The Behavior Effects of In-Office SARS-CoV-2 Nasopharyngeal Swab Testing on Pediatric Dental Patients Prior to Non-Intravenous Conscious Sedation Procedures

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BACKGROUND

SARS-CoV-2 was first detected in Wuhan, China in December 2019 and declared an official pandemic by the World Health Organization (WHO) March 2020. National statistics show, as of January 27th, 2022, children accounted for 18.6% of all COVID-19 cases in the United States, around 1.6-4.4% of all hospitalizations, and up to 0.26% of all deaths. The CDC recommended pediatric COVID-19 vaccinations for children aged 5-11 years on November 2, 2021, expanding vaccine recommendations to about 28 million children in the United States

Because SARS-CoV-2 replicates in the upper respiratory tract, nasopharyngeal swab testing has emerged as the diagnostic test of choice due to its higher specificity and sensitivity rates, as compared to other swab methods such as oropharyngeal swabs.

The behavioral effects of nasopharyngeal swab tests preceding dental treatment on pediatric dental patients has not been explored, particularly on uncooperative children planned for treatment with non-intravenous conscious sedation. The aim of this study was twofold; first, to assess the behavioral effects of children during the in-office nasopharyngeal swab testing for SARS-Cov-2, and second, to determine the effect in-office nasopharyngeal swab testing has on the behavior of children undergoing non-intravenous conscious sedation.

MATERIALS and METHODS

A retrospective chart review was conducted to identify children who had undergone swab testing followed by treatment with non-intravenous conscious sedation. Two trained and calibrated examiners (MP, KL) obtained the information from the patients' electronic health records. Any discrepancy in the data extraction process was resolved by the third examiner (JJ). Additional records were reviewed but excluded from the study if behavior was not recorded for both the nasopharyngeal swab appointment and the treatment appointment. The reliability of the examiners involved in the data extraction process was assessed using Cohen's Kappa analysis. An Excel spreadsheet was created to record the information including the patient's name, age, sex, ASA status, BMI, behavior during the nasopharyngeal swab test, administration route of sedation medications, treatment performed, duration of treatment, operator information, and behavior during the treatment (Table 1). Medications used included various combinations of oral meperidine (up to 1-2mg/kg, max 50mg), subcutaneous meperidine (up to 1mg/kg, max 25mg), oral diazepam (up to 0.25-0.3mg/kg, max 10mg), oral midazolam (up to 0.5-0.75mg/kg, max 15mg), and subcutaneous/intranasal midazolam (up to 0.5mg/kg, max 7mg). Selection of sedation medication was based on individual treatment needs, patient medical history, and provider preference. Duration of treatment ranged from 0-120 minutes. Behavior was categorized based on the Modified Frankl's Behavior Scale (1 = -/- definitely negative, 2 = - negative, 3 -/+ = negative positive, 4 = + positive, 5 = +/+ definitely positive).

Descriptive statistics (medians and proportions) were stratified based on the behavior during nasopharyngeal swab and during the dental treatment. Statistical significance was set at p<0.05 and Chi-square, Fisher tests were performed for categorical variables, and Wilcoxon tests were performed for continuous variables. The behavior score was modeled before and during treatment using linear regression to determine whether age, duration, ASA status, sedation medication administration route, and gender affected behavior. A similar proportional odds model for procedure behavior was implemented to account for the discreteness of the behavior score. All analysis was conducted in R statistical package (Version 4.0, Vienna, Austria).

RESULTS

In total, 110 children were identified as coded for an in-office SARS-CoV-2 nasopharyngeal swab test (D0999) followed by a non-intravenous conscious sedation procedure (D9248) with behavior adequately recorded at both appointments. Categorized by gender, there were 60 females and 50 males. The age of children ranged from 3-15 years old, with a median age of 6.00 years.

For the nasopharyngeal swab test, age was not associated with behavior during the nasopharyngeal swab. The correlation between behavior during swab testing and during the non- intravenous procedure (Figure 1) was 0.32 (Spearman, p<0.001). The mean behavior scores were similar at swab and during treatment, 3.1 vs 2.8, respectively (t-test, p=0.16). Duration of treatment was associated with behavior during treatment (Spearman rho 0.25, p<0.001). Females had a higher tolerance during nasopharyngeal swab behavior (p=0.006) and accounted for >70% of high compliance (5/5). In contrast, males accounted for >70% of poor compliance behavior (1/5). Males demonstrated statistically significant lower average behavior score compared to females during the swab (-1.0, p<0.001) and the treatment (-0.62, p<0.02). (Figure 2).

In-office nasopharyngeal swab testing did not appear to produce a statistically significant negative impact on the patient's behavior during the subsequent dental procedure appointment. Nasopharyngeal swab testing, however, was an independent predictor of behavior during treatment (Figure 3).

