Portland Area Dental Meeting May 16, 2019

Special Considerations for Dental Treatment for Elders

Adapted & Presented by:

Beatrice Gandara, DDS, MSD

Developed by:

Beatrice Gandara, DDS, MSD
Jacqueline M. Plemons DDS, MS
Terry Rees, DDS
Linda C. Niessen, DMD

ARCORA
The Foundation of Delta Dental of Washington

Session Objectives

- Understand the impact of aging on oral health in our elderly patients and on their ability to cope with dental treatment
- Recognize the risk factors for caries, tooth wear, and periodontal disease associated with aging
- Develop oral disease prevention and management strategies that are tailored to an elderly patient's unique needs

What happens as you get older?

Normal Aging

- Mucosal aging, slower cell turnover
- Immunosenescence- decreased immune surveillance and immunological response
- Increased risk of autoimmune disease
- Decrease in salivary function (mostly minor glands)
- Normal wear of teeth, exposure of root surfaces with gingival recession

Aging- medical conditions, effects of medical treatment

- Multiple systemic conditions (eg diabetes, hypertension, etc.)
- Polypharmacy
- Radiation treatment in the head and neck area for cancer
- Malnutrition related to GI dysfunction, absorption
- Slower wound healing
- Cognitive changes

Aging- behavioral and functional impairments

- Accumulation of assaults over time to oral tissues and other organ systems (alcohol, tobacco)
- Poor nutrition related to state of dentition, food access and preferences
- Cariogenic diets, inadequate hydration
- Poor oral hygiene
- Compromised manual dexterity, mobility
- Increase pathogens due to changes in saliva, plaque removal/retention
- Ill-fitting removable dentures

Aging- psychological and social issues

- Psychological problems- anxiety, depression, stress
- Social isolation, lack of social support
- Transportation challenges
- Limited income, access to health care
- History of traumatic dental and medical experiences (dental fears)

History-taking and Physical Examination and Risk Assessment

Our elders will experience these changes differently and be at different levels of risk for various oral diseases.

Risk Assessment

Risk assessment involves consideration for the **preoperative, intraoperative, and postoperative** periods and broadly includes the patient's susceptibility to infection, poor healing, bleeding, medication interactions, and physical and emotional ability to tolerate dental treatment.

AAOM Clinical Practice Statement
June 2016 Subject: Risk Assessment

http://www.aaom.com/assets/docs/Practice-Statements/riskassess-vol-121-6-2016.pdf

Importance of RISK ASSESSMENT - Systemic Health

- Medical conditions (and/or their treatment) can impact the safe delivery of care
- Medical conditions (and/or their treatment) can impact oral health (eg. affect immune resilience, salivary function, ability for self care)
- Oral disease may be a manifestation of systemic disease (or treatment for systemic disease) and/or present risk for systemic health
- Medical conditions may affect ability of the patient to attain and sustain desired outcomes of treatment

Importance of RISK ASSESSMENT - Oral disease diagnosis and treatment planning

- Salivary gland dysfunction
- Caries
- Non-carious tooth wear (attrition, erosion, abrasion)
- Periodontal disease
- Mucosal disease
- Temporomandibular disorders

How do you get the information to determine if risk factors are present?

- History taking (can simultaneously evaluate patient's communication ability while interviewing)
  - History of present illness/desires for treatment (HPI)
  - Medical history
  - Dental history (regular care, urgent care only, surgeries)
- Physical examination
- Salivary function assessment
- Dietary survey (sugars, acidic foods)

Medical History (shared EHR's make this easier)

- Past and present chronic diseases
- Past surgeries, hospitalizations
- Review of medications, allergies- have the patient bring a list or the medications
- Habits (alcohol, tobacco, drug abuse)
- Psychosocial, developmental, and behavioral histories (excessive stressors, can the patient maintain a healthy diet? What is their social support?)
- Review of systems (cardiovascular, pulmonary, GI, etc.)

Ask about hydration

This image cannot currently be displayed.

- Decreasing sense of thirst signals with increasing age
- Individuals may purposefully under-hydrate to avoid incontinence problems
- Salivary flow rates are reduced in dehydrated states!
- Ask what is used to hydrate. Does the beverage contain sugar? Is it acidic? Can it contribute to caries or erosive wear of the dentition?

Seniors are at higher risk for becoming dehydrated for several reasons:

- Body's ability to conserve water is reduced
- Thirst sense is reduced
- People in nursing homes or living alone tend to eat and drink less than younger people do
- Forgetfulness to eat or drink altogether
- Disability or neglect
- Chronic illness
- Body is less sensitive to temperature changes

http://preferredlivingsolutions.com/dehydration-danger-signals/

Alcohol Use – The NIAAA* defines risky alcohol use as the following:

Men over 65 and all women: more than 7 standard drinks/week on average, and more than 3 drinks on any day

Men under 65: more than 14 standard drinks/week on average, and more than 4 drinks on any day

Single-item screen for Alcohol use:

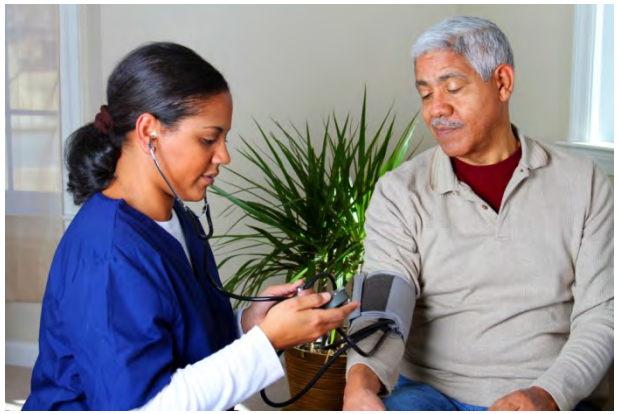
"How many times in the past year have you had four (five for men) or more drinks in a day?"

- Positive response is >0 or if a patient has difficulty coming up with the correct number (82% sensitive and 79% specific for unhealthy alcohol use)

*National Institute on Alcohol Abuse and Alcoholism (NIAAA)

Regular Health History Updates (your team can assist with this)

Health history changes? Check frequently, things can change quickly.



Ask questions to check:

“How are you doing today?”

“How’s your BP, cholesterol, etc?”

“How are you managing with your diabetes, etc?”

“Are you taking any new medicines?”

Have you lost/gained weight?

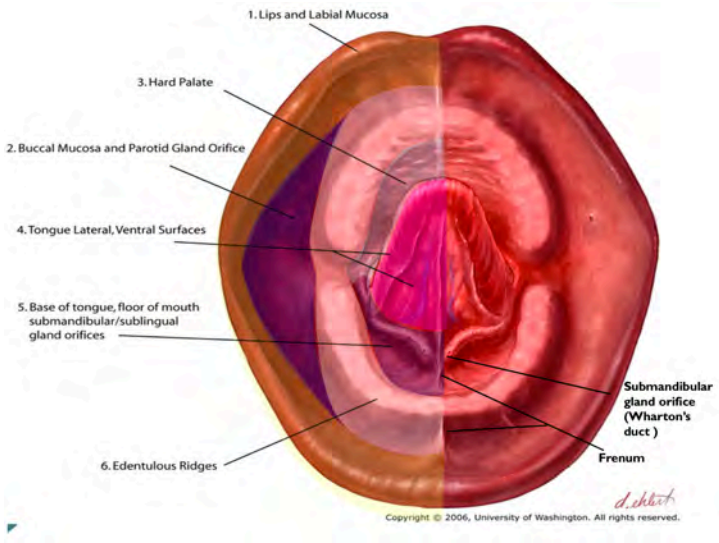
Clinical Examination – Vital signs, extra-oral

- Measurement of vital signs
- General assessment of physical appearance, posture and mobility
- Assessment of behavioral response
- Evaluation of the skin, hairline, ask about scalp
- Extra-oral head and neck examination

(lymph nodes, salivary and thyroid glands, TMJ, muscles)

Clinical Examination - Intraoral

- Clinical evaluation of salivary flow, appearance, and consistency
- Visual inspection and digital palpation of the oral soft and hard tissues
- Evaluate oral mucosa for lesions, with attention to premalignant and malignant oral lesions (eg. lichen planus, leukoplakia)
- Periodontal assessment (use periodontal probe)
- Examination of dentition
- Radiographs as needed
- **Examination of oral tissues is important regardless of presence of teeth or not!**



Visual Assessment of Salivary Flow

- Express saliva from the major salivary glands during oral examination, note clarity and quantity of expressed saliva
- Does saliva appear foamy or form strings of saliva?
- Does the mucosa stick to the mouth mirror or tongue blade?
- Does saliva pool in the floor of the mouth?
- Visually inspect minor gland secretion by holding out the lower lip and inspecting the labial mucosa for 30 seconds

You can also measure objectively with salivary assessment kits.

Saliva-Check BUFFER
Test for Saliva Quality, pH & Buffering Capacity

Saliva-Check BUFFER is a saliva-testing examination tool that is used to educate patients, assist in preventive treatment planning and properly select dental materials in order to initiate changes in the patient's oral hygiene. This product plays a significant role in maintaining oral health. It identifies, measures and assesses the patient's saliva condition, which helps determine the body's possible risk of caries. It is also helpful for testing hydration, salivary consistency, resting saliva pH, stimulated saliva flow, stimulated saliva pH and saliva buffering capacity. The Saliva-Check BUFFER is ideal for use during routine oral examinations.

