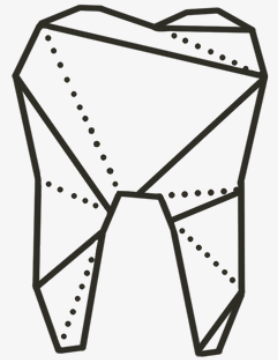


the dentin

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THE INTERCONNECTIVITY OF ORAL HEALTH AND OVERALL HEALTH

BY MANTRA ROOINTAN

It's no secret that taking care of your teeth and gums is important for preventing cavities and gingival disease. However, oral health is often disregarded as an essential part of one's overall health even though a strong connection exists between the two. Poor oral health can lead to various health problems and diseases while maintaining good oral hygiene can prevent certain health issues.

Poor oral health has been related to several illnesses, including respiratory infections, Alzheimer's disease, diabetes, cardiovascular disease, and osteoporosis. According to studies, oral bacteria, and inflammation can spread to other body regions through the bloodstream and cause these illnesses. For example, poor oral hygiene can lead to the formation of plaque and tartar, leading to the release of inflammatory chemicals which can worsen the inflammatory response of the immune system. As a result, many medical problems, including heart disease, stroke, and even preterm birth, may become more severe. Additionally, the bacteria that cause gingival or gum disease can enter the bloodstream and attach to fatty deposits in the blood vessels, increasing the risk of heart attack and stroke.



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<https://www.pexels.com/photo/photo-of-toothpaste-on-toothbrush-4202922/>

The maintenance of good oral and overall well-being depends heavily on preventative care. This includes brushing teeth twice a day, flossing daily, using mouthwash, eating a healthy diet, and limiting sugary and acidic foods and drinks. In addition to these preventative measures, there are also several lifestyle factors that can impact your oral health and overall health. For example, smoking and tobacco use can increase your risk of gum disease and oral cancer, as well as several other health problems. Regular dental exams are also essential for identifying any early signs of possible issues like cavities, gum disease, or oral cancer. By following these preventative measures, you can reduce the risk of developing linked diseases and maintain healthy teeth and gums.

It's important to note that good oral health is not just about having a bright, white smile. It's about taking care of your overall health and well-being. Many illnesses and health problems can be avoided by practicing good dental hygiene. It is essential to prioritize oral health as part of overall health care because neglecting oral health can lead to severe health problems.

The importance of oral health to general health cannot be overstated. Poor oral health can lead to a variety of health issues, whereas good oral hygiene can help to avoid certain diseases. By caring for your teeth and gums, you are caring for your entire body. Therefore, it's essential to prioritize oral health care as part of overall health care.



GOOD ORAL HEALTH IS NOT JUST ABOUT HAVING A BRIGHT, WHITE SMILE. IT'S ABOUT TAKING CARE OF YOUR OVERALL HEALTH AND WELL-BEING."

Photo by Taryn Elliott from Pexels: <https://www.pexels.com/photo/photo-of-a-person-s-hand-holding-a-toothbrush-with-toothpaste-6861151/>

HARMFUL EFFECTS OF TEETH WHITENING TOOTHPASTE

BY JONATHAN CHA



Teeth whitening products have become increasingly popular in recent years, with many products and treatments being sought after to achieve a more aesthetic and confident image. These products are designed to make discolored or stained teeth both whiter and brighter, to create a more prominent smile. Many lifestyle habits such as drinking tea or smoking can create such stains, which teeth whitening products aim to remedy. While there are various teeth whitening products available, from over-the-counter whitening strips to professional in-office treatments, it's essential to understand their effects and potential risks before using them.

The most common active ingredient in teeth whitening products is hydrogen peroxide or carbamide peroxide. When these ingredients come into contact with the teeth, they break down into oxygen molecules, which penetrate the enamel and dentin layers of the teeth. This process causes a chemical reaction that breaks down the stains, leaving the teeth looking brighter and whiter. Teeth whitening products can be applied in a variety of ways, including using strips or trays that are filled with a whitening gel, applying a whitening gel directly to the teeth, or undergoing professional in-office treatments using a stronger whitening solution.



