



PURPOSE

- The aim of this prospective study was to improve the quality of discharge procedures by validating the use of the Modified Aldrete Score (MAS) and Vancouver Recovery Score (VRS) in pediatric dental sedation, and to limit or reduce any post-discharge re-sedation and the risks for adverse events.

BACKGROUND

- Sedation dentistry is becoming more prevalent as dental fear and anxiety are common among children.
- Medications used to achieve conscious sedation in the pediatric population include, but are not limited to, nitrous oxide, sevoflurane, benzodiazepines, ketamine, propofol, opioids, and sufentanil,¹ all with limitations.
- Prolonged sleepiness, motor imbalance, agitation and other behavior changes, and delayed time to return to normal activity are the most frequently reported post-sedation discharge events.²
- Much information on pharmacokinetics, favorable features, and adverse effects of above medicaments exist, but very little research on how patients recover at home post-discharge.
- Agitation may include whines, cries, restlessness, or physical combativeness.^{3,4,5}
- Current AAPD recommended discharge criteria may lead to variability in the assessment of discharge readiness due to observer interpretation.⁶
- MAS compares post-operative vitals and how awake a child is to his/her pre-procedure score (commonly used in pediatric sedations).
- VRS identifies 12 distinct items that encompass three categories of alertness indicators (commonly used in medicine) and has shown excellent internal consistency and reliability.⁷

Criteria	Characteristics	Points
Response	Awake/alert	4
	Awake/drowsy	3
	Asleep/easily aroused	2
	Asleep/difficult to arouse	1
	Asleep/unable to arouse	0
(A)	Responds fully to stimuli in an age-appropriate manner	2
	Delayed response to stimuli	1
	Absent response to stimuli	0
(B)	*Alert* facial expression	1
	Flat facial expression	0
Eyes	Bright eyes	1
	Dull eyes, glazed	0
	Looks "at you"	1
	Looks "through you"	0
	Accommodates	1
	Does not accommodate	0
	Recognition of stimulus	1
	Limited or no recognition of stimulus	0
	Purposeful and spontaneous eye movement	1
	Little or no spontaneous or purposeful eye movement	0

Figure 2: Vancouver Recovery Score

Criteria	Characteristics	Points	
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	

METHODS

- This prospective cohort study recruited 40 children.
- Inclusion criteria: 3-6 years old, ASA I or II, and English speaking.
- Children scheduled for dental treatment with in-office moderate sedation were given one of the following medicaments:
 - PO Midazolam.
 - PO Midazolam/PO Hydroxyzine.
 - IN Dex.
 - IN or PO Midazolam/IN Dex.
 - PO Triazolam.
- Recovery scales were used at 5-, 10-, 15-, and 20-minutes post operatively (see Figures 1 and 2).
- Parental survey was given to assess how the patient recovered at home after treatment.

DATA ANALYSIS

- Descriptive statistics of demographics and sedation scores were completed. Categorical data were calculated as frequency count (%) and scores were presented as median (interquartile range with 24th percentile, 76th percentile). Median VRS and MAS and agreement were calculated. Descriptive statistics of post-discharge adverse events reported by the parents was completed.
- Data was analyzed with SAS v9.4.

RESULTS

- The median age was 5.7 years old with 60% male and 40% female included in the study.
- 60% of the patients received PO Midazolam/PO Hydroxyzine, 18% PO Versed, 10% IN Dex, 5% PO Midazolam/IN Dex, 3% IN Dex/IN Midazolam, 3% PO Triazolam, and 3% IN Midazolam.
- The residents' and nurses' VRS scores post-operatively agreed for 84% of cases, and MAS scores agreed for 100%.
- Pre-operatively, the median VRS was 22 and the median MAS was 10. Post-operatively at 20 minutes, the medians remained the same for both.
- By parent report, 51% of patients were awake but drowsy at home, 57% were agitated or restless, 62% were less active than usual, and 67% returned to normal activity between 2-6 hours after returning home.

CONCLUSION

- Based on this study's current data, the VRS and MAS scores are global scales that show potential to quantify discharge criteria after pediatric dental sedation.

LIMITATIONS

- Small sample size.
- Inability to fill out scales during and after treatment due to patient's poor behavior.
- Parent compliance with survey.

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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