So we have all this information…

Note RISK FACTORS for:

- Caries
- Non-carious tooth wear
- Periodontitis

General Risk Factors for Oral Health in Elders

Low-Risk

- Living independently, mobile
- Medically well
- Positive attitude to oral health
- High level of health literacy and awareness
- Good manual dexterity
- Oral cavity well lubricate
- No oral prostheses
- Good oral hygiene
- Low to moderate daily intake of carbohydrates.

High-risk

- Dependent, restricted social mobility
- Institutional care setting
- Medically compromised
- Low health literacy and awareness
- Compromised manual dexterity
- Hyposalivation
- Poor oral hygiene
- Wearing removable prosthesis
- Frequent intake of carbohydrates

*Minimal intervention dentistry for partially dentate older adults. *Gerodontology.* 2019:00:1-7

For our high-risk Elders, consider minimal intervention dentistry

- Identify the risk factors for caries, periodontal and mucosal disease
- Examine carefully for early detection of caries, periodontal disease and mucosal disease
- For caries, minimize removal of carious tooth structure using atraumatic techniques
- Repair rather than replace existing defective restorations

*Minimal intervention dentistry for partially dentate older adults. *Gerodontology.* 2019:00:1-7

Caries

Caries epidemiology

- In a study of global burden of disease, Kassebaum et al reported that untreated dental caries is the most prevalent non-communicable disease condition worldwide. It has 3 peaks at ages 6, 25 and 70 years of age

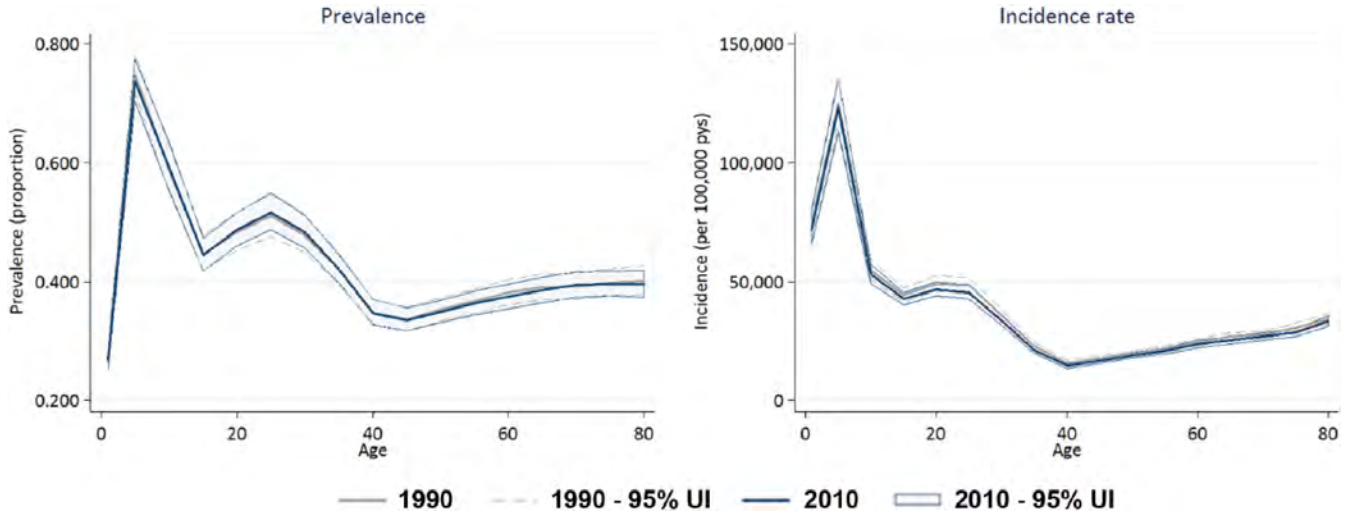


Figure 2. Prevalence (proportion) and number of incident cases of untreated caries in 1990 (light line) and 2010 (dark line) with 95% uncertainty intervals by age.

- Kassebaum NJ, Bernabe E. Dahiya M, et al. Global Burden of untreated caries: a systematic review and metaregression. J Dent Res. 2015;94(5):650-658

There is a high incidence of caries in older adults, caries increments as high as three surfaces every three years in adults over 65 years

Thomson W. Dental caries experience in older people over time: what can the large cohort studies tell us? Brit Dent J. 2004:196:89-92

Caries Prevalence in NA Adults

- "68 percent of Native Americans ages 35 to 44 had untreated decay in 1999, the most recent year for which nationwide data are available".
- "This is more than twice the 2011 rate of 27 percent among all adults in the U.S."
- "Forty-three percent of Native Americans in this age group had **both** untreated decay and periodontal disease."

http://www.pewtrusts.org/~/media/assets/2015/07/oralhealthnativeamericansfs.pdf

Root Caries

50% of older adults over 65 to 75 years old have root caries affecting at least one tooth.

Demineralization starts at the following pH levels:

- **Critical pH for Enamel: pH 5.2 – 5.5**
- **Critical pH for Cementum: pH 6.1 - 6.7**

1.Gregory D, Hyde S. Root caries in older adults. J Calif Dent Assoc 2015;43(8):439-45.

Common features of High Risk Caries Patients

1. Chronic medical conditions, taking 4+ prescription drugs
2. History of radiation therapy involving head/neck area
3. Low unstimulated salivary flow and/or pH and buffer capacity
4. Visible plaque (active lesions)
5. Previous recent caries lesions
6. Exposed root surfaces
7. Dietary factors
    1. healthy (but demineralizing diet)
    2. high intake of fermentable carbohydrates

Additional Risk Factors for Root Caries

- Diabetes
- Smoking, tobacco use
- Removable prosthesis
- Missing teeth
- Soft plaque
- Lack of routine dental services
- Physical limitations/dexterity
- Cognitive decline

A. V. Ritter, D. A. Shugars, and J. D. Bader, "Root caries risk indicators: a systematic review of risk models," *Community Dentistry and Oral Epidemiology*, vol. 38, no. 5, pp. 383–397, 2010. J. M. Sadowsky, R. D. Bebermeyer, and G. Gibson, "Root caries—a review of the etiology, diagnosis, restorative and preventive interventions," *Texas Dental Journal*, vol. 125, no. 11, pp. 1070–1082, 2008

Example:

ADA Caries Risk Assessment Form

ADA American Dental Association®
America's leading advocate for oral health

Caries Risk Assessment Form (Age >6)

Patient Name:				
Birth Date:			**Date:**	
Age:			**Initials:**	
		Low Risk	**Moderate Risk**	**High Risk**
Contributing Conditions		**Check or Circle the conditions that apply**		
I.	**Fluoride Exposure** (through drinking water, supplements, professional applications, toothpaste)	☐ Yes	☐ No	
II.	**Sugary Foods or Drinks** (including juice, carbonated or non-carbonated soft drinks, energy drinks, medicinal syrups)	Primarily at mealtimes ☐		Frequent or prolonged between meal exposures/day ☐
III.	**Caries Experience of Mother, Caregiver and/or other Siblings** (for patients ages 6-14)	No carious lesions in last 24 months ☐	Carious lesions in last 7-23 months ☐	Carious lesions in last 6 months ☐
IV.	**Dental Home**: established patient of record, receiving regular dental care in a dental office	☐ Yes	☐ No	
General Health Conditions		**Check or Circle the conditions that apply**		
I.	**Special Health Care Needs** (developmental, physical, medical or mental disabilities that prevent or limit performance of adequate oral health care by themselves or caregivers)	☐ No	Yes (over age 14) ☐	Yes (ages 6-14) ☐
II.	**Chemo/Radiation Therapy**	☐ No		☐ Yes
III.	**Eating Disorders**	☐ No	☐ Yes	
IV.	**Medications that Reduce Salivary Flow**	☐ No	☐ Yes	
V.	**Drug/Alcohol Abuse**	☐ No	☐ Yes	
Clinical Conditions		**Check or Circle the conditions that apply**		
I.	**Cavitated or Non-Cavitated** (incipient) **Carious Lesions or Restorations** (visually or radiographically evident)	No new carious lesions or restorations in last 36 months ☐	1 or 2 new carious lesions or restorations in last 36 months ☐	3 or more carious lesions or restorations in last 36 months ☐
II.	**Teeth Missing Due to Caries in past 36 months**	☐ No		☐ Yes
III.	**Visible Plaque**	☐ No	☐ Yes	
IV.	**Unusual Tooth Morphology** that compromises oral hygiene	☐ No	☐ Yes	
V.	**Interproximal Restorations - 1 or more**	☐ No	☐ Yes	
VI.	**Exposed Root Surfaces** Present	☐ No	☐ Yes	
VII.	**Restorations with Overhangs** and/or **Open Margins**; **Open Contacts** with Food Impaction	☐ No	☐ Yes	
VIII.	**Dental/Orthodontic Appliances** (fixed or removable)	☐ No	☐ Yes	
IX.	**Severe Dry Mouth (Xerostomia)**	☐ No		☐ Yes

Overall assessment of dental caries risk: ☐ Low ☐ Moderate ☐ High

Patient Instructions:

Clinical Signs of Root Caries

Active

Active

- Yellowish, light brown (more bacteria)
- Soft or leathery on probing with light pressure
- Covered by visible plaque
- Cavitation may or may not be present

Clinical Signs of Root Caries

Inactive

Inactive – arrested, remineralized

- Dark brown or black in color
- Well defined
- Smooth shiny surface
- Hard on probing with moderate pressure
- Usually not covered with plaque

Clinical pathway for the nonrestorative treatment of noncavitated and cavitated carious lesions on permanent teeth.

