

Research Aid Award

Dr. Farnaz Younessian, *Nova Southeastern University*

Biography

Dr. Farnaz Younessian is a second-year orthodontic resident at Nova Southeastern University. She completed her dental education and orthodontic residency in Tehran, Iran. Upon graduation from residency, she worked at the Dentofacial Deformity research center for two years in University of Shahid Beheshti in Tehran, Iran where she enhanced her skills in orthodontic research methodology and animal studies. She is interested in continuing her academic activities as a clinician-researcher after graduation.



Research project description

There is a growing interest among orthodontists in adopting adjunctive procedures to inhibit tooth movement during and after orthodontic treatment. The “Biological retention” theory has been introduced to prevent relapse, root resorption, and movement of teeth serving as anchor units to support and guide tooth movement during treatment. However, there are limited studies to support the effectiveness of the chemical agents used clinically for this purpose. Denosumab and Bisphosphonates are amongst the most viable antiresorptive agents to decrease the rate of orthodontic tooth movement. The proposed study will explore the clinical, histological and also immunohistological changes that occur when two antiresorptive agents are administered locally and describe how they inhibit orthodontic tooth movement, if at all. The result of the study will help orthodontist to provide selective inhibition of tooth movement during and after orthodontic tooth movement (anchorage preparation and retention respectively). Also, if these agents demonstrate antiresorptive characteristic in cementum, their local injections can inhibit or minimize severe root resorption in orthodontic patients.

In this prospective case control study, 56 wild type Sprague Dawley male rats will be randomly divided into 4 groups of Denosumab (anti-mouse RANKL mAb, rat version) (n=14), Clodronate (Bisphosphonate) (n=14), control monoclonal antibody (n=14), and control saline group (n=14). Orthodontic tooth movement will be induced by the attachment of NiTi closed coil spring between incisor and first molar in maxilla of rats that will receive local injection of Denosumab, control mAb, Clodronate or saline, respectively. The rats will be sacrificed at Day 14 and Day 21. The rate of tooth movement, root resorption, local production of pro-inflammatory cytokines, and number of TRAP+ osteoclasts in alveolar bone will be monitored and compared.

Importance of AAOF Funding

This research project will benefit both orthodontic clinicians and researchers by introducing a clinical solution for management of severe root resorption in orthodontic patients. In addition, it provides an alternative approach to management of anchorage by selective inhibition of tooth movement during orthodontic treatment.

The AAOF grant is essential to this project as it provides sufficient funding to evaluate the immune-histochemical differences (level of cytokines) between the groups. The support from the AAOF allows me to pursue my career in the future as an academic clinician by providing the opportunity to develop and conduct this research project during my residency.