

Research Aid Award

Dr. Spencer Crouch, *University of Michigan*

Dr. Spencer Crouch is currently a second-year orthodontic resident at the University of Michigan. He completed his undergraduate studies in Biomedical Sciences at Western Michigan University and then attended the University of Michigan for his dental school training. Dr. Crouch has conducted basic science research in an animal reproduction/endocrinology laboratory while at WMU and was part of a group at U of M working on a longitudinal study to quantitatively evaluate the use of cervical vertebrae maturation as a method for the detection of the peak in mandibular growth. In addition to these projects, he participated in the University of Michigan Kenya Summer Research Program and was an instrumental part of the dental mission aspect of this interdisciplinary effort. Spencer traveled to rural areas of Kenya as part of a team to conduct oral health epidemiological research. The overall goals of this program were to raise awareness for the inadequate access to healthcare in this area of the world and to work on the establishment of sustainable dental clinics in those areas.



The goal of his proposed research project is to determine if Tissue Nonspecific Alkaline Phosphatase (TNAP) enzyme is essential at a local cellular level for osteoblast differentiation, bone formation, and mineralization using *in vitro* and *in vivo* approaches. Assessing and predicting craniofacial bone growth is a critical aspect of clinical orthodontics. Currently, the underlying biologic mechanisms that control bone development are not entirely known. TNAP enzyme is essential for bone mineralization and TNAP deficiency causes abnormal craniofacial bone development (including craniosynostosis) by unknown mechanisms. If successful, results of this study will aid in determining the local cellular role of TNAP in osteoblast differentiation and bone formation. Such results would be relevant for developing better prognostic and treatment modalities for craniofacial anomaly patients. This project will benefit orthodontic education by providing information about the role of TNAP in craniofacial bone growth and development. If the data shows that local TNAP expression promotes bone formation, future studies could also investigate TNAP as a potential bone anabolic agent for controlling orthodontic tooth movement

Conducting *in vitro* and *in vivo* animal studies pertaining to bone biology are extremely important endeavors in the field of orthodontics. The funding and support of this AAOF Research Aid Award will be instrumental in the completion of this project and will be applied to the purchase of animals, housing/husbandry, and laboratory supplies.

During his career as a clinical orthodontist, Dr. Crouch wants to continue contributing to the profession through scholarly research and eventually become a part-time clinical faculty member at an orthodontic program. This support from the AAOF helps him embark on this career path and enables him to one day share his knowledge in orthodontics with the next generation of clinicians so that they can provide the best care possible to all of their patients.