Anxiety: Dentist Marisol Tellez Merchan (left) and psychologist Eugene Dunne both teach at Temple University's Maurice H. Kornberg School of Dentistry, where they have led efforts to study and address dental anxiety.

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A Promising Tool For Overcoming Dental Anxiety

Researchers in Philadelphia, Pennsylvania, are testing a cognitive behavioral intervention with the aim of removing a common obstacle to dental care.

BY CHARLOTTE HUFF

Sometimes patients with dental anxiety talk about their fear of needles, says Elizabeth Konneker, a research coordinator for dental anxiety research at Temple University, in Philadelphia, Pennsylvania. "Or they will talk about past experiences of pain, or just not be being so trustful that the anesthetic will be enough to manage their pain during a visit."

Other patients, Konneker says, provide "vivid descriptors of the sound of the drill or the smell of the drill, and they'll talk about how that bothers them." Or, she says, "for a lot of people, they just don't like the sensation of people being so close to their mouth for so long. Because it is very personal."

Konneker has been screening patients to determine whether they are eligible for and interested in participating in a $2.59 million National Institutes of Health–funded study led by researchers at Temple's Maurice H. Kornberg School of Dentistry. The goal: to find out whether a cognitive behavioral intervention, delivered through a series of videos immediately before an appointment, can ease this common form of anxiety that drives patients away from vital care.[1]

An estimated 15 percent of people worldwide report dental anxiety, women more frequently than men, according to a meta-analysis of thirty-one studies published in 2021.[2] Another study, which involved 308 US patients and was published in 2017, found that 19 percent of patients described moderate to high dental anxiety—sufficiently high to benefit from anxiety-reducing measures during treatment.[3] The most cited reasons were a fear of the dental experience, a previous negative experience, the cost of treatment, a gag reflex, and fear of bad news.

When patients delay or skip appointments because of anxiety, it sets up a cascading effect, says Eugene Dunne, a psychologist and an assistant professor in the Department of Oral Health Sciences at the Kornberg School of Dentistry. "We think about that in terms of the fear avoidance cycle related to dental anxiety—that anxiety and that fear can lead to delay or avoidance in dental care," he says.

"As a result, when you do ultimately go to seek dental care, it might be emergency care and more invasive treatment is going to be needed," he explains. "Thus, what they experience is more pain, more issues when they're actually at the dentist. So as a result, that cycle continues because it's being reinforced."

Moreover, the fallout doesn't stop with tooth and gum damage. Stained

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Photographs by Liam Nielsenshultz

and missing teeth can interfere with everything from landing a job to engaging in social situations where smiling contributes to building rapport. Twelve percent of US adults who reported not getting a job in the prior year because of problems with their teeth also described having dental fear, according to a survey of more than 5,000 adults conducted in 2021 by the CareQuest Institute for Oral Health, a nonprofit organization in Boston, Massachusetts. Hispanic, Black, and Asian adults were more likely to report fear compared with White adults.[4]

Meanwhile, anxious patients are caught in a bit of a treatment gap, says Marisol Tellez Merchan, a dentist and associate dean for research at the Kornberg School of Dentistry.

Psychologists and other mental health professionals have developed various approaches, including cognitive behavioral therapy, to treat symptoms of anxiety. But those clinicians are far removed from the dentists who care for patients in their offices. Even in dental schools, psychologists are often not part of the faculty, Tellez says.

"I think that the training in behavioral sciences in dental school has always been very minimal," Tellez says. At most, she notes, "dentists in general practice may have received some training regarding relaxation techniques and breathing exercises."

The patients treated by the faculty and students at Temple University's dental clinics are primarily Black and Hispanic, with roughly half covered by Medicaid and nearly a fourth lacking any insurance coverage, according to Tellez. Patients may drive as long as an hour to get care. Temple, which also has tuition revenue, often provides the nearest affordable option, with sliding-scale rates for uninsured people, she says.

