

Background

- The maxillary labial frenum (herein referred to as “frenum”) is the fold of connective tissue originating at the maxillary alveolar midline attaching the upper lip to the anterior surface of the maxillary gingiva.
- Restrictive frenum attachments present as a thick or tight tethering the upper lip to the maxillary labial attached gingival tissue. The attachment is theorized to interfere with the ability to flange the lip.^{1, 2,3}
- In infancy, the restrictive anatomy may impact the ability to latch while breast feeding, increase feeding time, and decrease lip mobility.⁴
- As the child ages, hyperplastic frenal attachments have been suggested to form pockets retentive for food, liquids, and can interfere with proper oral hygiene measures.⁵
- These anatomical interferences contribute to the complex dynamics of odontogenic demineralization and remineralization.³
- The relationship between maxillary frenum and maxillary anterior caries are largely anecdotal at this stage. Further research is required to substantiate cause-and-effect relationship.

Objective

This study intends to add to the literature on anatomical interferences and caries development. Specifically, if a more severe frenum classification is associated with increased caries in maxillary anterior dentition.

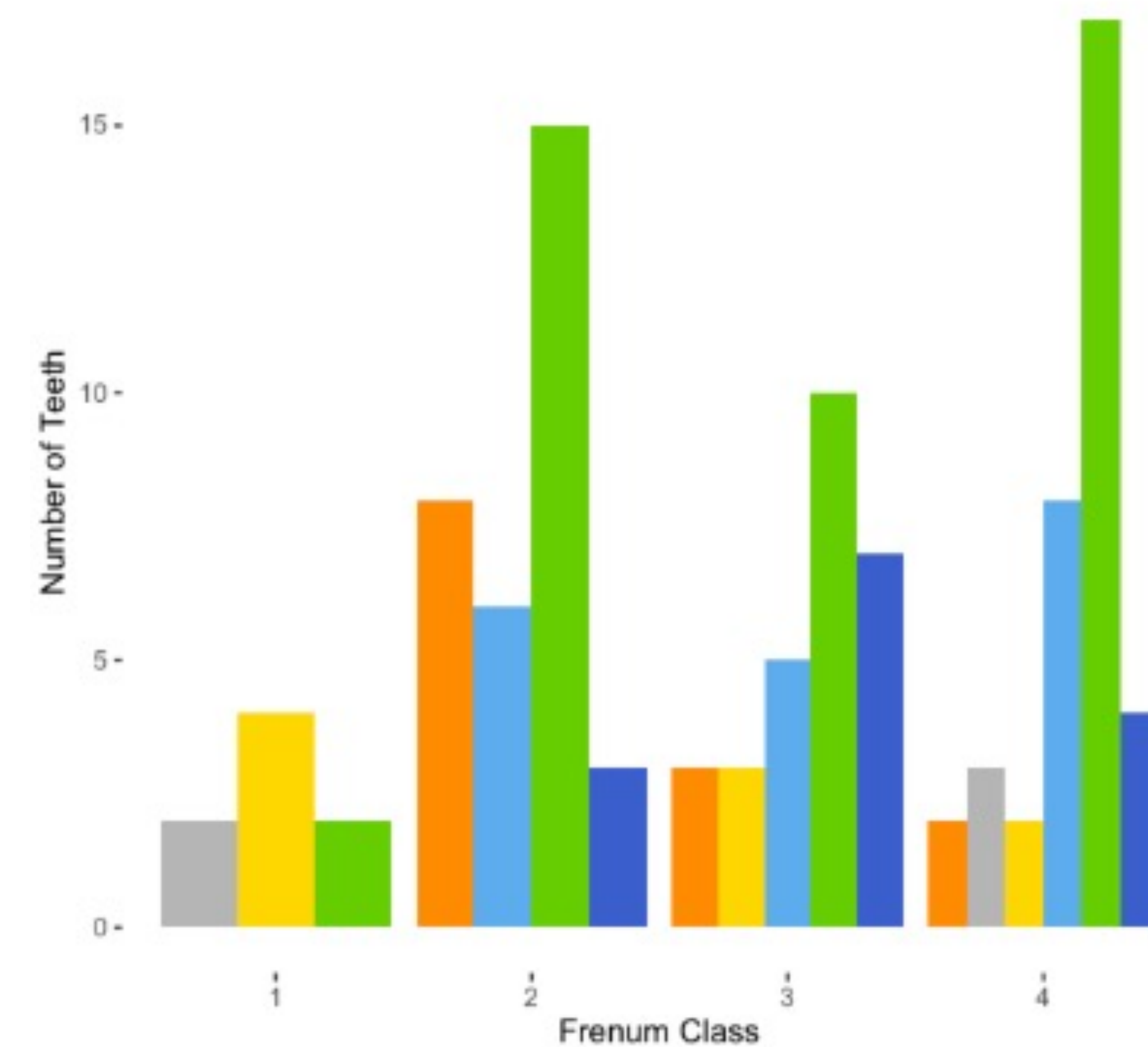
Methods

- This prospective cross-sectional study was conducted at the Children's National Medical Center Division of Oral Health following approval from the Institutional Review Board at Children's National Hospital.
- The study population consist of 26 children (ages 2 years to 6 years) with untreated facial-cervical caries on at least one maxillary incisor presenting to the Children National Hospital's Dental Clinic for routine care.
- Though photographs are within the standard of care, dental providers received verbal consent from the patient's guardian prior to taking photographs.
- Photographs were taken and frenum attachment graded using Kotlow Classification Method (Figure 1).²
