OHSU School of Dentistry
Anthology
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Message from the School of Dentistry Anthology Team

Samyia Chaudhry, D.M.D. and Christina Truong, D.M.D.

Welcome to the sixth issue of the OHSU School of Dentistry Anthology, or SODA. This issue celebrates the intellectual rigor, clinical curiosity and scientific contributions of our dental residents.

You'll find a curated collection of research abstracts and reflections on research experiences from residents across five advanced dental specialty programs: endodontics, oral and maxillofacial surgery, pediatrics, orthodontics and periodontics.

At the heart of these research efforts lies a shared commitment to evidence-based dentistry, a foundational principle that guides clinical decision-making across all specialty programs at OHSU.

By integrating the latest scientific evidence with clinical expertise and patient-centered care, residents in endodontics, oral and maxillofacial surgery, pediatrics, orthodontics and periodontics are trained not only to treat but to question, innovate and lead.

This anthology reflects that ethos: each abstract is a testament to the rigorous inquiry and scholarly engagement that defines OHSU's approach to specialty education and its dedication to advancing the future of oral health.

This issue highlights abstracts that explore pivotal topics in dental research, including comparative analysis of repaired traumatic Le Fort injuries, Oregon dental professionals' role in promoting HPV vaccination, the influence of host immunity on oral microbial dysbiosis in mice, the utility of parental pain risk screening in pediatric patients with oral discomfort, the impact of various sugar substitutes on the growth and biofilm formation of *Streptococcus mutans*, effect of different protocols on temperature changes, bone density, implant stability and biomechanical properties with triangular implants, potential association between cannabis use and periodontitis and correlation between temperature variation and number of implant osteotomy preparations performed in human cadaver tibiae.

Additionally, this issue features insights into the research journeys of three residents from the advanced programs in endodontics, orthodontics and pediatric dentistry.

We extend our heartfelt thanks to the SODA editorial team: senior editor, Ron Sakaguchi, D.D.S., Ph.D., M.B.A.; senior communicator, Rhonda Morin, APR, M.L.S.; and Pam Pierce, M.L.S., M.S., OHSU Library. Their invaluable contributions and steadfast support have brought this anthology to life.

Looking ahead, our winter edition will spotlight the emerging research voices of our first-year dental students as they embark on their scholarly journey through the CDEN course at the OHSU School of Dentistry. We invite you to submit your work for consideration of the upcoming issue. Your continued engagement and enthusiasm for the School of Dentistry Anthology are deeply appreciated.

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Comparative analysis of predicted and actual outcomes of repaired traumatic Le Fort injuries utilizing virtual planning

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Background. The use of computer-assisted surgery, or CAS, has become popular for various reconstructive procedures including craniomaxillofacial traumatic injuries. CAS can restore traumatized anatomy to predicted premorbid state to improve surgeon accuracy and efficiency. Various adjuncts can be fabricated during this process including stereolithographic models, patient-specific implants, as well as guides and splints to assist with repair. The objective of this study was to compare the predicted maxillary position to the actual maxillary position in patients with traumatic Le Fort I fractures treated with CAS.

Materials and Methods. Patients who were presented with traumatic Le Fort injuries to a level 1 trauma center in Portland, Oregon, from July to December 2024, treated by a single surgeon were enrolled. CAS was used to fabricate stereolithographic models and occlusal splints with restored anatomy and occlusion using medical grade CT scans. Stock plates were pre-bent using the perfected stereolithographic model to limit time between presentation and operative repair. In every case, the maxilla was completely mobilized prior to fixation. Predicted maxillary position was compared to the actual postoperative maxillary position by overlaying three-dimensionally reconstructed CT scans and analyzing various cephalometric landmarks. This overlay was completed by the engineer at 3D Systems who assisted with planning the surgical procedures.

