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Spotlight on medications, remedies, and supplements: Why a thorough health history really matters

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ABSTRACT

Prescription and over-the-counter medicines, home remedies, and supplements are used to combat illness, provide relief, and support health. The unintended oral consequences of medications and supplements are rarely discussed. Many medications and products have acidic pH levels. Others may be formulated with high levels of fermentable carbohydrates, and some products have both a high sugar content and low pH levels. Caries is a pH mediated microbial infection in which acid production via carbohydrate metabolism damages hard tooth structure. While erosion does not have a microbial component, damage occurs with regular, sustained acid attacks on tooth structure. It is important to understand formulations—syrups, lozenges, hard disks, sprays, gummy chews, gels, rinses, powders, effervescent tablets, chewable tablets, and tablet coatings. The impact of medications, remedies, and supplements on both acid erosion and caries development is important, especially if products are used routinely or multiple times a day. A thorough health history can uncover previously hidden risk factors that can lead to the development or exacerbation of erosive tooth wear or a caries infection.

EDUCATIONAL OBJECTIVES

At the conclusion of this educational activity, participants will achieve the following:

1. Appreciate how medications can play a role in caries and erosion
2. Recognize hidden sources of fermentable carbohydrates
3. Learn about ingredients and product formulations
4. Discover the destructive role of citric acid
5. Understand why dry mouth increases risk for caries and erosion
6. Compare pH levels of oral moisturizers
7. Know how a detailed health history uncovers dangerous habits and products



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Educational methods: This course is a self-instructional journal and web activity.

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A thorough health history should include over-the-counter (OTC) and prescription medications, vitamins, nutritional supplements, home remedies, and oral moisturizing products.

It is important to obtain a complete list of everything taken by mouth—every pill, liquid, lozenge, rinse, powder, spray, and gel. More patients now personally manage their health care and lifestyle choices, often using online remedies and protocols.

While seemingly innocuous, OTC medications and supplements—used to combat a mild illness, promote overall health, or provide comfort—can pose a risk to oral health. Many can significantly increase the risk for dental caries, erosion, and subsequent dentinal hypersensitivity.^{1,2} When products are used for protracted periods of time, or by those with an increased risk for caries and erosion, the potential for problems increases.¹⁻³

COMPLEXITY OF EROSION AND CARIES

Erosion is a loss of hard tooth structure over time. Erosion is a surface-softening lesion created by repeated exposures to foods, beverages, and other substances with acidic pH levels. It does not have a bacterial component.⁴ Erosion involves three different factors: pH value, number of exposures, and contact time. Permanent effects increase with lower pH levels and longer exposures.^{1,5}

Scientists who study erosion test for reduced surface microhardness and reflection changes.⁶ Once the surface has softened, abrasive activities or devices can accelerate loss of tooth structure, resulting in erosive tooth wear (ETW).^{7,8} Attrition caused by tooth-to-tooth contact of presoftened tooth structure also leads to wear. Scientific studies are carefully controlled in laboratory settings, but clinicians see erosive effects in the oral cavity every day.

Erosion and subsequent ETW can occur at any age. The prevalence of ETW in deciduous teeth ranges from 30% to 50% and between 20% to 45% for permanent teeth.⁹ Permanent teeth are harder than primary dentition. Primary teeth are rarely retained throughout a lifetime; thus, permanent teeth are at a higher overall risk for erosion.^{7,10}

Caries is a pH-mediated disease. Caries is a microbial infection and dramatically different from erosion. Biofilm-based microbes digest fermentable carbohydrates. Lactic acid is the by-product. The pellicle provides a protective barrier, but over time lactic acid percolates through enamel, leaching calcium and phosphorus from the dentin substructure. This initial phase, known as a white-spot lesion, still has an intact enamel outer layer, but a potential for remineralization. The outcome becomes irreversible when the weakened enamel cavitates.¹¹⁻¹⁴

PRODUCT COMPOSITION

Medication and supplement formulations can be complicated. Manufacturers must develop products that are efficacious, easy to use, have an acceptable taste, are stable over time, have a simple dosage routine, and fit into modern lifestyles.

