

Research Aid Award

Dr. Heather Ercolano, *Stony Brook School of Dental Medicine*

Biography

Dr. Heather Ercolano is a second-year orthodontic resident at the Stony Brook School of Dental Medicine in the Advanced Education Program in Orthodontics and Dentofacial Orthopaedics. She graduated *Cum Laude* from Stony Brook University with a strong biomedical background, obtaining her B.Sc. in Biology and Chemistry. She earned her Doctor of Dental Surgery degree from Stony Brook School of Dental Medicine where she gained research experiences in orthodontics working with the orthodontic residents. Her present research interest focuses on measuring the effects of orthopedic maxillary expansion and soft tissue changes. This investigation is using a special 3D camera system and its associated software developed in the Computer Science Department at Stony Brook University.



Project Description

One of the most common problems diagnosed and treated by orthodontists is a maxillary transverse discrepancy. Orthopedic maxillary expansion is a common treatment modality employed to treat maxillary deficiency. The transverse discrepancy is routinely measured during clinical examination, measuring orthodontic study models, intraoral scans or from specific radiographic imaging. Previous studies have assessed the soft tissue changes using 2-dimensional imaging techniques. Few studies have used a 3-dimensional camera to assess these changes. Past published studies have demonstrated that the nasal alar base and the mouth widen. These changes as a result of palatal expansion impact facial esthetics. The 2D images lack the ability to record and measure 3D facial surface changes accurately and are uniplanar.

The aim of this study is to attempt to quantify 3D facial soft tissue changes due to orthopedic maxillary expansion depending on the amount of expansion. The specific sites of interest are the middle and lower facial regions. The study sample is orthodontic patients aged 8 to 16 from the clinic at Stony Brook with transverse discrepancies requiring orthopaedic maxillary expansion. The patients were scanned with a 3D camera system prior to the initiation of rapid palatal expansion and after the expansion period was complete. Once the images were acquired and processed, 13 soft tissue landmarks were selected and a statistical analysis will be run using the geodesic and euclidean lengths. In addition, heat maps are being generated to evaluate the surface changes. This project has been IRB approved.

AAOF Support

The results from the study will help clinicians in orthodontic treatment planning for patients requiring orthopedic maxillary expansion. This will aid in evaluating the predicted changes that can be expected depending on the magnitude of the expansion that was planned for the patient. This data will be a guide for orthodontists to be able to fully understand the impact maxillary expansion has on facial esthetics, specifically soft tissue changes.

The Foundation funding is essential for supporting the research and development of the technology needed for the 3-dimensional camera. The camera and associated software for assessing soft tissue changes that occur will be important for orthodontics as we transition into the 3D world of diagnosis and treatment planning. The computer algorithms developed in this research will add an important part to the puzzle of how soft tissue is affected by orthopedic changes in the skeletal structures.

The generous funding from the AAOF is pivotal for the development of Dr. Ercolano's research skills and professional career. The Foundation funding supports the important contribution of translational research collaboration to further the development of evidence for the clinician to use with 3D treatment planning. The funding will support the ability of Dr. Ercolano to complete her master's degree in Oral Biology and Pathology. The AAOF RAA is key to support Dr. Ercolano's career in the field of orthodontics as a researcher, clinician, and teacher.