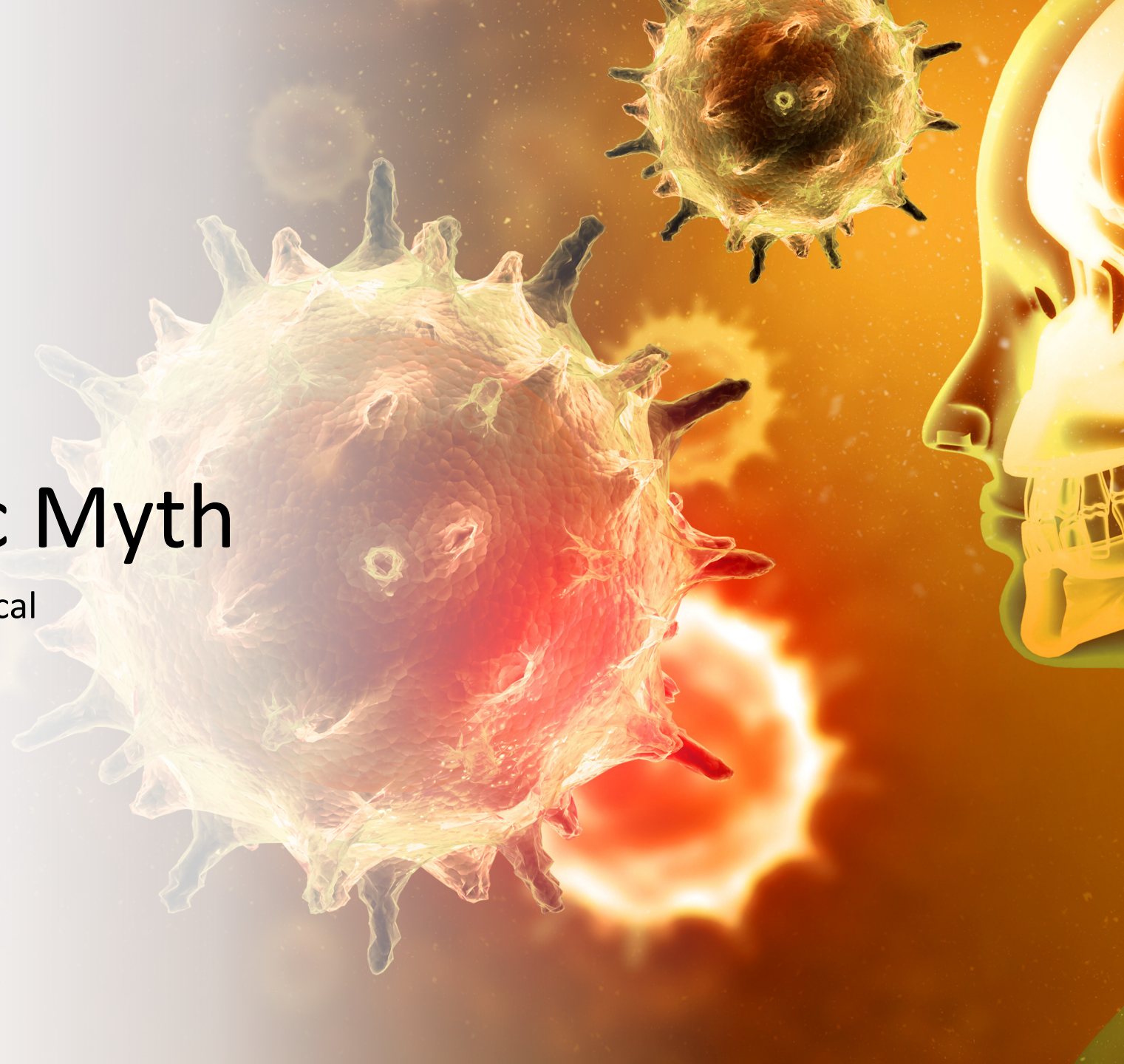
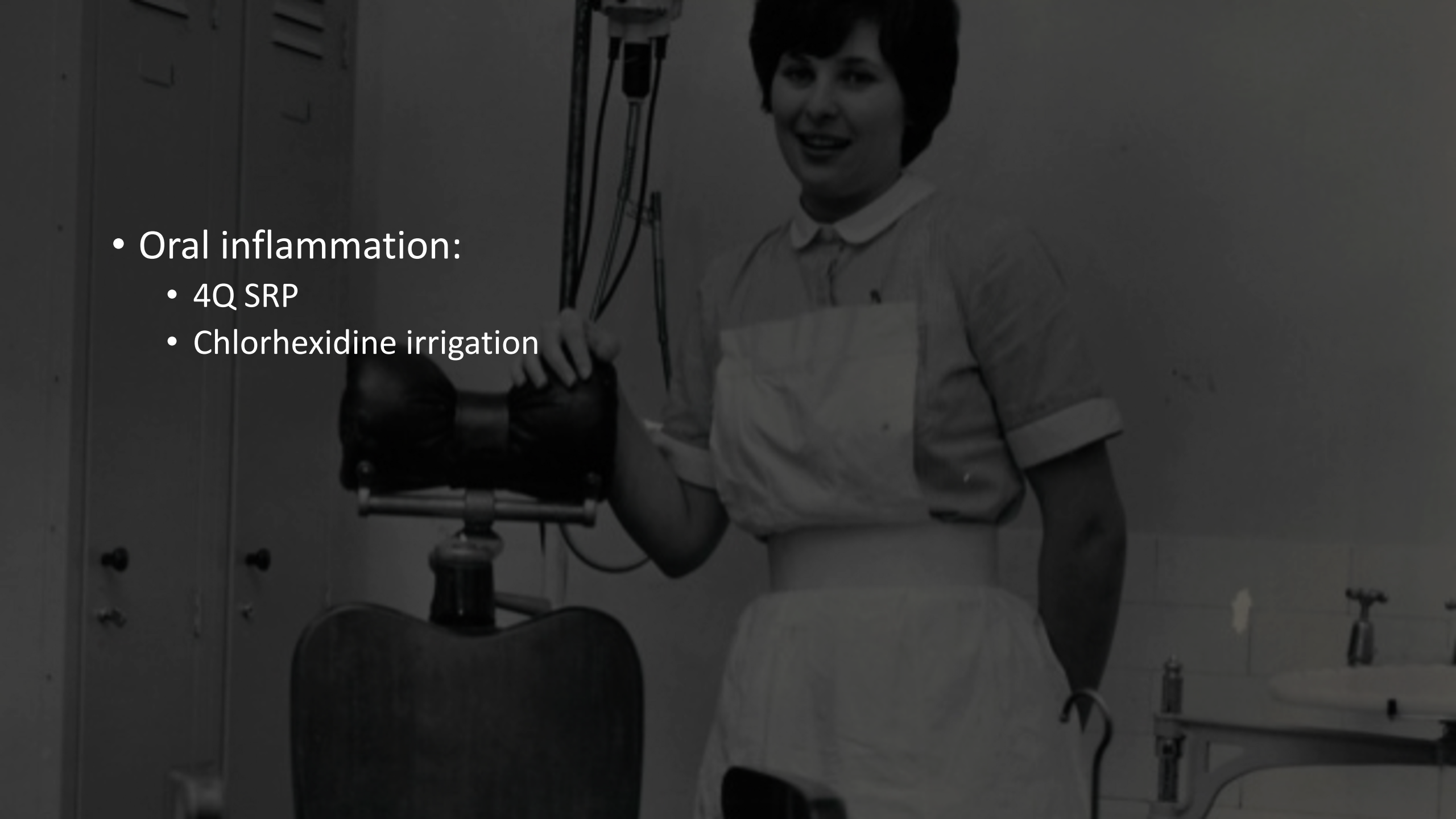
The Oral-Systemic Myth

A provocative Course in Bridging the Medical & Dental Professions

Katrina M Sanders RDH, BSDH, M.Ed, RF




JVC



- Oral inflammation:
  - 4Q SRP
  - Chlorhexidine irrigation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- Oral inflammation:
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  - Chlorhexidine irrigation
- Maintenance procedures:
  - Prophylaxis
  - 6 month hygiene recall
- Decay:
  - Removal of decay
  - Placement of restoration
  - Remineralization therapy

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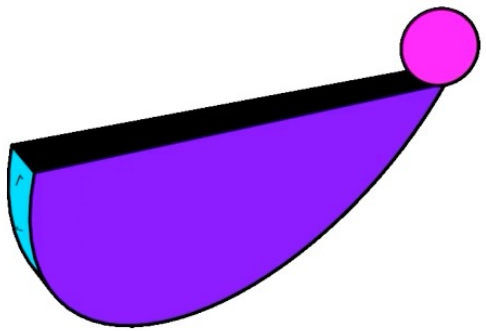
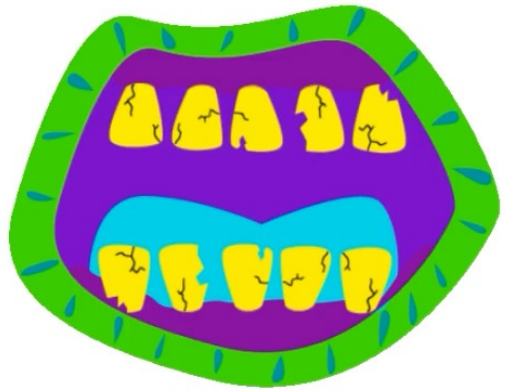
Evolution of Dentistry

- Infection Control
- Disease Prevention
- Technology
- Research
- Patients
  - Longer life expectancy
  - Co-morbidities
- Renewed focus of health & wellness
- Cosmetic Dentistry

When To Evaluate Our Work?



ALMOST 1 IN 2
ADULTS HAVE
PERIODONTITIS



90% OF ADULTS HAVE
A HISTORY OF
DENTAL DECAY

1 AMERICAN DIES
EVERY HOUR FROM
ORAL CANCER

Course Objectives

Evaluate aspects of the medical model as they relate to integrative patient care

Identify the challenges regarding the management of the oral-systemic link by dental professionals

Discuss implementation strategies for oral disease as they relate to the oral-systemic link

Understand co-therapeutic strategies in comprehensive patient care

I am on the editorial advisory board for endeavor business media and dental products report.

I do not have any personal conflict of interest with regard to the topic of my talk here today.

I have received honorarium for the preparation and presentation of this program from this study club.

Slides have not been altered other than for the enhanced interpretation of the material.

I am an employee of AZPerio.

KATRINA M SANDERS

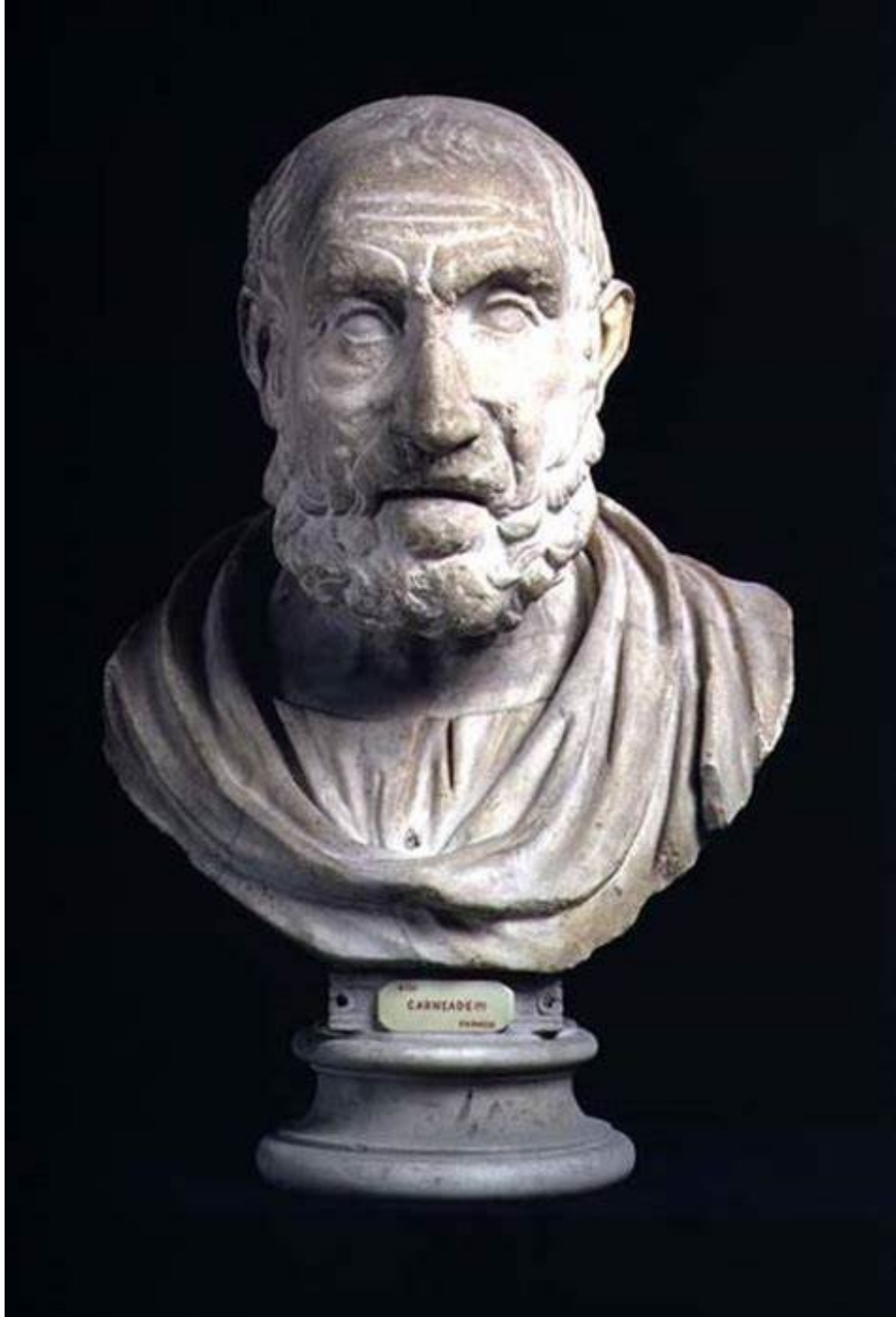
THE DENTAL WINEGENIST™

“The mouth is the center of vital tissues and functions that are critical to total health and well-being across the lifespan.”

Evans, C. A., & Kleinman, D. V. (2000). The Surgeon General's report on America's oral health: opportunities for the dental profession. *The Journal of the American Dental Association*, *131*(12), 1721-1728.

“Illnesses do not come upon us out of the blue. They are developed from small daily sins against Nature. When enough sins have accumulated, illnesses will suddenly appear.”

~Hippocrates



Who is the preventive specialist within the community?

Primary Care Physician

09:36

Dentist

05:00

Dental Hygienist

40:00 – 60:00

Jane Ogden, Kheelna Bavalia, Matthew Bull, Stuart Frankum, Chris Goldie, Micaela Gosslau, Azita Jones, Sonia Kumar, Kishor Vasant, “I want more time with my doctor”: a quantitative study of time and the consultation, *Family Practice*, Volume 21, Issue 5, October 2004, Pages 479–483, https://doi.org/10.1093/fampra/cmh502

We see patients in a perceived state of health

Clinical Decision Making Model

- Routine Films | Exams
- Screen for disease
- Prophylaxis
- Root plane
- Treat decay

”When you look at the way we actually treat our teeth, it would appear that our oral health is unimportant to us, a fact barely hidden by the veneer of orthodontia and teeth whitening procedures”
-Dr Steven Lin

The Dental Hygiene Process of Care

Assessment

Personal, Dental and Medical Histories. Vital Signs. EO/IO Examination. Imaging. Biofilm. Teeth. Occlusion. Periodontium.

Diagnosis

Periodontium. Hard Tissue. Oral Hygiene. Oral Tissues. Screening.

Planning

Care Plan. Risk Assessment. Sequencing. Presenting.

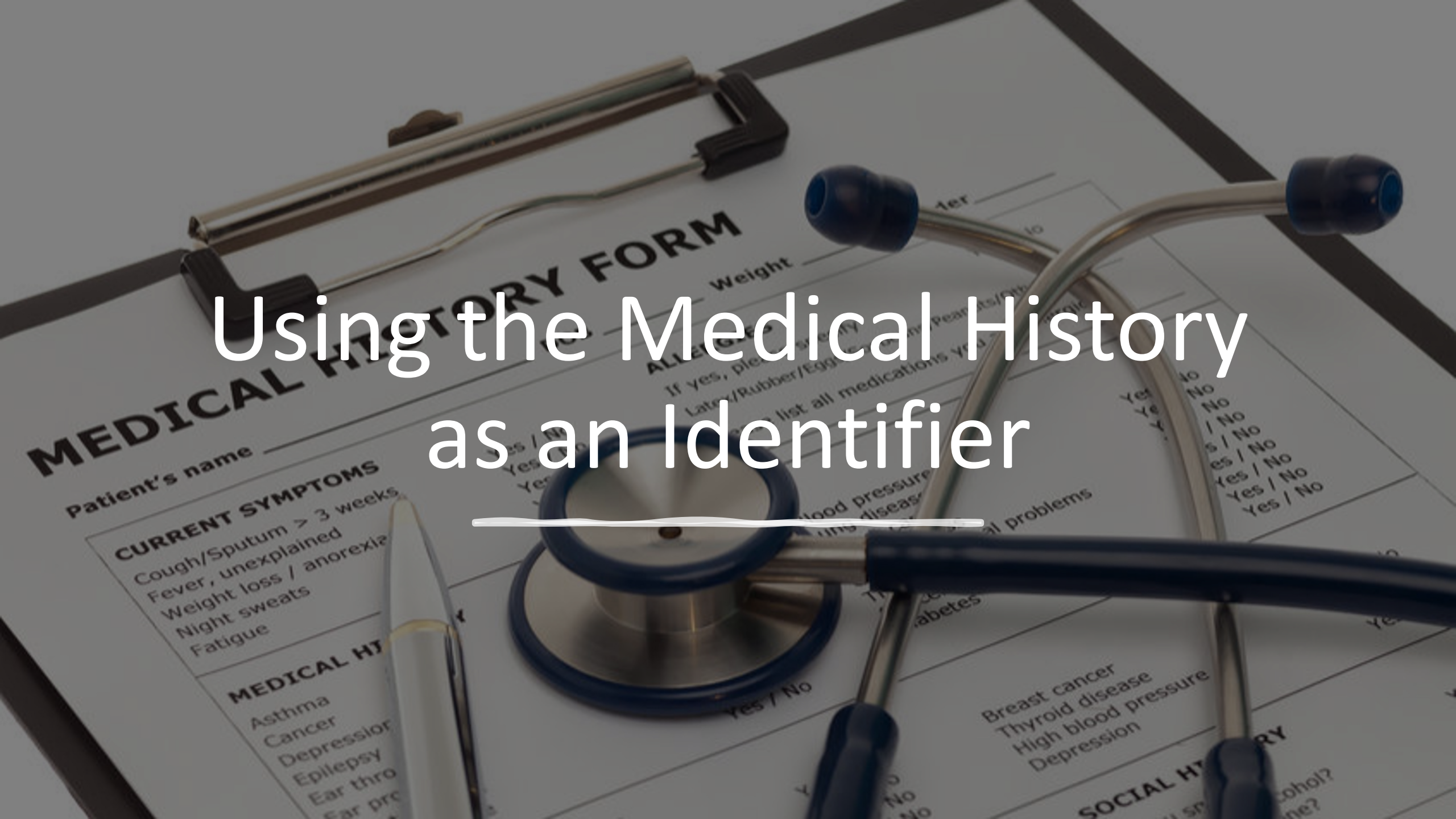
Implementation

Counseling: Nutrition, Oral Hygiene, Tobacco. Behavior change. Protocols. Medicaments. Adjuncts.

Evaluation

Goals. Outcomes. Frequency. Continuing care.

REFERENCE: Gehrig JS, Willmann DE, eds. *Foundations of Periodontics for the Dental Hygienist*. 3rd ed. Philadelphia, PA: Wolters Kluwer; 2011.



Using the Medical History as an Identifier

Meet Chris

- Patient of record for five years.
- Medical history: hypertension. RX: Atenolol.
- Periodontal Maintenance Appointment:
  - History of SRP 1.5 years ago
  - Presents with localized 4mm periodontal pockets with moderate bleeding tendency

Medical History Evaluation

MEDICAL CONDITIONS

MEDICATIONS

DENTAL HISTORY

GENETICS & PERSONAL HISTORY

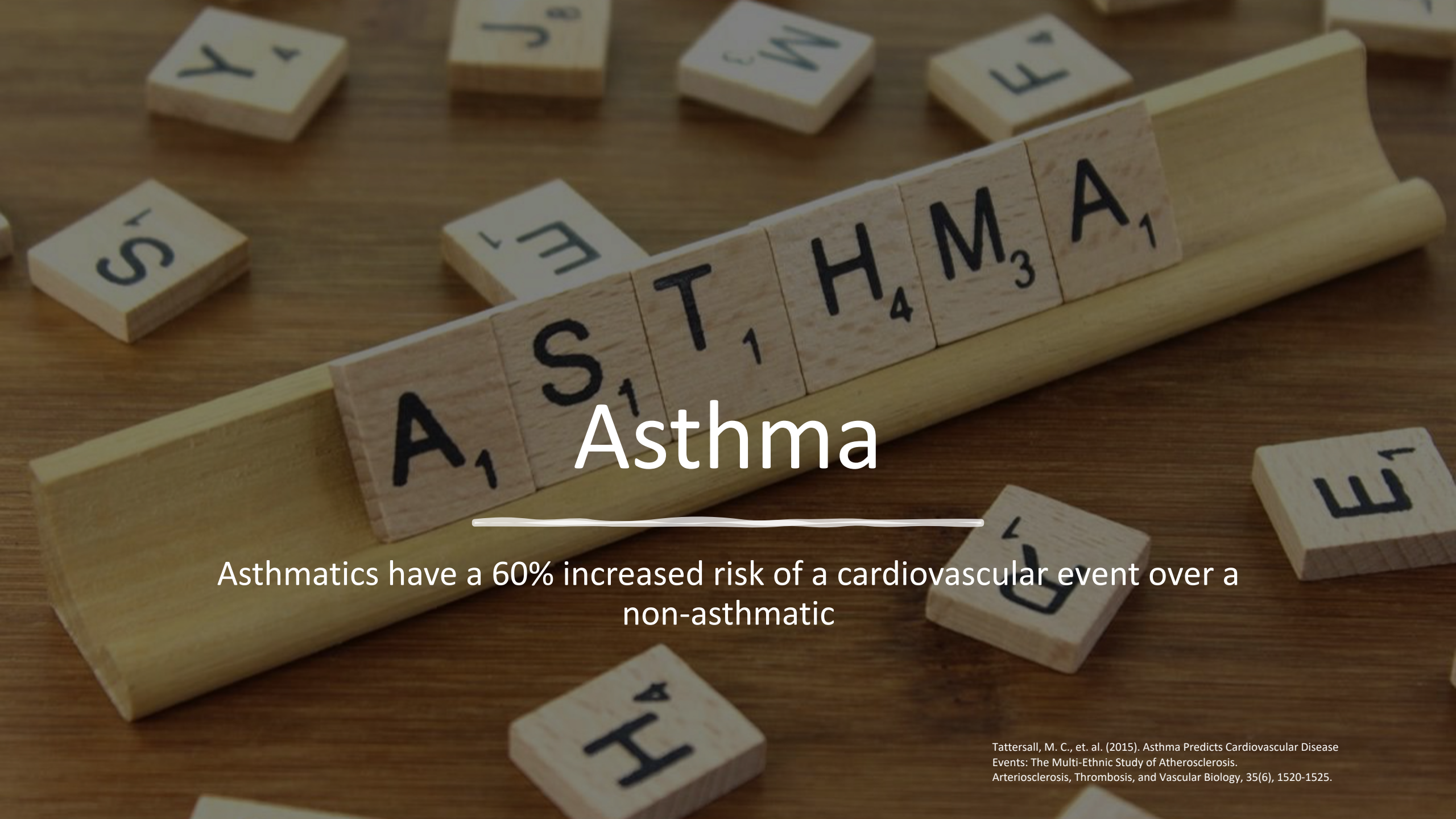
VITAL SIGNS

NUTRITIONAL STATUS

Hidden Risk Factors for Cardiovascular Disease

- Migraine Headaches
  - Women are four times more likely to experience a cardiovascular episode
- Rheumatoid Arthritis
  - Raises heart attack risk by 45%
  - In conjunction with high cholesterol, heart attack risk soars to 700% risk
- Gout
  - Elevated risk for insulin resistance
- Lack of sleep/Sleep Apnea
  - 1 additional hour of rest reduces calcium buildup and heart disease risk by 33%
- Erectile Dysfunction
  - 30 million men affected
- Depression & Anxiety
  - Doubles the risk of stroke and heart disease
- Vitamin D Deficiency
  - Increases risk of hypertension & diabetes and 30% increased risk of cardiomyopathy
- Psoriasis
  - 40% of those with Psoriasis experience a metabolic disorder. Same risk as smoking.