Basic formulations include wet, dry, and hybrid wet/dry. Syrups, sprays, elixirs, suspensions, rinses, gels, pastes, and drops are wet preparations. Some are swallowed, while others are applied to the oral mucosa, top of the tongue, or sublingually. Dry products include pills or coated disks that are swallowed, slow-release lozenges and hard disks, chewable tablets, gummy chews, and particle inhalers. Hybrid preparations include powders, effervescent tablets, and dispersible tablets that are dissolved in water or another fluid.

The product vehicle is significant, as are the exact ingredients and chemical properties of each medication.^{1,2} Bitter or unpleasant tasting products undergo taste-masking, a science that makes products more palatable. Taste maskers include sugars, artificial sweeteners, fruit flavors, and various acids.¹⁵⁻¹⁸

SWEET TO A FAULT

Sweetness is critical. Fermentable carbohydrates improve taste and can act as thickeners, preservatives, antioxidants, or stabilizers. Sucrose, glucose, lactose, fructose, cane sugar, and high fructose corn syrup are commonly used to achieve this goal. Lactic acid is produced when acidogenic and aciduric microbes metabolize these six-carbon sugars. Polyols, also known as sugar alcohols, are five-carbon sugars.

This group includes xylitol, sorbitol, maltitol, mannitol, and erythritol. Polyols create a sweet taste but are not fermentable so do not contribute to caries risk.

Pediatric liquid medications often contain high amounts of sucrose or glucose.¹⁹⁻²¹ A recent study found sucrose in 24 out of 29 pediatric antibiotics sampled.²² Cough syrups and cough drops can also contain high levels. A 2012 study showed the total sugar content of pediatric liquid cough medications ranged from 36% to 60%.²³ While “sugar-free” products are available, it can be challenging to find these preparations.

A STICKY SITUATION

Many adult and children’s vitamins and nutritional supplements come in chewable or gummy formats. Close inspection of labels reveals products made with fermentable carbohydrates—glucose, cane sugar, high fructose corn syrup, fructose, sucrose, or agave syrup. Gummy formats do not dissolve easily and adhere to tooth structures, in contrast to a product swallowed quickly. Bits and pieces of dry, chewable tablets, such as antacids or chewable gummy vitamins, pack into vulnerable occlusal surfaces and interproximal spaces.

Slowly dissolving hard lozenges or disks extend and exacerbate contact time.²⁴ Viscosity presents another challenge. The thicker the syrup or fluid, the longer the contact time, thus increasing erosion risk.^{10,19}

IT’S ACIDIC!

pH and titratable acidity are two important measurements. Both play a role in erosion and caries, creating the final outcome of each acid exposure.^{4,7,10}

A pH value measures the acidity or alkalinity at a singular point in time using a logarithmic scale ranging from 1 to 14, with 7 being neutral. Numbers lower than 7 indicate increasing acidity. For example, a 2.5 pH, common in many modern beverages, is 10 times more acidic than a 3.6 pH in another beverage.

Enamel can resist a 5.5 pH or higher before becoming compromised.⁴ Enamel fortified with fluoride can withstand a pH level as low as 4.5, a level that is 10 times more acidic. Exposed root structure can be

compromised at pH 6 or lower. Adults in mid to late years with root exposure or chronic dry mouth are at higher risk.

Titrateable acidity (TA) is another measurement of erosive potential. Products that contain multiple organic acids have higher TA scores. It takes more effort or time to neutralize an environment with a higher TA.

