Principal Investigator	Heesoo Oh
Co-Investigator	
Secondary Investigators	Katherine Kieu, Roger Boero, Maryse Aubert, Steven Dugoni
Award Type	Biomedical Research Award
Project Title	Comparison of post-retention changes in treated subjects with growth changes in untreated subjects during the same age interval
Project Year	2013-2016
Institution	University of the Pacific, Arthur A, Dugoni School of Dentistry
Summary/Abstract (250 word maximum)	Investigation of long-term stability after orthodontic treatment has been one of the most challenging subjects of clinical orthodontic research. Objective: To investigate posttreatment changes in the maxillary and mandibular arches in patients who underwent orthodontic treatment during the mixed and permanent dentitions. Materials and Methods: The sample was collected retrospectively from three private practices and consisted of 42 patients who were at least 10 years out of orthodontic treatment. The longitudinal records of study casts and cephalometric radiographs were analyzed to quantify post-treatment changes. Results: Minimal changes in maxillary and mandibular irregularity occurred after an average of 16.98 years from completion of treatment. More than 10 years post-treatment, approximately 81% of the maxillary anterior teeth and 88% of the mandibular anterior teeth showed clinically acceptable incisor alignment (<3.5 mm). Mandibular fixed retainers greatly aided in maintaining the stability of the mandibular incisor alignment. However, post-treatment changes in maxillary incisor irregularity did not appear to be influenced by the presence of a mandibular fixed retainer. When compared with longitudinal changes observed in untreated subjects, the increase in incisor irregularity resembled a pattern similar to the regression line of untreated subjects and seems to be entirely age related. Arch width and arch depth was consistently decreased after treatment, but the magnitude of change was minimal at about 1 mm. No associations were found between any of the cephalometric measurements and changes in incisor irregularities. Conclusions: Orthodontic treatment stability can be achieved and mandibular fixed retention appears to be a valuable contributor, especially in patients with further growth expected.
Were the original, specific aims of the proposal realized?	Yes

Were the results published? If not, are there plans to publish? If not, why not?	The results were published in the Angle Orthodontist, November 2016 issue (2016;86:1010–1018). I acknowledged this grant support in the paper (see attached)
Have the results of this proposal been presented? If so, when and where? If not, are there plans to do so? If not, why not?	The results were presented at the 41st Biennial Edward H. Angle Society meeting on September 29th, 2015 in Pasadena.
To what extent have you used, or how do you intend to use, AAOF funding to further your career?	This project provided me with an opportunity to investigate long term stability, one of the most challenging subjects in clinical orthodontic research. It required considerable effort and financial resources to recruit patients who were at least 10 years out of orthodontic treatment. We plan to follow-up with the patients who participated in the current study in another decade or so. This will provide important knowledge pertaining to longitudinal changes in the dentition during late adulthood. With my current R-01 grant studying craniofacial growth from early childhood to late adulthood in untreated subjects, this study will helps shed light on the topic of normal maturation process after orthodontic treatment and its effect on long-term post-treatment stability. The present study utilized the lateral cephalometric radiograph and the study cast separately. With the AAOF-BRA grant support, we were able to purchase the Geomagic 3D software program for 3D analysis of study casts. Currently, we are working on developing a method to integrate 3D study casts with 2D lateral cephalometric radiographs to study dynamic multidimensional relationships between craniofacial growth and dentition changes.