Slayton RL. Et al. JADA 2018:149(10):837-849

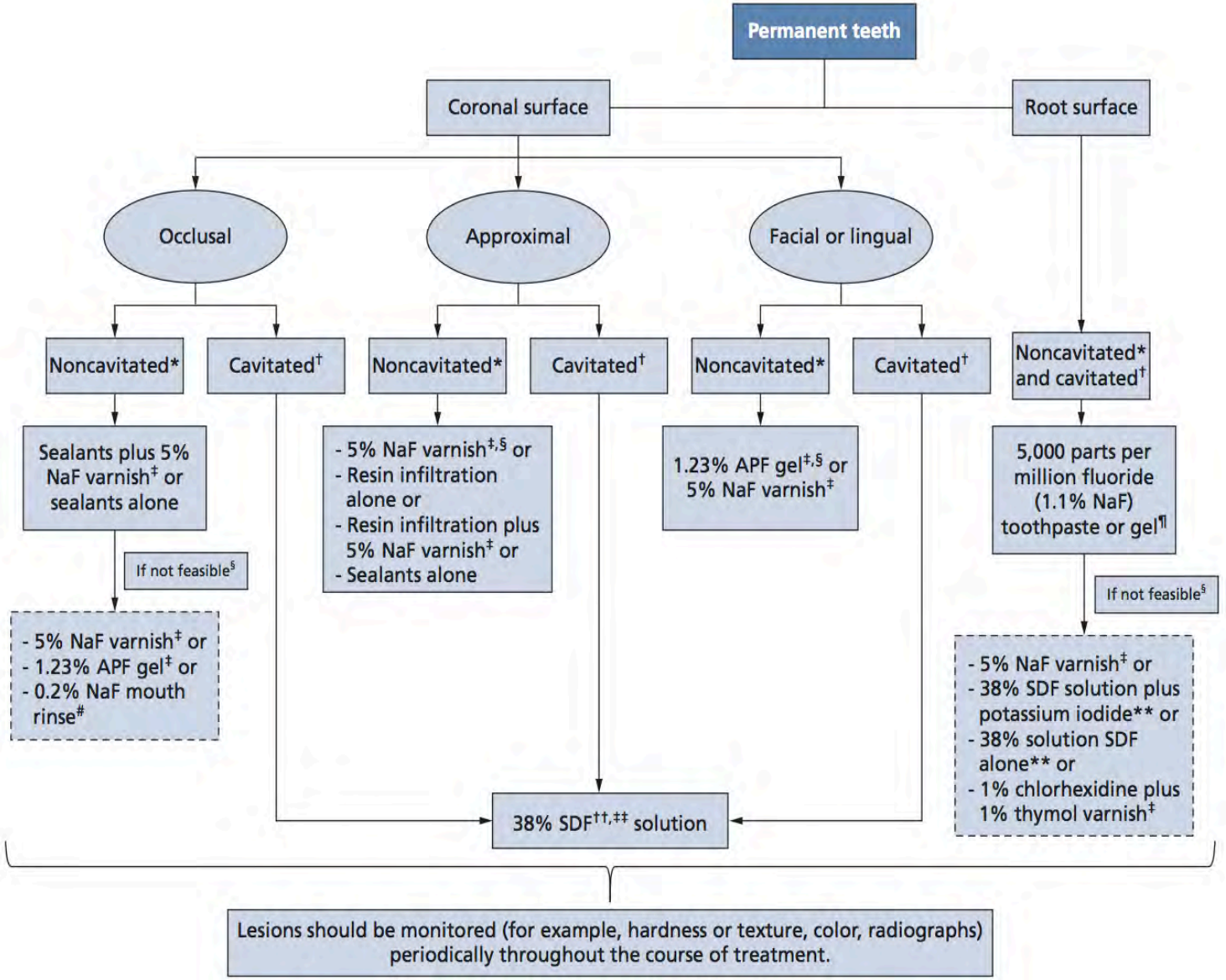
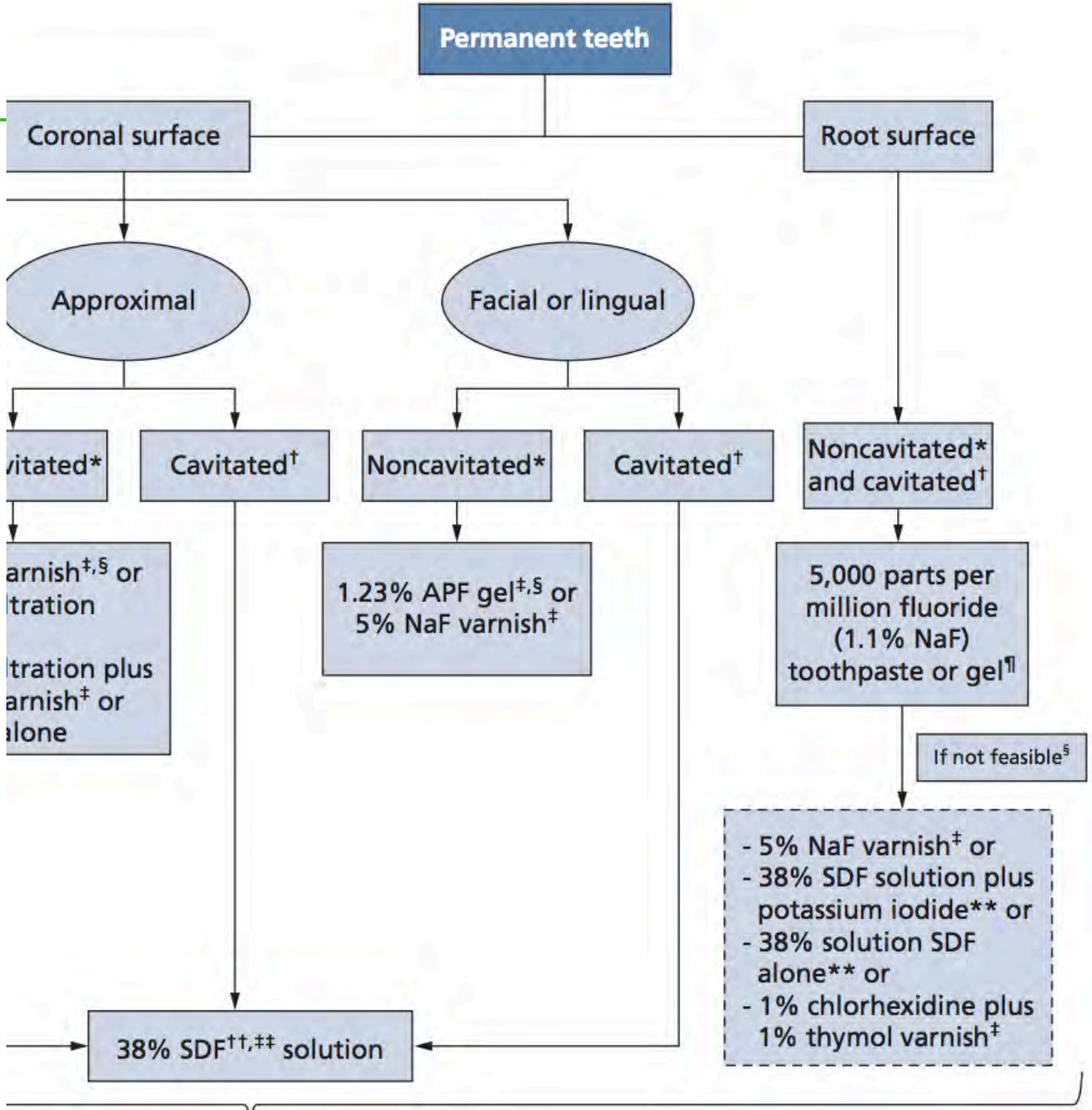


Figure 2. Clinical pathway for the nonrestorative treatment of noncavitated and cavitated carious lesions on permanent teeth. APF: Acidulated phosphate fluoride. NaF: Sodium fluoride. SDF: Silver diamine fluoride. * Defined as ICDAS 1-2. † Defined as ICDAS 5-6. ‡ Application every 3 to 6 months. § The

"Lesions should be monitored (for example, hardness or texture, color, radiographs) periodically throughout the course of treatment"



Slayton RL. Et al. JADA 2018:149(10):837-849

Recommendation for root surface caries

- To arrest or reverse non-cavitated and cavitated carious lesions on root surfaces of permanent teeth, the expert panel suggests clinicians prioritize the use of **5,000 parts per million fluoride (1.1% NaF) toothpaste or gel (at least once per day)**

over

- 5% NaF varnish (application every 3-6 months), 38% SDF plus potassium iodide solution (annual application), 38% SDF solution (annual application), or 1% chlorhexidine plus 1% thymol varnish (application every 3-6 months) (certainty: low; strength: conditional).†† but these can be used if it is not feasible for the patient to apply fluoride gel daily .

