

Incisal edge



WELLNESS EDITION

FALL 2021



Student Research Group
University of Texas Health Science
Center at Houston School of Dentistry

In This Issue

ABOUT INCISAL EDGE

Incisal Edge is a student-run, research-focused newsletter from UTHealth School of Dentistry's Student Research Group. A play on "the cutting edge," the title stands for the intersection of dentistry, research, and storytelling.

Meet



PRESIDENT
Ali Al Hatem '23



**GOVERNMENT
AFFAIRS AND
ADVOCACY**
Hannah Balcezak
'24



SECRETARY
Laura Arsto '23



HISTORIAN
Stephanie Gilbert
'24

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Several metaphors exist about wellness. One I have heard of is the swimming duck. Even though it appears as if the duck glides through the water peacefully, we do not know what goes on under the surface. The duck may be kicking through turbulent waters, but all that remains hidden from view. The metaphor emphasizes that what we know about each other is limitedly based on what we choose to present. More often than not, we preferentially see others as success stories, but focus on the failures in ourselves.

Everyone benefits from routine practice of wellness, even when we do not feel like we “need” to. Just like we instruct healthy patients to maintain oral hygiene, we should also train ourselves to practice mental health hygiene as a preventative measure. This is the reason why we asked all our contributors of this issue of Incisal Edge about what they do for wellness. I am so proud that every article relates to wellness in some way, and I hope you enjoy reading it as much as we did in making it!

“The fairest thing in the world is the sun. Regardless of latitude, every place on Earth, throughout the year, receives equal spans of day and night.” - A Sun (2019)

EDITOR-IN-CHIEF
Ryan Lee '23

A Letter From the Editor

The Editorial Board

Access at IncisalEdgeDigital.wordpress.com



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Want to get involved? **Incisal Edge** is always looking for interested writers! We also want to hear from you!

Please send requests and feedback to ryanlemminglee@gmail.com

What is the AADOCR?

LAURA ARSTO
Secretary '23



THE AMERICAN ASSOCIATION FOR DENTAL, ORAL, AND CRANIOFACIAL RESEARCH

(AADOCR) is an international professional community that boasts a 3,000 number membership. Dr. Chun-Teh Lee serves as the president of the AADOCR Houston Section. During his leadership, AADOCR offered the Small Grants Program, available to faculty and student researchers at UTSD. The group also sponsored seminars from guest speakers, such as one recently given by Dr. Yong-Hee Chun from San Antonio.

In this article, Dr. Lee shares how student researchers can engage with the wider research community through participation with AADOCR.

What is AADOCR and what does it do?

“The simplest explanation is that we are trying to make people feel engaged in dental and oral research. That’s why we have events with speakers, table clinic, and research showcase. Eventually people will want to become members, and get more resources from us. For example, they can listen to some presentations, or they can apply for some awards.”

What is your role?

“I am the president of the AADOCR Houston Section. I have to work with other officers like the vice president, secretary and treasurer, and the previous officers. We work together to host events and promote award applications like the AADOCR Houston Section Small Grants program. I have to make sure members enjoy the events we put on.”

What do they do for government affairs and policy making?

“AADOCR and ADEA work together to advocate for oral, facial, and dental research funding. They make sure politicians appreciate the importance of research, especially dental research, so then they can pass a bill to fund those projects.

“That is also why AADOCR actually needs some money from all the members. In addition to hosting an annual meeting, they have to hire people who are experts in advocacy. They have to advocate the bills or policies, and

this is really important.”

How can students be more involved with AADOCR?

“For dental students, the most important thing is to participate in research through the Student Research Showcase and Table Clinics. All the people in Student Research Group are also members of AADOCR-H. It means we have financial support to give out awards and invite speakers. For Table Clinics, AADOCR gives out awards for the resident students and hygiene students. For the showcase, awards are given by the Office of Research. So the two groups help each other. AADOCR officers also serve as judges.

“I hope in the future, we can have more interactions with the Student Research Group. Maybe SRG can invite us to give some presentations. We really hope to inspire more students to pursue research careers in the future. Probably 99% of dental students will practice outside in the future. I will say only a few will stay in academia, and even fewer will be involved in research. So in general, we really want to promote this.

