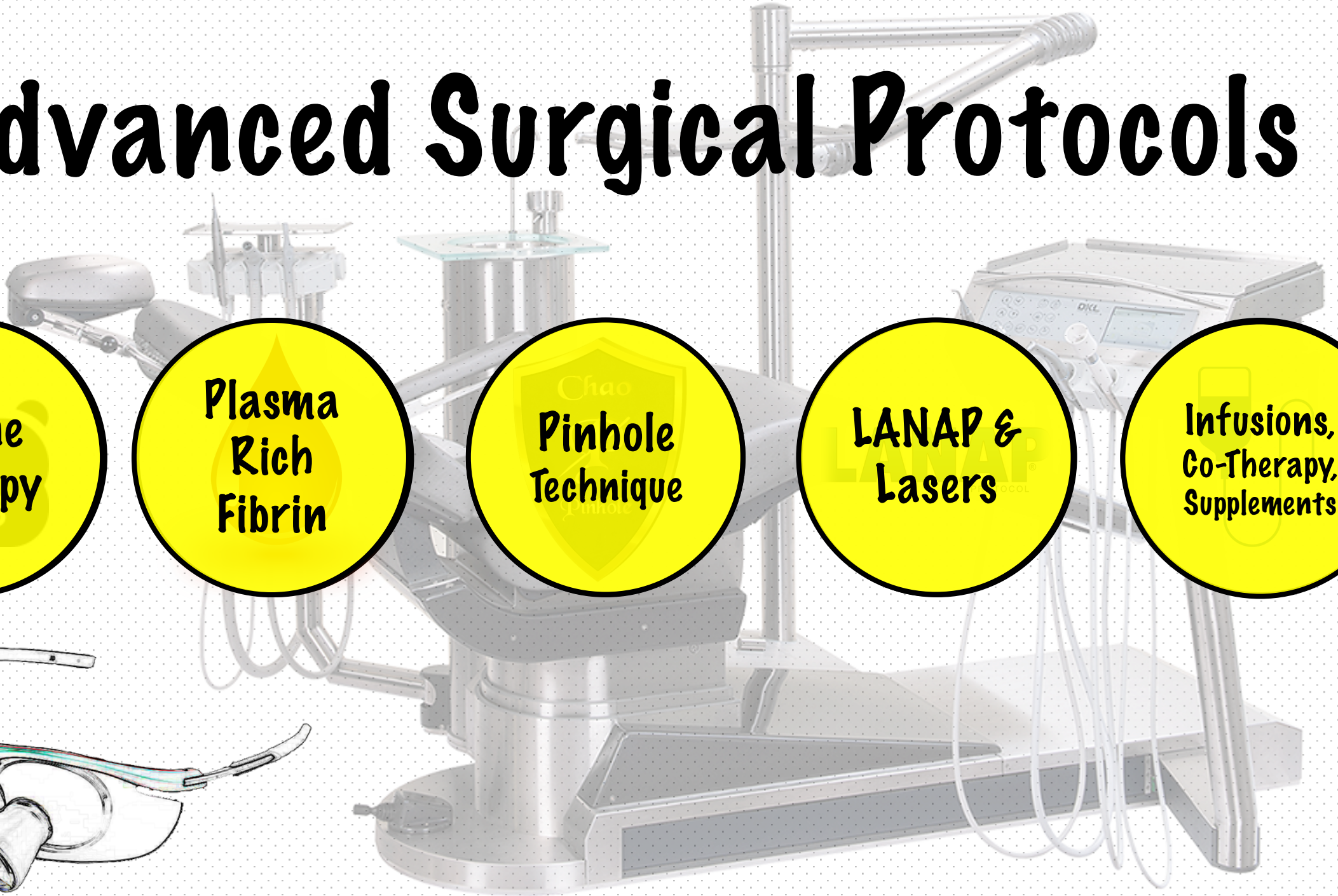
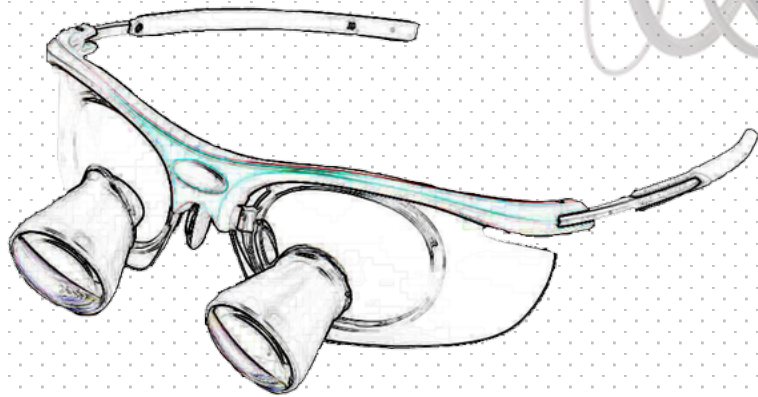
**Ozone  
Therapy**

