

Pediatric Dental Post-Sedation Discharge Events and Proper Discharge Timing

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PURPOSE

To evaluate the validity and inter-rater reliability of the Modified Aldrete Score (MAS) and the Vancouver Recovery Score (VRS) for discharge assessment following pediatric dental moderate sedation, and to compare post-discharge recovery outcomes across commonly used sedation regimens.

BACKGROUND

- Sedation is an advanced behavior guidance technique used to reduce anxiety and facilitate pediatric dental treatment.
- Commonly used medications include midazolam, hydroxyzine, dexmedetomidine, ketamine, and chloral hydrate¹.
- Safe discharge following sedation is critical, as residual effects may persist after leaving the clinical setting.
- Post-sedation discharge effects can include drowsiness, agitation, motor imbalance, and delayed return to baseline behavior and activity²⁻⁶.
- Current AAPD guidelines on discharge emphasize patient consciousness and airway stability but rely on clinical judgement, which may introduce variability in discharge readiness assessment⁷.
- MAS, commonly in medicine, evaluates physiologic recovery relative to baseline, but does not measure a detailed level of alertness.⁸
- VRS evaluates 12 items across three domains of alertness (response, eyes, and movement) and has shown excellent internal consistency and reliability in medicine.⁹

METHODS

- Prospective observational study of 115 children (1/5/2022-12/11/2025)
- Inclusion criteria: 3-6 years old, ASA I or II, and English speaking
- Patients were given one of the following sedation regimens:
 - PO or IN Midazolam
 - PO Midazolam/PO Hydroxyzine
 - IN Dexmedetomidine (DEX)
 - PO Midazolam /IN DEX
 - PO Triazolam
- MAS and VRS were recorded preoperatively and at 5-, 10-, 15-, and 20-minutes post operatively (Figure 1 and 2).
- Caregiver survey assesses post-discharge recovery (Figure 3).
- Descriptive statistics, signed-rank tests, and Fischer's exact tests were used to summarize results. Data was analyzed with SAS v9.4.

| Criteria | Characteristics | Points |
|-------------------|--|--------|
| Activity | Able to move 4 extremities | 2 |
| | Able to move 2 extremities | 1 |
| | Unable to move extremities | 0 |
| Respiration | Able to breathe deeply and cough freely | 2 |
| | Dyspnea or limited breathing | 1 |
| | Apneic | 0 |
| Circulation | BP ± 20% of pre-anesthetic level | 2 |
| | BP ± 20-49% of pre-anesthetic level | 1 |
| | BP ± 50% of pre-anesthetic level | 0 |
| Consciousness | Fully awake | 2 |
| | Arousable on calling | 1 |
| | Not responding | 0 |
| Oxygen saturation | Able to maintain O ₂ saturation >92% on room air | 2 |
| | Needs oxygen to maintain O ₂ saturation >90% | 1 |
| | O ₂ saturation <90% even with supplemental oxygen | 0 |

Figure 1: Modified Aldrete Score

- Did your child fall asleep on the ride home?
 - Yes
 - No
- How would you rate your child's alertness after he/she returned home?
 - Asleep
 - Asleep but easy to awaken
 - Awake but drowsy
 - Awake and alert
- How would you rate your child's behavior after he/she returned home?
 - Normal
 - Agitated (feeling or appearing troubled or nervous)
 - Restless (unable to rest or relax)
 - Withdrawn (not wanting to communicate with other people)
- How would you rate your child's activity level after he/she returned home?
 - Less active than usual
 - Same as usual
 - Hyperactive
- Time to return to normal activity after returning home?
 - 0 hours
 - Less than 2 hours
 - 2-4 hours
 - 4-6 hours
 - Greater than 6 hours
- Did your child have any breathing difficulties?
 - Yes
 - No

Figure 3: Parent Survey

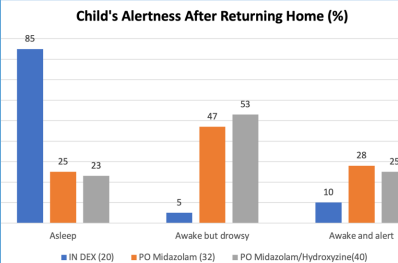


Figure 4: Children alertness after returning home

| Criteria | Characteristics | Points | |
|------------------------------------|--|----------------------------------|---|
| Response | Awake/alert | 4 | |
| | Awake/drowsy | 3 | |
| | Asleep/easily aroused | 2 | |
| | Asleep/difficult to arouse | 1 | |
| | Asleep/unable to arouse | 0 | |
| (B) | Responds fully to stimuli in an age-appropriate manner | 2 | |
| | Delayed response to stimuli | 1 | |
| | Absent response to stimuli | 0 | |
| | "Alert" facial expression | 1 | |
| (C) | "Fiat" facial expression | 0 | |
| | | | |
| Eyes | Bright eyes | 1 | |
| | Dull eyes, glazed | 0 | |
| | Looks "at you" | 1 | |
| | Looks "through you" | 0 | |
| | Accommodates | 1 | |
| (F) | Does not accommodate | 0 | |
| | Recognition of stimulus | 1 | |
| (G) | Limited or no recognition of stimulus | 0 | |
| | Purposeful and spontaneous eye movement | 1 | |
| (H) | Little or no spontaneous or purposeful eye movement | 0 | |
| | | | |
| Movement | Spontaneous and varied central activity | 4 | |
| | Spontaneous and varied peripheral activity | 3 | |
| | Central activity in response to stimuli | 2 | |
| | Peripheral activity in response to stimuli | 1 | |
| | No movement | 0 | |
| | (I) | Absence of tremor or ataxia | 2 |
| | | Minor ataxia or tremor | 1 |
| | (J) | Major ataxia or tremor | 0 |
| | | Coordinated spontaneous movement | 2 |
| | (K) | Weak/coarse spontaneous movement | 1 |
| No purposeful spontaneous movement | | 0 | |
| (L) | Shows age-appropriate manual dexterity | 2 | |
| | Awkward or clumsy hand movements | 1 | |
| | No fine hand movement | 0 | |

Figure 2: Vancouver Recovery Score

Children Who Fell Asleep on the Ride Home (%)

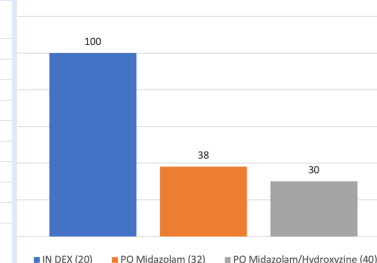


Figure 5: Children alertness on way home

RESULTS

- High inter-rater reliability between nurse and resident scoring: MAS 93% and VRS 71%; with no significant differences between raters.
- Median MAS and VRS scores remained at maximum value pre and post operatively with minimal change from baseline.
- Caregiver surveys (n=99) showed that 51% fell asleep on the ride home, 38% were awake but drowsy at home, 54% were less active than usual, and most patient returned to baseline within 2-6 hours.
- IN DEX was significantly associated with increased post-discharge sleep compared to PO midazolam and PO midazolam/hydroxyzine. 100% of IN DEX patients fell asleep on the ride home (P<.001) and 85% were asleep or asleep but easy to wake at home (P < .001) (Figure 4 and 5).
- No significant differences were observed between medication groups for behavior, activity level, or time to return to baseline.

CONCLUSIONS

- The VRS and MAS are appropriate tools, with high inter-rater reliability, for assessing discharge readiness following pediatric dental sedation.
- Mild post-discharge drowsiness is common, particularly with IN DEX.
- Standardized discharge criteria and caregiver education remain essential for patient safety.

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