Results. Four patients with traumatic Le Fort fractures were included in the pilot study. Preliminary data demonstrates anatomic reduction of the maxilla was achieved with this CAS protocol involving pre-bent plates and occlusal splints. The molar position was more accurate than the central incisor position in all patients. The most accurate reduction anteriorly at the incisors was achieved in the patient where hybrid arch bars were used

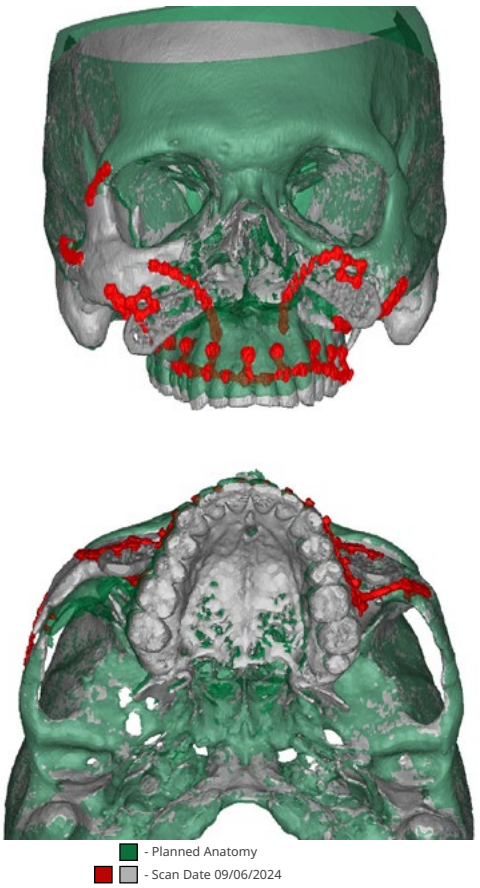

Figure 1. Overlay of predicted anatomic reduction using CAS (green) and actual position (gray).

as opposed to intermaxillary fixation screws. The patient with poor dentition, as well as the patient who was left orally intubated postoperatively, had less accurate reduction.

Conclusions. The use of CAS in treatment planning for traumatic Le Fort injuries to generate stereolithographic models and occlusal splints can simplify reduction and fixation of these fractures to restore premorbid anatomy. Occlusal splints fabricated using medical grade CT scans without an intraoral scan or impression were found to be well-adapted to the dentition and useful in positioning the maxilla intraoperatively. We suggest this protocol be used whenever possible.

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Dysbiotic oral microbial community selected by mouse immune system

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Introduction. The oral cavity has over 700 species of bacteria. Certain species of bacteria in the mouth are responsible for the two most common bacterial diseases: dental caries and periodontal disease. Streptococcus mutans excrete acid which can erode tooth enamel, lead to dental caries and compromise pulpal tissue in an acute and chronic inflammatory process. Porphyromonas gingivalis is one of the most highly enriched species in periodontal disease. Species such as S. mutans and P. gingivalis act as commensals at low relative abundance with deleterious effects if allowed to bloom.

Methods. Biofilms are inoculated in quadruplicate into pre-reduced SHI in wells pretreated with mucin and grown anaerobically at 37 degrees Celsius. At the end of the growth period, planktonic bacteria are discarded, and wells are rinsed with water. Biofilms are then stained with 0.1% crystal violet for 10 minutes at room temperature, then rinsed with water and dried. Primer sets were designed to target genes that were both 1) unique in the target strain versus the other MPI strains, and 2) present in >90% of the published genomes for the species.

Results.

1. We have isolated individual strains and developed enrichment protocols for the less prevalent species found in our inflammophilic community.
2. We have shown that the individual strains isolated coalesce into a community, and we have identified and removed from consideration a species that does not normally make its home in the oral cavity. We have also demonstrated direct interaction between several members of the community.
3. We have developed a qPCR panel that can be used to follow the changing proportions of species across the selection process and will be a tool for further investigations.