Bale, B. Doneen, A. (2014) *Beat the Heart Attack Gene.* New York, NY. Wiley Publishing



Asthma

Asthmatics have a 60% increased risk of a cardiovascular event over a non-asthmatic

Tattersall, M. C., et. al. (2015). Asthma Predicts Cardiovascular Disease Events: The Multi-Ethnic Study of Atherosclerosis. Arteriosclerosis, Thrombosis, and Vascular Biology, 35(6), 1520-1525.

Migraine Headaches

- Migraine headaches are associated with a doubled risk for an ischemic stroke and 50% increased risk of heart attack

Adelborg, K., et. al. (2018). Migraine and risk of cardiovascular diseases: Danish population based matched cohort study.
Bmj, 360. doi:10.1136/bmj.k96

Gout

- Gout is associated with insulin resistance
- Gout significantly increased the risk of stroke by 34% in women and of heart attack by 14% in men

Clarson, L. E., et. al. (2015). Increased risk of vascular disease associated with gout: a retrospective, matched cohort study in the UK Clinical Practice Research Datalink. Annals of the Rheumatic Diseases, 74(4), 642-647.

Hypothyroidism

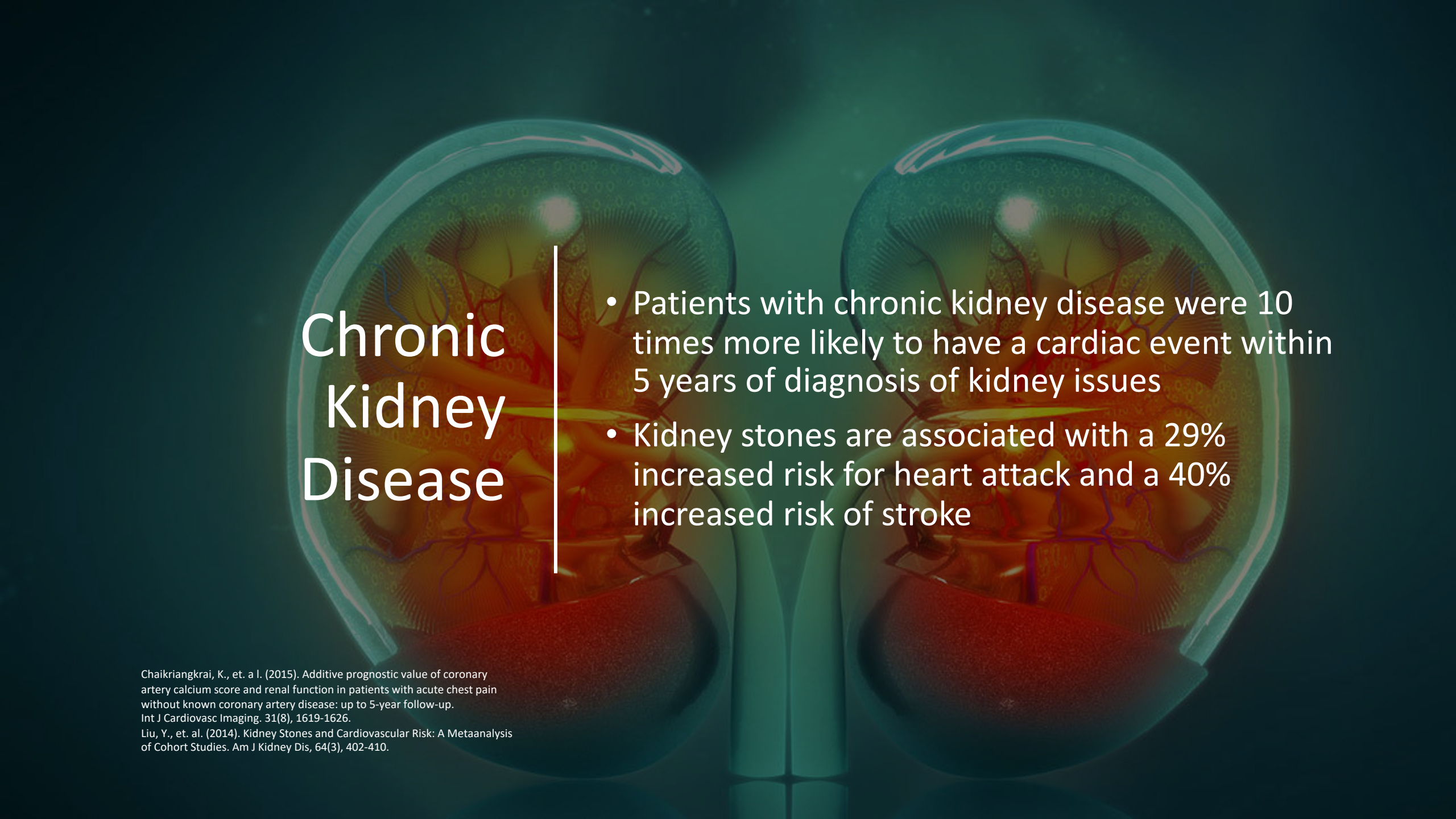
- Mild hyperthyroidism is significantly associated with atrial fibrillation
- Severe hypothyroidism doubles the risk of a heart attack

Rodondi, N., et al. (2010). Subclinical hypothyroidism and the risk of coronary heart disease and mortality. JAMA, 304(12), 1365-1374.
Larsson Susanna, C., et. al. (2019) Thyroid Function and Dysfunction in Relation to 16 Cardiovascular Diseases: A Mendelian Randomization Study. Circulation: Genomic and Precision Medicine, 0(0). doi:10.1161/CIRCGEN.118.002468

Erectile Dysfunction

- Identification of erectile dysfunction indicates a marker for microvascular issues
- Doubles the risk of a cardiovascular event within the next 4 years

Uddin, S. M. I., et. al. (2018). Erectile Dysfunction as an Independent Predictor of Future Cardiovascular Events: The Multi-Ethnic Study of Atherosclerosis. Circulation. doi:10.1161/circulationaha.118.033990



Chronic Kidney Disease

- Patients with chronic kidney disease were 10 times more likely to have a cardiac event within 5 years of diagnosis of kidney issues
- Kidney stones are associated with a 29% increased risk for heart attack and a 40% increased risk of stroke

Chaikriangkrai, K., et. a l. (2015). Additive prognostic value of coronary artery calcium score and renal function in patients with acute chest pain without known coronary artery disease: up to 5-year follow-up. Int J Cardiovasc Imaging. 31(8), 1619-1626.

Liu, Y., et. al. (2014). Kidney Stones and Cardiovascular Risk: A Metaanalysis of Cohort Studies. Am J Kidney Dis, 64(3), 402-410.

Reflux Disease

- Infection with H. pylori triples the chance of having coronary atherosclerosis disease
- Proton Pump Inhibitors: the most chronically prescribed medication; not meant for long-term use
  - Proton Pump Inhibitors increase the risk of heart attack by 16% and double the risk of a cardiovascular mortality

Lee M, et al "Current Helicobacter pylori infection is significantly associated with subclinical coronary atherosclerosis in healthy subjects: A crosssectional study" PloS One 2018; 13(3): e0193646.
Shah NH, LePendu P., Bauer-Mehren A., et al. (June 10, 2015). Proton Pump Inhibitor Usage and the risk of MI in the general population. LLoS ONE 10(6).

HIV/AIDS

- HIV increases the risk of heart attack by 50% and increased risk of developing peripheral arterial disease within 9 years of diagnosis

Beckman, J., Duncan, M., et al. HIV and PAD. March 12, 2018.
Circulation; 10.1161.117.032647

Hodgkin's Lymphoma

- Patients presenting with Hodgkin's Lymphoma present with a 4-6 times increased risk of congenital heart disease or heart failure; this risk persists for 35 years or greater

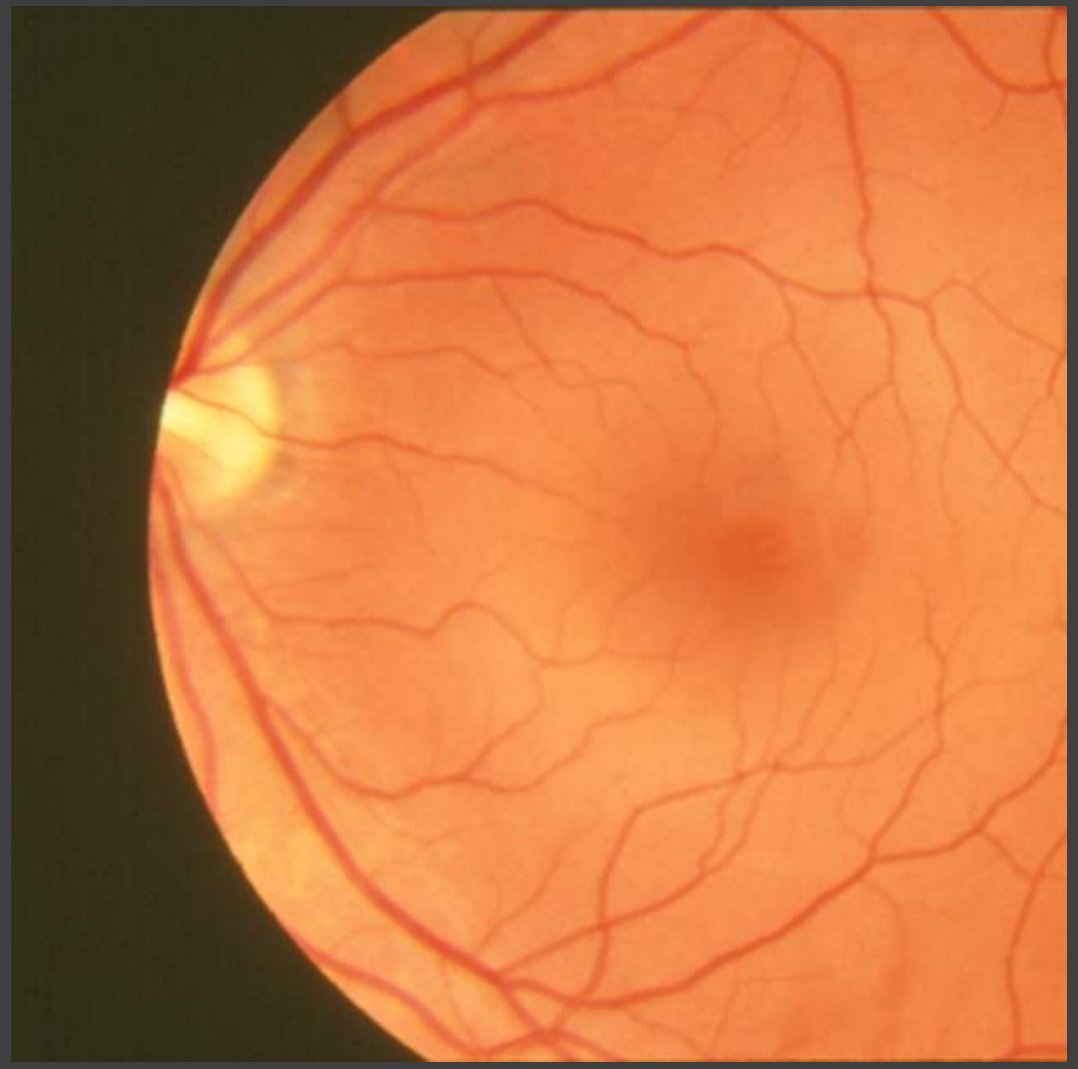
van Nimwegen, F. A., et. al. (2015). Cardiovascular disease after hodgkin lymphoma treatment: 40-year disease risk.
JAMA Intern Med. doi: 10.1001/jamainternmed.2015.1180

Cancer Chemotherapy

- Chemotherapeutic agents are cardiotoxic
- Can lead to coronary artery disease, heart failure or arrythmias

Yeh, E. T. H., & Bickford, C. L. (2009). Cardiovascular Complications of Cancer Therapy: Incidence, Pathogenesis, Diagnosis, and Management. J Am Coll Cardiol, 53(24), 2231-2247.

Using information from other professions to determine risk



- Breast arterial calcifications can predict cardiovascular risk
- Retinal photographs can predict cardiovascular risk
- Abdominal aorta calcifications and lower limb calcifications can predict cardiac death

Rotter MA, Schnatz PF, Currier AA et al. Breast arterial calcifications (BACs) found on screening mammography and their association with cardiovascular disease. Menopause 3/10/2008; 15:276-281.
Poplin, R., Varadarajan, A., Blumer, K., et al. Prediction of cardiovascular risk factors from retinal fundus photographs via deep learning. Nature Biomedical Engineering. Feb 19, 2018. doi:10.1038/s41551-018-0195-0
Chowdhury MM, et al. (2017) Lower limb arterial calcification (LLAC) scores in patients with symptomatic peripheral arterial disease are associated with increased cardiac mortality and morbidity.
PLoS ONE 12(9): e0182952.
https://doi.org/10.1371/journal.pone.0182952.

Comorbid Conditions Impacting Wound Healing

- Infection
- Poor circulation
- Poor nutrition
- Diabetes
- Autoimmune conditions
- Excessive swelling
- Repetitive trauma

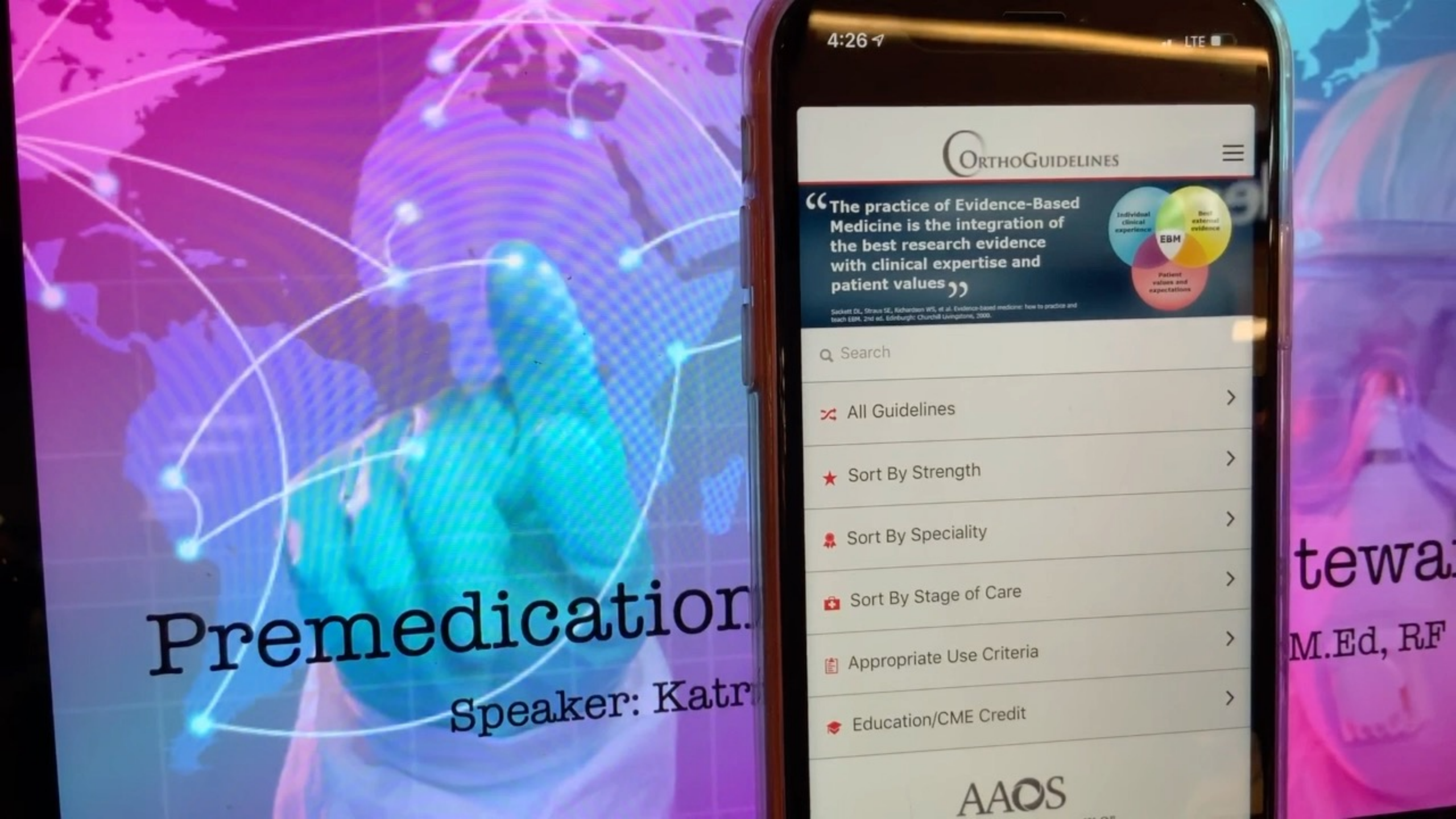
Beyene, R. T., Derryberry, S. L., & Barbul, A. (2020). The effect of comorbidities on wound healing. *Surgical Clinics*, *100*(4), 695-705.

Mayo Clinic Prospective, Case-Controlled Study

339 patients with PJI | 339 uninfected patients

1. Antibiotic premedication before dental treatment was not associated with lower risk
2. Staphylococci were most commonly encountered organisms isolated from the infection sites
3. 13.5% of joint infection cases were associated with bacterial flora of oral or dental origin
4. Good oral hygiene was associated with lower risk of PJI

Sollecito TP, et al. The use of prophylactic antibiotics prior to dental procedures in patients with prosthetic joints: Evidence-based clinical practice guideline for dental practitioners – a report of the American Dental Association Council on Scientific Affairs. JADA 2015; 146(1): 11-16.


Premedication
Speaker: Katr
tewa
M.Ed, RF
4:26
LTE
OrthoGuidelines
"The practice of Evidence-Based Medicine is the integration of the best research evidence with clinical expertise and patient values"
Individual clinical experience
Best external evidence
EBM
Patient values and expectations
Sackett DL, Straus SE, Richardson WS, et al. Evidence-based medicine: how to practice and teach EBM. 2nd ed. Edinburgh: Churchill Livingstone; 2000.
Search
All Guidelines
Sort By Strength
Sort By Speciality
Sort By Stage of Care
Appropriate Use Criteria
Education/CME Credit
AAOS

6.5%-7.9% "Stable" Diabetic Patient	Below 50 mg/dL Hypoglycemia Patient
8.0%-8.9% Poorly Controlled	50-119 mg/dL Otherwise Healthy Patient
9.0%-10.9% No Elective Procedures	120-179 mg/dL Stable Diabetic Patient
11.0% + Proceed with caution	180-214 mg/dL Poorly Controlled Diabetes
	215-279 mg/dL Extremely Uncontrolled Diabetes
	280 + mg/dL Proceed with caution

Dental Treatment Helps Lower Your Hemoglobin A1c

With Miguel Vinas, PhD, and Amy Hess-Fischl, MS, RD, LDN, BC-ADM, CDE

Risk Factors for Ulcerations & Amputations

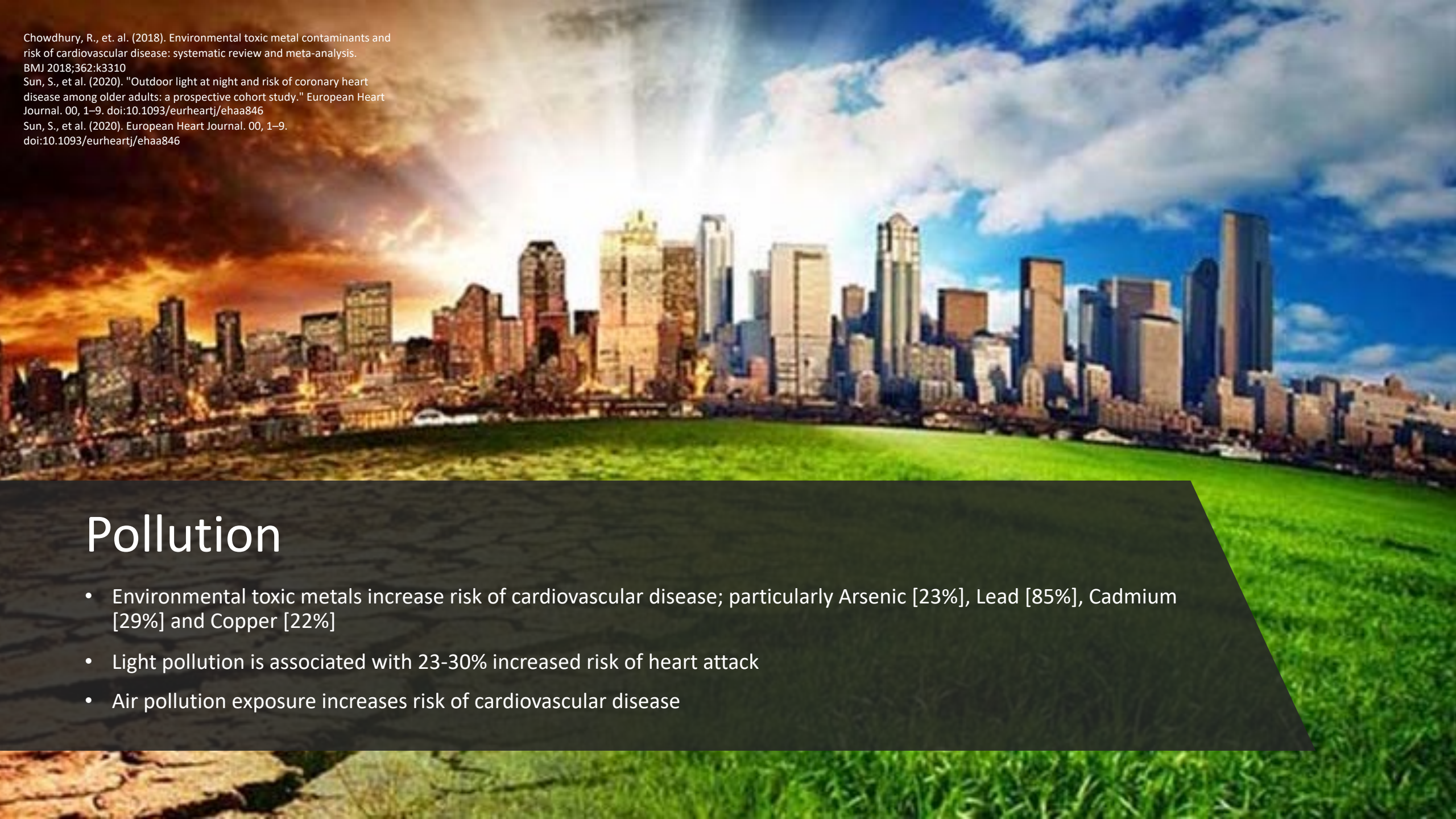
- Diabetes/glycemic control
- Peripheral sensory & motor neuropathy
- Vascular insufficiency
- Infection management
- Structural foot deformity
- History of previous ulcer or amputation
- Limited joint mobility
- Improper footwear
- Charcot deformity

