

Biomedical Research Award

Dr. Laura Iwasaki, Oregon Health & Science University

2023 Fred and Dianne Garrett Biomedical Research Award

Title: The impact of TMJ mechanobehavior on outcomes of mandibular advancement surgery

Short biography

Dr. Laura Iwasaki is a Professor in the Division of Orthodontics and Chair of the Department of Oral and Craniofacial Sciences at OHSU School of Dentistry, with a volunteer appointment in the Department of Oral Diagnostic Sciences, University at Buffalo School of Dental Medicine. She is engaged in research in the areas of biomechanics and behaviors associated with the human craniomandibular complex with special interests in the temporomandibular joint, the muscles of mastication, and the movement of teeth. Her responsibilities include clinical and didactic teaching in the advanced education and dental programs in Orthodontics and Dentofacial Orthopedics and research supervision at the pre-doctoral and graduate levels. Dr. Iwasaki is a Diplomate of the American Board of Orthodontics and has been involved in the clinical practice of orthodontics for several decades. Before joining OHSU, she was previously a full-time dental faculty member at the University of Missouri-Kansas City, University of Nebraska Medical Center, and University of Manitoba.



Brief description of the project

This project will use clinical tools previously developed by our research team to identify factors that may contribute to the loss of mandibular condylar structure (resorption) following orthognathic surgery to advance the mandible. Specifically, we will combine individual-specific information about jaw mechanics and behaviors plus psychosocial and physiological conditions to compare these before and after surgery. In particular, how much and how often the jaw joint is loaded (TMJ mechanobehavior) will be measured before and after surgery to predict the likelihood of post-surgical loss of jaw joint structure (TMJ degenerative change).

How orthodontic education will benefit

The foundational information to be gathered will be important for future risk stratification of patients who are to undergo orthognathic surgery regarding the potential for post-surgical side-effects such as condylar resorption. These outcomes will also be the basis for improved protocols which reduce the likelihood of post-surgical loss of mandibular condylar structure. These will hopefully be useful concepts that will contribute positively to improved orthodontic education. For example, the outcomes of the proposed research will provide simplified means of estimating TMJ joint loads and stress-concentration based on condyle and jaw muscle geometries, respectively, that are not currently included in clinical cephalometric analyses.

Why the Foundation is important

The AAOF is important to this project because the funding provided through this Biomedical Research Award will allow this collaborative research team to address these crucial next steps to acquire needed foundational data for the development of future evidence-based diagnostic tools and therapies. In addition, these results will be fundamental preliminary data for a future grant application to the National Institutes of Health. This collaborative team is distinctly poised to conduct this project based on specific expertise plus the experience of working well together, as demonstrated by past publications and grants.

How Foundation funding has benefitted career

AAOF funding has helped advance Dr. Iwasaki's career through four previous awards (two Center, two Biomedical Research), where she was principal investigator. To date, nine peer-reviewed publications, eight book chapters, and twenty-five presentations have resulted based directly on research funded by these awards. The current Biomedical Research Award is critical for Dr. Iwasaki and her research team to acquire novel longitudinal information that distinguishes differences in temporomandibular joint (TMJ) mechanics and jaw-use behaviors in individuals before and after mandibular advancement surgeries. This information will be foundational data for the determination of target sample sizes in future studies to evaluate the longer-term outcomes of this type of surgery and for future grant applications to the National Institutes of Health.