A much higher erosion risk occurs with combined low pH and a high TA value. The risk is further complicated when salivary flow rate is low, or the salivary concentrations of calcium, phosphate, and fluoride are insufficient to reverse the erosion process.^{25,26}

One study found 15 pediatric cough syrups with pH values ranging from 2.49 to 6.75. Twelve of the medications tested below the critical value of 5.5.²³ Another study reviewed both pH and titrateable acidity of 97 pediatric medications including liquids, chewable, and dispersible tablets. Fifty-seven percent of the medications had pH values of less than 5.5 and 41% had high TA values. Fifteen high-strength, sugar-free medications had significantly lower pH measurements and greater TA values than their lower-strength equivalents.²⁴

HEALTH-CARE PROFESSIONALS' PERCEPTIONS

The scientific literature has discussed sugar in products for decades. Dispensing pharmacists, prescribing physicians, and dentists have been queried. While sugar-free medications are available, more education is needed in every health-care discipline about formulations with fermentable sugars. A 1999 study showed pharmacists had a high level of interest in sugar-free medications, both over-the-counter and prescription.²⁷ Another study revealed 60% of physicians prescribing liquid medications were unaware of sweetness, and 71% believed syrups were not acidic. This group did not recommend brushing after taking the medicine or provide oral hygiene instructions, and felt lack of oral hygiene contributed to caries development.²⁸ A 2012 study surveyed dentists, pharmacists, and parents about sugar-free medicines. Over one tenth of the dentists and pharmacists, and 20% of the parents, did not feel the sugar

content was an important contributor to caries development.²⁹

A survey of 50 pediatricians in India indicated that 68% were aware that long-term use of pediatric liquid medications could contribute to dental caries, and 74% recommended rinsing with water, but only 58% advised routine dental exams.³⁰

A 2014 study found one third of all pediatricians and pharmacists prescribed or dispensed sugar-free medications. Sixty-seven percent of the pediatricians counseled parents about the risk of sugar-sweetened medications, and over half discussed oral hygiene methods.³¹ A more recent report found 87% of the pediatricians in the study knew pediatric liquid medicines were sweet, 72% were conscious of hidden sugars in the medications, 67% knew the low pH levels of liquid medications affected tooth structure, but only one half were aware that sugar-free alternatives were available.³²

CITRIC ACID—AN ENEMY OF DIRE PROPORTIONS

Citric acid is naturally found in fruits and in citrus-flavored products, and is used as a preservative in medications, nutritional supplements, and commercially prepared food products. Citric acid is highly erosive to hard tooth structure, quickly chelating valuable calcium molecules.^{33,34}

Acids stimulate salivary flow. It is a common medical practice to recommend sucking on hard lemon-flavored candies to alleviate dry-mouth symptoms. Sugar-free lemon candies or cough drops eliminate the fermentable carbohydrate threat, but citric acid can create significant damage.³⁴ Other organic acids such as malic and tartaric provide tartness and act as product preservatives.

ACTIVE AND INACTIVE INGREDIENTS

Ingredients on medication labels are separated into active and inactive categories. Active ingredients may or may not impact the oral cavity. Inactive ingredients commonly include the following acids: ascorbic (vitamin C), malic, lactic, and tartaric. Inactive ingredients often include sucrose, glucose, lactose, fructose, honey, agave syrup, corn syrup, corn syrup solids, and high fructose corn syrup.

Inactive ingredients in medications and supplements are listed in alphabetical order, not by proportional content.³⁵ The first ingredient is often citric acid, but without testing the pH, it is impossible to determine potential damage. Products can also contain buffers, such as bicarbonate, or additional calcium. Both can negate the erosive potential of the product.²⁵

DailyMed is an online NIH site that lists ingredients for 11,000 OTC preparations. It's easy to search for products such as a brand-name cough syrup as well as an ingredient such as xylitol. The site lists both active and inactive ingredients for the listed products.³⁶

BUT IT'S ORGANIC

Some health routines increase the risk for erosion and caries. Claiming a product is organic reflects how a product was grown, not how it can—or will—impact human health.

