

the dentin

uop pre-dental newsletter

matcha mouthwash: can it fight periodontitis-causing bacteria?

BY LAURA KIM

Matcha could be more than a tasty drink - Japanese researchers suggest that it could be the secret ingredient to prevent periodontitis, a gum disease that affects approximately 90% of adults globally ("Matcha extract mouthwash could fight gum disease-causing bacteria"). Matcha, a green tea powder derived from the *Camellia Sinensis* plant, is already well known for its antimicrobial effects and health benefits ("Health Benefits and Chemical Composition of Matcha Green Tea: A Review"). Containing a high level of catechin, a class of polyphenols, matcha has strong antioxidant properties and promotes the activity of detoxifying enzymes. Paired with its natural levels of caffeine, matcha has anti-inflammatory effects that can reduce oxidative stress, promote cellular redox homeostasis, and nurture anticarcinogenic activity ("Health benefits of polyphenols: A concise review"). However, according to *Microbiology Spectrum*, a peer-reviewed scientific journal by the American Society for Microbiology (ASM), matcha extract may offer an additional benefit: significantly reducing the number of periodontitis-causing bacteria.

Periodontitis is primarily caused by *Porphyromonas gingivalis*, a bacteria that leads to inflammation, destruction of periodontal (supporting) tissues, and periodontal bone loss if left untreated ("Multimodal inhibitory effect of matcha on *Porphyromonas gingivalis*"). In 85% of periodontitis-affected areas, *P.gingivalis* is also believed to be one of the leading factors of chronic periodontitis (*Porphyromonas gingivalis*: an invasive and evasive opportunistic oral pathogen). Specifically, *P. gingivalis* is a gram-negative, anaerobic, periodontal pathogen that invades biofilms on existing teeth surfaces and adheres to gingival epithelial cells ("Green tea catechins

potentiate the effect of antibiotics and modulate adherence and gene expression in *Porphyromonas gingivalis*"). Biofilms are key causes of chronic diseases like periodontitis because they are resistant to antibiotics and host immune systems ("Targeting Bacterial Biofilms by the Green Tea Polyphenol EGCG").



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While a low level of *P.gingivalis* is normally present in the oral cavity, when found in periodontal pockets, openings formed between the gums and tooth root due to tartar and plaque buildup, it can quickly proliferate and lead to alveolar bone destruction. *P.gingivalis*, therefore, is considered a “keystone pathogen” as even a quantitatively minor amount of the microorganism can lead to a widespread inflammatory disease (The Keystone Pathogen Hypothesis).

The matcha mouthwash solution was made using matcha powder from tea plants grown in Japan’s Kansai region along with H₂O-acetone in a 1:1 ratio (“Multimodal inhibitory effect of matcha on *Porphyromonas gingivalis*”). The efficacy of this matcha extract against 16 oral pathogens (which included three strains of *P.gingivalis*) was tested in 45 patients with chronic periodontitis at the Nihon University Hospital School of Dentistry at Matsudo. The patients were split into three groups where one group received the matcha extract, another received barley tea mouthwash, and the last group received mouthwash containing sodium azulene sulfonate. While the controls (barley tea, and sodium azulene sulfonate mouthwash) did not have much of an effect on the levels of periodontitis-causing bacteria, the match extract had a statistically significant difference in *P.gingivalis* levels before and after the intervention. The matcha mouthwash was able to inhibit *P. gingivalis* growth by disrupting the structural and functional properties of the bacterial envelope and breaking down membrane fluidity, which is vital for bacterial cell survival (Medical News). According to Dental Products Report, “matcha extract eliminated almost all *P.gingivalis* cells in a 2 hour period, with a full 4 hours eliminating all of these cells”. Specifically, researchers found that the pyrogallol-type B-ring of catechins within the matcha was what played a significant role in the reduction of *P. gingivalis* (“Multimodal inhibitory effect of matcha on *Porphyromonas gingivalis*”).

However, it is important to note that the matcha extract was only effective for shallower periodontal pockets less than 6 mm. For deeper periodontal pockets, the researchers said “more effective drug delivery into the bottom of periodontal pockets through drug formulations” would be needed (Multimodal inhibitory effect of matcha on *Porphyromonas gingivalis*). Additionally, in an interview conducted by MedicalNews, Rochester cosmetic dentist Jeffrey S. Haddad, D.D.S. said “... it’s [still] exciting to learn this because anything that we can do to help reduce the bacteria in our mouth, and especially the bacteria that can cause gum disease is a good thing”. While more research is needed to affirm the clinical applicability of matcha, the existing human, animal, and in vitro research on green tea’s positive effects on periodontal health suggests a cup of matcha a day could keep periodontitis away.

smile or scream? how movies shape our fear of the dental chair



BY
CELINA
YANG

The first thought of visiting a dentist is often unpleasant for many. According to the *Journal of Medicine and Life*, 50% of children between ages 7 and 11 show signs of dental fear. This raises the question: how has widespread media influenced people’s perception of dentists? Although there is a diverse range of dentists, there is usually one specific way that dentists are portrayed in popular media and films: in a negative light.

Examining popular children’s movies reveals a common stereotype about dentists pushed by the entertainment industry. The well-loved film *Charlie and the Chocolate Factory* is one example. The story follows Charlie, a young boy living in poverty, who is one of five children to win the Golden Ticket to tour Willy Wonka’s Chocolate Factory. Wonka’s father, a dentist, is depicted as the reason for Wonka’s obsession with chocolate and his decision to run away from home as a child. Wonka’s father is shown as strict, cold, and controlling. Even his office is portrayed as a brick building in the middle of a snowy field, which depicts Wonka’s fear of his father in a more literal sense. This portrayal highlights how dentists are often depicted in children’s movies as harsh or unpleasant figures.

