

Now that makes sense!
Creating a healthy sustainable
environment



OUT OF THE BOX LEARNING ACADEMY
LEARNING THAT WORKS FOR YOU

Desiccation Therapy - The new frontier in managing
dysbiotic periodontal microbes

Speaker - Anne Guignon, RDH, MPH, CSP is receiving an honorarium from the Utah Dental Association for this presentation. Additional support provided by: Young Innovations, Curaden USA, PerioProtect, and BioGaia.

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Complex patients - complex solutions



When faced with this.....



Or this.....



Or this.....



Or this.....



Key concepts:

Customized care strategy

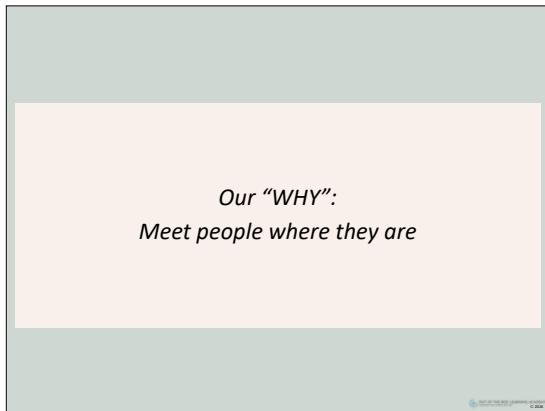
Focus on diagnostic needs

benefit plan is secondary

The Schedule!

| 7 AM | Petrified Penelope |
|-------------------|---|
| 8 AM | Barrel-chested Bob |
| 9 AM | Big-bosomed Bertha |
| 10 AM | Mrs. Don't-Put-Me-Back-Too-Far |
| 11 AM | Sensitive Sarah |
| <i>Lunch?????</i> | |
| 1 PM | George the Gagger |
| 2 PM | Anxious Andy |
| 3 PM | Little Johnny Jump Up and his Mom, Patti Protective |

7 AM Petrified Penelope
8 AM Barrel-chested Bob
9 AM Big-bosomed Bertha
10 AM Mrs. Don't-Put-Me-Back-Too-Far
11 AM Sensitive Sarah
Lunch?????
1 PM George the Gagger
2 PM Anxious Andy
3 PM Little Johnny Jump Up and his Mom, Patti Protective



Respect their concerns



- stick with the facts
- don't try and convert
- look for alternatives

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- look past legacy options
- reinforce natural physiology
- consider options
- support homeostasis

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There is just so much to know!



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Dry mouth - prevalence



- 30% population
- more women

Thomson WM, Lawrence HP, et al. The impact of xerostomia on oral-health-related quality of life among younger adults. *Health Qual Life Outcomes*. 2006 Nov 8;4:86.

Antil S, Vellappally S, Hashem M, et al. Xerostomia in geriatric patients: a burgeoning global concern. *J Investig Clin Dent*. 2014 Sep 1.

Mandel ID. The functions of saliva. *J Dent Res*. 1987 Feb;66 Spec No:62-6.

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- disruptive breathing
- dry climates / AC / heat
- OSA - CPAP therapy
- salivary gland pathology
- hormone imbalances
- laxative/diuretic abuse
- medications - over 700
- sodium intake
- nursing / pregnancy
- dehydration
- cancer therapy
- coughing / COPD
- cognitive impairment
- radiation treatment
- chronic renal failure
- autoimmune disorders
- eating disorders
- HIV - hepatitis C

Scialy IM, Vissink A. Dry mouth. The malevolent symptom: A clinical guide. Wiley-Blackwell. May 2003.

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Insufficient saliva



- increased acidogenic microbes
- aciduric microbes thrive
- decreased buffering capacity
- sticky plaque biofilm

Saliva and the Control of its Secretion. Ibsberg (ed.). Dysphagia, Medical Radiology: Diagnostic Imaging. Springer-Verlag Berlin Heidelberg 2012

Graham I, Mount WH. (2001). Preservation and restoration of tooth structure. 2nd Edition. Queensland, Australia: Knowledge Books and Software.