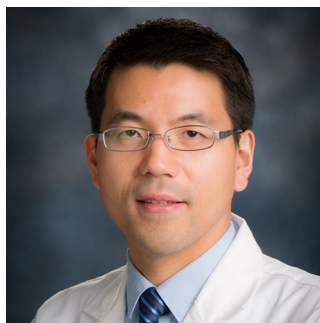
“Hopefully, we inspire some people, especially minority groups. This is actually not just in dental research, but research in general. We want to have more researchers from minority groups. We should have more representation and diverse members.”

What has been your favorite part of your role as president for AADOCR Houston Section?

“I would say the most exciting thing is when I see like a lot of applicants for the Small Grants Program, or see a lot of attendees for a presentation. And of course, I want to see more members. It’s not really about the money, but about people feeling that research is important. That is really the most important thing for me and for the all the officers. We will try to have more events in the future. But last year due to COVID, there were too many restrictions, and people could not come to our events. We could not invite any speakers. The restrictions just recently lifted, so hopefully people can attend more events next year.

“I also really appreciate the Student Research Group for publishing the newsletter. Once people read these articles, they can appreciate the importance of research. So thank you for your work, too.” ■

“Hopefully, we inspire some people, especially minority groups... We should have more representation and diverse members”



Chun-Teh Lee, DDS, DMSc, MS is Associate Professor and Director of Periodontics Research

WELLNESS SIDEBAR

“I try to keep a work-life balance. I feel relaxed when I play with my kids or go out with family.”

INTERSECTION OF

DENTAL AND GENERAL

MEDICINE:

Infective Endocarditis

GUEST WRITER

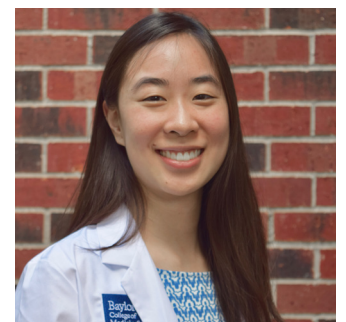
Sarah Ho '24

PHYSICIANS do not often ask about patients' dental health, but maybe they should start. Research shows that poor dental health adversely affects overall health. Diseases that have been linked to poor oral health include cardiovascular disease, pregnancy and birth complications, pneumonia, and endocarditis. The reverse is also true. Some diseases such as diabetes mellitus, HIV/AIDS, or osteoporosis negatively affect oral health. Both dentists and physicians should remember that they are part of their patients' care team, and that some health issues require cooperation from both providers.

Infective endocarditis: a textbook example

One classic example regarding dental health in relation to overall disease is infective endocarditis. Infective endocarditis is when the inner lining of the heart, including the valves, becomes infected. While rare, affecting 10 people out of 100,000, it is associated with poor outcomes. Up to 30% of patients affected by infective endocarditis die within 30 days. The bacteria can multiply and destroy the heart valves, preventing sufficient cardiac function. The bacteria can also form clots that block blood vessels in the brain and other important organs. The organisms that cause endocarditis are commonly members of staphylococcus, streptococcus, and HACEK organisms (haemophilus, aggregatibacter, cardiobacterium, eikenella, and kingella). The causative species of endocarditis associated with dental procedures is *Streptococcus viridans*. While not the most common cause of infective endocarditis, dental procedures that involve manipulation of the gum tissue can spread organisms from the mouth to the bloodstream, and subsequently, infect the heart.

Some physical exam findings that physicians watch out for include fever and anemia. When you look at a patient's hands and feet, keep an eye out for Osler nodes, Janeway lesions, and nail-bed splinter hemorrhage. When you see these signs, send the patient to the hospital to get checked out. If clinicians suspect endocarditis, they will run some tests. The patient should show changes to the endocardium on an echocardiogram, and after taking two different blood cultures positive for bacteria, the patient will then be diagnosed with infective endocarditis.



PHYSICAL FINDINGS OF IE

- Osler nodes are tender raised lesions on fingers and toe pads
- Janeway lesions are small, painless red lesions on the palms and soles
- Nail-bed splinter hemorrhage

OVERALL HEALTH

Welcome to our guest column, where we feature an article written by a student from medical school. Following UTSD's vision, the guest writer takes on a topic that connects oral and overall health. The goal of this column is to make the connection ever more salient here in the Texas Medical Center.