Conclusion. We have created and characterized potential inflammophiles isolated from an abscess forming bacterial community. The remodeled community is highly reminiscent of species found in human dental abscesses. Here this community is able to synergize resulting in a persistent abscess. This model will be used to further understand how this type of dysbiotic community evades the mammalian immune system and may give us clues as to the relationship between inflammatory disease and the oral microbiome.

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The effects of conventional, undersized and osseodensification protocols, on temperature changes, bone density, implant stability and biomechanical properties on bone-to-implant surface over a triangular implant

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Introduction. Peri-implant bone loss due to surgical trauma may be associated with bone overheating while preparing the osteotomy site or compression necrosis due to high insertion torque values. Two different surgical protocols are proven to increase initial stability; the undersized osteotomy, or U, and the use of osseodensification burs, or OD. The purpose of the study was to evaluate the effects of conventional, undersized and osseodensification protocols on bone density, implant stability, temperature changes and biomechanical properties on bone-to-implant surface, using a triangular implant.

Materials and method. Ten tibial plateaus from five fresh frozen human cadavers were sectioned and maintained at 37 degrees Celsius. Three drilling protocols were used for the placement of 30 triangular implants at 1000 RPM: 1) Clockwise, or CW, group (control group), 2) CW undersized group, or U, 3) Counterclockwise, or CCW, group.

Temperature changes (ΔT) were recorded after each osteotomy in all three groups. Insertion torque values, or ITV, resonance frequency analysis (implant stability quotient, or ISQ), and dumping capacity analysis (implant stability test or IST) were measured. Eighteen osteotomies were sent for histological and histomorphometric analyses. Additionally, nine osteotomies were prepared and sent for bone density evaluation through micro-CT.

Results. ΔT was significantly affected by the OD group and the CCW rotation. When drills and groups were combined, ΔT was affected significantly by all drill sizes of the CCW group. ITV was significantly higher at U and OD groups. ITV was not significantly affected by the rotation of the drills. No

differences were found between groups when ISQ and IST were evaluated. Cortical bone densification was observed from micro-CT images only at the OD sites.

The “spring back” effect was noted in the OD images through the narrowed osteotomy diameter and adaptation of surrounding bone to the installed spacer. Bone to implant contact, or BIC, was significantly higher at the OD group, where closer trabecular spacing was noted with thicker trabeculae. ITV was moderately associated with BIC at the OD group.

Conclusions. ΔT was significantly affected independently by the CCW rotation, and synergistically by the drill sizes and CCW rotation. ITV was significantly affected by the undersized and the OD protocols and was moderately correlated with BIC at the OD groups. ISQ and IST were not affected by the different protocols and did not identify osteotomies with lower ITV. Densified bone around the CCW osteotomies was confirmed with the use of micro-CT scanning. A significantly higher BIC was noted at the OD group.

The association between cannabis use and periodontitis: A retrospective study

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Background. Clinical data on reported cannabis use affecting the periodontium and dental implants is understudied. The limited published literature has found increased probing depths and clinical attachment loss in patients who report cannabis use. There is no current published literature on cannabis use and its association with peri-implantitis. The purpose of this study was to determine if there is an association between reported cannabis use and periodontitis or peri-implantitis.

Methods. A retrospective study was performed on 2,923 patients whose charts were randomly selected from the OHSU pre-doctoral clinic database. The patients were historically and currently non-tobacco users and not diabetic. Of the 2,923 patients, 1,617 were female and 1,306 were male. Reported cannabis users included 496 patients, compared to 2,427 non-cannabis users. The patients were evaluated on their periodontal diagnosis and whether they reported cannabis use. All cases required documentation of their age, gender and ethnicity.

Results. The prevalence of periodontitis increases as age increases. There is an increased prevalence of cannabis users in the male population. There is an increased number of cannabis users in the younger decades of life. This study found an increase in presence of gingivitis in cannabis users compared to non-users and an increased prevalence of periodontitis in non-users, conflicting with the hypothesis. No statistically significant results were found amongst the implant groups suggesting no identifiable associations between cannabis users and peri-implantitis.

