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Chapter 11.

(These are the first 2 pages of the printed book's 11 page chapter.)

DENTISTRY SEDATION and ANESTHESIA MEDICATION ADMINISTRATION ERRORS.

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1. INTRODUCTION.

Patients, particularly children, are often administered deep sedation or general anesthesia to facilitate their tolerance of dental procedures. The permitted standards of anesthesia care for this are evolving and have been very different around the world. In nearly all countries, dentists receive a modicum of training in core anesthesia theory and spend at least one month in training performing anesthesia care under close physician-anesthesiologist supervision. This aids them in administering sedation/anesthesia to their dental patients.

Although still a large ongoing problem, drug errors in adult anesthesia have been receiving attention for a very long time. Drug errors in pediatric anesthesia have only received separate attention recently. The 2018 Anderson [review](#) on pediatric anesthesia errors revealed the highly complex challenges specific to the pediatric anesthesia population¹. This highly respected author has worked with the world's leading 2 experts, Webster and Merry, in anesthesia drug errors in a country, New Zealand, that leads the world in measuring and rectifying anesthesia drug errors and having a safety culture that supports voluntary reporting of all anesthesia drug error events.

Medication issues cause 35% of adverse events in pediatric anesthesia. Leading errors in this patient subsector relate to ampule swaps, syringe swaps, and dosing errors. Dosing errors are often 10-fold errors due to incorrect drug dilutions. Less than 2% of children are weighed before calculating their drug doses. Pediatric drug elimination varies with age as well as with body mass. Different drugs need different adjustments; for example, propofol is best administered related to total body weight, and muscle-relaxant drugs are best administered to the estimated *lean body mass*. It is recommended that, ideally, all drugs prepared for the sedation-anesthesia of children need a double check. A double check may be a second-person or machine-based check such as bar code scanning. The full list of pediatric sedation-anesthesia-specific safety recommendations is a very large knowledge set to learn for a career-trained adult physician anesthesiologist and a much heavier burden for a dentist to know and understand who does both the dental surgery and the sedation-anesthesia. That is a large added work burden or cost for small, busy single-dentist office-based surgery practice.

A study was reported in 2017 by the American Society of Pediatric Anesthesia using their database of voluntary de-identified "Wake up Safe" adverse event reporting system². Dental pediatric anesthesia done outside of hospitals was not mentioned. Two hundred and seventy-six drug errors were identified for analysis. The most common error was a

dose error. Eighty percent of drug errors had a clinical consequence, with 5% needing life-preserving interventions. They commented that with certainty, very *many pediatric anesthesia drug errors go unreported*. Their strongest recommended safety adjustment was to encourage voluntary reporting of pediatric anesthesia drug errors to facilitate learning about root causes of errors, promote subject education, and conceive remedies to improve patient safety. This applies strongly to dentists performing pediatric patient sedation and anesthesia.

For over 40 years, it has been recognized that when the dentist works alone, providing both dental surgery and anesthesia, patient mortality is about double the mortality rate when a separate physician anesthesiologist provides the anesthesia care. It has also been recognized that to render dental sedation and anesthesia safely, the person must have had specific additional and substantial medical training for the task³.

In the USA, it is common for the dentist to provide both sedation/anesthesia care and dental surgical care simultaneously. There may be a low-trained second person assisting in most countries, but with the burden of observing the patient's vital signs and *simultaneously assisting with the dental surgery*. Trained physician anesthesiologists with undivided responsibilities do make anesthesia drug errors. Therefore, it is certain that dentists or dental assistants also make anesthesia drug errors matching at least, and more likely exceeding the error rate of proper anesthesiologists.

Healthy 3-year-old Owen Fields underwent a 30-minute dental procedure under anesthesia and died. Dr. H Lee has investigated pediatric anesthesia deaths and found 44 cases reported in the US layman's news media⁴. The techniques associated with deaths were labeled as sedation or anesthesia in about equal proportions. The reports were emotional and mostly included a photo of the children who were predominantly in the 3 to 5 year-old range. Lee believed these reports represented only a fraction of the true number of pediatric sedation/anesthesia deaths that occur many times every year.



Image no. 1. Three-year-old Owen Fields died after dental work under anesthesia.

2. INCIDENCE OF DRUG ERRORS DURING SEDATION ANESTHESIA FOR DENTAL PROCEDURES

(The book's full chapter includes 11 pages and 33 references.)