

Orthogators

MAY 2014

MESSAGE FROM THE CHAIR



It is my pleasure to send you the Spring/Summer 2014 Department of Orthodontics newsletter which is devoted to ongoing research in our department. I wanted

to share the diversity of ongoing research, ranging from tooth movement, activation of osteoclasts and pain. Research and the resulting presentations and publications is what makes our department known both nationally and internationally.

I received a small grant from Propel Orthodontics and I am conducting a study on the rate of space closure when the device is used. However I am just a very small part of a large research enterprise in the department.

I hope you enjoy learning a little more about ongoing research projects in the department and, as always, thank you for your support of the department.

Sincerely,

*Cal Dolce, D.D.S., Ph.D.
Professor and Chair*

RESEARCH NEWS

Dr. Shannon Holliday's main research focus is the osteoclast -- the cell responsible for the resorption of bone. He studies it at various levels ranging from elucidating atomic level structures of key elements to developing means to manipulate osteoclast activity in organisms to effect orthodontic tooth movement and treat periodontal disease. Areas of particular interest include extracellular signals required to activate osteoclasts, vesicular trafficking pathways necessary for osteoclast maturation and activity, and the vacuolar H⁺-ATPase, the key enzyme required for bone resorption. Recent studies are examining osteoclast-derived exosomes, small vesicles released from cells that are proving to be vital regulators of intercellular communication.



Shannon Holliday

Dr. John Neubert's academic interest primarily involves basic and translational pain research. This research includes investigation of different receptors involved in the expression of orofacial pain. Specifically, his laboratory has pioneered testing of orofacial pain in rodent models, a testing model that is more reflective of how humans feel pain. Recently, his work evaluating the placebo response in rodents received national and international attention following an Associated Press report. He also initiated a novel model of orthodontic tooth movement in rodents using a simplified lever system to apply a tipping force on teeth. He has validated this system and is planning to use it when we analyze the interaction of the nervous and bone biology systems.



John Neubert

MARK YOUR CALENDAR *Orthogators Annual Meeting August 22, 2014*

"LASERS IN ORTHO PRACTICE"

Dr. Sam Low, a periodontist, is our CE speaker. The morning session includes a lecture; Dr. Low will perform a live demonstration on various procedures in the afternoon. We'll be sending more information soon.

RESEARCH NEWS CONTINUED



Wellington Rody

Dr. Wellington Rody has a master's degree in basic sciences and 18 years of orthodontics experience. His translational research brings together the fields of mineralized tissue remodeling, basic immunology and orthodontics. Currently, Dr. Rody's research is funded by an industrial grant and by the American Association of Orthodontists Foundation (AAOF). His study will interrogate the cells that give rise to root resorption to identify pathways that can be utilized to develop novel diagnostic and therapeutic strategies. His long-term goal is to translate his research findings from bench to chair-side so that his group can develop non-invasive ways to diagnose root resorption and expedite tooth movement.

Dr. Timothy Wheeler continues conducting clinical trials with various companies. He received a grant for \$500,000 from OrthoAccel Technologies, Inc. to conduct a clinical trial comparing the rate of tooth movement between subjects who use the Aceledent device versus those who don't.

The study is also examining whether Aceledent use changes pain levels during aligner treatment and whether there's a change in biomarker expression between those who use the device and those who don't. He has received additional funding from Align Technology, Inc., to examine several variables involved in tooth movement with aligners. These clinical trials provide many opportunities for our residents to complete the thesis research necessary for earning their master's in science with a concentration in orthodontics degree.

Dr. Charles Widmer's current research involves both animal and human studies in the general topic area of orofacial pain. The animal study involves the testing of a pre-clinical model of persistent muscle pain using repetitive acidic saline injections into the masseter muscle of mice to induce a four-to-five week pain response. He then assesses potential behavioral indicators to determine which accurately reflect mild-moderate muscle pain over time, consistent with increased neuropeptide expression in trigeminal ganglion afferents that have been previously quantified.