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Detection strategies

- Salivary pH / buffering capacity
- Salivary flow rates
- Beverage pH
- Blue Check Caries detection
- Lumicare Caries detection rinse
- AI



Critical pH

- critical pH – is a dynamic number
- dependent - salivary calcium and phosphorus
- average resting salivary pH 6.4 – 7.2

Mount GI and Hume WI. Preservation and restoration of tooth structure. Knowledge books and software. 2nd Edition. 2005
Dove C. What is the critical pH and why does tooth dissolution in acid? J Can Dent Assoc 2003; 69(11):722-724
Stookey GK. The effect of saliva on dental caries. JADA 2008 May; 139:151-175.
Luisi A, Schlueter N, et al. Dental erosion—an overview with emphasis on chemical and histopathological aspects. Caries Res. 2011;45 Suppl 1:3-12.

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Healthy salivary pH

- resting - pH 6.8 - 7.2
- favors homeostasis
- supports remineralization
- suppresses pathogens

Seaby LM, Viscik A. Dry mouth: The xerostomia symptom: A clinical guide. Wiley Blackwell: May 2010.
Luisi A, Schlueter N, Rakhmatulina E, Garcia C. Dental erosion—an overview with emphasis on chemical and histopathological aspects. Caries Res. 2011;45 Suppl 1:3-12.

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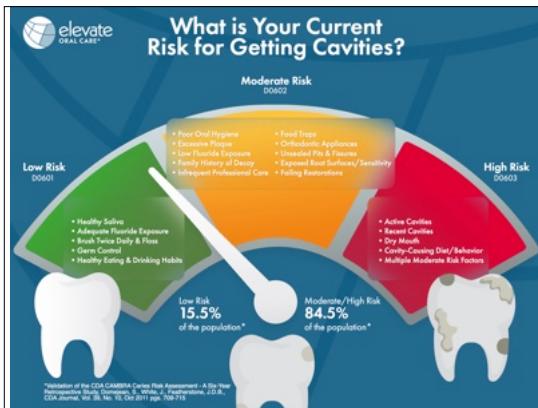


When do teeth melt???

- root structure - pH 6.7
- enamel - between pH 5 and 5.5
- fluorapatite - pH 4.5

Mount GI and Hume WI. Preservation and restoration of tooth structure. Knowledge books and software. 2nd Edition. 2005
Stookey GK. The effect of saliva on dental caries. JADA 2008 May; 139:115-175.
Luisi A, Schlueter N, et al. Dental erosion—an overview with emphasis on chemical and histopathological aspects. Caries Res. 2011;45 Suppl 1:3-12.
Hoppenbrouwers PM, Driessens FC, Borggreven JM. The mineral solubility of human tooth roots. Arch Oral Biol. 1987;32:319-322

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What is Your Current Risk for Getting Cavities?

Moderate Risk (D0602)

- Poor Oral Hygiene
- Excessive Sugar
- High Acid Exposure
- Family History of Decay
- Infrequent Professional Care
- Food Trap
- Oral Health Appearances
- Unprotected Pits & Fissures
- Exposed Root Surfaces/Sensitivity
- Falling Restorations

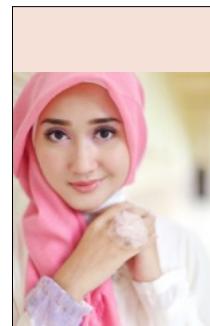
Low Risk (D0601)

- Healthy Saliva
- Adequate Fluoride Exposure
- Brush Twice Daily & Floss
- Good Oral Hygiene
- Healthy Eating & Drinking Habits

High Risk (D0603)

- Active Cavities
- Recent Cavities
- Dry Mouth
- Acid-Causing Diet/Behavior
- Multiple Moderate Risk Factors

*Validation of the CDA CAMBRA® Caries Risk Assessment: A Six-Year Prospective Study. CDA Journal, Vol. 39, No. 10, Oct 2011 pp. 708-716



Problem saliva?