Even though teeth whitening toothpaste is generally safe to use if it is used as directed, it is highly recommended to use such products under the guidance of a dental professional to ensure effective treatment in a safe manner. Teeth whitening products can cause side effects such as tooth sensitivity, gum irritation, and even chemical burns if used improperly. Some teeth whitening products contain abrasive agents or chemicals that can remove surface stains from teeth, but may also damage the enamel if used excessively. Different types of teeth stains may require different approaches to achieve the desired results. A dental professional can assess the type and severity of their patient's teeth stains and recommend the most effective teeth whitening method of removal.

It is important to note that teeth whitening products should not be seen as a replacement for regular dental cleaning and brushing because they do not address the underlying causes of tooth discoloration. They do not remove plaque buildup or address other dental issues that can contribute to tooth discoloration, such as cavities or gum disease. Regular brushing, flossing, and dental cleanings are essential for maintaining good oral hygiene and preventing tooth decay and gum disease. They can also help prevent future discoloration by removing surface stains before they become deeply embedded in the teeth.

WHY MANY DENTISTS DO NOT ACCEPT MEDICAID

BY SAMUEL VU

In 2019, 57% of all dentists did not accept Medicaid patients (5) and most dentists cite low reimbursement rates and high administrative requirements as reasons for not accepting Medicaid patients.



According to the American Dental Association's (ADA) Health Policy Institute, in 2020 the average Medicaid adult dental service reimbursement rate was 53.3% of private reimbursement rates (of states that provide it). For child dental services, the average reimbursement rate was better at 61.4% of private insurance rates (1, 2). Such comparatively low reimbursement rates make it hard for dentists to make money seeing Medicaid patients. Sometimes, the money received for a procedure does not always cover its cost. (3).


The ADA discloses that, the process for submitting Medicaid claims can be inefficient. Some states only take paper claim submissions, and many states use unique forms that have different requirements for documentation compared to private insurers. The ways dentists and reimbursed Medicaid are also varied and can be more difficult to work with. The paperwork involved in treating Medicaid patients is higher than that involved with private insurance. Especially for smaller dental practices, all this added complexity may be too expensive to manage (4).

Medicaid is a federal health insurance program for low-income individuals, individuals with disabilities, etc. but is funded and run by the state and federal government together. The federal government does not require states to provide dental coverage to adults over the age of 21 leaving states to run their dental coverage themselves (2). As a result, depending on the state, percentage dentist participation in Medicaid can vary from as high as 89% to as low as 13% (6).

There is research to suggest that increasing reimbursement rates can help with dentists' willingness to accept Medicaid patients. Especially for states with existing low reimbursement rates and low dentist density, increases in rates have the greatest positive impact on dentist participation in Medicaid (7, 8).

However, higher reimbursement rates alone are not enough. The American Association of Public Health Dentistry's review of literature indicates that higher reimbursement rates paired with administrative reforms are what yield the best increases in dentist participation in Medicaid. After a certain point, higher rates along do not increase dentist participation (9, 10).

Furthermore, analyses of the ADA's office database have found Black, Hispanic, or Asian dentists are more likely to take Medicaid patients, even when controlling for other factors such as zip code (11, 12). Increasing diversity at dental schools could be a way to increase the number of dentists willing to serve Medicaid patients (13).



ECO-DENTISTRY AND CARBON NEUTRAL DENTISTRY: HOW MILLIONS OF WASTE COULD BE REDUCED IN THE DENTAL FIELD

**BY
KIERSTEN NGEOW**

The dental industry contributes millions of waste per year. According to the Eco-Dentistry Association, this waste comprises “680 million patient barriers and 1.7 billion sterilization pouches a year, many of which contain plastic, along with 4.8 million lead foils, 3.7 tons of mercury waste and 28 million liters of X-ray fixer annually.” Furthermore, carbon dioxide emissions are prevalent in the dental industry, with England alone producing over 675,706 tons of carbon dioxide emissions in one year.