- Caries severity was determined using the Smooth Caries International Caries Detection and Assessment System II⁷
- Data was analyzed using Analysis of Variance (ANOVA).

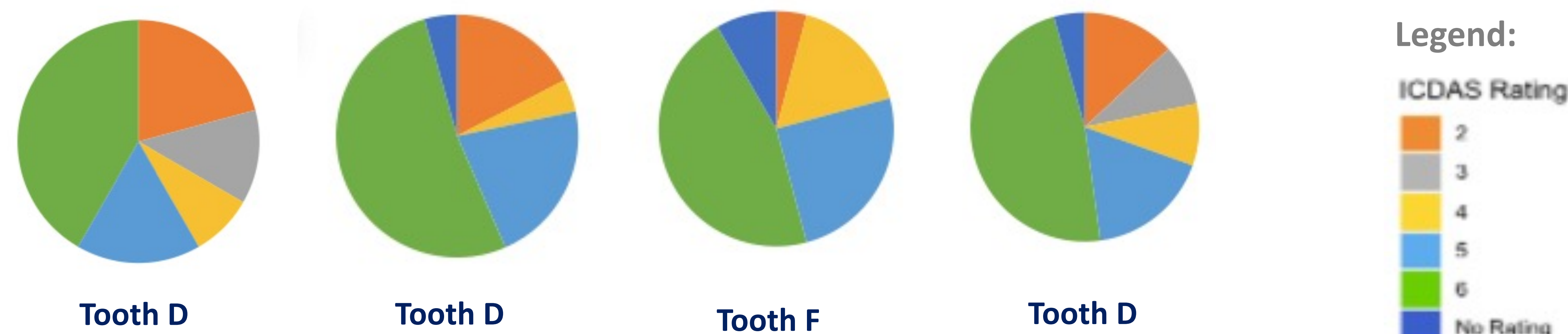
Figure 1



Distribution of ICDAS Classification by Frenum Class



Distribution of ICDAS Classification by Tooth



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Results

- ICDAS classification increases as the frenum grade increases
- The distribution of ICDAS classification by frenum class demonstrates that higher frenum classes have more teeth identified as ICDAS 5 or 6.
- Regardless of frenum class 69% of teeth had a severe ICDAS (ICDAS ≥ 4) classification.
- ANOVA test classification comparing severity between the different frenum classes had an F-stat = 0.39, p-value = 0.76.
- There is not a statistically significant difference in amount of severe caries between frenum classes.
- When evaluating ICDAS classification by tooth, there is an overall increase in the percentage of teeth with severe caries in the central incisors.

Conclusions

- Frenum class IV has the highest number of severe caries when compared to class I, II and III
- ICDAS values indicate that there is a similar caries distribution rate on all teeth amongst children with anterior smooth surface caries.
- When the ICDAS value is isolated by tooth, central incisors show a more consistent caries severity and more pronounced distribution of severe caries when compared to the lateral incisors.
- The consistency of ICDAS ratings, and the higher rate of severe caries presentation in Class IV ratings and on central incisors supports our hypothesis that restrictive frenum attachment may contribute to a more cariogenic environment.

Limitations

- This research was conducted in a high-caries-risk population, compromising external validity
- The small sample size limits the power of the study
- Future studies could further incorporate age of caries formation, diet, plaque score, oral hygiene practices, gender, race, or social economic status.

References

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