Identifying risks

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Baseline data

- snapshot in time
- data can change

first thing in the morning



pH testing

- wet strip with saliva
- match to grid on bottle
- take a "saliva selfie"

later in the day

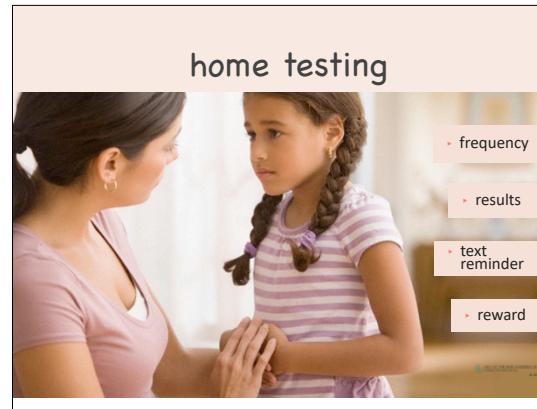
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Inquire **Test** **Discover**

Ownership **Participation** **Success**

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home testing

- frequency
- results
- text, reminder
- reward

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Details, details.....

- salivary pH testing
- taste dry mouth products
- balance oral pH to 7

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Healthy - daily flow rate

0.5 to 1.5 liters

- resting - 0.25 to 0.4 ml /min
- stimulated - 1 - 3 ml / min
- establish a baseline!**



Flow rate - visual inspection

- retract lower lip
- dry with gauze

- 1 min - drops on mucosa
- sufficient flow
- pooling in floor of mouth

Testing flow rate / per min

Caries detection rinse

LumiCare[®]
Caries Detection Rinse

Before

After

Using the LumiCare[®] Caries Detection Rinse, tooth decay is easily detected.

© 2014 Ultradent Products, Inc. All rights reserved.

Red Lines
Targeting moiety
Green Lines
Starch nanoparticle
Blue Filling
Drugs, mineral ions, other agents, or water

- targeted starch nanoparticles
- fluorescene rinse
- calcium loss - negative charge
- detect with curing light
- caries activity - fluoresces

Testing pH

Hydron®
Liquid pH
Indicator Strips
5.0-6.0

Hydron®
www.hydronchemicals.com

Liquid

- dry glass container
- 1/2 tsp product
- dip clean strip

Spray

- dry paper towel
- spray strip
- saturate

Testing water pH

- Arginine bicarbonate calcium carbonate
- Cervitec Plus
- Tubule occlusion
- Surface protectant - Ha / Glass ionomer
- Hydroxyapatite
- Synapse Dental Pain Eraser
- Diode laser
- SDF

| Tubule occlusion | | |
|---|-----------------------|---|
|  | Stannous fluoride | ■ toothpaste, gel, rinse |
|  | High fluoride | ■ varnish, gels |
|  | Precipitating salts | ■ calcium phosphate ■ arginine bicarbonate |
| | Restorative materials | ■ adhesives ■ resins |
| | Laser | ■ softlaser |



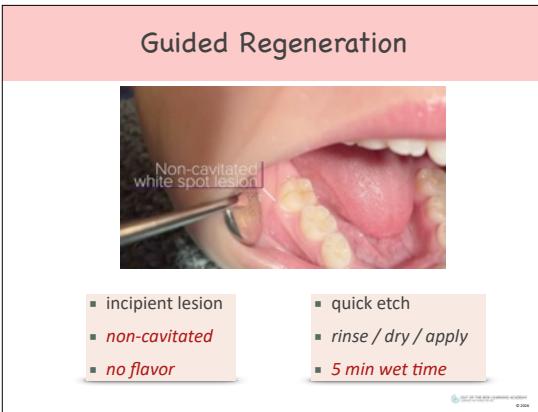
Surface protectants



- ▶ light cure / self cure
- ▶ glass ionomer fluoride
- ▶ hydroxyapatite



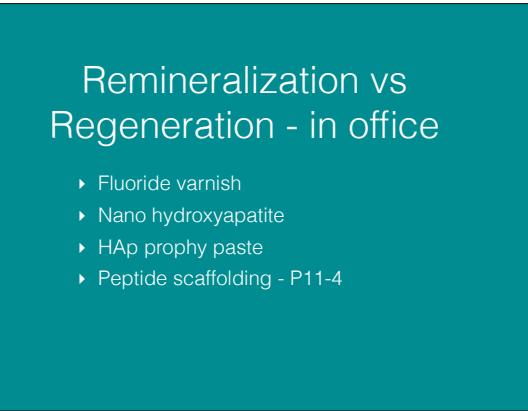
- non surgical perio therapy
- restorations
- crown seating
- aphthous ulcers
- post surgical
- exposed roots
- power scaling
- whitening
- bruxism
- ortho treatment