But what is the dental industry doing about this excessive waste?

Eco-dentistry, or “green dentistry,” focuses on reducing dentistry's environmental impact. This reduction occurs by promoting alternative procedures, technologies, and materials that increase sustainability within the dental field. Examples include using digital radiography instead of traditional X-rays, which emit harmful chemicals, and opting for more natural restorations than heavy metals.

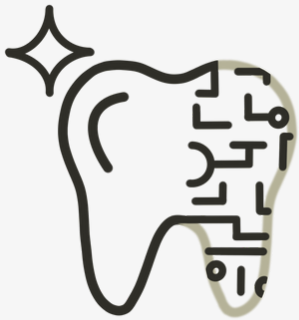
Furthermore, conflict surrounding excessive carbon dioxide emissions is prevalent within the dental industry. As stated earlier, over 675,706 tons of carbon dioxide emissions have been released, which the British Dental Journal states is “equivalent to flying 50,000 times from the UK to Hong Kong.” To address these concerns, the term “Carbon Neutral Dentistry” was created.

Carbon Neutral Dentistry is reaching net zero carbon dioxide emissions in dentistry through offsetting. This is done through a cap-and-trade system, where companies receive finite carbon credits, which determine a limit to the amount of pollution emitted. If a company has leftover carbon credits, it can sell them to other companies and produce additional income. In doing so, dental practices can reduce their carbon footprint while receiving potential monetary benefits.

Pollution remains a prevalent issue as millions of waste are dumped into oceans and our atmosphere annually. By promoting Eco-dentistry alongside Carbon Neutral Dentistry, dental practices can reduce millions of waste produced while fostering global sustainability. In doing so, the dental industry can improve pollution - one practice at a time.



A NEW PERSPECTIVE: THE APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN PATIENT DIAGNOSTICS



BY
**MATTHEW
OKUDA**

With the rapid progression of technology and its integration into daily life, it was only a matter of time before artificial intelligence found its way into the healthcare industry. Particularly, artificial intelligence can detect patterns and details that even a team of medical professionals may overlook, making it a useful tool to improve the accuracy of diagnoses and treatment plans. Artificial intelligence has the ability to provide a "third eye" for the dentist through reconstructive technology, like augmented reality. Access to artificial intelligence will allow for better detection of caries and oral lesions and assessing the structural integrity of dental structures to improve patient health.

Caries and oral lesions may not always be clearly visible. Some of these pits and bumps may be located between teeth or in areas that may be overlooked even by the most trained eye. Enter augmented reality. Augmented reality involves viewing a "superimposition of computer generated virtual content over [the] real environment," (Tandon, et al). In reconstructive dentistry, augmented reality can be incredibly useful. Utilizing its immersion and interaction, dentists can observe a digital reconstruction of patients' oral cavity providing a clearer view and perspective of their dentition that is not possible to see when observed manually.

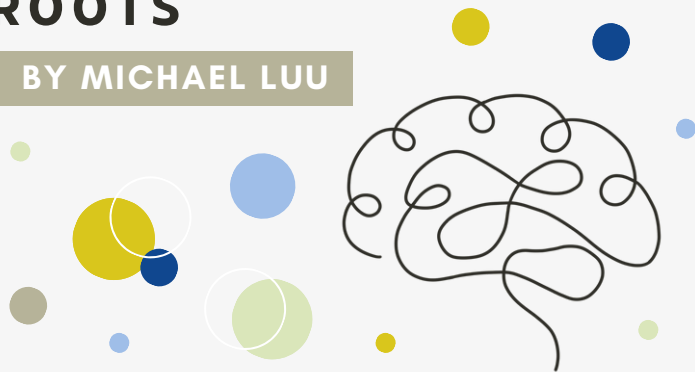
Machine learning utilizes a vast, general database, which includes the locations of the mandibular canals, tooth surfaces, and nerve endings using X-ray images as inputs, (Tan). With this in mind, dentists may diagnose caries at earlier stages, preventing its progression and saving patients from paying for costly subsequent treatment plans.