Another example of inaccurate portrayals of dentistry is found in *Little Shop of Horrors*. In this film, Dr. Scrivello is shown performing barbaric “dental surgeries,” using minimal anesthesia and even physically assaulting his patients by pulling their heads back by their hair. According to the *British Dental Journal*, “50% of films had the potential to negatively influence public perception of the professional”. These examples illustrate how popular media often contributes to the negative reputation of dentists. The significance of this may not be obvious, but a person’s perception of something portrayed in the media significantly influences their actions toward the fear- in this case, the fear of visiting the dentist. Furthermore, an article from Harvard University states, “Media has the power to influence individual beliefs, attitudes, and behaviors”. This fear of visiting the dentist can lead to a reduced willingness to seek dental care, ultimately resulting in poorer oral health.

Despite the majority of films depicting dentists negatively, there are exceptions, such as *Snow Dogs*, where the main character is a dentist who emphasizes empathy and adds a personal touch to his practice. Overall, with dental professionals often being villainized and stereotyped in the media, it becomes essential to recognize these inaccuracies and encourage positive portrayals of dentists to the general public.

sleep tight, smile bright

BY KATIE LUI



As more drugs are introduced to the market each year, avoiding excessive prescriptions of opiates and narcotics has become an increasingly important part of daily practice in dental offices. In response, efforts have shifted away from a reliance on opioid medication as a primary treatment for pain, with a focus on more holistic ways of healing the body from the inside out. Exercise and sleep are among the most frequently recommended prescriptions, encouraging patients to prioritize their overall well-being. Quality sleep, in particular, is known to enhance brain function, strengthen the immune system, and improve mental health. Recently, research has also shown that adequate sleep can benefit oral health.

Sleeping disorders (SDs) refer to struggles pertaining to sleep duration, physiology, or quality. Recent studies have attributed sleeping disorders to various medical conditions, including heart disease, lung cancer, and diabetes, due to their role in increasing inflammatory markers. In the same way, sleep disorders have now been linked with periodontitis (gum disease), a chronic infection that compromises gum tissue and tooth integrity.

In one study, a team of dentists conducted standardized oral and medical examinations on a cohort of volunteers, assessing factors such as blood pressure, physical activity, and calculus index ratings. The researchers then used these measurements to evaluate the severity of gum disease. Stages of periodontitis range from mild to severe, with symptoms varying from red and swollen gums, commonly referred to as gingivitis, to minor bone loss, and, in the most severe cases, tooth loss, along with pus and infection around the gums. Their research confirms sleep as having a significant role in strengthening the body's ability to combat bacteria responsible for infections such as periodontitis.



The study also took a holistic approach by monitoring factors such as socioeconomic status, physical activity, hypertension, and stress levels. While sleep may not be the sole factor contributing to patients' diagnoses of periodontitis, it was often the common denominator observed across the overall patient population. Insights to this experiment concluded that "SD individuals displayed [a] significantly higher amount of dental plaque, higher level of gingival inflammation, lower number of missing teeth, and lower masticatory function" (Carra). The elevated plaque and inflammation seen in sleep-deprived individuals contribute to the worsening of gum disease, leading to pain, discomfort, and potentially tooth loss over time. This finding is particularly concerning as poor sleep, when coupled with periodontitis, can create a vicious decline in quality of life. For example, reduction in masticatory function—one's ability to chew properly—not only impacts basic eating habits but also limits dietary choices, leading to poor nutrition. This cascade of oral health issues, compounded by the physical and cognitive toll of sleep deprivation, can lead to faster deterioration in overall well-being. The seemingly distant yet crucial connection goes to show how everyday habits can collectively influence the body as a whole.

minimizing waste in the dental field

BY
KATLYN
ONG

For the sake of keeping tools sterile and suitable for treatment, dental offices often generate large amounts of waste through single-use items, biomedical waste, and personal protective equipment. Heeding the global trend of adopting greener practices, it would be beneficial for dental offices to implement more environmentally friendly methods to combat the impact left on the planet.

Annually, dental practices generate 28 million liters of toxic X-ray fixer; 3.7 tons of mercury; and 680 million chair barriers, light handle covers, and patient bibs (Alston, 2023). One method of reducing waste is following the shift to digital practices, a trajectory that most dental offices are slowly transitioning to. For example, using digital dental molds is one practical method of replacing single-use materials with computer models, eliminating traditional dental impressions which typically account for 30% of solid waste (Alston, 2023). The majority of traditional molds are made from non-biodegradable materials like silicone, which take decades to decompose. Biodegradable molds like alginate can be composted, but still produce a significant amount of waste. An alternative is to go completely digital by using digital intraoral scanners to take molds of patients' mouths, which are subsequently sent to labs for processing. Not only does this reduce waste, but it also creates a more accurate scan of the oral cavity, providing increased patient satisfaction down the line.

Practicing sustainability also boils down to the products the office chooses to use. Single-use items are widespread throughout the dental field and are switched out between patients to maintain a sterile environment. However, dental practices can opt into choosing reusable tools such as stainless steel suction tips and prophy heads, glass syringes, and biodegradable paper products such as cups. Using these tools will significantly minimize the amount of waste produced.

Dental practices can also take part in programs designed to bolster the green movement. Programs like Colgate's Free Oral Care Recycling Program help participants recycle commonly used dental items including toothpaste tubes, toothbrushes, and floss containers. Not only can individual practices enroll in the free program, but they can also encourage their patients to participate. Other programs like Premier's Instrument Recycling Program also contribute to the goal of sustainability by helping dental offices recycle stainless steel instruments. There are a variety of other practices that dental offices can adopt to promote a more sustainable environment while maintaining ideal levels of sterility, but taking small steps in the right direction will ultimately contribute to minimizing waste in the dental field.



“oral health and the gut microbiome: what is the connection?”

