

Orthodontic Faculty Development Fellowship Award

Dr. Kyungsup Shin, *University of Iowa*

Biography

Dr. Kyungsup Shin is an Assistant Professor in the Department of Orthodontics at the University of Iowa. Dr. Shin received a B.S. in Chemical Engineering from Yonsei University, an M.S. in Chemical Engineering from Korea Advanced Institute of Science and Technology, a Ph.D. in Biomedical Engineering from the University of Michigan, a DMD from Harvard School of Dental Medicine, and an M.S in Orthodontics and certificate in Orthodontics from the University of Iowa. He became a Diplomate of the American Board of Orthodontics in 2016. Dr. Shin's areas of research include biomaterials and biomimetics for tissue engineering, craniofacial anomalies, cleft lip and palate, and temporomandibular joint disorders.



Project Description

Post-traumatic osteoarthritis (PTOA) on TMJ is one of the most challenging degenerative joint disorders resulting in facial asymmetry, malocclusion, and limited masticatory function. This degenerative disorder, if not intervened in a timely manner with conservative/non-surgical approaches, may require surgical procedures such as arthrocentesis, arthroscopy, discectomy, condylotomy, and/or joint replacement. However, due to its multifactorial etiology, the incidence of PTOA on TMJ related to trauma to the mandible is difficult to determine.

Fracture energy has been utilized previously as an objective method for assessing fracture severity and predicting PTOA risk in the lower extremities, but not yet in the craniofacial bones.

The objectives of this project are to validate that CBCT can be used to compute an objective fracture energy, and to characterize the range of fracture energy scores and their distribution over different anatomical regions of the mandible, which can be utilized as a predictive information for PTOA development.

Dr. Shin anticipate fracture energies will be well characterized by his research team's new methodology. Once the outcomes of this study are successfully achieved, Dr. Shin plans to expand his study to investigate potential association between the severity of fracture (i.e. fracture energy level) and occurrence of PTOA in TMJ.

Benefit to Orthodontic Education

The knowledge gained from his project could potentially be applied across a range of applications including orthodontic care for the patients with past medical history of trauma, post-traumatic craniofacial surgery, dentoalveolar bone defects, and condylar degeneration.

Importance of AAOF funding

Dr. Shin recently received the OFDFA Award from the AAOF. This generous funding by the AAOF is pivotal to his research investigations and his growth as an independent research scientist and orthodontic educator.