

## Orthodontic Faculty Development Fellowship Award

Dr. Rishma Shah, *University of North Carolina*

### Biography

Dr. Rishma Shah is Assistant Professor at the University of North Carolina, Adams School of Dentistry and a member of the UNC Craniofacial Center team. She completed her BDS with honors (DDS equivalent) at the United Medical and Dental Schools of Guy's and St. Thomas' Hospitals, London. Dr. Shah received her MS in Orthodontics with distinction and her PhD in Biomaterials and Tissue Engineering from the University of London, England. She has also completed Fellowships in Dental Surgery and in Orthodontics at the Royal College of Surgeons. She is experienced in the management of complex craniofacial and interdisciplinary cases. Her research complements her clinical interests and is focused on the role of the craniofacial muscles in dentofacial deformity and muscle tissue engineering applications.



### Project Synopsis: '*Craniofacial Muscle Phenotype in Patients with Mandibular Asymmetry*'

The face is the means by which humans recognize each other and interact socially through facial expression. Facial deformity can lead functional and psychosocial problems, which can be extremely debilitating for patients. Mandibular asymmetry is known to be one of the most frequent dentofacial deformities. Correction in non-growing patients often requires orthodontic and surgical intervention, which is associated with risks and complications.

Wolff's law states bone in a healthy person will adapt to the load under which it is placed. Human and animal studies have demonstrated the influence of the muscles of mastication on mandibular growth. Recent published case reports provide anecdotal information on secondary correction of the associated mandibular asymmetry in humans following Botulinum toxin injections used to treat unilateral masseter hyperplasia. There is an urgent need to better understand the role of the muscles of mastication in mandibular asymmetry, and to utilize this knowledge to develop cost-effective and less invasive therapies to manage this condition.

This study proposes to investigate masseter muscle phenotype in patients presenting with mandibular asymmetry. The study hypothesis is that there is a difference between left and right masseter muscle phenotype in patients with mandibular asymmetry and this varies with vertical dimension. The following specific aims will address the hypothesis: *Aim 1* – Characterization of the masseter muscles in patients with and without mandibular asymmetry; *Aim 2* – Investigation of the relationship between masseter muscle phenotype and vertical dimension.

### How Orthodontic Education Will Benefit from the Award

Orthodontists have in-depth knowledge of growth and development of the dentofacial complex. Although there are studies on the role of the muscles of mastication in dentofacial deformity, many of these studies are flawed. The proposed study will generate new knowledge of muscle phenotype

in patients presenting with mandibular asymmetry characterized in the transverse and vertical dimensions. This information will be important for the orthodontist in understanding and treating abnormalities of dentofacial form.

### **Why the Foundation is Important to the Project**

The Foundation is an important advocate of the project and its long-term implications for the orthodontic patient. The funding provided by the Foundation is essential for the generation of preliminary data to support future funding applications. Furthermore, the new knowledge learned from this project has the potential to support novel, less invasive and cost-effective therapies to manage mandibular asymmetry.

### **How Foundation Funding Might Help Advance Your Career**

I am grateful to the Foundation for the award of this funding. The generation of preliminary data from this project funded by the Foundation will support future funding applications to the NIH/NIDCR. As a tenure-track Assistant Professor, the award of research funding from institutions, such as the NIH/NIDCR, will be important for advancing my career as a clinician-scientist-educator in the field of orthodontics.