Conclusion. This study found a relationship between periodontitis and non-cannabis users. There were findings of increased inflammation (or gingivitis) with reported cannabis use. This study supports previously published data with trends of increased prevalence of periodontitis in males and periodontitis increasing as age increases.

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Temperature changes (ΔT) in correlation with number of implant osteotomy preparations in human cadaver tibiae, comparing osseodensification burs in clockwise versus counterclockwise mode

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Introduction. Osseodensification, or OD, burs are used in two different modes: (i) clockwise, or CW, and (ii) counterclockwise, or CCW. The purpose of the study was to evaluate the ΔT during the preparation of implant osteotomies in a four-way interaction.

Materials and methods. Three hundred and sixty osteotomies were prepared at 12 mm depth in human cadaver tibiae. The ΔT values were calculated similarly to the method used in two previous studies carried out by our group. Four different variables were evaluated for their effect on ΔT.

Results. A four-way interaction was observed in the CCW mode, allowing for 1000 RPM to have the least effect in both modes. However, in the CCW mode the use of 3.0 mm and 4.0 mm burs after 23 osteotomies showed a statistically significant increase in ΔT, and significant chatter, compared to the CW mode. In the CCW mode, the ΔT was increased significantly as the diameter of the burs increased in 800 and 1200 RPM.

Conclusions. The synergistic effect of drills' diameter, CCW mode, 800 and 1200 RPM, and bur usage (over 23 times) had a significant effect on ΔT, which exceeded 47 degrees Celsius. One thousand, or 1000 RPM, had the least effect in both modes. The 3.0 mm and 4.0 mm burs in the CCW mode drastically increased the temperature and produced significant chatter.

Parental pain risk screening in pediatric dental patients with oral pain

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Purpose. The dental diagnostic process is challenging as parental reports of young patient pain are often unreliable. The aims of this study are to examine 1) the associations among child pain and caregiver factors, and 2) the utility of screening measures in characterizing child pain risk.

Methods. A cross-sectional study was completed surveying caregivers of children seeking dental care with oral pain. Caregivers completed a REDCap survey reporting on caregiver and child demographics, medical and dental histories, pain experiences and cognitions/responses about child pain.

Results. Findings from the Parent Risk Screening Measure, or PRISM, categorized 50% of parents as high risk. Results of the Pediatric Pain Screening Tool, or PPST, categorized 70% of children as low risk. There was a positive correlation between PPST total score and parent stress ($P<.05$) and a negative correlation between PRISM total score and parent stress ($P<.05$) and child pain ($P<.05$).

Conclusion. Findings highlight associations among parent factors and pain in youth seeking care for oral health. The results of this study will help dentists understand the utility of screening tools in the dental setting to identify families at elevated risk and the caregiver factors that are associated with child dental pain to inform targeted interventions.

Exploring factors influencing Oregon dental professionals' engagement in HPV vaccination

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Purpose. The purpose of this study is to understand the challenges and motivators influencing dental residents' engagement in HPV vaccination advocacy and administration.

Methods. This qualitative study used the Theoretical Domains Framework, or TDF, to examine barriers and facilitators affecting dental providers' HPV advocacy and administration. One focus group was conducted with pediatric and orthodontic residents recruited from the OHSU School of Dentistry. Semi-structured TDF-based questions guided the discussion. Transcripts were analyzed using directed qualitative content analysis in NVivo, with codes derived from TDF domains.

Results. Pediatric and orthodontic residents demonstrated foundational knowledge yet reported limited training and confidence in vaccine administration and related patient conversations. While they acknowledged their role in preventive care, many still viewed medical providers as primarily responsible for vaccine delivery. Additional barriers included logistical constraints within dental clinic settings and concerns about negative consequences. Despite legislation in Oregon allowing dentists to administer vaccines, residents expressed concern about the social stigma and hesitancy surrounding HPV vaccine notably in the region.