About the writer

Hi, I'm Sara Ho! I'm currently a second-year medical student at Baylor College of Medicine. I'm a Houston native, and I went to Rice University for undergraduate. For wellness, I enjoy cooking and playing with my cat, Cosmo!

Antibiotic prophylaxis or not?

While endocarditis is a condition of concern, not all patients should be prescribed antibiotics prophylactically. Only certain populations at higher risk of infective endocarditis should be given these drugs. One of the lessons I have learned in medical school is to only prescribe what is necessary. Every medication comes with potential side effects. So for healthy patients, the risks of taking antibiotics before every dental procedure outweigh the benefits. We should also try to avoid giving unnecessary antibiotics to avoid antibiotic resistance. According to the American Dental Association (ADA), these adult patients should be prescribed antibiotics before dental procedure:

- people with prosthetic heart valves
- people with a history of infective endocarditis
- people with a heart transplant with abnormal valves
- adults with unrepaired congenital heart disease that results in cyanosis or defects near prosthetic devices

For pediatric patients, antibiotic prophylaxis is needed if they need a dental procedure while:

- having an unrepaired cyanotic heart defect
- a repaired congenital heart defect with residual problems
- six months after the repair of a congenital heart defect with prosthetic material.

Working together

Dental and medical associations have been working together to develop practice guidelines for preventing infective endocarditis. In 2012, the American Academy of Orthopaedic Surgeons and the ADA published a systematic review and guide on preventing infection of orthopedic implants in patients undergoing dental procedures. Recently in 2021, the American Heart Association updated its original guidelines, collaborating with members of the ADA. When dentists and physicians work together and combine knowledge, we better our patients' health.

Infective endocarditis is a serious disease that causes systemic problems. Preventing this disease in at-risk populations involves the patients' dental care team as well as their medical team. Endocarditis serves as a good example for why dentists and physicians should work together. Healthcare is most effective when it is comprehensive care addressing all parts of a patient's health. Providers from both fields should make sure that their patients are seeing both physicians and dentists for their health. I look forward to working with all you dentists in the future! ■

“When dentists and physicians work together and combine knowledge, we better our patients' health.”

QUESTION FROM USMLE RX

A 46-year-old man presents with a temperature of 38.6°C (101.5°F). He was fine 2 weeks ago, but started feeling poorly a few days ago after a dental examination. Physical examination reveals tender raised lesions on the beds of his fingers and toes, and painless, erythematous lesions on his palms and soles. The most likely causative organism will have which characteristics?

- A) Gram-positive cocci, catalase-negative, β -hemolytic, bacitracin-resistant
- B) Gram-positive cocci, catalase-negative, β -hemolytic, bacitracin-sensitive
- C) Gram-positive cocci, catalase-negative, α -hemolytic, optochin-resistant
- D) Gram-positive cocci, catalase-positive
- E) Gram-positive, weakly acid-fast rod

Steps to stress **LESS**

KAVITA MISRA
Writer '25



AS STUDENTS journey through dental school, it is important to find ways to cope with difficulties. Maintaining personal wellbeing is one of them. Managing stress, finding realistic expectations, and learning at your own pace are important skills.

Managing your stress

Finding ways to manage the stress that comes with a challenging education is an integral part of maintaining wellness. Some therapeutic ways include:

- engaging in exercise
- spending time with friends
- building a daily schedule
- staying organized
- making time for hobbies.

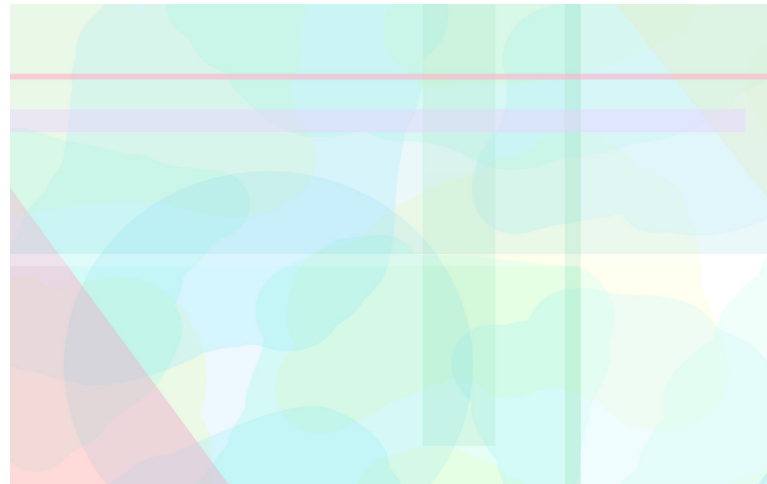
Everyone is different, so each person should find what works best for them. It is easy to get caught up in school work, so you must remember that your wellness comes first above all. A trick I have used through my first year is building a schedule that blocks out time