- 65 years or older (70% of Americans 65 and older have periodontal disease)
- Cardiovascular conditions
- Diabetes
- Smoking/tobacco use
- Obesity
- Rheumatoid arthritis
- Poor nutrition
- Clenching or grinding
- Medications such as oral contraceptives, anti-depressants and certain heart medications.
- Genetics
- Stress

American Academy of Periodontology. (2020). Gum Disease Risk Factors. Retrieved September 29, 2020, from https://www.perio.org/consumer/gum-disease-risk-factors

Using the Patient Interview as an Identifier

Chowdhury, R., et. al. (2018). Environmental toxic metal contaminants and risk of cardiovascular disease: systematic review and meta-analysis. BMJ 2018;362:k3310
Sun, S., et al. (2020). "Outdoor light at night and risk of coronary heart disease among older adults: a prospective cohort study." European Heart Journal. 00, 1–9. doi:10.1093/eurheartj/ehaa846
Sun, S., et al. (2020). European Heart Journal. 00, 1–9. doi:10.1093/eurheartj/ehaa846



Pollution

- Environmental toxic metals increase risk of cardiovascular disease; particularly Arsenic [23%], Lead [85%], Cadmium [29%] and Copper [22%]
- Light pollution is associated with 23-30% increased risk of heart attack
- Air pollution exposure increases risk of cardiovascular disease

Lifestyle Stressors

- Working 55+ hours per week was associated with a 13% increased risk of myocardial infarction and 33% increased risk of stroke
- Caregivers have a 15% increased risk of heart attack and a 25% increased risk of stroke
- Social dining increases cardiovascular risk: dining out is associated with a 31% increased risk for vascular disease
- Occupational:
    - Firefighters have a 12 times elevated risk of experiencing coronary death during work, likely due to air pollution, the activation of the fight or flight response, long work shifts and poor sleep patterns
- Divorce:
    - Divorce increases heart attack risk in women by 30%
    - Remarrying increases heart attack risk in women by 40%
    - A second divorce in women doubles the risk of a heart attack
    - Men experience a 40% increased risk of heart attack only after a 2nd divorce

Kivimaki, M., Nyberg, S., et al. Long working hours and risk of coronary heart disease and stroke: a systematic review and meta-analysis of published and unpublished data for 603 838 individuals. Lancet 2015; 386: 1739–46

Jianguang Ji, et. al. Increased Risks of Coronary Heart Disease and Stroke Among Spousal Caregivers of Cancer Patients Circulation. (2012) 125(14):1742-1747

Peñalvo, J. L., et. al. (2016). Association Between a Social-Business Eating Pattern and Early Asymptomatic Atherosclerosis. J Am Coll Cardiol, 68(8), 805-814.

Kales, S. N., et. al. (2007). Emergency Duties and Deaths from Heart Disease among Firefighters in the United States. New England Journal of Medicine, 356(12), 1207-1215.

Dupre, M. E., et. al. (2015). Association Between Divorce and Risks for Acute Myocardial Infarction. Circulation: Cardiovascular Quality and Outcomes. doi: 10.1161/circoutcomes.114.001291

Red Flags for Cardiovascular Events in Women

- Migraine headaches with an aura have a 90% increased risk of stroke
- Autoimmune disorders
- History of breast cancer
- Polycystic Ovarian Syndrome
- Bulimia nervosa
- Early/premature menopause is associated with a 55% increased risk of cardiovascular disease

Khoudary, S., Aggarwal, B., et al. (2020). Menopause transition and cardiovascular disease risk: Implications for timing of early prevention. Circulation. 2020:142

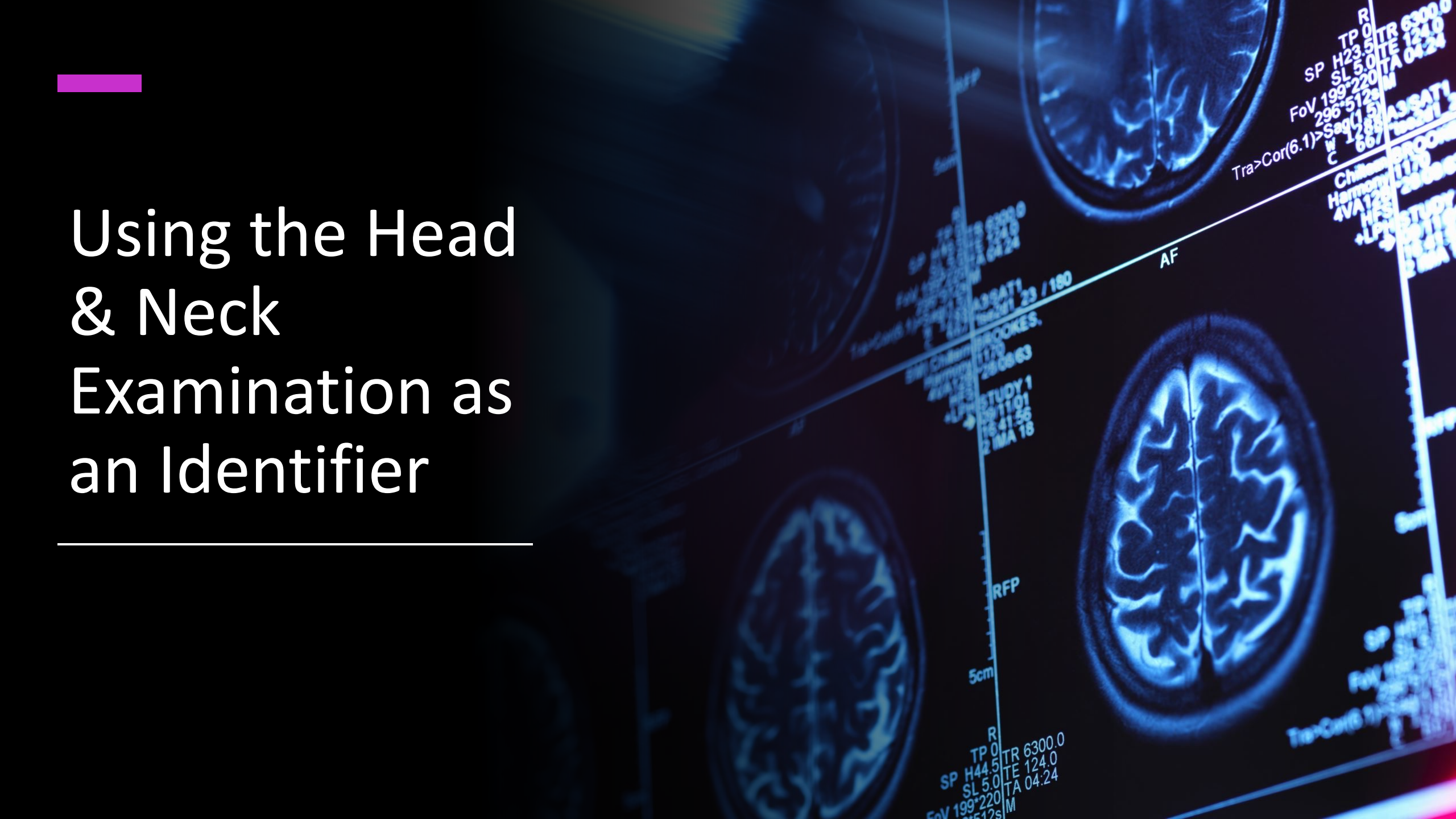
Pregnancy in Women

- Pregnancy complications are not temporary
- Gestational hypertension is associated with a 67% increased risk of cardiovascular disease
- Pre-eclampsia is associated with a 75% increased risk of death from cardiovascular disease via risk of heart attack and stroke from venous blood clotting
- Gestational diabetes provides a two-fold risk for developing Type II diabetes and 68% increased risk of developing cardiovascular disease
- 2 or more miscarriages are predictive of a two-fold increased risk associated with hypertension, myocardial infarction and stroke
- Delivery of a pre-term birth is associated with a two-fold increased risk of cardiovascular disease and death

Cho, L, Davis, M., et al. (2020). Summary of updated recommendations for primary prevention of CVD in women. JACC. Vol 75, Nov 20, 2020


A TIP FROM A
FORMER
SMOKER®

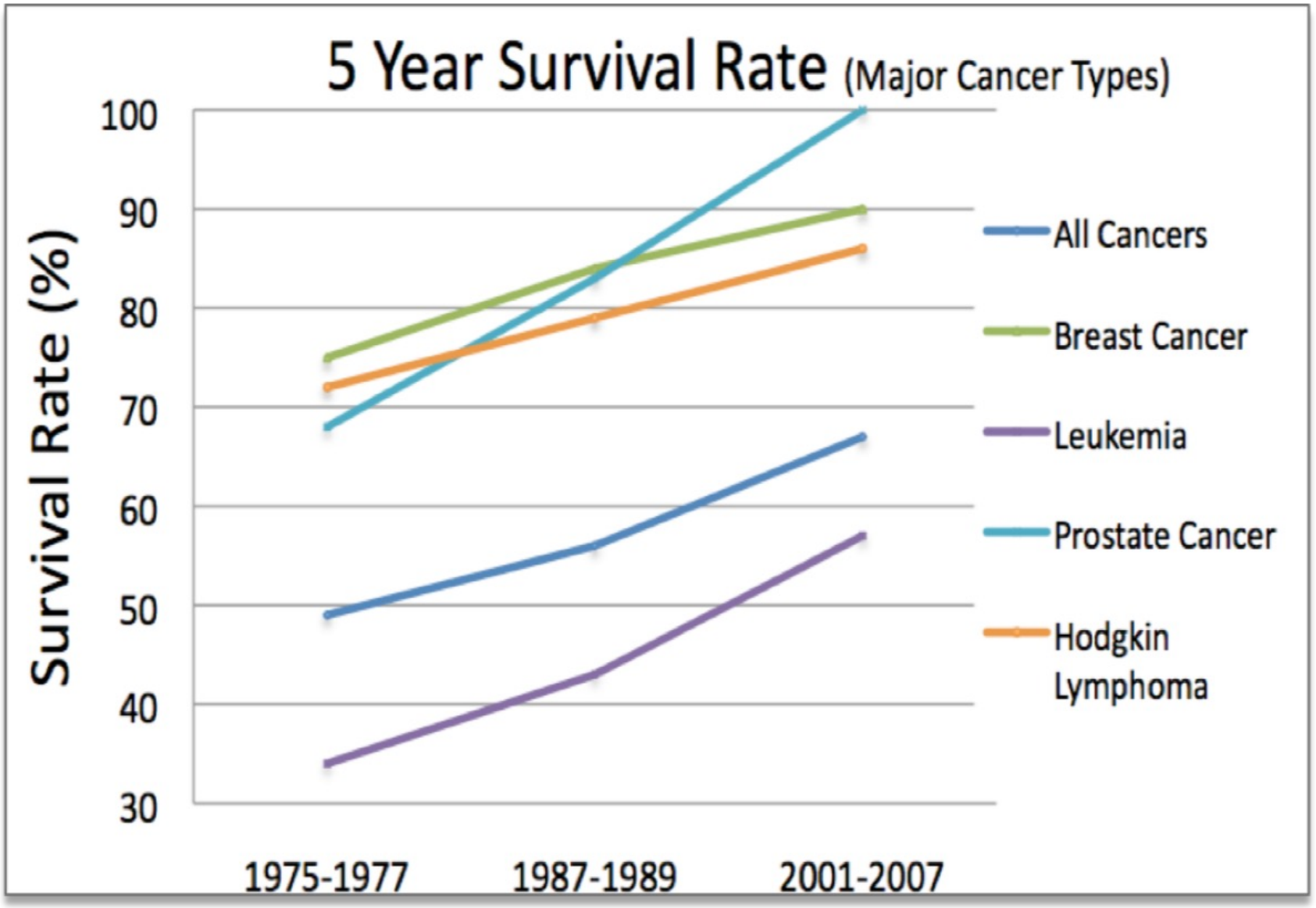
Using the Head & Neck Examination as an Identifier



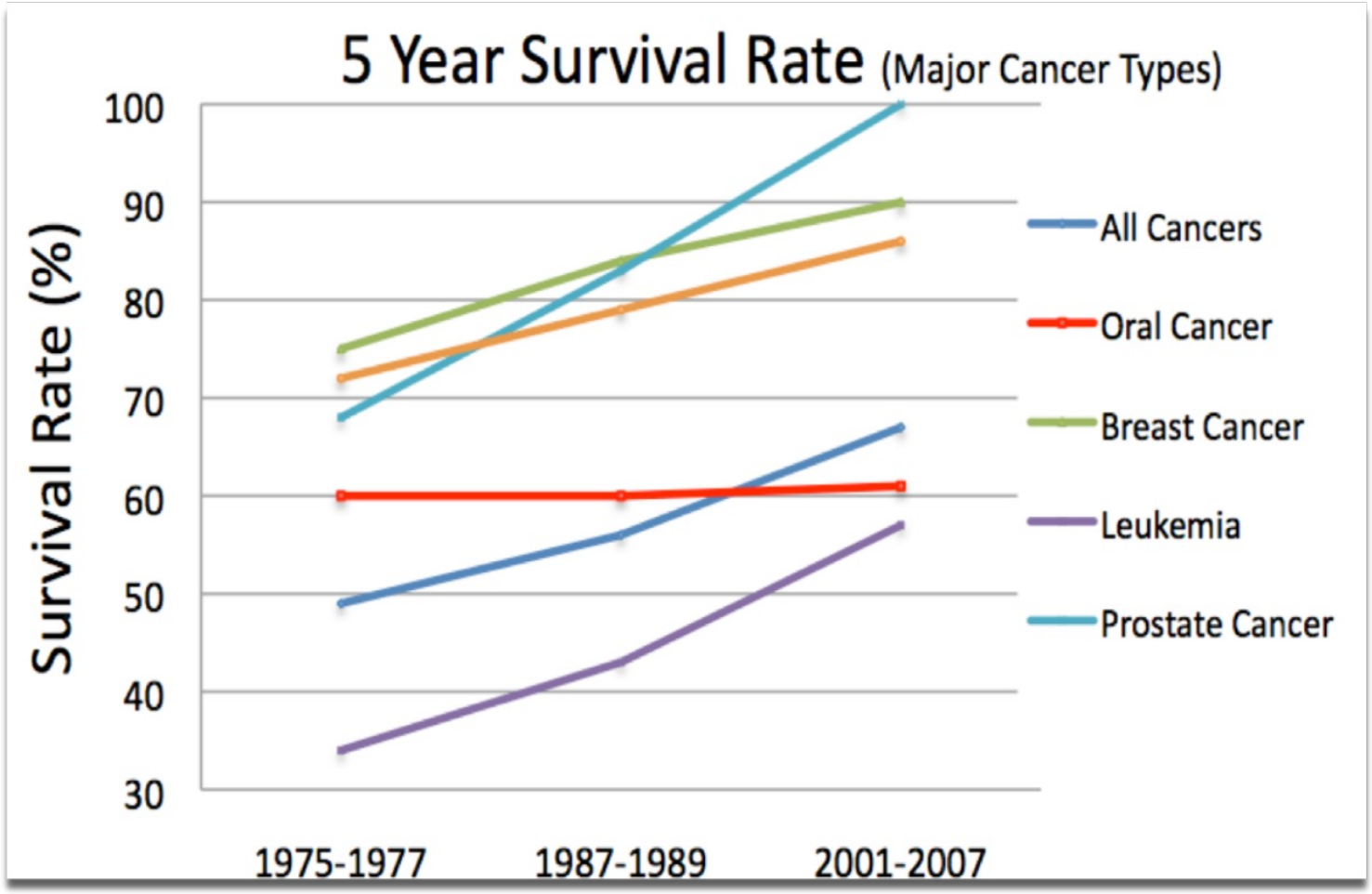
Oral Cancer

- The death rate of oral cancer is higher than that of other cancers such as cervical cancer, Hodgkin's lymphoma, laryngeal cancer, etc.
- Oral cancer kills roughly 1 person per hour, 24 hours per day.

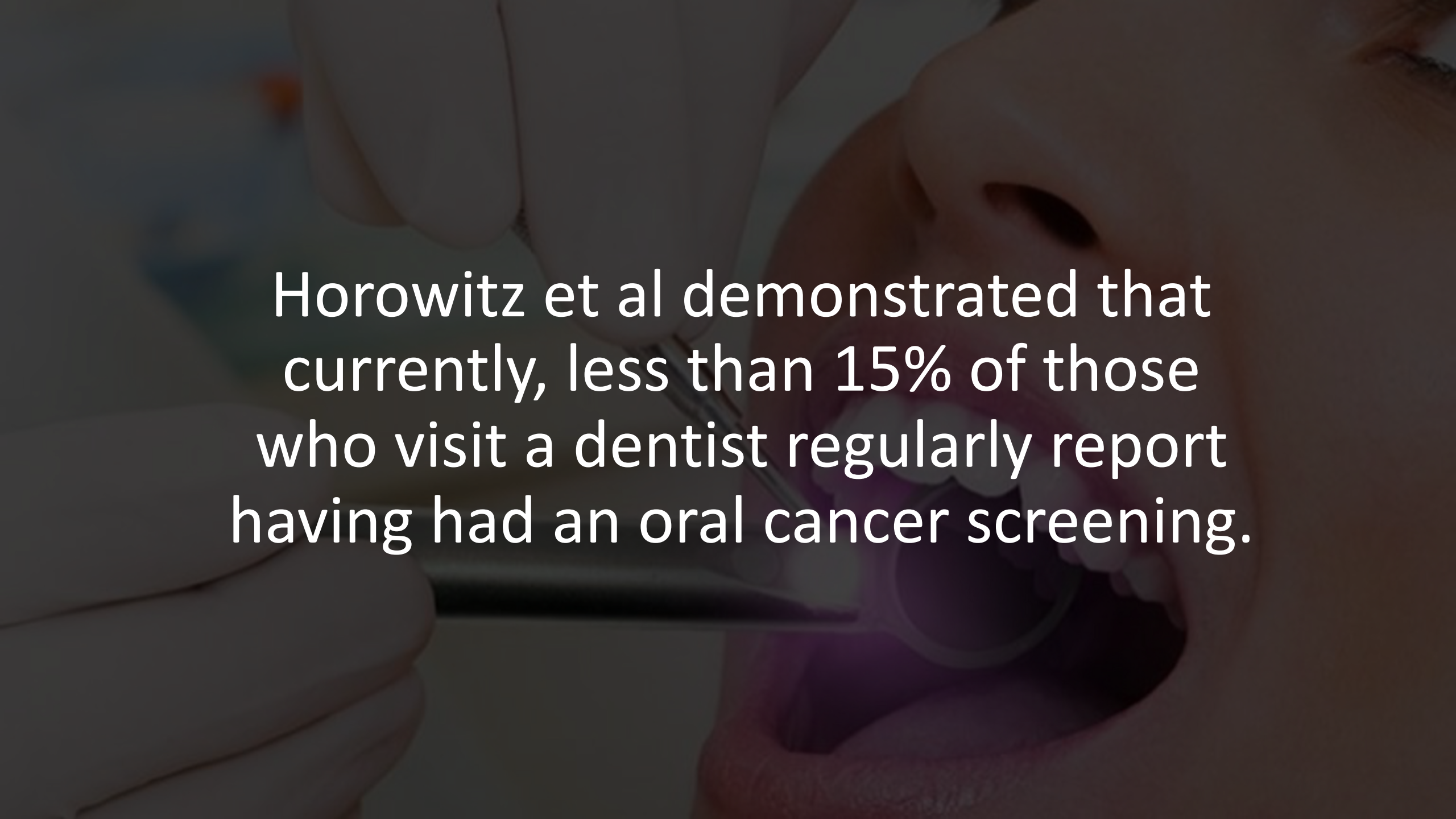
Oral Cancer Foundation. (2019, February 28). Oral Cancer Facts. Retrieved October 22, 2020, from https://oralcancerfoundation.org/facts/