Fluoride Varnishes

- ADA new recommendations for topical fluorides includes use of fluoride varnish (22,500 ppm) to arrest adult root caries based on expert opinion
  - *78% of root caries arrested when applied 4x yearly*

Amorphous Calcium Phosphate (ACP)

- Saliva is supersaturated with calcium and phosphate so ACP would **not** help in normal saliva conditions.
- **Target groups for ACP:**
  - *Xerostomia* patients (uncontrolled diabetic patients and patients on hypertension and depression medications)
  - *Cancer patients* who have undergone head and neck radiation therapy
- Calcium phosphate-based remineralization systems commercially available: Amorphous Calcium Phosphate stabilized by a Casein phosphopeptide (CPP-ACP)

EC Reynolds (2008): Calcium phosphate-based remineralization systems: Scientific evidence?
Papas et al.(1999 and 2008): Double blind study and Clinical trial

Prevention targeting the bacteria

- Chlorhexidine rinses
- Iodine rinses
- Xylitol gums/lozenges

Chlorhexidine (0.12%)

- Potent antiseptic antibacterial agent
  - Destabilizes bacterial membranes
  - Inhibits oxygen utilization of bacteria
  - Inhibits outgrowth of bacterial spores
- Swish 15 mL (.5 fluid once) CHX for at least 1 minute

OR

- Brush both gums and tongue with CHX solution for 1 minute 2x daily

Chlorhexidine

- "Non-staining" protocols:
  - Rinsing 1 week /month
  - Rinsing every other week
  - Rinsing every weekend (Saturday and Sunday)

- *Caries reducing effect in **high-caries-risk** patients*
  - but not in low-caries-risk.

- *SLS in tooth paste inactivates Chlorhexidine*
  –wait 30 min to 120 min between applications

- *Combine with home sodium fluoride gel or toothpaste use.*

EBD: Davies, 2004; Walls and Meurman, 2012

Place Iodine before F varnish

Age	Frequency	vs F varnish	Reference
12-19mo	q2mo	80% less	Lopez 2002
12-30mo	q3mo	24% less	Milgrom 2011
2-7y	q2mo	71% less*	Amin 2004
4y	q3mo	100% less*	Simratvir 2010
5-6y	q3mo	46% less	Tut & Milgrom 2010

Estimated Prevented Fraction

37% + (1-37%)*40% = 62%

Studies are underway to provide evidence for similar effect in adults.

Horst, *DCNA*, 2018

Xylitol-containing lozenges or chewing gums

- Lozenges have caries preventive effect on root surfaces
- Xylitol containing chewing gum should be used 5x daily x 5 min
- Need 5 – 10g daily to be effective in reducing Str. Mutans levels

Example- Ice Breakers Ice Cubes
(1.15 gm Xylitol/gum)

Source: Ritter et al., 2013: Tooth-surface-specific Effects of Xylitol: Randomized Trial Results
JDR 2013 Jun;92(6):512-7

Toothbrushes

- A recent Cochrane Review (Type 1) concluded, following a systematic review of 56 studies involving 5068 participants, that ***powered toothbrushes with a rotation-oscillation action are more effective than manual brushes***

- Toothbrushes with this mode of action reduced ***plaque by 21%*** **and** ***gingival bleeding by 11% after 3 months of use*** when compared with manual brushes.

EBD: Davies, 2004

https://www.cochrane.org/CD002281/ORAL_poweredelectric-toothbrushes-compared-to-manual-toothbrushes-for-maintaining-oral-health

Advantage Arrest

Silver Diamine Fluoride 38%

Tinted formula

Slide courtesy of Steve Pardue, Elevate Oral Care

Silver Nitrate, Early History

- First dental use in mid 1800s
- Silver reacts with organic material of dentin and forms a protective layer and is more resistant to acid (Hill & Arnold, JDR, 1937)
- Effective in arresting initial lesions, repeat per 12 months (Hyde, JCDA, 1973)

Slide courtesy of Dr. Peter Milgrom

Systematic Review of Silver Diamine Fluoride

Proposed Indications for SDF:

1. Extreme caries risk (xerostomia or severe early childhood caries)
2. Treatment challenged by behavioral or medical management
3. Patients with carious lesions that may not all be treated in one visit
4. Difficult to treat dental carious lesions
5. Patient with lack of access to care

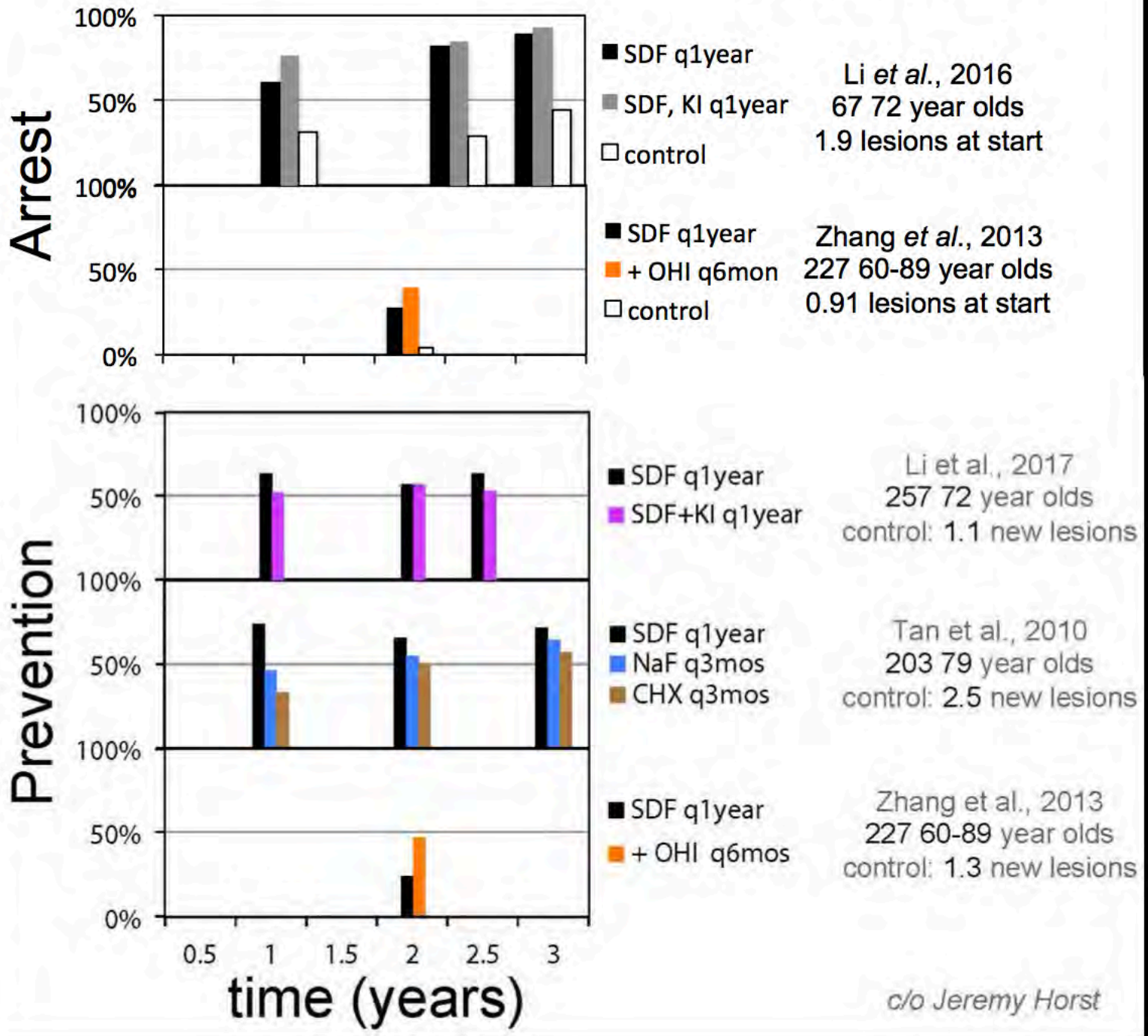
UCSF Protocol for Caries Arrest Using Silver Diamine Fluoride: Rationale, Indications and Consent

Jeremy A. Horst, DDS, PhD; Hellene Ellenikiotis, DDS; and Peter L. Milgrom, DDS **CDA JOURNAL, VOL 44, No1: 17-28 Jan 2016**