for different activities. I make time for going to the gym, studying, eating lunch, reading a book, and even something as simple as calling my family. It certainly has worked well for me. You should find ways to de-stress and prioritize activities necessary to maintain your mental and physical wellness.

Take a few minutes out of every day to do these things, and it will make an immense positive impact on your life. Fill your day with positivity and appreciation for where you are today. You may feel that you have no time for anything but school, but this only results in a counterproductive mindset. You must set time aside for stress-relieving activities. For example, if you had a hobby prior to dental school, you should try continuing it. Maryam Baldawi '25 said, "I was able to use my hobby of calligraphy to take a break from research at the school. I believe hobbies are important because they help me focus and enjoy a task that I am not being assessed on."

Artwork by Amber Hua '23

"Realize that our classrooms are filled with some of the most impressive students in the nation, and then remind yourself that you are one of them"



Finding realistic expectations

Managing expectations of ourselves is an integral aspect of dental school and is necessary to promote our mental health. Some students are used to being at the top of their class and making high A's. Although this may have been a realistic expectation in the past, we must remember that as we progress professionally, our education becomes more challenging. Take a step back to realize that our classrooms are filled with some of the most impressive students in the nation, and then remind yourself that you are one of them. This is one of the ways I am able to manage my expectations and be proud of myself. If you feel that you are struggling, remember that no one is alone and remind yourself to try your best. Plan realistic goals for yourself as you go through your journey in dental school.

Learning at your own pace

It is easy to compare ourselves to others and forget the challenges we had to overcome in our journey to end up where we are now. However, there is little sense in feeling inferior from comparing grades, study habits, or hand skills. Everyone has their own set of strengths and weaknesses, and no one is perfect. Instead, we should use this opportunity to learn from each other, teach each other, and grow together as colleagues. Everyone learns differently and uses different methods to study. We should focus on how we can better improve each other. If you are struggling through different aspects of dental school, seek support from professors, counselors, and peers. You will benefit by learning new techniques and skills to succeed.

Tips for student researchers

With school already a challenge for most students, adding research to the mix can cause more stress. Student researchers should focus on managing their time to balance both school and research. The same ideas mentioned earlier apply here, too. Make a schedule with time blocked out for certain activities to balance your activities. Remember that it is not a sign of weakness to ask for advice. We all learn together and benefit from one another. Engage in stress-relieving activities to stay healthy and mindful. Joseph Green '25 said, "Research during the summer was stressful, but making new friends throughout the process made it worth it. When I got stressed out, I would work out and hang out with friends." ■

