



The effect of deep and awake tracheal extubation on turnover times and postoperative respiratory complications post adenoid-tonsillectomy

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To the Editor,

Tonsillectomies and adenoidectomies (T&As) are increasingly performed in an outpatient setting in order to increase time efficiency with rapid turnover between cases.¹ Though Patel *et al.* showed no difference in postoperative respiratory complications between deep and awake tracheal extubation after T&A, there remains considerable debate amongst pediatric anesthesiologists concerning which extubation technique is safer and more efficient.² We undertook a retrospective review of T&As in our institution to examine whether one method of tracheal extubation (deep or awake) saved time in the operating room and reduced turnover time. We also examined differences between extubation techniques relating to postoperative respiratory complications following T&A.

After approval by the Committee on Human Research on March 29, 2012, we reviewed the charts of all < 18-yr-old patients who underwent tonsillectomy, adenoidectomy, or both over a one-year period at the University of California San Francisco Benioff Children's Hospital Ambulatory Surgery Center. Inclusion criteria included otherwise healthy patients with a primary surgical diagnosis of sleep-disordered breathing, chronic nasal congestion, recurrent tonsillitis, recurrent otitis media, or hearing loss/speech delay. A single surgeon performed all procedures and pediatric anesthesiologists, usually with a resident, provided the anesthesia. Patients were excluded if they had a condition known to increase the incidence of postoperative respiratory complications, including active upper respiratory tract infection, moderate to severe asthma, age less than two years,

American Society of Anesthesiologists' physical status III or above, cerebral palsy, craniofacial anomalies, chronic cardiopulmonary disease, a history of seizures, a history of prematurity, hypotonia, and failure to thrive.³⁻⁵

"Deep" tracheal extubation was presumed when anesthesia records showed an age-appropriate end-tidal anesthetic concentration ≥ 1.0 minimum alveolar concentration at extubation. Three time intervals were recorded: time from surgery end to exiting the operating room (out of operating room time), time from exiting the operating room to re-entering with the next patient (turnover time), and time from the end of surgery to transfer of anesthesia care to postanesthesia care unit (PACU) personnel (anesthesia end time). Significant respiratory complications requiring an anesthesia provider's assessment and/or management were collected from the PACU record, including airway obstruction requiring jaw thrust and/or airway adjuncts, pulse oximetry reading $< 93\%$ for more than two minutes (prolonged oxygen desaturation), bronchospasm, laryngospasm, bleeding episodes, and need for tracheal reintubation or admission to the intensive care unit.

Sixty-two of the 110 patients who met the inclusion criteria underwent deep tracheal extubation and 48 patients underwent awake extubation. There were no statistically significant differences between groups for age, weight, sex, or opioid received. Most (77%) patients were diagnosed with sleep-disordered breathing, though not all had formal sleep studies preoperatively. There were no statistically significant differences between extubation groups for out of operating room time ($P = 0.14$), anesthesia end time ($P = 0.17$), or turnover time ($P = 0.59$) (Figure). Two postoperative respiratory complications were observed in the PACU: one episode of laryngospasm in the awake extubation group and one episode of significant airway obstruction in the deep extubation group.

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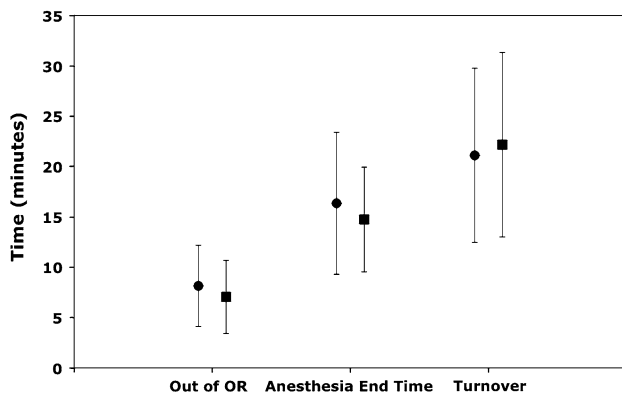


Figure Times associated with awake (circles) and deep (squares) tracheal extubation. “Out of OR” time = from surgery end to exiting the operating room ($P = 0.14$); “Anesthesia End” time = from end of surgery to transfer of anesthesia care to postanesthesia care unit personnel ($P = 0.17$); “Turnover” time = from exiting the OR to re-entering with the next patient ($P = 0.59$). OR = operating room

The low incidence of postoperative respiratory complications in this study is likely due to the study requirement that any respiratory complication be severe enough to warrant management by an anesthesia provider. Another factor might be underreporting by providers in the PACU. In this retrospective study, deep tracheal extubation did not decrease anesthesia time in either the operating or recovery room when compared with awake tracheal extubation in healthy patients post T&A. Also, the choice of extubation technique (awake or deep) did not affect the anesthesia

provider’s time efficiency or respiratory complications. This suggests that both extubation techniques have similar safety profiles. Since deep tracheal extubation did not decrease anesthesia time in either the operating or recovery room when compared with awake tracheal extubation post T&A, the extubation technique used should be guided by provider experience, the condition of the patient, and the training of PACU personnel.

Competing interests None declared.

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