Dunne and Tellez, co–principal investigators of the study, are among a small cadre of researchers around the country who are developing interventions to better assist patients. Temple's research pairs up the expertise of dentists and psychologists to study whether exposing patients to their fears in advance through a series of videos—using a psychological approach called exposure therapy—can ratchet down their angst.

The ongoing study, which plans to enroll 450 patients, assesses patients' anxiety before the intervention, immediately after the dental appointment, and for the next several months, as well as checking how well they stay up with appointments.[5]

Therapy: At Temple University's School of Dentistry, Marisol Tellez Merchan (left) and Eugene Dunne are testing a computer-based intervention that incorporates several cognitive behavioral techniques, including exposure therapy, to treat patients' dental anxiety.

"I hope that we can see a reduction in anxiety and fear," Tellez says. "I want to see that somehow that reduction led them to maybe miss fewer appointments during the course of the next twelve months. And that overall, they are more satisfied with the dental experience that is being provided at the school."

'The Big Thing To Know'

Dental anxiety can occur in a range from mild nerves all the way to dental phobia, which must meet the criteria for diagnosis in the *Diagnostic and Statistical Manual of Mental Disorders*, Fifth Edition, says Cameron Randall, a psychologist who studies dental anxiety at the University of Washington School of Dentistry, in Seattle.

Along that range, a portion of patients still visit the dentist and can cope relatively well, although they may be apprehensive about a particular procedure or a certain aspect of the visit, says Randall, an assistant professor in the Department of Oral Health Sciences at the dental school. But higher degrees of fear can affect care, he says.

"It would be apprehension or nervousness about aspects of dental treatment that results in a stress response and worry that is distressing or impairing [for patients]," he says. "And behaviors that are impairing, such as avoidance of dental treatment."

Not even half of US adults had seen a dentist in the prior year in 2017–18, according to data from the American Dental Association (ADA) Health Policy Institute. The rates were highest among White adults (47.8 percent) compared with Asian adults (38.9 percent), Black adults (28.6 percent), and Hispanic adults (27.8 percent).[6]

Anxiety is by no means the only reason patients stay away, Randall notes—affordability, insurance coverage, and other access challenges all can pose significant barriers. But a negative experience at the dentist can reverberate. Randall cites a study looking at dental anxiety in Canadian adults, which found that half of those with dental anxiety described it as starting in childhood, and an additional 22 percent pointed to its origins in adolescence, typically tied to a painful, frightening, or embarrassing experience.[7]

Laura Seligman, a child psychologist who is studying dental anxiety and phobia prevention in the Rio Grande Valley in Texas,[8] says that ideally, a child has a series of easy checkups before they develop a problem that requires treatment. In South Texas, fear and anxiety are common, in part because people delay care for financial reasons, as well as a broader perception in the local community that the dentist's role is for treatment only, says Seligman, a professor of psychological science at the University of Texas Rio Grande Valley in Edinburg.

In other words, Seligman suggests, the benefits of regular preventive care extend beyond simply maintaining good oral health. It also builds familiarity and comfort with the act of visiting the dentist. "If you wait to bring your child for treatment, then by the time they need treatment, there's already a problem," she says.

At that point, the child is likely experiencing pain, which builds a negative association with dental care, Seligman says. "Or they're going to be

embarrassed because the dentist is going to say things like, 'Why did you wait so long?'"

But Mirissa Price, an ADA spokesperson, maintains that dentists coming out of school have gotten training in strategies to ease anxiety, starting with not shaming patients. Patients can be loath to admit that fear has kept them away from care for years, Price says. "The big thing to know is that dentists are not going to be judgmental."