FUTURE potential of Antibody- Mediated Osseous *Regeneration*

WRITER

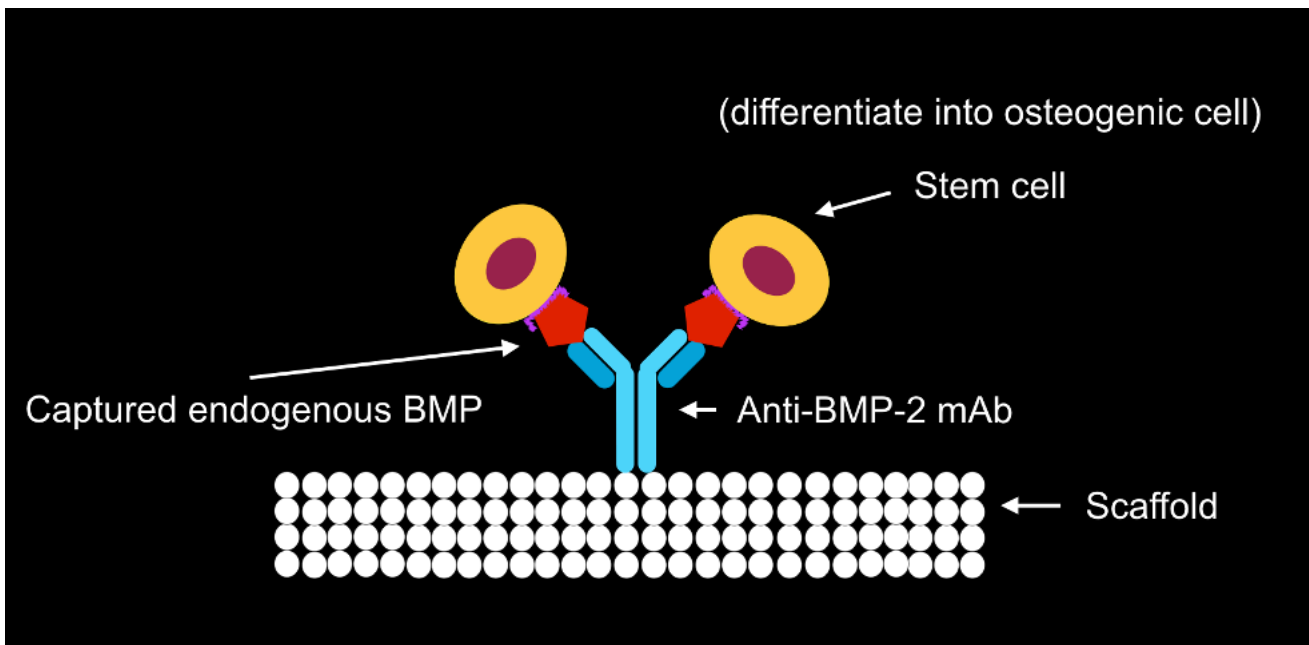
Brandon Pham '25



BONE LOSS of the intraoral cavity can be due to several reasons including congenital disorders, periodontal disease, or trauma. Autologous and allogenic bone grafts have been used in the regeneration of bone, but these methods have limited potential. Bone tissue engineering is an alternative that recruits growth factors and progenitor cells to induce bone formation. The traditional method involves recombinant growth factors from an exogenous source. But there may be a novel way. Dr. Seiko Min and his research team have developed an approach to bone tissue engineering that uses antibody-mediated osseous regeneration (AMOR) in conjunction with endogenous bone morphogenic protein (BMP).

Focus of research

Clinicians and researchers are working hard to discover what types of protein or growth factor facilitate bone regeneration. One of the most studied proteins is BMP which functions as a signal that induces mesenchymal stem cells to differentiate into osteogenic cells. Everyone has endogenous BMP in their system, but not enough for clinical purposes. Bone regeneration requires large quantities, made possible in the recombinant form which needs to be made exogenously in the lab. Based on the literature, recombinant BMP works like endogenous BMP but there are a number of



Printed with permission courtesy of Dr. Min

disadvantages. One is the lower cellular activity of the recombinant BMP compared to the endogenous type. Since the cellular activity is so low, it must be applied at higher concentrations. This makes it more expensive and more prone to complications such as inflammation-induced airway problems.

The AMOR technique bypasses these problems by using endogenous BMP. To be successful, it needs to capture and localize BMP to the bone defect. To overcome this challenge, Dr. Min and his group created a specific monoclonal murine antibody that can capture the endogenous BMP, specifically BMP-2. The anti-BMP-2 antibody is incubated with a scaffold such as a bone graft or collagen sponge for 24 hours. This immobilizes the antibody and prevents it from floating around in the systemic circulation. Then this antibody-scaffold material is applied to the area of the bone defect. Those antibodies capture the endogenous BMP-2, attract mesenchymal stem cells, and initiate differentiation into osteogenic cells which induces bone regeneration.

Current discussions and future endeavors

Dr. Min has so far demonstrated the effectiveness of AMOR in mice studies. He hopes to apply the same technique in human clinical trials. However, safety must be determined first. The insertion of antibodies coming from a different species can lead to immunogenic problems due to rejection of foreign antibodies. Therefore the team has been working on several animal models using chimeric anti-BMP antibodies. In this design, different regions of the murine antibody swap places with its human counterpart. The goal is to achieve as much similarity to the endogenous source as possible, thus minimizing immunologic problems. Current animal models suggest the effectiveness and safety of AMOR. Thus, clinical trials will depend on approval and

review from the Food and Drug Administration and funding by the National Institute of Health.

