# AAO Foundation Award Final Report

| | |
|---|---|
| Principal Investigator | Flavio Uribe |
| Co-Investigator | N/A |
| Secondary Investigators | Ivo Kalajzic<br>Ravindra Nanda |
| Award Type | Biomedical Research |
| Project Title | The effects of corticision on differential forces in a rat model |
| Project Year | 2012-2013 |
| Institution | University of Connecticut |
| Summary/Abstract (250 word maximum) | Introduction: This study aimed to evaluate the effect of two distinct magnitudes of applied force with and without corticision on the rate of tooth movement and the alveolar response in a rat model.<br>Method: Sixty six week old male rats were divided equally into four groups. Groups included: light force, light force with corticision, heavy force and heavy force with corticision. Force was delivered from the maxillary left 1st molar to the maxillary incisors using prefabricated 10g or 100g Sentalloy springs. Corticision was performed at time of appliance placement and repeated one week afterwards on the mesiopalatal aspect of the left maxillary first molar. The right hemi maxillae served as unloaded controls. Micro computed tomography (µCT) was used to evaluate tooth movement and the alveolar response between maxillary 1st and 2nd molars on day 14. Tartrate resistant acid phosphatase (TRAP) staining was used to quantify osteoclasts and odontoclasts present. The expression of receptor activator of nuclear factor kappa ß ligand (RANKL) was evaluated.<br>Results: Intergroup comparisons showed no significant differences in the magnitude of tooth movement, bone volume fraction, apparent density, tissue density, total volume, or bone volume. Intragroup comparisons showed significantly less bone volume fraction (BVF) and tissue density on the loaded sides, with the exception of BVF in the light force group. No significant differences in the number of osteoclasts/odontoclasts, osteoclast/odontoclast surfac or RANKL expression was found between groups.<br>Conclusions: No differences in tooth movement or dentoalveolar tissue response was observed related to force magnitude and/or corticision. |
| Were the original, specific aims of the proposal realized? | Both specific aims were accomplished. Specifically, aim one: to determine the effect of corticision and two distinct magnitudes of applied force on the rate of orthodontic tooth movement; and aim two: to quantify and determine the localization of the osteoclasts and RANKL during orthodontic tooth movement with corticision and 2 distinct magnitudes of applied force were completed. |

| | |
|---|---|
| Were the results published? If not, are there plans to publish? If not, why not? | The results have not been published yet, but we are in the process of writing the manuscript for submission. The resident involved with this project defended his thesis successfully. |
| 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? | Results of this study were presented at IADR and at the AAO meeting in Philadelphia as posters.<br>This research also got a second place award in the Charley Schultz competition in the basic sciences category at the 2013 AAO meeting in Philadelphia. |
| To what extent have you used, or how do you intend to use, AAOF funding to further your career? | This funding has served as the foundation to launch further investigations within our department on the biology and modulation of orthodontic tooth movement. We have consolidated a good tooth movement model in rodents that will allow to pursue other projects and consolidate my career in this area of research in orthodontics. |