Characteristics	Beta	95% CI	p-value
Age	0.20	0.08, 0.32	0.001*
Sex			
Female	—	—	
Male	0.01	-0.51, 0.54	0.9
Asa status	-0.46	-1.0, 0.11	0.11
Covid Test Behavior	0.29	0.11, 0.46	0.002*
Sedation medication used/ Dose PO/SQ	-0.39	-1.0, 0.19	0.2
Sedation medication used/ Dose SQ	0.30	-0.66, 1.3	0.5
Duration of treatment	0.02	0.01, 0.03	0.003*

CI = Confidence Interval, *Statistically significant value, p<0.05

Table 1. Adjusted model for behavior during nasopharyngeal swab appointment.

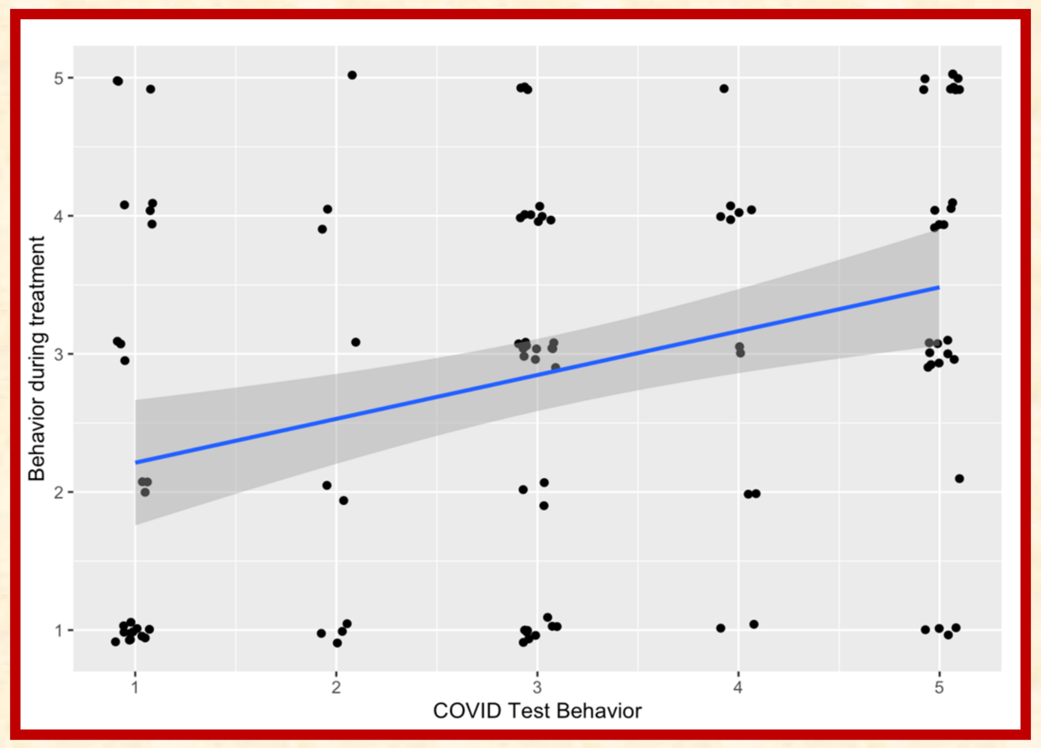

Figure 1. Correlation between the behavior scores during COVID test and during dental treatment.