Conclusion. The study identified a range of facilitators and barriers influencing dental providers' engagement in HPV vaccine advocacy and administration. Targeted interventions addressing multiple TDF domains—particularly knowledge, professional role, environmental context and social influences—may strengthen dental providers' capacity to engage meaningfully in HPV vaccine advocacy and delivery.

Effects of sugar substitutes on *Streptococcus mutans* biomass formation and growth dynamics

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Background. Dental caries is a global health issue frequently associated with *Streptococci mutans* and the consumption of fermentable carbohydrates. The impact of some sugar substitutes, like allulose, needs to be investigated.

Methods. *S. mutans* UA159 subcultures were grown to (OD_{600} ≈ 0.5) in Todd Hewitt Broth, or THB, and brain heart infusion, or BHI. Bacterial subcultures were added to media supplemented with 1% sugar (sucrose, fructose) or sugar substitutes (erythritol, xylitol, allulose) to assess biomass and growth dynamics, then incubated for 16 hours in 5% CO_2. Biomass assessed using crystal violet assay (OD_{562}). Growth curves were obtained using OD_{470} measurements. Statistical significance determined using Student's t-test ($p<0.05$).

Results. For biofilm; allulose, erythritol, xylitol and fructose all exhibited significant decreases in biomass ($p<0.001$) compared to sucrose control. Allulose produced significantly less biomass as compared to fructose ($p<0.001$). Only sucrose and fructose produced visible biofilms. All sugar substitutes resulted in significant growth defects ($p<0.001$) starting at 2-2.5 hours as compared to cell only control while fructose showed a significant increase starting at seven hours ($p<0.001$).

Conclusion. Sugar substitutes significantly reduced biomass formation and impacted cell growth compared to sucrose and fructose controls. These findings may suggest minimal cariogenic potential through decreased plaque formation in the presence of sugar substitutes. Further studies are crucial to evaluate the effects on polymicrobial and combined sugar conditions. It's important because it may suggest that sugar substitutes like allulose and erythritol could reduce the risk of tooth decay by reducing plaque formation and limiting bacterial growth.

Research experience of an endodontic dental resident

Faisal Shakir, D.D.S.

My journey into biological research began well before residency. As an undergraduate at Virginia Commonwealth University, I worked at the Massey Cancer Center focusing on cancer cell motility. That experience—formulating questions, designing experiments, troubleshooting methods and interpreting data—culminated in an honors thesis defense and the conferral of an honors degree in biology.

Following graduation, a role at the National Cancer Institute at the National Institutes of Health as a clinical data manager provided firsthand exposure to how rigorous study design translates into patient-level impact. I was building clean datasets, standardizing definitions, and safeguarding data integrity to ensure trustworthy and reproducible conclusions.

Today, as an endodontic resident at the OHSU School of Dentistry, my research efforts center on the immunomodulatory potential of Triple Antibiotic Paste, TAP, in regenerative endodontics. Regenerative endodontic procedures, or REPs, have redefined approaches to treating endodontically involved teeth. Cellular biology—the choreography of how cells sense, communicate and adapt—naturally aligns with the investigative focus of regenerative endodontics. The motivating question is simple and significant: beyond antimicrobial action, can TAP also modulate the immune system's inflammatory response to enhance the predictability of regeneration?

This inquiry holds clinical relevance across multiple dimensions. Infections within the root canal system not only harbor microbes but also disrupt host signaling, intensify endotoxin-driven inflammation and create a hostile environment for tissue regeneration. If TAP, even at precisely calibrated doses and exposure durations, can attenuate harmful inflammatory signaling or shift immune responses toward healing, standardized REP protocols may become more consistently effective.

At minimum, uncovering these mechanisms can clarify the rationale behind specific clinical steps, enabling evidence-based refinement rather than rote repetition. At best, findings may inform dosing, timing or adjunctive strategies that improve consistency and broaden access to regenerative care.