Once dentists know about a patient's anxiety, they can ask about the underpinnings and related triggers, such as the sound of the drill or a fear of the unknown, says Price, an assistant professor of pediatric dentistry at the Meharry Medical College School of Dentistry, in Nashville, Tennessee. During training, dentists are taught to talk patients through stages of a procedure before they start, such as explaining what they will do and demonstrating the instruments involved. Some dental schools have social workers on staff, who teach guided imagery or breathing techniques, Price says.

Fearful patients can be given medication, including valium or nitrous oxide, which has a short-term calming effect and can help patients get through a procedure while still experiencing it, Price says. Sedation should be avoided when possible, as it has a stronger effect and can cause short-term amnesia, she says.

"Once you start introducing sedation medicine through an [intravenous drip] or through an oral injection, then the patient becomes less aware of what's happening," she says. "The problem with that is the patient is not building the coping tools necessary to be successful at the next appointment. Then they will just leave the dentist with the same fear that they came with."

Although a prior negative experience is a major risk factor, not all negative experiences necessarily lead to anxiety, Randall says. Other factors can contribute, he adds. Some people are more prone to anxiety. Others may be more vulnerable because they have a lower ability to accept and cope with emotional or physical distress—referred to as distress tolerance—or have a higher need for control.

There can be physical contributors as well, Randall says. For instance, a patient may have a lower pain threshold or a strong gag reflex. Randall was involved with research published in 2014 in the *Journal of the American Dental Association* that found that 7.5 percent of 478 dental patients surveyed recalled gagging always or nearly always. The more frequent the gagging tendency, the more likely the patients were to describe dental-related fear, the researchers found.[9]

Dental anxiety can occur in a range from mild nerves all the way to dental phobia.

Patients also can absorb negative messages through the broader culture, picked up from friends or family or comments though the media, Randall says.

"Here a good example is root canal therapy," he says. "It has a really bad rap. Lots of people are very worried about having a root canal. And yet lots of those people have never had one. So how do they become fearful of this procedure?"

Other patients may be dissuaded by racist encounters, says Dunne, the Temple co–principal investigator. He points to a study published in 2022 in the *Journal of Public Health Dentistry* that surveyed nearly 300 pregnant Black women living in Appalachia. More than one-third described at least one instance of racism they experienced when getting dental care, such as not being listened to, not being treated with respect, or receiving poorer service compared with others.[10]

"Shame and blame in terms of a dentist maybe coming across as, 'Well, you're not taking care of yourself,'" Dunne says, describing the study's findings. "Patients reporting not feeling heard and listened to. As a result, you can imagine: 'Why would I want to go back to this person?'"

Dentists can ask patients to complete a brief anxiety screening before their appointment. One common tool, which Temple researchers use in their study, is the Modified Dental Anxiety Scale.[11] It rates degrees of anxiety based on five questions, such as, "If you were about to have a tooth drilled, how would you feel?"

When speaking with patients about their prior dental history, Temple dentist Kelly Holst asks whether they've had any prior difficulties with needles or related to anesthesia. Sometimes patients admit to fears. Other times it's readily apparent, such as when she asks them to open their mouth, says Holst, who treats patients at Temple but is not part of the ongoing research.

"Patients will kind of grip the handles on the side [of the dental chair], almost white knuckling a little bit, you could say," Holst says. "Maybe sometimes they won't open quite as wide. Some tend to be a little jumpier if they're nervous about what you're going to do."

Holst sympathizes with how a sense of lack of control, for patients who are already nervous, can be difficult. "Really, the act of reclining a patient in a dental chair, shining this light in their face, we're putting the patient in a very vulnerable position," she says.

She's adopted a mix of strategies. If patients prefer, they can sit up straight in the chair during the procedure. Before Holst begins, she explains what she's doing, using pictures to, for example, explain how an implant procedure is performed. When providing care, she describes what she's doing before taking the next step. She reminds patients that they're not powerless. She explains, "Something that I always say 100 percent of the time is, 'We're going to get started now. If you have any pain or sensitivity, or if you just need a break, raise your left hand.' I say, 'You're in control of this appointment.'"

