AAO Foundation Award Final Report

Principal Investigator	Eung-Kwon Pae DDS MS PhD
Co-Investigator	
Secondary Investigators	Flavio Uribe
Award Type	Biological Research Category 4
Project Title	Subcellular response of the masseter muscle to stretch.
Project Year	2000
Institution	U. of Connecticut Health Center
Summary/Abstract (250 word maximum)	*Introduction:* Functional appliances alter neuromuscular function in order to change form, however the underlying mechanisms are still unknown. Nonetheless, it is believed that muscle function causes mechanical stress to the bone that in turn adapts by changing its form. *Methods:* The purpose of this study was to observe changes in the fiber types that occur in the masticatory muscles when they are subjected to stretch by means of a functional appliance and compare those with stretched limb muscle changes. Eight New Zealand rabbits were divided into control and experimental groups. The experimental group received a prefabricated curved inclined plane that caused an anterior protrusion of the mandible. All rabbits received a cast in one of the hind limbs that maintained it in stretched position. Animals were sacrificed after 1 week and changes in fiber composition on the masseter, lateral pterygoid, and extensor digitorium longus (EDL) muscles were evaluated by means of immunohistochemestry. *Results:* An increase in the percentage of slow fibers type I on the EDL stretched muscle occurred suggesting a muscle transition from fast to slow. This same muscle showed a significant increase in the percentage of developmental fibers suggesting a regenerative or reprogramming effect. No significant difference in muscle fiber type was found in the masticatory muscles, although some increase in the number of neonatal fibers was observed. *Conclusions:* Masticatory muscles respond differently to stretch than the limb muscles in the rabbit. Although masticatory muscles and limb muscles are predominantly fast fiber type muscles, masticatory muscle fail to show the same fiber type transitions from fast to slow as the limb muscles in rabbits.

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?	Publication of the work is at Dr. Flavio Uribe U. Conn Health Center. The project was used as part of his thesis for Master's degree.
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?	The results were presented at IADR, in Japan, 2002 and 2003. Lee S, Uribe F, Shin K-H, Pae E. (2002) Proportion of myosin heavy chain isoforms in masticatory muscles is altered when stretched. J Dent Res 82 (Special Issue A): Abs. # 1511. Uribe F, Havens B, Krebs L, Pae E. (2003) Subcellular response of the masseter muscle to stretch. J Dent Res Special Issue: Abs. # 1257.