**Plasma  
Rich  
Fibrin**

**Pinhole  
Technique**

**LANAP &  
Lasers**

**Infusions,  
Co-Therapy,  
Supplements**



REVIEW

Open Access

# Platelet-rich plasma (PRP) in dental and oral surgery: from the wound healing to bone regeneration

Antonino Albanese\*, Maria E Licata, Bianca Polizzi and Giuseppina Campisi

## Abstract

Platelet-rich plasma (PRP) is a new approach to tissue regeneration and it is being used to promote healing in many procedures in dental and oral surgery, especially in the context of bone regeneration. PRP is obtained by the centrifugation of the patient's own blood and it contains growth factors that are playing an important role in tissue repairing mechanisms. The use of PRP in dental and oral surgery is becoming increasingly popular and it is expected to play a significant role in the future of regenerative medicine.





# Chao Pinhole Technique



# Vitamin C: Intravenous Use by Complementary and Alternative Medicine Practitioners and Adverse Effects

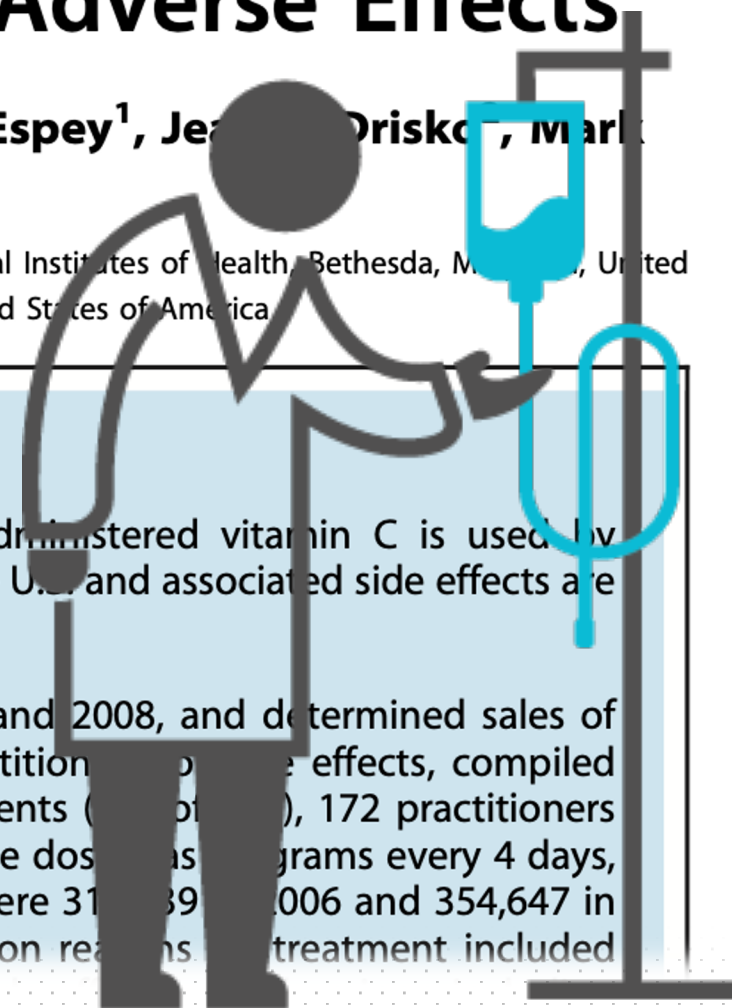
Sebastian J. Padayatty<sup>1</sup>, Andrew Y. Sun<sup>1</sup>, Qi Chen<sup>2</sup>, Michael Graham Espey<sup>1</sup>, Jennifer Drisko<sup>1</sup>, Mark Levine<sup>1\*</sup>

