

# The Dentin

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## Ice Chewing: A Harmless Habit or a Hidden Threat to Your Teeth?

Diya Modi

Chewing on ice is a surprisingly common habit. Many people enjoy the crunchy texture, while others prefer the cold, refreshing feeling of ice with a cold drink. While this may seem harmless, since ice is just frozen water, this habit can have negative effects on oral health if done frequently.

One reason people enjoy chewing ice is the sensory satisfaction it provides. The cold, crisp texture can feel calming or help relieve boredom, similar to chewing gum. However, just because a habit feels harmless does not mean it is safe for teeth.

Ice is extremely hard, and teeth are not designed to crush such rigid material repeatedly. The enamel, which is the outer protective layer of the tooth, is strong but brittle. Biting hard substances like ice can create tiny cracks or chips that weaken the teeth over time. According to dental guidance published by Colgate, repeatedly biting hard substances can increase the risk of tooth wear, fractures, and sensitivity. Even if damage is not immediately visible, the repeated stress on enamel can accumulate. Enamel may be the strongest substance in the human body, but biting on something hard like ice repeatedly over time can still damage it.

Cold temperatures can also worsen the problem. The extreme temperature difference between ice and the mouth may trigger tooth sensitivity or small structural stresses in the enamel. As this accumulates over time, it can make the teeth more vulnerable (The Washington Post, 2024).

Frequent ice chewing may also be a sign of an underlying health condition rather than just a preference. Medical professionals have linked this persistent craving for ice, pagophagia, to iron-deficiency anemia in some individuals. In these cases, addressing nutritional deficiency can help reduce the urge to chew ice and improve overall health (The Washington Post, 2024).

Dentists highly recommend avoiding chewing ice altogether to protect tooth structure and prevent unnecessary damage. Letting ice melt in the mouth instead of crunching on it, staying hydrated, or choosing a softer alternative can help satisfy a desire for something cold without the immense stress on teeth. Maintaining regular dental checkups is also important so that early signs of enamel wear or fractures can be detected before they worsen.

While chewing ice may be refreshing in the moment, dental professionals emphasize that teeth are meant for chewing food, not such hard frozen objects. Breaking this habit could prove essential in preserving enamel, reducing sensitivity, and preventing avoidable dental problems. This all can ensure a healthy smile to last longer than the temporary satisfaction of a crunch.



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# Do School Dental Programs Truly Improve Children's Oral Health?

Sowon Bok

Many dental students in contemporary society belong to the millennial generation, a generation where people adapt to social media easily and use it often for educational and personal growth (Brownstein et al., 2015). This shift in trend influenced how health information, such as school dental education, is shared and learned. As a result, health education, including dental knowledge, has expanded beyond traditional settings and into classrooms and digital platforms.

Specifically, there has been a positive change in dental education plans in diverse schools, and their main purpose is to ensure that children learn about the basic knowledge in oral hygiene. The prominent aspects of dental education plans include learning about appropriate brushing, flossing, sugar intake, and how to prevent cavities through brushing techniques and food. The ultimate goal of this is to improve children's knowledge of oral health, as well as to encourage appropriate dental behavior among children.

However, the question remains: do dental education programs in schools actually improve children's oral health? There have been many studies through research papers that aimed to determine whether those dental education plans improve children's oral health.

Many peer-reviewed studies indicate that school dental programs are effective in improving students' knowledge of oral health and their daily hygiene practices. For example, studies from the Indian Journal of Dental Research on the effectiveness of school education programs in improving oral health showed that dental health education programs carried out in schools can significantly improve their knowledge of oral health, as they changed their oral hygiene practices. The study also mentions that the program even improved their gingival health (Shenoy et al., 2010).

In addition, a study conducted in Australia on challenges in implementing community-based dental education programs suggests that these programs in schools greatly improve students' knowledge of oral health, develop their positive attitudes towards dental health, and enhance their self-efficacy in maintaining oral health (Taylor et al., 2024).

Several other studies support these main findings. They indicate that educational interventions carried out in schools significantly improved students' practices. These practices include flossing and proper brushing techniques (Jaime et al., 2015).

In summary, it is clear that structured school dental education programs can greatly affect children's attitudes toward oral health.

Other than the knowledge and attitudes, the programs can also improve their actual oral health. Some studies show that there is improvement in oral hygiene status, as well as in gingival and periodontal health. This improvement was prominent for students who went through these educational programs compared to those who did not receive the same education (Shenoy et al., 2010).

Education programs also play a part that improves a behavior of children that leads to good dental health and oral well-being. For example, when children receive education about how to prevent plaque, their teeth will likely be healthier (Geetha Priya et al., 2019).

This shows that school dental programs can lead to improvements in oral hygiene in children, at least in the short term, by encouraging children to improve their daily dental habits.

Even though there are significant beneficial effects of these programs present, studies have revealed that the enhancement in knowledge and hygiene practices does not always directly translate into long-term reductions in dental caries. Some studies found that even though the students who got the education gained better oral health knowledge, there was no significant difference in dental caries incidence between the students who participated in the program and those who did not (Jaime et al., 2015).

This finding highlights the important limitations of the program, as the outcome of the education program is not clear, even though it is clear that the program enhanced children's understanding of health knowledge. While the programs successfully increased their awareness of dental health, the long-term effect of this remains unsolved. Factors including diet, access to dental care, fluoride exposure, and socioeconomic status may also play a role in this inconclusive outcome and in terms of determining whether dental caries develop.

For example, research indicates that programs conducted more frequently, such as every three weeks, are significantly more effective in improving children's oral health knowledge and hygiene compared to those that did the program less often (Shenoy et al., 2010). This finding suggests that continued education and exposure to the dental program are necessary for students to actually improve their oral hygiene because it may lead them to fully adopt healthy oral hygiene habits.

Overall, it can be noted that the school dental programs, based on the studies, clearly show the benefits of these programs because these programs helped to improve the oral health knowledge and awareness of the students. The students who took part in these programs have better brushing techniques and better knowledge of oral health concepts.

However, the evidence also suggests that these programs may not be enough to improve the oral health of the students perfectly, especially for long periods. Although it can be noted that education may play a big role in improving their oral well-being, it can also be noted that children's diets, preventive dental care, and health conditions may also have an effect on their oral health.

Therefore, school dental education programs should still be viewed as an important factor that leads students to be aware of their health, but they should not be used as a complete solution for preventing dental disease. Their effectiveness appears to depend on the program frequency, structure, and continued education. When implemented consistently and continuously, these programs can play a valuable role in improving children's knowledge, awareness, and oral health.



## Silver Diamine Fluoride (SDF): The End of the Dental Drill?

Madison Zhou

Dental caries continue to challenge clinicians despite decades of preventative progress. Tooth decay ranks among the most common chronic diseases worldwide, affecting an estimated 3 billion people (National Institute for Dental and Craniofacial Research). Water fluoridation and fluoride-containing oral care products have reduced the severity of this disease, yet clinicians still encounter untreated decay in children, older adults, and populations with limited access to care.

Silver Diamine Fluoride (SDF) is a colorless to blue-tinted alkaline solution containing approximately 38% silver diamine fluoride complex. This solution effectively combines the antimicrobial power of silver, the strengthening properties of fluoride, and the stabilizing effects of ammonia. While the U.S. Food and Drug Administration (FDA) officially classifies SDF as a Class II medical device cleared for treating dentin hypersensitivity, its application has expanded significantly in clinical practice.

To understand how SDF successfully arrests dental caries, it is helpful to explore its multifaceted biological mechanisms. The process begins with silver, which functions as a broad-spectrum antimicrobial agent; it actively disrupts bacterial cell membranes, denatures proteins, and interferes with DNA replication to reduce the bacterial load within a lesion. Simultaneously, the fluoride component promotes remineralization by facilitating fluorapatite deposition, which significantly increases the mineral density of demineralized enamel and dentin. Supporting these active ingredients is ammonia, which stabilizes the solution and maintains the high pH levels necessary for chemical activity. Consequently, when clinicians apply SDF to hydroxyapatite, the resulting silver phosphate and other silver compounds harden the softened dentin

and inhibit further collagen degradation (Silver diamine fluoride: the science behind the action – a narrative review).

Recent progress was seen in a 2025 study that Volponi led, building upon her previous work. Her team developed a new material in which to grow the teeth that better replicates the real environment where biological teeth grow inside the mouth. The material enables cell communication, allowing one cell to be able to effectively tell another to start becoming a tooth cell, according to BBC. In previous attempts to grow teeth, the researchers faced the issue of all signals being sent at once. This new material replicates the actual process that happens in the body by releasing signals slowly over time.

With strong statistical rates of effectiveness, SDF offers practical and immediate advantages for every patient. When clinicians apply it quickly to the decayed tooth, they allow for the preservation of sound tooth structure. The procedure eliminates the need for drilling, local anesthesia, and complex equipment. To add on, it is inexpensive and requires minimal technique sensitivity, making it especially valuable in community health settings, pediatric dentistry, geriatric care, and special needs populations. Providers also use SDF to stabilize multiple lesions in a single visit and reduce the need to put patients under sedation.



However, SDF presents some limitations that may affect the patients' oral health and dental aesthetics. It permanently stains arrested lesions black because silver compounds integrate into the tooth structure (Silver Diamine Fluoride Facts Sheet–THE MEDICAID EVIDENCE-BASED DECISION PROJECT (MED)). The solution may temporarily stain soft tissues, cause mild irritation, or leave a metallic taste. Dentists must often reapply to SDF to maintain the arrest. On top of that, they may still need restorative treatment to restore function or esthetics.

Silver diamine fluoride does not replace restorative dentistry. Instead, it strengthens the profession's ability to control disease through minimally invasive, evidence-based care. As dentistry continues to balance prevention, accessibility, and conservative intervention, SDF stands as a scientifically supported advancement in caries control (Dental Caries and Sealant Prevalence in Children and Adolescents in the United States, 2011–2012).

