Oral Health 101: Unleashing your Career Potential with a Doctorate in Dentistry

DELAWARE HEALTH AND SOCIAL SERVICES
Division of Public Health
A Nationally Accredited Health Department

Nicholas R. Conte Jr. DMD, MBA
Dental Director
Bureau of Oral Heath and Dental Services

Introduction

Dental Director

Delaware Public Health

Bureau of Oral Health and Dental Services

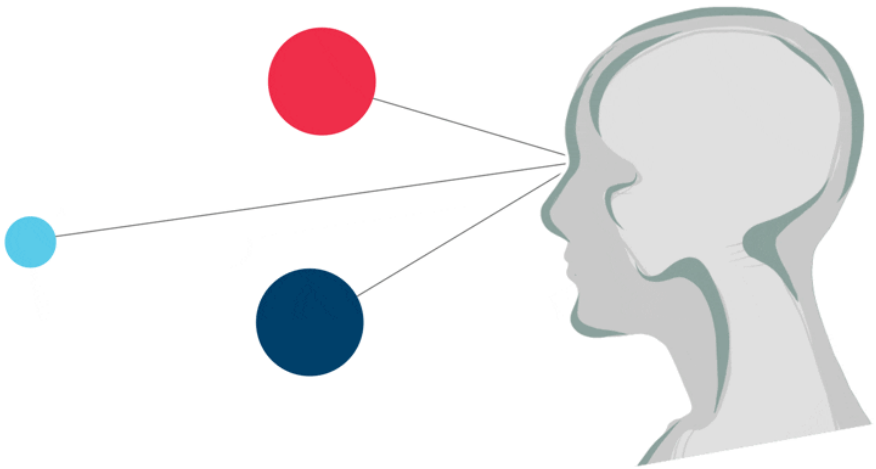
Nicholas R. Conte Jr. DMD, MBA

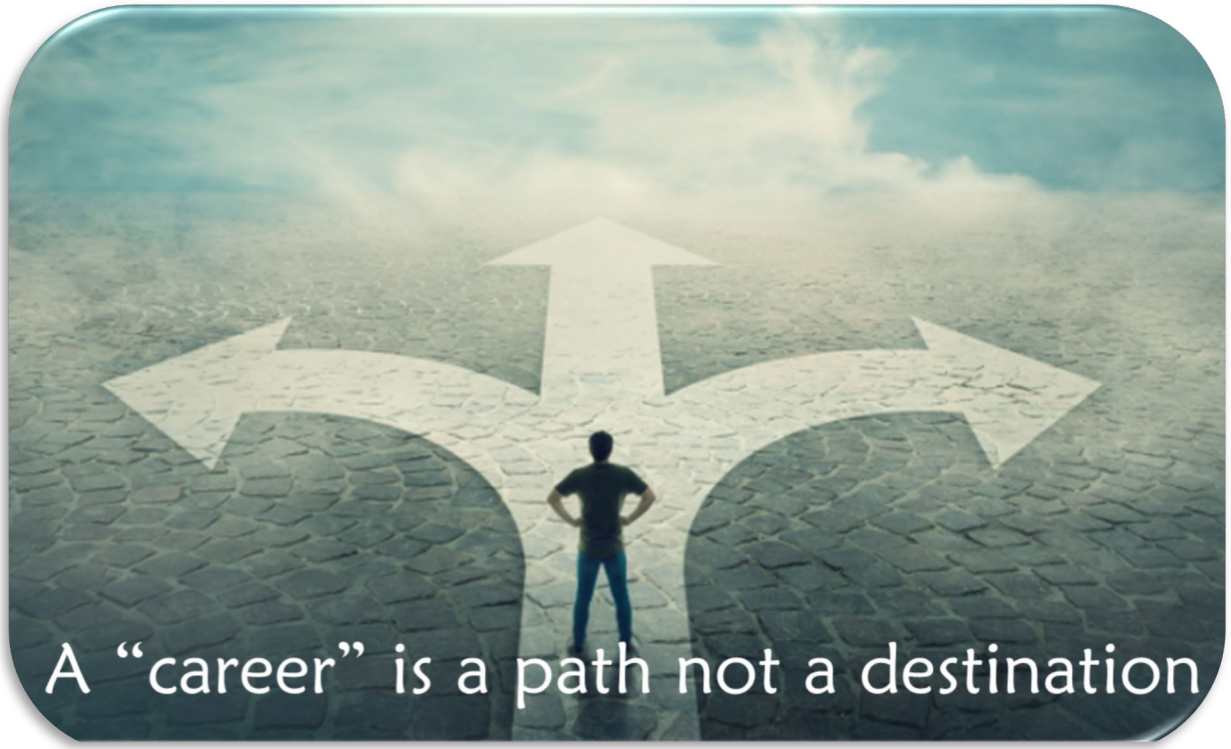
Dentistry is an Opportunity to:

- Be a health care provider! Responsibility and Respect
- Provide a needed health care service
- Help create healthy mouths and healthy bodies
- Use artistic talents and scientific skills
- Work as a part of a team
- Exercise autonomy

Dentistry Requires Varying Skills

- 3-Dimensional problem solving
- Critical Thinking
- Judgement
- Manual dexterity
- People skills



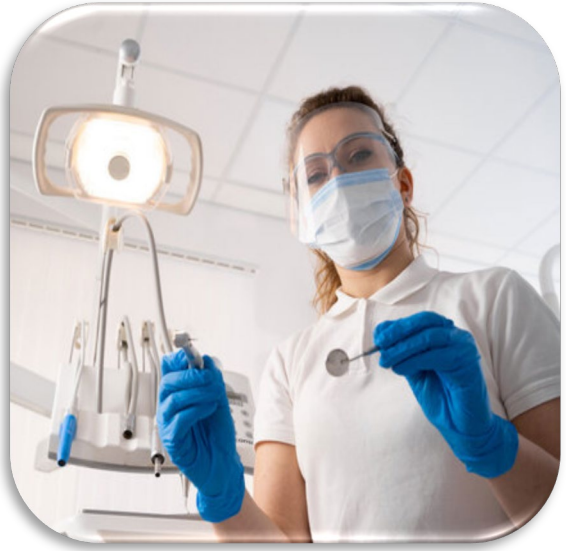


Did you always want to be a dentist?

How did you know you wanted to become a dentist?

Career Path Opportunities

- Private practice- Solo & Group
- Teaching (Academia)
- Research (Academic and Corporate)
- Public Health (State Government)



Educational Background

- Preparatory School in the Bronx
  - Catholic School- Jesuit Priests
  - Emphasis on:
    - Discipline
    - Self Reflection
    - Altruism

College: University of Rochester

Career Pathway: Pre-Med

Major: Health Economics
Minor: Political Science

Always Better

Dental School & Specialty Training

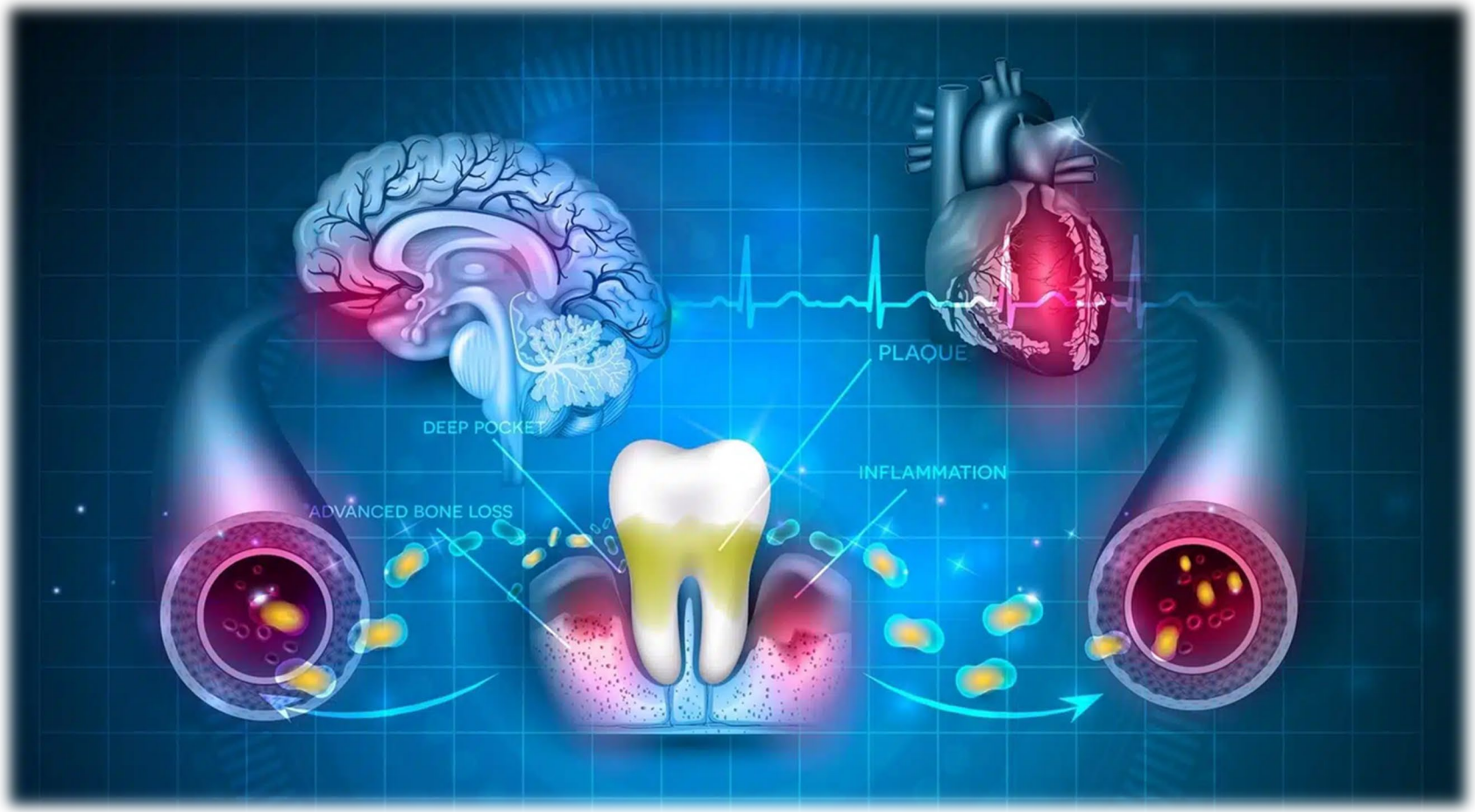
UMDNJ
NEW JERSEY DENTAL SCHOOL
University of Medicine & Dentistry of New Jersey

RUTGERS
School of Dental Medicine

Earned my DMD degree and a Specialty Certificate in Prosthodontics

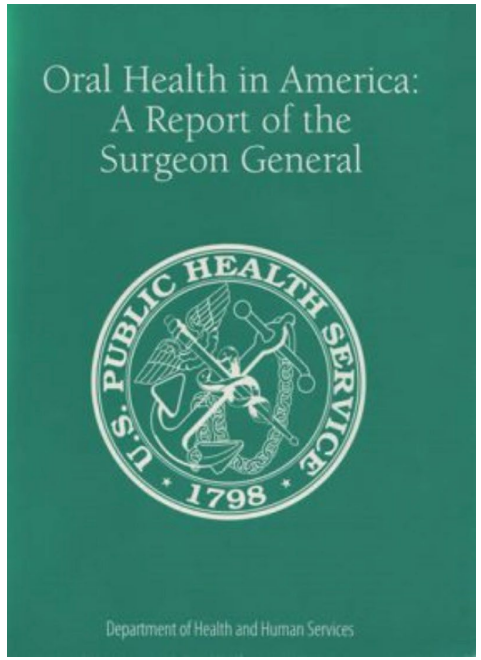
Newark, New Jersey

Oral Health



Surgeon General's Report on Oral Health

- Dental care is the most common unmet health need.
- Oral disease can adversely affect systemic health.
- Much oral disease is preventable or at least manageable.
- Profound disparities in oral health and access to care exist for all ages.
- Interdisciplinary care is necessary to achieve optimal oral and general health.



2000 and 2021

Oral Health IS….

- Oral health is not just absence of disease, but the presence of oral wellness.
- Oral wellness is when you have healthy gums, teeth, and tongue that allow you to speak, chew, enjoy food, and smile.
- Oral wellness affects; Obtaining a job, confidence and enjoyment.

Oral Health IS....

....being free of mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss, and other diseases and disorders that limit an individual's biting, chewing, smiling, speaking, and psychosocial well-being.

Smiles for Life
A national oral health curriculum

Prevalence of Poor Oral Health

- Dental caries is the most common chronic disease of childhood
  - More than half of children have had dental decay by age 7
- One in five adults has untreated dental disease
- Two in five adults have periodontal disease, which can lead to infection, pain, and tooth loss
- Every year there are more than 58,000 cases of oral cancer diagnosed, and more than 12,000 people die from oral cancers

ADA
American Dental Association

Oral Pain is linked to:

- Poor school performance in children
- Work loss in adults to care for themselves and their children
- Difficulty chewing and inadequate nutrition
- Costly emergency department visits

Consequences of Poor Oral Health

- The economic and social consequences of oral pain and dental decay can result in social stigma.
- There is growing evidence of aggravating effects on systemic conditions due to poor oral health.