He is also assessing the effect of different types of analgesics (narcotic and non-narcotic) in this pain model. The goal of his research is to develop a pre-clinical model of masticatory muscle pain that

does not involve extensive tissue destruction found in other animal masticatory muscle persistent pain models and more closely approximates the human masticatory muscle pain condition. The study also tests the efficacy of non-invasive pain assessment techniques that can be used in the mouse home cage environment. The human research study he's working on involves a randomized, controlled, double-blind study of the efficacy of steroid supplementation after temporomandibular joint lavage (arthrocentesis).

Currently, the effect of temporomandibular joint lavage is well-documented for reducing or eliminating certain types of TMJ pain but it is unclear if adding steroids will promote an improvement in the resolution of joint pain over joint lavage by itself. Ultimately, it can tell us if steroid supplementation is needed to resolve temporomandibular joint pain. If steroids are not effective, then eliminating them from the protocol would reduce the cost of the procedure and potential steroid morbidity in these patients.

Dr. Robert Yeziarski's research focuses on changes in thermal sensitivity as a result of different experimental conditions. Studies carried out have evaluated the impact of age, spinal compression and the anti-convulsant gabapentin on the performance of an operant task that measures thermal sensitivity in rodent models of chronic pain. Results show that thermal sensitivity increases as a function of increasing age and following spinal cord compression and is decreased in a dose dependent manner following gabapentin administration.



Timothy Wheeler



Charles Widmer



Robert Yeziarski

SECOND YEAR RESIDENTS RECEIVE GRANTS

Congratulations to four of our second-year residents who received grants from the Southern Association of Orthodontist for the following:

Dr. Derek Hoffman	\$420
Dr. Aylin Mazzuocolo	\$600
Dr. Andrew Murray	\$675
Dr. Lindsay VonMoss	\$700

HUYNH, PATEL WIN AAO AWARDS AT ANNUAL MEETING

Two of our residents received awards during the American Association of Orthodontists meeting in New Orleans this year.

Dr. Nancy Huynh, a third-year resident, had her research selected by the AAO for the Thomas M. Graber Award of Special Merit. Thanks to the mentorship provided by Drs. Holliday, Dolce and McHugh, she executed a project that is both innovative and relevant to orthodontics. Her research, "Osteoclast-Derived Exosomes: Novel Regulators of Bone Remodeling and Markers of Resorption," demonstrated the existence of osteoclast-derived exosomes and established their role in osteoclast-osteoclast communication. She also presented her research at the AADR, the FAO, the SAO and the UF College of Dentistry's Spring Synergy where she received first place in the oral presentation category.

Dr. Neha (Shah) Patel, a third-year resident, received the Charley Schultz Resident Scholar Award award for her clinical research of the SmartTrack™ and the EX30 Invisalign® material related to the amount of tooth movement achieved according to the aligner prescription. Her results showed that the SmartTrack™ material exhibited exceptional results in tooth movement over a 14-day period compared to the previous EX30 material used by Invisalign®. The Charley Schultz Resident Scholar Award program gives residents an opportunity to showcase their clinical or basic science research. One resident from each program is enrolled, and finalists are asked to present their research to a panel of judges at the AAO. Their work is judged according to the originality, relevance, research design validity, and results and conclusions of the project presented.



Patel, left, and Huynh, received awards during the AAO meeting.

FIVE RESIDENTS ATTEND TWEED COURSE



From left, Derek Hoffman, Aylin Mazzuocolo, Andrew Murray, Lindsay VonMoss and Vaughn Holland.

In April 2014, four second-year residents and one third-year resident Vaughn Holland (right) attended the Tweed course in Tucson, Arizona, to learn from the Charles H. Tweed International Foundation. They said that the Tweed course provided a different prospective on orthodontics and demonstrated the importance of controlling anchorage and how to analyze the face as well as keep it in harmony even while extracting teeth. In addition they learned invaluable lessons and techniques relating to bending wire, soldering and how to set up anchorage in order to provide the best results for their future patients.

ORTHO GATOR RECEPTION AT AAO



From left, Dr. Cal Dolce, Dr. Sophia Scantlebury, Dr. Lisamarie Brazeau and Dr. Kay O'Leary



From left, Dr. John Metz and Dr. Ben Campbell.