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## When the Mouth Runs Dry: Understanding Xerostomia

Uran Seo

A persistently dry mouth may seem harmless at first, but it can be an early sign of xerostomia, a condition that affects saliva production and oral health. An occasional dry mouth is normal; dehydration or simply forgetting to drink water can leave anyone with a temporary parched feeling. However, the situation becomes more serious when the mouth continuously remains dry despite adequate water intake. Surprisingly, xerostomia affects approximately 1 in 5 people, with risk increasing as individuals age (Cleveland Clinic, 2023). Stress alone can also trigger episodes of dry mouth, making this a condition that could affect anyone (NIH, 2020).

Under normal physiological conditions, salivary glands produce saliva that protects the teeth and oral tissues. Without sufficient saliva, this natural defense system becomes significantly compromised (Simcoe Family Dentistry, 2024). While a dry mouth may appear to be a minor inconvenience, it deserves serious attention because saliva plays multiple critical roles. It helps break down food, facilitates swallowing, washes away food particles from the gums, and supports everyday functions such as speaking. Additionally, saliva contains minerals like calcium and phosphate that are essential for maintaining tooth strength and resisting decay. Without adequate saliva, oral health can deteriorate rapidly and can increase risks of gum disease and oral infections (NIH, 2020; Cleveland Clinic, 2023).

However, identifying xerostomia can be challenging because an occasional dry mouth is commonly faced among many individuals. Therefore, how can we identify this condition and seek appropriate dental treatment? One can recognize common symptoms of xerostomia: a persistent dry or sticky feeling in the mouth, thick or stringy saliva, halitosis (bad breath), and difficulty eating or speaking. Apart from a persistent dry mouth, frequent cavities and oral discomfort are also signs that should not be ignored, as these symptoms may be caused by xerostomia. Some people may also experience a burning sensation on the tongue, cracked lips, or alterations in taste perception (Mayo Clinic, 2018; Cleveland Clinic, 2023).

Xerostomia can result from a variety of underlying causes, including certain medications, health conditions, radiation therapy, chemotherapy drugs, dehydration, and mouth breathing. The most frequent cause is the use of certain medications because many drugs interfere with the nervous system signals that stimulate salivary gland secretion (Arany et al., 2021). According to a 2018 systematic review and meta-analysis published in the Journal of the American Geriatrics Society, urologic medications, antidepressants, and psycholeptics are all commonly associated with xerostomia in older adults (ADA, 2018; Tan et al., 2017). In addition to medications, certain health conditions can directly impair saliva production. Autoimmune disorders such as Sjögren's disease attack the salivary glands, while systemic diseases like diabetes and HIV/AIDS contribute to dehydration (NIH, 2020). Moreover, cancer treatments are another significant cause of xerostomia. Radiation therapy to the head and neck can permanently damage salivary glands, while certain chemotherapy drugs may temporarily reduce saliva production by affecting rapidly dividing cells involved in glandular function (Cleveland Clinic, 2023).

Although no perfect solution for xerostomia currently exists, the condition can be managed with simple and consistent practices. One can try several methods at home, such as chewing sugarless gum to stimulate saliva secretion, avoiding smoking, and limiting carbonated drinks and alcoholic beverages (Cleveland Clinic, 2023). Furthermore, even though xerostomia is not always preventable since the most common cause is the use of medications required to treat serious or life-threatening medical conditions, early detection and proper management can greatly reduce its impact. So next time your mouth feels dry, please do not ignore it! Your dentist can help.



“However, the situation becomes more serious when the mouth continuously remains dry despite adequate water intake.”

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# Laser-Based Stimulation for Gum Repair

Anika Jain

What if you could heal gums faster, not with stitches and grafting, but with light? As dental technology advances, lasers are being used at low powers to stimulate healing at the cellular level, offering a new, minimally invasive technique to periodontal care.

Photobiomodulation (PBM), also known as low level laser therapy (LLLT) is used to facilitate healing using low-energy light like red or near-infrared wavelengths; this makes it an appealing approach for gum procedures where reduced inflammation and cell regeneration are priorities.

At the cellular level, PBM is a form of “light-driven” therapy. When the low-energy light shines on the tissue, tiny particles of light called photons enter cells, where mitochondria function as the powerhouse of the cell by producing ATP. Specific wavelengths of the light are absorbed by an enzyme called cytochrome c oxidase, which is a part of the cell’s energy production system. After absorbing, the mitochondria become more active and produce more ATP. With more energy in the form of ATP, cells can repair tissue faster and more efficiently. This process is known as oxidative phosphorylation in the electron transport chain.

Specifically in gum tissue, the increase of energy helps make fibroblasts, which are cells responsible for producing collagen, more active. Collagen is crucial to providing structure and strength in order to repair the tissue. PBM simultaneously reduces inflammation and supports the growth of new blood vessels, improving oxygen and nutrient delivery to the impacted area. These benefits support healing after periodontal treatment like gum disease repair.

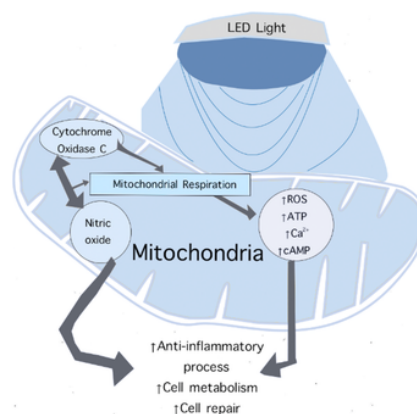
LLLT does not regrow large amounts of bone itself. Instead, it functions as a feature to enhance the body’s natural healing response. For patients with severe periodontal damage, doctors will perform treatment like root planing, tissue regeneration, bone grafting, etc. PBM is an adjunct treatment, used alongside traditional treatment options, not a replacement for the above.

Newer systems are marketed for post-surgery healing, implant integration, gingival regeneration, and TMJ control. For each of these purposes, different wavelengths are used, determined by how deep the light penetrates and how tissues absorb it. For example, an issue in a deeper muscle/bone may use 810/940/980 nm, while surface level treatments may use 660 nm.

Let’s take a look at what using PBM looks like in the clinic:

After an implant procedure, where a titanium implant is surgically placed into the jawbone, the body begins to heal around the implant, and often the success of the implant is reliant on how well the implant can fuse with the surrounding bone. First, blood will fill the site and form a blood clot; over time, osteoblasts, or bone-forming cells, produce new bone that grows around the titanium implant. This process is called osseointegration, which allows the implant to act as a natural tooth root. Sometimes, doctors use PBM immediately after placing the implant as well as during follow-up visits. The clinician will direct the laser at the surgical site for a short period of time, ensuring that they only stimulate cellular growth, not heat or cut the tissue.

Photobiomodulation is an amazing development in modern dentistry, further integrating technology to improve treatment outcomes after procedures.



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# Which Dental Startups Should You Bet Your Money On?

Raffaella Wong

Dentistry is no longer defined solely by drills, fillings, and material improvements. The field is undergoing technological shifts driven by robotics, AI, and automation. For investors looking at healthcare innovation, dentistry presents a very compelling opportunity. The procedural, image-driven, and administratively complex nature makes it highly receptive to AI powered applications. Several startups really stand out addressing the constraints in both clinical care and dental practice operations.

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### **Robotic Surgery Enter the Operatory**

One of the most upfront innovators in dental robotics is Neocis, the creator of the Yomi system. Yomi is the first FDA approved robotic assistant for dental implant surgeries. Unlike fully autonomous surgical robots, Yomi works in collaboration with the clinician. Dentists are able to digitally plan the implant placement beforehand. During the procedure, the robotic arm guides the dentist precisely at a perfect angle, depth, and position.

The main goal is consistency and accuracy when it comes to implant placement; a small millimeter deviation can affect long term outcomes when it comes to the patient's dental health. By integrating digitally planned robotic assistance, dentists are able to reduce inconsistencies and enhance confidence for both themselves and their patients. As implant demand grows alongside an aging population and expanding cosmetic dentistry market, robotic assisted technology represents a high margin segment of dental innovation for investors.

### **Radiograph Reading AI**

Artificial intelligence is also reshaping diagnosis in dentistry. Diagnocat has developed a machine learning platform that is able to interpret dental imaging. Some of these imaging technologies include panoramic X-rays and CBCT scans (Cone Beam Computed Tomography, an automated segmentation that can identify teeth and surrounding bone structures while also pinpointing any potential issues). Using these images, Diagnocat then produces structured diagnostic reports to aid the dentist, especially for pathologies invisible to the naked eye.

The clinical relevance of the technology is supported by peer reviewed research, published in Nature, which demonstrated that AI-based segmentation models can be compared to human experts in performing CBCT analyses. In controlled studies, the automated measurements showed no statistically significant differences from manual segmentation.

For dental practices, this translates into saving loads of time, a standardized method of reporting, and potentially improving the consistency of diagnostic accuracy. For investors, this AI imaging platform operates on a cloud based subscription model. This enables the distribution of the technology across practices without the burden of physical equipment.

As dental offices continue to adopt digital imaging systems, Diagnocat is destined to become a key embedded infrastructure!

### **Automating the Back Office**

Clinical innovations often take over the spotlight, but efficiency, when it comes to the administrative side, is one of dentistry's most persistent burdens. Insurance verification, claim follow ups, and coordination of patients' benefits consume hours from staff and contribute to their burn out.

SuperDial tackles this challenge with AI chat bots that autonomously call insurance providers. Additionally, they are able to navigate unique automatic phone systems and retrieve coverage information from insurance companies. Instead of staff having to wait on hold, this AI handles repetitive calls and feeds the results directly into the practice network.

This may not appear as futuristic as robotic surgery, but rest assured, operational automation can directly impact one's practice profitability. Many private clinics operate on tight margins, and labor is one of the largest expenses of each practice. Reducing the administrative workload improves efficiency without having to sacrifice quality patient care.