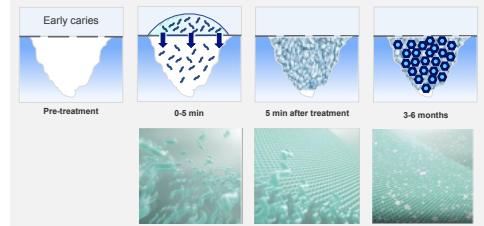
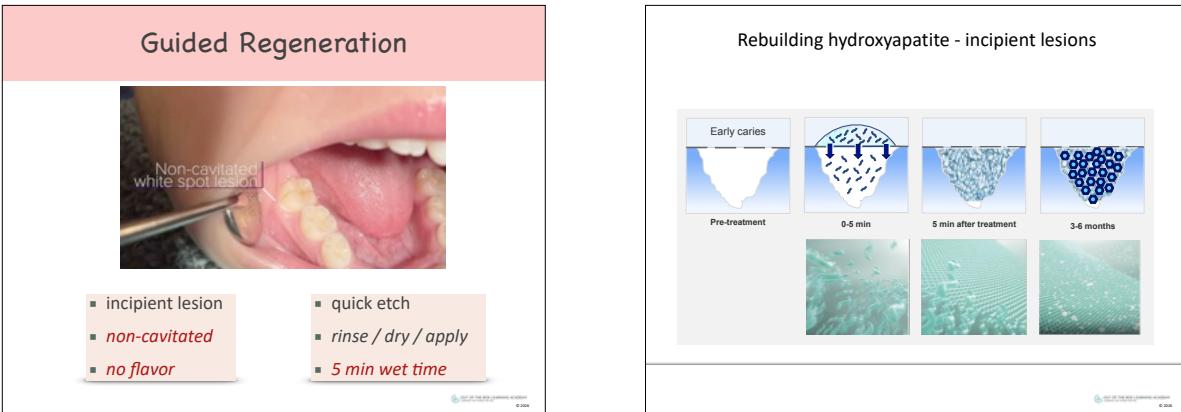
Guided Regeneration



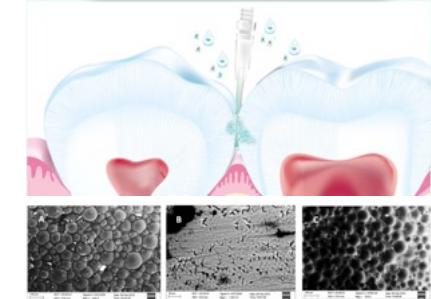
- incipient lesion
- **non-cavitated**
- **no flavor**
- quick etch
- rinse / dry / apply
- **5 min wet time**



- ▶ Fluoride varnish
- ▶ Nano hydroxyapatite
- ▶ HAp prophy paste
- ▶ Peptide scaffolding - P11-4



- peptide scaffolding
- **calcium and phosphate precipitate**
- **lesion rebuilt in 6 months**



Stopping microbial activity - in office

- ▶ SDF and SF
- ▶ Povi-One plus fluoride varnish
- ▶ Chlorohexadine thymol varnish
- ▶ Pappacarie Duo - dentin caries removal
- ▶ Laser bacterial reduction
- ▶ Desiccation therapy
- ▶ Liquid probiotic placement

Non Fluoride Treatment



Silver diamine fluoride

- ▶ natural antibacterial
- ▶ hypersensitivity relief
- ▶ carious dentin lesion turns black
- ▶ no anesthesia



Rosenblatt A, Stamford TC, Niederman R. Silver diamine fluoride: a caries "silver-fluoride bullet". J Dent Res. 2009;88(2):116-25.