BY ANIKA BALAJI

Gut health: a popular topic on social media and other areas of the internet, with many influencers promoting prebiotics and probiotics through food and drinks. Similar to how a cow's tongue indicates disease throughout its body, oral health in humans can indicate problems within our gut microbiome.

Saliva traveling down the digestive system contains various types and amounts of bacteria, such as *Streptococcus salivarius* (31.94%), *Streptococcus parasanguinis* (5.41%), *Streptococcus pneumoniae* (3.65%), with the most common bacteria in the mouth being *Streptococcus* spp. (83%). For healthy individuals, the bacteria in the saliva cannot survive the harsh conditions of the stomach and the intestines, but for those with diseases such as HIV or colon cancer, some microorganisms can survive the harsh environment. The oral-gut axis, a network where the mouth and the gut can communicate via saliva or the bloodstream, suggests that

the bacteria in the mouth can influence and reshape the gut microbiome. A study was conducted where segmented filamentous bacteria, also known as SFB, a common type of bacteria found in the gut, was planted inside germ-free mice to study its effects. After six weeks, the infected mice had an imbalance in their osteoclasts and osteoblasts, caused by the SFB, resulting in loss of bone surrounding their teeth. This is because the SFB forces an immune response disrupting the regular communication between the bone-generating and bone-degrading cells in alveolar bone marrow, leading to bone loss. The findings of this study underscore the surprising link between gut and oral health, demonstrating how the introduction of a gut bacterium can negatively impact oral health—an example of the oral-gut axis in action.

Irritable Bowel Syndrome, an unfortunately common disease, portrays oral bacteria existing in the intestine. Although the cause of IBS is unknown, the symptoms include cramping of the abdomen, bloating, and constipation. Individuals with gum disease or an imbalance in their oral microbiome are more prone to IBS. This is due to the bacteria from the mouth traveling down to the intestine through saliva, and further surviving in the harsh acidic pH environment, causing inflammation of the gut. Inversely, problems in the gut can affect your oral health. Issues such as acid reflux, which is a condition where stomach acid flows back up through the esophagus, causing symptoms like heartburn, can wear away enamel over time, leading to tooth decay.

Solutions to prevent the diseases mentioned previously include consuming probiotic-rich food such as sauerkraut, kimchi, and yogurt. Probiotic-rich foods can have higher acidity, which could erode enamel, so moderation should be considered when consuming such foods. Overall, the oral and gut microbiome co-influence each other, therefore maintaining a diet rich in fiber and probiotics will aid in maintaining a healthy microbiome.

the links between oral health and cardiovascular health

BY MIHIR GILL



Oral health has a significant, and often forgotten, influence on one's cardiovascular health. For example, the American Heart Association stated that there is an association between oral health, specifically periodontitis, or gum disease, and cardiovascular health. Knowing about the links between oral health and cardiovascular health can be essential to know the risk of cardiovascular disease associated with not maintaining good oral health.

According to The University of Pennsylvania School of Dental Medicine, bacteria from the mouth can spread to other parts of the body through the bloodstream and can reach the heart, causing inflammation which can lead to serious heart issues, like endocarditis, infections in the heart's inner lining, and atherosclerosis, clogged arteries with plaque. Research conducted at the European Society of Cardiology studied over 1,500 participants above the age of 65 who had healthy gums, mild periodontitis, and severe periodontitis. After six years, a follow up was done and those who had severe periodontitis had a 49% higher risk of developing heart issues than patients without periodontitis.

Not having regular dental visits where oral health issues can be detected can be detrimental to one's heart health. According to a study conducted by the Journal of Dental Research in 2016, people with untreated tooth infections have a 2.7 times higher risk of coronary heart disease than those with good oral health. Cardiologist Dr. Andrew Waxler from Penn State Health Medical Group, said that infections like cavities can be linked to hardening of arterial walls, which carry oxygen to vital organs, and blockages of arteries with plaque can result in heart attacks. Furthermore, cardiovascular problems in adulthood can stem from poor oral health and delayed treatment, like with the lack of access to dental care, from when the individual was in their youth. A 2017 study analyzing the correlation of oral health and cardiometabolic risk found that their participants who had deferred dental care in their young adulthood had increased blood pressure, both systolic and diastolic (95% confidence interval), and had increased risks of being hypertensive later on in adulthood, which can lead to serious cardiovascular problems like heart attacks and strokes.

The interconnections between oral health and cardiovascular health are often not associated with one another. However, by understanding how periodontal disease and untreated tooth infections affect each, there may be more connections than one may think.

ayurveda in holistic dentistry: ancient wisdom in modern care

BY PRIYAL JAIN

Ayurveda, the ancient Indian health science, offers a comprehensive approach to wellness, treating the body, mind, and soul as interlinked components. Originating over 5,000 years ago, Ayurveda has been revisited in recent years for its implementation in various health fields, including periodontology. Holistic dentistry fuses Ayurveda's emphasis on natural, preventative measures for dental diseases, aiming to attain oral health that resonates with balance and wellness in the body.

Ayurveda excels in prevention of diseases, a shortcoming of standard Western medicine. It is based on the three core energies or doshas, Vata (movement), Pitta (metabolism and digestion), and Kapha (mucous/lubrication) which come together to govern all metabolic activity in our bodies. Balance of the three doshas is ideal for healthy physiology and psychology. Each person has a distinct balance of these doshas, consequently Ayurvedic treatment revolves around a personalized treatment philosophy. An imbalance in doshas can be observed as a deficiency in digestion, metabolism, or overall health, including oral health. In the field of Oral Medicine, oral health is used as a reliable measure of the broader state of one's health. Holistic dentistry incorporates this mindset and treats the mouth as a part of the body, emphasizing the connection of mouth to body. Rooted in minimal intervention and prevention of disease over maintenance, holistic dentistry favors natural remedies and discourages chemical substances. It attempts to restore balance within the oral cavity.

