

## Biomedical Research Award

Dr. Iacopo Cioffi, *University of Toronto, Faculty of Dentistry*

### Short biography

Dr. Cioffi is an orthodontist with expertise in masticatory muscle pathophysiology and Temporomandibular disorders (TMD). He was trained in dentistry, orthodontics, and temporomandibular disorders at the University of Naples Federico II, Italy. In 2008, he completed a PhD program in Oral Sciences. During his training, he has also worked at the University of Zurich (Switzerland) and ACTA (Amsterdam, the Netherlands). Dr. Cioffi completed the dental specialty training and assessment training program (Orthodontics) at the University of Toronto. Currently, he is a fellow of the Royal College of Dentists of Canada.



Since 2015, he is an Assistant Professor at the Faculty of Dentistry, University of Toronto. He co-directs the Centre for Multimodal Sensorimotor and Pain Research (<http://painresearchcentre.org/>), which is funded by both the Ontario and the Federal Governments. The Centre uses innovative approaches to study chronic pain with a specific focus on orofacial pains. Dr. Cioffi has authored >45 papers in the field of orthodontics, temporomandibular disorders, and neuroscience. He actively serves as a reviewer for the American Journal of Orthodontics, The European Journal of Orthodontics, the Journal of Oral and Facial Pain and Headache, and many other pain and neuroscience journals. Dr. Cioffi has been an invited speaker at many international orthodontic and pain meetings.

### Description of the project

TMD are the most common chronic orofacial pain condition. Pain from TMD affects the muscles of mastication (mTMD), the temporomandibular joint, or both. Chronic mTMD exerts considerable suffering and poses a significant economic burden. Despite numerous studies, a definitive cause of mTMD has yet to be identified. The lack of an apparent cause of the disease leads to inappropriate treatments, with >30% of individuals reporting pain up to at least five years after treatment.

Dr. Cioffi's team has recently shown structural and functional abnormalities in the muscles of mastication of individuals with mTMD. They have demonstrated that mTMD is associated with increased masticatory muscle activity, abnormalities in the tendon-aponeurosis complexes of the masticatory muscles, and reduced muscle oxygenation. Altogether, these data likely suggest that the muscles of mastication of individuals with chronic mTMD do not become hypertrophic in response to increased muscle activity, but could undergo degenerative changes, probably because of reduced oxygenation.

The overall *aim* of this project is to determine whether experimentally induced masticatory muscle ischemia and overload cause structural changes in the muscles of mastication. By developing a novel rodent model of mTMD, Dr. Cioffi and his lab team will determine whether reduced oxygenation of the masticatory muscles together with muscle overload lead to muscle inflammation and muscular structural abnormalities.

The pathophysiology of muscular TMD is still unclear. This research will clarify mechanisms of TMD, and contribute, in the long term, to develop more effective strategies for this condition. Dr. Cioffi's research will benefit both dental and orthodontic education by providing a better knowledge of mTMD. Through support from the AAOF, Dr. Cioffi will be able to conduct cutting-edge research and offer new research opportunities to orthodontic residents as they train to develop excellent orthodontists and, hopefully, scientists.