



## CFAO GRADUATE STUDENT POSTERBOARD ABSTRACTS

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### Analysis of Soft Palate Morphogenesis Supports Regional Regulation of Fusion

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**Objectives:** In humans, hard palate development occurs between 7-12 weeks post conception with the fusion of the epithelial lined maxillary prominences creating a midline epithelial seam. The failure of fusion or seam removal in hard palate leads to cleft palate or cyst formation. The mechanism of soft palate formation is less well defined. Evidence exists supporting both fusion and the alternative mechanism of merging. The aim of this study is to densely sample the late embryonic-early fetal period between 54-84 days post-conception to determine the mechanism and timing of soft palate closure.

**Methods:** 28 human specimens aged 54-74 days post-conception were serially sectioned and analyzed histologically for soft palate development. Nine unsectioned human specimens aged 64-84 days post-conception underwent MRI scanning and qualitative analysis of 3-dimensional shape changes during palatal development using a 3D-slicer program.

**Results:** We confirm the presence of a seam extending throughout the soft palates in 57-day specimens suggesting fusion. Cytokeratin antibody staining confirmed the epithelial character of the cells in the midline seam. The seam is rapidly degraded and exists only in the posterior soft palate by 64 days. In contrast, we show the remnants of the seam exist in the hard palate from the time of initial fusion and remain during and after soft palate seam degradation up to 84 days. Our data shows that the soft palate follows a developmentally more rapid fusion compared to the hard palate.

**Conclusions:** Soft palate development occurs similar to the hard palate with the formation and removal of an epithelial seam with resulting fusion albeit faster than in the hard palate. This differential timing of development of the hard and soft palate suggests that the two regions of the palate have their own internal clocks regulating seam removal.

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