An Ayurvedic approach to orofacial diseases include practices such as oral cleansing and extractions as well as daily preventive therapies such as Dant Dhavani (Brushing), Jivha Lekhana (Tongue scraping), Gandoosha (gargling and oil pulling), and tissue regenerative treatments. Dant Dhavani is the practice of chewing on herbal brushes such as neem or liquorice. Mastication of these stems is thought to initiate salivary secretion and aid in plaque control due to the antibacterial function of some stems. Jivha Lekhana aims to remove halitosis (bad odor) and improve taste by stimulating the secretion of digestive enzymes. Clinical evidence depicts consistent use tongue scrapers is linked to eliminating anaerobic bacteria in the mouth and decreases bad breath. The practice of Gandoosha or oil pulling has recently gained popularity in the online wellness community and involves swishing sesame oil in the mouth for oral benefits. Historically, it was used to strengthen the anatomy associated with mastication as well as bleeding of the gums. Recently, however, it is connected to plaque prevention and gingivitis. Finally, herbs like Amla support the healing of connective tissue "Amla extract and collagen peptide suppressed the formation of 8-OHdG-positive cells and epidermal hyperplasia, and controlled skin hydration, thus reducing skin wrinkle formation in the mice." (Mirjalili & Karimi, 2013).

**"AYURVEDA
EXCELS IN
PREVENTION
OF DISEASES"**



Implementing Ayurveda into holistic dentistry begins with subtle but impactful changes in daily lifestyle and routines. When combined, Ayurveda and holistic dentistry offer a balanced approach to oral health that expands beyond the limitations of allopathic medicine and explores the realms of homeopathy. An emphasis on preventive care, natural remedies, and personalized patient plans, Ayurvedic principles align oral care with the body, encouraging a healthier mouth and healthier lifestyle.

what is regenerative dentistry?

BY AIDAN CHAN

Regenerative dentistry is a new and innovative branch of dental science focused on using stem cells, tissue engineering, and biomaterials to regenerate and restore oral tissues, including teeth, gums, and jawbones. This field bridges the gap between traditional restorative methods, which often involve extraction or prosthetics, and the promise of natural tissue regeneration, aiming for more sustainable, biological solutions.

Conventional dentistry relies on approaches like fillings, crowns, and implants to treat damaged or decayed teeth. While effective, these methods don't restore the growth and functionality of the natural tissue. This causes limitations for procedures like implants because people need to have their teeth fully developed before implants can be installed. Regenerative dentistry fixes this problem by restoring damaged tissues to their original state, providing lasting solutions for issues like periodontal disease, tooth decay, and trauma. For instance, stem cell-based therapies may allow for tooth regeneration instead of extraction and replacement, offering a biological approach to restoring dental health (Demarco et al. 2017). Since a regenerated tooth would be made out of biological cells, it has many more benefits than installing an implant, such as avoiding immune system rejection, infection, and bone loss.



Recent advances in regenerative dentistry:

1. **Early Foundations:** Research into regenerative dentistry began with the development of tissue engineering in the late 20th century, which combined biology and engineering principles to develop biological substitutes for tissue loss.
2. **Stem Cells and Tissue Engineering:** Over the past two decades, stem cells from dental pulp have been studied extensively for their regenerative potential, with success in regenerating dental pulp and even whole tooth structures (García-Godoy and Murray 2010).
3. **Recent Breakthroughs:** Advances in biomaterials and nanotechnology have accelerated research, enabling the creation of scaffolds that support cell growth and tissue formation. As of the last few years, researchers have been able to use these technologies to regrow periodontal tissues, gum, and even parts of the jawbone (Nicolescu 2016).

How Does Regenerative Dentistry Work?

In essence, tissue is regenerated using 3 main techniques: (Further reading is recommended since many details are left out.)

- **Stem Cells:** Collected from dental pulp, periodontal ligament, or other tissues, stem cells have the special ability to differentiate into various types of cells necessary for tooth and tissue regeneration (Narang and Sehgal 2012).
- **Scaffolds:** Biomaterials, often combined with growth factors, create an environment that supports stem cells in developing into new tissue. These scaffolds help with the growth and shape of the new tissue, resembling the structure of natural teeth or bones (Yelick and Sharpe 2019).
- **Growth Factors and Molecular Biology:** Growth factors encourage stem cells to differentiate and grow into the desired tissue. By manipulating the cellular environment, researchers can enhance the regenerative process, allowing for more effective tissue restoration (Bakopoulou 2020).

How Will It Change the Future of Dentistry?

You might be wondering why regenerative dentistry techniques aren't prevalent in all dental practices, since it holds the potential to transform dental treatments drastically. While it's very promising, there are challenges like cost and regulations. Transitioning from lab research into clinical practices all over the world will take extensive time and research.

However, regenerative dentistry still poses many benefits. It not only provides a more sustainable treatment but also preserves patients' natural dental structures, potentially reducing the need for prosthetics and improving quality of life (Amrollahi et al. 2016). Furthermore, as regenerative dentistry evolves, dental care might become less invasive and more affordable, making high-quality dental care more accessible globally.

do orthodontic treatments weaken your teeth?

BY KELVIN LAM

Apart from common reasons such as the high cost, discomfort, duration, and concerns about appearance, many adults are also deterred from getting braces due to the fear that their teeth will weaken after treatment. At first glance, it may seem logical since you're applying pressure on your teeth for an extended amount of time and relocating the teeth; however, considering how braces and the body work, this is not true! If orthodontic treatment is performed properly, and patients follow the instructions from their dentist, braces will give one an aligned, functional, and aesthetically pleasing bite rather than weakening teeth.

