

Orthodontic Faculty Development Fellowship Award

Dr. Hyeran Helen Jeon, *University of Pennsylvania*

The Orhan C. Tuncay Teaching Fellowship Award

Biography

Dr. Hyeran Helen Jeon is an Assistant Professor in the Department of Orthodontics at the University of Pennsylvania. Dr. Jeon has received her DDS at Pusan National University, and Periodontics training and a MSD degree at Ewha Womans University, and Orthodontics training and a DScD degree at University of Pennsylvania. Dr. Jeon is a Korean Board of Periodontology Board certified periodontist (2008) and American Board of Orthodontics Board certified orthodontist (2014). Her main research interests are: (1) bone remodeling, (2) wound healing, and (3) maxillary expansion using temporary anchorage devices (TADs).



Project Description

Maxillary expansion has been widely used for more than 40 years to correct maxillary width deficiencies. Mesenchymal Stem Cells (MSCs) in the mid-palatal suture proliferate and differentiate into osteoblasts when the suture is expanded and therefore new bone formation occurs in the suture. However, to date, the mechanism by which stem cells sense and transduce a mechanical stimulus into a biochemical response remains undetermined. The primary cilium is a single sensory cellular extension of many mammalian cells including MSCs, demonstrating a role in cellular mechano-transduction and MSC lineage commitment. Intraflagellar transport protein (IFT) proteins are required for primary cilia biogenesis. In this study, we examine the role and mechanism of IFT proteins in MSCs during maxillary expansion using the transgenic mice.

Benefit to Orthodontic Education

Craniofacial sutures respond to different types of mechanical stimuli. While only limited information is available on the cellular and molecular events induced during maxillary expansion, the animal models described here will provide an opportunity to examine the mechanisms how MSCs sense and respond to mechanical force. This study will provide the foundation for not only orthodontic and orthopedic procedures, but also other areas of the Dental and Craniofacial Research including tissue engineering, distraction osteogenesis, and bone remodeling. In addition, MSCs have been extensively investigated for therapeutic applications in tissue engineering and regenerative medicine. Thus, understanding the role of primary cilia in regulating stem cell mechano-responses is very important, further highlighting the cilium as a potential therapeutic target to mimic the effect of physical loading.

Importance of AAOF funding

Recently Dr. Jeon has received the Orhan C. Tuncay Teaching Fellowship Award from the AAOF. This funding will be used entirely for Dr. Jeon's research support, allowing her to produce the preliminary data for future extramural grant proposals. This generous funding from the AAOF will greatly help Dr. Jeon's academic and scientific growth.