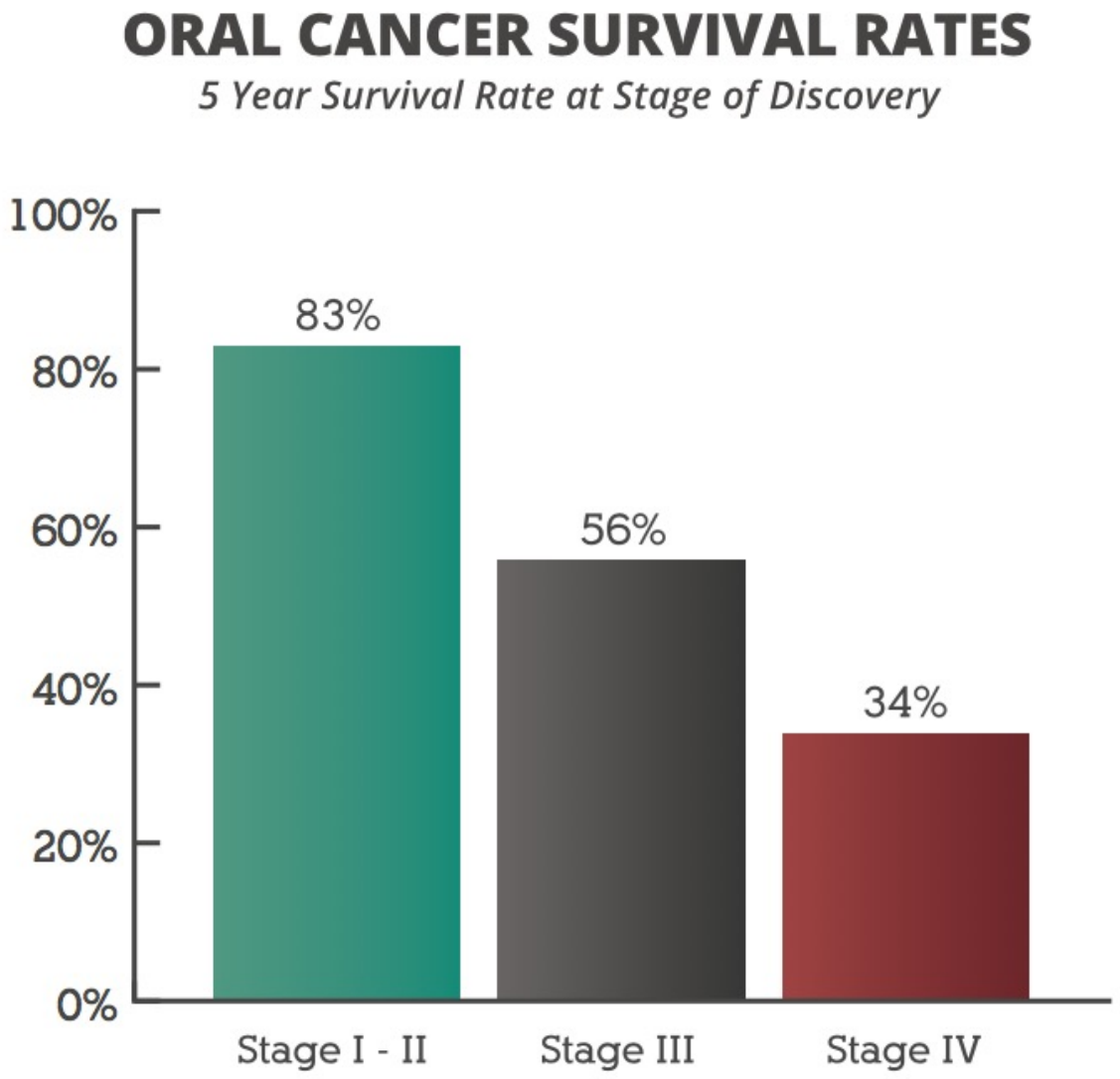


Courtesy of Forward Science



Courtesy of Forward Science

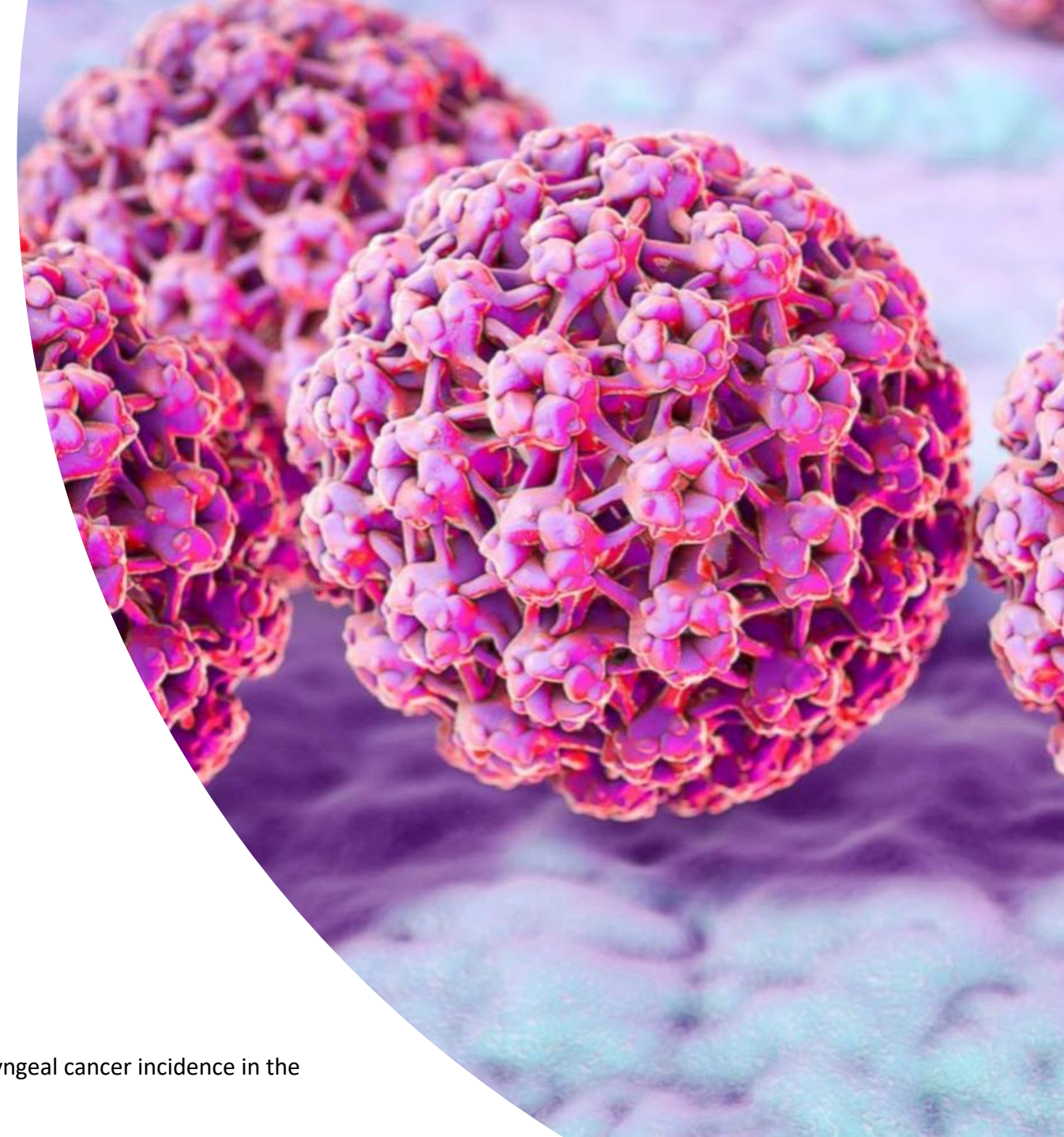

Horowitz et al demonstrated that currently, less than 15% of those who visit a dentist regularly report having had an oral cancer screening.



Courtesy of Forward Science

HPV-16 | HPV-18

- HPV is the most common sexually transmitted disease.
- Administration of Gardasil, Cervarix and Gardasil 9
  - 25% of 15 year-olds are sexually active
  - 50% of 18 year-olds are sexually active
- Almost all sexually active people will have HPV at some point in their lifetime
- HPV is found encased in biofilm in pockets of the tonsils, in tonsillary “crypts”
  - Coughing up blood
  - Lump in the neck or in the cheek
  - Hoarseness that doesn’t go away

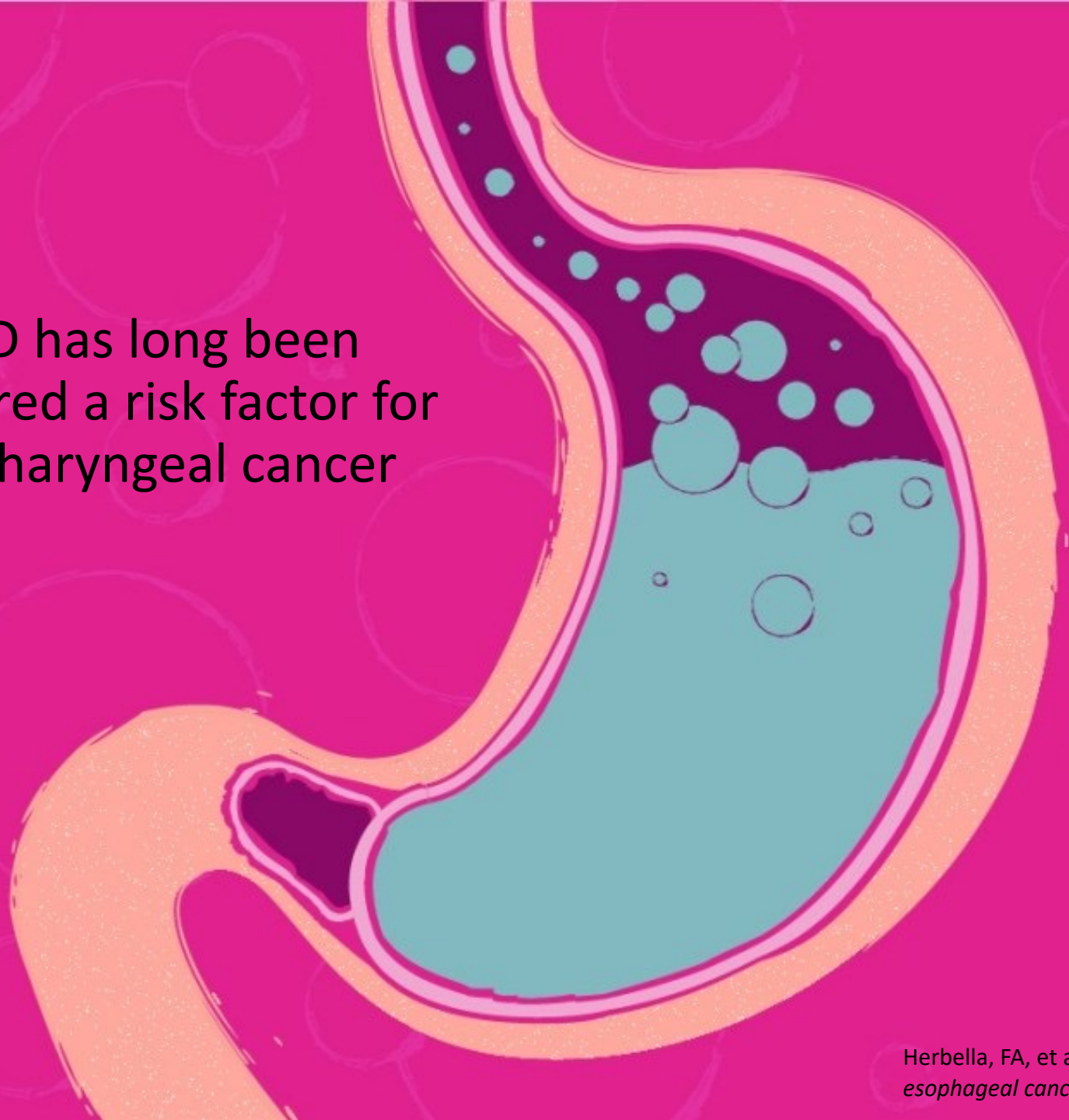


Chaturevedi AK, Engels EA, Pfeiffer RM, et al. Human papillomavirus and rising oropharyngeal cancer incidence in the United States. *J Clin Oncol.* 2011; 29:4294-4301

Head & Neck Examination

- Skin, Hair and/or nail disorders
- Variations of normal
- Tethered oral tissues
- Lymphatics
- Thyroid evaluation
- TMJ Evaluation
- Occlusion
- Airway Evaluation
- Difficulty swallowing, harsh voice, idiopathic taste disorder

GERD has long been considered a risk factor for oral/pharyngeal cancer



Melatonin supplement reduces G.E.R.D by improving sphincter function

Herbella, FA, et aJ. (2015). *Gastroesophageal reflux disease and non-esophageal cancer*. World J Gastroenterol. 21(3): 815-819

Frank’s Sign

- Demonstration of Frank’s sign is indicative of a 78% increased risk of experiencing cardiovascular disease

Haim Shmilovich , et. al. Relation of Diagonal Ear Lobe Crease to the Presence, Extent, and Severity of Coronary Artery Disease Determined by Coronary Computed Tomography Angiography The American Journal of Cardiology, Volume 109, Issue 9, 2012, 1283 - 1287

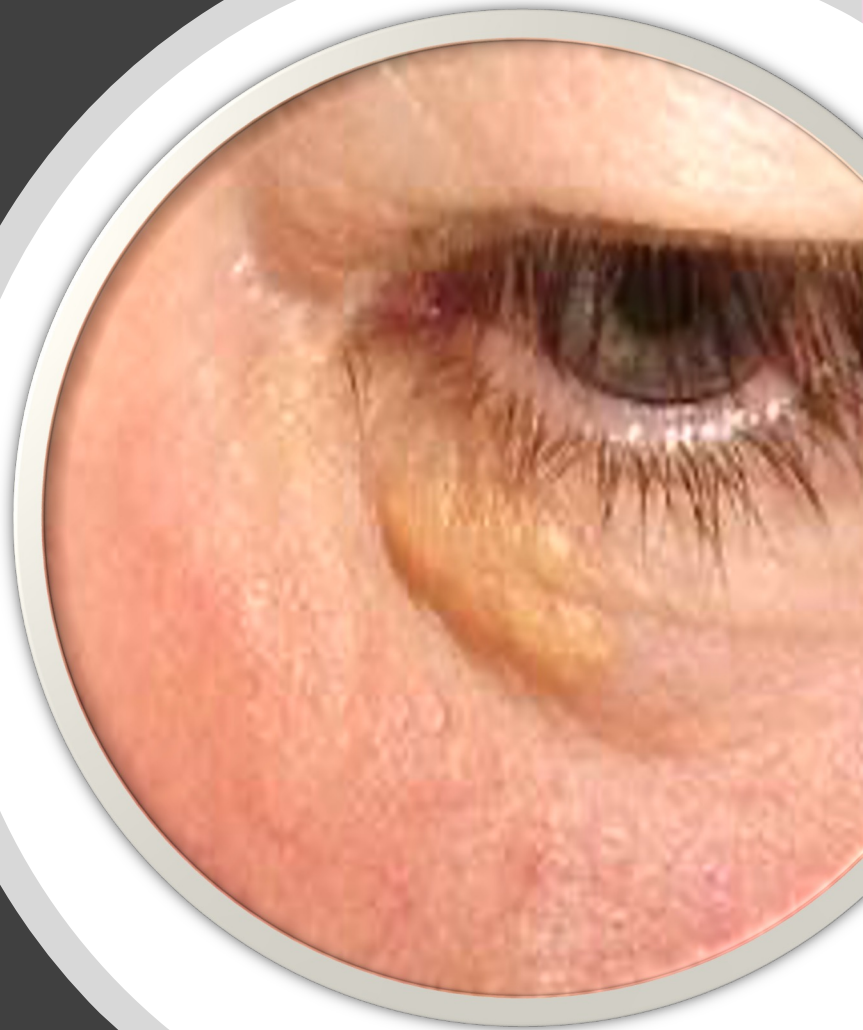
Male [and Female] Pattern Baldness

- Frontoparietal baldness is associated with a 40% increased risk of myocardial infarction
- Crown top baldness is associated with a 13% increased risk of Myocardial infarction

Christoffersen, M., et. al. (2014). Visible age-related signs and risk of ischemic heart disease in the general population: a prospective cohort study. Circulation, 129(9), 990-998.
Christoffersen, M., et. al. (2014). Visible age-related signs and risk of ischemic heart disease in the general population: a prospective cohort study. Circulation, 129(9), 990-998.

Xanthomatosis

- Xanthoma presence indicates a 48% increased risk of myocardial infarction



Christoffersen, M., et. al. (2011). Xanthelasmata, arcus corneae, and ischaemic vascular disease and death in general population: prospective cohort study. Bmj, 343. doi:10.1136/bmj.d5497

Fordyce Granules

- Fatty deposits noted in the cheek indicate a marker for hyperlipidemia
- Inquire about if the patient has had their cholesterol levels checked

Gaballah, K. Y., & Rahimi, I. (2014). Can presence of oral Fordyce's granules serve as a marker for hyperlipidemia? Dental Research Journal, 11(5), 553-558.

Tissue Tags

Presence of tissue tags can indicate a 70% increased risk that the colon may present with polyps

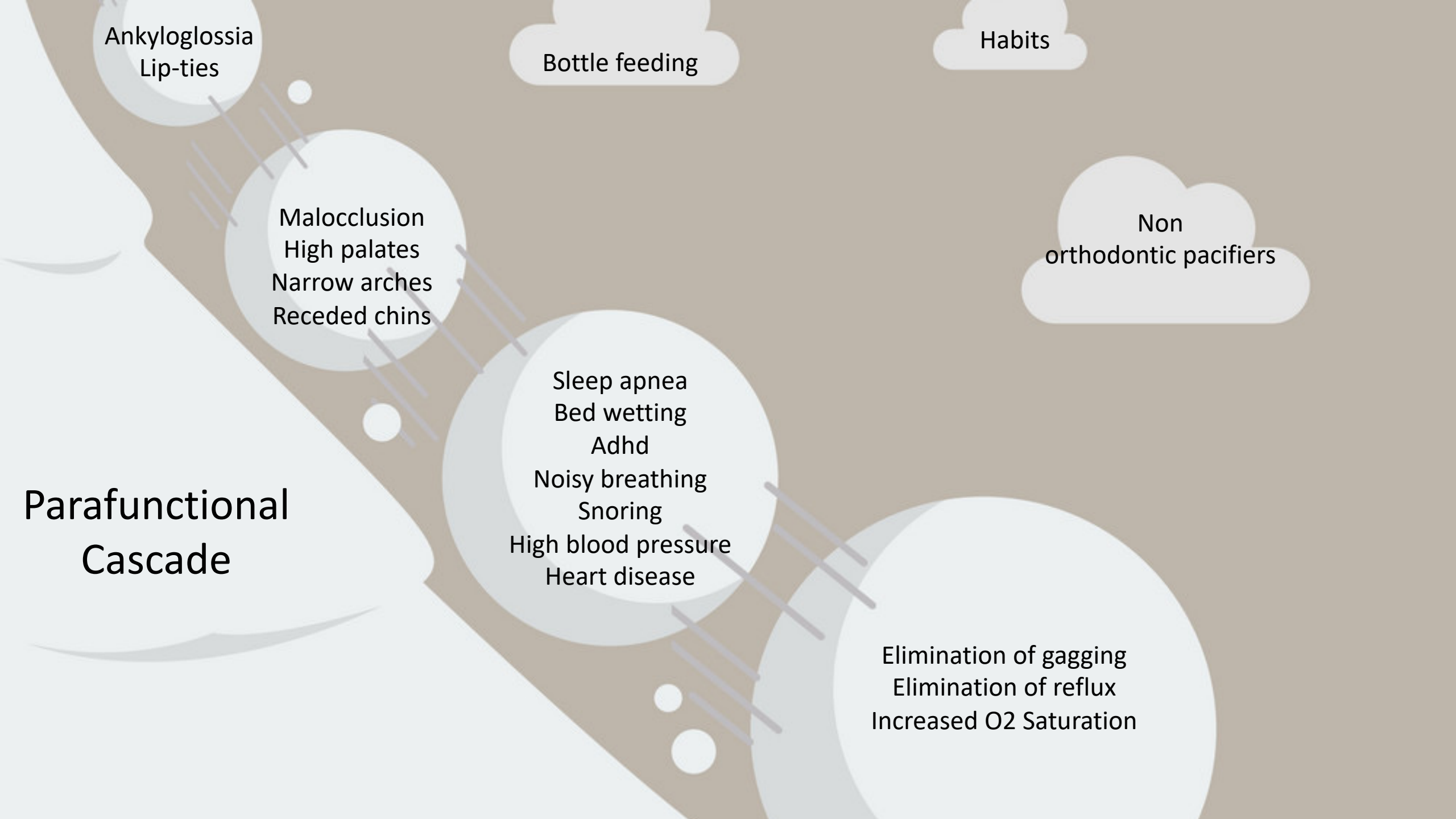
KLEIN, I., GULNAR, P., GAVALER, J. S., & DAVID H, V. A. N. T. H. I. E. L. (1982). Colonie polyps in patients with acromegaly. *Annals of Internal Medicine*, *97*(1), 27-30.

Splinter Hemorrhage

- Tiny spots of blood that appear under the nail which may indicate a damaged blood vessel
- Could be related to: bacterial endocarditis, vasculitis, diabetes, Raynaud's disease, accumulation of cholesterol or systemic diseases such as rheumatoid arthritis, psoriasis, lupus, scleroderma, peptic ulcers and malignancies

Facial Varicosities

- Injured capillaries can indicate pressure from long-term inflammation, obesity or high blood pressure
- Can also indicate weakened vessels associated which may indicate a systemic vascular problem


Ankyloglossia
Lip-ties
Bottle feeding
Habits
Malocclusion
High palates
Narrow arches
Receded chins
Non
orthodontic pacifiers
Parafunctional
Cascade
Sleep apnea
Bed wetting
Adhd
Noisy breathing
Snoring
High blood pressure
Heart disease
Elimination of gagging
Elimination of reflux
Increased O2 Saturation

Clinical Observations

- Open mouth, habitual lips-apart resting posture
- Restricted lingual frenum
- Excessive anterior overjet, open bite, under bite
- Abnormal tongue rest posture
- Distorted speech
- Drooling, poor oral control
- Nonnutritive sucking habits: pacifier use after 12 months
- Lack of a consistent linguapalatal seal during swallows

Functional classification of ankyloglossia based on tongue range of motion ratio (TRMR)

Grade 1 Functioning	Grade 2 Functioning	Grade 3 Functioning	Grade 4 Functioning
TRMR > 80%	TRMR 50-80%	TRMR < 50%	TRMR < 25%

Yoon A, et al. (2017). *Ankyloglossia as a risk factor for maxillary hypoplasia and soft palate elongation: A functional – morphological study*. Orthodontics & Craniofacial Research DOI: 10.1111/ocr.12206

Class I: Normal

Class ii: Inserting just above or in between central incisors

Class III: Beginning to insert into anterior papilla

Class IV: inserts into anterior papilla

Kotlow’s Classification of Maxillary Lip-Tie Attachments

Mallampati Classification

Using Vital Signs as an Identifier

Resting Heart Rate

Women with a resting heart rate at or above 76 bpm increased risk of heart attack by 26%

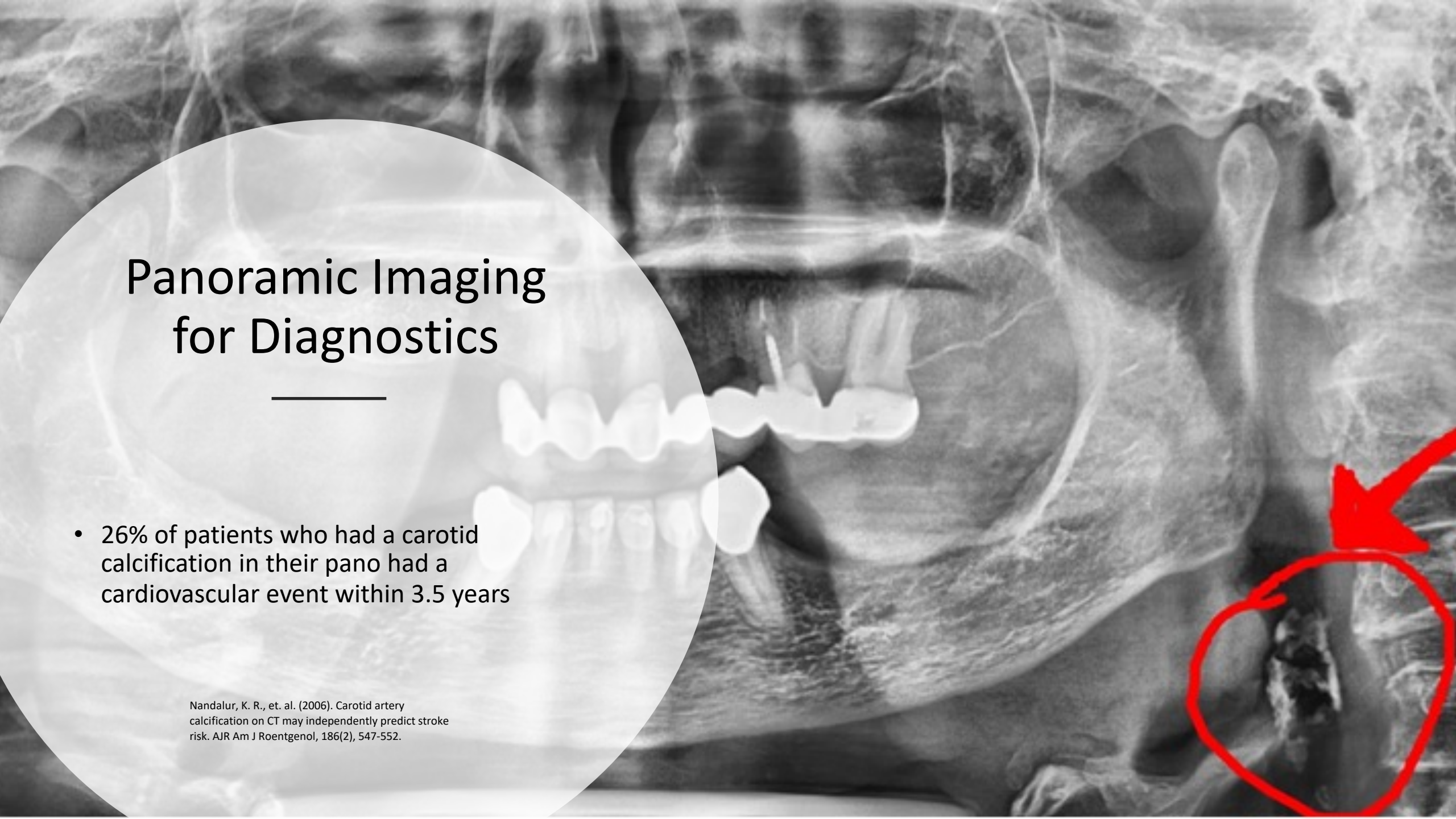
An elevated resting pulse rate indicates a high risk of a cardiovascular episode in women of all ethnic groups

Hsia J, Larson JC, Ockene JK, et al. Resting heart rate as a low tech predictor of coronary events in women: prospective cohort study. BMJ 2/4/2009; DOI:10.1136/bmj.b219.