Oral health problems are connected to and made worse by the social factors that affect health

Social Determinants of Health

Dental Decay and Tooth Loss can lead to:

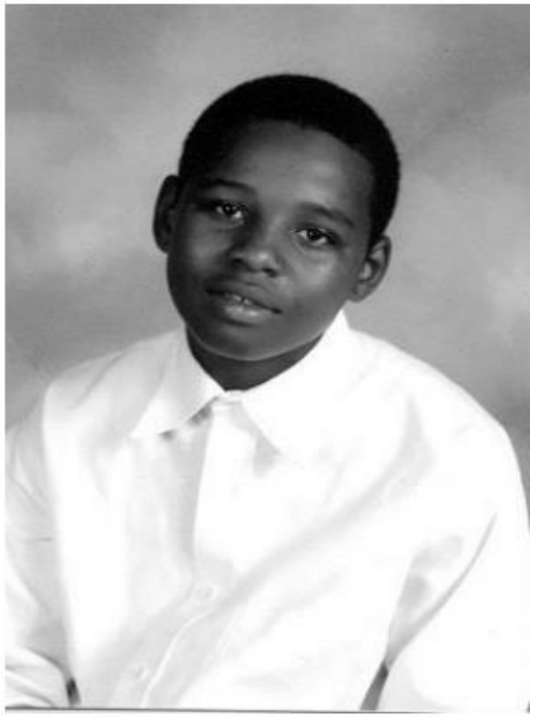
- Esthetic and self-image issues
- Feeling worthless, unhappy and shy
- Costly restorations
- Systemic complications

Healthy Tooth Decay Extensive Decay

Have you heard this tragic story?

Deamonte Driver

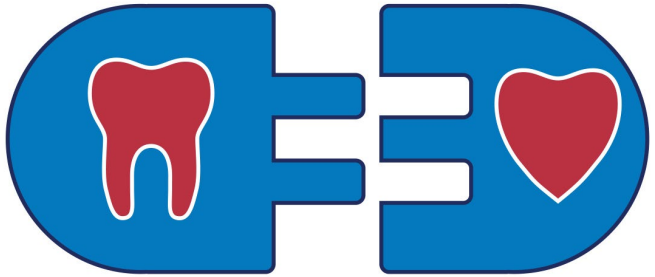
- Grew up in Prince George's County, Maryland, the 3rd of 5 boys
- From low-income family
  - Children had medical and dental insurance through the Maryland HealthChoice (Medicaid) program contracted thru managed care organizations (MCO)
- Had long-standing tooth decay and abscess – but never complained
- Always received primary medical care through a pediatrician – a medical home
- But not a dental home – no primary care dentist
- Mother could not find a dentist willing to accept Medicaid despite the Medicaid MCO listing 27 dentists on their provider panel for that area
  - All panel dentists could not see his brother
  - Needed the Public Justice Center along with the help of others to finally find a dentist to treat his brother



Have you heard this tragic story?

2017 Vadim Anatoliyevich Kondratyuk, a 26-year-old truck driver, was on his way from Truckee, California, to New York on January 24 when he began complaining of a toothache that resulted in complications that claimed his life within just six days, according to his wife. Diabetes diagnosis while in hospital for infection.

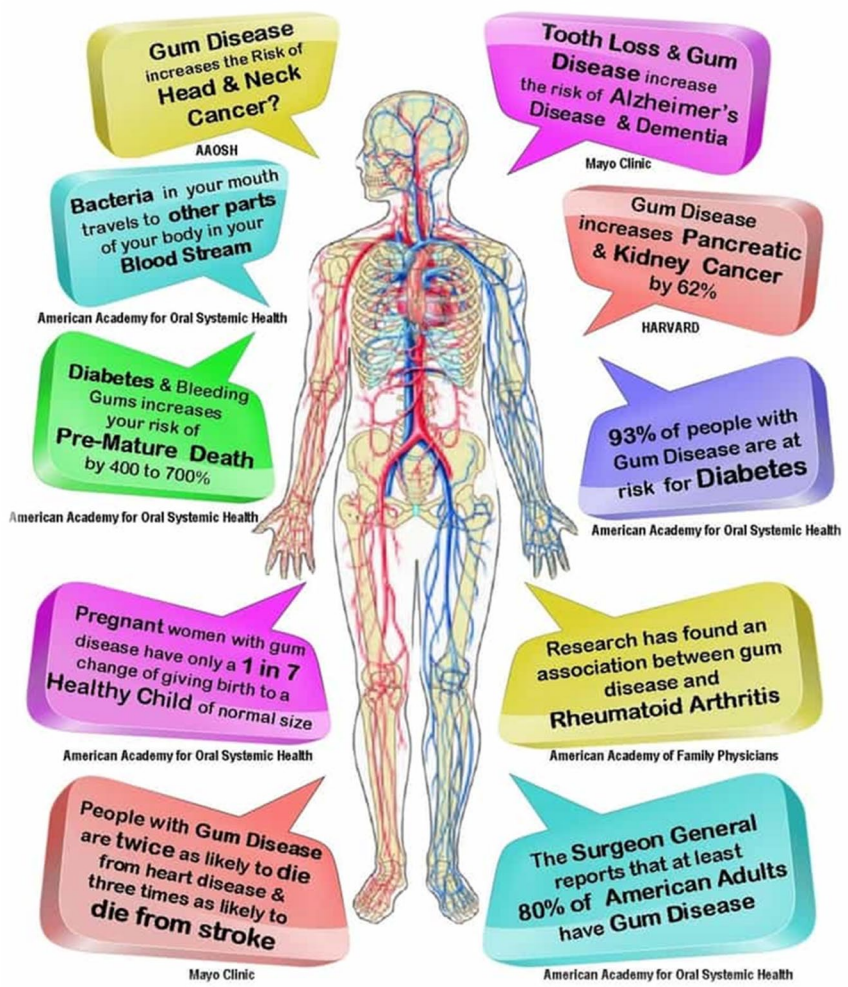
The Oral - Systemic Connection

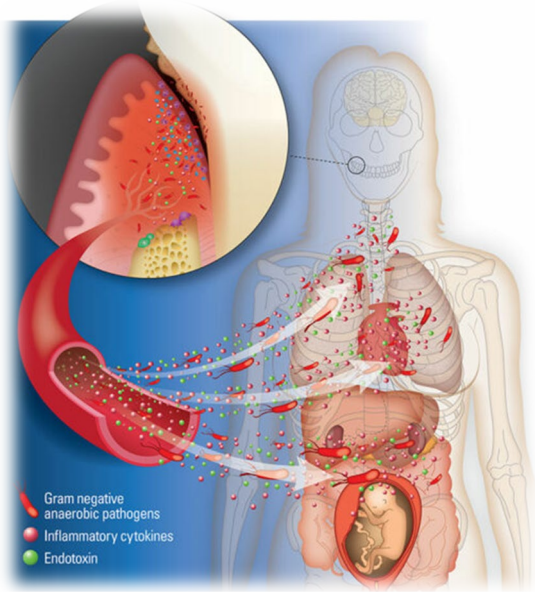


Oral Health and Overall Wellness are linked together!

The Oral-Systemic Connection

DID YOU KNOW?





Stroke

- Those with severe periodontitis have increased risk of getting stroke and periodontal treatment can help to reduce the risk. [26]

Alzheimer's Disease

- *P. gingivalis* with its toxic protease (gingipain) was identified in patients' brains with pathologic mechanism. [25]

Heart Disease

- Those with severe periodontitis may have increased risk of fatal heart attack. [15,16]
- Bacteria in the gingiva may travel through the bloodstream, reaching atheroma and causing clotting problems in the cardiovascular system. [30]
- Controlling periodontal disease can retard the progression of carotid atherosclerosis. [35,36]

Uncontrolled Diabetes

- People with type 2 diabetes are three times more likely to develop periodontal disease than those without diabetes.[13] Periodontal treatment can potentially help with controlling HbA1c. [37]
- Pathogens can be identified in pancreatic islet. [33]

Respiratory Infections

- Poor oral hygiene and periodontal infection are associated with increased anaerobic periodontal pathogens in the lungs of patients with lower respiratory track infection and pneumonia. [27-28]
- Improved oral hygiene and periodontal treatment can reduce risk of pneumonia and mortality rate. [38-39]

Osteopenia and Rheumatoid Arthritis

- Reduction in bone mass (osteopenia) is associated with periodontal disease and related tooth loss. [20]
- Periodontal pathogens can be present at the joint and periodontal disease is associated with arthritis. [18,31]

Cancer

- Periodontitis is associated with esophageal, breast, pancreatic, and colon cancer. [21,22]

Preterm or Low-Birthweight Babies

- Women with advanced periodontal disease may be more likely to give birth to an underweight or preterm baby. [17]
- Oral microbes can cross the placental barrier, exposing the fetus to infection. [32]

What constitutes Overall Wellness?

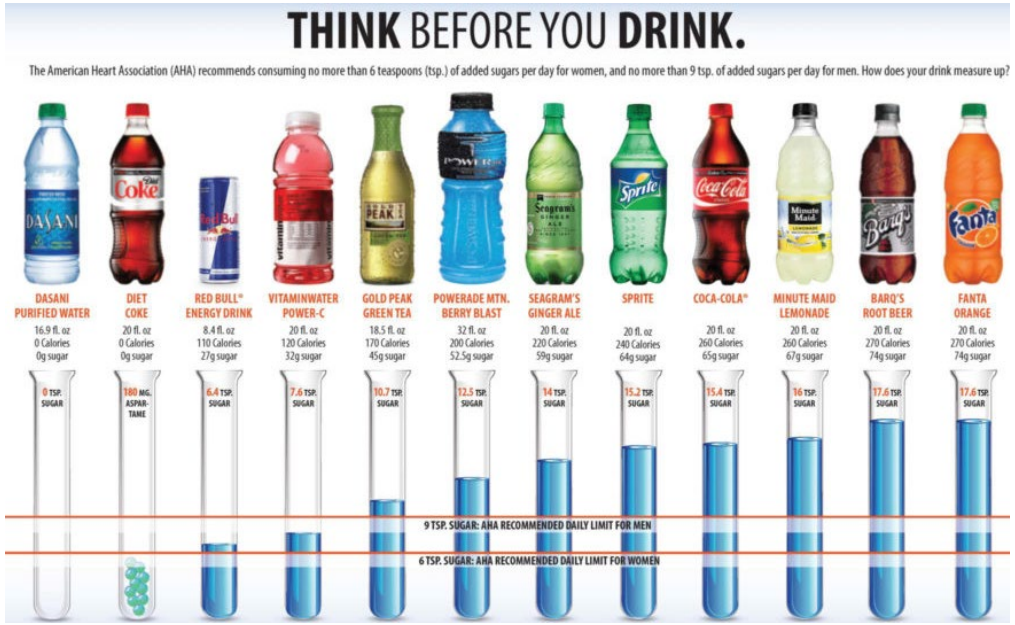
Mental health and oral health are closely related.

- Stress
- Anxiety
- Depression
- Eating disorders
- OCD

Studies show that people with mental health disorders are nearly 3x as likely to lose teeth.