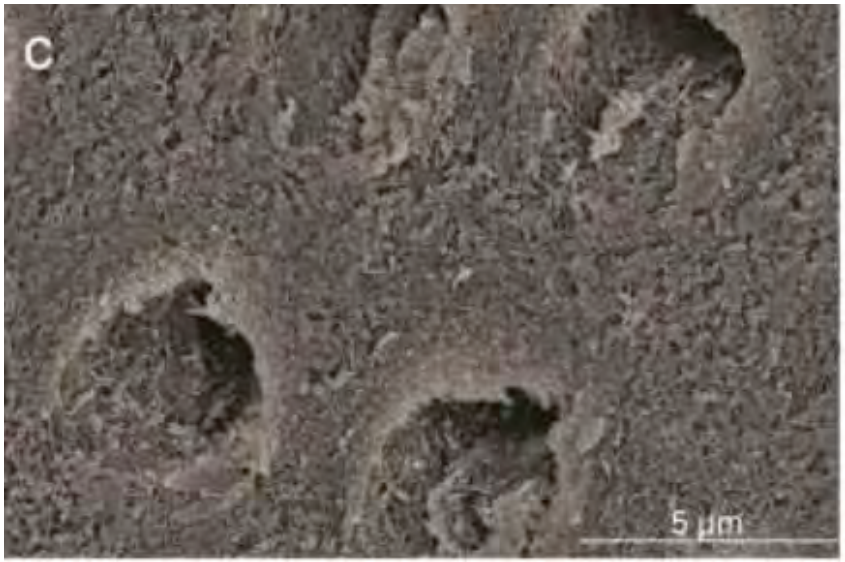
Silver diamine fluoride in older adults

- Existing reports of SDF trials support effectiveness in root caries prevention and arrest, remineralization of deep occlusal lesions and treatment of hypersensitive dentin
  In a 3 year study, the preventive fraction for SDF, sodium fluoride varnish, and chlorhexidine varnish was 71%, 64%, and 57% respectively, compared with placebo and oral hygiene instruction
- **The authors found no studies reporting the effects of SDF on coronal caries in adults. However, many studies support the effectiveness of SDF in both prevention and arrest of coronal caries in children 18 through 36 months of age.**

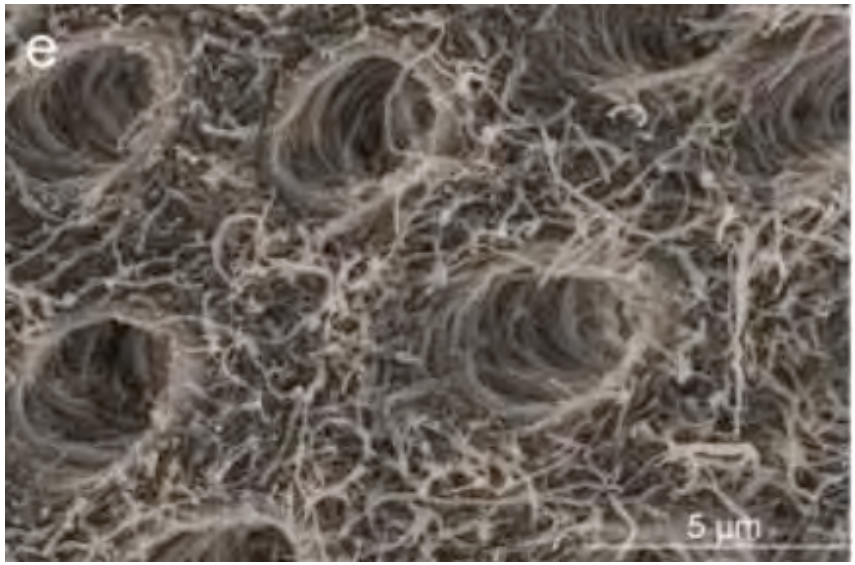
- Hendre AD[1], Taylor GW[1], Chávez EM[2], Hyde S[1]. Gerodontology. 2017 Dec;34(4):411-419.


Arrest
100%
50%
100%
50%
0%
SDF q1year
SDF, KI q1year
control
Li et al., 2016
67 72 year olds
1.9 lesions at start
SDF q1year
+ OHI q6mon
control
Zhang et al., 2013
227 60-89 year olds
0.91 lesions at start
Prevention
100%
50%
100%
50%
100%
50%
0%
SDF q1year
SDF+KI q1year
Li et al., 2017
257 72 year olds
control: 1.1 new lesions
SDF q1year
NaF q3mos
CHX q3mos
Tan et al., 2010
203 79 year olds
control: 2.5 new lesions
SDF q1year
+ OHI q6mos
Zhang et al., 2013
227 60-89 year olds
control: 1.3 new lesions
0.5
1
1.5
2
2.5
3
time (years)
c/o Jeremy Horst

Protection Against Demineralization



Silver diamine fluoride (SDF)



Control

- Arrests caries by forming hardened, impermeable layer of dentin
- Blocks dentin tubules, reducing sensitivity
- Antimicrobial action against Str. Mutans

Slide courtesy of Dr. Peter Milgrom

What Do You Need For Application of SDF?

- White Petroleum Jelly for protection of gingival margins
- 1 drop of 38% SDF in a cup
- Several Microtips
- Air/Water Spray

Application of SDF

Needs to be repeated 2-3 x for full preventive effect

Photo courtesy of Dr. Peter Milgrom

- Apply on cleaned tooth surfaces. Avoid application where caries is close to dental pulp, since this will be very painful.
- Coat gingival margins (if applying to root surfaces) with Petroleum Jelly. SDF is acidic, and has an etching effect on the gingiva.
- Apply 1 drop with Microtip for precise application
- Dry gently with air for the intial ~ 5 seconds. Dry thoroughly with air for another period of ~ 5 seconds
- Wash off excess with high volume suction to prevent excess ingestion and reduce metallic taste
- Treat 1 tooth at a time, and a rec. max of 5 teeth per appointment. Avoid application on front teeth, as it will produce a brownish/black staining. Discuss this with patient before application, and get their consent.

Silver Fluoride in Adults

Time 0

Time 24 h

Time 7 d

Arrested lesions become black and hard

Slide courtesy of Dr. Peter Milgrom

Extensive tooth decay arrested with Silver Diamine Fluoride

Slide courtesy of Dr. Peter Milgrom

SSKI Potassium Iodide 1 g/ml, to counteract staining

- Can be purchased from pharmacy
- Requires Rx
- Removes most of the stain
- Not for use in pregnant or lactating mothers

Slide courtesy of Dr. Peter Milgrom

Restorations following SDF application

Post SDF Application

Round bur w/o LA, acid-etch, bonding agent, light-cured resin opaquer, light-cured Majesty flowable composite

Slide courtesy of Steve Pardue, Elevate Oral Care

Dr. John Frachella

Indications for Treatment

- **Is the lesion continuing to enlarge?**
- **Is patient having sensitivity?**
- **Are esthetics a concern?**
- **Therapeutic considerations**
  - Eliminate etiology/remove causal factors
- **Restore areas of loss of hard tissue**
  - Restorative dentistry
  - Periodontal surgery

Non-operative treatment of *active*, *cavitated* lesions

Baseline

2 years

4 years

10 years

Photo Source: Dental caries, 2nd edition, Ed: Fejerskov, O and Kidd, E; Nyvad & Fejerskov, 1997

Repair v. Replace Restoration

Minimal invasive dentistry goals:

- Remove the least tooth structure as possible
- If caries adjacent to existing restoration, can add to restoration; may not need to remove all existing restoration
- **Repair** when possible
- **Replace** if existing restoration is undermined by caries
- Attempt repair first, can always replace if restoration undermined

Restorative Options for Maintaining Teeth

When tooth is strategic for prosthesis or critical for chewing (or patient refuses extraction), consider:

- Use of SDF to arrest caries
- Composite, amalgam or glass ionomer (high viscosity) restorations
- Splinting teeth, if support needed
- *Periodontal surgery to access root caries lesion, then restoration*
- Stainless steel crown as low cost crown option

Restoring Cervical Lesions

From Best To Least	Esthetics	Caries Risk	Strength
+++	Composite	**GI – takes up and releases fluoride**	Amalgam
++	Glass Ionomer (GI)	**Amalgam - cariostatic**	Composite
+	Amalgam	Composite – no inhibition to plaque	GI –Fuji IX better than Fuji II

Goals:

- No further symptoms, no new lesions, or root caries
- Remineralization
- Long-term retention of the restorative material

Source: Peumans M, De Munck J, Van Landuyt KL, et al. Restoring cervical lesions with flexible composites. Dental Materials 2007; 23:749-754.

Non-carious Tooth Wear

Gastroesophageal Reflux Disease (GERD)

54 year old male with asymptomatic GERD

Tooth Erosion - Risk Factors

Increased risk of erosion if:

- Citrus fruits eaten more than twice a day
- Soft drinks were drunk daily
- Apple vinegar ingested weekly
- Sports drinks were drunk weekly
- Gastric symptoms
- Vomiting
- Low un-stimulated whole saliva flow rate

Jarvinen (1991), JDR, Risk factors in dental erosion

Gastroesophageal Reflux Disease (GERD)

- 7% of the US population have reflux episodes on a daily basis
- Many self-treat with OTC medications
- Prevalence is increasing

Clin Gastroenterol Hepatol. 2007 Jan;5(1):17-26. Epub 2006 Dec 4.