Overall, these startups are united in creating a shift of dentistry into an increasingly data and automated enabled field at every stage of patient care. For investors evaluating where to bet their money on, the most promising dental startups are those that integrate seamlessly into existing workflows. The future of dentistry will likely belong to companies that combine technology with clinical expertise. These three startups are simply three wonderful examples at the center of that transformation.



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# Oral Health Seen Through the Tongue

Deana Lee

While dentists mainly examine your teeth, did you know that dentists are trained to catch oral health and other systemic health conditions through observing a patient's tongue? There are greater than 100 disease symptoms that may be observed in one's mouth and over 40 diverse diseases, systemic conditions, and nutritional deficiencies visible via the tongue. Often overlooked, the tongue plays a critical role in dental examinations. Changes in color, texture, or surface of a tongue may very well be a signal to hidden systemic conditions that go beyond simply cavities or gum diseases.

The tongue is one of the primary indicators of oral health. For this reason, dentists cannot skip examining the tongue of their patients. A healthy tongue is usually pink, moist, and covered with small bumps, also known as papillae, helping us detect taste and certain textures (Life Dental Group, 2023). Because our tongue hosts a wide microbiome, poor oral hygiene can lead to visible changes such as a white coating of plaque buildup or discoloration - all of which are precursors to experiencing bad breath or taste. Due to these factors, dentists often emphasize tongue hygiene as one of the first steps for maintaining overall oral health (Dentist of Gardena, 2026).

Beyond hygiene-related changes, the tongue can reveal signs of a more serious oral condition, cancer. Some precursors to oral cancer may include recurring sores, red or white patches, or ulcers that do not heal within two weeks on the tongue. Tongue cancers could develop on the visible front portion of the tongue or at the base near the throat; and in some cases, it is thankfully detected by the clinician during dental checkups before symptoms worsen. Cancer that grows on the oral tongue (front half

section of the tongue) is commonly known as mouth cancer, and one that is growing on the base of the tongue (back of the tongue) is referred to as oropharyngeal cancer. These symptoms may vary based on the location of cancer growth. The exact reason behind oral cancer has yet to be specified, still risk factors that could increase the possibility of developing one. Some contributing carcinogens include smoking or chewing tobacco, and consuming large amounts of alcoholic beverages (Macmillan Cancer Support, 2022).

The tongue serves as a valuable diagnostic tool in dentistry, offering insight into oral hygiene, and disease. While it may only seem like a mechanism for tasting, the tongue can reveal important information about various physiological factors in our body. Overall, paying close attention to changes in the tongue and maintaining good oral hygiene with dental checkups will better support our oral health in the long run.



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# Importance of Toothbrush Storage

Evelyn Vu

Floss after you eat. Visit the dentist twice a year. Brush your teeth everyday. All these rules are established at an early age and reinforced throughout our lives. While maintaining proper dental hygiene habits are crucial, the tools we use to achieve this are often overlooked. A notable one would be toothbrushes.

Despite new advancements from the traditional toothbrush to electronic ones, the life span of its use remains fairly constant. Simplified, it is a tool used to brush away the germs and bacteria in our mouth everyday. Bacteria will inevitably cling to and hide in our toothbrushes, so it is recommended to get a new one, or change the brush head for electronic toothbrushes, every three to four months (Nakasato).

Even when toothbrushes are exposed to bacteria before the recommended three to four months, the toothbrush should still be replaced. For example, when toothbrushes are used while sick, dropped on the floor, or touched by other people's toothbrushes, they are introduced to all kinds of bacteria that would be unhealthy to continuously expose teeth to. Although the cost of electronic toothbrushes may discourage people from replacing the brush head so often, it's important to keep in mind that toothbrushes containing bacteria will do more harm than good.

The time span of a toothbrush's effectiveness is strictly three to four months, but there are some tips to increase the likelihood of it lasting to its maximum duration. Firstly, water buildup on toothbrushes is a

major cause of bacteria build up; that can be affected by the positioning of the toothbrush and humidity of the storage area. In order to minimize this buildup, toothbrushes should be positioned standing up, so that leftover water can drain (UCSF California Childcare Health Program). Furthermore, toothbrushes should not be covered or stored in a closed container. Drawers and cabinets may be a practical and aesthetic location to store toothbrushes, but a closed, humid environment is the ideal conditions for any leftover bacteria on toothbrushes to grow (Paradise Dental Associates). The bathroom counter is the most suitable location for toothbrushes, and preferably in some sort of storage that separates the toothbrushes if multiple people use that bathroom.



“The bathroom counter is the most suitable location for toothbrushes, and preferably in some sort of storage that separates the toothbrushes if multiple people use the bathroom.”

Aside from storage, there are other contributing factors to toothbrush durability. Researchers continue to learn more about how much bacteria is released by toilets, and how that bacteria quickly and effectively spreads despite being undetectable to the human eye (University of Colorado Boulder). It can help to close the toilet seat before flushing and, generally, toothbrushes should be kept as far away from toilets as possible. Some sources suggest that toothbrushes undergo deep cleaning to better disinfect it, but other sources claim that these processes end up damaging the bristles of the toothbrush as well. Both sides agree and reinforce that toothbrushes are not a life long tool. In order to make the most of them, they should be treated with the proper care and then be replaced to ensure that they don't negatively affect our dental hygiene and general health.

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## Dental Care Barriers for Low-Income Americans Living With AIDS

Ria Bhutani

For many Americans living with HIV/AIDS, it has shifted from an acute terminal illness to a manageable chronic condition. However, a significant gap still remains in the holistic care of this population: oral healthcare. Oral lesions and periodontal disease are often the first clinical indicators of HIV progression: low-income individuals living with the virus face a daunting trifecta of systemic, financial, and social barriers that prevent them from accessing essential dental services.

Oral health is not merely a cosmetic concern for those with HIV; it is a critical component of viral management. Conditions such as oral candidiasis (thrush), hairy leukoplakia, and severe periodontitis can interfere with a patient's ability to eat, swallow, and adhere to Antiretroviral Therapy (ART).

Research has consistently shown that poor oral health can lead to systemic inflammation, potentially complicating the management of the virus and increasing the risk of secondary infections.

The primary barrier for low-income Americans is the fragmented nature of dental insurance. While the Ryan White HIV/AIDS Program (RWHAP)—specifically Part F, the Dental Reimbursement Program—provides a safety net, it is often underfunded and overstretched. Many low-income patients rely on Medicaid, but dental coverage for adults under Medicaid is optional for states. In many regions, coverage is restricted to emergency extractions

rather than the preventive cleanings and restorative work necessary for HIV patients. According to research, individuals living with HIV are significantly more likely to report unmet dental needs compared to unmet primary medical needs, largely due to the out-of-pocket costs associated with specialized oral surgery.

Even when funding is available, social barriers persist. Stigma remains a powerful deterrent. Many patients report dental shaming or fear disclosing their HIV status to community dentists due to potential discrimination. On the provider side, some dental professionals still harbor outdated fears regarding chair-side transmission, leading to a referral merry-go-round where patients are bounced from office to office because a general practitioner feels unequipped to treat them. This lack of a trained, empathetic workforce creates dental deserts for the immunocompromised.

To bridge this gap, public health experts advocate for the integration of dental care into primary HIV medical homes. By co-locating services, patients can receive dental screenings during their routine viral load checks. Furthermore, increasing the reimbursement rates for Medicaid dental providers and expanding the reach of the Ryan White Dental Programs are essential steps to ensure that a low-income status does not dictate the quality of one's oral health.

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## Ancient Times: Teeth Meant Survival, Not Beauty

Amrin Gill

For most of human history, people across ancient civilizations cared for their teeth primarily for survival functions – eating, avoiding infections, and staying healthy – but over centuries, advances in science and society transformed dentistry into a field that is also influenced by and focuses on aesthetics and creating confident smiles.

According to *Cosmetic Dentistry Has Evolved Through the Centuries* from JL Dental, dentistry shifted towards an aesthetics-based focus in the 1980s and 1990s, as new technology like tooth-colored bonding, composite resins, and effective whitening techniques changed the field from strictly restorative to incorporating cosmetics. This source states that “modern-day cosmetic dentistry owes the 1980s a debt of gratitude” because the innovations from this time period allowed dentists to improve not only function, but also appearance.

Long before whitening treatments and veneers, early societies viewed dental care as a matter of necessity. According to Sharp Dentistry's *The Evolution of Cosmetic Dentistry: From Past to Present*, archaeological findings show that as early as 4000 BC, ancient Egyptians used gold and ivory to create basic dental prosthetics. These efforts were not about perfect or expensive-looking smiles, but instead about replacing lost teeth so people could chew and avoid pain.

Fast forward to the time period of the Renaissance, and dentistry slowly evolved as techniques improved and dentures made from human or animal teeth became more common. Sharp Dentistry reports that by the 18th century, porcelain dentures introduced by French innovator Alexis Duchâteau set a new standard by more closely resembling the look of natural teeth, reflecting a growing interest in appearance with function.

The shift towards aesthetics advanced even more in the 20th century. JL Dental recalls that veneers were first created in the 1930s for Hollywood actors, although they were temporary and often fell off. Later breakthroughs – such as “acid-etch” techniques in the 1950s and permanent bonding methods in the 1980s – made cosmetic treatments more reliable and accessible.

Research pertaining to the *Evolution of Aesthetic Dentistry* published through PubMed highlights that one major goal of modern dental treatment is to mimic natural teeth and design smiles that fit each patient's unique features. The publication notes that advances in materials, digital technology, and treatment planning have significantly improved dentists' ability to create natural and aesthetic results over the past century.

Today, dentistry is versatile; this field blends health and artistry. Technology like digital imaging, laser treatments, and advanced implants allows dentists to restore function while also enhancing appearance. Cultural perspectives also play an important role – different societies value different smile aesthetics, reminding professionals that beauty is not a “one-size-fits-all” matter.