Weight-loss strategies and protocols that support a healthy gut microbiome are increasingly popular. Common practices include sipping fresh lemon juice and water with a known pH from 1.8 to 2.5. Warm drinks speed erosive activity.^{25,34}

Apple cider vinegar and water, touted to promote digestion and weight loss, is often sweetened with honey. Kombucha, a highly-acidic fermented tea, is thought to improve gut microbial diversity. The pH of apple cider vinegar is 2.8 to 3.0. Kombucha pH ranges between 2.8 and 3.2. Other hidden sources of acidity include fruits, many raw vegetables, salad dressings, jams, jellies, pickled/fermented vegetables, yogurt, sour cream, ketchup, and mustard.³⁴

Vegetarians are at an increased risk for developing caries and erosion. A 2018 study found those who followed a vegetarian or lacto-ovo vegetarian diet had significantly more erosive tooth wear as compared to omnivores.³⁷ A 200-subject study concluded vegetarians ate more fruit daily and had an increased risk for caries and erosion over nonvegetarians.³⁸

Many try to maintain weight as they age. Thick nutritional supplements are sticky and loaded with fermentable carbohydrates. An 8-ounce bottle can contain 5 to 10 teaspoons of sugar. Body builders also

consume drinks or use powder supplements high in sugar and additives to increase muscle mass.³⁹ Granola bars frequently contain dried fruits or added sugars.

Overweight and obese children have significantly more erosive tooth wear and caries experience in both primary and permanent dentition as compared to normal weight children.⁴⁰

ADDING CALCIUM REDUCES EROSION POTENTIAL

Adding high calcium products such as yogurt or sour cream to an acidic product, such as a fruit smoothie, supersaturates the concoction with calcium. This negates the erosive potential even though the pH value of the original product remains low.^{4,34} Fruit juices with added calcium demonstrate this benefit, along with containing natural vitamins and minerals.²⁵

DETERMINING PH

pH testing measures the relative acidity or alkalinity of a water-based substance. Lipid-based products require a more complex evaluation protocol. The 14-point pH scale is logarithmic. The midpoint 7 is neutral. A pH meter provides a more accurate reading than pH/litmus paper or drops. University and commercial laboratories use high-quality pH meters to obtain precision measurements.

It is easy and inexpensive to test liquid products or salivary pH levels using high-quality plastic strips or rolls of pH paper. While a pH meter is more accurate, using pH test paper or strips provides a reasonable determination of a product's risk. Testing is an excellent educational tool in a clinical setting, health fair, or classroom demonstration.

For product testing, pour 1/8 teaspoon into a clean, dry glass or plastic container. Dip the strip into the test liquid. To test spray products, place the pH strip on a paper towel. For either procedure, make sure the pH indicator is thoroughly wet. For saliva, expectorate into a cup or place the strip in the mouth. Immediately match the color change to the reference grid. For an accurate reading, record the pH value immediately. Information about titratable acidity and about other ingredients

(calcium, phosphorus, fluoride) provides a more complete understanding about total erosive potential, tests that need to be performed in a laboratory setting.

DRY MOUTH—INSUFFICIENT BUFFERING CAPACITY

The pH of healthy saliva ranges from 6.8 to 7.2. Tooth demineralization does not occur at these levels. Hyposalivation sets the stage for a low oral pH, thus increasing demineralization potential. Insufficient salivary flow or poor-quality saliva translates to poor buffering capacity. Dry mouth is a side effect of many medications, a symptom of many modern degenerative diseases, and directly related to a wide range of lifestyle choices and environmental conditions. All age groups can experience intermittent dry mouth episodes. Thirty percent of overall population suffers from chronic dry mouth; the prevalence increases with aging.⁴¹⁻⁴⁴

Dry-mouth issues are found in all age groups, with those over age 50 at most risk.⁴⁵⁻⁴⁷ Fifty-nine percent of 2,147 British men aged 71-92 reported one or more symptoms of dry mouth, but only 34% reported their mouth felt dry occasionally or more often.⁴⁸ A study of 139 adults in Mexico over the age of 60 revealed similar data. Sixty-nine percent of the participants were female. Clinical examination revealed 60% suffered from hyposalivation, while only 25% of the subjects self-reported xerostomia.⁴⁹ A study in 2006 found 10% of people in their early 30s were affected by dry mouth.⁴⁷

Dry mouth affects nutritional intake, digestion, sleep, ability to talk, respiratory comfort, and quality of life.⁴¹ Dental professionals need to understand the components of healthy saliva, recognize factors that lead to dry mouth, and appreciate the role of saliva in both homeostasis and disease.⁵⁰ It is important to provide thorough screening techniques and offer appropriate therapies and interventions to those who suffer from dry mouth syndrome and its subsequent sequelae.⁵¹