RESULTS *(cont.)*

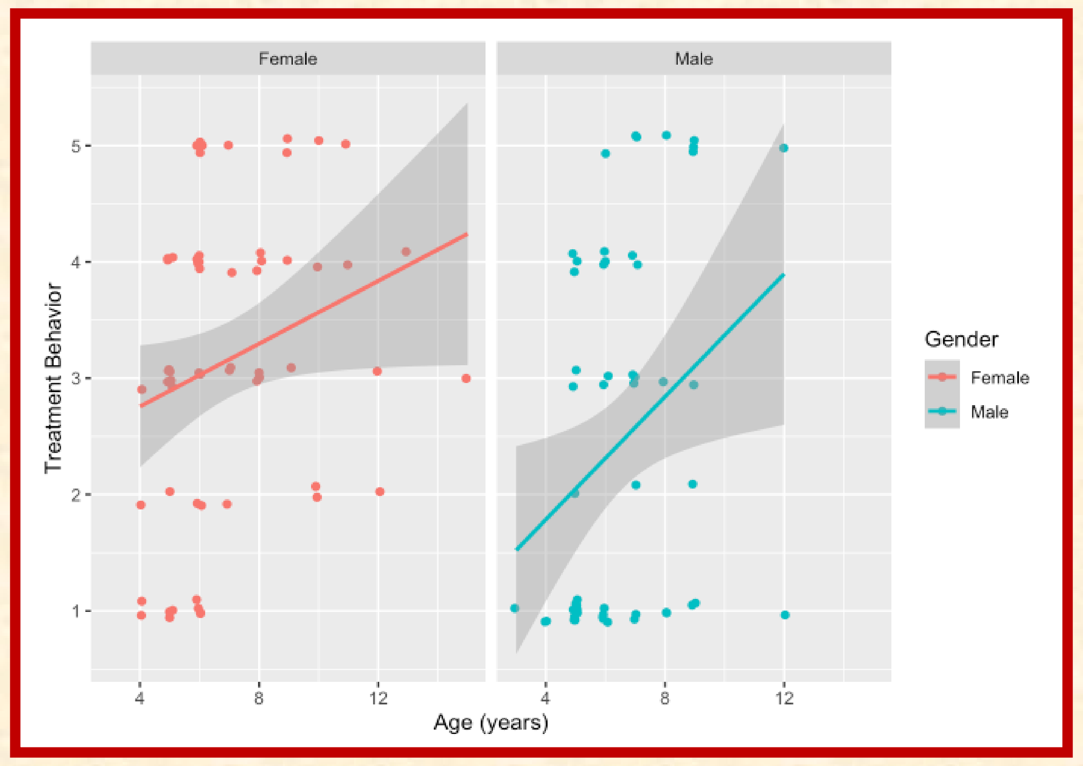

Figure 2. Behavior rating during nasopharyngeal swap appointment.

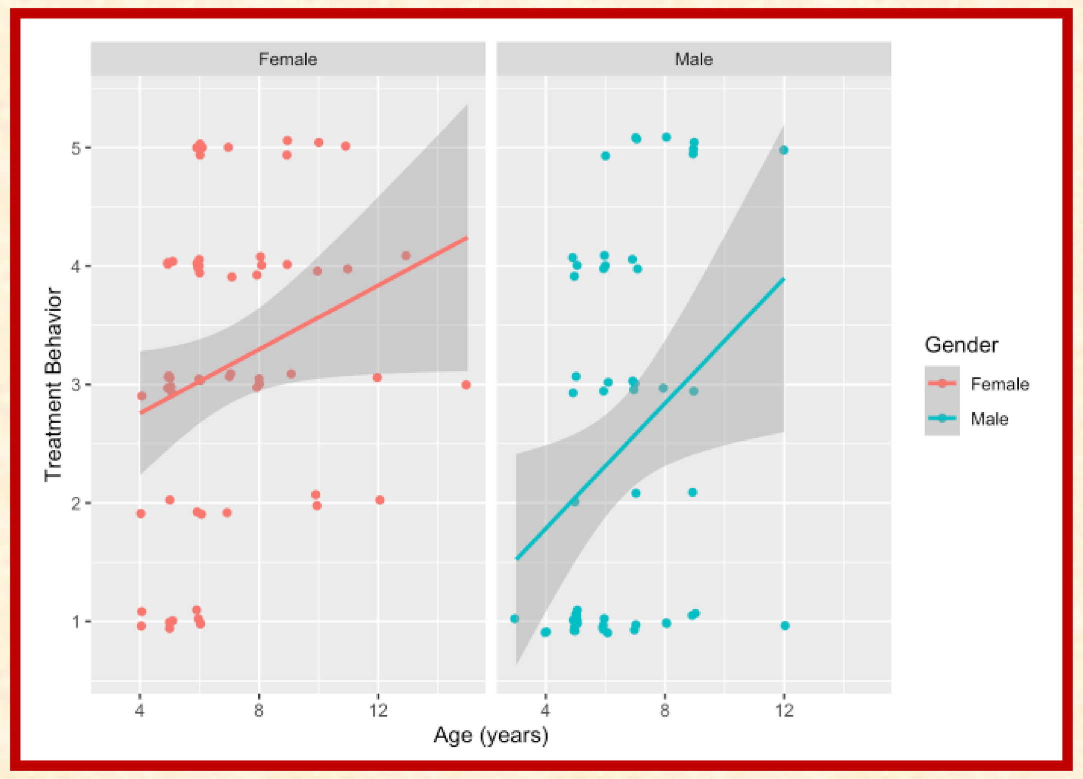

Figure 3. Behavior rating during dental treatment appointment.

CONCLUSIONS

1. The mean behavior scores were similar at swab testing and during treatment with non-intravenous conscious sedation, for both males and females.
2. Males demonstrated lower average behavior score compared to females during the nasopharyngeal swab testing and the dental treatment.
3. In-office nasopharyngeal swab testing did not appear to produce a negative effect on the patient's behavior during the subsequent dental procedure appointment, but nasopharyngeal swab testing was an independent predictor of behavior during treatment.

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