Pursuing academic research and balancing wellness

Dr. Min loves that the field of periodontology is always evolving. While periodontal research is already mature, he believes there is always room for improvement. According to him, dentists should always be looking to innovate and share knowledge with society to ensure a better future.

“Continuing to learn about and teach periodontics are things I love,” said Dr. Min. “That is why even when facing difficulties, I can keep coming back to it. My passion for the field makes it feel like I am not working. I am having fun when I do research, see patients and students, and perform procedures. So it feels I’m doing a hobby, which is the most important part. If you are feeling any negativity or not enjoying something, you are not going to be really productive. That is why my big advice would be find something that puts you in the mindset you really want and you really love.” ■

“My big advice would be find something that puts you in the mindset you really want and you really love.”



Seiko S. Min, DDS, PhD, MS is Assistant Professor in the Periodontics and Dental Hygiene department

Writing to COMMUNICATE

EDITOR-IN-CHIEF

Ryan Lee '23



I WENT to a well-known, hipster grocery chain, and there I found in bold letters: “FLUORIDE-FREE TOOTHPASTE.” Quack toothpaste is nothing new, but something still took me by surprise. Nothing on the package claims “antibacterial effect” or some other health benefit, besides some vague notion that all ingredients are “natural.” But it did not need to. The toothpaste aisle sandwiches between the organic fruit and herbal supplement sections. The implication is that any of these items are equally good for your health.

Oral health communication

Misinformation is both ubiquitous and subtle. Patients get exposed to more oral health “information” throughout their daily lives than from the dental office. Therefore, oral health communication from dentists must happen both inside the office and outside. While unlikely to influence grocery stores, dental professionals can tap into places where they already have presence: schools, houses of worship, and of course, social media.

Science communication

Clear public health communication is hard enough for long-established facts. Communicating new science, when many questions remain unanswered, kicks the difficulty to the next level. As the pandemic has taught us, the challenge comes from two fronts: one, to communicate newfound facts, and two, to communicate the method of science itself. This second part deals with odds ratios and levels of evidence. How much methodology to include is an editorial choice. A story that dives deep may be more accurate, but limits itself to a narrow audience. More commonly, a general audience would learn a simplified version of the story, and just trust its source. And so, science requires careful communication, especially

by people with credibility.

Neurologist and psychiatrist Dr. Jonathan Howard wrote an article in *Evidence-Based Medicine* titled: “Reader Beware: Certain doctors may not be anti-vaccine, but they need to be fact-checked as if they are.” This was written back in August 2021, during the heated discussion over vaccinating adolescents, timed with the incoming school season. Howard points out claims made by several doctors that underplay the severity of COVID-19, while overplaying the adverse effects of the vaccine. As Howard shows, these misleading claims can easily be fact-checked, but often they are not. Doctors rely on their credentials, which automatically gives credibility to their claims. Howard wrote: “If I didn’t have the facts at my fingertips, these doctors’ arguments to not vaccinate all eligible children might have been very compelling.” The point is, what healthcare providers say makes a real-world difference. Dentists and their messages are no exception.

Writing to communicate

I hope I have made the case for both oral health and science communication as important skills to learn for dental students. These skills must extend beyond the proverbial chairside “oral hygiene instructions.” We must communicate to a bigger audience and make the message stick. In short, we must publish our message for people to encounter during their daily lives. And to do that, we must be able to write.

How well-equipped are dental students in writing for a public readership? To answer that question, let us think about the occasions when we are asked to write. Students are no strangers to writing assignments. But treating them as homework, students write with the expectation that only the grader will read it. Not only so, but students can also expect that the grader is required to do so, no matter the presentation. And so, there exists no motivation for students to make the material interesting to read. But in the real world, the writer-reader relationship is precisely reversed. Just because you write it, it does not mean people will read it. If you want to win influence, then you must first win their attention.