DRY-MOUTH PRODUCTS

Years ago, there were very few products or strategies to combat dry-mouth issues. Saliva is 99% water. The remaining 1% contains mucins, proteins, digestive enzymes,

calcium, phosphorus, and other compounds that allow saliva to combat erosion and maintain homeostasis. Sipping water frequently throughout the day dilutes the nonerosive ingredients. Additionally, most bottled water products are mildly acidic with pH levels ranging from 5–5.5.^{52,53} pH levels of municipal water sources are generally neutral.

Many products claim to alleviate dry mouth symptoms. Product goals and formulations vary. Benefits can include salivary stimulation, improving electrolyte balance, supporting neutral pH, promoting patient comfort, and enhancing mouth feel. Most products are safe; however, some lozenges, sprays, gels, and rinses have acidic pH levels.^{1,2,54,55} Gels or products with a high viscosity create a film on tooth surfaces. The film is protective if the pH is not acidic.⁵⁵ Acidic products increase the risk for those with limited buffering capacity or inability to clear a product from the oral cavity.⁴³

CAREFUL CASE CONSIDERATIONS

Carefully guided health history questions can reveal harmful habits and products. For example, many patients take aspirin daily. The erosion potential is dependent on how the aspirin is ingested—swallowed directly, chewed, or taken in the form of a dispersible powder dissolved in water. Fizzy tablet headache formulations contain aspirin.¹ When swallowed in pill form, teeth are not subjected to an acidic pH. Vitamin C (ascorbic acid) comes in tablet formulations that are either swallowed or chewed, gummy formats, powders, or drops added to liquids/foods.

In moderation, intermittent use of cough syrups or drops will not substantially increase caries or erosion risk.

Products taken at night or between meals pose unique risks. Nocturnal salivary flow rate is unstimulated, and flow is compromised, thus increasing overall risk. Remineralization or acid neutralization diminishes during sleep.^{1,7,41-43}

MITIGATING EROSION, ENHANCING REMINERALIZATION DAILY

Decades of research have demonstrated the value of stannous fluoride in remineralizing noncavitated tooth surfaces, an

important consideration in reversing early caries lesions. Stannous fluoride, a well-accepted desensitizing agent, plugs open dentinal tubules. It is also bacteriostatic. Lowering the number of acid-producing microbes reduces caries and hypersensitivity risks.

Caries still poses a unique health threat. The rise in erosion and ETW is fueled by increased exposures to dietary acids and the inability of dry mouth sufferers to buffer the acids.^{1-5,40-43} Research demonstrates the superiority of stabilized stannous fluoride in protecting vulnerable tooth surfaces against the initiation and progression of acid erosion, the initial phase of erosive tooth wear.⁵⁶⁻⁵⁹

New stabilized stannous fluoride formulations offer an economical and easy approach. Regular use incorporates tin and fluoride into enamel and dentin, valuable tools to arrest erosive tooth wear.⁶⁰ In today's busy world, providing preventive and therapeutic benefits in an over-the-counter toothpaste gives users an effective weapon to combat erosion and caries daily.

CONCLUSION

Every patient presents with an individual risk profile. Dental professionals are uniquely positioned to provide easy-to-integrate solutions that prevent or resolve erosion, caries, and dentinal hypersensitivity.

It is critical for dental professionals to obtain complete information from each patient about medications, remedies, and nutritional supplements. The ideal platform is the initial health history and subsequent updates. Consider questions on a more global level. Answers to specific questions uncover patients at risk for caries, erosion, and dentinal hypersensitivity and lead to appropriate and targeted preventive and therapeutic solutions.