Different orthodontic treatments have different mechanisms. For instance, braces rely on a "pulling" mechanism to shift the teeth, where the wire applies pressure on your teeth, and the brackets hold the strand in place. Certain spots in your mouth can be used as anchors, like a molar or even the hard palate. Invisalign, on the other hand, relies on a "pushing" mechanism, gradually spreading the teeth apart. Despite these differences, all of these treatments have the same basic principle of bone resorption and bone formation. When orthodontic braces and aligners, for example, apply a horizontal force on the teeth, one side will be stretched while the other side is compressed. Osteoblast (bone formation cells) will enter the stretched side and create bone to fill up the tooth peripheral space, while osteoclast will enter the compressed side and resorb or break down bone to create more room. With the help of these two cells, the tooth can shift while remaining secure in the gum socket.

Knowing this, teeth don't lose anchorage with these orthodontic treatments because of net zero bone formation. However, because of this mechanism, according to research on adult bone properties in the International Journal of Oral Science, adults would have a harder time aligning their teeth with these treatments because of their high bone density and slow bone growth.

It's also good to take into consideration that even though, generally, orthodontic treatments don't affect the strength of your teeth due to the mechanism explained earlier, it's possible that teeth can be weakened by dental conditions like periodontitis, pulp infection, tooth decay, and gingivitis. This is because braces can cause difficulties in cleaning by hindering specific areas of the teeth from tooth brushing, allowing food pieces to get stuck, and allowing bacteria to grow and infect the teeth. To avoid this, patients need to pay attention to cleaning their teeth thoroughly with the correct technique, do routine check-ups once a month, and get extractions if necessary.

Even though, in theory, orthodontic treatment mechanisms themselves don't cause weakened teeth, braces patients are said to have a higher chance of getting gum recession in some severe cases due to constant pulling pressure. Meanwhile, Invisalign does a better job of preserving the gum because there isn't as much pressure, and it's easier to brush and floss because Invisalign is removable. Invisalign is also less noticeable when you smile! That's why dentists often recommend Invisalign to their patients for less complex cases. One downside is that Invisalign is much more expensive than braces. Nevertheless, you shouldn't worry as long as you brush and floss often and with accurate technique.

According to research in the International Dental Journal, the prevalence of dental caries was significantly lower for people who had received orthodontic treatment than people who had not, so you don't need to worry too much about this as long as you follow the doctor's instructions. Having weaker teeth after getting braces is just a myth, so just get braces if your dentist recommends and take good care of your teeth during the treatment!

"IF ORTHODONTIC TREATMENT IS PERFORMED PROPERLY, AND PATIENTS FOLLOW THE INSTRUCTIONS FROM THEIR DENTIST, BRACES WILL GIVE ONE AN ALIGNED, FUNCTIONAL, AND AESTHETICALLY PLEASING BITE RATHER THAN WEAKENING TEETH."



veneers: the good, bad, and ugly of modern smile makeovers

BY SUKHMAN SIDHU



With the rise in popularity of cosmetic dentistry, veneers have become a go-to choice for those seeking a flawless smile. However, the surge in demand has also led to some concerning trends, such as the rise of unlicensed “veneer techs” on social media. This article examines the benefits and risks of veneers, underscoring why relying on licensed dental professionals is essential amid the growth of dangerous DIY dental practices currently trending online.

The Good: Cosmetic Benefits and Advances in Dental Techniques

When handled by licensed professionals, veneers offer remarkable aesthetic and functional advantages. Veneers, typically made from porcelain or composite resin, conceal imperfections like chips, discoloration, and minor misalignments, creating a polished, natural appearance. Thanks to advances in CAD/CAM (computer-aided design and manufacturing) labs, licensed dentists can achieve exceptional precision in crafting and fitting veneers, making procedures quicker and more comfortable.

The Bad: High Costs and the Need for Long-Term Maintenance

The cost of veneers, often ranging from \$1,000 to \$2,500 per tooth, can make them a significant investment, especially since in most cases, they aren’t covered by insurance. The procedure is irreversible, as a small layer of enamel is removed to ensure the veneer fits securely. While veneers can last 10 and 15 years with proper care, maintaining them is critical. For instance, patients who grind their teeth may need a custom mouthguard to prevent chipping, adding to the overall cost of veneer care.

The Ugly: Unlicensed “Veneer Techs” and DIY Dentistry Trends on Social Media

A troubling trend has gained momentum on social media: unlicensed “veneer techs” advertise low-cost veneer services, especially on platforms like TikTok and Instagram. As DIY health hacks gain traction, more people are turning to social media for dental advice. According to Forbes, approximately 1 in 5 American adults consult TikTok for health guidance before visiting a doctor.

While these “veneer techs” promote veneers at prices far below those of licensed professionals, the risks can outweigh the savings. The American Dental Association (ADA) has issued warnings about these unlicensed practices, which can lead to serious complications, including nerve damage, infections, and even tooth loss. Dr. Ada Cooper, an ADA spokesperson, emphasizes that licensed dentists undergo years of extensive education and training to ensure patient safety—qualifications these unlicensed practitioners lack.

Board-certified orthodontist Dr. Zach Truman highlights that unlicensed practitioners often bypass crucial steps, such as proper anesthesia administration, leaving patients vulnerable to pain and further complications. Without proper dental assessments, veneers may be placed over untreated issues like cavities, which can lead to severe decay and tooth loss as decay is sealed beneath the veneer.

The Takeaway: Safety First with Licensed Professionals

Veneers can offer life-changing results, but patients should recognize the importance of working with licensed dentists who prioritize quality and safety. While unlicensed “veneer techs” may offer tempting prices, the long-term consequences can be severe. Making educated decisions and adhering to professional standards in cosmetic dentistry ensure safe and satisfying outcomes -- transforming smiles without compromising health.

“VENEERS CAN OFFER LIFE-CHANGING RESULTS, BUT PATIENTS SHOULD RECOGNIZE THE IMPORTANCE OF WORKING WITH LICENSED DENTISTS WHO PRIORITIZE QUALITY AND SAFETY.”



