Principal Investigator	John Dolan
Co-Investigator	N/A
Secondary Investigators	Brian Schmidt
Award Type	Orthodontic Faculty Development Fellowship Award
Project Title	Creation, Development and Validation of a Mouse Model of TMD
Project Year	2012
Institution	New York University, College of Dentistry
Summary/Abstract (250 word maximum)	Despite advances in orofacial pain research, we are limited by inadequate models of TMJ disorders (TMD) which do not reflect behavioral components of TMD etiology. For example, overuse following injury to the masticatory complex can lead to TMD; however no preclinical models recapitulate this natural history. The debilitating effect of injury and overuse was investigated using my newly invented automated feeder, termed dole-a-meal (D-A-M). D-A-M elicits a discrete quantity of gnawing function from a mouse by allotting a food reward upon completion of a gnawing task (severing a polymer dowel). In this way the D-A-M manipulates orofacial function in the generation of TMD models. Ten D-A-M were fabricated. Dowel Diameter and durometer were titrated to achieve an appropriately arduous incising task. I standardized the task/meal ratio to evoke vigorous gnawing activity in the mouse without exhaustion. Two groups of mice (injury, healthy, $n \geq 5$ in each) gained access to food solely through D-A-M for 10 days. Gnawing was quantified with my previously published orofacial assay (dolognawmeter) at 3 time-points: baseline (1 day before D-A-M use) and after 5 and 10 days with D-A-M. In one group, Jaws were held open (15mm) for 1 hour under general anesthesia to produce injury immediately after the day 5 dolognawmeter trial. Gnaw-time in the dolognawmeter decreased significantly ($p=.001$) for both groups at day 5. At day 10, gnaw-time of the injury group was significantly greater than baseline ($p<.05$) and greater than that in the healthy group ($p<.001$). These data demonstrate orofacial debilitation in the presence of overuse and injury.
Were the original specific aims of the proposal realized	The initial phase of the project has been completed. Preliminary data supporting an R01 application through NIH/NIDCR was obtained.
Were the results published? If not, are there plans to publish? If not, Why not?	Results will not be published. Instead, the preliminary data will be used to support an R01 application through NIH/NIDCR. The Results of the study proposed in the R01 application will be published.
Have the results of this proposal been presented? If so, when and where? If not, are there plans to do so? If no, why not?	The results of the proposal have not been presented because they will be used to support a grant proposal that will ultimately generate more reliable data to confirm the preliminary findings. The Results of the study proposed in the R01 application will be presented at a national meeting.
To what extent have you used,	AAOF funding has allowed me to dedicate additional time on my

or how do you intend to use, AAOF funding to further your career?	preclinical investigation of TMD models in mice. As a result of my preliminary studies on TMD I have submitted an R01 grant application (6/5/2013) to the NIH/NIDCR with a proposal to investigate TMD using my orofacial assay as well as my automated feeder. In the near future I will characterize and modulate gnawing function in a mouse model of TMJ osteoarthritis (biglycan and fibromodulin double deficient mice first generated by Dr. Marian Young at the NIH) spontaneously developed over many months in the mouse. Degenerative joint disease in this model destroys the normal architecture of the TMJ by 18 months of age. For the duration of disease progression I will quantify debilitation in oral function and modulate masticatory overuse in separate groups of animals.