

**AAO Foundation Award Final Report
(a/o 2/12/08)**

Principal Investigator	Laura R. Iwasaki
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Secondary Investigators	Larry D. Crouch, Richard A. Reinhardt
Award Type	Biomedical Research Award
Project Title	Interleukin-1 gene cluster polymorphisms and orthodontic tooth movement.
Project Year	2001 (Project timeline: July 1, 2001 - June 30, 2005)
Institution	University of Nebraska Medical Center, College of Dentistry
Summary/Abstract (250 word maximum)	<p>Introduction: The variables affecting speed of tooth movement are unquantified. In particular, the effects of stress and human biological variations are unknown. Therefore, our objectives in this study were to determine relationships between (1) stress and velocity of tooth translation (v_t), and (2) interleukin-1 (IL-1) gene cluster polymorphisms, IL-1β and IL-1 receptor antagonist (IL-1RA) in gingival crevicular fluid (GCF), and v_t. Methods: Ten subjects had their maxillary first premolars extracted and cheek wipe samples genotyped. In each subject, a maxillary canine received 26 kPa and the other received 13 or 52 kPa of stress. GCF samples and tooth movements were measured at 9 or 10 visits over 84 days. Results: Mean v_t for canines retracted by 13, 26, and 52 kPa were 0.054, 0.072, and 0.064 mm per day, respectively. Faster v_t was shown from 26 kPa than 13 kPa ($P=0.015$) and 52 kPa ($P=0.030$), with higher IL-1β/IL-1RA in GCF at experimental relative to control sites, and in subjects with homozygosity for allele 1 (A1,A1) compared with at least 1 copy of A2 (A2+) at IL-1RN(VNTR86 bp) ($P=0.032$), and with A2+ compared with A1,A1 at IL-1B(+3954) ($P=0.051$). Conclusions: Stress, IL-1β/IL-1RA in GCF, and IL-1 gene cluster polymorphisms are related to v_t. (Am J Orthod Dentofacial Orthop 2006;130:698.e1-698.e9)</p>
Were the original, specific aims of the proposal realized?	Yes
Were the results published? If not, are	Results were published in:

<p>there plans to publish? If not, why not?</p>	<p>Iwasaki LR, Gibson CS, Crouch LD, Marx DB, Pandey JP, Nickel JC (2006): Speed of human tooth movement is related to stress and IL-1 gene polymorphisms. <i>Amer J Orthod Dentofacial Orthoped</i> 130:698.e1-e9.</p> <p>Iwasaki LR, Crouch LD, Nickel JC (2008): Genetic factors and tooth movement. <i>Seminars in Orthodontics</i> 14:135-145.</p> <p>Iwasaki LR, Nickel JC (in press): Markers of paradental tissue remodeling in the gingival crevicular fluid of orthodontic patients. For <i>Biological Mechanisms of Tooth Movement</i>, Davidovitch Z, Krishnan V (eds), Blackwell Publishing Co.</p>
<p>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?</p>	<p>Results have been presented:</p> <p>March 2006 “Stress magnitude and growth status affect human tooth movement velocity,” Annual General Session of the AADR, Orlando, Florida.</p> <p>Feb. 8, 2006 "Factors that affect the speed of orthodontic tooth movement," Georgia Section of the American Association for Dental Research, Medical College of Georgia, Augusta, Georgia.</p> <p>March 2005 AInterleukin-1 gene cluster polymorphisms and velocity of orthodontic tooth movement,≅ Annual General Session of the IADR, Baltimore, Maryland.</p> <p>Sept. 20, 2004 AIdeal forces, faster treatment?≅ Pacific Coast Society of Orthodontists, 68th Annual Session, Palm Springs, California.</p>