OHSU offers an exceptional environment for this work. Within the School of Dentistry, mentorship in study design, assay selection and critical interpretation support ongoing development. A dedicated laboratory on the 7th floor of the Skourtes Tower at the Robertson Life Sciences Building provides infrastructure for controlled experimentation. Access to advanced platforms—including 3D-printed "Tooth-in-a-Chip" models—enables simulation of canal microenvironments and assessment of protocol variations.

Equally vital, the OHSU library ensures decisions are grounded in current biomedical literature. This ecosystem shortens the distance between clinical questions and testable experiments: mentors refine inquiries, the lab facilitates rapid prototyping and the library aligns each step with existing knowledge and emerging gaps.

Looking forward, maintaining an active, part-time role in research alongside private practice remains my priority. Contributions to multi-center collaborations, mentoring students and residents in project design and integration of outcomes tracking into daily care represent tangible ways to support the specialty.

Research fosters curiosity and accountability, ensuring treatments evolve with evidence and that new evidence is generated. Above all, this commitment reflects a core purpose: improving patient outcomes through thoughtful, compassionate and rigorous care.

As regenerative endodontics continue to evolve, the goal is to help shape its future—one protocol, one dataset and one patient at a time. With OHSU's mentorship, laboratory resources and culture of inquiry, the foundation is being built to translate basic scientific insights into clinical impact. We strive for more predictable procedures, improved long-term outcomes and responsible, evidence-based care for all patients.

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Research experience of a pediatric dental resident

Shelby Cansler, D.D.S.

Current research centers on pediatric dental pain aim to understand how diagnostic and clinical features correlate with pain response. Pain remains one of the most common reasons children seek dental care, yet its assessment is complicated by developmental limitations in communication. Unaddressed dental pain can impact daily functioning, emotional health and long-term perceptions of dental treatment.

A current project I am working on explores whether clinical and radiographic findings align with a child's reported pain and evaluates the adequacy of these tools for accurate diagnosis and management. Inspiration for this work stemmed from a former OHSU resident's exploration of the topic, highlighting its relevance to everyday pediatric practice.

Originally from Seattle, I currently serve as chief resident for the School of Dentistry Pediatric Dental Residency program for second-year students at OHSU. My academic training includes undergraduate and dental degrees from the University of Washington.

My research experience has consistently focused on public health, beginning in college and continuing through dental school. As an undergraduate in the Department of Occupational and Environmental Health Sciences within the School of Public Health at the University of Washington, my involvement in a project on earthquake emergency response planning led to the development of a post-disaster plan to ensure access to clean water and sanitation.

During dental school, my participation in a study assessing silver and fluoride levels in children following silver diamine fluoride application provided deeper insight into research methodology and the intersection of public health and clinical dentistry.

As a pediatric resident, I find that OHSU provides a robust environment for resident research, offering faculty mentorship, peer collaboration and access to comprehensive academic and clinical resources. The program supports research through structured timelines, clear expectations and guidance in study design, data analysis and scholarly writing. This work holds promise for enhancing evidence-based pain assessment in pediatric dentistry, contributing to more accurate diagnoses, improved treatment planning and reduced unnecessary interventions.

Throughout this process, key competencies are being refined, including critical thinking, project management and evidence-based practice. Additional expertise is being developed in data interpretation, scientific writing, interdisciplinary collaboration and effective communication of findings. These skills are essential for delivering informed, high-quality care.

The goal is to treat a diverse pediatric population, many of whom experience dental pain, with a comprehensive understanding of how to assess and manage that pain—considering social, medical and behavioral factors—to promote lasting improvements in pediatric oral health.

Research experience of an orthodontic dental resident

Zixin (Kira) Chen, D.D.S.