Symptoms of GERD

Gastrointestinal:

Belching

Heartburn

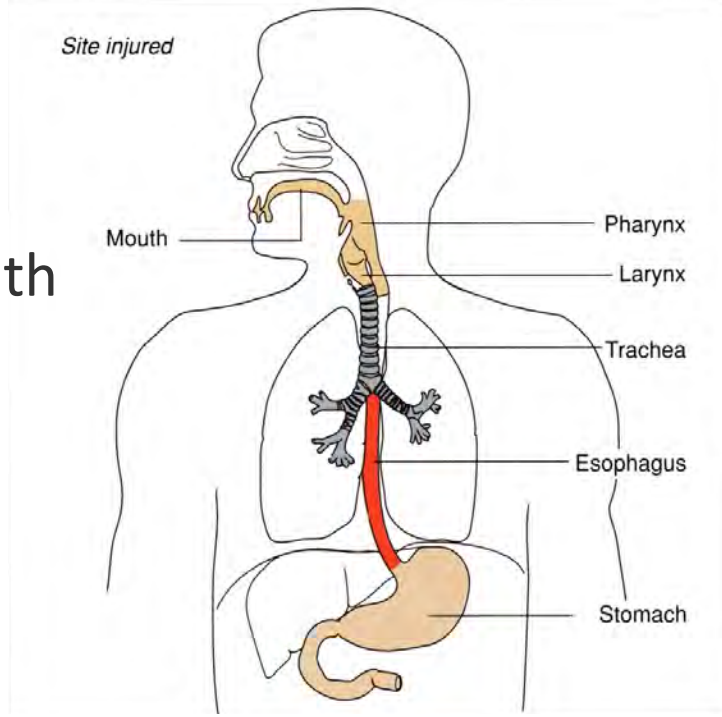
Acid taste in mouth

Vomiting

Stomach ache

Gastric pain on awakening

Excess salivation



Otolaryngologic:

Voice change/ hoarseness

Persistent coughing

Lump in throat

Sore throat

Halitosis

Choking Spells

May also be asymptomatic!

Source: Feldman, M. Gastroenterology and Hepatology, 1997

Tooth Erosion and GERD

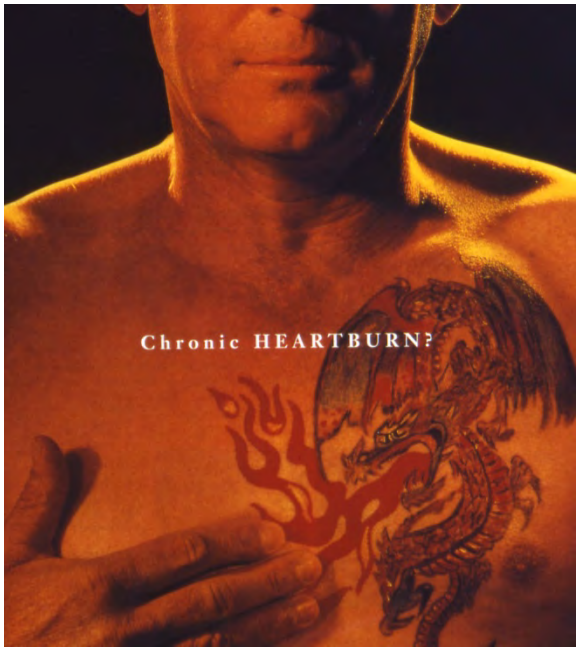
- 20 – 55 % of patients with GERD have been reported to have dental erosion.
- Acidic gastric contents (pH $\leq$ 2) reflux into the esophagus and may reach the oral cavity. Prolonged exposure of teeth to stomach acids result in demineralization.
- Medications used to treat GERD cause dry mouth
- Decreased salivary buffer capacity is common which also affect enamel solubility

Also contributory to erosive tooth wear:

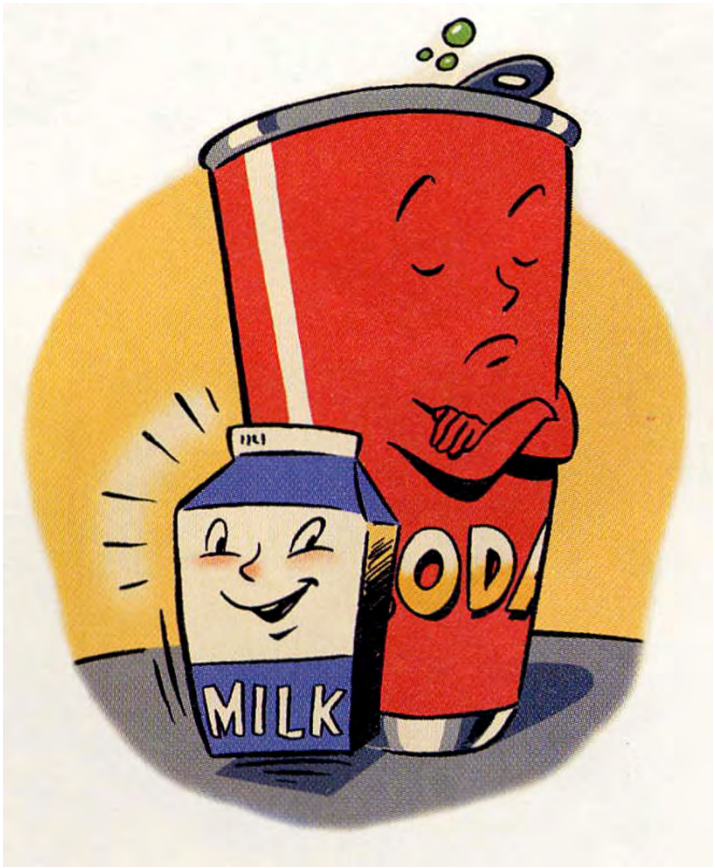
- Excessive intake of dietary acids
- Chewing vitamin C tablets
- Chewing acidic medications
- Occupational exposure to acids

Treatment of underlying medical disorder

- Referrals for suspected GERD, bulimia
- Conditions that cause decreased salivary flow such Sjogren's syndrome, alcoholism, xerostomia-inducing medications, dehydration



Diet Modification



- Decrease amounts and frequency of intake of acidic beverages and foods
- Use of a straw to drink acidic beverages to reduce contact with the teeth. No slow sipping of acidic beverages.
- Dietary products such as milk may reharden softened enamel

Remineralization

- Daily use of topical fluoride gel or rinse
- So far, the evidence supports stannous fluoride over sodium fluoride
- Use fluoride varnishes or gels at dental appointments

Compend Contin Educ Dent. 2018 Mar;39(3):e13-e17.

- **Protection From Dental Erosion: All Fluorides are Not Equal.**
- Faller RV[1], Noble WH[2].
- **Abstract**
- All fluoride sources help strengthen teeth against bacterial acids that cause caries. However, excessive exposure to dietary acids, which can result in dental erosion, presents a more aggressive level of challenge compared to caries. Despite the fact that almost all toothpastes contain fluoride, both the incidence and prevalence of dental erosion appear to be on the rise. This article: (1) describes key differences between caries and dental erosion and the ability of different fluoride sources to help prevent erosion; (2) discusses the importance of the evaluation of patients for dental erosion at the earliest stages using the Basic Erosive Wear Examination scoring system to help assess and educate patients; and (3) provides evidence-based information for making specific recommendations to patients with dental erosion. The objective of this article is to assess the comparative ability of fluoride agents to protect against dental erosion. Though all fluorides are able to help strengthen teeth against cariogenic acids, not all available sources of fluoride provide the same level of erosion protection. **Daily use of a stabilized stannous fluoride dentifrice has been shown to provide the most effective means of protecting teeth against the increasing risk of dental erosion and erosive tooth wear.**
-

Eur J Oral Sci. 2006 Jun;114(3):180-3.

Effect of stannous fluoride toothpaste on erosion-like lesions: an in vivo study.

Young A[1], Thrane PS, Saxegaard E, Jonski G, Rölla G.

Int Dent J. 2014 Mar;64 Suppl 1:29-34. doi: 10.1111/idj.12100.

Protective benefits of a stabilised stannous-containing fluoride dentifrice against erosive acid damage.

Faller RV[1], Eversole SL, Saunders-Burkhardt K.

Clinical Oral Investigations January 2015, Volume 19, Issue 1, pp 71–76|

- **Effect of commercial fluoride dentifrices against hydrochloric acid in an erosion-abrasion model,**

Authors. Vanara Florêncio Passos, Andréa Araújo de Vasconcellos, José Heriberto, Pinheiro Pequeno,

Santiago

Which tooth pastes have stannous fluoride?

Which tooth pastes have stannous fluoride?

- Crest Pro Health, 45% **Stannous fluoride**, sodium lauryl sulfate, **no ACP**
- Colgate Total SF Whitening Toothpaste, Advanced Whitening Paste, 5.1 oz, **Stannous fluoride (0.454%),** sodium lauryl sulfate, **no ACP**
- **A new formulation of Colgate Total SF with Stannous fluoride stabilized with Zinc Phosphate** in being introduced.
- **Parodontex, Stannous fluoride 0.454%**

Self-assembly of dental surface nano-laments and remineralisation by snF2 and CPP-ACP nano-complexes.