Chlorhexidine/Thymol Varnish – Cervitec Plus



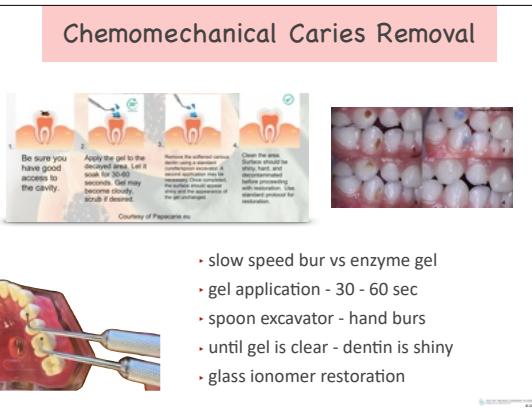
Chemomechanical Caries Removal

- ▶ enzyme based - papain
- ▶ introduced in 2003 in Brazil
- ▶ FDA cleared - 2026



- decreased pain perception
- reduced fear / anxiety
- no aerosol generation
- no noise
- no anesthesia
- split mouth design
- 25 children age 5-9
- 50 primary molars
- CMCR - no pain - 92%
- breaks down denatured protein
- improves bond strength

Almeida BC, Oliveira GD, Oliveira GD, Oliveira GD. Comparative evaluation of the clinical effectiveness of chemomechanical (Papain) and conventional mechanical caries removal methods in treatment of carious primary molars: a randomized controlled clinical study. BMC Oral Health. 2020 Feb 22;21(1):56. doi: 10.1186/s12946-020-05064-7.



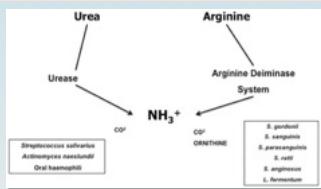
Dentin hypersensitivity / Erosion - home care

- Arginine bicarbonate calcium carbonate chews
- Arginine paste
- Calcium phosphate gel or strips
- Nano hydroxyapatite toothpaste
- 5000 ppm toothpaste

NEWS FLASH

Prebiotics.....
stimulate growth or activity
of certain healthy bacteria

Salivary arginine - mode of action



- ★ saliva & crevicular fluid
- ★ broken down by urease
- ★ byproduct-ammonia

- Arginine - many bacteria
 - low in saliva/abundant in peptides
 - ADS - 3 enzyme system
 - byproduct - ammonia
 - action produces ATP

Burne RA, Zeng L, Abu-Si, et al. Progress Reviewing the Oral Microbiome in Caries and Health. *Advances in Dental Research*. 2022;34(2):77-90.

| | |
|---|--|
| Biochemistry <ul style="list-style-type: none">■ ammonia production■ raises the pH■ sucrose metabolism decreases | Microbes <ul style="list-style-type: none">■ shift in salivary microbiome■ increase healthy commensals■ 4 weeks |
|---|--|

Nascimento MM, Brownhardt C, et al. The effect of arginine on oral biofilm communities. *Mol Oral Microbiol*. 2014 Feb;29(1):45-54.1. Huang X, Schultz RM, Burne RA, Nascimento MM. Characterization of the arginolytic microflora provides insights into pH homeostasis in human oral biofilms. *Caries Res*. 2015;49(2):165-76.2. Zhu Y, Maryland C, Kitashita T, Xu P. Streptococcus sanguinis biofilm formation & interaction with oral pathogens. *Future Microbiol*. 2018 Jun 1;3(3):015-032.



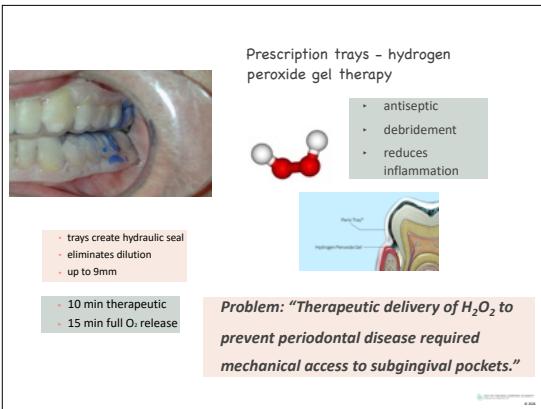
- ▶ calcium and phosphate
- ▶ fluoride free
- ▶ cleared for hypersensitivity
- ▶ plugs open tubules

Perio biofilm management and disruption - home

- ▶ Tray therapy
- ▶ Water flossing
- ▶ Improved manual brushes / interprox devices
- ▶ Advanced and speciality power brushes
- ▶ Probiotics
- ▶ Iodine application
- ▶ Arginine bicarbonate



Daily biofilm destruction



Prescription trays - hydrogen peroxide gel therapy

- ▶ antiseptic
- ▶ debridement
- ▶ reduces inflammation

Problem: "Therapeutic delivery of H_2O_2 to prevent periodontal disease required mechanical access to subgingival pockets."