3D printing of crowns and bridges

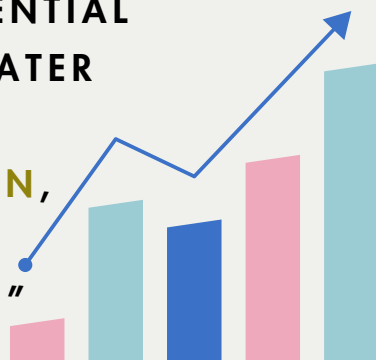
BY PARI SHAH

Since the early 1990s, restorative dentistry has undergone a remarkable transformation. Traditional methods of crafting dental crowns and bridges, once labor-intensive and time-consuming, have been supplanted by 3D printing technology has led to increased precision, efficiency, and patient satisfaction.

Historically, the fabrication of dental restorations involved a meticulous process. Dentists would use physical impression materials, such as alginate or silicone, to capture a detailed replica of the patient's oral anatomy. These impressions were then sent to dental laboratories, where technicians constructed wax models and metal frameworks using traditional casting techniques. The final restoration, often veneered with porcelain or other materials, was then delivered to the dentist for placement. While effective, this method was time-consuming and prone to human error, impacting the fit, function, and aesthetics of the restoration.



"AS 3D PRINTING TECHNOLOGY CONTINUES TO EVOLVE, THE FUTURE OF RESTORATIVE DENTISTRY APPEARS INCREASINGLY PROMISING, WITH THE POTENTIAL FOR EVEN GREATER PRECISION, CUSTOMIZATION, AND PATIENT SATISFACTION."



Traditional dental restoration techniques, while effective, are susceptible, including inaccurate impressions, technical errors in laboratory fabrication, and clinical mistakes such as inadequate tooth preparation or excess cementation. These errors can compromise the fit, function, and aesthetics of restorations. In contrast, 3D printing offers numerous advantages, including digital precision, customization, reduced time, and improved accuracy. By minimizing the potential for human error and enabling highly customized restorations, 3D printing has revolutionized the field of dentistry, providing patients with more precise, efficient, and aesthetically pleasing restorations.

3D printing has streamlined the restorative process. Digital impressions, captured using intraoral scanners, provide a highly accurate 3D representation of the patient's oral structures. This digital data is then used to design a virtual model of the restoration using computer-aided design (CAD) software. The design can be customized to meet specific patient needs, considering occlusion, aesthetics, and biocompatibility factors. Once the design is finalized, it is transmitted to a 3D printer, which fabricates the restoration layer by layer using materials such as resin, metal, or ceramic.

The benefits of 3D printing in dentistry are manifold. First, it significantly reduces the time required to fabricate restorations. The digital workflow eliminates the need for physical models and allows for rapid production, often within a matter of hours. Second, 3D printing offers unparalleled precision. The technology can create intricate details and complex shapes with remarkable accuracy, resulting in restorations that fit seamlessly and function optimally. With higher precision, the crown or bridge will be a better fit for the patient and can make for better oral health and enable a stronger patient-provider relationship. Third, the customization options afforded by 3D printing are extensive printing enables the fabrication of complex restorations, such as implant-supported prostheses and fixed partial dentures, with greater ease and accuracy.

The integration of 3D printing into dental practice has not only enhanced the efficiency and accuracy of restorative dentistry but has also elevated the patient experience. Reduced chairside time, improved fit, enhanced aesthetics, and increased patient satisfaction are just a few of the benefits that can be attributed to this technological advancement. As 3D printing technology continues to evolve, the future of restorative dentistry appears increasingly promising, with the potential for even greater precision, customization, and patient satisfaction.

whitening strips: pros, cons, and recommendations



BY RIA BANSAL

Whitening strips have gained significant popularity due to their convenience and practicality for white teeth. These over-the-counter products promise to brighten teeth and enhance users' confidence. However, like any cosmetic dental product, they come with their own set of advantages and disadvantages.

One of the most appealing aspects of whitening strips is their convenience. These products are designed for easy at-home application, allowing users to brighten their smiles without the need for professional assistance. Users simply peel off the backing and apply the strips directly to their teeth. This is particularly beneficial for those with busy schedules, as the strips can be worn during daily activities or while relaxing at home. In addition to convenience, whitening strips are generally more affordable than professional whitening treatments. Dental procedures can be costly, making whitening strips an attractive option for those looking to enhance their smiles on a budget. The variety of products available also allows users to select strips that cater to their specific needs, whether they are looking for stronger formulations or less strong options suitable for sensitive teeth. Also, whitening strips provide effective results in a short amount of time. Most products contain active bleaching agents, such as hydrogen peroxide or carbamide peroxide, which work to break down stains and discoloration both internally and externally. (Coelho, 2021). While results can vary, consistent use often leads to noticeable improvements in teeth whiteness.

Despite their benefits, whitening strips also have disadvantages to be aware of. One significant concern is the variability of results. Factors such as the initial tooth color, the type of stains, and adherence to the product's instructions can all influence the outcome. While many users achieve a brighter smile, some may find the results less satisfying. Tooth sensitivity and gum irritation are other common issues associated with whitening strips. (Yetman, 2021). Although side effects are generally mild, some individuals may experience increased sensitivity, particularly if they already have sensitive teeth. Sensitivity is way less common in over the counter whitening strips than with in-office professional procedures. (Coelho, 2021). Additionally, whitening strips have limited coverage. They are designed to adhere to the surfaces of the teeth where they are applied, which means that not all teeth may receive the same level of whitening.

This can lead to uneven results if the strips are not applied carefully. Lastly, effects of teeth whitening are temporary. Whitening strips do not provide permanent whitening; the effects can fade over time, depending on factors such as dietary habits and oral hygiene practices. Consistency is necessary to maintain whiteness, which can be inconvenient for some users.

