

## Biomedical Research Award

Dr. Carlos Flores-Mir, *University of Alberta*

2021 AAOF synopsis BRA “An exploration into the paradox of midfacial hypoplasia and pediatric upper airway obstruction: probing intrinsic defects in bone/cartilage differentiation.”

### Short Biography:

Carlos Flores-Mir was born in Peru. He completed his dental (1994) and dental specialty in orthodontics (1998) training at the Universidad Peruana Cayetano Heredia in Lima – Peru. In parallel, he also completed his BSc (1994), MSc (1997) and DSc (2002) degrees in Stomatology in the same institution. In 2002 he immigrated to Canada, where he completed a post-doctoral fellowship in the Orthodontic section at the University of Alberta (2005). Since 2005 Dr. Flores-Mir has been teaching full time at the University of Alberta in different capacities. He is currently the Interim Orthodontic Graduate Program Director and the Associate Chair, Graduate Studies. Dr. Flores-Mir has held a Canadian unrestricted orthodontic specialty licence since 2007. He has practiced extramurally since 2008.



### Project Description:

Midfacial hypoplasia is often associated with severe morbidities that require surgical intervention, such as upper airway obstruction (manifested as sleep-disordered breathing [SDB]), malocclusion or craniosynostosis. Surgical intervention in children with severe hypoplasia is prone to complications and a high relapse rate. Our understanding of midfacial growth is incomplete; there is disagreement to what degree midfacial growth is driven by the nasal septum, frontonasal suture, or both. Furthermore, controversy about whether upper airway obstruction leads to reduced midfacial growth reflects intrinsic complex changes to bone formation. This results in uncertainty regarding the best type of surgical approach and the appropriate timing for surgical intervention. It also hampers optimal non-surgical management in milder cases. We hypothesize that intrinsic defects to bone/cartilage formation and growth are associated with midfacial hypoplasia. Understanding these defects will allow better diagnostics and improve clinical management options in the long term. This project aims to understand to what degree bone, cartilage, and suture anomalies might contribute to midfacial hypoplasia and airway obstruction. The proposed work investigates to what degree intrinsic changes to bone/cartilage formation are associated with midfacial hypoplasia and airway obstruction.

### Benefit to the Orthodontic Community

A better understanding of how the intrinsic changes to bone/cartilage formation are associated with midfacial hypoplasia and airway obstruction should enable an improved differential diagnosis and better personalized treatment plans based on these etiologies. Often, as clinicians, we can identify craniofacial anomalies, but we are limited in fully understanding the etiology of

the malformations. These three objectives should shed some light on this critical area. Incorporating the new knowledge into the orthodontic curricula would benefit prospective patients treated by future generations of orthodontists.

Importance of AAOF support:

Foundational laboratory studies are expensive due to the costs associated with maintaining animals and laboratory supplies. The provided AAOF grant funds are indispensable to support this project. It has to be noted that this awarded grant is based on the initial groundwork of a 2018 AAOF Biomedical Research Award. I have been fortunate to be supported by the AAOF multiple times. I have been able to publish many publications based on AAOF funding. This support has been critical to advance my academic career.