- disruption - 29% more effective than string
- irrigation + brushing - more effective - all surfaces



Probiotics are live microorganisms that, when administered in adequate amounts, confer a health benefit on the host.....

Importance of strain specificity

| Indication | <i>L. reuteri</i> ATCC PTA 5289 | <i>L. reuteri</i> DSM 17938 | Immunological isolates K-2 | Immunological isolates K-15 | <i>Streptococcus salivarius</i> 2H145 |
|----------------|---------------------------------|-----------------------------|----------------------------|-----------------------------|---------------------------------------|
| Gingivitis* | HIGH EFFECT | Not studied | | | |
| Periodontitis* | HIGH EFFECT | NO EFFECT | | | |
| Implantitis* | HIGH EFFECT | Not studied | | | |
| Caries* | Moderate | Moderate | | | |
| Hallosis* | LOW | Not studied | | | |

***L. reuteri* Prodentis – human-derived probiotic strains**

Isolated from the breastmilk of a lactating woman from a rural, indigenous, Westernized area of the Andes mountains

Isolated from the saliva of a Japanese woman with excellent oral health despite poor oral hygiene

Gingivitis, peri-implant mucositis, caries
Non-surgical perio - adjunct

Maintenance

Traditional nylon brush
500

Curaprox 5460 brush
5460

Polyester filaments

- flex not bend
- dry quickly
- retard bacterial growth

Design

- easy to grasp handle
- angled head

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HYDROSONIC PRO

Hydrosonic Pro -
Ultra small tear drop head

> won't brush > coordination issues > caring for another

Maintaining a neutral pH

- Xylitol
- Arginine
- Remin Gel
- Rx - Aquoral / pilocarpine AllDay toothpaste

Know your products

What's the point?

Mouth feel Antimicrobial
Balanced pH Hydration
Lubrication Electrolyte balance
Mucosal protection Prebiotic
Remineralization Salivary stimulation

Garcia-Godoy E. (2010). Maintaining the integrity of the enamel surface: the role of dental buffers, saliva and preventive agents in enamel demineralization and remineralization. *J Am Dent Assoc.* 141(3):255-265.

Taste and see.....why not?

- flavors
- textures
- foaming
- SLS / fluoride

Taste and see.....