To maximize the effectiveness of whitening strips, users should follow specific guidelines written on the box or in the user manual. When shopping, users should look for key ingredients such as hydrogen peroxide and carbamide, as these ingredients help to remove both internal and external stains according to the American Dental Association. (Coelho, 2021). When using, a key thing to note is that users are to not brush shortly before applying the whitening strips. (Coelho, 2021) To apply, peel off the backing and apply the strip to the teeth, aligning it with the gum line and pressing gently to secure it. The timing of application is also important. Most whitening strips recommend a wear time ranging from 30 minutes to two hours, depending on the product. According to Healthline, users are to wear whitening strips twice a day for 2 weeks, 30 minutes each time in order to see noticeable results in a short amount of time. (Yetman, 2021). Users should avoid eating or drinking during this time to enhance the effectiveness of the treatment. After removing the strips, it is advised to not consume teeth-staining foods and beverages—such as coffee and tea—for at least 24 hours to prolong results. However, if necessary, using a straw or brushing your teeth directly afterwards can help to minimize staining. (Yetman, 2021). As for when to use whitening strips, many individuals find it convenient to apply them in the evening or during times when they can relax at home. However, one very important thing to note is that using high concentrations of hydrogen peroxide on your teeth can de-mineralize them, which is the loss of calcium and other minerals from teeth. (Yetman, 2021). Consistency is crucial; using the strips regularly over a specified period, as recommended by the manufacturer, will yield the best results.

Whitening strips can be a valuable addition to your dental care routine, offering an accessible way to enhance your smile. By understanding their pros and cons, choosing the right product, and following best practices for use, you can achieve a brighter smile effectively and safely. As always, consult with a dentist before starting any whitening regimen, especially if you have sensitive teeth or dental concerns. By following proper usage guidelines and maintaining realistic expectations, users can successfully incorporate whitening strips into their oral care routine. Ultimately, a brighter smile can enhance confidence, but it is essential to approach whitening treatments thoughtfully and informed.

indicative nature of communication towards dental success

BY BENJAMIN NGUYEN



Effective communication plays a critical role in dental care, contributing to trust, better treatment outcomes, and improved patient satisfaction. A review published in 2020 in *Communication Skills of the Clinician and Patient Motivation in Dental Practice* highlights its importance. Dentists with strong communication skills are better able to help patients understand periodontal treatment plans and adopt necessary behavioral changes. According to the review, “Good communication skills increase patient satisfaction while better implementing recommendations for the prevention of further dental problems.”

Clear and effective communication positively impacts treatment outcomes by fostering patient cooperation and facilitating a more thorough exchange of information. It is particularly significant in addressing oral health literacy, defined as the ability to obtain, process, and understand health information to make appropriate decisions. Limited oral health literacy is associated with higher risks of oral diseases and challenges, such as reduced use of preventive services and lower adherence to treatment instructions. The review indicates that inadequate literacy can lead to delayed diagnoses, ineffective self-management, and worse health outcomes.

A study conducted at a university-affiliated dental clinic explored the relationship between oral health literacy and periodontal health. It found that patients with lower literacy levels often experienced poorer health outcomes. However, the study noted that while a correlation exists, the findings did not establish a direct cause-and-effect relationship.

These insights emphasize the need to adapt communication approaches to individual patient needs. Factors such as emotional state, literacy level, and psychological barriers, including anxiety or fear, can influence the effectiveness of interactions. Personalizing communication strategies can enhance the quality of care and contribute to better health outcomes.

As the field of dentistry evolves, prioritizing communication remains essential for improving patient experiences and achieving successful treatment outcomes.

automated dental surgery

BY
JOONGEON
LEE

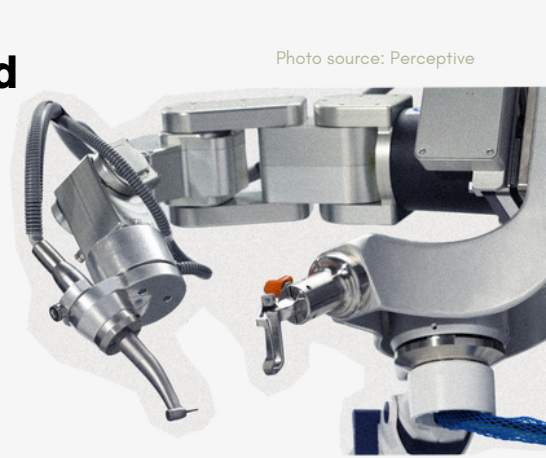


Photo source: Perceptive

A surgical robot, developed by Perceptive, a dental technology company, has successfully performed the first fully automated dental procedure.

On July 30, 2024, Perceptive announced that it had “completed in-house testing, as well as ... dry run testing on awake moving patients, and a first in-human ... automated restoration procedure.” (Perceptive) Live footage of this groundbreaking procedure was uploaded to social media on August 5, 2024.

The dental operation involved a two-part procedure. First, the patient’s teeth were scanned using Optical Coherence Tomography (OCT), a technique that shines red light waves across the sample and measures their reflections to provide accurate cross-sectional images (Cleveland Clinic). Through these images, the scanning software obtains detailed structural information about the patient’s teeth, which an artificial intelligence algorithm, developed by Perceptive, uses to plan out the procedure with the structural data.

The robotic arm receives the planned instructions and executes the procedure. Perceptive’s robotic arm is particularly tested for precision, allowing it to modify its motion in response to the patient’s movements.

The procedure Perceptive’s robotic arm performed was dental crown placement surgery. A “dental crown is a tooth-shaped cap that restores a decayed, broken, weak or worn-down tooth.” (Cleveland Clinic) From metal to resin, it could be made with a variety of materials. The damaged or defective tooth is modified to fit the crown, which is then secured over the tooth.