Previous research experience

My research journey began during high school summers, starting with the University of California San Diego's Research Scholar program, where I had my first proper laboratory experience. I barely knew what I was doing, but my mentor's patience helped me through my first poster presentation. The following summer, I worked on a fun geology project through a science internship at the University of California, Santa Cruz. My mentor welcomed me into her home in the Santa Cruz mountains, and I'd follow her around to gather data on the Elkhorn Slough in Monterey and to local colleges where she lectured. She taught me how to paddleboard and spot sea otters, and I owe her so much for being a kind, understanding and fun mentor.

Kira Chen, D.D.S., with a chirp source attached to a boat. University of California at Santa Cruz Science Internship Program, 2014.

The summer after high school graduation, I took part in research at a dermatology-related pharmaceutical company. My supervisor liked me enough to rehire me the following summer at his startup, where I ran assays on cosmetic products and even traveled to Singapore to meet our partnering dermatologist. I was able to shadow him and a plastic surgeon.

During college, I joined the Joanna Jankowsky Lab in the Department of Neuroscience at the Washington University in St. Louis. I learned how to harvest and cryosection mouse brains and watched retroorbital surgeries and electrophysiology tests. The lab became like family. When I got hit by a car while biking to the lab, every single lab member, including my principal investigator, visited me while I was in the emergency room. I've remained very close friends with many of them through college, dental school and residency.

Mentor Ana García-García, B.Sc., Ph.D., left, working with Kira Chen, D.D.S., right, in the field as part of an University of California at Santa Cruz Science Internship Program, 2014.

In dental school, I conducted TMJ research at the Embree Lab at the Columbia University Irving Medical Center. My postdoctoral colleague was a brilliant and sweet prosthodontist from Japan, and my principal investigator inspired me with her effortless balance of practicing orthodontics and research.

Current research

Growing up in Fremont, California, and attending a high school that was about 90% Asian— where most students were first-generation Americans

or immigrants—I experienced a culture shock when I left, even in cities as diverse as New York and Houston. Through conversations with friends from different ethnic backgrounds, I was intrigued by how dramatically our esthetic preferences could differ. Even among Asian Americans, opinions varied, and I wondered if preferences correlated with the depth of cultural ties and immersion.

This curiosity led me to my master's thesis project, titled "A comparison of contemporary cultural preferences of laypeople from America vs. East Asia in cross-race and same-race soft tissue profiles." In orthodontics, while we may have quantitative diagnostic criteria like cephalometric values and objective goals like proper occlusion, an equally important aspect is the patient's personal esthetic goals. These preferences are also undoubtedly shaped by their cultural background. I want to understand how race and culture influence our esthetic preferences, whether it's ourselves, people who look like us, or those who look different from us.

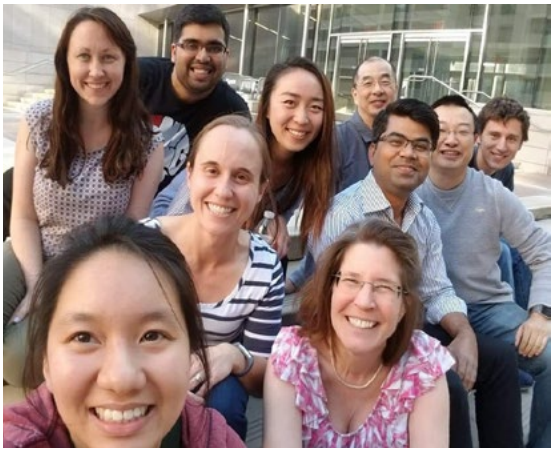
My goal is to become an orthodontist who is culturally sensitive and focused on what makes each individual patient happy with their outcome. However, this broad, nebulous sentiment needed to be refined into a proper research question. We narrowed our scope to focus on differences in lip protrusion preferences, which is something that orthodontics can influence.

Due to the extensive work required to manually edit multiple image iterations, we kept our initial study focused on East Asian and Caucasian models.

