



Dr. Joshua Bussard
2026 Research Aid Award
Indiana University

1. "Short" Biography

Dr. Joshua Bussard is an orthodontic resident in the Department of Orthodontics and Oral Facial Genetics at Indiana University School of Dentistry. He earned his Doctor of Dental Surgery degree from Indiana University School of Dentistry and completed an Advanced Education in General Dentistry residency through NYU Langone Hospitals in Hawaii. He then practiced general dentistry in Indiana and Michigan before completing an Orthodontic Fellowship at Indiana University while continuing to practice clinically. Following the fellowship, he practiced general dentistry in Indiana before returning to Indiana University to begin his orthodontic residency.

Dr. Bussard is committed to advancing the specialty of orthodontics through research, leadership, and collaboration. His current research investigates the effects of vibrational force applications on orthodontic tooth movement, with the goal of improving treatment efficiency through evidence-based innovation.

2. A brief description of the project

Orthodontic tooth movement (OTM) relies on alveolar bone remodeling induced by mechanical forces. Although effective, prolonged orthodontic treatment may increase the risk of adverse effects, including root resorption, gingival recession, and reduced patient compliance. Low-magnitude, high-frequency mechanical vibration has been proposed as a non-invasive adjunct to enhance bone remodeling; however, optimal loading parameters and their histological effects remain unclear.

This study aims to compare histomorphometric changes in the periodontium following experimental tooth movement under different vibrational peak loads by analyzing the effects on rats.

3. A statement of how orthodontic education will benefit from your award.

Research on accelerated orthodontic tooth movement using controlled vibrational force applications has the potential to enhance orthodontic education by strengthening the evidence base for biologically driven treatment strategies. Understanding how specific vibrational forces influence bone remodeling and tooth movement will help educators

teach evidence-based biomechanics and prepare future clinicians to critically evaluate adjunctive technologies. Ultimately, this research may support the development of standardized clinical protocols and improve the efficiency, predictability, and biological safety of orthodontic treatment.

4. Why the Foundation is important to your project

The support of the American Association of Orthodontists Foundation has been instrumental in advancing my research. This financial award helps offset research expenses, allowing me to focus on conducting high-quality, evidence-based research that will contribute to the advancement of orthodontics by investigating vibrational force applications as a method of accelerated orthodontic tooth movement. Beyond the financial support, receiving this award is a meaningful recognition of the significance of my research and reflects the Foundation's commitment to fostering innovation, supporting the next generation of orthodontists, and advancing evidence-based orthodontic care.

5. How the Foundation funding is expected to or has benefited your career.

Receiving funding from the American Association of Orthodontists Foundation has had a meaningful impact on my professional development as an orthodontic resident. In addition to providing financial support for my research, the award recognizes my commitment to advancing the specialty through scientific inquiry and evidence-based practice. The Foundation's investment has allowed me to develop essential research skills, collaborate with experienced faculty and investigators, and gain valuable experience in study design, data analysis, scientific writing, and research dissemination.

This support has also encouraged me to pursue opportunities to present my findings at professional meetings, engage with leaders in orthodontics, and establish a strong foundation for future academic and clinical contributions. These experiences have strengthened my ability to critically evaluate emerging technologies, incorporate research into clinical decision-making, and pursue lifelong scholarly activity. The AAO Foundation's commitment to supporting resident research not only advances individual careers but also cultivates future leaders who will continue to improve orthodontic care through innovation, education, and evidence-based practice.