**1** Molecular and Clinical Nutrition Section, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, Bethesda, Maryland, United States of America, **2** Program in Integrative Medicine, University of Kansas Medical Center, Kansas City, Kansas, United States of America

## Abstract

**Background:** Anecdotal information and case reports suggest that intravenously administered vitamin C is used by Complementary and Alternate Medicine (CAM) practitioners. The scale of such use in the U.S. and associated side effects are unknown.

**Methods and Findings:** We surveyed attendees at annual CAM Conferences in 2006 and 2008, and determined sales of intravenous vitamin C by major U.S. manufacturers/distributors. We also queried practitioners for adverse effects, compiled published cases, and analyzed FDA's Adverse Events Database. Of 199 survey respondents (100% response), 172 practitioners administered IV vitamin C to 11,233 patients in 2006 and 8876 patients in 2008. Average dose was 10 grams every 4 days, with 22 total treatments per patient. Estimated yearly doses used (as 25g/50ml vials) were 31,139 in 2006 and 354,647 in 2008. Manufacturers' yearly sales were 750,000 and 855,000 vials, respectively. Common reasons for treatment included





# Restoring the Balance



Find a  
Doctor &  
Dentist

Perform  
Tests

Remove  
Metals &  
Detox  
Safely

Remove  
Infection,  
Promote  
Healing

Heal.

# Breaking Chains... ?



**Be Open  
Minded**

**Question  
Everything**

**Don't  
Judge,  
Investigate**

**Make  
the  
Connections**

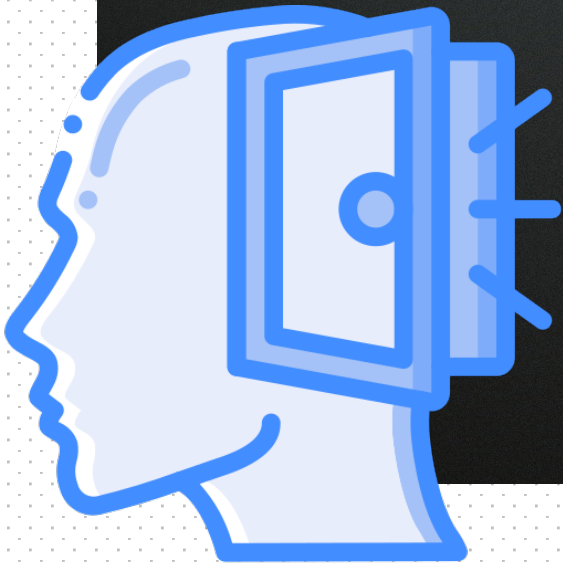
**Continue  
to Learn**



The purpose of education  
is to replace an empty  
mind with an open one.

Malcolm S. Forbes

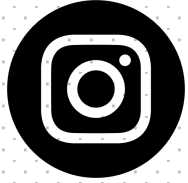
 quotefancy







**IHatePlaque@aol.com**



**@IHatePlaque**



**IHatePlaque**



**www.NicoleGreco.com**

**Nicole Greco,  
RDH, BS, MA**