Dr. Ciriello, CEO of Perceptive, believes this technology could help reduce dental service deficiencies. “There weren’t enough dentists to treat all the patients in my community,” he explains. “It dawned on me that I needed to find a way to scale myself.” Perceptive, through successful automation of crown surgery, has proved that automated dental procedures are indeed feasible.

importance of water testing in dentistry

BY
RAFFAELLA
WONG



With a hidden threat lurking in dental unit waterlines (DUWLs), infection prevention experts are emphasizing the importance of regular water testing in dental offices. This routine check is essential to preventing bacterial contamination in DUWLs. Despite clean appearances, the narrow tubing in dental hand handpieces and air-water syringes can quickly develop biofilms—layers of bacteria that could infect patients during clinical procedures. Experts at the Centers for Disease Control and Prevention (CDC) and Loma Linda University’s School of Dentistry warn that without regular testing, these waterlines can harbor pathogenic bacteria, leading to severe health risks for patients, especially those with compromised immune systems.

According to Henry Schein, a major dental supplier, notes that even seemingly clear water can harbor up to 200,000 colony-forming units (CFU) per millimeter of bacteria within just five days of installation. However, studies have shown that many water lines fail to meet this threshold without consistent maintenance and testing protocols. In a study conducted by ProEdge Dental Water Labs of over 22,000 dental waterline samples, more than 31% of treated water lines failed to meet this safety threshold even with routine treatments in place.

Guidance from the CDC suggests that in addition to regular testing, dental practices should adopt comprehensive maintenance routines. This includes waterline “shocking” with disinfectants, daily flushes, and using sterile water in surgical procedures. By proactively monitoring and treating waterlines, dental offices will not only be able to protect patient health, but also avoid potential legal liabilities.

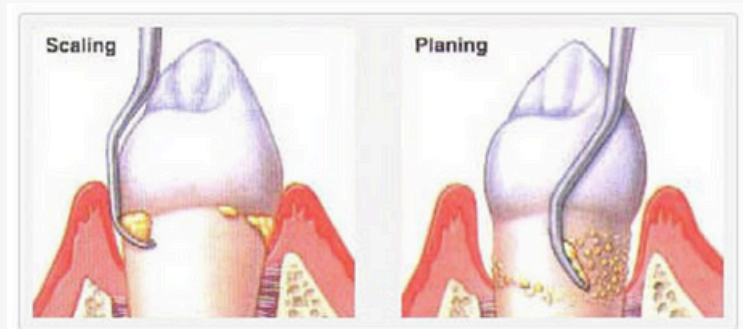
Waterline testing is not currently mandatory nationwide, but multiple states have begun enforcing stricter regulations, with some requiring quarterly testing. Hopefully these advances in water testing can bring attention to the microscopic world within the water lines to make clinical dentistry safer for both patient and provider.

scaling and root planing (SRP): benefits, periodontal disease, and further discussions

BY EMMI PHAN

With complications from bone loss to even fatal infections of the soft tissue, periodontal disease is best kept at bay early on. Professional dental cleanings, such as scaling and root planing, are often the “gold standard” treatment for preventing and maintaining chronic periodontal disease. Scaling and root planing are the most common deep cleaning techniques. However, their limitations, connection with gum disease, and future development are still significant discussion points.

SRP is a two-part procedure: scaling to remove all the plaque and tartar above and below the gum line and root planing to smooth out the root surfaces. Plaque and tartar both promote an imbalance in the mouth’s microbiome, potentially leading to other ailments, such as cavities. When scaling and root planing are compared with conservative surgery regarding the ultimate goal of tooth retention, both treatments can be effective for most patients with an adequate maintenance regimen. However, SRP is still critical to the treatment of not just gum-related diseases but the prevention of much more serious issues. Anaerobic bacteria that live beneath tartar layers, such as *Porphyromonas gingivalis*, digest gum tissue, periodontal ligaments, and the alveolar bone beneath the gumline which promotes tooth loss. The removal of plaque and tartar during the SRP procedure reduces the growth of pathogenic microbes, which maintains the integrity of the teeth.



<https://www.midlandparkfamilydentistry.com/scaling-and-root-planing/>

“SRP IS A TWO-PART PROCEDURE: SCALING TO REMOVE ALL THE PLAQUE AND TARTAR ABOVE AND BELOW THE GUM LINE AND ROOT PLANING TO SMOOTH OUT THE ROOT SURFACES.”

Despite the obvious benefits of improving gum health, preventing tooth loss, reducing bad breath, and minimally invasive and cost-effective treatment, the procedure is also painful and poses potential limitations. Though dentists do their best to evaluate the current condition of the teeth, many of these limitations relate to post-operative symptoms. Patients may report temporary discomfort, minor bleeding, and gum recession. Though rare, some immunocompromised patients may contract a potentially fatal condition called septicemia when oral bacteria enter the bloodstream. As a preventative measure, dentists may prescribe antibiotics after the procedure as well as an antiseptic mouthwash. SRP often requires multiple sessions for complete treatment. Patients are advised to maintain their oral health by brushing twice a day with a soft brush, flossing, eating a balanced diet, and avoiding tobacco products. With these post-operative instructions and lifestyle maintenance, SRP remains an excellent standard for preventing and maintaining gum health.

As for the future of SRP, ultrasonic scalers and laser-assisted deep cleaning are just some of the latest technologies. Ultrasonic scalers can create small bubbles through cavitation, which then vibrate and work together to loosen and remove unwanted debris on the teeth without scraping them. Laser treatments complete a deep cleaning using a laser instead of hand instruments. Your dentist will target the laser at specific areas, generating heat that breaks down plaque and bacteria. Nowadays, there are other technologies, like 3D scanners, self-cleaning dental mirrors, and jaw support. Coupled with technology, SRP may become even more accurate and efficient than before, allowing dentists to deliver a better standard of care to their patients.

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