



PURPOSE

- The aim of this study was to validate discharge scales, the Modified Aldrete Score (MAS) and the Vancouver Recovery Score (VRS) in pediatric sedation and to compare the post-discharge effects of commonly used moderate sedation medications in pediatric dentistry.

BACKGROUND

- Sedation dentistry is a common practice in which medications are used to help combat patient's dental fear and anxiety during a procedure to aid in successful treatment.
- The goal of pediatric dental treatment is enhanced patient outcomes, while prioritizing safety not only during the treatment, but ensuring the safe and timely discharge after sedation.
- Sedation drugs can be administered through various routes such as oral, nasal, intramuscular, intravenous (IV), subcutaneous, and inhalational routes¹ and include but are not limited to, midazolam, hydroxyzine, dexmedetomidine, ketamine, and chloral hydrate.²
- Post-sedation discharge events may include prolonged sleepiness, motor imbalance, delayed time to return to normal activity³ and agitation, which may include whines, cries, hallucinations, restlessness, or physical combativeness.^{4,5,6}
- Current AAPD recommended discharge criteria focus on patient consciousness and O2 saturation⁷, and may lead to variability amongst providers due to objective interpretation.
- MAS, which is commonly used in pediatric dental sedation, compares post-operative vitals and how awake a child is to their pre-procedure score, but fails to measure alertness.⁸
- VRS, commonly used in medicine, identifies 12 distinct items that encompass three categories of alertness indicators. It has shown excellent internal consistency and reliability.⁹

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 Not responding	1 0
Oxygen saturation	Able to maintain O ₂ saturation >92% on room air	2
	Needs oxygen to maintain O ₂ saturation >90% O ₂ saturation <90% even with supplemental oxygen	1 0

Figure 1: Modified Aldrete Score

Criteria	Characteristics	Points
Response		
(A)	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
(C)	"Alert" facial expression	1
	"Flat" facial expression	0
Eyes		
(D)	Bright eyes	1
	Dull eyes, glazed	0
	Looks "at you"	1
	Looks "through you"	0
	Accommodates	1
(E)	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
Criteria Characteristics Points		
Movement		
(I)	Spontaneous and varied central activity	4
	Spontaneous and varied peripheral activity	3
(J)	Central activity in response to stimuli	2
	Peripheral activity in response to stimuli	1
(K)	No movement	0
	Absence of tremor or ataxia	2
(L)	Minor ataxia or tremor	1
	Major ataxia or tremor	0
(M)	Coordinated spontaneous movement	2
	Weak/coarse spontaneous movement	1
	No purposeful spontaneous movement	0
	Shows age-appropriate manual dexterity	2
(N)	Awkward or clumsy hand movements	1
	No fine hand movement	0

Figure 2: Vancouver Recovery 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

METHODS

- A prospective cohort study of 70 children, 1/5/2022-12/13/2023
- 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 medications
 - PO Midazolam
 - IN Midazolam
 - PO Midazolam/PO Vistaryl
 - IN Dexmedetomidine (Dex)
 - PO Versed/IN Dex
 - PO Triazolam
- Recovery scales were used 5-, 10-, 15-, and 20-minutes post operatively (Figure 1 and 2)
- Parental survey was given to assess how patient recovered at home after treatment (Figure 3)

DATA ANALYSIS

- Descriptive statistics were completed
- Categorical data are presented as frequency count (%) and scores are presented as median [interquartile range with 25th percentile, 75th percentile].
- Data were analyzed with SAS v9.4.

RESULTS

- The resident's and nurse's VRS scores post-operatively agreed for 73% of cases and MAS scores agreed 97%
- Pre-operatively, the median VRS was 22 and median MAS was 10. Post-operatively at 20 minutes, the medians remained the same for both.
- By parent report, 42% of patients were awake but drowsy when home, 42% were agitated, 58% were less active than usual, 67% returned to normal activity between 2-6 hours after returning home

CONCLUSIONS

- 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

- Inability to fill out scales during and after treatment due to patient's behavior
- Parent compliance with survey
- Uneven distribution of drug regimen used

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