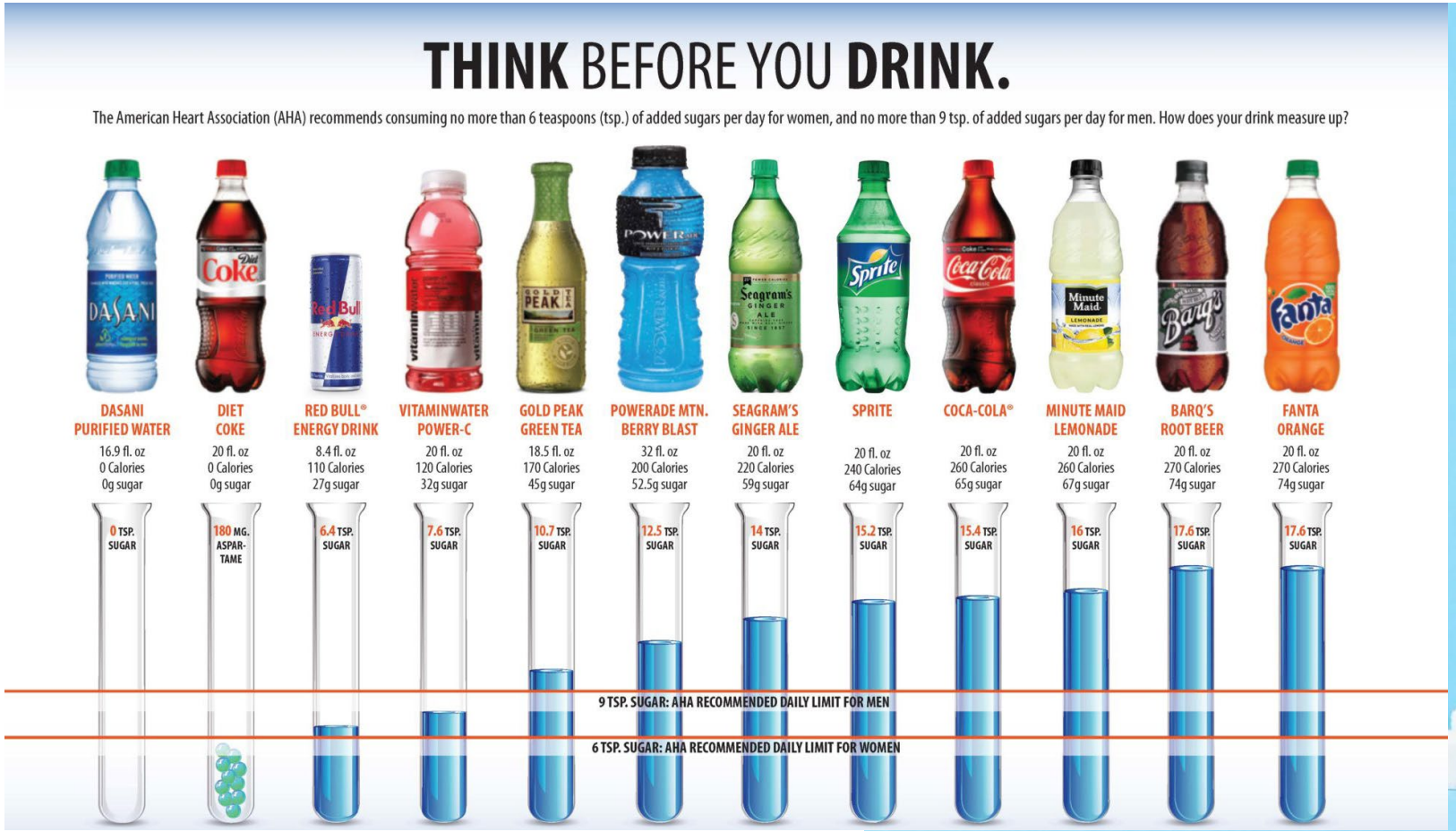
Nutrition and Oral Health

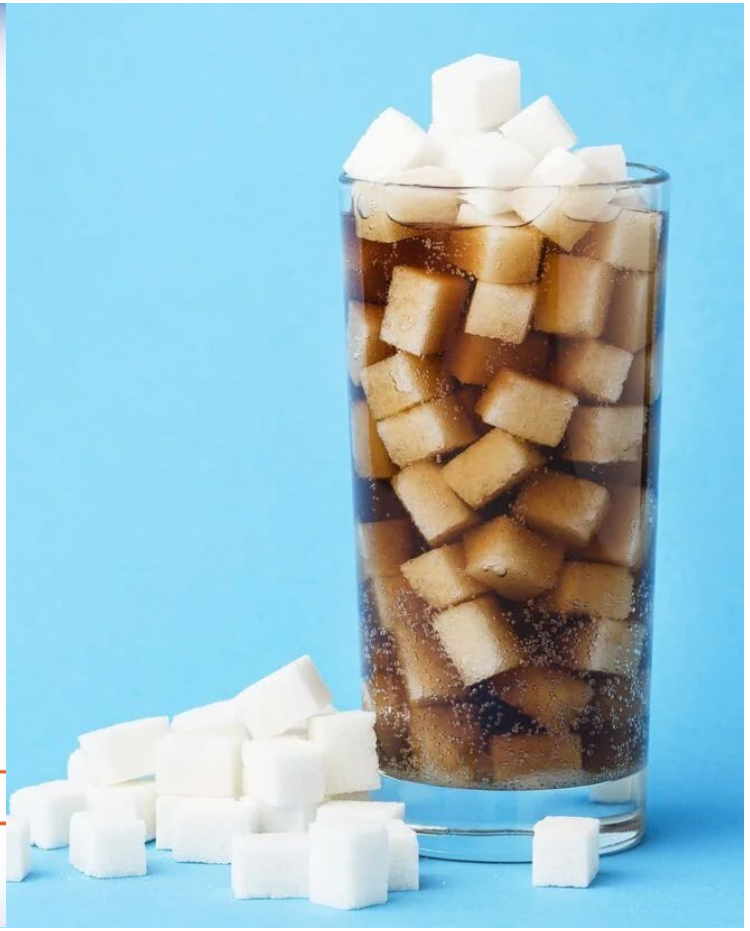
- Frequent ingestion of sugary snacks and beverages contributes to obesity, diabetes, and dental caries
- Poor dentition, dental pain, and chewing problems due to missing teeth make eating fruits, vegetables, and sources of protein more challenging
- Children, patients with special healthcare needs, and older adults are more at risk of malnutrition and health consequences from poor nutritional intake



Visuals Make a HUGE Difference

American Heart Association®

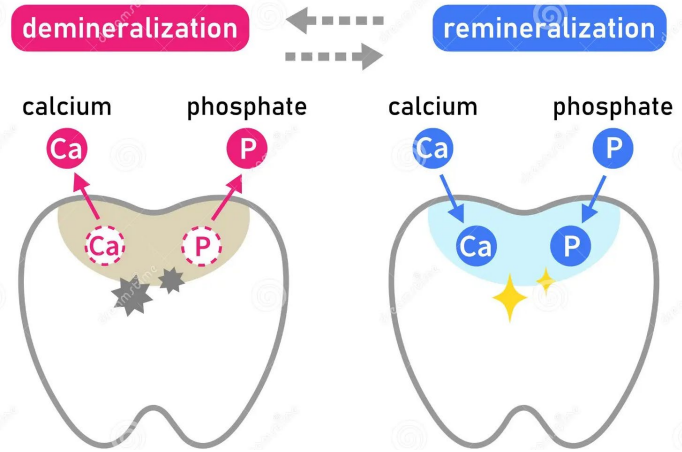




Role of Oral pH Levels

- Prolonged periods of low (acidic) pH in the mouth provide the biologic oral environment that promotes the growth of cavity-causing bacteria
- Low pH (below 5.5) is responsible for the demineralization and net mineral loss of the teeth

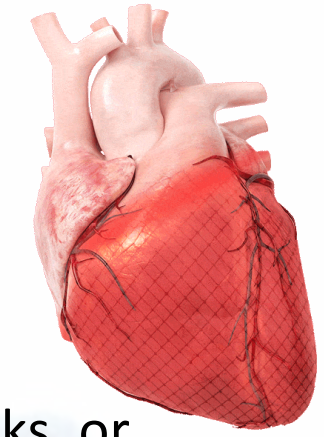
Figure 11. The results of being above and below the critical pH point of 5.5



The Role of Diet in Oral pH

- Eating/drinking lowers plaque pH to an acidic level
- Saliva is designed to restore pH to a healthy (alkaline) level
- In balanced oral environment, we eat or drink something, pH drops, some mineral is lost from the teeth, pH recovers and mineral returns to the teeth
- When the system is out of balance, prolonged periods of low pH result in demineralization of teeth and decay
- Frequent exposure to food/drink (except water) increases the number of acid attacks on the teeth
- Therapies are available to neutralize acidity and increase pH to more favorable levels (oral rinses, sprays, gels and gum)

Heart Disease



1. **Gum disease can raise your risk of heart problems**
   People with unhealthy gums are more likely to have heart disease, heart attacks, or strokes. Long-term gum infection can affect the whole body—not just the mouth.

2. **Germs from the mouth can travel to the heart**
   When gums are inflamed or bleeding, bacteria from the mouth can enter the bloodstream. These germs have been found in clogged heart arteries.

3. **Inflammation links gum disease and heart disease**
   Gum disease causes inflammation, and so does heart disease. Ongoing inflammation in the body can damage blood vessels and increase heart risk.

4. **Healthy gums support overall health**
   Brushing, flossing, and regular dental visits help reduce inflammation in the body. While dental care doesn’t replace medical care, good oral health supports heart health.

Oral Health and a Healthy Pregnancy

1. **Gum disease is linked to preterm birth**
   Pregnant women with untreated gum disease have a higher risk of **delivering early**. Inflammation from infected gums may trigger early labor.

2. **Poor oral health is associated with low birth weight**
   Babies born to mothers with gum infections are more likely to have **low birth weight**, which can affect early development and health.

3. **Hormonal changes can worsen gum problems**
   Pregnancy hormones make gums more sensitive, leading to **pregnancy gingivitis**—red, swollen, or bleeding gums. Without care, this can progress to more serious infection.

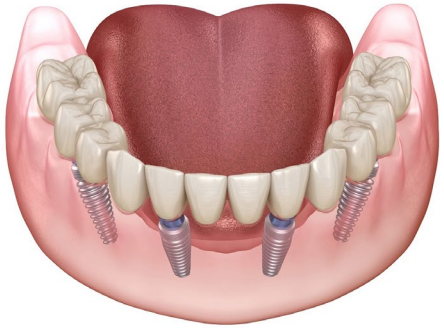
4. **Dental care during pregnancy is safe and important**
   Routine dental cleanings, exams, and most treatments are **safe during pregnancy** and help reduce infection and inflammation—supporting both maternal and baby's health.

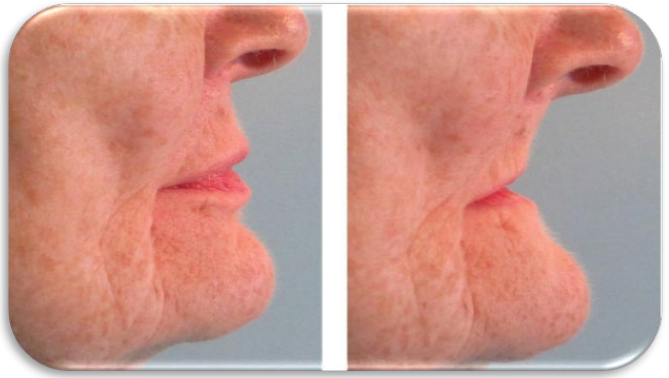
Sharing my journey and perspective

RUTGERS HEALTH
School of Dental Medicine

Prosthodontics

Prosthodontics is the dental specialty pertaining to the diagnosis, treatment planning, rehabilitation and maintenance of the oral function, comfort, appearance and health of patients with clinical conditions associated with missing or deficient teeth and/or oral and maxillofacial tissues using biocompatible substitutes.



