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Presentation: Office-Based Anesthesia for Dental Rehabilitation using TIVA

Summary for syllabus.

Complete Dental Rehabilitation is a term used to describe the comprehensive restoration of damaged dentition in children with early childhood caries, a condition estimated to affect approximately 2% to 3% of preschool-aged children in the United States.¹ Treatment of this condition under general anesthesia is quite common in both the hospital and office-based settings.² This presented describes a total intravenous technique (TIVA) for providing intubated general anesthesia in either environment.

The dental office environment often presents several challenges to the anesthesia provider. Most dental operatories are extremely small compared to ASC and hospital operating rooms. A typical 10ft by 11ft dental operatory is one-fourth the size of a typical hospital operating room and has 33% less square footage than the minimum standard space designed for endoscopy. Medical gas plumbing and waste gas evacuation is highly variable across offices.³ Dental rehabilitation is usually a mix of light and heavy surgical stimulation, often at unpredictable times. The use of local anesthesia under general anesthesia is not universally practiced by pediatric dentists. In the midst of these factors, the anesthesia provider is expected to provide rapid induction, excellent analgesia in an immobile, unconscious patient, and rapid recovery with minimal postoperative pain and PONV.

In our experience, the TIVA technique outlined in this presentation consistently meets those expectations. Initial separation of the parent and child is achieved with an intramuscular injection of ketamine and midazolam. Nasal intubation is facilitated by bolus administration of propofol and remifentanil (in divided doses). Intraoral local anesthetic administration is performed immediately after the airway is secured, and often returns the patient to spontaneous ventilation within 3-5minutes of induction. Maintenance is achieved by administering separate infusions of remifentanil and propofol. Adjuvant drugs are added for PONV prophylaxis, control of oral secretions and postop analgesia, as needed. The chief advantage of this technique is the ability to separate and control analgesia and anesthesia in a balanced anesthetic approach which enables the anesthesia provider to rapidly adjust to changing levels of surgical stimulation while maintaining a light general anesthesia with a protected airway.⁴ Compared to inhalational anesthesia, this approach is associated with less PONV.^{5,6}

¹Anil S, Anand PS. Early Childhood Caries: Prevalence, Risk Factors, and Prevention. *Front Pediatr.* 2017;5:157. Published 2017 Jul 18. doi:10.3389/fped.2017.00157

² Saxen MA, Urman RD, Yepes JF, Gabriel RA, Jones JE. Comparison of Anesthesia for Dental/Oral Surgery by Office-based Dentist Anesthesiologists versus Operating Room-based Physician Anesthesiologists. *Anesthesia Progress.* 2017 ;64(4):212-220. DOI: 10.2344/anpr-65-01-04.

³ Saxen MA, Tom JT and Mason KP Advancing the Safe Delivery of Office-Based Dental Anesthesia and Sedation in: *Ambulatory Anesthesia* Walsh MT Ed., *Anesthesiology* CI 37(2019) 333-348.

⁴ Scott, H.B., Choi, S.W., Wong, G.T.C. and Irwin, M.G. (2017), The effect of remifentanil on propofol requirements to achieve loss of response to command vs. loss of response to pain. *Anaesthesia*, 72: 479-487. <https://doi.org.proxy.ulib.iu.edu/10.1111/anae.13781>

⁵ Lerman J, Jöhr M. Inhalational anesthesia vs total intravenous anesthesia (TIVA) for pediatric anesthesia. *Paediatr Anaesth.* 2009 May;19(5):521-34. doi: 10.1111/j.1460-9592.2009.02962.x. PMID: 19453585.

⁶ König MW, Varughese AM, Brennen KA, Barclay S, Shackleford TM, Samuels PJ, Gorman K, Ellis J, Wang Y, Nick TG. Quality of recovery from two types of general anesthesia for ambulatory dental surgery in children: a double-blind, randomized trial. *Paediatr Anaesth.* 2009 Aug;19(8):748-55. doi: 10.1111/j.1460-9592.2009.03054.x. Epub 2009 Jun 15. PMID: 19538532.