Coupled with current advances in 3D printing, AI can be used to propose structures and models for procedures involving implants and crowns, which may reduce the number of visits a patient must make to receive their treatment. Having the ability to envision and design a proposed model of the dental field without the need for impressions or additional lab work can cut down the number and length of patient visits. AI even has the ability to predict the location of dental caries and oral lesions, both of which are essential in the prevention of oral infection, inflammation of the oral cavity, and oral cancer.

While artificial intelligence provides a practical approach to dentistry due to its efficiency and accuracy, it is not an end-all solution: a patient's unique bite and arch cannot be judged solely on an input of general patterns, (Toews). As technology continues to be integrated into the world of dentistry, it is important to be aware of its limitations as well as the new pathways it can open. Seeing where manual dexterity, dental experience, and technology are best utilized is the key for progress in the dental field. Either way, artificial intelligence has opened an entirely new avenue of resources to provide the dentist with ways to digitally visualize solutions, create treatment plans, and improve patient care. It is an exciting and novel pathway that will change the face of dentistry along with its practice.

PATIENT BEHAVIOR AND ITS BIOPSYCHOLOGICAL ROOTS

BY MICHAEL LUU



Going to the dentist can invoke fear and anxiety. This prevalent misconception is something that can be changed and is important for dentists to address while practicing. Part of the fear of dentistry may be due to factors outside of the control of practicing dentists, such as movies depicting dentistry in a negative light. However, by paying attention to sensory experiences and the delivery of information, these stereotypes can be broken. Tangible improvements to patient care can be achieved and both patients and dentists will benefit.

The importance of helping patients relax is often overlooked in general dental offices, having productivity prioritized. However, taking the extra step to reduce a patient's anxiety can lead to the dentist being able to more efficiently care for that patient. According to DentistryIQ, being mentally stressed can lead to physical changes, such as, “clenching muscles, fists in balls, and crunching inward.” These physical reactions may be either conscious or unconscious, but nevertheless, they may hinder treatment. For comparison, the characteristics of a relaxed patient are more “relaxed, open and loose”, which results in anesthesia working faster and improved vision in the mouth (Dentistry IQ). Overall, with an increased focus on the psychology associated with dentistry, procedures can be done more efficiently and successfully.

Photo by Cedric Fauntleroy from Pexels:
<https://www.pexels.com/photo/woman-in-blue-scrub-shirt-holding-dental-tool-4269686/>

Mental struggles have the potential of manifesting into further health problems. For example, patients begin to avoid scheduling routine appointments. Avoiding dental appointments leads to worse dental hygiene overall. This can be linked to increased rates of “cardiovascular disease, diabetes, stroke, and premature birth,” according to Dr. Daneil W. McNeil, a psychology and dental professor at West Virginia University. Therefore, if dental anxiety can be reduced, trust in the dentist will increase, and patients will be more willing to show up to appointments. In the view of a dental provider, being able to help reduce the fear associated with coming to see the dentist will have a direct impact on patients’ overall health, not just oral wellness.

Anxious patients experience nervousness, rapid heartbeat, and sweating. These feelings result in the aforementioned changes associated with mental stress. One way anxiety can be reduced is to take into account the way humans psychologically perceive a physical location. According to APA, because dentists are typically desensitized to certain sensory information such as the smell and sound of the office, they don’t notice how patients may perceive certain things. Scents such as the smell of a tooth being drilled and the sound of a drill can cause anxiety and make patients uncomfortable. An office can play music to drown out the noise of a complex root canal and use an oil diffuser to suppress the smell of teeth being drilled.