The evolution of dentistry shows how a practice that was once forced by survival has expanded into a discipline that supports both well-being and self-expression. As innovations continue, from digital smile design to emerging artificial intelligence tools, dentistry reflects a broader truth: caring for your teeth is no longer just about avoiding pain, but about helping patients feel and look healthy and confident in their everyday lives.

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# A Guide to Dental Floss Options

Anna Hyun

Dentists can not stress enough about the importance of flossing daily; daily flossing is essential in removing plaque that tooth brushes can easily miss (Paragon Dental, 2019). However, with the vast variety of flosses on the market, how do you know which is the right option for you?

According to your teeth, you might want to consider these common floss options (Aspen Dental 2024):

- Dental tape: wider and flatter than traditional floss; more ideal for larger gaps between the teeth, with the flatter surface being more gentle on the gums.
- Waxed and unwaxed floss: most commonly used floss. It is easy to use and durable. Unwaxed floss may be recommended if you are looking for a thinner option. However, waxed floss is smoothly coated for better navigation for individuals with less gaps between their teeth.
- Super floss: ideal for wider gaps or braces. It is a pre-cut strand with a thicker portion to ensure better removal of plaque.
- Water flossers: great to use between braces, but it is a pricer option.
- Dental picks: a variation of dental tape or waxed/unwaxed floss with a handle for easier maneuvering. Although if it is applied with too much force, it may lead to swelling to bleeding. It is particularly beneficial to use for teeth with braces, which may require more careful and accurate navigation.



Apart from these options, many patients with highly sensitive gum may experience mild, consistent bleeding after flossing. For the best result for these types of gums, expanding dental floss may be ideal (Sunstar Gum, 2025). The woven, soft thread minimizes swelling and irritation of gums, while the expansion of thread as it touches saliva ensures a deeper clean, even for those with tight gaps between their teeth. Alternatively, water flossers may be suitable for sensitive gum as well.

However, some patients use supplements to floss, such as wooden tooth picks, which might actually worsen their gum health in exchange for immediate relief, doing more harm than good (Legend Dental, 2025). Repetitive scrapping and poking with sharp and rigid wooden tooth picks often leads to receding gums over time, or an increased chance of getting splinters in their gum. Therefore, compared to the floss options listed above, wooden tooth picks are not the safest option to dislodge food particles.

Though there are many floss options for your teeth, it is most important to ensure that your floss are products with an ADA seal of approval. The seal ensures that the product is tested for safety and that the floss is effective in removing plaque and helping prevent gum disease (Lowry Dental, 2016). Additionally, it proves the floss has been verified and the manufacturer's claims in packaging are true.

For specific inquiry, always consult with your dentist to ensure your choice of floss is right for your needs.

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# Sleep Apnea's Connection to Oral Health

Katlyn Ong

Imagine your breath stopping sporadically throughout the night: scary, right? Unfortunately, that is the reality for people suffering with sleep apnea. Sleep apnea is a sleep disorder where breathing stops and starts repeatedly during sleep. Breathing often pauses for ten seconds or more, causing those affected to partially wake up several times throughout the night. This makes it impossible to achieve deep sleep, causing symptoms such as daytime fatigue, morning headache, difficulty concentrating, and forgetfulness. People with sleep apnea are usually unaware of waking up throughout the night, but nevertheless experience excessive exhaustion throughout the day.

Sleep apnea is categorized into three types: obstructive sleep apnea, central sleep apnea, and complex sleep apnea. According to University General Dentists, "Obstructive sleep apnea is the most common form of sleep apnea, accounting for over 80% of cases in the U.S." Obstructive sleep apnea

occurs when muscles—such as the tongue and soft palate which support the soft tissues in your throat—relax too much, causing narrowing of the airway. This form of sleep apnea can be caused by a variety of factors, from dental malformations to allergy issues. In contrast, central sleep apnea is a neurological issue that instead involves failure of the brain to activate respiratory muscles that are used for breathing during sleep. This form of sleep apnea is typically coupled with other neurological disorders like a stroke or Parkinson's disease. Lastly, complex sleep apnea is a combination of obstructive and central sleep apnea. Complex sleep apnea is a rare form that typically arises from ineffective treatments of obstructive sleep apnea.

Symptoms such as excessive fatigue are just the start. Sleep apnea also has a major impact on oral health, including bruxism, temporomandibular joint (TMJ) disorders, and tooth decay. Bruxism, or tooth grinding, is caused by excessive throat relaxation.

To prevent the airway from being blocked, the jaw bites down reflexively, leading to headaches, and neck and jaw pain. TMJ disorders are another issue associated with obstructive sleep apnea. The TMJ is a joint that connects the lower and upper jaws. Sleep apnea can cause issues with the joint or surrounding muscles, leading to headaches, and issues with the neck, ear, and jaw. Tooth decay is another oral health issue tied to sleep apnea. People with sleep apnea often breathe through their mouth while sleeping, a surefire precursor to mouth dryness. Without a normal amount of saliva present in the mouth to consistently wash over oral surfaces, sleep apnea-induced mouth dryness can lead to oral issues such as plaque, gingivitis, and periodontal disease.

While sleep apnea is a disease that significantly impacts quality of life, there are several treatment options to reduce sleep apnea's negative effects. The simplest option is behavioral modification. Mild cases of obstructive sleep apnea are often caused by conditions such as obesity, or excessive consumption of alcohol or drugs; addressing these concerns can reduce the effects of sleep apnea. Another common cause of sleep apnea is sleep position. Sleeping on your back increases airway obstruction, exacerbating

the symptoms of obstructive sleep apnea. Sleeping on your side or elevating your head during sleep can mitigate symptoms.

For more extreme cases of sleep apnea, more intense treatments are often required. Positive airway pressure (PAP) therapy is one method, delivering air from a device to the pharynx to counteract airway obstruction. PAP devices come in various machine sizes and mask types to maximize fit and comfort. However, patient compliance is low due to mask discomfort, mouth dryness, or nasal congestion. Oral appliances are another option, providing custom appliances to be worn in the mouth during sleep. Appliances are built to stabilize the mandible and prevent throat muscles from collapsing and obstructing the airway. The most extreme treatment option is surgery, which is often recommended for patients whose conditions do not improve with non-surgical methods. Surgical procedures involve adjusting bone or soft tissues to reduce obstruction of the airway, or implanting neurostimulator devices that properly activate respiratory muscles. While sleep apnea is a condition that greatly impacts quality of life and has major implications for oral health, there are several treatment options that can significantly reduce its adverse impacts.

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## Beneath the Surface: Impacts of Scuba Diving on Oral Health

Pritha Trivedi

Breathing underwater is an unforgettable experience - slow bubbles and the quiet calm of the ocean. But while scuba diving feels peaceful, the environment places unique stresses on the body, including the teeth and jaws. Increased pressure, dry air, and hours spent biting a regulator mouthpiece can turn small dental issues into painful problems. Maintaining good oral health is critical for safety when far away from the surface.

One very common dental problem experienced by divers is barodontalgia, or pressure-related tooth pain. As a diver descends, water pressure increases and compresses any air trapped inside teeth. Cavities, leaking fillings, cracks, or poorly sealed crowns all can contain small air sockets that respond to these pressure changes. It can cause sharp, sudden pain in the water. During ascent, expanding air can create the opposite effect, sometimes loosening restorations or causing discomfort after the dive even when on land.

Divers can also experience a condition called "tooth squeeze" where pressure differences pull on tissues surrounding an already compromised tooth, causing a throbbing sensation. In more severe cases, it weakens teeth or restorations can fully fracture.

Another major factor is the regulator mouthpiece itself. Divers hold the mouthpiece between their teeth for long periods of time, often clenching unconsciously to keep it secure. This constant pressure can strain the jaw muscles and TMJ, leading

to soreness, headaches, and facial fatigue after dives. Poorly fitted mouthpieces can worsen problems, forcing divers to bite harder to maintain a seal. This is why custom-fit mouthpieces are so important in the diving world - they can significantly reduce jaw strain and improve comfort underwater.

Breathing compressed air also contributes to oral challenges. The air supplied through scuba tanks is extremely dry, which can reduce saliva flow. Saliva plays a big role in protecting teeth by neutralizing acids, washing away bacteria, and keeping oral tissues healthy. Reduced saliva can lead to dry mouth, gum irritation - especially with the mouthpiece, and increased risk of cavities over time. This is especially important when divers go on multi-day dive trips.

Because dental emergencies can be dangerous underwater, dentists often complete any needed restorative work well before the dive trip to allow time for proper healing. Pressure changes can severely impact teeth or worsen oral health problems already present.

Scuba diving offers extraordinary adventures, from coral reefs to shipwrecks, but it also shows how interconnected oral health is in this sport. While it may not come up as the first priority, even a small oral health issue can be heightened underwater and under pressure.

# So You Have Impacted Wisdom Teeth. What Should You Be Prepared For?

Jonathan Jen

Finding out that you have impacted wisdom teeth might be a punch to the jaw, especially if you have to get them removed and you've had surgery before – the area in question is going to be sore. But, what is really happening in the mouth to elicit the need for such a procedure?

Impacted wisdom teeth are third molars that do not fully emerge through the gums and into the mouth, stuck under the gums or trapped in the jawbone because the tooth lacks space to emerge properly (Patel). Your dentist may have mentioned the type of impacted teeth you have: mesial, vertical, distal, or horizontal impaction. Mesial impaction means that the wisdom tooth is angled toward your other teeth and vertical impaction means that the tooth is emerging vertically into the mouth, but lacks the physical space. The other two types are more serious: distal impaction is the rarest, with the tooth angled towards the back of the mouth and horizontal impaction results from the tooth pointing straight at another tooth (Cleveland Clinic).

Now, some dentists may give differing statements about procedures regarding impacted teeth. Depending on the severity of your issue, your dentist or oral surgeon may recommend local anesthesia, sedation anesthesia, or general anesthesia. Here is what to be prepared for for each one.