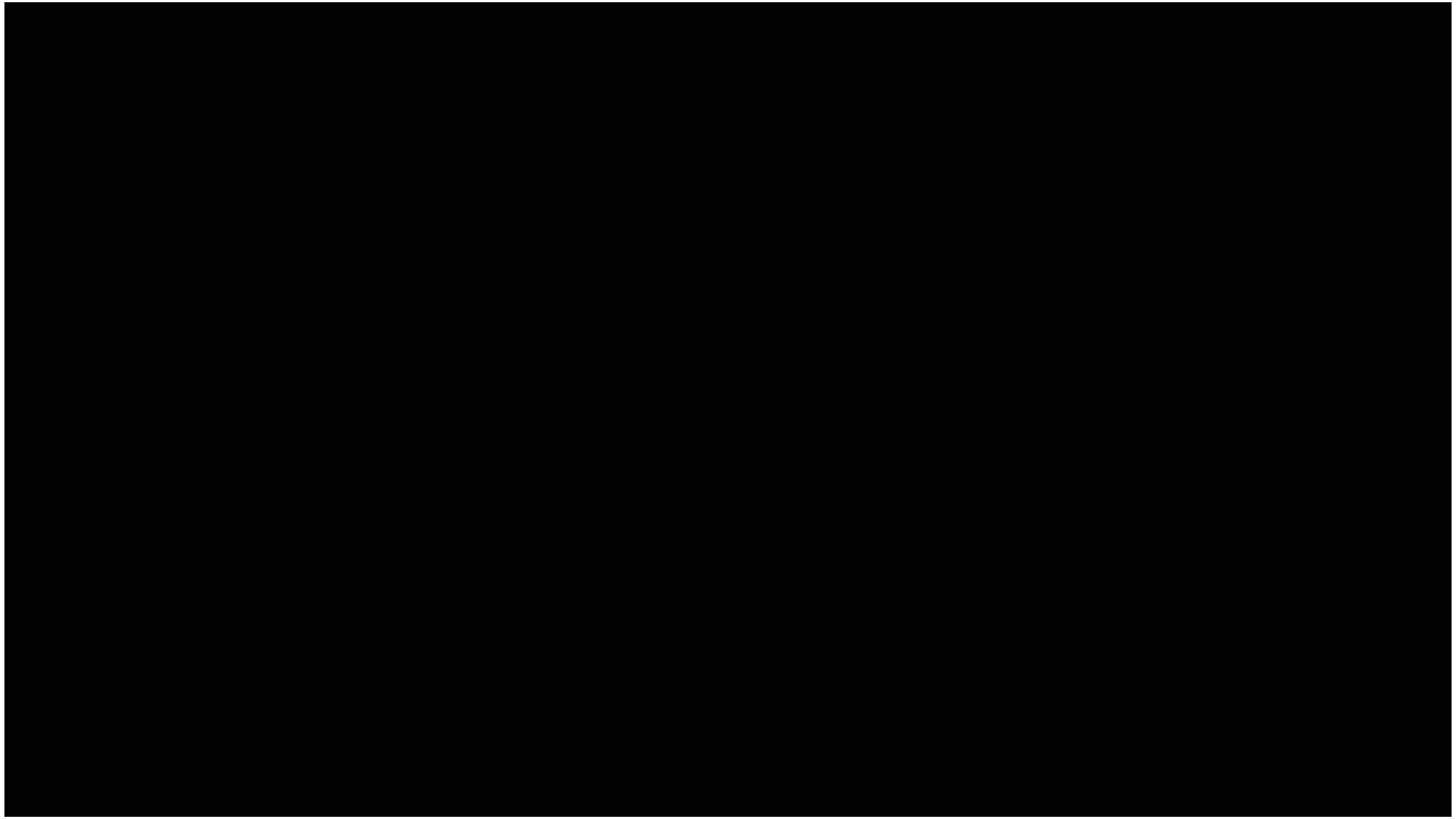


Assistant Professor-NJDS/RSDM

Preclinical and Clinical Instructor

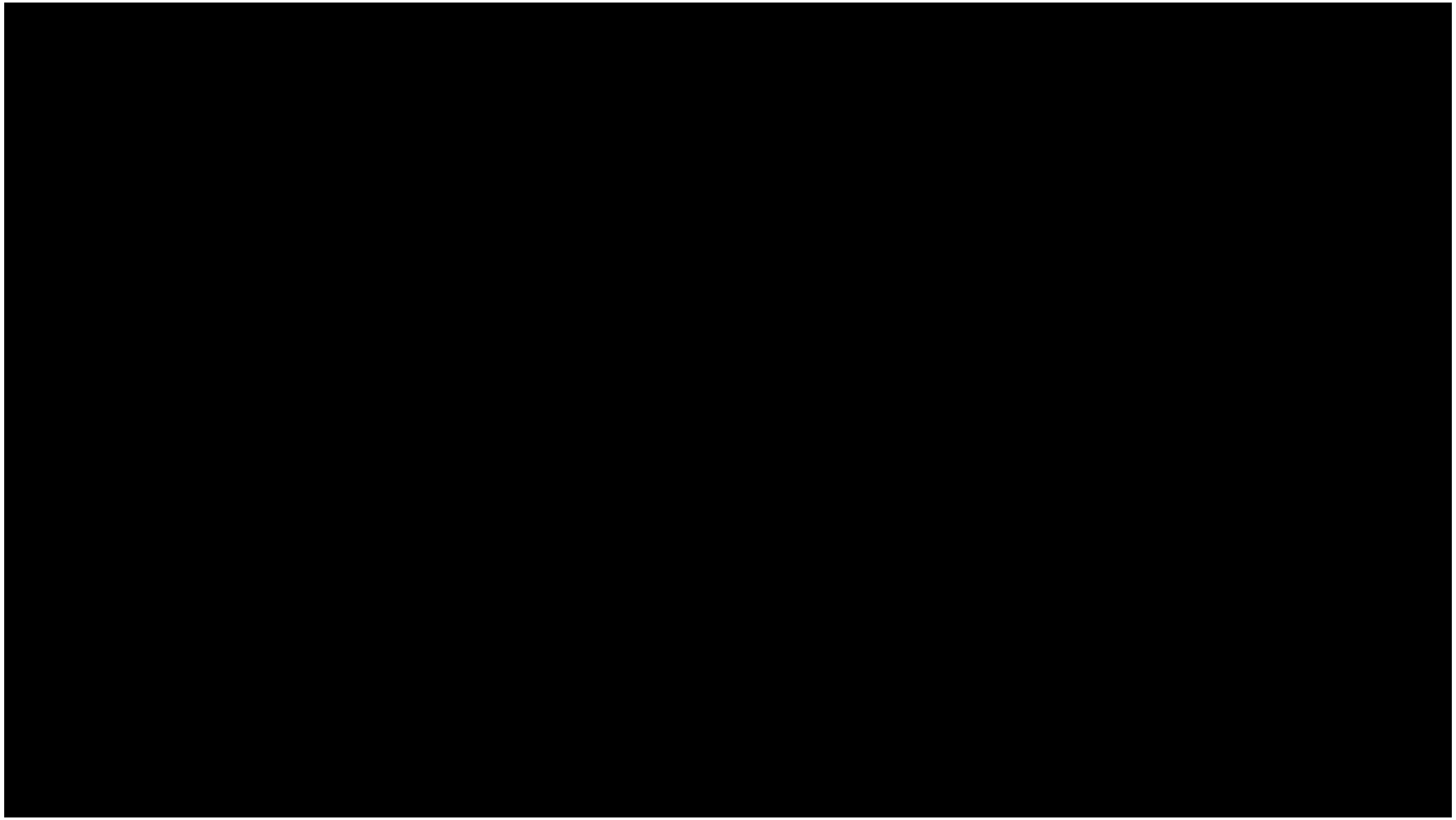
Group Practice Administrator

Preclinical Simulation Lab



Private Dental Practice- Havertown PA

Artificial Intelligence in Dentistry



Industry-
Milford, Delaware

Director-Clinical Research & Education

Focus on creating new dental products designed to make the doctors experience better, to improve the patient experience and to generate better outcomes

For Better Dentistry

Technology in Everyday Practice

Dental Public Health

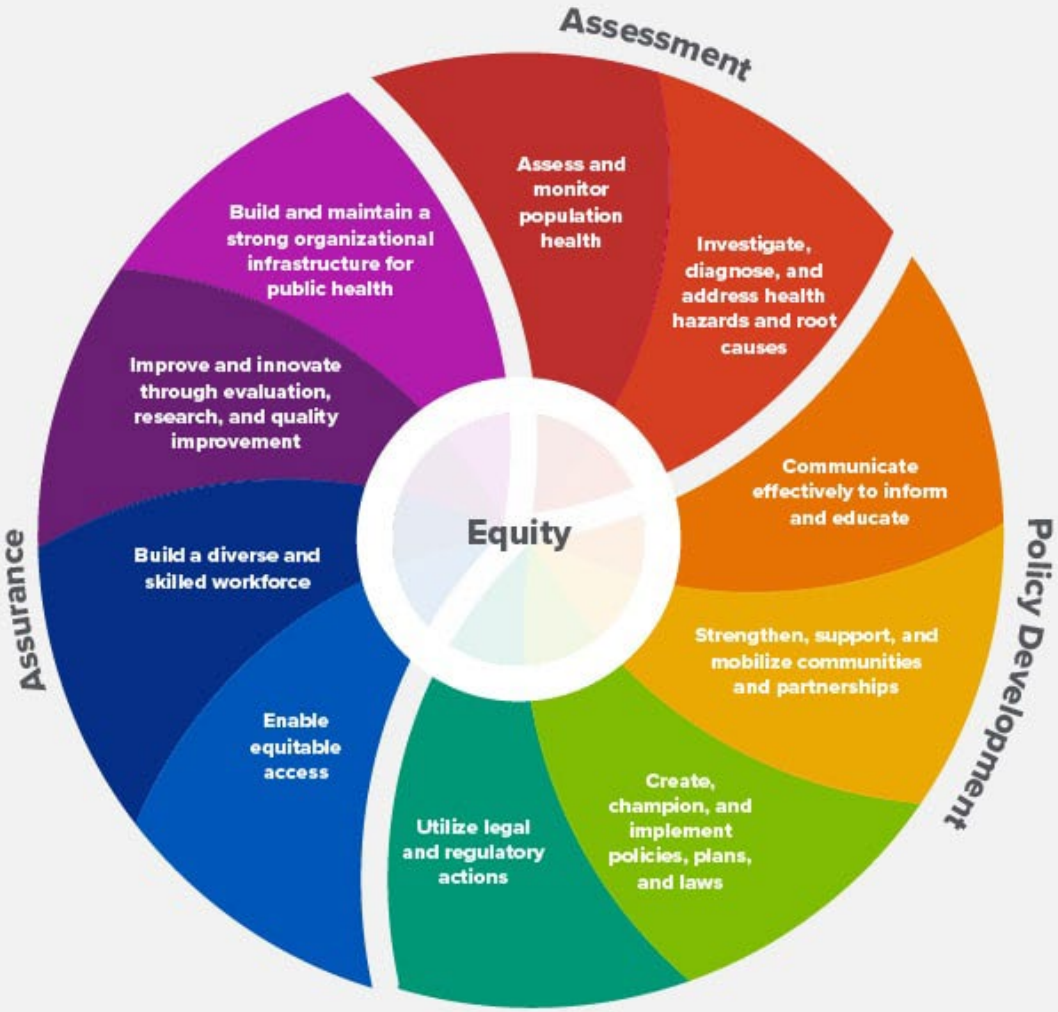
- Dental Public Health is the science and art of preventing and controlling dental diseases and promoting dental health through organized **community efforts**
- It is that form of dental practice which serves the **community as a patient** rather than the individual.
- It is concerned with the **dental health education of the public**

AMERICAN BOARD OF DENTAL PUBLIC HEALTH

preventing dental diseases (e.g., via fluoridation)
promoting oral health through education
increasing access to care for underserved populations

THE 10 ESSENTIAL PUBLIC HEALTH SERVICES

To protect and promote the health of all people in all communities



Dental Public Health*: the science and art of preventing and controlling dental diseases and promoting **dental health** through organized community efforts.

Healthy People 2030

Healthy People identifies public health priorities to help individuals, organizations, and communities across the United States improve health and well-being.

Healthy People provides 10-year, measurable public health objectives — and tools to help track progress toward achieving them.

Healthy People sets data-driven national objectives to improve health and well-being over the next decade.

Healthy People 2030 objectives are organized into topics such as:

Health Conditions- *Oral conditions, infectious disease, mental health, cancer, diabetes*
Health Behaviors- *child and adolescent development, physical activity, vaccination*
Populations- Infants, children adolescents and older adults
Systems and Settings- Health insurance, Public Health infrastructure, transportation
Social Determinants of Health-Economic stability, health care access and quality

https://health.gov/healthypeople

Healthy People 2030 Oral Health Objectives

- Reduce the proportion of children and adolescents with lifetime tooth decay (OH-01)
- Reduce the proportion of children and adolescents with active and untreated tooth decay (OH-02)
- Reduce the proportion of adults with active or untreated tooth decay (OH-03)
- Reduce the proportion of older adults with untreated root surface decay (OH-04)
- Reduce the proportion of adults aged 45 years and over who have lost all their teeth (OH-05)
- Reduce the proportion of adults aged 45 years and over w moderate and severe periodontitis (OH-06)
- Increase the proportion of oral and pharyngeal cancers detected at the earliest stage (OH-07)
- Increase use of the oral health care system (OH-08)
- Increase the proportion of low-income youth who have a preventive dental visit (OH-09)
- Increase the proportion of children and adolescents who have dental sealants on 1+ molars (OH-10)
- Increase the proportion of people whose water systems have the rec amount of fluoride (OH-11)
- Increase the proportion of people with dental insurance (AHS-02)
- Reduce the proportion of people who can't get the dental care they need when they need it (AHS-05)
- Reduce consumption of added sugars by people aged 2 years and over (NWS-10)

Delaware Public Health

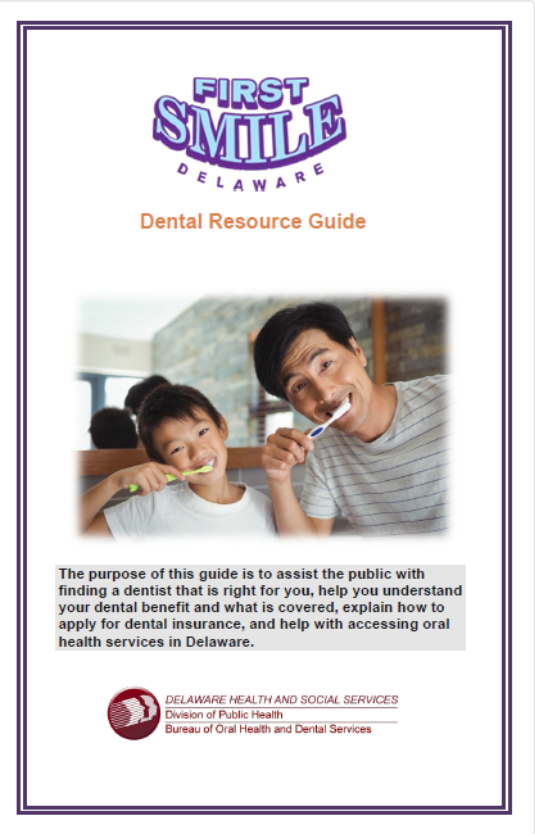
DELAWARE HEALTH AND SOCIAL SERVICES
Division of Public Health
Bureau of Oral Health and Dental Services

- Oral Health Access
  - Policy
  - Education
  - Medical/Dental Integration

In the words of former Surgeon General **C. Everett Koop**,
"You're not healthy without good oral health."

Bureau of Oral Health and Dental Services

- **Focus areas include:**
  - The assessment of population-based dentistry and how dental health practice meets the needs of communities.
  - The accumulation of data on the incidence of dental and oral disease across populations, to help policy makers raise awareness of these problems and devise appropriate strategies.
- **Activities include:**
  - Providing community-based care for the prevention of dental disease and the promotion of dental health
  - Conducting widespread surveillance of oral health including the monitoring of problems such as oral cancer and prevalence of untreated dental decay.
  - Working in support of the public health mission to protect and promote the health of all people in Delaware



Dental Resource Guide English

Dental Resource Guide Spanish

Legislative Council,
General Assembly
State of Delaware

LAWS OF DELAWARE
VOLUME 84
CHAPTER 132
152nd GENERAL ASSEMBLY
FORMERLY
HOUSE SUBSTITUTE NO. 1
FOR
HOUSE BILL NO. 83

AN ACT TO AMEND TITLE 14 OF THE DELAWARE CODE RELATING TO ORAL HEALTH SCREENINGS.

WHEREAS, all Head Start Programs and Delaware Department of Education funded Early Childhood Assistance Programs (ECAPs) currently require yearly oral screening and referrals, as warranted, for all enrolled children in accordance with national best practices; and

WHEREAS, the American Academy of Pediatric Dentistry recommends preventative oral health programs and services to reduce oral health disparities by preventing, identifying, and treating oral health issues early; and

WHEREAS, early identification of oral health problems, preventive dental measures and assistance with accessing care significantly reduces dental expenditure and improves student readiness to learn; and

WHEREAS, the Delaware Department of Health and Social Services' January 2020 Burden of Oral Diseases Report demonstrated the significant long-term benefits of oral health screening and preventive measures.

NOW, THEREFORE:

BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF DELAWARE:

Section 1. Amend Chapter 41, Title 14 of the Delaware Code by making deletions as shown by strike through and insertions as shown by underline as follows:

§ 4123. Oral health screening.

(a) For purposes of this section, "oral health screening" means the screening done by a dental hygienist or dentist.