Using Radiographs as an Identifier

Panoramic Imaging for Diagnostics

- 26% of patients who had a carotid calcification in their pano had a cardiovascular event within 3.5 years



Nandalur, K. R., et. al. (2006). Carotid artery calcification on CT may independently predict stroke risk. AJR Am J Roentgenol, 186(2), 547-552.

Systemic Diseases on Radiographs

- Osteoporosis: thin porous cortical bone lamellae
- Hyperparathyroidism: seen in unilocular cystic lesions, loss of lamina dura. Lamina dura will reconstitute following removal of a parathyroid tumor.

- Tuberculosis: sinus tracts are developed following infection, sequestration of necrotic bone can occur
- Syphillis: depression of subperiosteal new bone along the inferior border of the mandible resulting in large radiolucent areas

Watanabe, P. C. A., Farman, A., de Carvalho Watanabe, M. G., & Mardegan Issa, J. P. (2008). Radiographic Signals Detection of Systemic Disease. Orthopantomographic Radiography. *International Journal of Morphology*, *26*(4).

Modern Tooth

Normal Pulp Horns

Archaeological Tooth

Chair Shaped Pulp Horns

Dental History Review

Frequency of Visits

Evaluate: has this been efficient for the patient?

History of Treatment

Identify history of past dental treatment

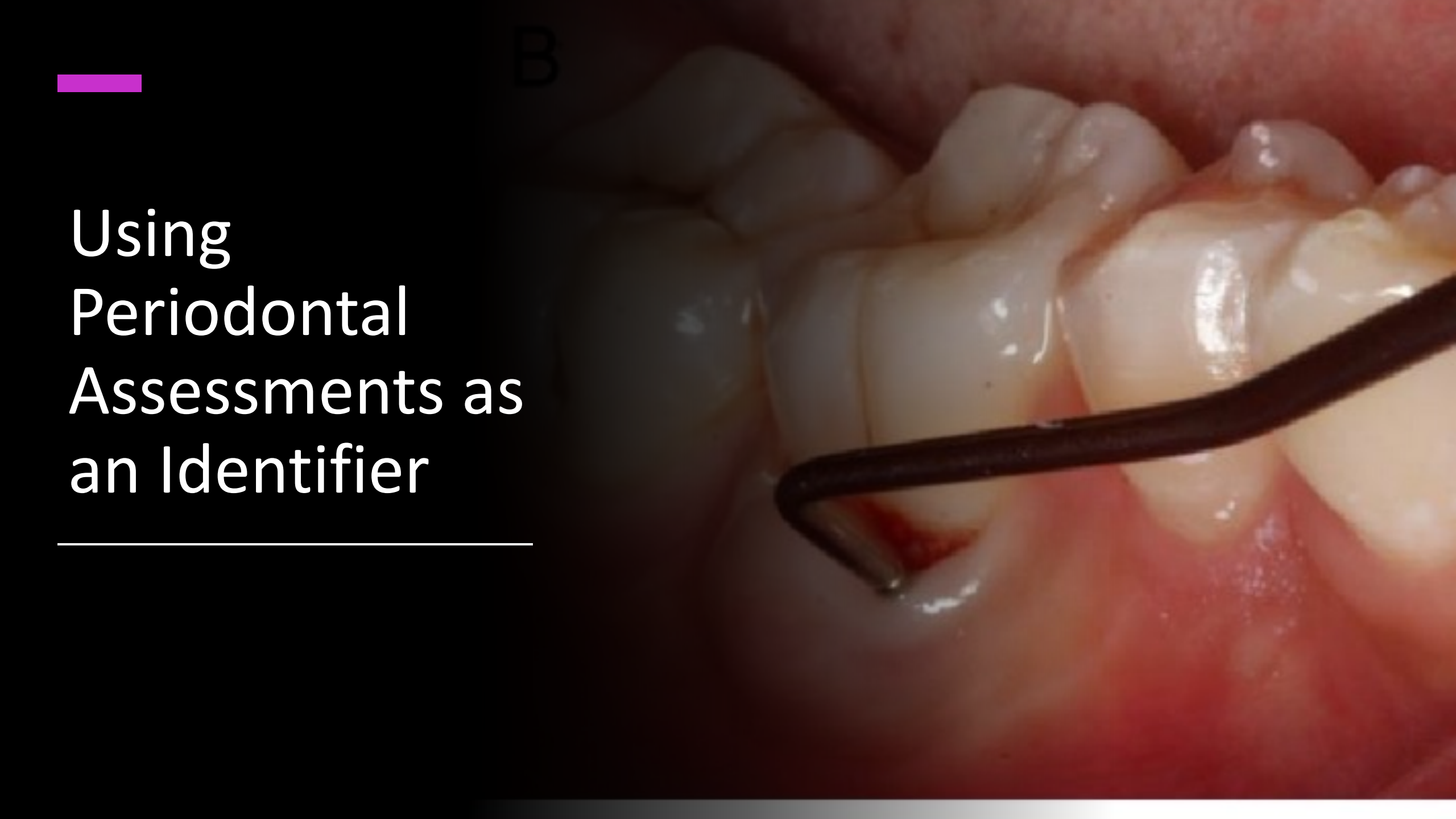
Response to Treatment

Identify patient-specific response to dental treatment

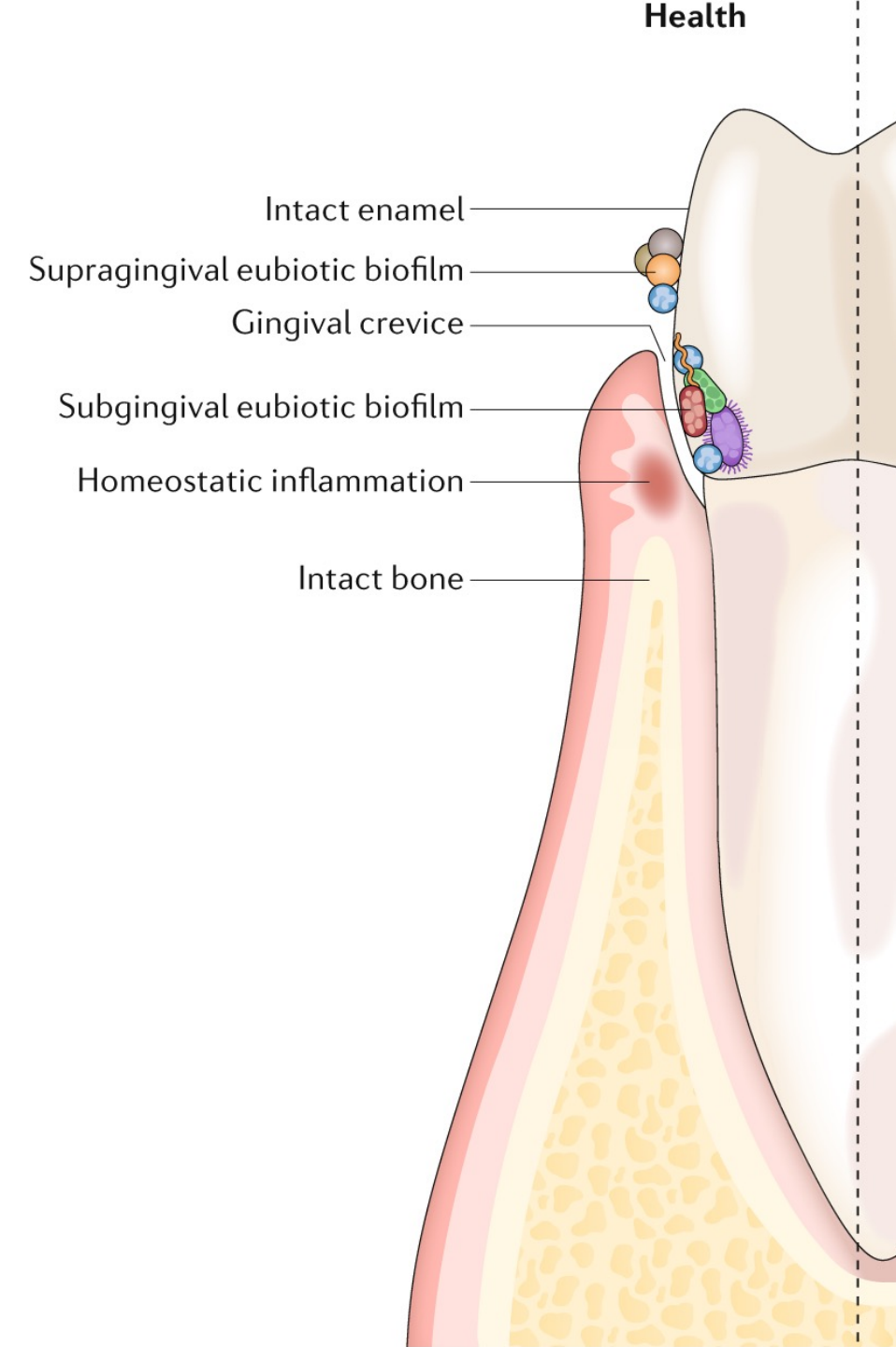
Genetic History

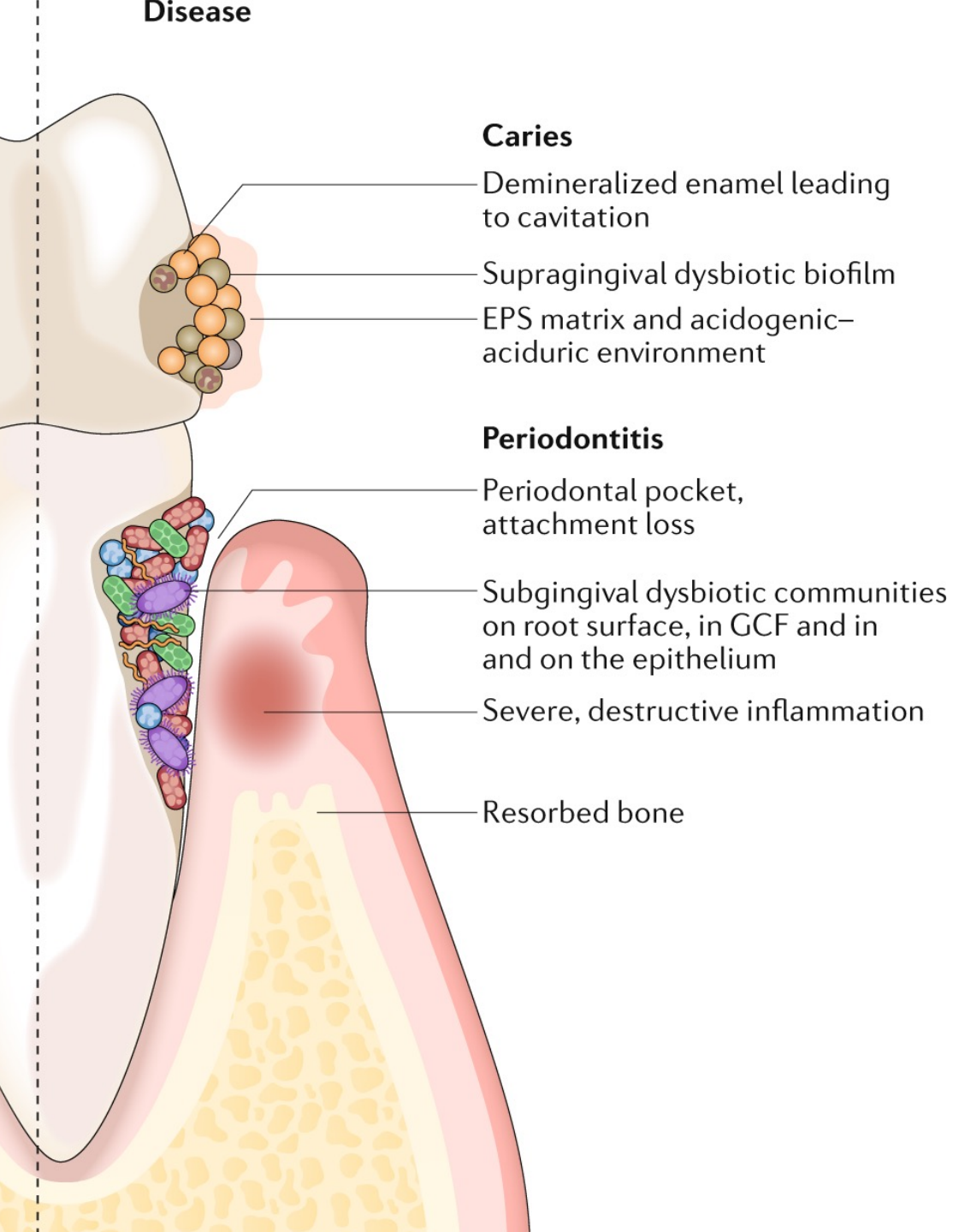
Evaluate potential genetic components linked to dental history

Using Periodontal Assessments as an Identifier

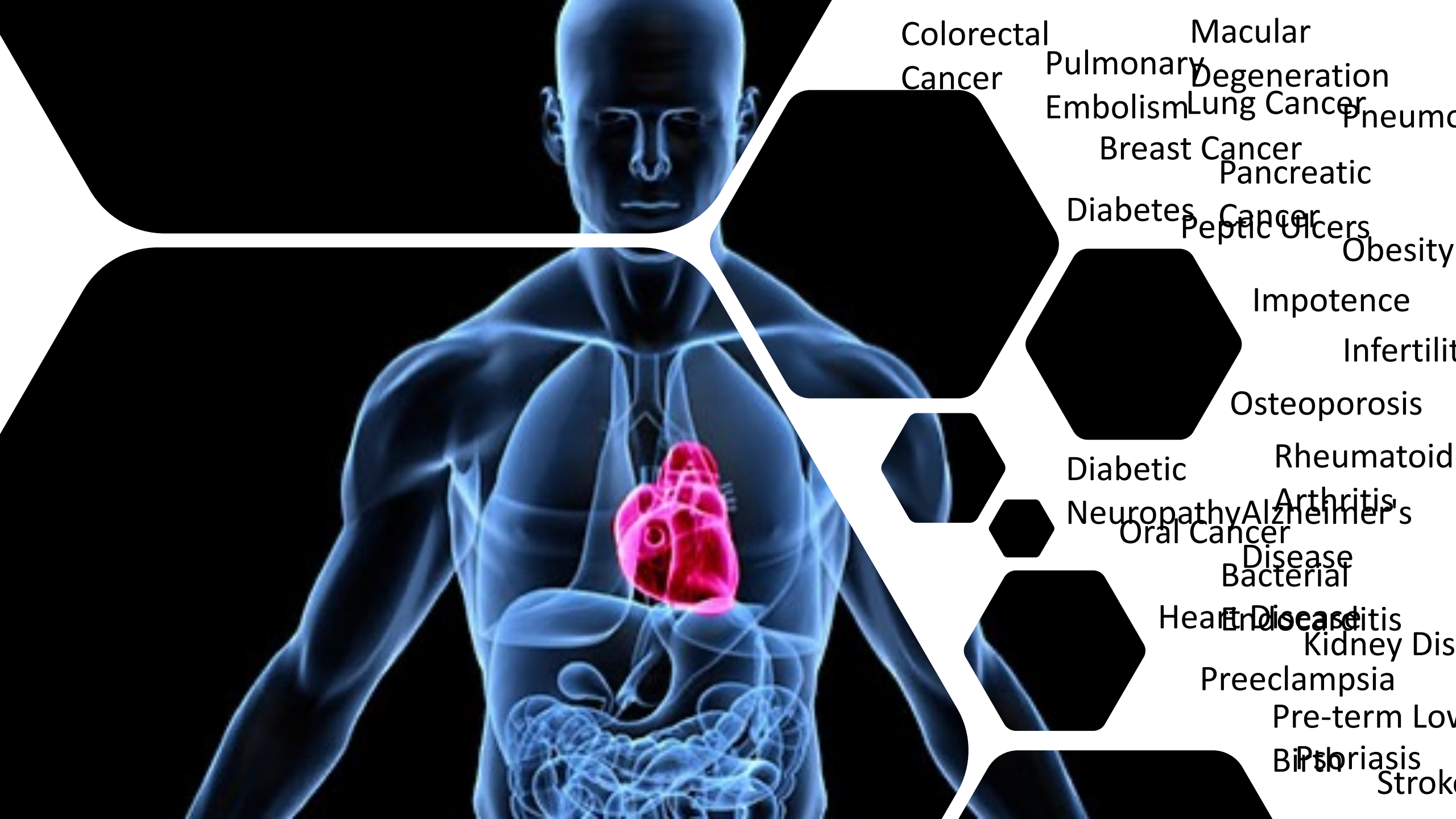


The Healthy Periodontium





The Diseased Periodontium


Colorectal Cancer
Macular Degeneration
Pulmonary Embolism
Lung Cancer
Pneumo
Breast Cancer
Pancreatic Cancer
Diabetes
Peptic Ulcers
Obesity
Impotence
Infertilit
Osteoporosis
Rheumatoid Arthritis
Diabetic Neuropathy
Alzheimer's Disease
Oral Cancer
Bacterial Endocarditis
Heart Disease
Kidney Dis
Preeclampsia
Pre-term Lov
Psoriasis
Birth
Stroke

Periodontal infection and inflammation, as well as common genetic and acquired risk factors, are the scientific basis that explains the biological plausibility of the associations between periodontitis and systemic diseases.

Currently, up to 57 diseases and conditions have been studied with regards to their connection with periodontitis

1. Van Dyke TE, van Winkelhoff AJ. Infection and inflammatory mechanisms. J Clin Periodontol 2013; 40 (Suppl. 14): S1–S7. doi: 10.1111/jcpe.12088.
2. Monsarrat P et al. Clinical research activity in periodontal medicine: a systematic mapping of trial registers. J Clin Periodontol 2016; 43: 390–400.