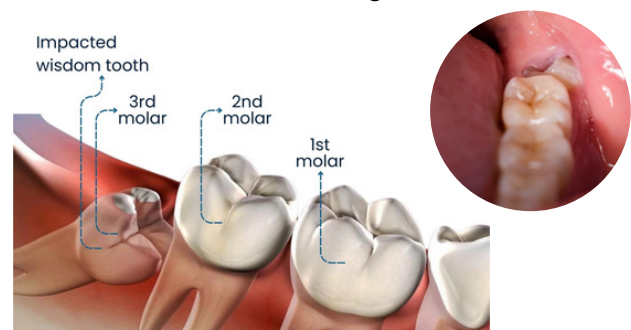
**Local anesthesia:** The numbing of the mouth. For procedures that are usually simple extractions, usually only topical anesthetic is applied and one or two teeth are being removed. In this situation, patients are fully awake and can follow instructions. The standard procedure is to apply local numbing, then test sensitivity, repeat if necessary, then finally extract (Lentz). For these extractions both your dentist and an oral surgeon are qualified. But, if the patient has anxiety or would rather be more relaxed, nitrous oxide is given at the time of the procedure, which can reduce tension and make the experience feel faster (Timm). To prepare for this procedure, simply get a good night's rest, brush your teeth gently beforehand, and wear comfortable clothes (Nozaki). Afterwards, patients generally have the fastest recovery time and the fewest restrictions after the appointment. If given nitrous oxide there may be some restrictions on driving (Timm).

**Sedation anesthesia:** The reduction of consciousness. For these procedures, a local anesthesia at the time of with patients taking an oral sedative beforehand or given an IV sedation on site, where patients are in a deep sleep-like state. For these procedures, one or multiple impacted wisdom teeth are removed and are sometimes recommended for patients with moderate to high anxiety.

After this procedure, most patients don't or barely remember the experience. To prepare for this procedure, get a good night's rest, wear comfortable clothing, fast for around eight hours before the procedure, take any prescribed medications, and do not forget to prepare transportation to and from the office. For both prescribed medication and IV sedation, effects linger for the rest of the day, especially for IV sedation, so be sure to follow the oral surgeon's instructions (Timm). Additionally, patients may have nausea, vomiting, dizziness, disorientation, or headaches afterwards, and in very rare cases there may be respiratory depression leading to low blood oxygen levels or low blood pressure (Murray).

**General anesthesia:** The deep sleep. General anesthesia is reserved for the more complicated cases, patients with special medical considerations or severe anxiety, or if general anesthesia would be more beneficial to the procedure (Timm). Patients are completely unconscious during the procedure and have no awareness or memory of the surgery (Miami). During the procedure, general anesthesia may be applied through an IV or through inhalation and because patients are in such deep sleep, specialized equipment may be used to help breathing as well as monitoring bodily functions, which may be impaired. Some common side effects include drowsiness, fatigue, nausea, vomiting, chills, confusion, temporary memory problems, and headache. In the next few days, patients may have postoperative delirium, which is a state of confusion and disorientation. To prepare, get a good night's rest, wear comfortable clothing, fast for around eight hours before the procedure, take any prescribed medications, and do not forget to prepare transportation to and from the office. Additionally, do not take alcoholic beverages for 24 hours prior to the procedure and above all, follow your oral surgeon's instructions.

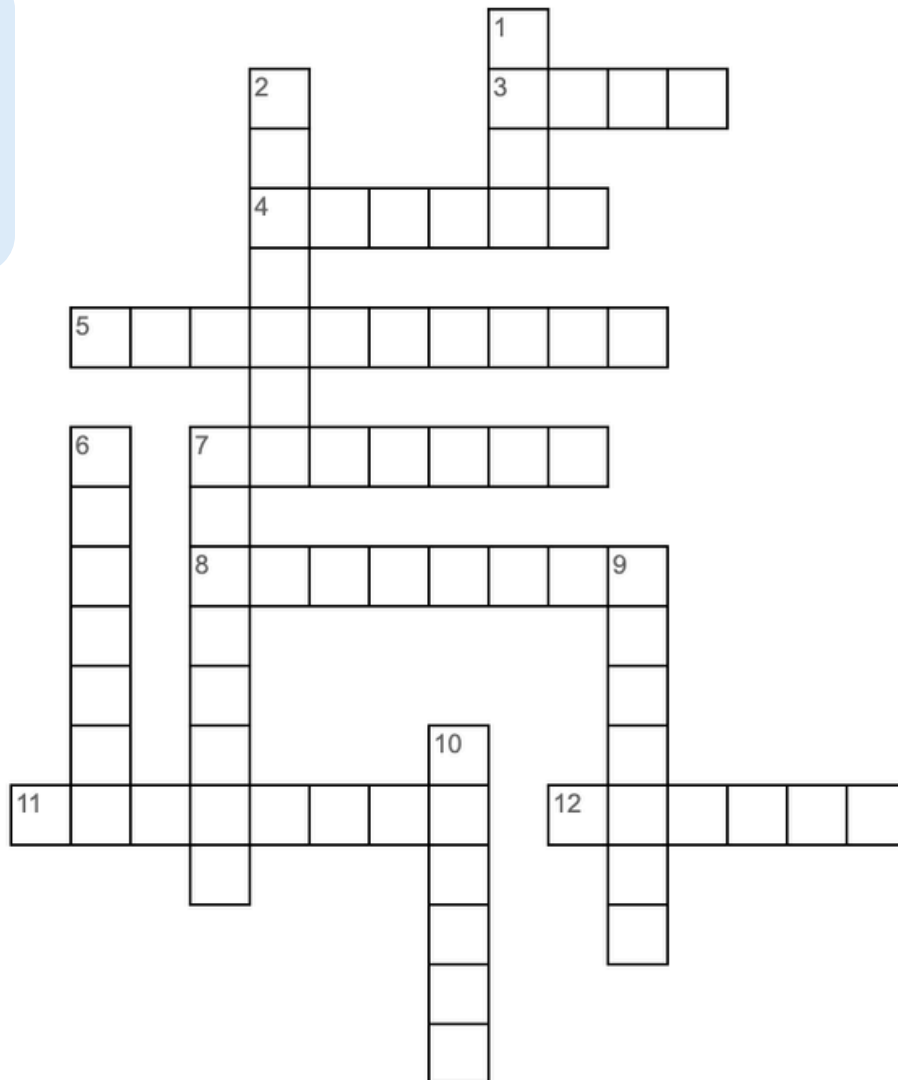
For all of these procedures, do not forget to bring necessary medical devices, insurance, and emergency contact information. Wearing shoes with good support will be helpful in keeping your balance after certain procedures (Nozaki). For the more complicated procedures, make sure to not have any tasks to finish for the rest of the day, as people are often out of commission during this time.



# Crossword Puzzle



Remember to  
send a fully  
finished copy of  
your crossword  
for a PDS point!  
(First 10 people)



## Across

3. Pertaining to the mouth
4. Decay, erosion, or abrasion of the mouth
5. What "The Dentin" produces each semester
7. The grinding or clenching of teeth
8. Hard connective tissue covering the outer surface of the root
11. The lower jaw
12. Sticky substance which forms on the external surface of teeth

## Down

1. Part of the tooth which projects into the gums
2. Tooth which cuts; located at the front of your mouth
6. The clinical term for your gums
7. A premolar tooth; 2 cusps
9. The upper jaw
10. Hard tissue which forms the internal bulk of the tooth

For the days after the procedure has been completed, you are not done yet: Your body needs to heal. Healing will take several days up to a few weeks, so plan accordingly. Having formal pictures, vacations, or intense work immediately afterwards is not advised. For the days after the procedure, be sure to have an elevated sleeping arrangement to reduce swelling and have a space prepared for comfort and rest. This space should have tissues, paper towels, and a waste basket for minor bleeding and gauze changes (Nozaki). You should have ice packs and gauze pads ready and avoid using straws while healing, as suction can disturb the blood clot protecting the surgical site leading to a dry socket or infection and irritation. A dry socket is a hole where a blood clot is supposed to reside to promote healing and to protect the bone and nerves underneath, which affects a low amount of tooth extractions, and is more common after wisdom tooth extractions. If there is too much of a suction or if the blood clot is removed, the bone and nerves are exposed, which causes lots of pain, risking infection, and slows down healing (Cleveland Clinic). Prepare soft foods for minimal chewing and to prevent food particles staying in the mouth to avoid disturbing the blood clot (Kesecker).

Final note: One thing important to consider is that wisdom tooth extraction is a surgical procedure, meaning that you should treat it as such. Just because it is something that may seem superficial does not mean that it is always simple. But, wisdom tooth extraction is also not as extreme as other surgical procedures with barely any permanent side effects, meaning that the long term benefits often greatly outweigh the impacts that are mostly short-term. Another thing to consider is to always reconvene with your dentist about any questions or concerns. They are the ones who are more educated and experienced in these matters and their job is to assist and help you for not only this procedure but for any complications related and regarding this procedure that may occur before and after. Just remember, dentists and oral surgeons are always there to assist any and all patients and they would much rather listen and record any situations that you may deem relevant, as any information may be important to share beforehand and can result in a smoother experience. So, even if the news that you may need to remove your impacted wisdom teeth may be a punch to the jaw, your dentist's goal is to make sure you heal better from it – even if you'll be sore for a few days.

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## Regenerative Dentistry Research Progresses Lab-Grown Teeth

Maya Tedini

Recent breakthroughs in regenerative dentistry have furthered the possibility of growing or implanting real biological teeth in the human jaw. Though it may be long before these procedures reach dental practices, new advancements bring with them the potential to revolutionize restorative and cosmetic dentistry.

Dr. Ana Angelova Volponi, director of the postgraduate program in regenerative dentistry at King's College London, has been experimenting with lab-grown teeth for almost two decades, according to CNN Science. In 2013, Volponi and her team grew a tooth from human and mouse epithelial cells. The teeth bioengineered from the cell combination they used contain dentin and enamel, and can have developing roots following transplantation into renal capsules. Though there had been previous research and experimentation with lab-growth teeth dating back to the 1980s, this was the first study that used adult human gingival cells, combining them with "progenitor" tooth cells taken from a mouse embryo. Recent progress was seen in a 2025 study that Volponi led, building upon her previous work.