(b) Each school district and charter school must provide an oral health screening to each student enrolled in kindergarten by the last student attendance day of each school year.

(c) The school shall record the results of the oral health screenings within the student's electronic health record.

(d) If a student fails an oral health screening, the school must notify the student's parent, guardian, or relative caregiver.

(e) The Bureau of Oral Health and Dental Services must inform a parent or guardian of each student's oral health status by sending home, with the student, a copy of the dental screening results and must refer students who need a dental referral or restorative care to a dentist.

(f) The requirements of this section are contingent on the ongoing funding and implementation of the Delaware Smile Check Program under the Department of Health and Social Services or other comparable program of sufficient capacity to provide free oral health screenings to all enrolled kindergarten students.

Section 2. This Act takes effect for the 2024-2025 school year.

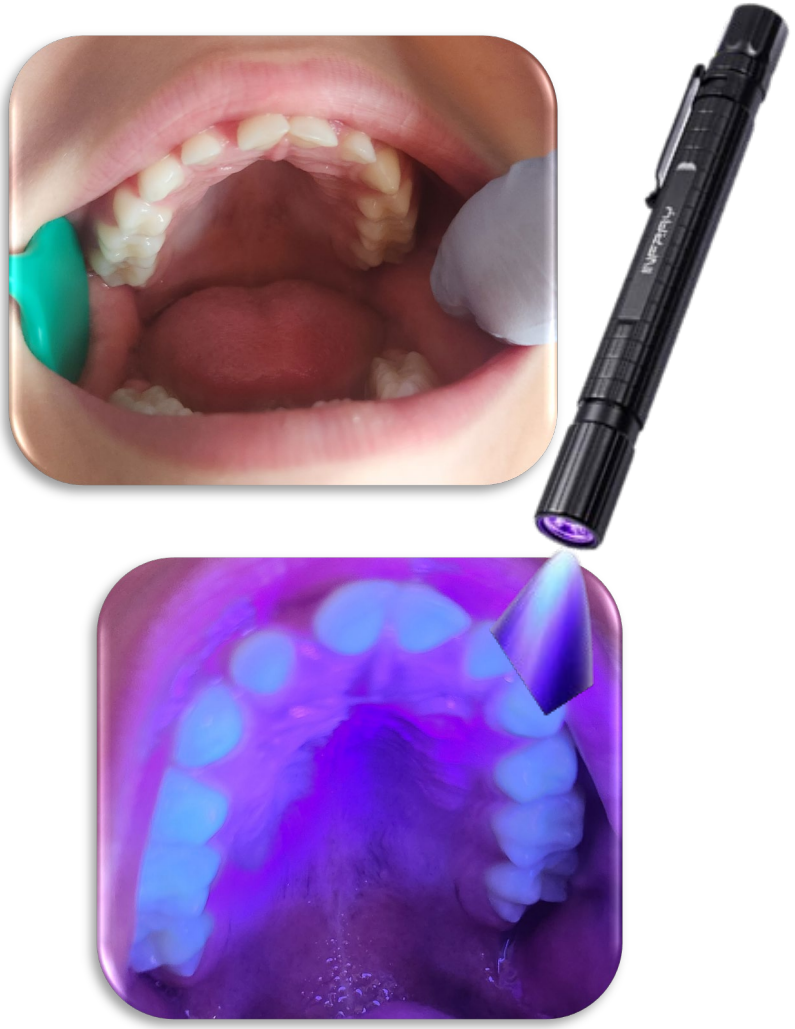
Approved August 3, 2023

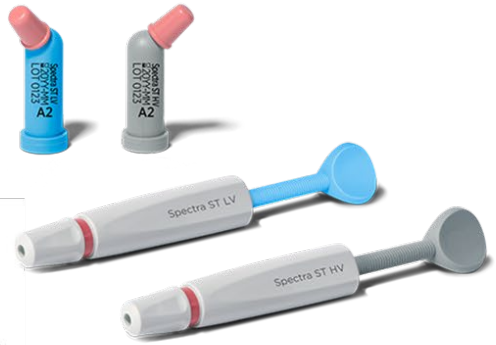
KINDERGARTEN SCREENING LEGISLATION

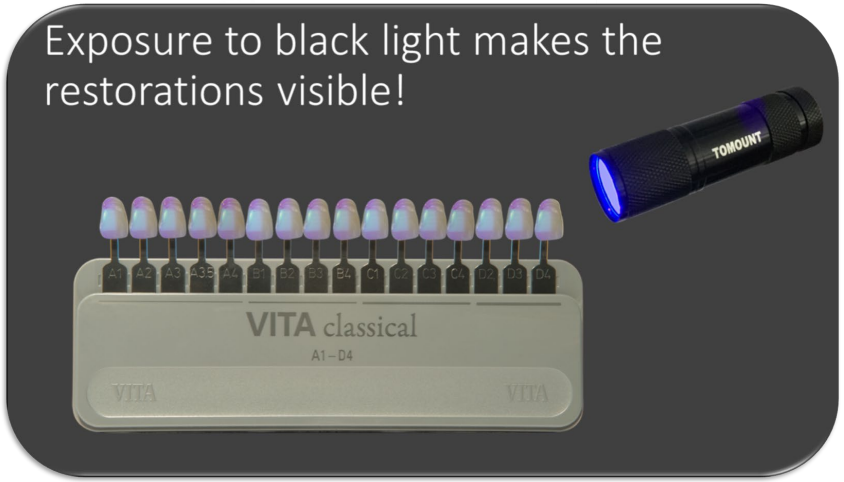
HOUSE SUBSTITUTE 1 FOR HB83

Importance: Access to Care and Baseline Health

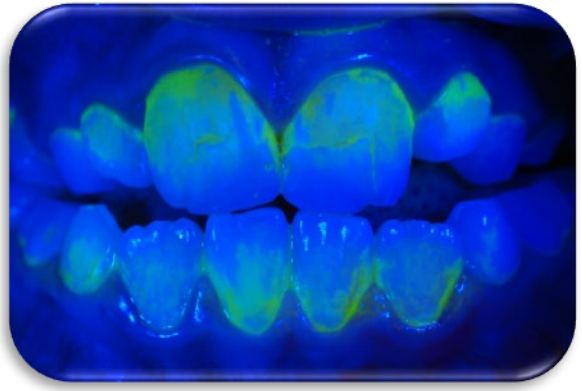
Extent and/or History of Treated Decay





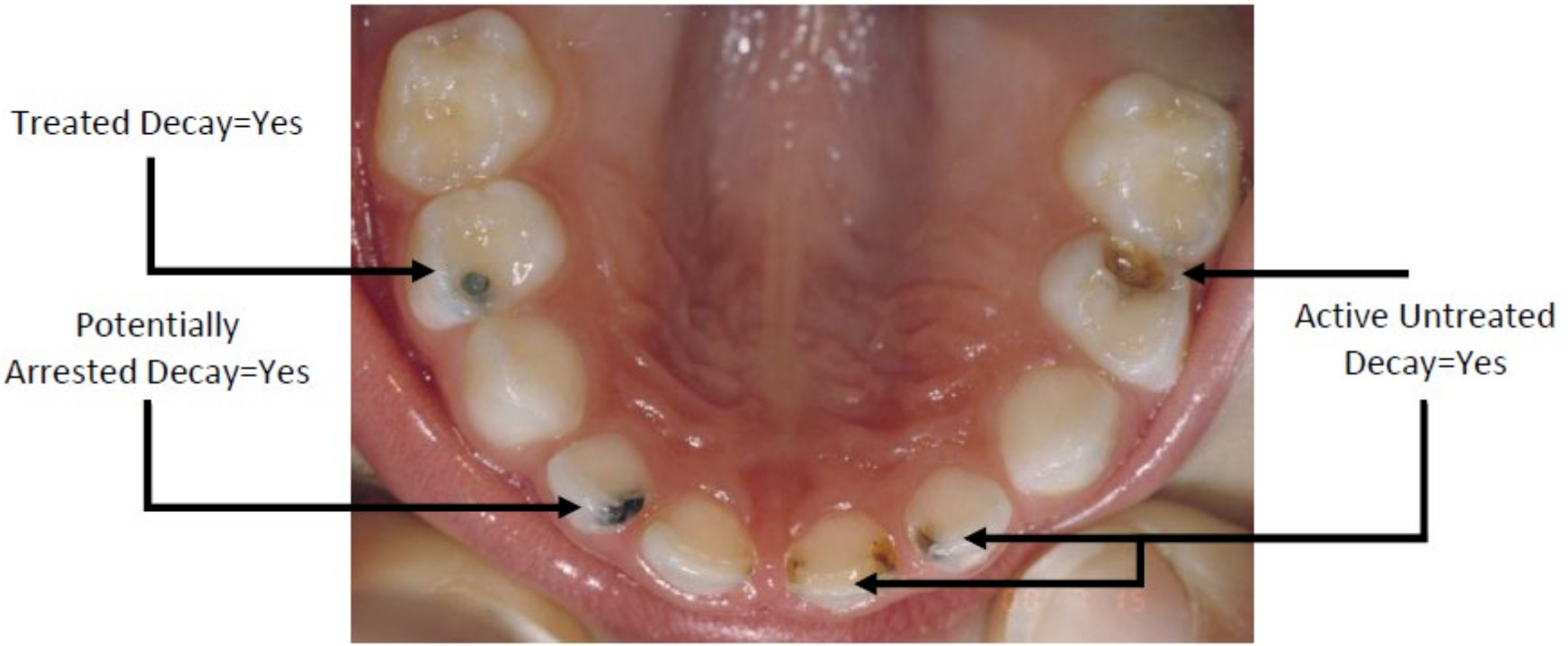


Evaluate the Extent of Treated Decay



Oral Health Screening Video

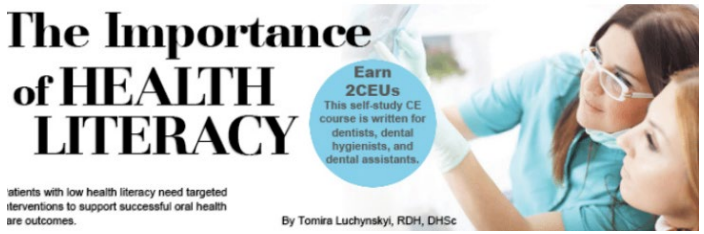
Lets Do a Screening Together!



What can we identify ……. Is it an Urgent Situation? Is there unmet need? Prior History?

Oral Health Literacy

Oral Health Literacy* (OHL) has been defined as the degree to which individuals have the capacity to obtain, process, and understand basic oral health information and services needed to make appropriate health decisions and act on them.



Source: National Institute of Dental and Craniofacial Research, National Institutes of Health, US Public Health Service, US Dept. of Health and Human Services.

The Profession of Dentistry

Joseph C. Kelly Jr., DDS
2/25/2026

The Profession of Dentistry

- My Story
- Dive into the World of Dentistry
- Dental Specialties
- Tooth Decay 101

My Story

- University of Delaware (Graduated 1992)
- Mentor(s)
- Worked for a year at Astra Zeneca
- Dental Admission Test (DAT)
- University of Maryland, School of Dentistry (Graduated 1997)
- Christiana Care General Practice Residency (Graduated 1998)
- Private Practice

University of Delaware

- Graduated with a degree in Political Science
- Grant studying the Delaware Constitution
- My passion for science started with an Ecology class
- Stayed an extra year and acquired the necessary prerequisite classes for dental school
- Interviewed with professors to get a letter of recommendation from the University

Mentors

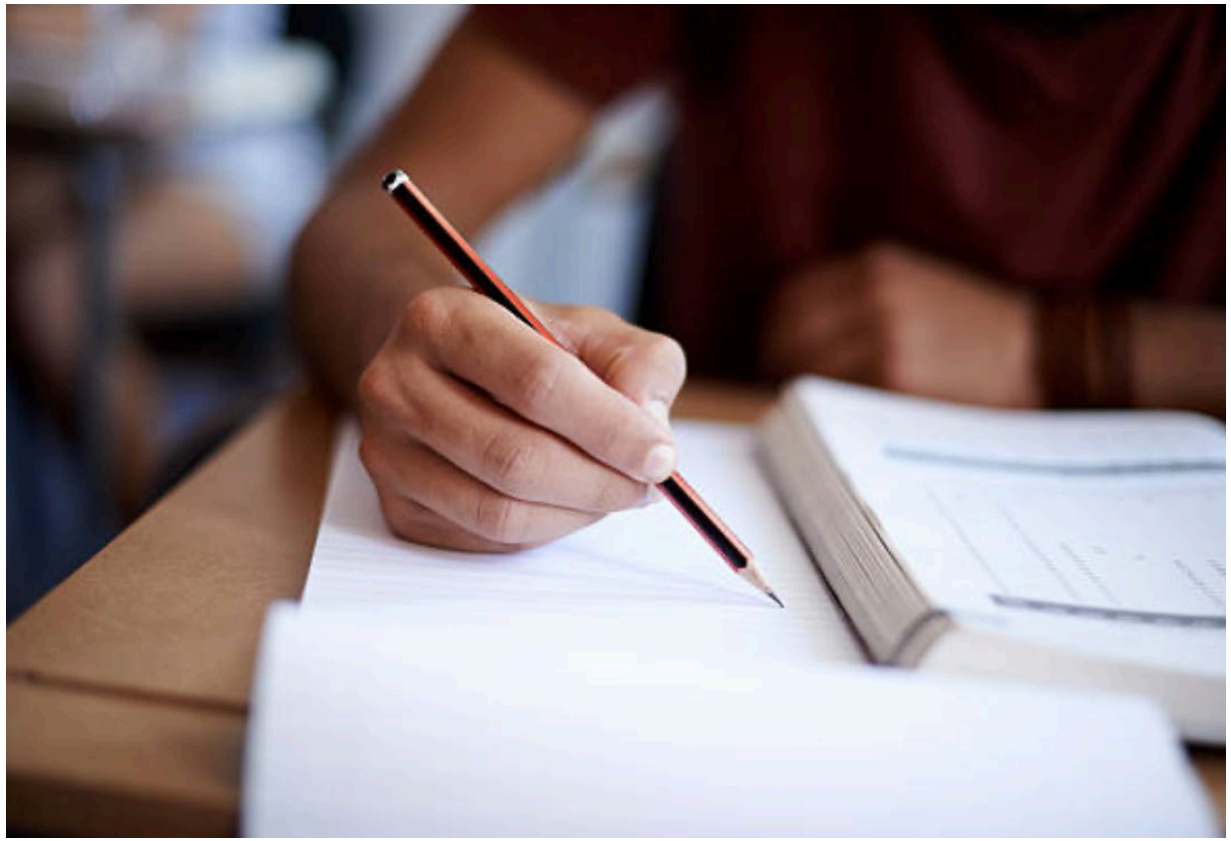
- My father's friend was a dentist and he became my mentor
- You need someone who has experience, who can be trusted, and someone that has gone down this similar path
- Reach out to your family dentist or shadow at an office

Astra Zenaca

- My Senior year summer
- Performed dissections on animals for urinary incontinence and pulmonary hypertension
- Great hand eye training for dental school

Dental Admission Test

- Natural Sciences (Biology, general chemistry, organic chemistry)
- Perceptual Ability (two and three dimensional problem solving)
- Reading Comprehension (dental and basic sciences)
- Quantitative Reasoning (mathematical problems, conversions)
- Accepted by 66 dental schools in the US
- 4.5 hour exam
- Prep classes recommended
- Timing of the exam should be considered
- Biology section is the toughest to prepare for due to the volume of material.



