A Retrospective Study Comparing Post-Sedation Behavior With or Without Midazolam

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ABSTRACT

Purpose: This retrospective study compares patient behavior changes between pre- and post-sedation appointments based on whether Midazolam (IM/PO) was utilized.
Methods: Charts of pediatric patients from UTHealth School of Dentistry Pediatric Dentistry Clinic from 2- to 10-years-old who have had one or more non-intravenous conscious sedation with or without the use of Midazolam and have had a post-operative appointment within 6 months of their sedation were reviewed. All patients were ASA I/II classification, and sedation medication regimens include a combination of Midazolam, Meperidine, and Hydroxyzine. Extracted data include age, gender, sedation regimen/route, time between sedations, and behavior (treatment planning, pre-sedation, sedation, and post-sedation appointments). Data was analyzed using appropriate parametric analyses, with p-values less than 0.05 considered significant.
Results: One thousand fifty-six charts were analyzed. There was no significant difference (*P>.05*) in post-sedation appointment behavior based on Midazolam use. In general, the pre-second sedation Frankl score was higher than the treatment planning Frankl score (*P=.003*). For patients who had simple restorative treatment, the pre-second sedation (*P<.004*) and recall (*P<.006*) Frankl score was greater than the initial Frankl score. Analysis of sex, age, weight, and types of treatment are were individually analyzed against behavior and had significant differences (*P<.05)* in at least one timepoint. However, analysis of ASA classification and time between appointments had no significant difference in behavior changes (*P>.05).***Conclusions:*** There is no difference in post-sedation behavior with or without 0.2-0.5mg/kg Midazolam utilized in the study period of 6 months to 1 year at post-operative appointments

BACKGROUND

- Dental caries is the most common chronic disease among children 6-19 years old and there is a high dental phobia which ranges from 5-20%.
- Advanced behavioral guidance techniques, pharmacological and non pharmacological methods are approved by the AAPD to alleviate anxiety, enhance a positive dental attitude, and to perform safe and efficient oral health care.
- Moderate sedation is a drug induced depression of consciousness during which patients respond purposefully to verbal commands or after light tactile touching.
- Several medications used in moderate sedation including Meperidine, Midazolam, Hydroxyzine, and Nitrous have been studied extensively for efficacy and safety in IM, IN, and PO administration.
- Midazolam has been extensively studied for its effects on memory impairment, including both retrograde and anterograde amnesia.

The goal of this project is to compare the patients behavior changes in initial Frankl and Recall/Pre-second sedation Frankl scores to determine if sedation regiments with Midazolam would have better Recall/Pre-second sedation Frankl scores due to its amnestic properties.

METHODS

- This retrospective study was approved by the UTHealth Houston Institutional Review Board.
- Patients included in this study were from 2- to 10-years-old, ASA I/II classification, who have taken sedation medication regimens including a combination of Midazolam, Meperidine, or Hydroxyzine either IM or PO and a return visit within 6 months of the sedation.
- Collected data include date of services, age, gender, sedation regimen utilized, and behavior (Frankl score) at initial treatment planning appointment, sedation appointment, and return appointment.
- The data will then be compared between patients who have received regimens with and without Midazolam and two calibrated investigators will analyze post-op notes and Frankl scores.
- Statistical analysis completed to compare the two study groups. P-values <0.05 considered significant.

RESULTS

- 1056 patients fit the criteria and data was analyzed (Figure 1).
- Regardless of sedation regimen, there was no significant difference in Initial Frankl score and Recall/Pre-second Sedation Frankl score (*P* >.05; Figure 2).
- Patients who had simple restorative treatment (composite/amalgam restoration or band fitting) had higher Frankl scores during the pre-second sedation and recall appointment compared to initial appointment (Frankl 3.23, 3.15, and 2.67, *P*=0.004 and *P*=0.006, respectively; Figure 3).
  - There was no significant difference in Initial Frankl score and Recall/Pre-second sedation Frankl for no treatment, full coverage restoration, pulpal treatment, and extractions (p>0.05) (Figure 3).
- As age increases, pre-second sedation Frankl score is higher than Initial Frankl score and there is a greater difference in pre-second sedation Frankl score and Initial Frankl score (*P*=.04; Figure 4).
- There was no significant difference in Initial Frankl score and Recall/Pre-second sedation Frankl for gender, weight, and ASA category.

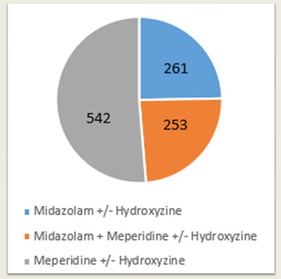

Figure 1: Breakdown of patients by sedation regimens

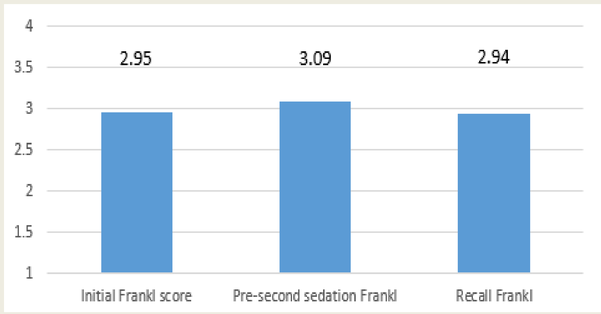

Figure 2 Non-significant Difference in Frankl Scores

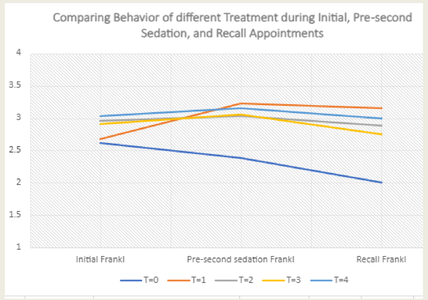

Figure 3 Frankl Scores using Different Treatment Types.

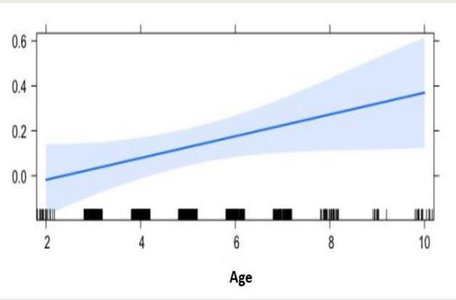

Figure 4: When comparing pre-second sedation to initial Frankl scores, as age increases, Frankl scores improve.

DISCUSSION

- ***In this study, there is no significant difference in Recall/Pre-second sedation Frankl behavior and Initial Frankl score.***
  - In literature, Midazolam has been shown to have an amnestic effect; however, there was no difference in behavior in our study.
- The results of this current study still **support the recommendations of the AAPD** for advanced behavior guidance techniques including pharmacological methods.

Limitations:
- Based on retrospective analysis of post-op notes. Different residents determining Frankl scores from 2011-2023.
- Adequate data at this time is only available for six months after sedation. Additional timepoints and Frankl scores could possibly show effectiveness of Midazolam and the amnestic effect.

Further research should focus on the continued effect of Midazolam and amnestic effect during sedation and recall appointments at later timepoints. Additional information at later timepoints can provide vital information on effects of further behavior improvement.

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