Her team developed a new material in which to grow the teeth that better replicates the real environment where biological teeth grow inside the mouth. The material enables cell communication, allowing one cell to be able to effectively tell another to start becoming a tooth cell, according to BBC. In previous attempts to grow teeth, the researchers faced the issue of all signals being sent at once. This new material replicates the actual process that happens in the body by releasing signals slowly over time.

The right environment, referred to by researchers as the "scaffold," is essential for the successful development of a tooth. In the 2013 study, the scaffold Volponi used was made of the protein collagen. Now, she uses a gelatine-based hydrogel, which is a type of polymer that can absorb and retain large amounts of water while maintaining a solid but flexible structure. The hydrogel was developed in collaboration with Imperial College to replicate the matrix around the cells in the body.

Cells are gathered from mouse embryos and spun to form a pellet that is injected in the hydrogel to grow for about eight days, according to PhD student Xuechen Zhang from the King's College Faculty of Dentistry, Oral and Craniofacial Sciences, a co-author of the study. Tooth-like structures form inside the gel once the eight days have passed. In the 2013 study, they were then transferred into a mouse to develop into a complete tooth structure.



Researchers are still working towards figuring out how to replace the embryonic mouse cells with adult human cells. Once these hurdles are overcome, designing the mode of transfer of a lab-grown tooth into the patient's mouth is the next task. A tooth could either be grown to a certain stage of development and then embedded into the tooth socket to potentially grow into a full biological tooth, incorporating itself within the organic structures such as the bone and the ligament. Alternatively, the tooth could be fully grown and then implanted surgically. In terms of how lab-grown teeth could be incorporated procedurally, Volponi sees promise in these two approaches, but which would be superior is still difficult to deduce at this stage of research.

A biological tooth grown from a human's own cells would transform the healing process and durability of the tooth, as the tissue would accept it without inflammation. It would also feel much more like a real tooth in comparison to fillings or implants that are simply fused into the bone, lacking feeling or elasticity. Additionally, fillings weaken tooth structure over time and implants require invasive surgery; not to mention that not all patients make good candidates for the procedure depending on bone structure. Lab-grown teeth would regenerate naturally and integrate into the jaw, making them stronger and longer lasting.

Similar research has been done or is in progress at the Medical Research Institute Kitano Hospital in Japan, the School of Dental Medicine of Tufts University, the University of Washington, and the University of Pennsylvania. In contrast with traditional dentistry's approach to replacing lost structures with synthetic materials, these advancements in regenerative dentistry are furthering the goal of repairing damaged tissues using the body's own biological processes for improved healing and function.

A biological tooth grown from a human's own cells would transform the healing process and durability of the tooth, as the tissue would accept it without inflammation.



## Sip on It: The Impact of Straws on Enamel Health

Sarah Jeon

Every sip of soda or juice bathes your teeth in acid, but the way you drink it might matter more than you think. Carbonated drinks hinder enamel health in two ways: the low pH and high acidity of some drinks may lead to erosion of enamel surface and, secondly, sugars in drinks are metabolized by plaque microorganisms, leading to demineralization (Tahmassebi).

A pH of 5.5 is considered to be the "critical pH" for enamel dissolution. Carbonated drinks have an extrinsic acidity and a pH of up to 2.5 because of the quantity of carbonic acid that is formed with the addition of carbon dioxide, which produces the fizz and other acids (Inchingolo). Drinking carbonated drinks exposes the enamel to an acid 1000 times stronger than the recommended threshold, damaging the enamel extensively with repeated consumption and prolonged periods between brushing.

Moreover, oral bacteria uses sugar as a substrate and generates acid as a metabolic byproduct, which lowers oral pH and speeds up demineralization (Alsulaimani). Long-term sugar retention in the mouth, expedited from consuming sugary beverages during the day, feeds bacteria and prolongs the production of acid, leading to a demineralization cycle where calcium and phosphate, two very vital minerals, are lost from the enamel.

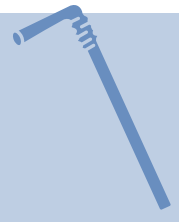
Additionally, seemingly healthier alternatives like fruit juices and smoothies are as detrimental to enamel health as carbonated drinks (Alsulaimani). Fruit juices and smoothies have an average pH of around 3.5. However, the enlarged pieces of fruit in these beverages increase the likelihood of getting stuck between teeth, increasing direct contact between enamel and acid, which catalyzes the time period for demineralization. On-the-go lifestyle has enhanced an image that fruit juices are beneficial to dietary health while many overlook the oral health aspect. Enamel erosion, if not controlled, leads to dental hypersensitivity and therefore to pain, emphasizing the importance of maintaining enamel health.

With the major companies like Coca-Cola and Pepsi as central figures in the economy, it seems rather unlikely that the admonition of carbonated drinks will prevent their consumption. Alternative sources of preventative care like utilizing fluoride toothpaste and drinking with straws are more feasible methods of preserving enamel health. Drinking beverages through a straw can limit the amount of liquid that comes in contact with teeth, and therefore, reduce risk for damage. Drinking directly without a straw leads to drinks with full contact with teeth, offering no protection or barrier for demineralization and degradation.

Soft drinks can linger on the surface of teeth long after consumption, increasing the likelihood of hindering enamel health. Although straws do not offer full protection against enamel degradation, straws still reduce full contact, decreasing probability of acidification. So, the next time you pick up a Celsius or juice, think twice before bathing your teeth in acid.



Drinking carbonated drinks exposes the enamel to an acid 1000 times stronger than the recommended threshold



## Nicotine Pouches and How They Relate to Oral Cancer



Alauki Parikh

Nicotine Pouches are the next big thing, you may have seen them on TikTok and advertised on highway signs. They are packaged to be attractive and welcoming, but within that colorful packaging contains a compound (nicotine) that is linked to causing oral cancer. The pouches themselves are terrible for your gums, as they can cause inflammation and gum recession which can lead to permanent corrosion on your teeth and damage to your gums. But most importantly how do they relate to oral cancer?

Let's start by talking about nicotine itself. Nicotine is not a carcinogen, but it does play a huge role in cancer development. Some things that Nicotine can do includes reducing blood flow to oral tissue, impairing the immune response hence delay in healing and promote chronic inflammation of gums. These characteristics of nicotine foster an environment for oral cancer to develop.

The nicotine pouches themselves are oftentimes staying in the same place in the mouth, and this can cause chronic irritation which is known to white lesions, which can then develop into cancer. Adding to that the chemical additives and flavorings have been known to cause cellular stress and damage DNA, which can also lead to tumors to form. Finally some nicotine products contain TSNAs which are known carcinogens, though it is not likely that this exists in the nicotine pouches.

While it has not been proven that nicotine pouches directly cause oral cancer, due to how new nicotine pouches are in the market. But, they do foster environments in which oral cancer can develop and their side effects are often linked to ways that cancer can form. Additionally compared to other products, it is said that nicotine pouches are less harmful, but again further research needs to be done before a conclusion is made. Although nicotine pouches have these adverse affects, nothing has been proven to cause oral cancer directly, but further research needs to be done since the conditions increase the risk of cancer development.

## Cosmetic and Therapeutic Mouthwashes: How do they help?

Susie Choi

Fresh minty mouthwash is something you probably have tried at least once, thinking it would be a quick way to make your mouth feel refreshed and clean. However, even within the large term of mouthwashes, there are 2 different subtypes: cosmetic and therapeutic.

Cosmetic mouthwashes are mouthwashes that only temporarily control bad breath and leave a refreshing taste in your mouth. Although they might seem to have temporary benefits, they do not have the long-term chemical or biological applications that therapeutic mouthwashes have.

Therapeutic mouthwashes on the other hand have active ingredients to help control or reduce various dental conditions such as bad breath, gingivitis, plaque, and tooth decay. These active ingredients include cetylpyridinium chloride, chlorhexidine, essential oils, fluoride, and peroxide. For example, cetylpyridinium chloride may be added to reduce bad breath by targeting and killing bacteria that are responsible for bad breath, and chlorhexidine and essential oils have functions in controlling plaque and gingivitis.

Knowing the difference between cosmetic and therapeutic mouthwashes can help customers be smart in finding the correct mouthwash for their needs, and to not be fooled by certain marketing schemes that may mislead customers. While some therapeutic mouthwashes may be available over the counter, some are only available by prescription, depending on the type and the active ingredients. Another thing to look for in mouthwashes would be the ADA seal of acceptance. This seal signifies that the product has been objectively tested and evaluated for safety and efficacy by the ADA council on scientific affairs by scientists.



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# Electric vs Normal Toothbrushes: The Pros and Cons

Tanish Dinesh Reddy

Electric toothbrushes may remove slightly more plaque than manual toothbrushes, but research shows that both can effectively maintain oral health when used correctly. According to the American Dental Association (ADA), the most important factor in preventing cavities and gum disease is brushing twice a day for two minutes using proper technique. As the ADA states, "Brushing your teeth twice a day with fluoride toothpaste is one of the most important oral health habits you can practice." While electric toothbrushes offer technological advantages, manual toothbrushes remain a reliable and affordable alternative for many individuals.

Electric toothbrushes are designed to use oscillating and rotating movements to clean the teeth more efficiently. A review published by Cochrane found that powered toothbrushes reduce plaque and gingivitis slightly more than manual brushes over time. Many electric models include built-in timers to ensure users brush for the recommended two minutes and pressure sensors to prevent brushing too hard which can damage enamel and irritate the gums. These features can be especially beneficial for children, older adults, and individuals with limited dexterity.

