## Biomedical Research Award

## Dr. Jae Hyun Park, *A. T. Still University*

My goal as the Postgraduate Orthodontic Program Chair at A.T. Still University and as a director of the American Board of Orthodontics is to elevate the quality of orthodontic care. I am committed to giving my best effort and contributing to our profession and the advancement of clinical orthodontics. In particular, I strive to implement advanced technologies and new techniques in orthodontics based on evidence-based information. This includes publishing more than 280 scientific and clinical articles in peer-reviewed orthodontic and dental journals, including five cover pages in the AJO-DO, three cover pages in the JCO, three books, and 22 book chapters. My focus has been on topics such as cone-beam computed tomography, temporary skeletal anchorage devices (TSADs), and now in the COVID era, teledentistry, and artificial intelligence (AI) in orthodontics.

Current advancements in AI technology have improved the reliability of the information on a tooth's position and movement as communicated through teledentistry. The proposed project involves verifying the accuracy, reliability, and clinical feasibility of AI-based remote orthodontic monitoring technology for tracking crown and root movements in place of in-person office visits. Dental Monitoring (DM) has released the first commercially available AI-assisted remote orthodontic monitoring technology. They claim that AI technology can be used to remotely process the intraoral images taken with patients' smartphones to measure the amount and direction of tooth movement and thus monitor treatment progress remotely. The proposal was spurred by the American Association of Orthodontists Foundation's Rapid Assessment of Evidence Committee's report describing an urgent need for robust scientific evidence validating this AI-assisted software's accuracy and reliability. The two specific goals of this project are to validate DM’s ability to monitor AI-assisted crown movement and to explore the clinical viability of AI-assisted tooth root movement tracking.

Once DM's AI-assisted orthodontic treatment monitoring technology has been validated, an essential foundational basis for clinically applicable and evidence-based use of AI technology in orthodontic treatment can be established. Clinicians will be able to provide more personalized, patient-centric care by closely following their patients' treatment and post-treatment stability with fewer office visits. The quality and efficiency of care will be enhanced with more timely, accurate intervention. Also, AI technology can potentially assess root parallelism without additional radiation exposure but with high accuracy and efficiency, making it an efficient solution to the shortcomings of panoramic radiograph and CBCT. Lastly, this study will provide an evidence-based foundation for using this AI technology to conduct research projects to verify various orthodontic mechanics' effects in an unprecedented way. Conducting this research with the help of the grant represents the zeitgeist of integrating cutting-edge technology into postgraduate orthodontic education.

During the past ten years of my career, I have worked hard to demystify the biomechanics and clinical application of TSADs. Receipt of this funding would help expand the boundaries of my research to practical, evidence-based AI applications in orthodontics to benefit both the future generation of orthodontists and the patients they treat. I feel blessed to be given the privilege of better preparing the next generation of orthodontists with this award's help.