Biofilm

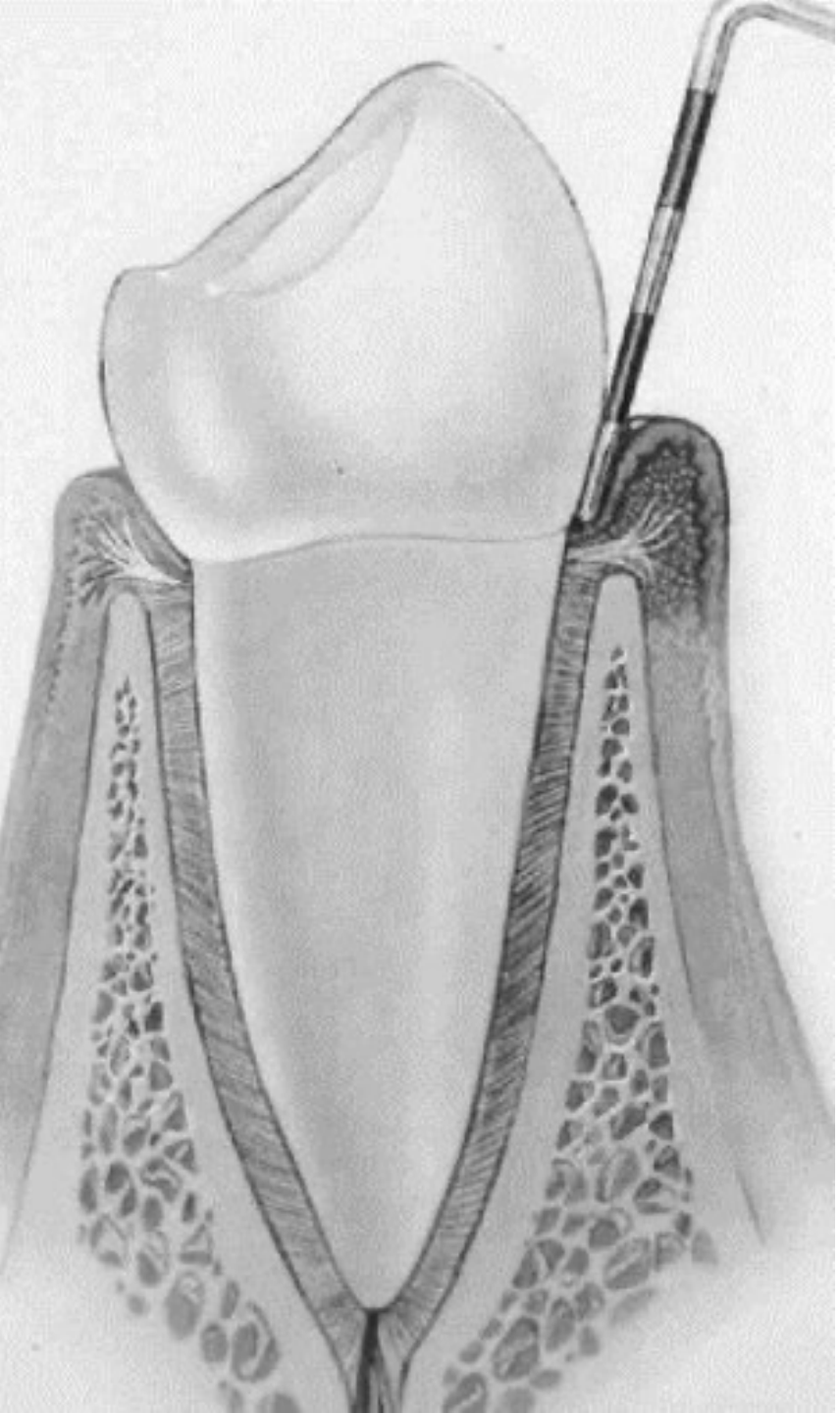
↓

Host inflammatory response

↙ ↘

Local effects

Systemic Inflammation

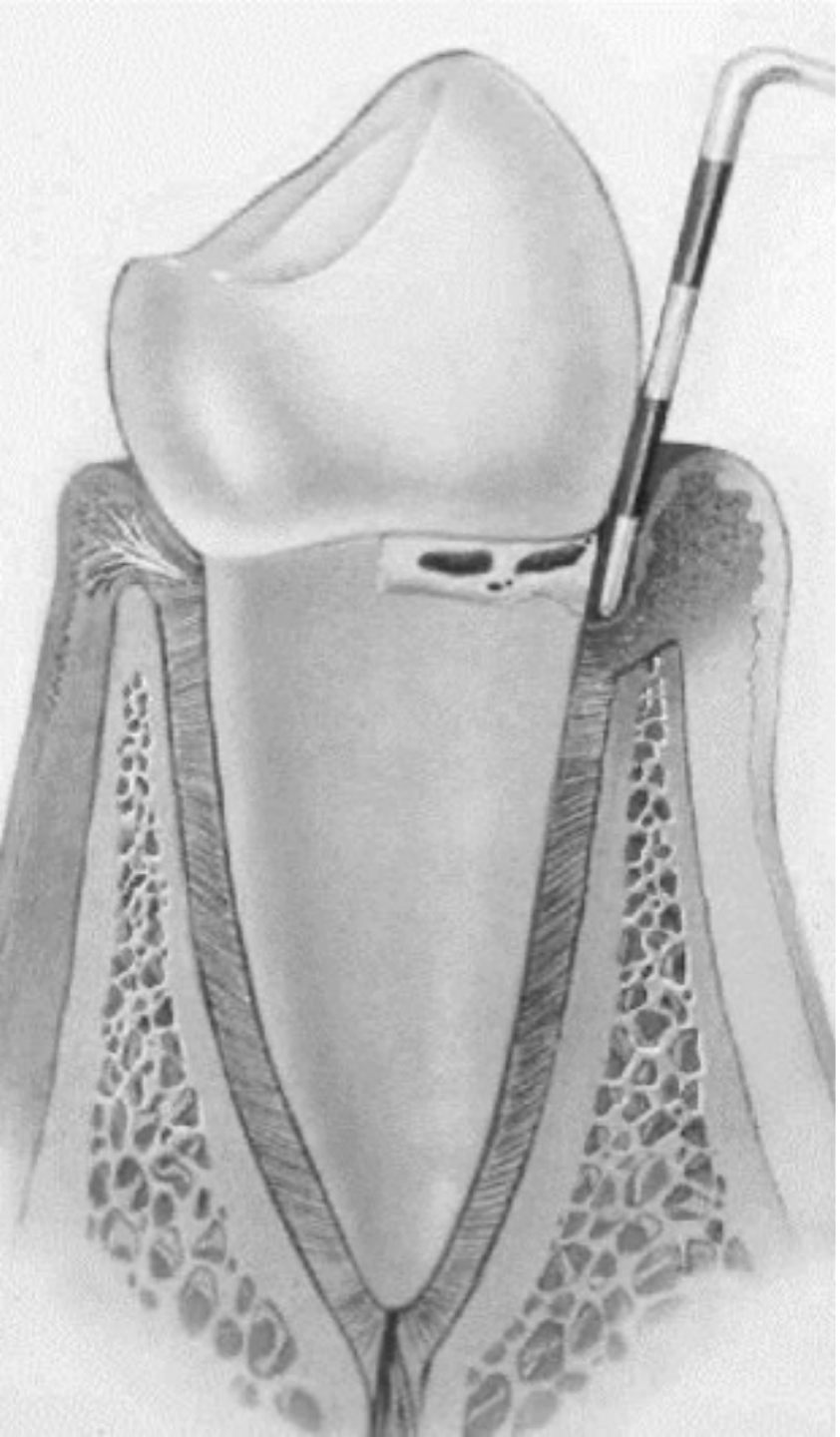


Stage I

Earliest stages of attachment loss

		Stage I
Severity	Interdental CAL	1-2mm
	RBL	Coronal third (<15%)
	Tooth loss	None
Complexity	Local	Max probing depth 4mm Mostly horizontal bone loss

Tonetti MS, Greenwell H, Kornman KS. Staging and grading of periodontitis: Framework and proposal of a new classification and case definition. *J Periodontol.* 2018; 89 (Suppl 1): S159-S172.

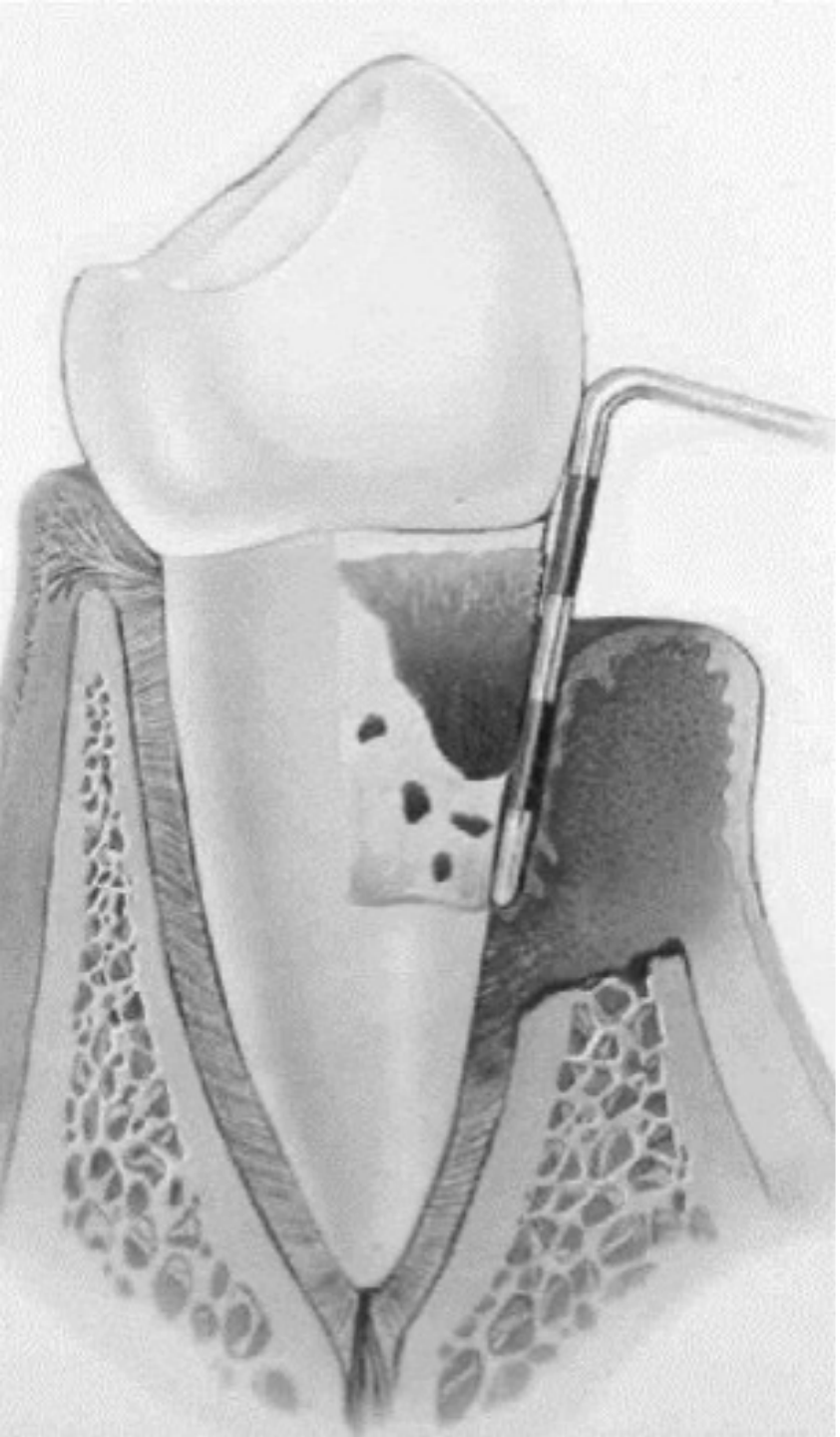


Stage II

Opportunity for clear intervention and subsequent monitoring

		Stage II
Severity	Interdental CAL	3-4 mm
	RBL	Coronal third (15-33%)
	Tooth loss	None
Complexity	Local	Max probing depth 5mm Mostly horizontal bone loss

Tonetti MS, Greenwell H, Kornman KS. Staging and grading of periodontitis: Framework and proposal of a new classification and case definition. *J Periodontol.* 2018; 89 (Suppl 1): S159-S172.

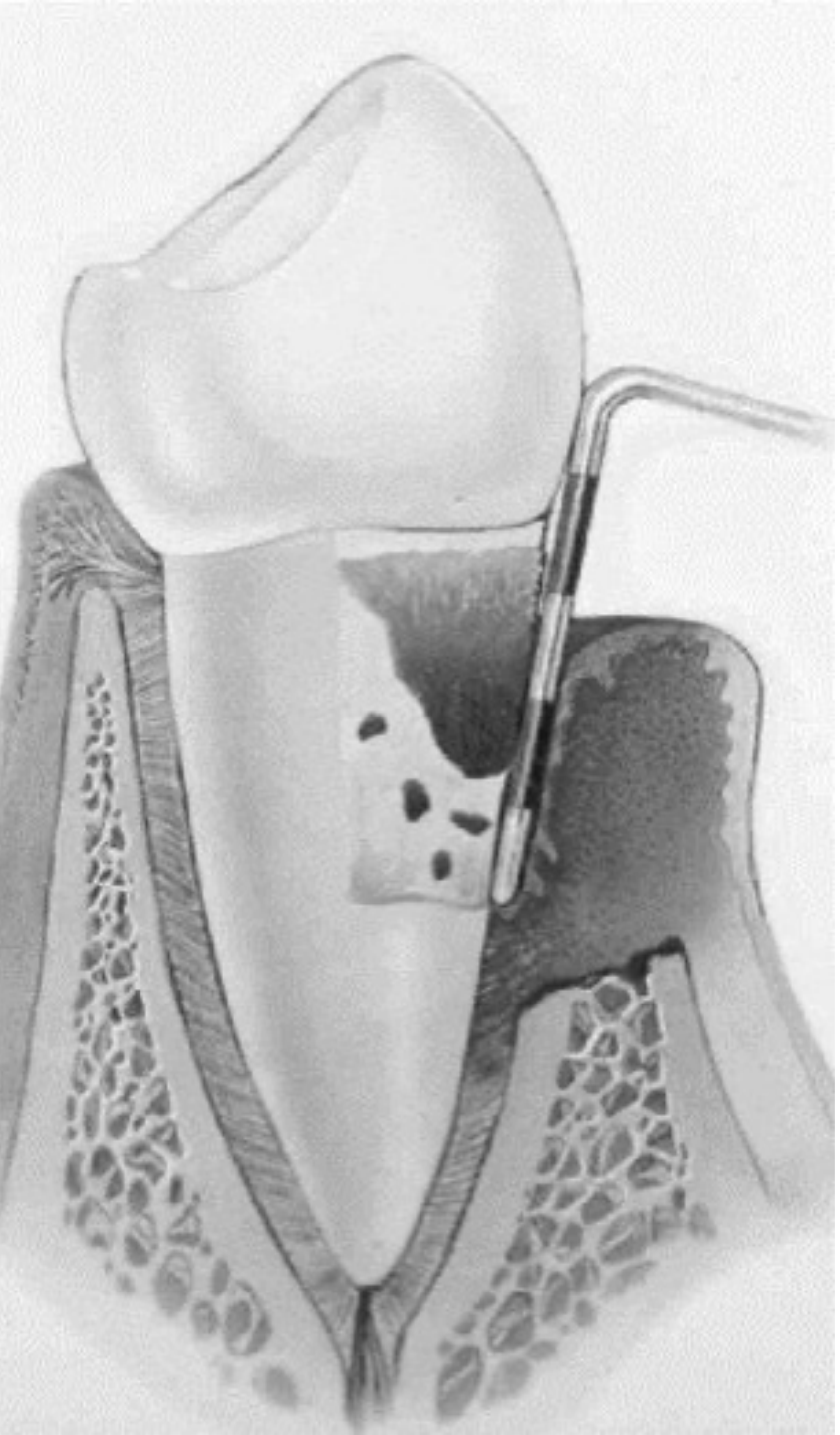


Stage III

Characterized by deep lesions that extend into the middle portion of the root and whose management is complicated

		Stage III
Severity	Interdental CAL	5 mm or less
	RBL	Extending to mid-third of root and beyond
	Tooth loss	Less than or equal to 4 teeth
Complexity	Local	In addition to Stage II: Probing depth 6mm+ Vertical bone loss Furcation involvement cls II or III Moderate ridge defect

Tonetti MS, Greenwell H, Kornman KS. Staging and grading of periodontitis: Framework and proposal of a new classification and case definition. *J Periodontol.* 2018; 89 (Suppl 1): S159-S172.

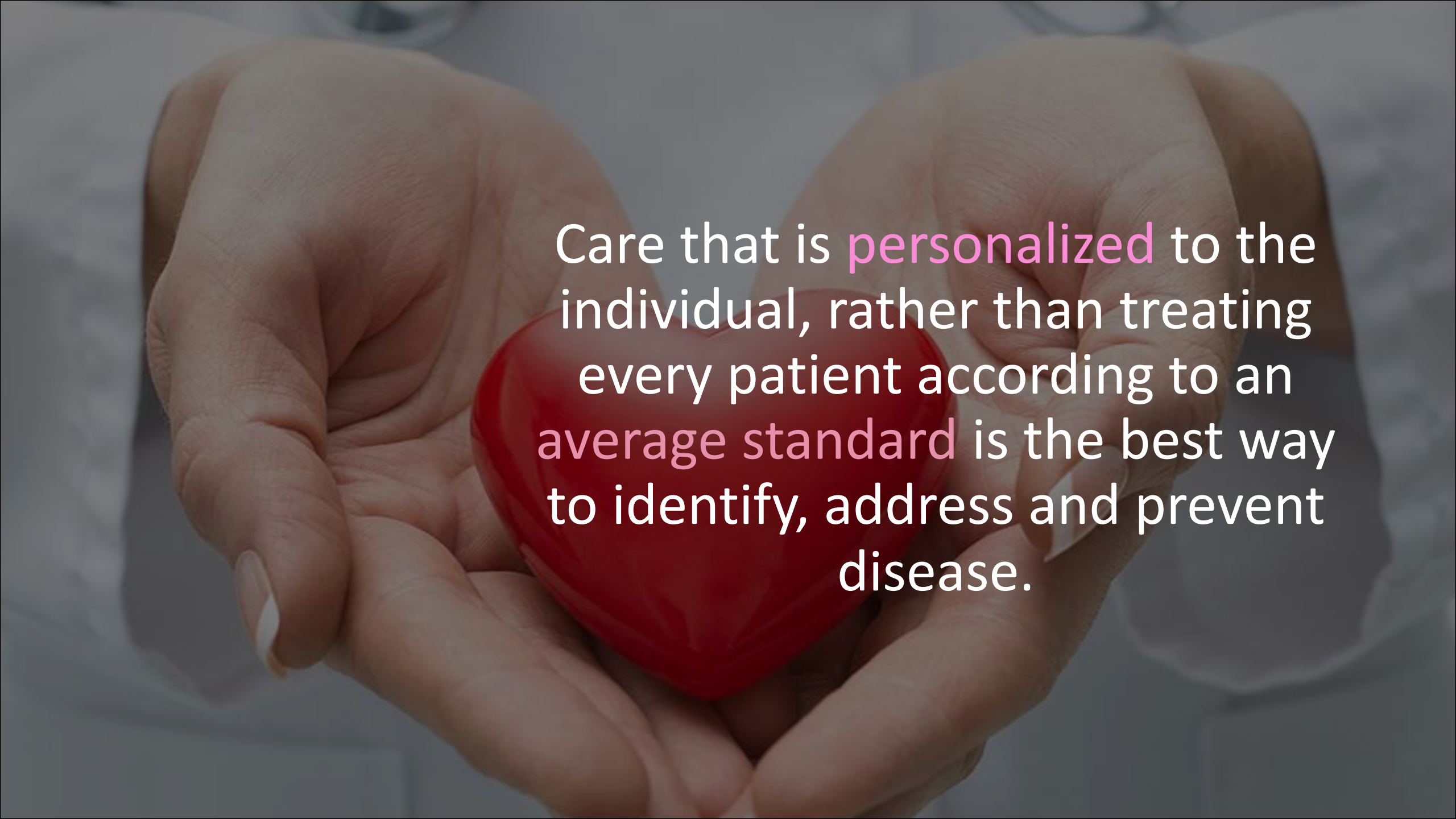


Stage IV

Translates to loss of masticatory function

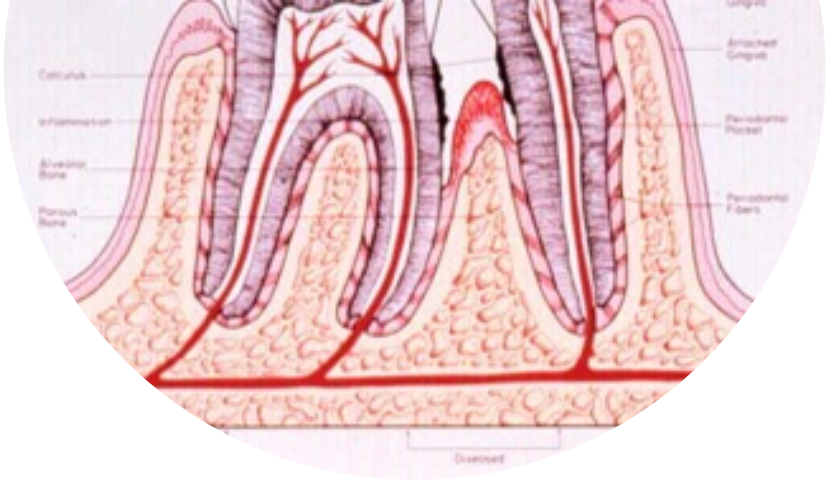
		Stage III
Severity	Interdental CAL	5 mm or more
	RBL	Extending to mid-third of root and beyond
	Tooth loss	5 or more teeth
Complexity	Local	In addition to stage III: Need complex rehabilitation due to: Masticatory dysfunction Secondary occlusal trauma Severe ridge defect Bite collapse, drifting, flaring Less than 20 remaining teeth

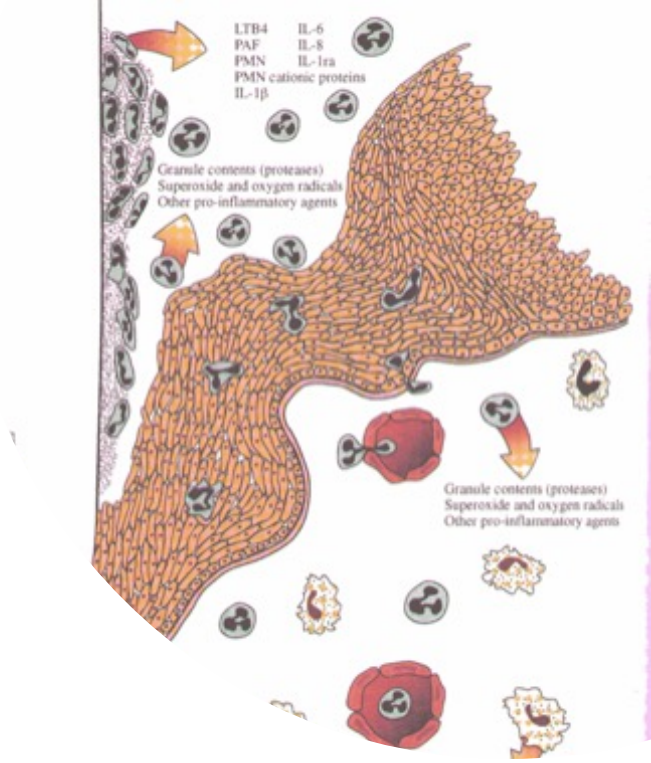
Tonetti MS, Greenwell H, Kornman KS. Staging and grading of periodontitis: Framework and proposal of a new classification and case definition. *J Periodontol.* 2018; 89 (Suppl 1): S159-S172.

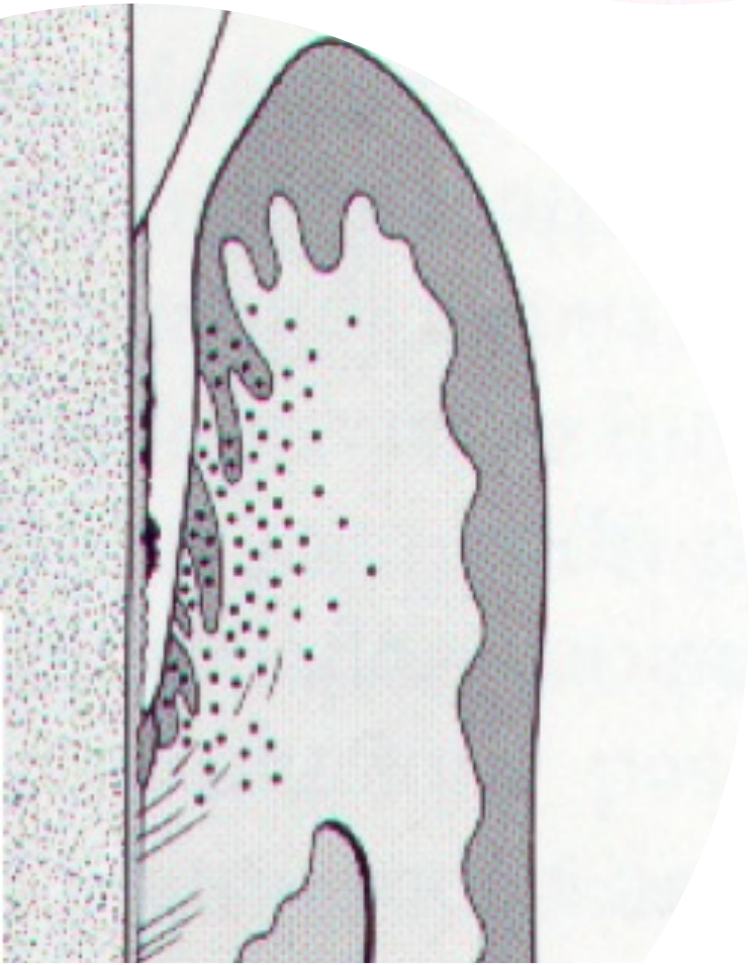

Care that is personalized to the individual, rather than treating every patient according to an average standard is the best way to identify, address and prevent disease.

