

Center Award

Dr. Tracy Popowics, *University of Washington*

Synopsis: Periodontal Ligament Mechanics under Orthodontic Tooth Loading: A Combined Fiber Optic Experimental and Mechanical Modeling Approach

Research investigating periodontal tissue responses to orthodontic loading holds the potential to improve orthodontic treatment through identification of optimal force ranges for bone remodeling and tooth movement. The American Association of Orthodontists has selected the University of Washington for an award to establish a research center investigating periodontal ligament strain during orthodontic loading.



This 3-year center award is a collaboration between the University of Washington and the University of Alberta and offers the exciting opportunity to integrate orthodontic and periodontic knowledge from both institutions. The principal investigator of the Center Award, Dr. Tracy Popowics, is an Associate Professor in the Dept. of Oral Health Sciences at the University of Washington School of Dentistry (UWSOD). Dr. Popowics provides expertise in the development and biomechanical function of dental tissues and will lead a team of researchers at UWSOD, focusing on the biological responses of periodontal tissues to orthodontic load. Dr. Dan Romanyk is the co-principal investigator at the University of Alberta, leading collaborative efforts in the use of fiber optic strain sensors and in modeling of viscoelastic tissues. The use of fiber optic technology is an innovative approach to measure periodontal strain and will be applied in a pig model, both in vitro and in vivo, during orthodontic tooth loading. These measurements will be utilized in conjunction with finite element and analytical modeling techniques to gain a more comprehensive understanding of PDL responses to applied loads. With expertise from both the University of Washington and the University of Alberta, this center award will address a significant gap in the orthodontic literature surrounding the measurement and prediction of PDL mechanics under applied loading.

The AAOF's support of this project is critical in providing the funds and mechanism to development a unique and leading international collaborative program. The award will benefit orthodontic education at both institutions in providing research opportunities for students interested in orthodontic research questions and orthodontic residents pursuing MSD research projects.