

AAO Foundation Award Final Report

Principal Investigator	Toru Deguchi
Co-Investigator	Henry Fields
Secondary Investigators	
Award Type	Michael Matlof Memorial Teaching Fellowship Award
Project Title	Microglia activation by tooth movement and the effect of minocycline
Project Year	2014
Institution	The Ohio State University College of Dentistry Division of Orthodontics
Summary/Abstract (250 word maximum)	<p>Introduction: Orthodontic tooth movement causes pain to a patient. Glial cells are non-neuronal cells in the central nervous system (CNS), and implicated in various types of pain. The present study assessed glial activation responses following experimental tooth movement using immunocytochemical detection of OX-42 and glial fibrillary acidic protein (GFAP) immunoreactivity (ir) to illustrate the microglial and astrocytes response, respectively. In addition, the effect of minocycline in reducing pain during tooth movement was also investigated.</p> <p>Methods: Fifty-five Sprague Dawley rats with and without administration of minocycline after 1,3,5,7,14 days (n=5, for each) of tooth movement were used. Immunohistochemistry for microglia (OX-42) and astrocyte (GFAP) were performed at the medullary dorsal horn (MDH; trigeminal subnucleus caudalis). Three-dimensional quantitative analysis was performed with confocal fluorescence microscope and WinRoof software program.</p> <p>Results: There was a significant increase in the OX-42 and GFAP-ir in response to tooth movement in the MDH. Furthermore, systemic administration of minocycline, a selective inhibitor of microglial activation, significantly attenuated the nociceptive c-Fos expression in MDH that was induced by experimental tooth movement.</p> <p>Conclusion: These data indicate the possible importance of microglial activation in the development of orthodontic pain. This is also the first report on the systemic application of minocycline.</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?	<p>In submission.</p> <p>Title: The effect of minocycline on induced glial activation by experimental tooth movement. Toru Deguchi, Rie Adachi, Hiroshi Kamioka, Kim Do-Gyoong, Henry Fields, Teruko Takano-Yamamoto, Hiroyuki Ichikawa, Takashi Yamashiro</p>
Have the results of this proposal been	At the 73 rd Annual Meeting of the Japanese Orthodontic Society held in Chiba, Japan, at October 20-22, 2014.

presented? If so, when and where? If not, are there plans to do so? If not, why not?	Title: Effect of minocyclin on glial activation and pain control during tooth movement. Toru Deguchi, Rie Adachi, Hiroshi Kamioka, Kim Do-Gyoون, Henry Fields, Teruko Takano-Yamamoto, Hiroyuki Ichikawa, Takashi Yamashiro
To what extent have you used, or how do you intend to use, AAOF funding to further your career?	I would like to use the AAOF fund for further grant application for NIH grant.