However, electric toothbrushes are significantly more expensive than manual options. Replacement brush heads also add ongoing costs. According to the Centers for Disease Control and Prevention (CDC), effective plaque removal depends largely on consistent brushing habits and fluoride use rather than the type of toothbrush alone. The CDC notes that "Brushing twice a day with fluoride toothpaste helps prevent tooth decay and keeps gums healthy." For individuals on a budget, a manual toothbrush used with proper technique and fluoride toothpaste can provide adequate protection against tooth decay and gum disease.

Manual toothbrushes are widely available, portable, and do not require charging or batteries. They enable the user to have complete control over the brushing force and movement. Nevertheless, manual brushing needs proper technique and adequate time to be done properly. Otherwise, some people may end up brushing their teeth too vigorously, too quickly, or skipping some areas of the mouth which can reduce effectiveness.

Ultimately, both electric and manual toothbrushes can help in maintaining good oral health if used properly. The ADA stresses that regular flossing, routine dental visits, and limiting sugary foods are equally essential parts of oral health. As the ADA explains, "Daily flossing and regular dental visits play a key role in preventing gum disease and maintaining overall oral health." While electric toothbrushes may offer some advantages over manual ones, the most ideal toothbrush is the one that the user will use regularly and properly.



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## Pop Quiz!

1. Which of the following is the most common cause of xerostomia (chronic dry mouth)?
  - a. Eating too much sugar
  - b. Use of certain medications
  - c. Lack of teeth brushing
  - d. Cold weather
2. Which type of floss is most suitable for people with braces or wider gaps between their teeth?
  - a. Unwaxed floss
  - b. Super floss
  - c. Dental tape
  - d. Wooden toothpicks

Answers: B, B, D, C

## Let's see how many you can get right!

3. Which material is used as a scaffold in recent lab-grown tooth research?
  - a. Copper
  - b. Polyacrylamide
  - c. Calcium composite
  - d. Gelatin-based hydrogel
4. How can nicotine pouches increase the risk of oral cancer?
  - a. They directly contain large amounts of sugar
  - b. They instantly destroy teeth enamel
  - c. They create conditions like chronic irritation and inflammation
  - d. They eliminate saliva production completely

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# More Than a Caffeine Boost: The Oral Health Risks of Energy Drink Use

Farah Al-Tameemi

It's 1:47 a.m. in the library and you've got an 8 a.m. exam. You crack open a cold energy drink and suddenly you're awake and unstoppable.

Meanwhile, your teeth are dealing with something else.

Energy drinks don't just boost your energy. They coat your enamel, and any fillings you already have, in an acidic mix that can gradually change tooth surfaces, weaken restorations, and affect how your smile looks and feels over time. The tricky part is that it usually starts subtly, like sensitivity when you sip something cold, so it's easy to blame it on anything except the drink you've been reaching for all semester.

If you've ever done any of these, you're the target audience:

- Sip it for 2–3 hours while studying (instead of finishing it fast)
- Chase it with something sweet
- Drink it when you're already dehydrated (dry mouth = less natural protection)
- Use sugar-free and assume it's okay

## 1. Timing

The main villain isn't sugar. It's the acid and the timing in which you consume the drink. According to the Department of Preventive and Restorative Dentistry at the University of the Pacific and UCSF, multiple popular drinks, including energy drinks, sports drinks, and soda, caused measurable enamel volume loss in an in vitro study after exposure. Their key point is the one students need to hear, which is that pH alone didn't predict damage. Some drinks with less acidic pH still caused a lot of enamel loss, and titratable acidity (how much base it takes to neutralize the drink) didn't perfectly predict it either.

Sugar feeds bacteria, bacteria produce acid, acid demineralizes enamel. That's the classic cavity pathway. If you're sipping a sugary drink slowly, you're extending the time your mouth stays in an acidic environment.

When enamel gets softened by acid, it's easier to mechanically wear away. So if you consume an energy drink and brush your teeth right after, you can be scrubbing softened enamel. Many dentists recommend waiting (often 30–60 minutes) after acidic drinks before brushing.

## 2. "But I drink sugar-free."

Sugar-free can reduce the cavity risk related to sugar, but it doesn't remove the erosion problem. A lot of sugar-free energy drinks still rely on acids, commonly citric acid, for flavor and shelf stability. Acid can soften enamel whether or not sugar is present.

## 3. Energy drinks can mess with your fillings too

If you've had any restorative work, such as composites ("white fillings"), glass ionomer, or bulk-fill, energy drinks will mess with not only your teeth, but the materials inside them as well.

According to an article by *BMC Oral Health*, sport and energy drinks caused measurable changes in tooth-colored restorative materials in vitro, including decreased surface hardness, increased surface roughness, and color change (staining/appearance shifts). Rougher restoration surfaces can hold plaque and stain more easily. Changes at the margins can make fillings feel off over time. If you already have visible fillings on front teeth, color shift can be noticeable faster than you'd expect.

## 4. "Why are my teeth suddenly sensitive?"

The early signs can be subtle. Examples include cold sensitivity from water, teeth looking less shiny in certain areas, edges feeling slightly thinner, noticing more staining especially near the gumline, and old fillings picking up stains around the edges.

## 5. How to keep the caffeine and keep your teeth

To keep the caffeine without harming your teeth, dentists recommend a few simple habits. Drinking coffee more quickly rather than sipping it over long periods can reduce how long acids stay in contact with enamel. Using a straw may also help limit contact with the front teeth. After finishing a drink, rinsing your mouth with water can wash away some of the acid. Experts also suggest waiting before brushing after acidic beverages, giving enamel time to re-harden. Maintaining a routine with fluoride toothpaste, and in some cases higher-fluoride products recommended by dentists, can further help protect teeth from damage.



In conclusion, if you drink energy drinks regularly, the goal isn't to completely cut them out forever. Dentists are more concerned with how often and how long you're exposing your teeth to them. When you go in for a cleaning, being honest about how frequently you drink energy drinks matters more than naming a specific brand. It also helps to directly ask if there are signs of enamel erosion or acid wear, since these changes can be easy to miss on your own. If you've been dealing with tooth sensitivity, it's better to ask your dentist about remineralizing or anti-sensitivity

options instead of just switching to a whitening toothpaste and pushing through the discomfort. If you already have several fillings, it's worth asking whether your drink habits should influence the type of material used for future restorations, since some materials are more affected by acidic drinks than others. The real issue isn't whether energy drinks automatically ruin teeth, but how often you drink them, how long your teeth are exposed, and the way you consume them.

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## Why Cavities Are Still the Most Common Chronic Disease Worldwide

Ria Bansal

Despite major advances in modern dentistry, cavities, also known as dental caries, remain the most common chronic disease worldwide. According to the World Health Organization, untreated dental caries in permanent teeth affects an estimated 2 billion people globally, while 514 million children suffer from caries in primary teeth (WHO, 2023). In the United States alone, the Centers for Disease Control and Prevention reports that more than 90% of adults have had at least one cavity, and about 1 in 5 children ages 5–11 have untreated decay (CDC, 2022). Although tooth decay is largely preventable, it continues to be a major public health issue.

At its core, cavities develop through a comprehensive biological process. The mouth contains bacteria that metabolize sugars and carbohydrates from food and beverages. When these bacteria digest sugar, they produce acids that demineralize tooth enamel. Repeated acid exposure leads to the formation of cavities (National Institute of Dental and Craniofacial Research, 2021). Because eating is a daily activity and sugar is common in modern diets, most people are routinely exposed to conditions that promote tooth decay.

Diet plays a major role in the global burden of cavities. The WHO has identified free sugars as a key risk factor for dental caries and recommends limiting sugar intake to less than 10% of total daily energy consumption (WHO, 2015). However, processed foods and sugar-sweetened beverages remain widely available and heavily marketed, particularly to children and adolescents. Frequent snacking and sipping on sugary drinks prolong acid attacks in the mouth, giving enamel little time to remineralize. Even beverages often perceived as healthy, such as fruit juice, can contribute to decay when consumed frequently.



Cavities persist not because they are inevitable, but because they are shaped by a complex interaction of biological, behavioral, and social factors.

Inconsistent oral hygiene practices further contribute to high cavity rates. The American Dental Association recommends brushing twice daily with fluoride toothpaste and flossing once per day to reduce plaque and strengthen enamel (ADA, 2023). Fluoride has been shown to significantly reduce caries by enhancing remineralization and inhibiting bacterial activity (CDC, 2020). Yet many individuals brush only once per day or neglect flossing, allowing plaque biofilm to accumulate and increase the risk of decay.

Access to dental care is another critical factor. The WHO reports that oral diseases disproportionately affect disadvantaged and low-income populations (WHO, 2023). In many rural or underserved areas, limited access to dental professionals, lack of insurance coverage, and financial barriers prevent individuals from receiving preventive services such as cleanings, sealants, and fluoride treatments. Even in high-income countries, cost and dental anxiety often delay care until the patient experiences severe pain.

Social determinants of health also influence cavity prevalence. Research published in *The Lancet* highlights how socioeconomic inequality, limited health literacy, and poor access to nutritious foods contribute to higher rates of oral disease (Peres et al., 2019). Children are particularly vulnerable, as early dietary habits and inconsistent supervision of brushing can establish patterns that persist into adulthood.

However, there is encouraging evidence that certain prevention methods work. Community water fluoridation, described by the CDC as one of the "Ten Great Public Health Achievements of the 20th Century," reduces cavities by approximately 25% in children and adults (CDC, 2020). School-based sealant programs have also been shown to significantly reduce decay in high-risk children (CDC, 2022). Simple daily habits, such as brushing with fluoride toothpaste, flossing, limiting sugary snacks and beverages, and attending regular dental visits, remain highly effective strategies for prevention.

Cavities persist not because they are inevitable, but because they are shaped by a complex interaction of biological, behavioral, and social factors. Reducing the global burden of dental caries requires more than individual responsibility; it requires strong public health initiatives that improve access to care, promote

healthier diets, and prioritize oral health education. With continued investment in prevention and equity-focused healthcare strategies, accelerated progress against the world's most common chronic disease is entirely plausible.

