



Dr. Vaibhav Gandhi
2026 Orthodontic Faculty Development Fellowship Award
Medical University of South Carolina

Short Biography

Dr. Vaibhav Gandhi is an Associate Professor and Assistant Program Director in the Department of Orthodontics at the James B. Edwards College of Dental Medicine, Medical University of South Carolina, SC. He received his dental and orthodontic training in India before completing a second orthodontic residency and Master of Science in Dentistry at the University of Louisville, KY. He subsequently held academic and research appointments at the University of Connecticut and the University of Nebraska Medical Center. Dr. Gandhi is also a Diplomate of the American Board of Orthodontics.

Dr. Gandhi's academic career focuses on integrating clinical orthodontics with translational research. His scholarly interests include salivary biomarkers, orthodontic biomechanics, cone-beam computed tomography (CBCT), finite element analysis, and biomaterials research. As an educator, he is committed to evidence-based orthodontic education, mentoring residents and students, and advancing scientific inquiry that improves patient care.

Brief Description of the Project

Clear aligner therapy has become one of the most widely used orthodontic treatment modalities worldwide. Recent laboratory studies suggest that aligner materials may undergo degradation during intraoral use and release microscopic plastic particles known as microplastics. However, no clinical study has directly evaluated whether aligner-derived microplastics are present in patients undergoing orthodontic treatment.

This project will provide the first in vivo investigation of microplastic release associated with clear aligner therapy. Saliva samples collected before and during treatment will be analyzed using Raman microspectroscopy, gas chromatography-mass spectrometry (GC-MS), and electron microscopy to identify and characterize aligner-derived microplastics. The findings will establish foundational evidence regarding the magnitude and characteristics of patient exposure and help guide future biomaterial development and patient safety recommendations.

Statement of How Orthodontic Education Will Benefit from the Award

This award will advance orthodontic education by introducing residents and students to emerging concepts in biomaterials safety, translational research, and evidence-based clinical decision-making. The project will provide opportunities for trainee involvement in study design, patient recruitment, sample collection, laboratory analysis, and scientific dissemination. Ultimately, the knowledge generated from this work will strengthen the

scientific foundation of orthodontic education and improve understanding of the safety profile of contemporary orthodontic materials.

Why the Foundation Is Important to the Project

Support from the AAOF Foundation is essential to the successful completion of this project. The funding will provide critical resources for advanced analytical testing, including Raman microspectroscopy, GC-MS, and electron microscopy, which are necessary to identify and characterize aligner-derived microplastics. In addition, Foundation support will facilitate research training, interdisciplinary collaboration, and the generation of preliminary data needed for future externally funded studies.

How Foundation Funding Is Expected to Benefit My Career

The AAOF Faculty Development Fellowship will play a critical role in my development as an independent clinician-scientist. The award will provide protected time to advance my research program in biomaterials safety and translational orthodontics while balancing teaching and clinical responsibilities. The preliminary data generated through this project will support future NIH and NIDCR funding applications and help establish a long-term research program focused on biomaterials, salivary diagnostics, and patient safety. Ultimately, this support will strengthen my ability to contribute to orthodontic research, education, and evidence-based patient care throughout my academic career.