

## AAO Foundation Award Final Report

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|---|---|
| Principal Investigator  | Greg King   |
| Co-Investigator   | Steve Noxon   |
| Secondary Investigators   |   |
| Award Type  | Biomedical Research   |
| Project Title   | Apoptosis of Osteoclasts at Compression Sites during Orthodontic Tooth Movement   |
| Project Year  | 1999  |
| Institution   | University of Washington  |
| Summary/Abstract<br>(250 word maximum)  | <p>The regulation of osteoclast populations during orthodontic tooth movement is unclear. The purpose of this study was to examine the role of apoptosis in osteoclast clearance at orthodontically treated compression sites. Ninety-six 30 day-old Sprague-Dawley rats were randomized to two groups. The treated group had orthodontic appliances (initial activation: 40cN) designed to tip maxillary molars mesially. A sham group had similar appliances without a coil spring. Rats were sacrificed at 1, 3, 5, and 7 days following appliance activation. Tartrate-resistant acid phosphatase (TRAP) and TUNEL (ApopTag®) stains were used simultaneously to identify osteoclasts, committed pre-osteoclasts and apoptotic nuclei. Pyknotic chromatin and apoptotic bodies were also counted as a morphologic assessment of apoptosis. These criteria were analyzed with respect to group, time and location using non-parametric statistics. Higher percentages of TRAP/ApopTag® positive nuclei were observed in the treated group at 3, 5, and 7 days (<math>p &lt; 0.001</math>). The percentage of TRAP positive cells morphologically apoptotic was also higher in the 5- and 7-day samples (<math>p &lt; 0.05</math>). After normalizing the data using percentage of TRAP/ApopTag® positive nuclei in the shams as a baseline rate of apoptosis, the greatest rate was found on the bone surface and in the PDL at days 3, 5, and 7 (<math>p &lt; 0.01</math>). <u>These data strongly suggest that osteoclasts recruited for orthodontic tooth movement are cleared in part by apoptosis.</u> Supported by AAOF and Univ. of Wash. Ortho. Alumni. snoxon@snet.net.</p> |
| 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 120(5): 466-76   |
| 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. Also won Milo Hellman Award in 2000.   |