Clinical relevance is significant: this research aims to refine orthodontic care with population-specific reference points, moving us beyond a one-size-fits-all approach. In our increasingly diverse society, understanding cultural esthetic preferences can lead to better patient satisfaction, more personalized treatment plans and ultimately improved outcomes. Rather than applying universal beauty standards, we can provide culturally sensitive care that respects and incorporates patients' backgrounds into their treatment goals.

Program resources

Our orthodontics program requires each resident to assemble a research committee of three to five faculty members. My principal investigator, Bruce Havens, D.D.S., Ph.D., is incredibly smart with a dry dad's sense of humor. His genuine passion for teaching and care for his residents is



The Jankowsky lab family, 2020.

Mildred (Millie) Embree, D.M.D., Ph.D., left, the principal investigator, Ikue (Iku) Tosa, D.D.S., Ph.D., center, and Kira Chen, D.D.S., right, in a lab, 2023.

palpable. While I had diverse and extensive research experiences, I had always assisted on other people's projects. I had no idea how to write IRB protocols or develop precise research questions from scratch. Havens, who began teaching after completing his orthodontics residency and earning his doctorate from the University of Connecticut, guided me from my project's initial concept to implementation. I'm lucky to have someone like him helping me.

OHSU School of Dentistry assistant professor, Howard Freedman, D.D.S., affectionately called "clinic dad" by the residents, wears multiple hats and serves as our sunshine, "fun uncle" and clinic director. His experience developing research surveys and expertise in profile esthetics perfectly aligned with my project. He taught us the Andrews analysis, a profile diagnostic tool by Larry Andrews, D.D.S.

OHSU School of Dentistry professor, Lyndie Foster Page, B.D.S., Ph.D., the final committee member, proved instrumental in connecting me with the right people to distribute my survey. With her help, we achieved an impressive 80%+ response rate from the first- and second-year OHSU School of Dentistry classes.

My OHSU School of Dentistry chair, Laura Iwasaki, D.D.S., M.Sc, Ph.D., and advanced education program director, Jeff Nickel, D.M.D., M.Sc, Ph.D., encouraged me to reach international contacts. Satoko Matsumura, D.D.S., Ph.D., M.D.S. my radiology professor from dental school, introduced me to Andrew Nalley, D.D.S. OMFR, Diplo. ABOMR at Hong Kong University. Andrew Nalley was incredibly responsive and provided insightful feedback to help improve the survey. We just received IRB approval from Hong Kong University and will distribute the survey to their dental students.

OHSU offers excellent research resources, including librarians who helped me conduct a comprehensive literature review, and seminars on tools that enhance and accelerate the research process. I felt thoroughly supported by my program and the school's resources.

Plans and professional benefits

I'm excited to expand this project internationally and develop iterations for different races and ethnicities. Given our world's diversity, these results can help orthodontists provide more culturally sensitive patient care. While I'm not certain exactly what the future holds, I would love to stay involved in academia. The literature review and research experience have shaped my approach to patient care. The skills I'm developing will be helpful for patient care throughout my career, ensuring that I can provide personalized care that respects the diversity of the communities I serve.

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(SoDA, D.M.D., oral communication, November 2023)

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Reference to a website:
5. Zika travel information. Centers for Disease Control and Prevention. January 26, 2016. Updated August 11, 2016. Accessed June 18, 2019. https://wwwnc.cdc.gov/travel/page/zika-travel-information

Reference to software:
7. Coon E, Berndt M, Jan A, et al. Advanced Terrestrial Simulator (ATS) v0.88 (Version 0.88). Zenodo; 2020, March 25. https://doi.org/10.5281/zenodo.3727209

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[data set] 5. Oguro, M, Imahiro, S, Saito, S, Nakashizuka, T. Mortality data for Japanese oak wilt disease and surrounding forest compositions, Mendeley Data, v1; 2015. http://dx.doi.org/10.17632/xwj98nb39r.1

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