University of Maryland, School of Dentistry

- 4 Year program
- First two years were the course work in the sciences and dentistry along with labs that prepare you for the clinical years.
- The last two years you are in the clinic working on patients and course work focused on dentistry.
- Took two written board exams: Part 1 and Part 2
- You had to perform a defined number of procedures for graduation.
- Clinical Board is required to gain licensure.

General Practice Residency

- One year hospital-based residency in general dentistry
- Anesthesia rotation
- Emergency medicine rotation
- Oral medicine rotation
- Oral surgery rotation
- On call schedule for dental emergencies
- General dentistry performed in the dental clinic
- Lectures covering a wide array of dental topics
- Provides practical experience in emergency and multidisciplinary comprehensive oral healthcare
- Exposes you to a wide variety of case including patients with special needs and medically complex patients
- Understand the oral health needs of communities and take part in community service
- Function effectively within the hospital and other health-care environments

General Practice Dentistry

General Dentists:

- Worked as an associate and owner
- Provide a wide range of comprehensive oral health care services such as restorations, crowns/bridges, sealants, teeth whitening, cosmetic bonding, dental implants, emergency dental care
- Diagnose and treat plan for common dental issues
- Typically the first point of contact for individuals seeking dental care
- GP's make up 78.2% of the dental profession
- Refer patients to specialists and direct the multidisciplinary team when treating complex cases. Act as the "quarterback" for these cases.

The Dental Team

- A coordinated group of of licensed professionals
- Works together to deliver prevention, diagnosis and treatment plan for common dental issues
- Combines clinical skill, communication and patient support
- Focused on safety, efficiency and long-term oral health

The Dental Hygienist

- Provided prophys, scaling and root planning
- Monitors disease and documents findings
- Educate patients on home care and risk reduction
- Focused on prevention and *periodontal health*

The Dental Assistant

- Supports procedures chairside
- Maintains infection control and operatory flow
- Manages instruments, materials and radiographs\
- Helps ensure patient comfort

The Administrative Team

- Scheduling and Patient coordination
- Insurance and financial arrangements
- Treatment acceptance and communication
- Keeps the practice running smoothly
- Helps ensure patient comfort

The Dental Specialist

- Provide advanced care and diagnosis beyond general practice
- Work collaboratively with the general dentist
- Communication is key

Why the Team Approach Matter

- Improves quality and safety
- Expands access to care
- Enhanced patient experience
- Allows every professional to work at the top of their training

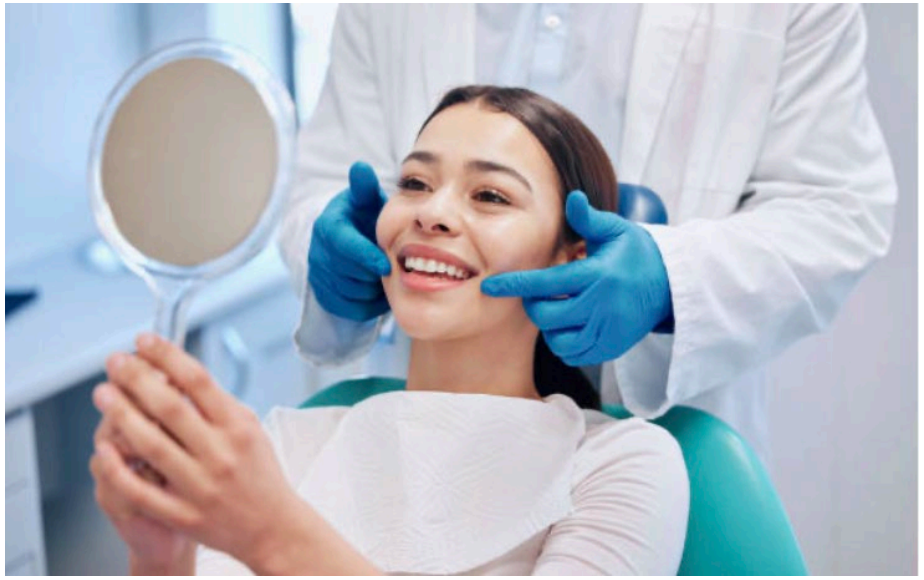
Dental Specialties

- **Endodontics (1983):** This area focuses on dental pulp and periradicular tissues. Endodontists primarily perform root canals.
- **Orthodontics and Dentofacial Orthopedics (2003):** If you want to straighten your teeth, you need an orthodontist. Dentofacial orthopedic specialists correct facial deformities using many of the same types of appliances used in teeth straightening therapy.
- **Pediatric Dentistry (1995):** Pediatric dentists provide dental care for infants, children and teenagers.
- **Periodontics (1992):** The ADA defines this as the prevention, diagnosis and treatment of diseases of the tissues around the teeth – the gums, that is.
- **Prosthodontics (2003):** Prosthodontists provide restorative dental procedures including dental implants, crowns, bridges, and dentures. They also perform cosmetic dental treatments.
- **Oral and Maxillofacial Pathology (1991):** This specialty concerns diseases affecting the oral and maxillofacial regions.
- **Oral and Maxillofacial Radiology (2001):** Oral and maxillofacial radiologists analyze radiographic images (x-rays) for issues of the maxillofacial area.
- **Oral and Maxillofacial Surgery (1990):** Oral surgeons perform surgery on the teeth, jaw, face, and gums. These include facial reconstruction, cleft lip and palate correction, bone grafting, dental implants, and impacted teeth.
- **Dental Public Health (1976):** This discipline focuses on the prevention and treatment of dental diseases and promoting dental health through community effort.

So, let's dive into the world of dentistry and learn more about it!

❖ What is Dentistry?

Dentistry is a branch of medicine that focuses on the health of your teeth and gums. Dentists are the professionals who specialize in the the oral cavity and related structures. They are responsible for diagnosing, preventing, and treating oral health problems.



❖ Why is Oral Health Important?

Oral health is important because it affects your overall health. Your mouth is the entry point for many of the things that enter your body, including food, water, and air. Poor oral health can lead to problems like tooth decay, gum disease, and bad breath. In severe cases, it can contribute to heart disease, stroke, and other health problems.

Dental Caries: AKA Tooth Decay or Cavities

So, what exactly is Dental Caries?

- It is a common problem that affects people of all ages.
- It is a disease that occurs when bacteria in the mouth produce acids that dissolve the hard outer layer of the teeth, called enamel.
- Over time, these acids can create a hole, or cavity, in the tooth.
- If left untreated, the cavity can become larger and deeper, leading to pain, infection, and even tooth loss.

Factors that Contribute to the Development of Dental Caries

There are several factors that contribute to the development of dental caries.

1. The most important factor is **poor oral hygiene**, which allows bacteria to accumulate and produce the acids that cause tooth decay.

2. A diet high in sugar and carbohydrates

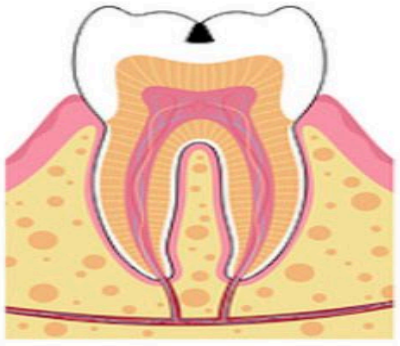
3. A lack of fluoride in the water and toothpaste

4. Certain medical conditions that reduce the flow of saliva, which helps to protect the teeth.

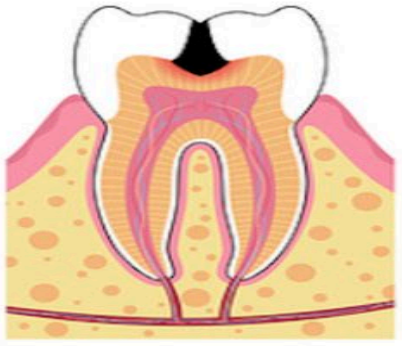
Stages of Tooth Decay

1. **Initial Demineralization**: This is the earliest stage
2. **White Spots**: These may appear on the tooth's surface. This is a sign of early decay. It is important to address by improving oral care and diet.
3. **Enamel Decay**: As decay progresses, the enamel is further eroded.
4. **Dentin Decay**: The decay reaches the dentin which is the layer beneath the enamel.
5. **Pulp Involvement**: Decay reaches the pulp which contains nerves and blood vessels. This stage is painful.
6. **Abscess Formation**: An abscess can develop at the root of the tooth.

White Spot



Enamel Decay



Dentin Decay

Involvement of The Pulp

What is Streptococcus Mutans?

- Streptococcus mutans is a type of bacteria commonly found in the human oral cavity. It is considered to be one of the primary etiological agents in the development of dental caries, which is the most prevalent oral disease worldwide.

- S. mutans is able to colonize the surfaces of teeth, particularly in areas where there is a buildup of plaque. Once it has colonized the tooth surface, S. mutans produces acid as a byproduct of its metabolism of carbohydrates, particularly sugars. This acid production causes a drop in the pH of the surrounding environment, leading to demineralization of the tooth enamel.

- Over time, this demineralization can progress to the point where a cavity is formed. S. mutans is also able to produce glucans, which are sticky polysaccharides that allow the bacteria to adhere more firmly to tooth surfaces, further contributing to the formation of dental plaque and caries.

- In addition to its ability to produce acid and adhere to tooth surfaces, S. mutans is able to form biofilms, which are complex communities of bacteria that are embedded in a matrix of extracellular polymeric substances. These biofilms are resistant to mechanical removal, as well as to the action of many antimicrobial agents, making them difficult to treat.

Strategies to Promote Remineralization of Tooth Structure

Effective prevention and management of dental caries requires a multifactorial approach that includes measures to control the growth and activity of S. mutans, as well as strategies to promote remineralization of the tooth structure. Remineralization is the process by which minerals, such as calcium and phosphate, are deposited back into the tooth structure, thus repairing and strengthening the enamel.

There are several strategies that can be used to promote remineralization of tooth structure, including:

1. **Fluoride treatments:** Can be applied topically to the teeth in the form of toothpaste, mouthwash, or professional fluoride varnish treatments. Fluoride also inhibits demineralization and enhances remineralization at the crystal surface. The resulting remineralized layer is resistant to acid attack. It also inhibits bacterial enzymes.

2. **Dental Sealants:** Dental sealants are thin plastic coatings that are applied to the chewing surfaces of teeth, particularly molars, to protect them from decay. They help to prevent food and bacteria from getting trapped in the grooves of the teeth, reducing the risk of decay and promoting remineralization.

3. **Calcium and Phosphate Supplements:** Calcium and phosphate are essential minerals for tooth remineralization. Supplements in the form of mouth rinses, toothpaste, or professionally applied treatments can help to deliver these minerals to the teeth.

Strategies to Promote Remineralization of Tooth Structure, cont.

4. **Xylitol:** Xylitol is a sugar substitute that has been shown to reduce the growth of S. mutans, and thus, the risk of decay. It is often found in sugar-free gum or mints and can be used as a dietary supplement. Xylitol is converted into xylitol 5-phosphate (X5P) after its uptake into bacterial cells and X5P may inhibit bacterial metabolism, including acid production. Thus, xylitol retards growth of S. mutans.