The way information is conveyed is key to fostering trust between the dentist and the patient. Attributing the success of dental procedures to medicine is a fallacy dentists should try to avoid, according to APA. Some dentists try to reassure patients by discussing medicine or sedatives that they will provide during or after a procedure. However, this has the unintended effect of causing patients to “ ascribe their success to medication,” (APA). If patients continue to believe in this fallacy, they may start to respond to other procedural recommendations by stating that they can not undergo the procedure unless they have a certain medication or sedation along with it (APA).

Patients with various accommodations rarely enjoy visiting the dentist, and only attend to pursue good oral hygiene. By emphasizing the importance of biopsychology in the office and information delivery, dentists can help patients feel consistently comfortable. This tactic will increase the success of procedures, resulting in higher efficiency for dentists and better results for patients.

TOPICAL GEL TREATS GUM DISEASE BY FIGHTING INFLAMMATION

BY
NIEL
PATEL



Periodontitis, commonly known as gum disease, is a widespread oral disease affecting many adults in areas including gum inflammation and loss of teeth. According to the Center for Disease Control and Prevention, 47.2% of adults older than 30 years have gum disease to a certain extent. These numbers only increase with age. To exemplify, around 70.1% of adults older than 65 years have some form of gum disease.

So how is gum disease caused? When a person has poor oral hygiene and does not brush their teeth on a frequent basis, bacteria begin to colonize on their teeth, eventually forming plaque. The progression of the disease is characterized by the hardened plaque that eventually develops into calculus under the gum line. This results in severe inflammation of the gingiva, or the gums, which can ultimately lead to the loss of teeth.

The early onset of gum disease is referred to as gingivitis. At this stage, some symptoms include mild bleeding and swollen gums although it is common to see a lack of symptoms. With proper care and treatment, gingivitis can be reversible. However, the second stage, periodontitis, has serious consequences. To illustrate, the inner layer of the gum pulls away from the teeth and forms open pockets. Alongside this, periodontitis promotes bone loss which can ultimately lead to the loss of teeth. Some risk factors for periodontitis include smoking, chewing tobacco, taking certain medications, suffering from immune system disorders, or having a family history of gum disease.

The procedures currently used to treat periodontitis all require surgical intervention. This includes incising the gum line in order to access the roots of the teeth for cleaning, completing bone grafts when there is bone loss, and performing gum grafts to replace lost tissue. Luckily, with the discovery of a new topical gel by researchers at NYU College of Dentistry, gum disease can be treated less invasively. On top of this, this gel simultaneously prevents disruption of the oral microbiota and prevents bone loss, and reduces inflammation.



HEALTHY GUMS

PERIODONTITIS



The topical gel research is based on a specific molecule, succinate, found in metabolism. Yuqi Guo, an associate research scientist at NYU, and her colleagues discovered a positive correlation between levels of succinate and inflammation. This assertion was observed in mice acting as test subjects for the study. The study confirmed succinate's relationship with gum disease when genes that code for the succinate receptors in mice were "knocked out", resulting in lower levels of inflammation.

Using this discovery, the researchers developed a gel that would inhibit succinate receptors. When applied to human gum cells, the gel decreased inflammation and bone loss. This prompted the scientists to directly apply the gel to mice. The results of the study showed that mice who received gel treatment had overall lower levels of inflammation and half as much bone loss than that of the control. Amazingly, the study also found that bacteria within the Bacteroidetes family, known for their propensity to cause the inflammation, did not survive after the gel was applied.

While the results of the study are encouraging, there are still many complex differences between an animal model and humans. The NYU College of Dentistry researchers are currently investigating the full effects of the gel on humans and looking into any harmful side effects. Their goal is to develop gel strips that can be easily applied on the teeth at home. If this finding is successful, it will be a revolutionary discovery in the field of periodontics and will pioneer the path for noninvasive care for gum disease.



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