Speech Intelligibility in the Pediatric Dental Setting

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BACKGROUND

- Pediatric dentists often treat pre-cooperative children who create age-appropriate noise, including screams and cries.
  - Treatment type and treatment location may influence the amount of noise to expect from an appointment.
  - **May lead to increased miscommunication, decreased speech intelligibility**.
- Speech intelligibility
  - Degree to which speech sounds can be correctly identified and understood by listeners in a particular environment
- Articulation Index (AI) : A measure of Speech Intelligibility
  - Sound metric ranging from 0 → 1
  - 0 = No speech is understood
  - 1= All speech is understood

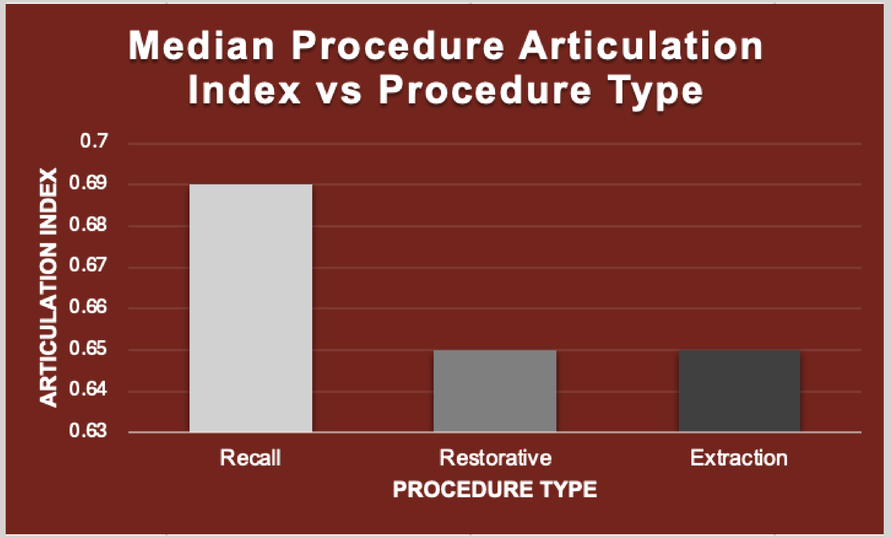
OBJECTIVES

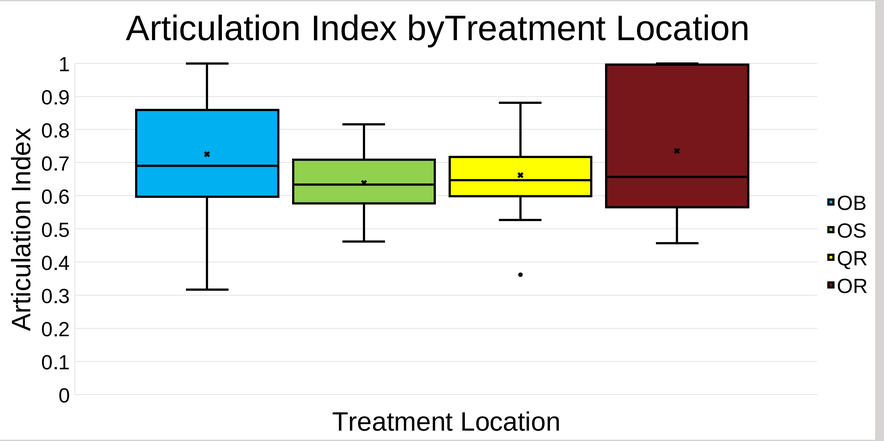
I. Compare the articulation index (AI) of different pediatric dental procedures and treatment locations

II. Understand how noise effects speech intelligibility in the pediatric dental setting

METHODS

- Background sound levels were analyzed using a **Sound Level Meter (SLM)** [Larson Davis Model 831C] in four locations over 19 clinical days
  - Quiet room (QR), open bay (OB), in-office moderate oral sedation suite (OS), and hospital outpatient operating room (OR)
- Chart data from 197 dental charts corresponding to the collected SLM data were obtained. The following information was acquired:
  - Dental procedures performed, treatment location, patient age, FRANKL score, type of isolation, use of protective stabilization, and post-graduate year of provider
- Categorical variables compared across treatment locations using either Chi-Squared Tests or Fisher's Exact Tests
- Continuous variables were compared across treatment locations using Kruskal-Wallis Test
- The AI of both location and procedure type were compared using multiple Kruskal-Wallis Tests





RESULTS

- The AI ranged from 0.3-1.0.
- The median AI per treatment location
  - Open Bay (0.69)
  - Quiet Room (0.65)
  - Oral Sedation (0.63)
  - Operating Room (0.66)
- The median AI per procedure type
  - Recall (0.69)
  - Restorative (0.65)
  - Extraction (0.65).
- The AI ranged from 'excellent' (>0.7) to barely 'acceptable' (0.3)
  - 'Unacceptable' is defined as <0.3
  - Median measurements were 'good' (range: 0.5-0.7)
- There was no significant difference of median AI values across treatment location or procedure types (p >0.05).

CONCLUSION and DISCUSSION

- The results suggest **that noise impacts speech intelligibility regardless of treatment location or procedure performed.**
- The median AI for each location and procedure fell into the "good" category, where 50%-70% of speech can be understood.
- OS treatment location had the lowest median AI (0.63)
  - Patients in OS are treated with protective stabilization and have lower FRANKL scores
- The open bay and recall appointments had the highest median articulation index and greatest amount of speech intelligibility between location and treatment type
  - FRANKL 4 (+,+) patients are more frequently treated in the open bay setting
- Future research is needed to assess how personal protective equipment, like hearing protection, will affect SI.

REFERENCES