Assessing Sedation Using Patient-Centered Outcomes: Behavior, Safety, Efficacy

THE OHIO STATE UNIVERSITY

COLLEGE OF DENTISTRY

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BACKGROUND¹⁻³

Moderate Sedation:

- Advanced behavior management technique to minimize patient fear and prioritize patient safety
- Several medication combinations/routes of administration
- Risk of adverse events
- Need for more information on medications, safety, and efficacy

METHODS

- Cross-sectional Retrospective Cohort Study
- Dental patients (24-60 months) from 2015-20 at Nationwide Children's Hospital, Columbus, OH with dental procedure(s) and first moderate oral sedation (CPT D9248)
- Descriptive statistics and bivariate analyses compared medication regimens

Figure 1: Concept map for statistical analysis modeling each of four sedation outcomes: overall success, behavior success, safety success, and treatment outcome success.

• Age

- Gender
- LanguageRace
- Ethnicity

Exposure

Medication regimen and dosageSingle Medication Regimen

• ≥2 Medications Regimen

Sedation Variables

- Protective Stabilization
- Nitrous Oxide
- Sedation-related complications
- Paradoxical Reaction

Outcome Variables

- Behavior
- SafetyEfficacy (Treatment Outcome)

Medical Conditions (Confounders)

- American Society of Anesthesiologists status
- Behavioral Diagnoses
- Brodsky Tonsil Classification
- Weight status based on Body Mass Index Percentile
- Pre-Sedation Medical conditions
- Pre-sedation Behavioral Assessment
- Pre-Sedation Dental Clinic Visits
- Pre-Sedation Dental Treatment under General Anesthesia

PURPOSE

To evaluate pediatric dental sedation success using patient-centered outcomes for behavior, safety, and treatment.

RESULTS⁴

Figure 2. Behavior, Safety, Treatment Outcome, and Overall Sedation Success*.

Patients (24-60 months of age) meeting inclusion criteria treated with dental sedation from 2015-2020 (N=824)

Behavior Success: Frankl 3-4 (N=404, 49.0%)

Behavior Failure: Frankl 1-2 (N=420, 51.0%)

Safety Success**:
recorded SBP, DBP, HR ≤2
SD of age- and gendermatched sample means
and SpO2 ≥94% (N=655,
79.5%)

Safety Failure**: recorded SBP, DBP, HR >2 SD of age- and gender-matched sample means and SpO2 <94% OR no vital signs recorded (N=169, 20.5%)

Treatment Success: recommended next visit for restorative visit with or without sedation or for hygiene (N=512, 62.1%)

Treatment Failure: recommended next visit GA (N=312, 37.9%)

OVERALL SUCCESS: ≥2 Successes (N=571, 69.3%) OVERALL FAILURE: <2 Successes (N=253, 30.7%)

*Abbreviations used in this figure: SBP=systolic blood pressure; DBP=diastolic blood pressure; HR=heart rate; SpO2=oxygen saturation

**Subjects without vital signs were not included in mean/standard deviation calculations

ADDITIONAL TABLES & REFERENCES



RESULTS

Table 1: Overall, Behavior, Safety, and Efficacy for 1 versus ≥2 Medications and Intranasal versus Oral Midazolam.

	Overall	Behavior	Safety	Treatment
	Success	Success	Success	Success
	N (%)	N (%)	N (%)	N (%)
Number of sedation medications (N=824)	<i>P</i> = 0.17	<i>P</i> = 0.52	<i>P</i> = 0.07	<i>P</i> = 0.63
1	503	357	577	454
	(68.5)	(48.6)	(78.6)	(61.9)
≥2	68	47	78	58
	(75.6)	(52.2)	(86.7)	(64.4)
Midazolam Only (N=723)	<i>P</i> = 0.05	<i>P</i> = <0.001	<i>P</i> = 0.005	<i>P</i> = 0.23
Intranasal	361	242	413	343
	(66.5)	(44.6)	(76.1)	(63.2)
Oral	140	113	162	110
	(74.1)	(59.8)	(85.7)	(58.2)

DISCUSSION & CONCLUSIONS

- 1. In this patient-centered, rather than clinician-driven approach to outcome measurement, ~70% of sedations were successful; all regimens exceeded 75% safety success confirming literature-reported efficacy of moderate sedation in pediatric dental treatment^{2,5-11}.
- 2. Combination regimens were not associated with increased success or impaired safety, which encourages use of the minimal number of drugs to avoid adverse events¹².
- 3. Intranasal midazolam was less effective for behavior and safety success than oral, possibly attributable to nasal irritation¹³.
- 4. Older age, male gender, healthy weight, fewer previous dental clinic visits at NCH predicted success.