'Face That Anxiety'

The computer-based intervention that Temple researchers use in their study, which they previously validated,[12] incorporates several cognitive behavioral techniques, including exposure therapy, Dunne says. This cognitive behavioral approach has been used to treat other anxieties, such as fear of flying, he says.

The idea is to work with the patient to develop a hierarchy of fear, so to speak, Dunne says. If the most acute fear involves cruising along at 30,000 feet, the patient works up to that scenario through a series of exposure sessions. They may begin by holding a stuffed replica of an airplane or watching a cartoon of a plane flying, he says. At each level of

exposure they work on developing strategies to cope, such as deep breathing techniques and more helpful thoughts.

The approach helps patients learn to be present with their anxiety even as it peaks, so that they can experience weathering it and reaching the other side, Dunne says: "Facing that fear, letting that anxiety peak, using those skills to face that anxiety."

In the Temple study, participants select the three procedures that cause them the most angst from a list of six: cleanings, x-rays, cavity fillings, root canals, injections, or tooth extractions. Then patients watch a series of videos about those three procedures, starting with the least-feared one.

For instance, over the course of several root canal videos, the procedure is depicted from various vantage points, beginning at more of a distance from the patient actor in the chair and then moving gradually closer. During the procedure the narrator's running commentary suggests ways in which the patient can readjust their thoughts about pain, lack of control, and other anxieties to more calming, coping thoughts.

The final root canal video is filmed from the perspective of the patient sitting in the chair, looking upward at the dentist. The video runs a monologue of the patient's internal thoughts and efforts to reframe them. In one scene the patient frets that the dentist may do something wrong but then reminds himself that a mistake is highly unlikely and that it's far more possible that the root canal will eradicate his pain.

The study, which had enrolled 376 patients by early December 2022, has divided participants to be followed into three groups. In one group, participants complete the intervention before their appointment, with the help of someone with graduate-level psychology training. In the second group, the intervention is administered by a dental assistant who has received some cognitive behavioral training. In the final group, which is the control group, participants watch a nature video instead.

The in-office approach misses a key group of patients that everyone involved in dental anxiety wants to reach: those who never show up in the first place.

Participants' anxiety level is assessed shortly after the dental appointment, as well as one month and three months later. Their appointments also are followed for the first year to see how many appointments the patients schedule, whether they keep them, and other changes in patterns, Tellez says. Participants receive a total of $175 in gift cards for completing all of the assessments.

The researchers hope that the study, which Tellez anticipates will publish results in 2024, shows that a dental assistant can deliver the intervention to patients just before their appointment. Dental assistants would be ideal for the task, as they're already involved with educating patients, Tellez says. The researchers are creating training manuals, and the intervention has been translated into Spanish to better reach Hispanic patients, although the study is only being conducted in English, she says. The goal is to disseminate the intervention more widely to dental schools and dental practices, but broader implementation would require additional funding.

Even so, the in-office approach misses a key group of patients that everyone involved in dental anxiety wants to reach: those who never show up in the first place. "Getting the patient through the door is the biggest barrier that we have," says Price, with the ADA.

Teledentistry, which some dental schools now offer and which has become more common during the pandemic, can connect with patients suffering at home, Price says. Although treatment can't be delivered through a video screen, the dentist can walk patients through a plan, including showing pictures and providing other explanations that hopefully convince them to get care, she says. "We have seen patients who are sitting at home trying to use gummy bears to pull teeth out of their mouth because they are in so much pain," she says.

Similarly, Temple researchers hope that their computer-based intervention can one day be completed before a patient arrives. Ideally, an online or app-based version of the exposure therapy tool could be tested that, if effective, would assist patients who are terrified to cross the office threshold, Dunne says.

"Then we could make this available to patients, to prevent them from canceling appointments or not scheduling at all," he says. "That would ultimately be one of the goals of where we want to go with this research." ■

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