

## AAO Foundation Award Final Report

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Award Type	Research
Project Title	Molecular Determinants of root resorption due to orthodontic forces
Project Year	1998
Institution	University of Southern California
Summary/Abstract	<p>Although many clinical and histological studies have been carried out to elucidate the etiology and pathogenesis of external root resorption, the molecular events leading to this process during orthodontic tooth movement are unknown. In this study we proposed to test the hypothesis that by comparing the expression of mRNAs in the periodontium subjected to orthodontic forces determined to produce resorption, and teeth where no forces were applied, we can identify the molecules involved in root resorption. Wistar rats were used. A close coil spring was ligated to the maxillary left first molar and maxillary incisors with a .010 ss ligature wire. A continuous force of 90gr was applied to the left maxillary molars, and rats were sacrificed after 5, 10, 15 and 20 days of placing the coils. Mandibles were dissected, decalcified, embedded in paraffin and serial sections prepared. Results indicated that by day 5 root resorption was quite noticeable. Based on these results, animals were sacrificed after 1,2,3,4 and 5 days of placing the coils for RNA analysis. Differential display was used to detect any changes in gene expression due to orthodontic movement. Left maxillary molars (treated) and right maxillary molars (control) were compared. Changes in gene expression were apparent from day 1. Using two different primers, 58 differentially expressed genes were isolated and two of them appear to be novel sequences. In summary, the application of differential display to characterize the molecular determinants of root resorption due to orthodontic movement promises to provide an insight into the molecular mechanisms involved in this process.</p>