Biomedical Research Award

Dr. Kurt Kasper, *The University of Texas Health Science Center at Houston*

Dr. Kasper holds an appointment as Assistant Professor in the Department of Orthodontics at The University of Texas Health Science Center at Houston. He earned a doctorate in bioengineering from Rice University and a Bachelor of Science in biomedical engineering from Case Western Reserve University. His research applies fundamentals of engineering, materials science, and the biosciences toward the development and evaluation of biomaterial-based technologies to meet clinical needs. He has been recognized with a variety of honors, including the Young Investigator Award of the Society for Biomaterials and the Young Investigator Award of the North American Chapter of the Tissue Engineering and Regenerative Medicine International Society.

Patients often present concern regarding the esthetics associated with fixed appliances during orthodontic treatment, which has motived considerable investment over the years in the development of "esthetic brackets." Recent advances in additive manufacturing technologies present the potential for fabrication of esthetic orthodontic brackets in-office via 3D-printing using materials cleared for intraoral use. As clinical cases of 3D-printed brackets emerge in the literature, a clear and urgent need exists to investigate key properties of 3D-printed brackets, including their mechanical and color stability as a function of time, to inform the orthodontic community regarding potential advantages and limitations. The overall objective of the present proposal is to evaluate the mechanical and color stability of 3D-printed orthodontic brackets.

As orthodontists increasingly embrace 3D-printing technologies in workflows for patient care, it is important that evidence-based resources guide them in appropriate application of the technologies to meet clinical needs. However, research to this end is not presently a high priority for funding through federal sources. Accordingly, generous support of the project through The American Association of Orthodontists Foundation (AAOF) provides crucial resources for the completion of the research and the potential publication of the findings for the benefit of the profession.

The project will involve the participation of residents and dental students, thereby enhancing their professional training and broadening their engagement in collaborative translational research. Moreover, the project will enable Dr. Kasper to build upon research previously supported by the AAOF at the exciting intersection of bioengineering and orthodontics. Dr. Kasper deeply appreciates the opportunities for continued professional mentorship and exposure to clinical orthodontics made possible through the generous support of the AAOF as he continues to expand his research program.