Writing assignments do not reflect reality, and so the best way to learn is to just practice. Luckily, dental students have several opportunities to write for publications for this purpose. Some examples include ASDA’s *Contour* magazine and ADA’s *JADA Plus*. Consider this too the mission statement of *Incisal Edge* newsletter. Proudly student-led, *Incisal Edge* serves as a training ground for practical writing in the real world. Here, writing exists where presentation matters. And so dear reader, if my arguments sound at all compelling, then please, consider volunteering to write for us. ■

“What healthcare providers say makes a real-world difference. Dentists and their messages are no exception.”

WELLNESS SIDEBAR

When I want to relax, I watch movies. I try to watch everything I can. A good movie makes me see the world differently, and shapes the way I think. I also like to write out my thoughts, which is an exercise I find particularly helpful for wellness.

ARTIFICIAL INTELLIGENCE

and *furcation* *involvement:*

An unexpected duo

WRITER

Ashley Mathew '23



THE 11TH ANNUAL Student Research Showcase marks the culmination of work students have done since the Summer Research Program. For Omkar Patel '24, a panel of judges awarded him Best Abstract Award for the category “Applications of Radiology.” Titled “Using Machine Learning to Diagnose Radiographic Furcation Involvement of Molars”, the poster represents Patel’s work under the mentorship of Dr. Jennifer Chang. Here, he shares his experience of doing research.

Can you give an overview of your research topic?

“In this project, we created a machine learning algorithm that can detect furcation involvements in mandibular and maxillary molars. Overall, the algorithm was fairly accurate as it was able to detect buccal furcation involvements with 85% accuracy and interproximal furcation involvements with 80% accuracy. This model shows a lot of promise and may be a useful tool to help general dentists to diagnose furcation involvements at an early stage.”

How did you contribute to the research project?

“Over the summer, I annotated 727 radiographs for their furcation involvements. These annotations were then compared to the annotations created by the machine learning algorithm. After that, I calculated test sensitivity, specificity, positive and negative predictive values, and the accuracy of the CNN model as a whole.”

What is the award that you won? And how does one win this award?

"I won the award for "Best Abstract" in the radiology division. All the summer research projects are divided into different categories based on the subject of their research. After that, all the abstracts were evaluated by a panel of judges, and one project from each division was chosen to win this award. Each of us were also given a slot for oral presentations."

What made you choose this topic?

"Ever since I was young, I have always been interested in the topic of artificial intelligence when it came to things such as robots and cars. I was excited to get on board with this project because I wanted to get a preview of how artificial intelligence is used in healthcare. I also thought this project would be a great way for me to increase my data analytical skills and improve my ability to analyze radiographs."

What has been the most challenging part of research?

"The most challenging part of the research was the annotations of the radiographs in the summer. It was my first time looking at radiographs, so it took me a while for my eyes to get adjusted. Luckily, my mentor reviewed every annotation that I did and taught me a lot of great tips!"

What would you tell other students who are interested in research at UTSD?

"I would encourage anyone remotely interested in research to join the Summer Research Program. In my opinion, getting involved in research is great because it allows you to become a mini-expert on a topic, forces you to think critically, allows you to interact with faculty outside of regular classes, and allows you to contribute to the greater body of scientific knowledge."

What are your future plans for the research?

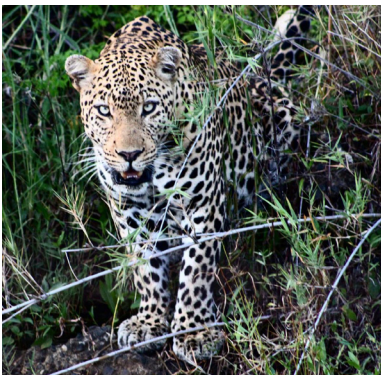
"My future plans for the research would be seeing if we could improve the accuracy of the algorithm. I think there are several ways that the machine itself can be expanded in order to better detect furcations. I am looking forward to more clinical applications with the software." ■

WELLNESS SIDEBAR

I like to go out and explore nature. During the parts of the semester when we are really busy, I like to find different outdoor study spots, like by a swimming pool or the Japanese garden at Hermann park. During my breaks, I love to travel and I am super into wildlife photography!



"I was excited to get on board with this project because I wanted to get a preview of how artificial intelligence is used in healthcare."



Omkar Patel '24 won "Best Abstract" in the radiology division at the 11th Annual Student Research Showcase. His wildlife photography is pictured top and left.



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