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QUESTIONS

1. **Erosion:**
 - A. Occurs only in permanent teeth
 - B. Is a surface-softening lesion
 - C. Is a rare condition
 - D. Can be reversed by drinking milk
2. **Erosive tooth wear:**
 - A. Is only caused by acid
 - B. Occurs only while one is sleeping
 - C. Occurs when a softened surface is abraded
 - D. Is an uncommon event
3. **Caries is caused by erosion. Erosion is a surface-softening lesion.**
 - A. Both statements are true.
 - B. The first statement is true and the second is false.
 - C. Both statements are false.
 - D. The first statement is false and the second is true.
4. **Caries is considered a multifactorial disease. Which statement is true?**
 - A. Caries can affect any age group.
 - B. Dry mouth increases the risk of caries.
 - C. Caries is accelerated by drinking low pH beverages.
 - D. All are true.
5. **Which statement is false about erosive lesions?**
 - A. Patients who suffer from dry mouth are at high risk for erosion.
 - B. Primary teeth are at risk for erosion.
 - C. Erosion only occurs at pH 4.
 - D. Regular consumption of energy and sports drinks contributes to erosion.
6. **The acquired enamel pellicle on the tooth surface:**
 - A. Provides protection from acid attacks
 - B. Protects only primary teeth
 - C. Can be easily disrupted by rinsing with water
 - D. Does not play a role in caries development
7. **White spot lesions:**
 - A. Can never be remineralized
 - B. Indicate subsurface mineral loss under an intact enamel layer
 - C. Are a result of excessive calcium in the saliva
 - D. Occur only around fixed orthodontic brackets
8. **Measuring pH values in the clinical setting:**
 - A. Is time consuming and costly
 - B. Does not yield accurate results
 - C. Is a valuable educational tool
 - D. Is not in the scope of the dental practice
9. **When taking a health history, it is important to discern:**
 - A. All over-the-counter and prescription medications
 - B. All nutritional supplements
 - C. Any home remedies
 - D. All of the above
10. **Which statement about over-the-counter medications and supplements is true?**
 - A. Do not have the potential to impact oral health
 - B. Can contain significant levels of fermentable carbohydrates
 - C. Are no more harmless than a vitamin pill
 - D. None of the above
11. **Citric acid:**
 - A. Is commonly found in foods, beverages, and medications
 - B. Is highly erosive
 - C. Curbs salivary flow rates
 - D. A and B
12. **Dry mouth:**
 - A. Can occur at any age
 - B. Can be intermittent
 - C. Increases erosion risk
 - D. All of the above
13. **Sipping bottled water throughout the day:**
 - A. Poses no threat to hard tooth structure
 - B. Improves salivary composition
 - C. Washes away protective salivary factors such as calcium and mucins
 - D. Reduces the risk for tooth erosion
14. **Which statement about dry mouth is false?**
 - A. It reduces the risk for dental hypersensitivity.
 - B. It accelerates the caries process.
 - C. It sets the stage for demineralization.
 - D. It is a common problem.
15. **Adding calcium to a product:**
 - A. Makes foods or medications taste more delicious
 - B. Can negate the erosion potential
 - C. Has no nutritional value
 - D. Increases the risk for decay
16. **Medication formulation is important. Which factor reduces compliance?**
 - A. Acceptable taste
 - B. Ease of use
 - C. Complicated directions
 - D. Simple dosage routine
17. **Taste masking uses all but which of the following to cover bitter flavors?**
 - A. Dried milk
 - B. Natural sugars
 - C. Fruit flavors
 - D. Artificial sweeteners
18. **Fermentable carbohydrates are used to formulate medications in the following ways. Which application is false?**
 - A. Thickener
 - B. Antioxidant
 - C. Buffering agent
 - D. Preservative

