AAO Foundation Award Final Report

Principal Investigator	Greg King
Co-Investigator	Michael Insoft
Secondary Investigators	
Award Type	Biomedical Research
Project Title	The Measurement of Acid and Alkaline Phosphatase in G.C.F. during Orthodontic Tooth Movement.
Project Year	1995
Institution	University of Florida
Summary/Abstract (250 word maximum)	This study examines acid and alkaline phosphatase activities in gingiva crevicular fluid (GCF) to learn if bone turnover dynamics can be monitored in human subjects during orthodontic tooth movement. Three female subjects were followed longitudinally assessing tooth movement, plaque and inflammation. One randomly selected premolar served as the control and was not treated, while the other was moved buccally with 100 grams. GCF was collected weekly and assayed for phosphatases. Alkaline phosphatase peaked between the first and third weeks followed by an increase in acid phosphatase between the third and sixth weeks. After the first week, tooth movement averaged .09 mm. Minimal additional movement occurred during the next 3 weeks followed By 1.4 mm during weeks 4-6. Thirty additional patients, randomly divided into headgear/bite plate, bionator and control groups were also sampled cross-sectionally at the maxillary first molars. GCF phosphatase activities were assessed as functions of location on the tooth, treatment modality, duration of treatment, gingival inflammation and plaque accumulation. The plaque index did not show a relationship to either acid or alkaline phosphatase activity on the mesial or distal in treated groups. However, alkaline phosphatase increased with inflammation on the distal in treated groups and acid phosphatase was consistently higher on the mesial than on the distal in the treatment groups. Alternating peaks of acid and alkaline phosphatase were found in GCF of treated teeth as a function of treatment duration. The timing and sequence of these changes suggest that alveolar bone remodeling is detected in GCF with bone remodeling cycles taking place continuously and repeating approximately every four to five months. This work supported by AAOF and NIH/NIDR DE08659.
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?	Yes. AJODO 109(3):287-96
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?	Yes. IADR