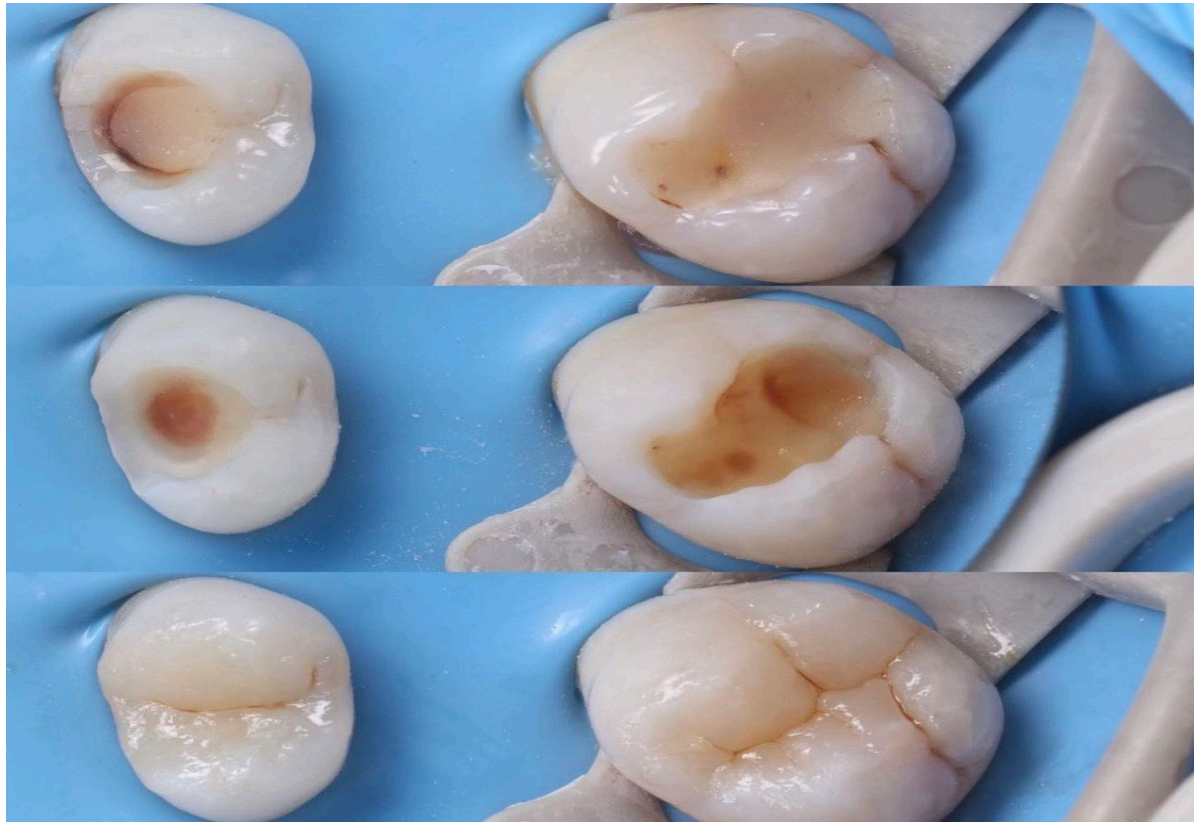
5. **Oral Hygiene Practices:** Regular brushing and flossing help to remove food particles and plaque from the teeth, reducing the risk of decay and promoting a healthy oral environment for remineralization to occur.

It is important to note that these strategies are most effective when used in conjunction with a healthy diet and regular dental checkups to monitor and treat any early signs of decay.

Treatment and Restoration of Dental Caries

Dental caries can be restored or treated in various ways, depending on the severity and extent of the decay. Here are some of the most common ways to restore dental caries.

1. **Dental Fillings:** Dental fillings are the most common way to restore teeth that have been affected by caries. The decayed area is removed and replaced with a filling material, such as composite resin or amalgam



Step 1

Step 2

Step 3

Step 4

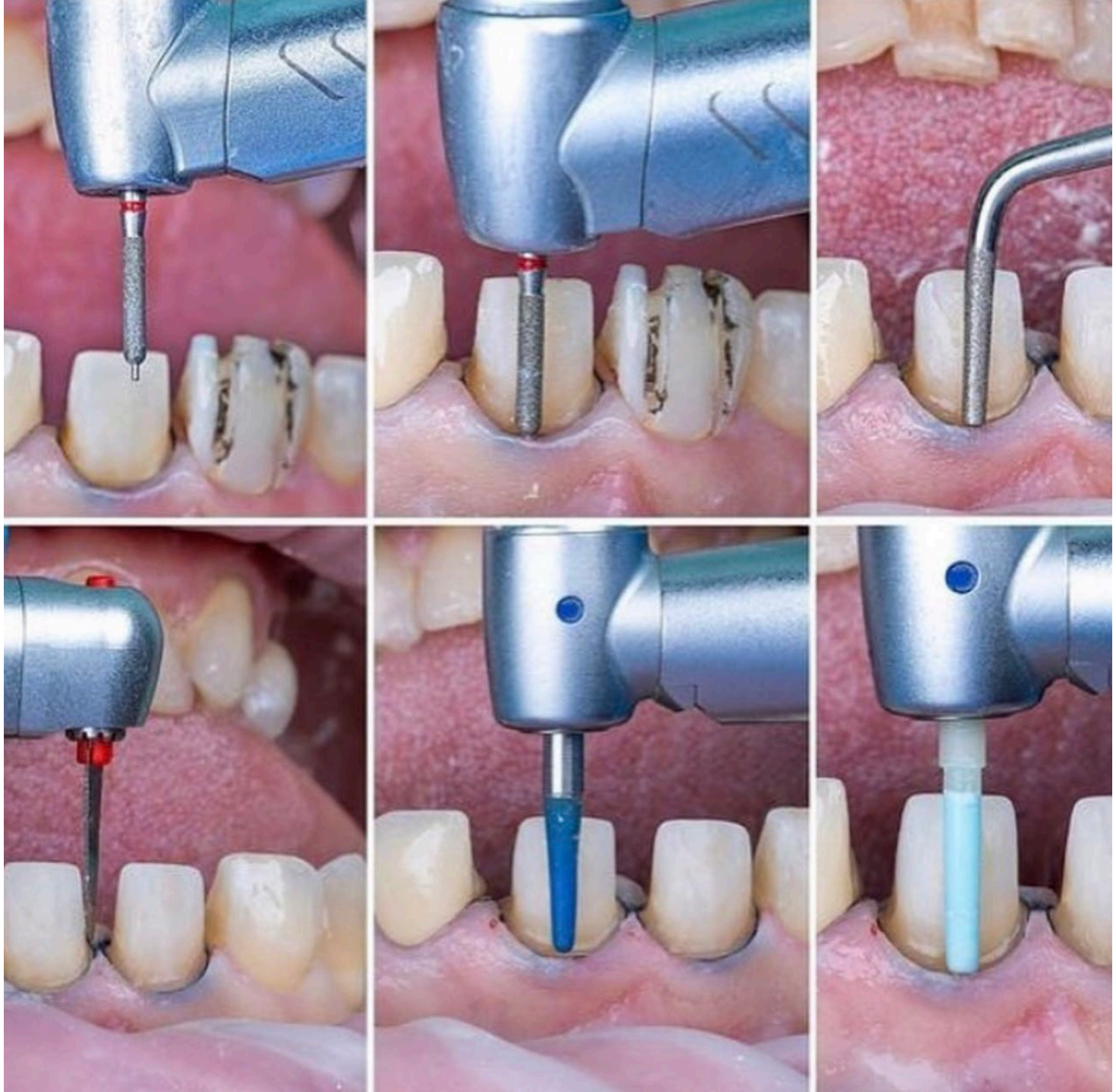
Step 5

Step 6

Treatment and Restoration of Dental Caries, cont.

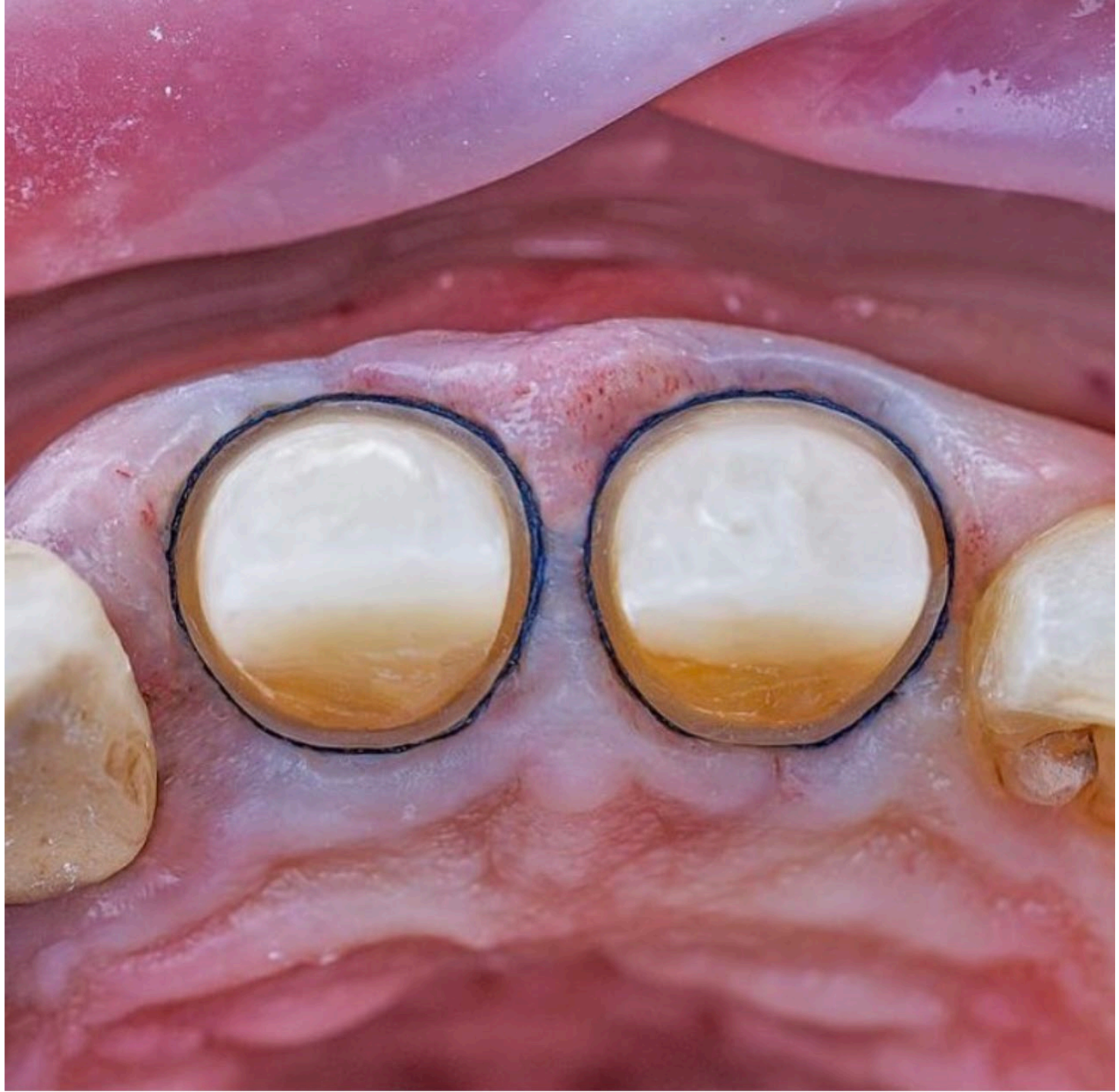
2. **Dental Crowns:** Dental crowns are used to restore teeth that have extensive decay or damage. The decayed or damaged portion of the tooth is removed and covered with a crown, which is a custom-made cap that covers the entire tooth.

Step 1



Step 2

Step 3

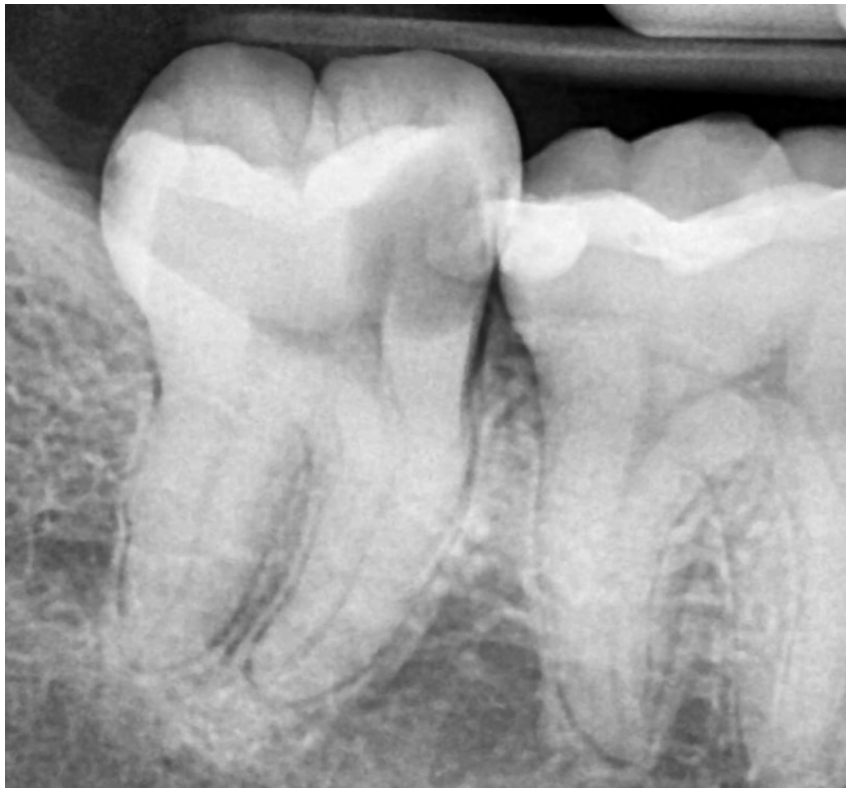


Step 4

Treatment and Restoration of Dental Caries, cont.