Considering progression rate, predicted response and general health or systemic disease is critical for precision medicine.

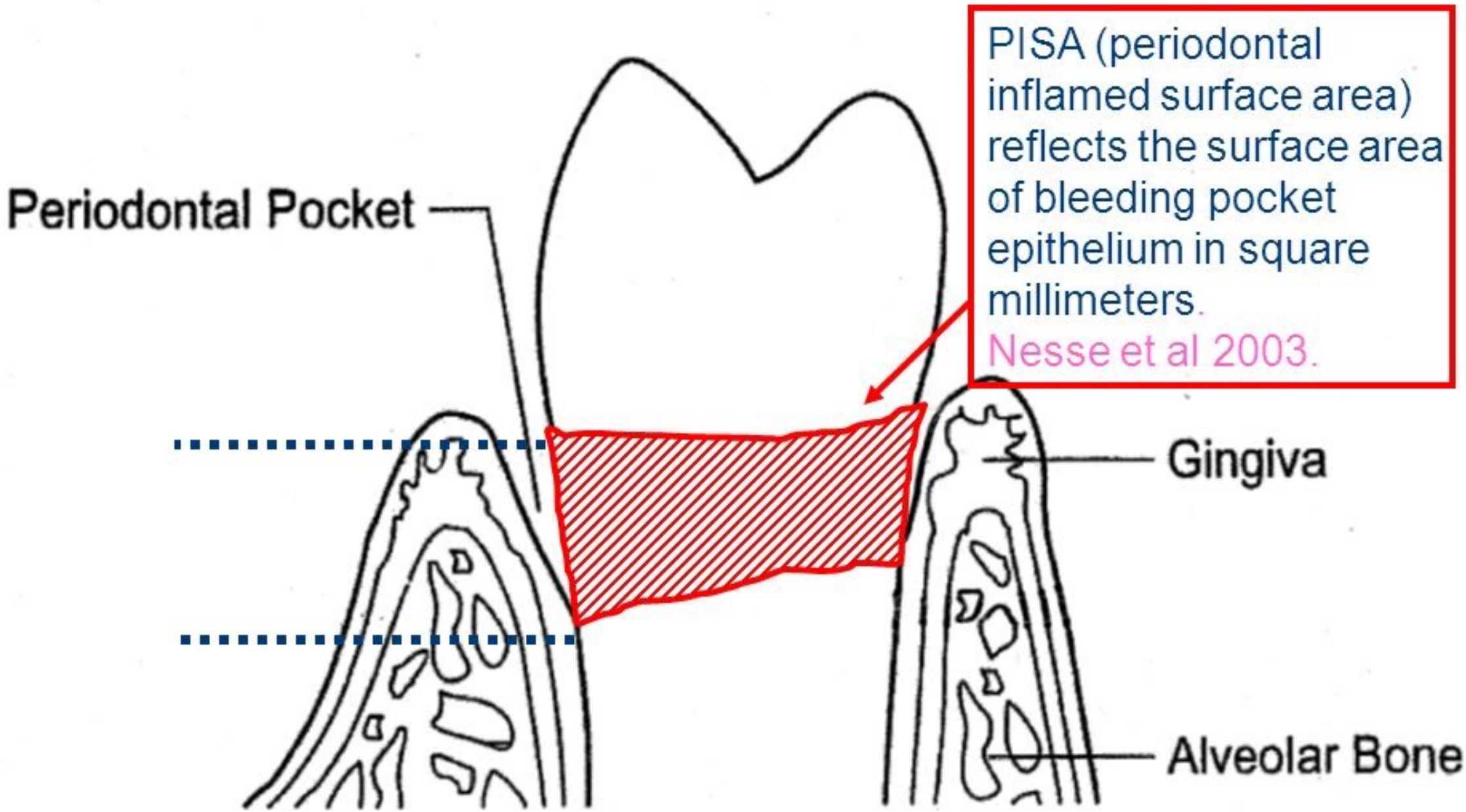
REFERENCE: Tonetti, MS, Greenwell, H, Kornman, KS. Staging and grading of periodontitis: Framework and proposal of a new classification and case definition. *J Periodontol*. 2018; 89(Suppl 1): S159– S172. https://doi.org/10.1002/JPER.18-0006





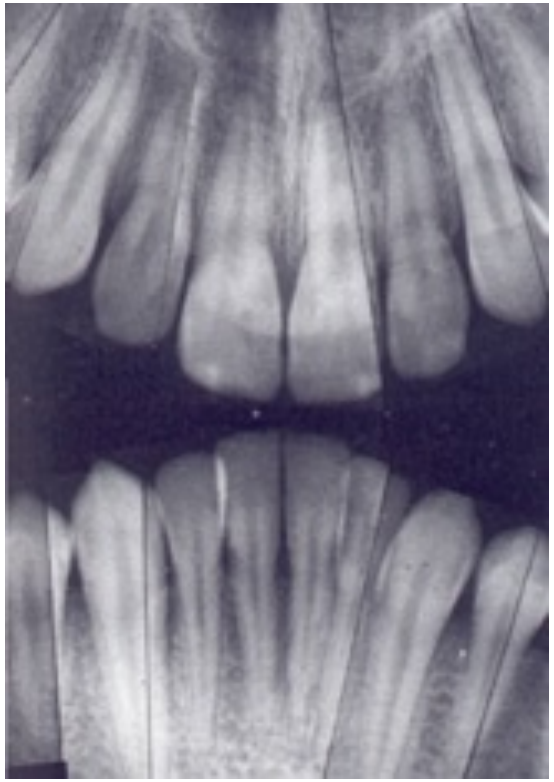


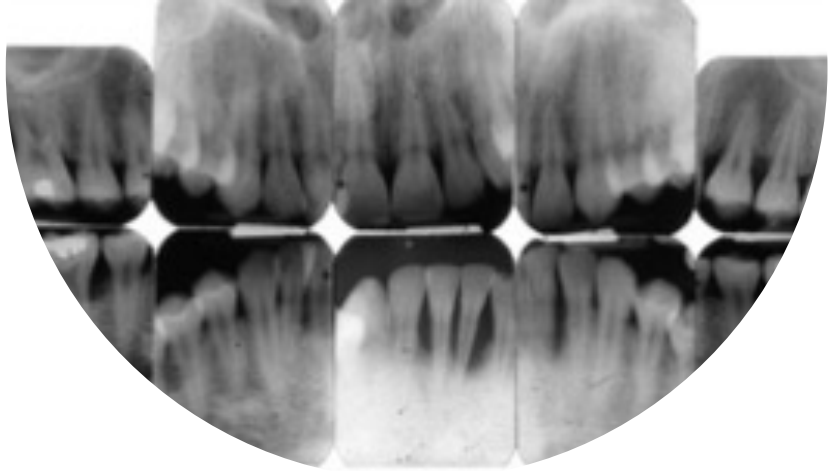
INSIDE the Periodontal Pocket


PISA (periodontal inflamed surface area) reflects the surface area of bleeding pocket epithelium in square millimeters.
Nesse et al 2003.
Periodontal Pocket
Gingiva
Alveolar Bone

PISA: Gingival Health

- Periodontal Inflamed Surface Area (PISA)
- Ulcerated area within the gingival sulcus/pocket
- PISA = 0.3 cm^2 (approximately 0.05 $inches^2$)

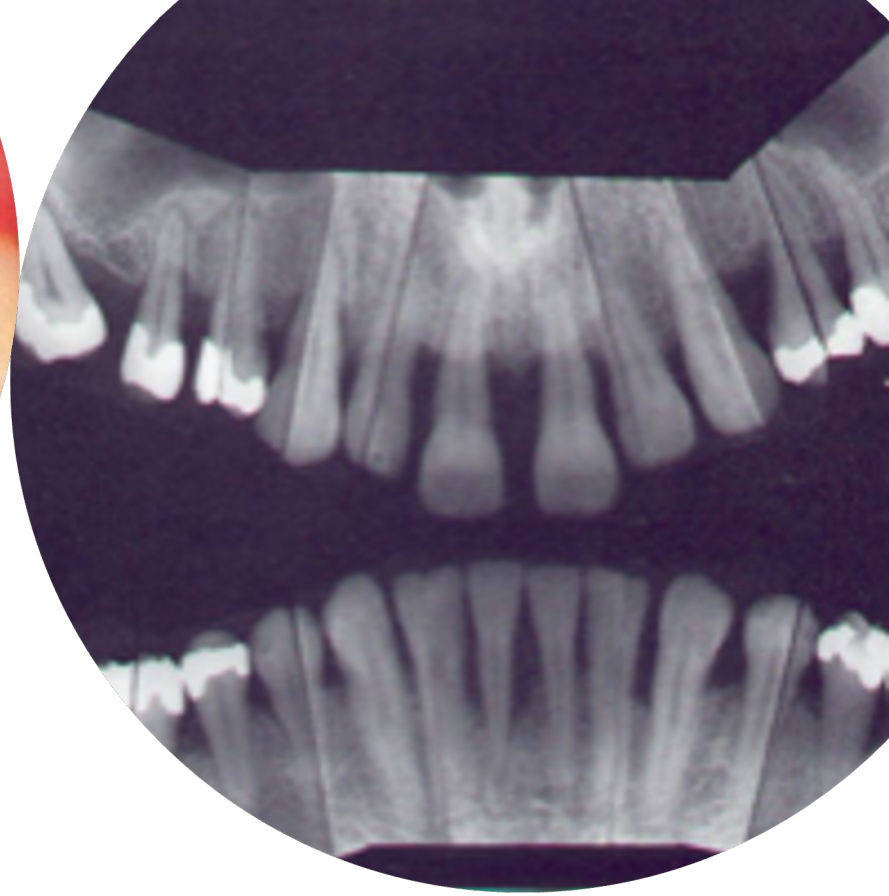




PISA: Localized Severe Chronic Periodontitis

Periodontitis Stage 3, Grade B/C, Localized Distribution

PISA = 10 cm^2 (approx



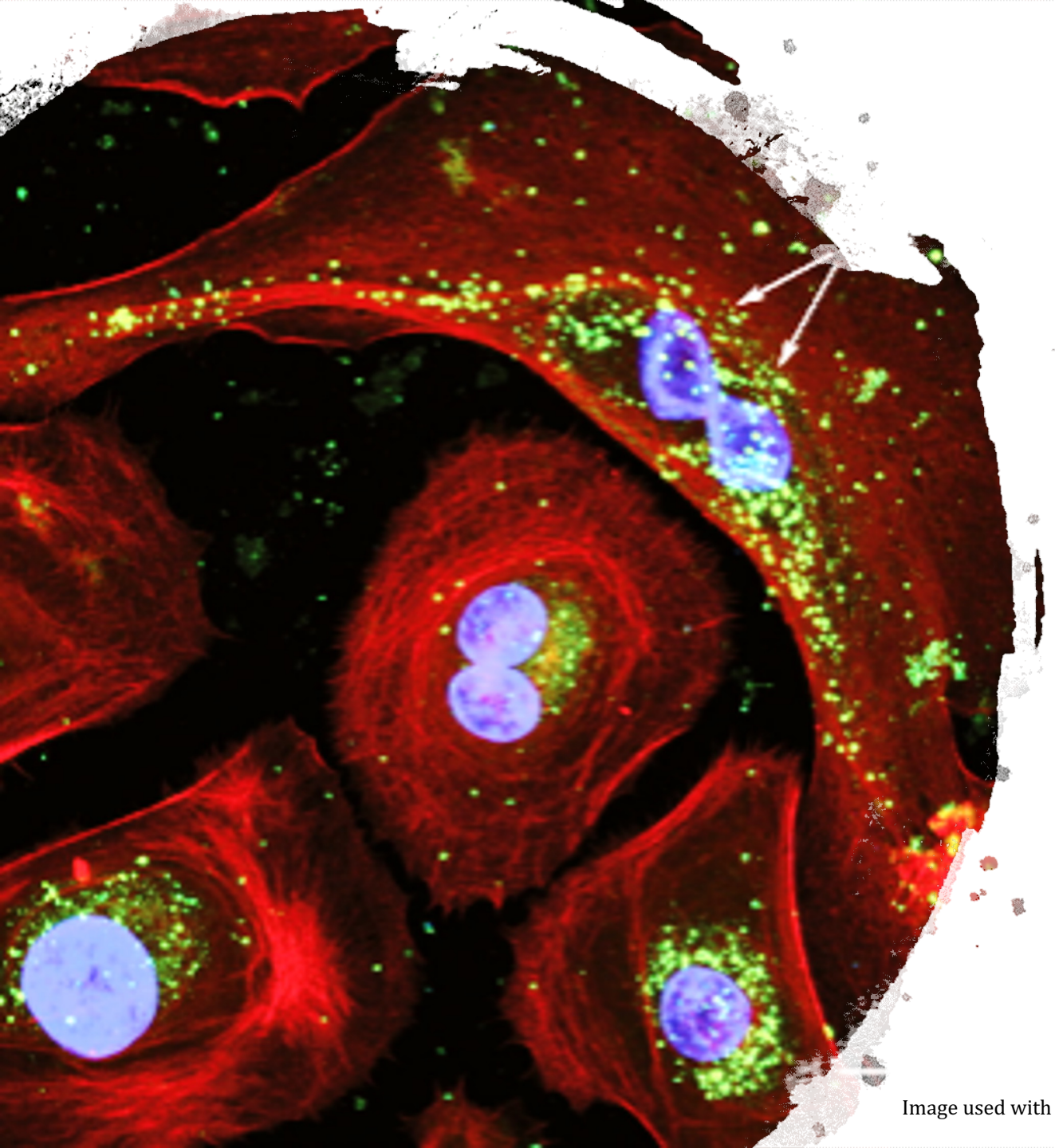
PISA: Generalized Severe Chronic Periodontitis

Periodontitis Stage 3/4, Grade B/C, Generalized Distribution

PISA = 37 cm^2 (approximately 5.7 $inches^2$)

Periodontitis As A Manifestation Of Systemic Disease

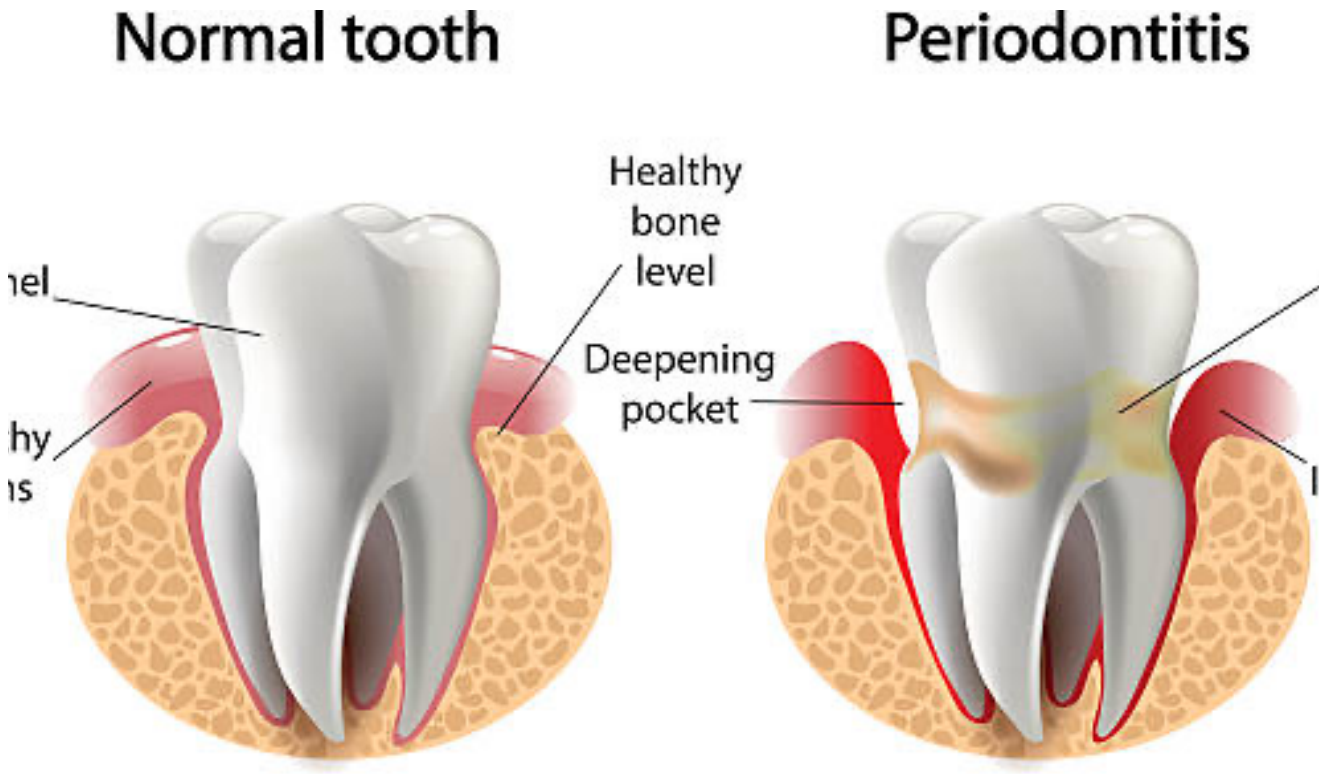
Familial and cyclic neutropenia	TRISOMY 21	Leukocyte adhesion deficiency syndrome	Papillon-LeFevre syndrome
Chediak-Higashi syndrome	Histiocytosis syndromes	Glycogen storage disease	Infantile genetic agranulocytosis
Cohen syndrome	Ehlers-Danlos syndrome	Hypophosphatasia	Associated with hematological disorders: Acquired neutropenia



Bacteria are Tissue Invasive

Image used with permission by Dr. Denise Gay, Naples, Florida

Comprehensive Periodontal Assessments

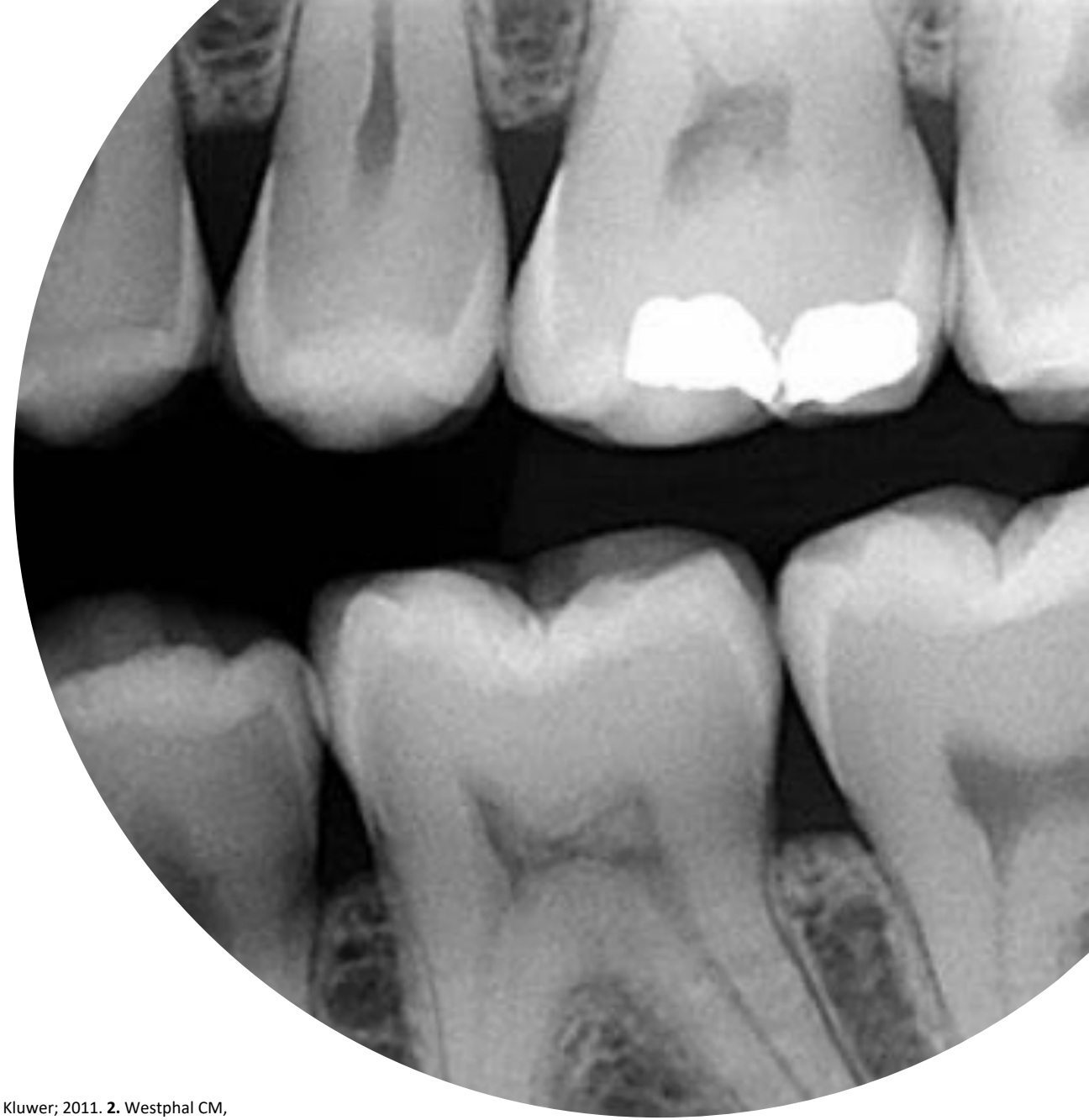


- Periodontal Charting
  - Pocket depth
  - Bleeding points
  - Recession Points
  - Furcation Involvement
  - Mobility
- Gingival Assessments
  - Color, contour, consistency, texture
  - Enlargement
  - Malodor, pain
- Deposit Assessment
  - Calculus, plaque, materia alba, food impaction, stain