- James R. Fernando [1], Peiyan shen[1], Christina P. C. Sim[1], Yu-Yen Chen[1], Glenn D. Walker[1], Yi Yuan[1], Coralie Reynolds[1], David P. stanton[1], Colin M. MacRae[2] & Eric C. Reynolds [1]

- Dental caries, erosion and hypersensitivity are major public health problems. SnF2 is used widely in oral care products to help prevent/treat these conditions. Casein phosphopeptide-stabilised amorphous calcium phosphate nanocomplexes (CPP-ACP) are a biomimetic nanotechnology of salivary phosphopeptide-ACP complexes that deliver bioavailable calcium and phosphate ions to promote dental remineralisation (repair). We show here using *in vitro* studies and a double-blind, randomised controlled, cross-over design *in situ* clinical trial that SnF2 and CPP-ACP interact to form a nano lament coating on the tooth surface and that together they are superior in their ability to promote dental remineralisation. Sn(II) by cross-linking the CPP-ACP helps to stabilise the complexes which improves delivery to the tooth surface and enhances binding and ion incorporation into tooth mineral.

- **The combination of SnF2 and CPP-ACP in oral care products may significantly improve their efficacy in prevention/treatment of dental caries/erosion and hypersensitivity.**

- Releases bioavailable calcium, phosphate and fluoride
- Is Sodium Lauryl Sulfate - free
- Designed to be gentle to the tooth
- High cleaning efficacy
- Has a low Relative Dentin Abrasivity (RDA) value of 64

- Stabilized stannous fluoride
- ACP technology (calcium and phosphate ions)
- 970 ppm fluoride (0.40 %) utilizes calcium and phosphate ions to uniquely deliver two times greater fluoride uptake than 5000 ppm fluoride toothpastes
- Home-use treatment plan for caries prevention, gingivitis, and sensitivity relief.
- Non-abrasive

Internet influence/convenience for consumers!

Premier 9007280 Enamelon Fluoride Toothpaste, 122 G,- Mint Breeze (Pack Of 1)

★★★★☆ 28

$15.99 ✓prime

Periodontal Disease Prevention & Treatment Options

Adapted & Presented by:

Beatrice Gandara, DDS, MSD

Developed by:

Denise Fedele, DMD, MS, MPH
Beatrice Gandara, DDS, MSD
Susanne Kolare Jeffrey, DDS, PhD
Judith Jones, DDS, MPH, DScD
June Sadowsky, DDS

ARCORA
The Foundation of Delta Dental of Washington

Periodontal Disease Status of Older Adults

64% of adults over the age of 65 have moderate to severe periodontal disease.

High-risk groups:

- Older adults
- Black, Hispanic and Native American/Alaska Native seniors
- Smokers
- Lower education level
- Lower income

Eke PI, Dye BA, Wei L, Thornton-Evans GO, Genco RJ, Prevalence of Periodontitis in Adults in the United States: 2009-2010. J Dent Res. Published online 30 August 2012

Periodontal Risk Factors for Older Adults

- Smoking/Tobacco use (4-5 x)
- Systemic diseases (*diabetes*, metabolic syndrome, autoimmune diseases)
- Poor nutrition, poor oral hygiene
- Immunosuppression (disease, medications that impact host immune response
- Obesity (2x)
- Stress
- Osteoporosis
- Genetics

Source: J Evid Base Dent Pract 2014:145:4-16

Diabetes Mellitus

Prevalence in Washington
463,000 diabetic adult ,
1 million people in Washington estimated to have pre-diabetes
(1 in 3 adults)

Older adults: fastest demographic being diagnosed with diabetes

Diabetes affects every organ system in the body

Significantly correlated with CVD, renal disease, stroke, and poor wound healing after surgery

Periodontal Disease & Diabetes

- Diabetes puts patients at risk for periodontal disease and is associated with increased incidence, extent, and severity of periodontal disease.
- There is a growing body of evidence that periodontal disease adversely affects glycemic control and that periodontal treatment can improve blood sugar control.
- Periodontal treatment reduces medical costs for people with diabetes: cost reduction estimated at $2,840 per patient per year

Jeffcoat, M. et al.. *American Journal of Preventive Medicine, 47*, 166–174, 2014.

Periodontal Disease Increases Insulin Resistance

- Highly reactive **pathogens** from beneath the gum line reach the muscle, liver and fat cells, and **interfere with the signaling capabilities of the enzymes within the insulin receptors.**

- Insulin resistance leads to difficulty controlling blood glucose even when patients seems to be adhering to appropriate self-management behaviors.

https://www.healio.com/endocrinology/diabetes-education/news/print/endocrine-today/%7B5ef6e31f-0818-44e0-8a8d-22a3b4cca928%7D/diabetes-education-must-include-oral-health

Benefits of Treating Periodontal Disease

- Studies have shown a 0.4% A1C reduction from scaling/root planing. This is a similar decrease seen with adding a second drug to a patient's diabetes medication.**
- Decreased incidence of myocardial infarction and heart failure.*
- Can reduce medical costs

*Internal Medicine May 1, 2017, Vol. 56:9, pp. 1015-1021

**Marjorie Jeffcoat, DMD; Nipul K. Tanna, DMD, MS; Clay Hedlund, DDS; Michael S. Hahn, DDS; Miles Hall, DDS, MBA; Robert J. Genco, DDS, PhD; Posted: 10/19/2011 Medscape Dentistry & Oral Health

For individuals aged 65 years and older:

- 54 % of the AI/AN elders reported **diabetes**, compared with only 27% of the US population
- 47.2 % of AI/AN elders over 65 were diagnosed with **arthritis** compared with 31 % of the US population

Education Income, and Employment and Prevalence of Chronic Disease Among American Indian/Alaska Native Elders. Adamsen D, et al. Prev Chronic Dis 2018;15:170387

Rheumatoid Arthritis

- Systemic inflammatory autoimmune disorder causing synovial inflammation, joint swelling, stiffness and pain with resulting damage to joint structures
- Estimated 1.5 million adults have RA. (CDC data, 2012)
- Genetic predisposition exists

70 year old female with rheumatoid arthritis and TMJ involvement

Rheumatoid arthritis and periodontitis connection

- Individuals suffering from advanced rheumatoid arthritis (RA) are more likely to experience more significant periodontal problems compared to their non-RA counterparts.
- This is likely due to a general and underlying dysregulation of the host inflammatory response present in both conditions involving pro-inflammatory and anti-inflammatory cytokines.

Inter-relationships between rheumatoid athritis and periodontal disease. A review. Mercado FB et al. J Clin Periodontal 2003;30:761-772

Rheumatoid Arthritis/Osteoarthritis

Can lead to:

Physical limitations

Multiple medications

(including steroids)

Self-care challenges

Transportation considerations

Cardiovascular Disease and Periodontitis

- Weak but statistically significant association exists
- Share common inflammatory markers (CRP, IL-1, IL-6, IL-8, TNF-alpha, others)
- Periodontal pathogens may be deposited in atheromatous plaques
- Periodontitis is associated with endothelial dysfunction
- Meta-analyses indicates that an individual with periodontitis is at greater risk of either having or developing cardiovascular disease
- Whether of not periodontal therapy alters the risk for CVD has not been established

Otomo-Corgel J, et al. J Evid Base Dent Pract 2012:S1:21-28

Osteoporosis

- There is evidence indicating an association between systemic measures of osteoporosis and oral bone mineral density (BMD) and tooth loss.
- Some association of decreasing systemic BMD in postmenopausal women with periodontitis, attachment loss and gingival recession
- Shared risk factor vs causal factor?
- More studies needed to determine if interventions to alter BMD (ie hormone therapy, Vit D or calcium supplementation, bisphosphonates, etc) affect periodontal status

Otomo-Corgel J, et al. J Evid Base Dent Pract 2012:S1:21-28

Periodontal Disease Prevention & Management

Decrease risk by controlling plaque and biofilm

- Discuss brushing and flossing techniques and any needed adaptive devices
- Consider other products to manage disease, e.g. mouth rinse, chlorhexidine, or mouth guards
- The whole dental team can play important roles in education and management.

Factors that may impact patients' self-care

- Dexterity to perform oral hygiene
- Vision
- Medications
- Overall health status

Sources: Boehm TK, Scannapieco, F. The epidemiology, consequences and management of periodontal disease Assoc. 2008 Mar; 139(3):252-3.

Treatment of Periodontal Disease

- Management of systemic disease plays a role so inter-professional teamwork is ideal
- General dentists can provide most periodontal treatment, particularly non-surgical interventions
- Allow dental hygienist more time to provide the hygiene care and education the patient needs based on health history and physical abilities

- Treatment is not limited by age

Sources: Boehm TK, Scannapieco, F. The epidemiology, consequences and management of periodontal disease in older adults. J AM Dent Assoc. 2008 Mar; 139(3):252-3.

Evidence-based Clinical Practice Guidelines for the Nonsurgical Treatment of Chronic Periodontitis

A recent publication in JADA, July 2015 reported a systematic review of the literature by the Council on Scientific Affairs of the American Dental Association asking two questions:

1. *Does …*
    - SRP (hand or ultrasonic)

      VS.
    - No treatment
    - Supragingival scaling and polish (prophylaxis)
    - Debridement

result in greater improvement of CAL (clinical attachment level)?

Source: JADA 2015: 146(7)525-535

Guidelines for the Nonsurgical Treatment of Chronic Periodontitis (continued)

2. *Does the use of:*

- Locally deliverable antibiotics or antimicrobials
- Systemic antibiotics
- Combinations of locally delivered and systemic antibiotics
- Agents for biomodification or host modulation and non-surgical lasers as adjuncts to SRP

…result in greater improvement in CAL than

SRP alone ?

