

# Morbidity and Mortality Involving Pediatric Dental Sedation: Non-Compliance Following Sedation Guidelines

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## Abstract

This editorial serves to discuss the tragic occurrence of morbidity and mortalities reported with the use of pediatric dental sedation and its etiological factors. Literally thousands of in-office sedations for management of varying levels of childhood dental anxiety and uncooperative behavior are performed successfully on a daily basis throughout the U.S. Since 1985, safety guidelines which describe expectations and responsibilities of pediatric dental specialists to insure patient safety have been in place. These guidelines have been reviewed and updated by multiple health care disciplines since their inception. To date, when guidelines are implicitly followed, no reports of morbidity and mortality have been presented. In recent years, constraints have been placed by various state and institutional settings on the use of a few agents with long track records of safety due to misuse. One agent in particular has been removed from the marketplace and production for reasons related to excessive/inappropriate dosing. Non-compliance with safety guidelines appears to remain the common denominator across multiple levels to account for sedation mishaps. Suggestions are made to enhance favorable outcomes and minimize and eliminate adverse reactions and mismanagement.

## Mini Review

Despite the development and continuous updating of guidelines for the safe and effective use of in-office pediatric dental sedation, instances of morbidity and mortality continue to appear. Originally presented in 1985 by the American Academy of Pediatric Dentistry along with conjoint efforts by other health care disciplines (American Academy of Pediatrics, American Society of Anesthesiology, American Dental Association, American Association of Oral and Maxillofacial Surgery) safety guidelines have served to define expectations and requirements for responsible agent and dosage selection, patient pre-operative physical evaluation, patient monitoring, personnel, facility, and emergency equipment demands; proficiency in advanced airway management, recognition and management of adverse reactions and medical emergency characterize the in-depth nature of these guidelines.

Enforcement, however, of practitioner compliance with existing guidelines to insure patient safety remains a dilemma. Management of moderate to heightened levels of anxiety and

uncooperative child dental behaviors represents a daily task for the pediatric specialist. Most young and older children possess cooperative potential whereby conventional communication strategies prove sufficient to permit treatment when needed. There are those, however, who are below the age of reason, possess negligible attention spans, lack cognitive and coping skills, having little or are no experience coping with stress, where more advanced behavior management techniques (conscious and unconscious sedation) becomes necessary to overcome disruptive and interfering behaviors.

Advanced training programs as of today exhibit wide variation with respect to sedation training curricula and experience. Dosage selection for single agents and combinations commonly used for the pediatric patient range from one extreme to another. Few programs currently include a diverse repertoire of agents to manage the manifestations of pediatric dental anxiety and uncooperative behavior. In an effort to avoid potential for over-dosage, current trends appear in the direction of using sub-therapeutic low-range dosing, or frequent deployment of general anesthesia [1]. A vast majority of programs have

restricted their armamentarium only to agent(s) with reversal capabilities, (e.g. midazolam). This benzodiazepine represents the most frequently used sedative agent for pediatric sedation. It has a short or ultra short duration of action and becomes predictably useless when visits exceed 10-20 minutes; potency is unpredictable and dosing by either oral, intranasal, or injectable routes carries an accepted and anticipated need for patient immobilization/physical restraint. From a parental perspective, need for such measures when deploying pharmacological agents can be expected to offset if not nullify the intent and rationale of selecting patient sedation measures.

One sedative/hypnotic agent (chloral hydrate) used safely for over 50 years, both alone and in combination, known for its broad range of safety, and longer duration of action has recently been discontinued in oral elixir formulation due to misuse and excessive dosing. This has created a significant void for visits with extensive treatment need and lengthier periods of cooperation. Use of high ended dosing well above manufacturer recommendations resulting in prolonged recovery periods, morbidity, and mortalities have prompted several state regulatory agencies and some institutions to ban its teaching and use. Despite being one of the most frequently selected agents, time-tested, with very specific upper limit dosing recommendations, mishaps have been reported, leading to its removal. In each instance, dosing despite abundant study and warnings to avoid exceeding maximal single dosing, reports of morbidity and mortality have appeared when manufacturer recommendations have been grossly ignored. In all cases, significant departures, occurring across several planes, from guideline compliance accounted for mishaps. In addition to clinician non-compliance following safety guidelines, excessive use of local anesthetic grossly exceeding maximum recommended dosing, in combination with reasonable sedative agent dosing collectively account for a majority of episodes of morbidity and mortality [2].