Radiograph Assessment

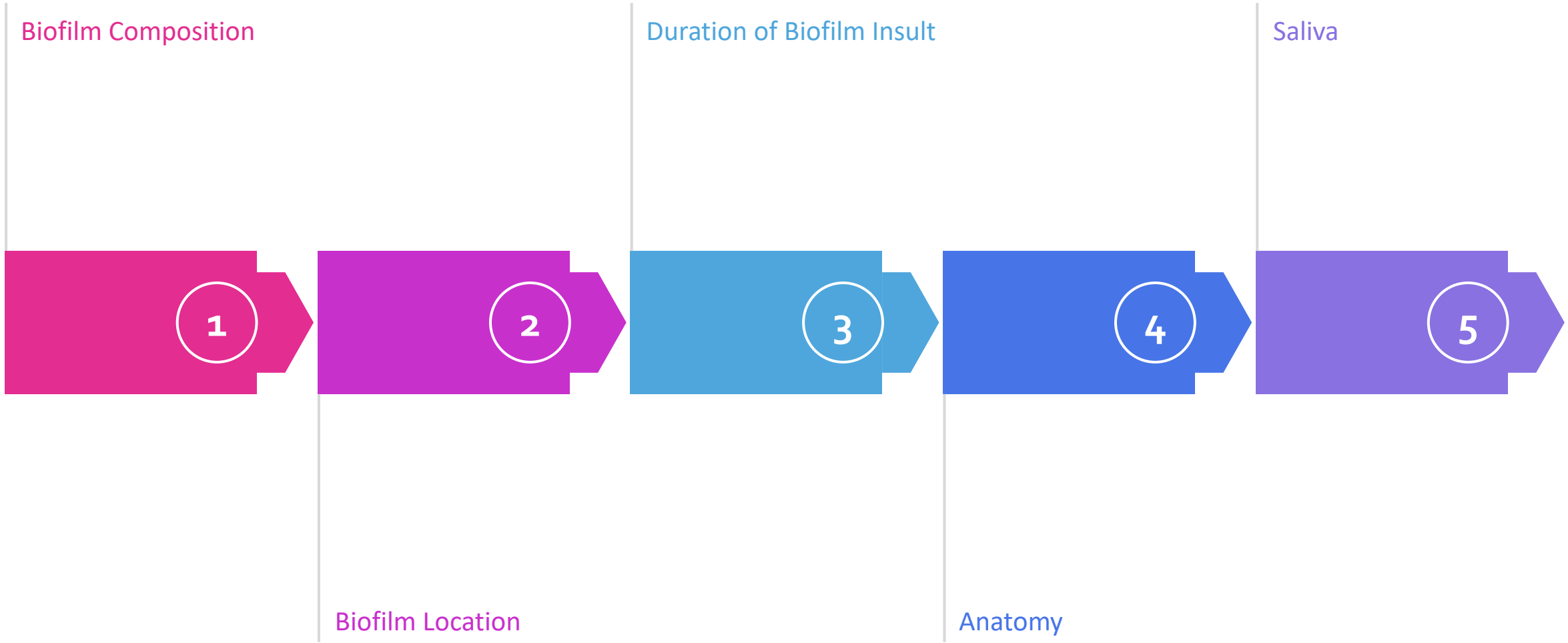
- Early attachment loss is NOT seen on radiographs[1]
- Bone loss can only be identified radiologically when approximately 30-50% of the bone has been demineralized[2]
- Radiographically, the cortical bone plates may hide slight bone loss[1]

- Stage I periodontitis is defined as radiologic bone loss of less than 15% of the coronal third[3]



REFERENCES: 1. Gehrig JS, Willmann DE, eds. *Foundations of Periodontics for the Dental Hygienist*. 3rd ed. Philadelphia, PA: Wolters Kluwer; 2011. **2.** Westphal CM, Weinberg MA, Froum SJ, Segelnick S, eds. *Comprehensive Periodontics for the Dental Hygienist*. 4th ed. Upper Saddle River, NJ: Pearson; 2015. **3.** Tonetti MS, Greenwell H, Kornman KS. Staging and grading of periodontitis: framework and proposal of a new classification and case definition. *J Periodontol.* 2018;89(suppl 1):S159-S172.

Oral Hygiene Status



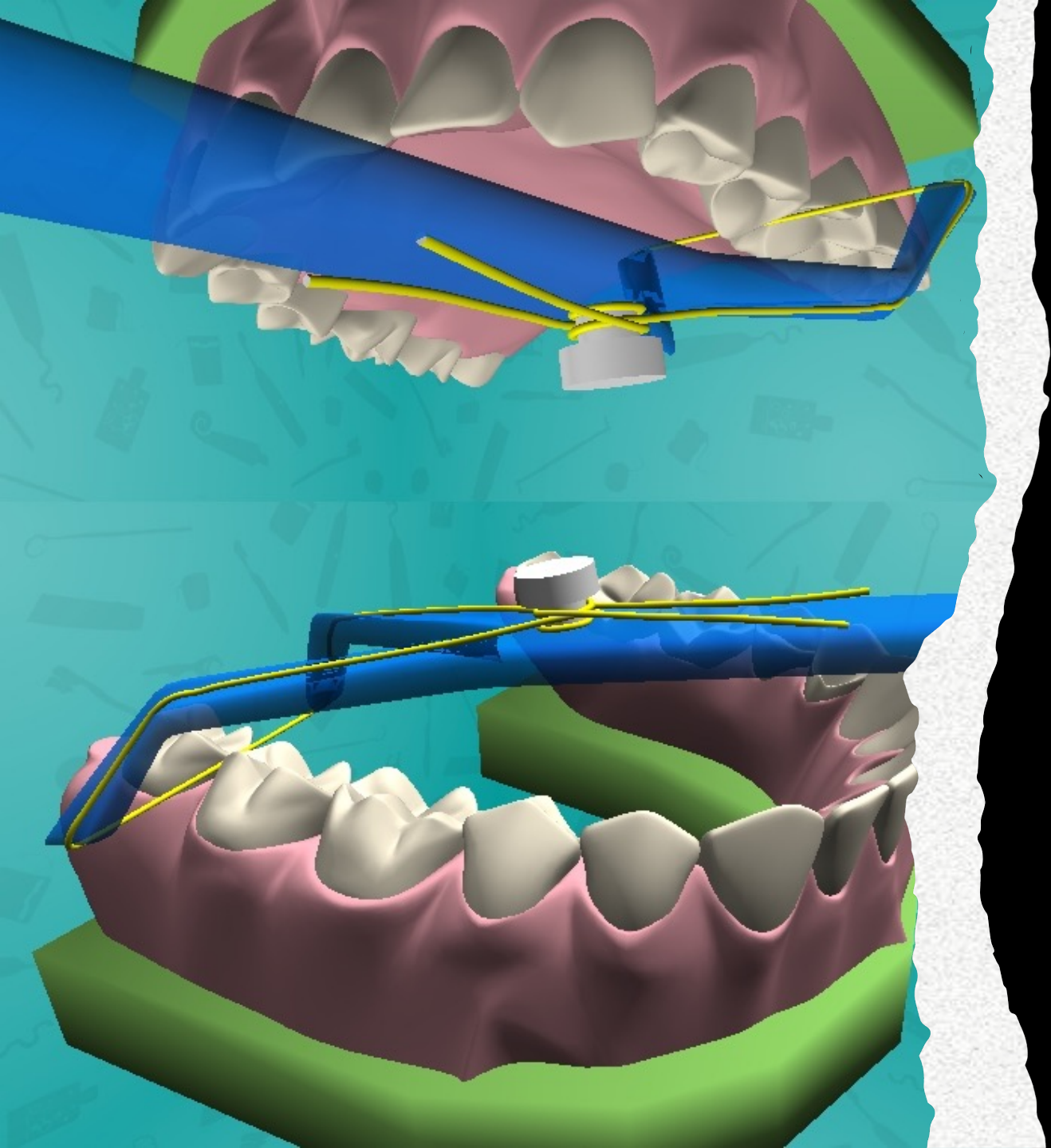
REFERENCE: 1. AlJehani YA. Risk factors of periodontal disease: review of the literature. *Int J Dent.* 2014:18523.

Inflammatory Predictors

INFLAMMATORY BURDEN
(hsCRP)

BIOMARKERS

BACTERIAL TESTING



Generation of Bacteremia

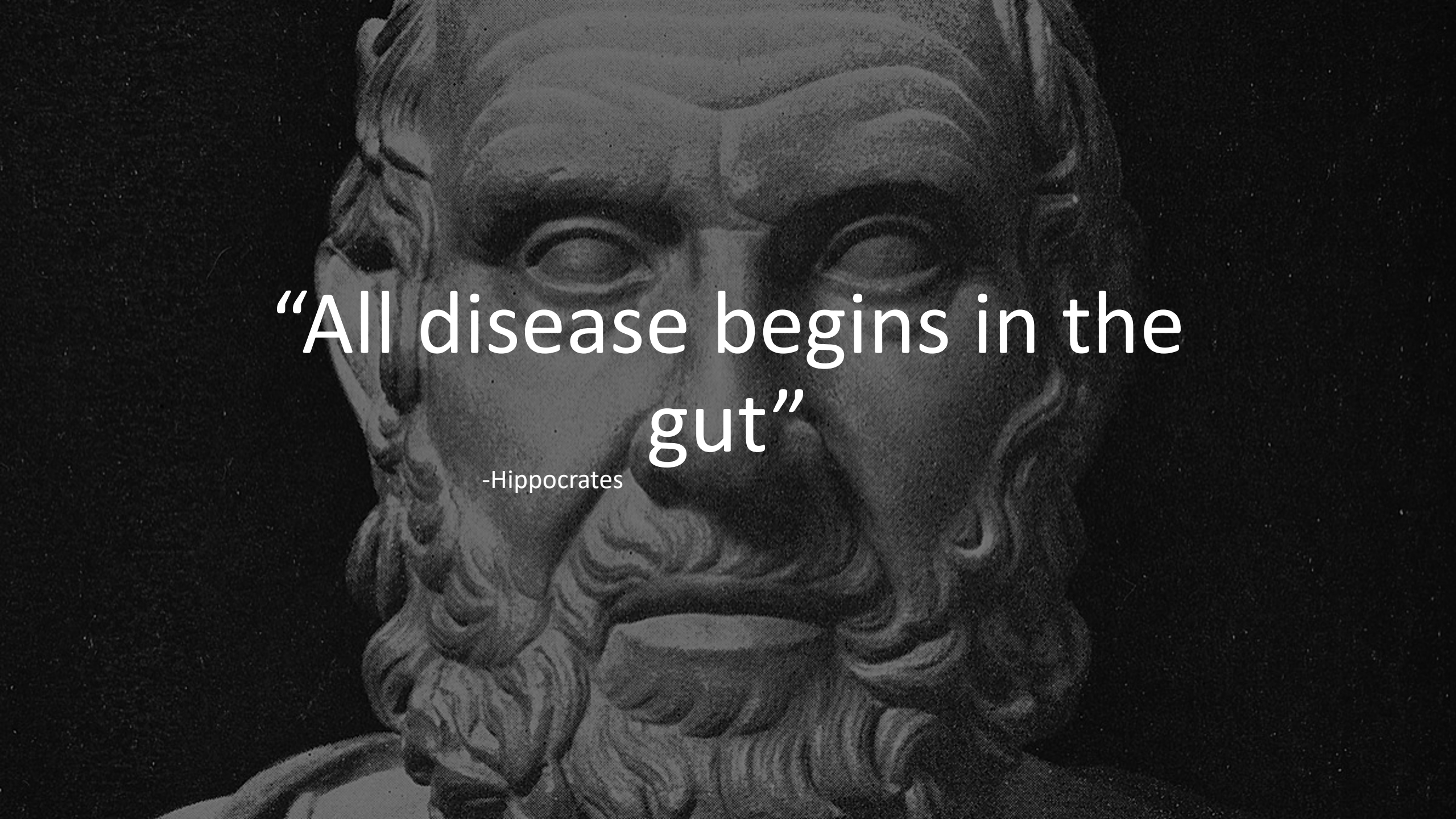
- 20-38% of bacteria are introduced systemically during eating
- 40% of bacteria are introduced systemically during brushing
- 20% of bacteria are introduced during flossing and 40% of bacteria are introduced with using interdental picks respectively

Olsen, I. (2008). Update on bacteraemia related to dental procedures. Transfusion and Apheresis Science, 39(2), 173-178.

Localized Effects of Periodontal Disease

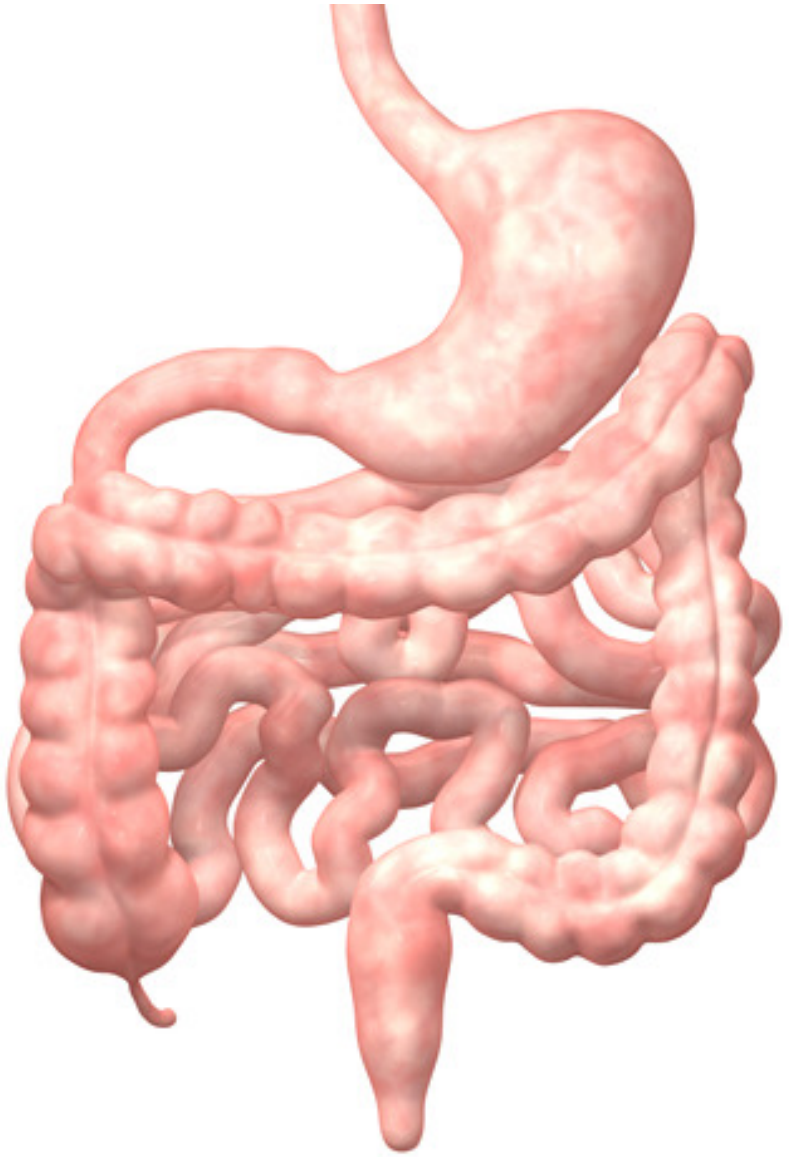
- Increased pocket depths
- Bleeding on probing
- Furcation involvement
- Mobility
- Tooth loss

REFERENCE: haw PM. Detection and diagnosis of periodontal conditions amenable to prevention. *BMC Oral Health*. 2015;15(suppl 1):S5.


“All disease begins in the gut”
-Hippocrates

Evolution of Human Jaws & Guts

- 25% of our energy goes to our massive brain
- A smaller gut was key to our evolution because it lets the body spend less energy processing food and more energy fueling the brain
- Cooking became a surrogate set of teeth and gut for ourselves, as it makes food easier to break down, digest and elicit nutrients from.
- As a result, our jaws, teeth and gut shrank, freeing up more resources for our nutrient-greedy brains



Aiello, LC. Wheller, P. "The expensive-tissue hypothesis: the brain and the digestive system in human and primate evolution." *Current anthropology 36*, no. 2 (1995): 199-121.

Nutritional Deficiencies

- Iron deficiency affects more than 25% of people worldwide
  - At risk: preschool children, menstruating women, young pregnant women, vegetarians/vegans
- Iodine deficiency affects 1/3 of the world population
- Vitamin D deficiency affects 42% of Americans
  - At risk: 74% of older adults and 82% of people with dark skin
- Vitamin B12 deficiency affects more than 20% of adult Americans
  - At risk: 90% of vegetarians and vegans
- Calcium deficiency
  - Less than 15% of teenage girls, fewer than 10% of women over 50 and less than 22% of teenage boys and men over 50 meet the recommended calcium intake
- Magnesium
  - Half of the US population consumes less than the required amount of magnesium.

Vitamin B_1 (Thiamine)

1.Sheetal, A., Hiremath, V.K., Patil, A., Sajjansetty, S., S.R. Malnutrition and its oral outcomes. Journal of Clinical and Diagnostic Research. 2013 Jan:7 (1): 178-180. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3576783/

Vitamin B_6

Vitamin B_{12}

Periodontal Nutrition

“Illnesses do not come upon us out of the blue. They are developed from small daily sins against Nature. When enough sins have accumulated, illnesses will suddenly appear.”

~Hippocrates

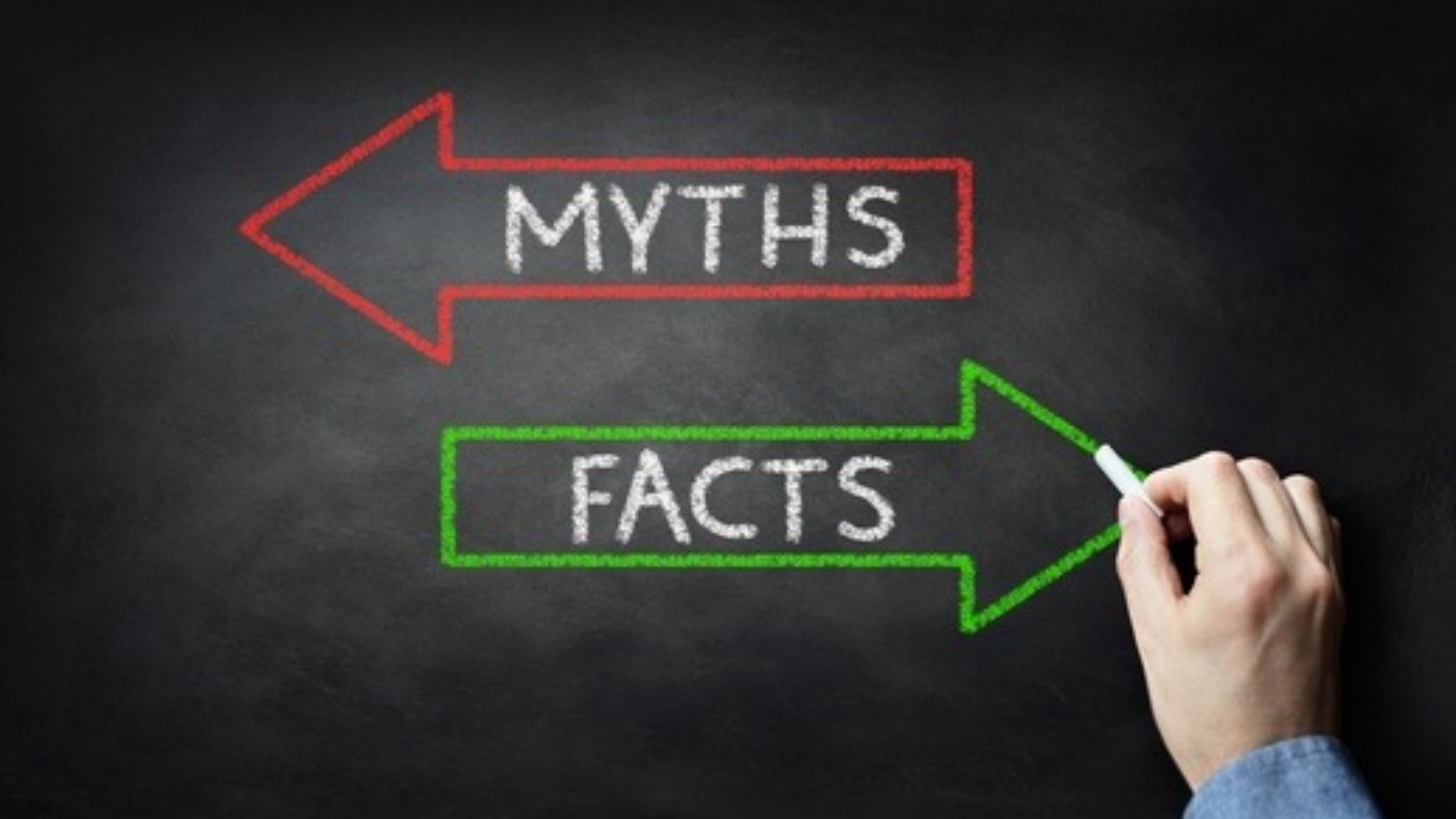
Meet Chris

- Patient of record for five years.
- Medical history: hypertension. RX: Atenolol.
- Periodontal Maintenance Appointment:
  - History of SRP 1.5 years ago
  - Presents with localized 4mm periodontal pockets with moderate bleeding tendency

Meet Chris

- Patient of record for five years.
  - Previous medical history: no significant findings
- Medical history [new finding]: hypertension. RX: Atenolol.
  - Blood Pressure: 142/85. Pulse 65.
  - Family history of cardiovascular disease: Maternal Grandmother has congestive heart failure. Paternal Grandfather passed from a myocardial infarction.
  - Occupation: dispatch firefighter for emergency services [works nocturnally].[1]
  - Diet: inconsistent. Patient reports consistent weight gain.
- Head & Neck Examination: Frank's Sign[2]. Fordyce Granules across buccal mucosa[3].
- Periodontal Maintenance: History of SRP 1.5 years ago
  - Presents with localized 4mm periodontal pockets with moderate bleeding tendency
  - Previous findings reveal tissues within normal limits.
  - Patient reports new findings may be due to declined oral hygiene routine.

REFERENCES: 1. Kales, S. N., et. al. (2007). Emergency Duties and Deaths from Heart Disease among Firefighters in the United States. New England Journal of Medicine, 356(12), 1207-1215. 2. Haim Shmilovich , et. al. Relation of Diagonal Ear Lobe Crease to the Presence, Extent, and Severity of Coronary Artery Disease Determined by Coronary Computed Tomography Angiography The American Journal of Cardiology, Volume 109, Issue 9, 2012, 1283 – 1287. 3. Gaballah, K. Y., & Rahimi, I. (2014). Can presence of oral Fordyce's granules serve as a marker for hyperlipidemia? Dental Research Journal, 11(5), 553-558.


MYTHS
FACTS


I have to tell you about
the future!

Your future is whatever you make it,
so make it a good one!

~Doc Brown

www.katrinasanders.com

Twitter: @MsSandersRDH

Facebook: @TheDentalWINEgenist

Instagram: @TheDentalWINEgenist

LinkedIN: Katrina M Sanders RDH, BSDH, M.Ed, RF

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Katrina M Sanders

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