- 44% xylitol
- 5000 ppm fluoride
- no SLS
- pH 7

- super saturated 44% xylitol
- muco-adhesive complex
- more viscous

- viscous / protective film
- lubricates / hydrates

- Salagen - pilocarpine
- Evoxac - cevimeline

pleasanthillsapotheary.com

Rinses

Lozenges

Disks

Sprays

Gels

Pastes

| pH levels of common dry mouth products | | | |
|--|-----------------|--------------------------|------|
| Rinses | Lozenges + Disk | Sprays | |
| TheraBreath® | 9.2 | CTX Spray® | 9.5 |
| Perio Sciences AG | 7.75 | Saline® | 8.2 |
| Hydrate® | 8.5 | All Day Spray® | 7 |
| MyGum® | 7.97 | Carry Right Mouth® | 8.98 |
| Smart Mouth® | 7.11 | Smart Mouth® | 6.43 |
| Cheer® | 7.1 | MyGum®/My Spray® | 6.11 |
| GUM® Hydrate Rinse® | 7 | Art Dry Mouth® | 6.31 |
| Plaque HD Extreme Dry | 7 | Smart Mouth® | 6.15 |
| Hydrate® | 7.05 | 3M Monistat Spray® | 6 |
| Biotene Dry Mouth® | 6.72 | Alabone Lozenges® | 5.2 |
| Art Total Care® | 6.55 | CVS Lozenges® | 5.28 |
| TheraBreath® | 6.5 | MediActive Spray® | 5.92 |
| MediActive So2® Rinse | 6.18 | TheraBreath® | 5.82 |
| Hydrate® | 6 | LoDent® | 5.72 |
| Oasis Mouth Rinse | 6 | Art Lozenges® | 5.72 |
| MyGum® | 6 | OralMed Patch® | 5.34 |
| Smart Mouth® | 6 | TheraBreath® Sugar-Free® | 5.37 |
| Hydrate® So2® Rinse Complete® | 5.8 | Grape® | 5.31 |
| Biotene PMF® Oral Moisturizer® | 5.39 | GUM® Hydrate Gel® | 6.8 |
| OralCare® | 4.8 | DenSel® | 2.9 |
| Luden's® Pepto® | 2.93 | Biotene Oral Balance® | 6.5 |

Potential Erosive Assessment of Dry Mouth Lozenges and Tablets on Dentin

Delgado AJ, Olafsson VG, Biotene oral moisturizers with pH below 6.7 may be harmful to teeth depending on formulation: a short report. *Clin Cosmet Invest Dent*. 2017;9:81-83. Published 2017 Aug 2.

Evaluation of pH Values of Products Managing Xerostomia

Delgado AJ, Olafsson VG, Biotene oral moisturizers with pH below 6.7 may be harmful to teeth depending on formulation: a short report. *Clin Cosmet Invest Dent*. 2017;9:81-83. Published 2017 Aug 2.

In order to verify the dose distribution, the dry mouth tablets were evaluated with a histogram analysis. All dosage, 10 mg.

Initially, statistical analysis was performed to verify the dose distribution of the dry mouth tablets. The results were not correlated with dose distribution, therefore, the x-tables, non-parametric tests were performed. A Kruskal-Wallis test was performed to verify the dose distribution regarding dose distribution. The doses

Slowing down erosion

- xylitol gum, mints, lozenges or spray
- chew gum to stimulate saliva
- use bicarbonates – rinse, paste or lozenge

Tamer S, Bilezikci N, Tunc I, Mihmud G. Effect of dietary combinations on plaque pH recovery after the intake of pediatric liquid medicines. *Eur J Dent*. 2015 Jul Sep;9(3):340-345. doi: 10.1016/j.ejod.2015.06.020

van P, Puglisi A, Severi N. Anticariogenic potential of white cheese, xylitol chewing gum, and black tea. *J Am Dent Assoc*. 2016 Mar;147(3):199-204. doi: 10.14219/jada.2015.00010

Agarwal D, Li, Zeng D. Protective role of cheese against the erosive potential of dental plaque. *Caries Res*. 2015;49(2):145-149. doi: 10.1160/00086565-2015-00010

Slowing down erosion

- brush before morning juices, etc.
- rinse with water - reduces titratable acidity, not pH
- soft bristle brushes / low abrasion paste

Wiegert A, Gysi L, Henn T. Reassessing believe as an acidic challenge to incisive tooth wear. *Am J Dent*. 2008 Feb;21(1):114.

Wiegert A, Gysi L, Henn T. An index of toothwear: dentin abrasion and dentin wear. *Am J Dent*. 2008 Aug;21(4):221-5.

Carrasco AM, Weissbach M, Cerezo G, Serrano R. The pH and titratable acidity of a range of diluted drinks and their potential effect on dental erosion. *J Dent*. 2002 Sep-Oct;30(7):511-7.

Cheese and chocolate

Reisbord T, Gordan V, Targan P, Park A, Chairez T. Effect of consuming different dairy products on calcium, phosphate and pH levels of human dental plaque: a comparative study. *Am J Dent*. 2012;25(1):51-55.

Yilmaz S, Bilezikci N, Tunc I, Puglisi A, Cevizli M, Yuksel M. The effect of cheese on plaque remineralization after a citric challenge. *J Am Dent Assoc*. 2011 Jul;142(7):413-7.

Conversation starters!

oral health to general health

- get the facts
- positive energy
- coaching not scolding
- legitimate spin