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## Dentistry Amidst a Pandemic: What COVID Changed— And What It Revealed

Katie Lui

In early 2020, dentistry faced a rare contradiction: the care patients needed most was the care they were suddenly afraid – or unable – to access. Almost immediately, routine cleanings, fillings, and preventive visits were postponed, and a profession built on close contact had to navigate distance, PPE, and uncertainty.

That shock did not hit every office equally, however. COVID revealed glaring differences in which practices had sufficient staffing, systems, and financial cushion to adapt. From there, the divide between solo practices and larger dental support organizations (DSOs) became much harder to ignore.

During the peak of the pandemic, dental practices, especially those providing non-emergency care, were forced to put a hold on or significantly reduce their in-person services at the very least. Many offices relied on teledentistry for basic patient check-ins, but the suspension of routine care still drove costs up while simultaneously reducing accessibility and availability. Even when clinics began the long process of reopening, patient flow was slower and less efficient due to heightened infection-control protocols, longer turnaround times between appointments, and ongoing uncertainty. Dental education was also disrupted, both in the sense that fewer patients sought routine care and that dental students in clinical training had fewer chances to develop essential practical skills.

While these disruptions left all communities shaken, it hit hardest where dental disparities were already common. With fewer safe, consistent opportunities to receive preventative and restorative care, many people delayed treatment until problems worsened—contributing to a ripple effect where oral health decline reinforced broader health consequences.

But how did the effect differ between solo and group practices? The ADA's Health Policy Institute surveys suggest that the recovery phase was not just about "reopening," as many offices were open while struggling to reach their usual patient volume. The article explains that DSO-affiliated and larger group practices were more likely to feel back to business as usual, likely because they had more built-in infrastructure, including standardized protocols, centralized administrative support, and more flexibility with staffing and scheduling despite COVID precautions slowing everything down. The May 2021

survey revealed that about 78.8% of DSO-affiliated clinics reported operating normally, compared with 60.1% of non-DSO practices overall, showing a clear gap in how quickly different practice models stabilized (Booth).

The gap highlights an even more stark difference when specifically looking at solo, non-DSO dentists, with the article noting that only 56.2% reported operating as normal, while 42.8% said their patient volume was still lower than usual. In other words, the pandemic amplified structural vulnerability in solo offices since they were more likely to absorb every disruption directly in terms of having a higher overhead (fixed operating costs required to keep the practice running), slower turnover, cancellations, and patient hesitancy) without the stability larger practices have from being spread across more people and systems.

Ultimately, COVID-19 did not just put a hold on routine dentistry. Rather, it exposed how quickly oral health access can unravel when prevention is interrupted. When regular cleanings, screenings, and early restorative care are delayed, small oral health problems can progress into more serious and costly conditions, especially for patients who already face barriers to care. The recovery gap between solo and larger group practices shows that resilience often depends on infrastructure. Moving forward, solo dentists may be better protected against future disruptions by strengthening preventive systems within their own practices through approaches such as expanding teledentistry for triage and follow-up, improving patient communication systems, building emergency preparedness plans, and emphasizing early intervention so treatment is not delayed until disease becomes more severe. At the same time, the relative stability of DSOs should not be viewed as proof that they are better in every aspect. Although their centralized staffing and administrative support may have helped them recover more quickly amidst the pandemic, they are sometimes also associated with production pressure and less personalized care, which affects both provider autonomy and patient experience. For that reason, the goal should not be to rank practice models, but rather to identify how solo practices can be given the operational support needed to remain sustainable while preserving the individualized care that often defines them.

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# Tension in the Teeth: How Creativity Can Calm a Clenched Jaw

Madison Ma

You might not realize it, but your jaw could be clenched right now. Many people carry hidden tension there, pressing their teeth or tightening muscles without noticing. This habit, known as bruxism, affects millions worldwide (National Institute of Dental and Craniofacial Research, NIH). I didn't notice mine until I got braces - and even more when I learned to adjust my embouchure while playing the French horn. That's when I started wondering if music, or any creative activity, can relieve this tension?

Bruxism is more common than most people realize. Stress, caffeine, and some medications can trigger it, and about one in five people experience bruxism, either asleep or awake. Awake bruxism, teeth grinding or jaw clenching during the day, affects nearly a quarter of adults (NIH). When untreated, it can lead to headaches, sore jaw muscles, and worn-down teeth. Becoming aware of jaw tension, and learning ways to release it, can make a difference in daily comfort.

For me, music offered that awareness and control. Playing the French horn revealed how much I was tightening my jaw and teeth unnecessarily. Adjusting my embouchure made playing easier and more enjoyable. This practice mirrored studies that show how engaging in creative activities can reduce stress and heighten awareness of muscle tension (American Music Therapy Association). By focusing on my jaw while producing sound, I was training my muscles to relax, turning an unconscious habit into a conscious exercise of control and mindfulness.

This principle extends beyond music. Painting, drawing, acting, dancing, or sculpting can also help release tension and relieve stress (The Arts Creative). Studies show that just 45 minutes of art-making, regardless of artistic experience, can significantly lower cortisol levels. (Kaimal, Ray, Muniz; National Library of Medicine). Neuroscience research further indicates that creative activities activate brain regions involved in emotional regulation and reward, helping people process stress more effectively (Public Med Central). These findings are especially meaningful for someone with bruxism, showing that creative activities can help the body to notice tension, release it, and regain control.

By noticing our bodies, engaging our minds, and channeling energy into creation, we can turn hidden stress into awareness and action into something both productive and satisfying. Next time you feel a tight jaw or clenched teeth, consider picking up an instrument, a paintbrush, or stencil. What feels like tension can become the first step toward relief, insight, and even joy.



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# The Exploding Tooth: The Phenomenon of Barodontalgia

Joe Nguyen

Imagine being a fighter pilot in the throes of World War II, or a deep-sea diver exploring a sunken shipwreck, only to be suddenly incapacitated not by enemy fire or decompression sickness, but by an excruciating toothache. It sounds like a bizarre plot twist, but this phenomenon, known as barodontalgia or "flyer's tooth," is a very real, physics-driven dental emergency. Moving beyond routine hygiene, this condition highlights the fascinating intersection of restorative dentistry, human physiology, and Boyle's Law.

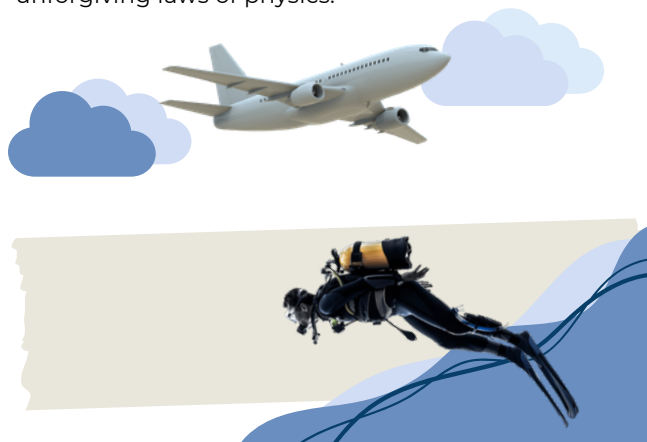
The underlying mechanism of barodontalgia is rooted in basic physics. According to Boyle's Law, at a constant temperature, the volume of a gas is inversely proportional to the surrounding pressure. If a microscopic void, such as a tiny air pocket, is inadvertently left inside a composite filling, a poorly obturated root canal, or beneath a cemented crown, that trapped gas will react to atmospheric changes

(Zadik, Journal of Endodontics). As a pilot or passenger ascends to high altitudes where ambient pressure drops, the trapped gas expands. This expansion creates intense internal pressure against the highly innervated dental pulp, resulting in a severe, sharp pain that can easily ground an aviator or ruin a patient's flight (Zadik et al., Aviation, Space, and Environmental Medicine).

Conversely, scuba divers face a similar, yet inverted, peril known as "tooth squeeze" or barodontocrexia. During a dive descent, increasing underwater pressure compresses any trapped air within faulty restorations or areas of untreated decay. This pressure differential can physically pull on the tooth structure or the underlying pulp. In extreme cases, the rapid pressure changes during a diver's ascent can cause the expanding gas to literally fracture the tooth or forcefully dislodge a restoration entirely (Robichaud et al., Journal of the American Dental Association).

The implications of this phenomenon extend even further into the cosmos. NASA maintains notoriously strict dental clearance protocols to prevent barodontalgia from jeopardizing a mission. Before an astronaut is ever cleared for launch, they must undergo rigorous screening, which includes simulated altitude testing in a hypobaric chamber. This controlled environment artificially lowers atmospheric pressure, acting as a direct physical stress test to see if any hidden voids in a candidate's restorations trigger pain (Rai et al., Aerospace Medicine and Human Performance). Furthermore, NASA utilizes a rigid dental classification system where any teeth with questionable margins, signs of recurrent decay, or incomplete endodontic therapy must be definitively treated well before launch. The reason for this zero-tolerance policy is simple. An astronaut experiencing barodontalgia cannot simply turn the ship around. Additionally, attempting to treat a pressure-induced tooth fracture or perform an extraction in microgravity is incredibly dangerous. Standard high-speed drilling creates floating debris and water droplets that could be inhaled by the crew or short-circuit sensitive equipment. Because of this, space dentistry relies almost entirely on flawless, void-free preventative care long before the countdown begins.

Ultimately, while "exploding teeth" might seem like a niche concern reserved for extreme explorers, its clinical relevance to the everyday dentist is universal. It underscores the critical importance of meticulous technique in daily practice. Proper isolation, thorough caries removal, and strictly adhering to incremental layering techniques in composite restorations aren't just about structural integrity and aesthetics. They are essential preventative measures to ensure that your patient's next scuba vacation or cross-country flight isn't derailed by a microscopic void and the unforgiving laws of physics.



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