JADA 2015: 146(7)525-535

Results of the Systematic Review

For patients with chronic periodontitis, a systematic review of the literature indicates the evidence for -

- SRP - **IN FAVOR** initial non-surgical treatment, moderate benefit, benefits outweigh the potential adverse effects

And as adjunctive therapy-

- Systemic sub-antimicrobial dose of doxycyline, **IN FAVOR**
- Systemic anti-microbials, **WEAK**, may cause allergic reaction, promotion of resistant strains
- Chlorhexidine chips, **WEAK**
- Photodynamic therapy with a diode laser, **WEAK**

Expert opinion only, not enough studies to assess:

- Doxycycline hyclate gel, minocycline micropheres, **EXPERT OPINION FOR**
- Non-surgical use of other lasers, **EXPERT OPINION AGAINST**

JADA 2015: 146(7)525-535

Scaling and Root Planing Treatment Planning

- Discuss and incorporate patient expectations
- Evaluate the ability of the patient to tolerate the treatment
- Determine the expected frequency of maintenance visits
- Frequently evaluate the treatment progress
- Clearly present any changes to the plan of care

Costa, FO, Cota, LOM, EJP Lages, et al. Periodontal risk assessment model in a sample of regular and irregular compliers under maintenance therapy: A 3-year prospective study. J Periodontol 2012;83:292-300

Costa, FO, Santuchi CC, Lages EJP et al., Prospective Study in Periodontal Maintenance Therapy: Comparative Analysis between academic and private practices. J Periodon 83:3:301-311.

Scaling and Root Planing Methods

- **Power scalers**
  - *Sonic scalers (3 - 8 kHz)*
    - Driven by air pressure, 32-35 psi
  - *Ultra Sonic scalers (20 – 50 kHz)*
    - Magnetostrictive
      - *Older pace-makers*
      - *Shunts*
    - Piezo
- **Manual - hand scalers**

Magnetostrictive Ultra Sonic Scaler

Sonic Scaler

Power Scaler Caveat

If your patient has an implantable defibrillator or pacemaker, it may cause electromagnetic interference.

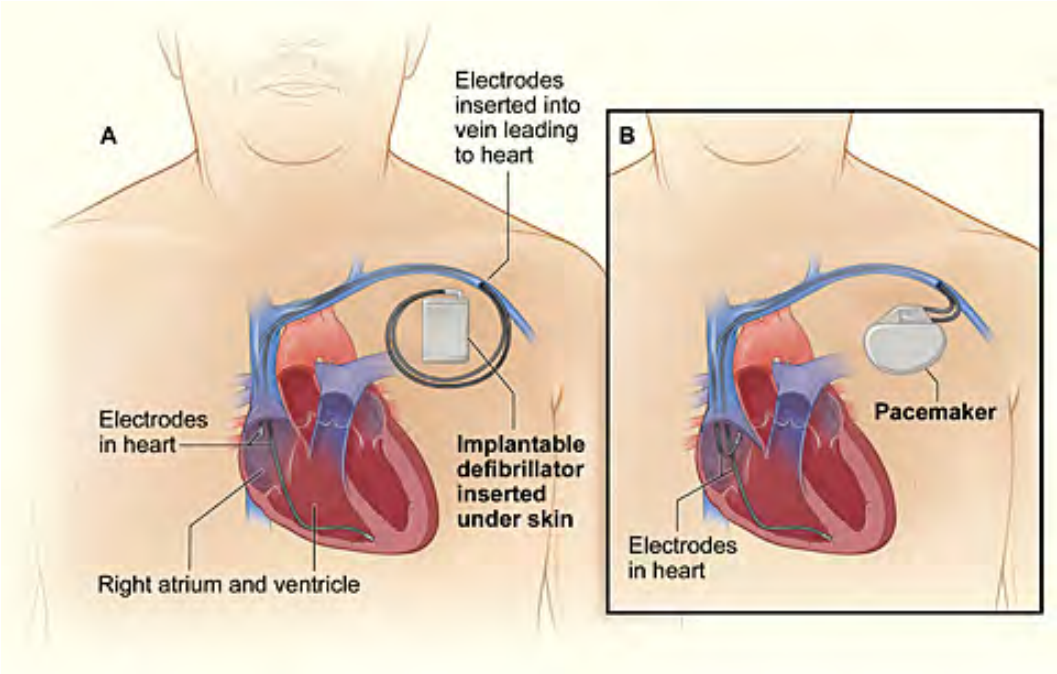


Illustration credit: http://www.nhlbi.nih.gov/health/health-topics/topics/icd

Power Scaling Advantages

- More effective than manual in pockets > 4mm
- Very effective disrupting biofilm from tooth surfaces
- Power scaling tips can penetrate deeper into pockets and causes less tissue distension, kinder to root surfaces
- More effective cleaning of difficult access areas
- Quicker, more comfortable than manual scaling
- Can be used with less pressure,
- *May not be tolerated by patients with dementia – too much sensory stimulus*

How do improve access to care for our elders?

- Expand the workforce (Dental Health Aide Therapists, EDFA's, community health workers, etc)
- Work with our health professional colleagues in primary care
- Find ways to work inter-generationally – Elders and. youth can work together to learn about oral health and disease prevention

Dental Health Aide Therapists in Training
Anchorage, Alaska

Dental Health Aide Therapy students practice physical examination

Dental Career Exploration, EWU

High school students from the Spokane Tribe in Wellpinit, WA, get a taste of dentisty at EWU with RIDE dental students

Excellent job with wax-up!


Dr. Beau Bent and RIDE dental student teach suturing techniques to Native American high school students in the Na Ha Shnee program at EWU.

EWU dental hygiene students oversees a Na Ha Shnee scholar’s first attempt at scaling teeth.

Successful Aging Through the eyes of Alaska Native Elders. What It Means to Be an Elder in Bristol Bay, AK

Jordan P. Lewis, MSW, PhD*

The Gerontologist
Vol. 51, No. 4, 540–549.2011

- Data were gathered from 26 elders aged 61–93 years in 6 Bristol Bay communities in South- west Alaska.
- “The quality of life for elders is directly related to the quality of their social network, which is an important aspect of the lives of the AN Elders in this study. “
- “The roles of the Elders in their community also contributed to their sense of generativity. Almost every Elder discussed the importance of passing down their knowledge to the youth. A majority of the communities in this study valued their Elders and understood the importance of their wisdom and experience, providing opportunities for them to participate and educate those who were interested.”

Alaska Native Elders in Recovery: Linkages between Indigenous Cultural Generativity and Sobriety to Promote Successful Aging

Jordan P. Lewis & James Allen

J Cross Cult Gerontol (2017) 32:209–222

- Ten life history narratives of Alaska Native older adults, representing Alutiiq, Athabascan, Tlingit, Yup'ik/Cup'ik Eskimos, from the PA sample were explored using thematic analysis.
- "A desire to pass on their accumulated wisdom to a younger generation through engagement and sharing of culturally grounded activities and values, or indigenous cultural generativity, is a central unifying motivational and maintenance factor for sobriety. "

Digital stories as a tool for health promotion and youth engagement.

Fletcher S[1], Mullett J.

- “Youth and Elders were invited to a 3-day digital story workshop consisting of knowledge-sharing sessions by Elders and digital story training by the youth research team. Workshop attendees returned to their communities to develop stories. The group re-convened at the university to create digital stories focused on community connections, family histories and healthy lifestyles.”
- “The digital stories method facilitated intergenerational interactions and engaged community members in creating a digital representation of healthy lifestyles. … it affords critical reflection on historical, cultural and spiritual ideas of health and what it means to be healthy in an Aboriginal community. It is a particularly relevant health promotion tool in First Nations communities with strong oral history traditions.

Can J Public Health. 2016 Aug 15;107(2):e183-7

Age itself should not determine dental treatment

- Medical conditions can impact oral health, ability to cope with dental intervention, outcomes of treatment and ability to maintain oral health.
- Socioeconomic issues impact access to professional care, health knowledge and ability to sustain prevention measures including affording and eating a healthy diet, good oral hygiene and adequate stress management.
- Potential benefits of replacing teeth or tooth surfaces should be “weighed up against the increased burden of maintenance and the biological price associated with restorative treatment.”*

*Minimal intervention dentistry for partially dentate older adults. *Gerodontology.* 2019:00:1-7

- Must take into account the patients concerns and expectations and the ability to cope with care
- Care for a ”robust” vs ”frail” vs ”dependant” elderly patient will determine if we strive for comprehensive care, rational or pragmatic care, emergency care or no treatment.

*Minimal intervention dentistry for partially dentate older adults. *Gerodontology.* 2019:00:1-7

Take Home Messages

- Older adults experience a variety of medical conditions and take multiple medications for these illnesses.
- These medical illnesses have implications for oral health that dentists must be aware of when providing dental care to patients.
- A comprehensive health history and medication history are key and consults with patient's physician (s) may be required. This may take longer in older adults with multiple medical problems.
- Expanding the workforce by new models of care and education as well in increasing Native American/Alaska Native representation in the health care workforce are important elements for addressing the oral health care needs of our elders.

Thank you!