AAO Foundation Award Final Report

Principal Investigator	Hong Beom Moon, DDS, MS, FICD, ABO
Co-Investigator	(1) Patrick K. Turley, DDS, MSD, MEd, (UCLA) (2) Margarita Zeichner-David, PhD (USC CCMB)
Secondary Investigators	
Award Type	Orthodontic Faculty Development Fellowship Award (Anthony A. Gianelly Teaching Fellowship Award)
Project Title	(1) Maxillary Protraction Therapy with or without Rapid Palatal Expansion on Class III Malocclusion: A Prospective, Randomized Clinical Trial (RCT) (2) Gene Expression in response to Orthodontic Tooth Movement and/or Root Resorption
Project Year	2000
Institution	University of California at Los Angeles (UCLA)
Summary/Abstract	**(1) UCLA Center for Class III Clinical Trial**: This continuing study demonstrated that, in this sample, facemask therapy with or without rapid palatal expansion, produced equivalent (no statistically significant) changes in the dentofacial complex that combined to improve the Class III malocclusion. These results suggest that the indication for rapid palatal expansion should be based on clinical criteria for transverse correction. (AJODO 2005;128:299-309, JDR 2001;80 SI:1108) **(2) Gene Expression in Tooth Movement /Root Resorptin using Microarrays**: 80 Wistar rats (7 wks old) were used. A continuous force of 30 grams was applied to the left maxillary first molar using Ni-Ti closed coil springs and rats were sacrificed after 0,1,3,5,7,14,21 and 28 days. Total RNAs obtained from left and right (control) molars were converted into cDNA, labeled with P33 and hybridized to Plastic Rat Microarrays containing 3,897 genes (Clontech, CA). Analysis of gene expression was done using the AtlasImage 2.7 and AtlasNavigator 2.0 software. Significant ($p<0.05$) tooth movement was produced (0.5mm/4weeks) as a result of the force applied and histological analysis indicated that movement was achieved without causing root resorption. Microarray analysis indicated that more than 130 genes were up- or down- regulated after 1 day of applying the orthodontic forces, amongst them several transcription and growth factors (Sp1, Growth differentiation factor 9B, Myogenic factor, etc) as well as extracellular matrix proteins like Matrix Gla protein. The application of Microarray technology provides a tool to understand the sequence of events, at the molecular level, associated with bone remodeling in response to orthodontic tooth movement. (JDR 2003;82 SI:170, JDR 2002;81 SI:3583, 3818)