3. **Root Canal Therapy:** Root canal therapy is used to treat teeth that have decay that has reached the pulp, or inner portion, of the tooth. The decayed tissue is removed, and the tooth is filled and sealed to prevent further infection.

Step 1



Step 2

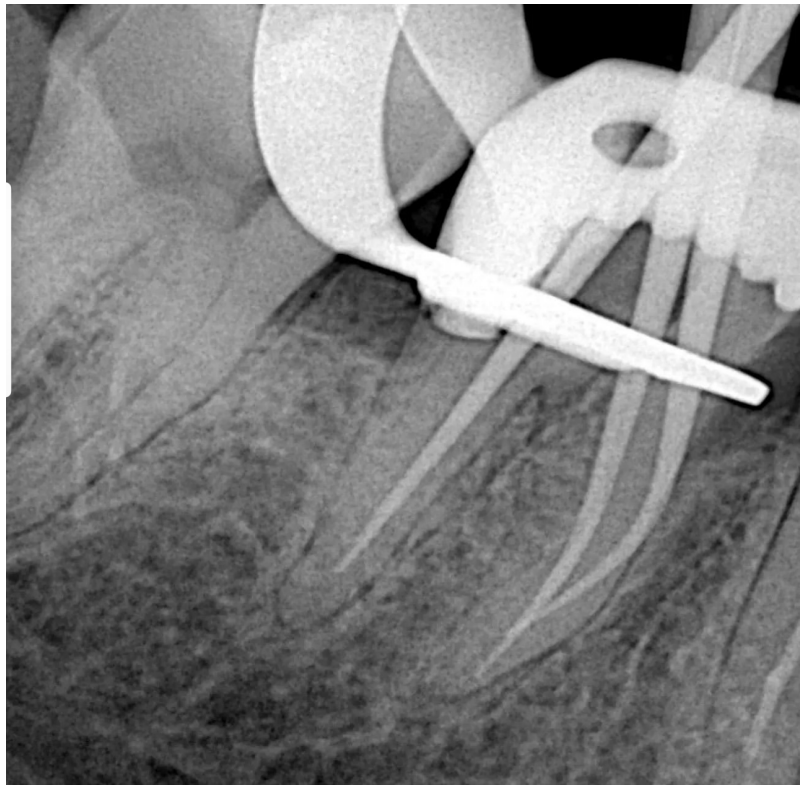
Step 3

Treatment and Restoration of Dental Caries, cont.

Root canal therapy continued…..

Step 4

Step 5



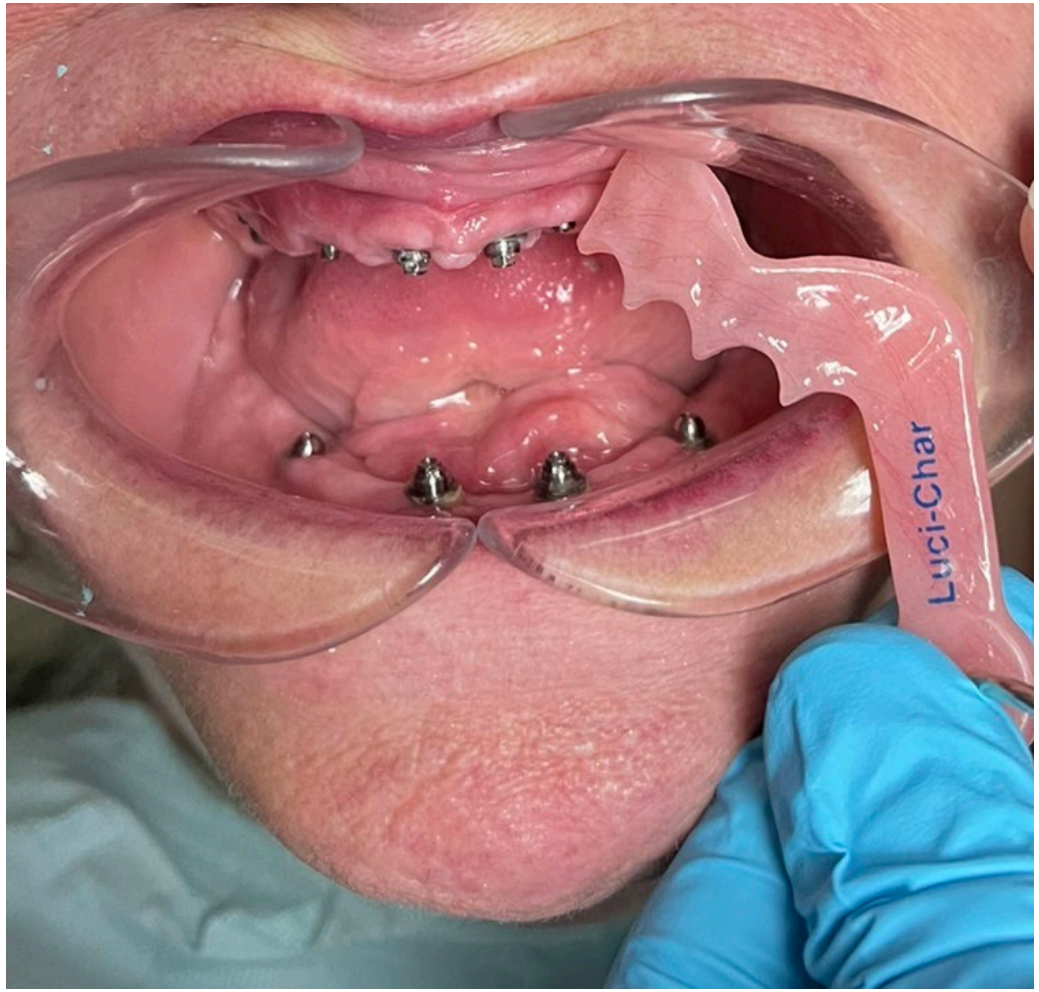
Step 6

Treatment and Restoration of Dental Caries, cont.

4. **Dental Implants:** Dental implants are used to replace teeth that have been lost due to decay or other factors. A small metal post is placed into the jawbone, and a custom-made artificial tooth is attached to the post.

Treatment and Restoration of Dental Caries, cont.

Dental Implants continued…..



Treatment and Restoration of Dental Caries, cont.

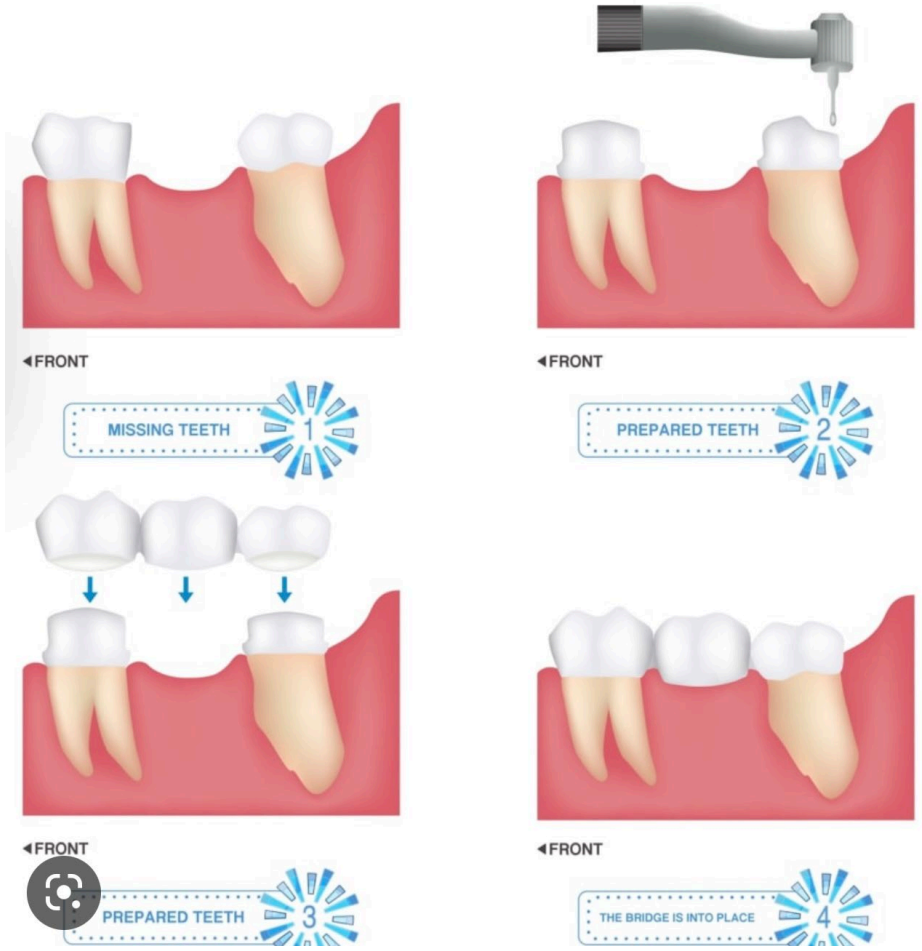
Dental Implants continued…..

Treatment and Restoration of Dental Caries, cont.

Dental Implants continued…..

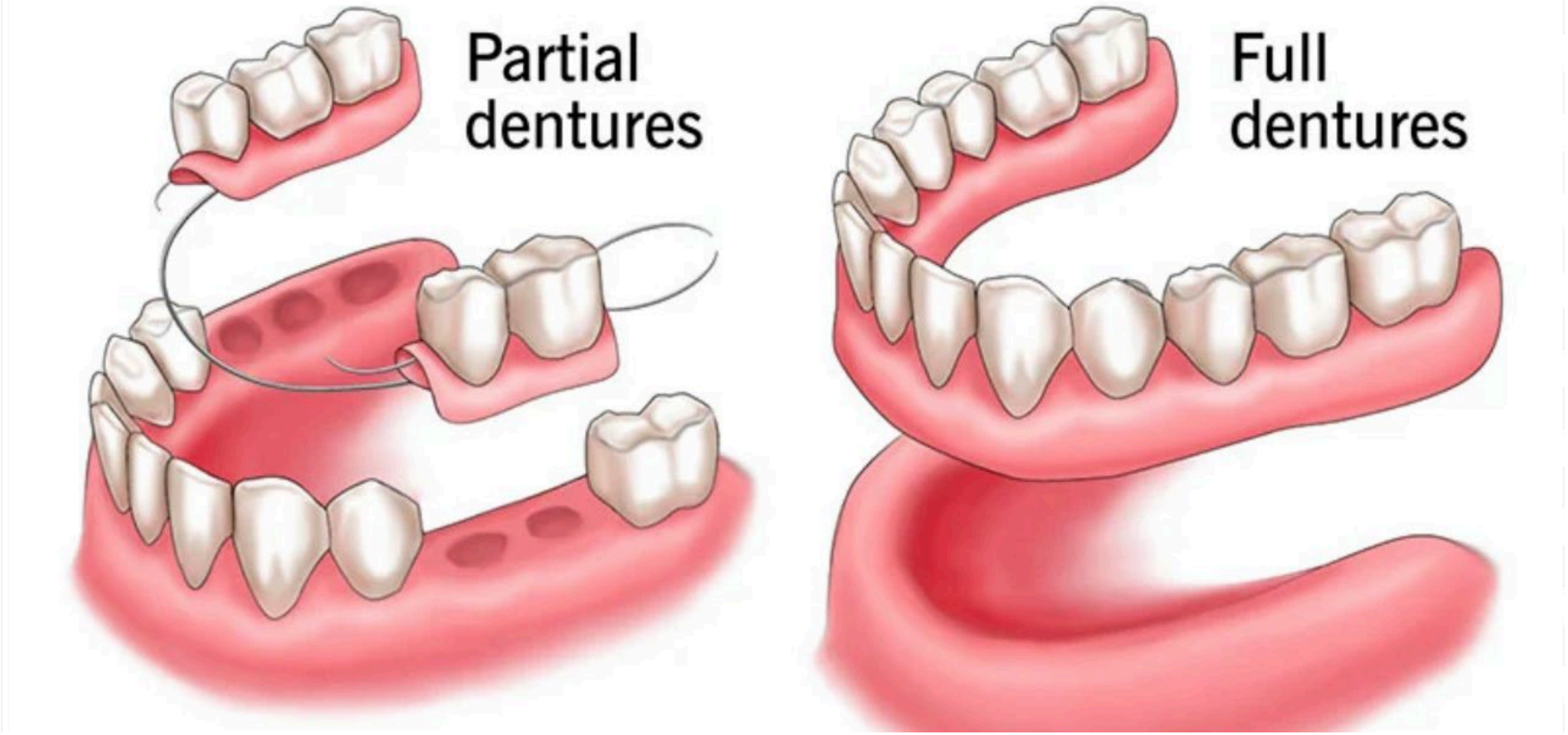
Treatment and Restoration of Dental Caries, cont.

5. **Fixed Bridge:** A fixed bridge can be used to replace teeth that have been lost due to decay. The bridge uses teeth that are adjacent to the missing space as anchors. The adjacent teeth are prepared for crowns and a fake tooth sits in between crowned teeth.



Treatment and Restoration of Dental Caries, cont.

6. **A Partial Denture or Complete Denture:** A denture is a removable device that replaces missing teeth. A complete denture will replace an entire arch, whereas a partial denture will replace a segment of the arch relying on existing teeth to provide retention



Treatment and Restoration of Dental Caries, cont.

Dentures continued…..

Treatment and Restoration of Dental Caries, cont.

Dentures continued…..

Questions??

Thank You!
Joseph C. Kelly Jr., DDS