Numerous reports of morbidity and mortality have become public knowledge and of growing concern. The Raven Maria Blanco Foundation, a pro-active internet blog aggressively seeks to increase public awareness of numerous cases of misuse and incompetency of pediatric dentists, reporting 31 fatalities over the past 15 years. While lacking in eloquence, their message is clear and not without merit and justifiable national notice. Concern and criticism by disciplines outside pediatric dentistry [3-5] have examined etiologies of mishaps, and conclude that assurances of practitioner knowledge and proficiency are in general, not in place to support the use of sedative techniques without advanced airway management skills. Practitioner proficiency in the ability to prevent, recognizes, and manages an adverse reaction or medical emergency is under question. Of note, virtually all pediatric dental residencies and graduate programs require their students to secure PALS (Pediatric Advanced Life

support) certification. Reinforcement and refinement of these skills subsequently, however, following completion of advanced training, does not readily occur and future curriculum and state agencies need explore remedies. Verification of office compliance with emergency equipment, personnel proficiency and patient monitoring demands appear lacking.

Public awareness, particularly for cases involving mortality, is often suppressed within the legal system. Factual and contextual analyses as to the causes of mishaps are not readily made available once litigation ensues; out-of-court settlements generally restrict disclosure of actual events, medication dosing and involved parties. The dental profession and its various components while aware of these occurrences often choose to refrain from imposing significant or lengthy punitive and licensure retraction against those guilty of intentional or unintentional departure from safety guidelines and standards of care. Only under circumstances where criminal charges are brought do long-standing sanctions appear to take place. To date, the American Academy of Pediatric Dentistry chooses not to accumulate a national data bank of mishaps, nor indefinitely sanction colleagues found to have deviated from the standards of care where mortality has occurred. A more aggressive stance regarding the consequences of safety guideline departure might be considered beneficial to the interests of parents, patients, and practitioners alike. Their focus to date essentially remains directed at the provision of continuing education, evidence-based support for strict adherence to safety guidelines, and enhanced proficiency in emergency management training. While laudable, explanation to an affected parent and family, victims of operator negligence and disregard for safety guideline compliance, seems inadequate.

### Conclusion

In rare instances do any states currently mandate recertification of office compliance and practitioner proficiency in the continued use of in-office sedation procedures? While prohibitively time and manpower consuming, such measures might be considered. At present, such energies remain reactive rather than pro-active. Needed is legislation with the establishment of a national database of pediatric and adult sedation mortalities accompanied by mandatory licensure termination where non-compliance is determined as the causative factor with existing safety guidelines. Such endorsements might best be initiated and supported by medical and dental associations, and respective legislative bodies.

### Reference

1. Wilson S, Nathan JE (2011) A Survey Study in Sedation Training in Advanced Pediatric Dentistry Residencies. *Pediatr Dent* 33(4): 353-360.
2. Nathan JE (2015) The Direction of Pediatric Sedation: A Contemporary and Historical Look at its Science, Art, Strengths and Shortcomings. *Inter J Otorhinolaryngology* 1(1): 8-15.

3. Cravero JP, Blike GT, Beach M, Gallagher SM, Hertzog JH, et al. (2006) Incidence and nature of adverse events during pediatric sedation/ anesthesia outside the operating room: Report from the Pediatric Sedation Research Consortium. *Pediatrics* 118(3): 1087-1096.
4. Coté CJ, Karl HW, Notterman DA, Weinberg JA, McCloskey C (2000) Adverse Sedation Events Pediatrics: Analysis of medications used in sedation. *Pediatrics* 106(4): 633-644.
5. Lee HH, Milgrom P, Starks H, Burke W (2013) Trends in Death associated with pediatric dental sedation and general anesthesia. *Paediatr Anaesth* 23(8): 741-746.