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QUESTIONS

- 19. Nutritional supplements can have an adverse effect on oral health when products:**
- Contain high levels of sugar
 - Stick to hard tooth surfaces
 - Supply needed nutrients
 - A and B
- 20. Critical pH in the oral cavity is:**
- A fixed number
 - Dependent on the salivary levels of calcium and phosphorus
 - An accurate measure of periodontal disease activity
 - An indicator of frequent snacking
- 21. Neutralizing oral acid is:**
- An end point that can't be achieved
 - Easily accomplished by rinsing with water every two hours
 - An important factor in controlling caries and erosion
 - A benefit of daily brushing
- 22. Which statement about dry mouth is false?**
- The estimated population prevalence for dry mouth is 30%.
 - 10% of people in their 30s report dry mouth issues.
 - Dry mouth is a rare occurrence.
 - Dry mouth can be chronic or intermittent.
- 23. Which factor does not increase the risk for caries or erosion in a medication or supplement?**
- An acidic pH level
 - A pill format that is swallowed
 - High titratable acidity
 - A formulation that sticks to tooth surfaces
- 24. Sufficient healthy saliva performs all but which of the following functions?**
- Buffers oral acids
 - Causes food to stick to the teeth
 - Improves oral soft tissue comfort
 - Helps clear food from the oral cavity
- 25. Which statement about oral moisturizers is false?**
- Are always formulated in a safe pH range
 - May create a film on the tooth surface
 - Can include lozenges, sprays, rinses, and gels
 - Regular use benefits those with dry mouth
- 26. Primary teeth are harder than permanent dentition. Permanent teeth are at higher overall risk for erosion.**
- Both statements are true.
 - The first statement is true and the second is false.
 - Both statements are false.
 - The first statement is false and the second is true.
- 27. Prescribing physicians understand the oral health risks of prescribing acidic medications. Given options, pharmacists are interested in dispensing sugar-free medications over formulations that contain fermentable carbohydrates.**
- The first statement is false and the second is true.
 - Both statements are true.
 - Both statements are false.
 - The first statement is true and the second is false.
- 28. Which dietary practice does not increase the risk for erosion?**
- Adopting a vegetarian diet
 - Eating cheese at the end of every meal
 - Drinking a fermented tea beverage such as kombucha
 - Drinking a fruit smoothie
- 29. Stabilized stannous fluoride performs which of the following functions?**
- Incorporates tin ions into susceptible tooth surfaces
 - Deposits fluoride into both dentin and enamel
 - Helps arrest erosive tooth wear
 - All of the above
- 30. Which statement about pH is true?**
- pH values are listed on medication labels.
 - The pH value measures the acidity or alkalinity at a singular point in time.
 - The pH value of a product does not play a role in erosion or caries.
 - Values from 8-14 are acidic.

NOTES

Spotlight on medications, remedies, and supplements: Why a thorough health history really matters

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EDUCATIONAL OBJECTIVES

1. Appreciate how medications can play a role in caries and erosion
2. Recognize hidden sources of fermentable carbohydrates
3. Learn about ingredients and product formulations
4. Discover the destructive role of citric acid
5. Understand why dry mouth increases risk for caries and erosion
6. Compare pH levels of oral moisturizers
7. Know how a detailed health history uncovers dangerous habits and products

COURSE EVALUATION

1. Were the individual course objectives met?

Objective #1: Yes No	Objective #3: Yes No	Objective #5: Yes No	Objective #7: Yes No
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Please evaluate this course by responding to the following statements, using a scale of Excellent = 5 to Poor = 0.

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| 3. Please rate your personal mastery of the course objectives. | 5 | 4 | 3 | 2 | 1 | 0 |
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| 5. How do you rate the author's grasp of the topic? | 5 | 4 | 3 | 2 | 1 | 0 |
| 6. Please rate the instructor's effectiveness. | 5 | 4 | 3 | 2 | 1 | 0 |
| 7. Was the overall administration of the course effective? | 5 | 4 | 3 | 2 | 1 | 0 |
| 8. Please rate the usefulness and clinical applicability of this course. | 5 | 4 | 3 | 2 | 1 | 0 |
| 9. Please rate the usefulness of the supplemental web bibliography. | 5 | 4 | 3 | 2 | 1 | 0 |
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15. What additional continuing dental education topics would you like to see?

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| 11. (A) (B) (C) (D) | 26. (A) (B) (C) (D) |
| 12. (A) (B) (C) (D) | 27. (A) (B) (C) (D) |
| 13. (A) (B) (C) (D) | 28. (A) (B) (C) (D) |
| 14. (A) (B) (C) (D) | 29. (A) (B) (C) (D) |
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