

# Opioid-Free Tonsillectomy in the Pediatric Patient: A Feasibility Study

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## Background

The American Academy of Otolaryngology released a guideline in 2021 recommending the development of multimodal treatment plan for postoperative pain management and advocated for non-opioid medications as first-line treatment.<sup>1</sup> The potential for chronic use and misuse of opioids is a major concern due to the current opioid epidemic in the United States.<sup>1</sup>

- In 2013, FDA issued a black box warning for use of codeine and tramadol following tonsillectomy in children < 12 y/o after a review of 8 cases of pediatric death associated with codeine use.<sup>2</sup>
- Opioid-induced respiratory depression in a patient with sleep apnea can be life threatening.<sup>3,4</sup>
- The high risk of opioids is partly due to children that are rapid metabolizers of drugs such as codeine, oxycodone, hydrocodone, and tramadol by the cytochrome P450 isozyme, CYP2D6.<sup>4,5</sup>
- Pain control following tonsillectomy is difficult. Pain is cited as the most common morbidity in children following tonsillectomy.<sup>7</sup>
- A 2015 study demonstrated 91% of pediatric patients had adequate pain control when recommended to alternate acetaminophen and ibuprofen postoperatively.<sup>8</sup>
- Few prior studies have examined intraoperative or PACU use of narcotic pain medications in patients undergoing tonsillectomy.

## Methods and Materials

### Study Design

Retrospective Chart Review  
IRB approval granted by Beaumont IRB

### Methodology

- Chart review conducted for patients who underwent tonsillectomy +/- adenoidectomy with and without the use of intraoperative opioid medications.
- In July of 2018 an opioid free protocol for tonsillectomy +/- adenoidectomy was initiated by anesthesia and otolaryngology.

Chart review conducted to evaluate for:

- Oral intake in Post-Anesthesia Care Unit (PACU)
- PACU pain and nausea scores
- Time of patient recovery required in PACU
- Postoperative outcomes and complications

Data analyzed by Beaumont Department of Statistics using SAS for Windows version 9.4. Wilcoxon-Mann-Whitney two-sample test was used to compare if there is any difference between groups on a continuous variable.

## Methods and Materials Continued

**Group 1:** Intraoperative opioid group June 2017-December 2017.

- Patients received narcotic medications during surgery and in the PACU
- No narcotics were given post-operatively for home
- Patients were given prescription for oral prednisolone to be taken on day 3 post operatively as well as instructed to alternate acetaminophen and ibuprofen

**Group 2:** Opioid free group August 2018-March 2022.

Data from January 2018-July 2018 not collected to avoid inconsistencies

- Patients were instructed to use acetaminophen starting 2 days prior to surgery
- Post-operatively patients were given the same prescriptions and instructions as patients in group 1; patients were given prescription for oral prednisolone to be taken on day 3 post operatively as well as instructed to alternate acetaminophen and ibuprofen

## Results

Table 1. Patient characteristics

Variables <sup>§</sup>	All n	Intraoperative Group		p value
		Opioid n	Opioid-Free n	
Age, years	6.0 ± 2.6 5.0 (4.0 to 8.0)	5.8 ± 2.9 5.0 (3.0 to 8.0)	6.1 ± 2.2 6.0 (4.0 to 8.0)	0.39
Sex				
Male	38 (50.7%)	18 (50.0%)	20 (51.3%)	0.91
Female	37 (49.3%)	18 (50.0%)	19 (48.7%)	
Race				
Whites	62 (82.7%)	30 (83.3%)	32 (82.1%)	0.88
Non-Whites	13 (17.3%)	6 (16.7%)	7 (17.9%)	
Indications for surgery				
SDB/O SA	63 (84.0%)	29 (80.6%)	34 (87.2%)	0.46
Tonsillitis	10 (13.3%)	5 (13.9%)	5 (12.8%)	
Other	2 (2.7%)	2 (5.6%)	0 (0.0%)	

Abbreviation: SDB/O SA=sleep disordered breathing/obstructive sleep apnea.  
<sup>§</sup>For continuous variables, mean ± SD and median (IQR) were shown.

Table 1. This table demonstrates patient characteristics for all patients as well as indication for tonsillectomy and/or adenoidectomy procedure.

Table 2. Clinical outcomes

Variables <sup>§</sup>	All (n=75)	Patient Protocol Group		p value
		Opioid (n=36)	Opioid-Free (n=39)	
Aldrete (average) Pain Score	1.9 ± 0.2 2.0 (2.0 to 2.0)	1.9 ± 0.2 2.0 (1.9 to 2.0)	1.9 ± 0.1 2.0 (2.0 to 2.0)	0.33
Aldrete (average) Emetic Symptoms	2.0 ± 0.02 2.0 (2.0 to 2.0)	2.0 ± 0.0 2.0 (2.0 to 2.0)	2.0 ± 0.03 2.0 (2.0 to 2.0)	1.00
FLACC (average) Pain Score (51/21/30)*	1.6 ± 1.9 1.5 (0.0 to 2.2)	1.4 ± 2.0 1.3 (0.0 to 1.7)	1.8 ± 1.8 2.0 (0.0 to 2.6)	0.21
FLACC (average) Pain Score (51/21/30)*				
Minimal (0-2)	31 (60.8%)	17 (80.9%)	14 (46.7%)	0.01
Above Minimal	20 (39.2%)	4 (19.1%)	16 (53.3%)	
PO Intake in PACU, mL (57/27/30)*	143.6 ± 125.9 120.0 (60.0 to 180.0)	121.3 ± 125.0 110.0 (60.0 to 120.0)	163.1 ± 125.4 120.0 (90.0 to 235.0)	0.23
PACU LOS, mins (64/36/38)*	88.5 ± 36.7 80.5 (68.0 to 99.0)	97.8 ± 46.3 90.5 (71.0 to 103.0)	79.8 ± 21.6 75.0 (65.0 to 90.0)	0.07

Abbreviation: FLACC=face, legs, activity, cry, consolability scale; PO=oral; PACU=post anesthesia care unit; LOS=length of stay.

<sup>§</sup>mean ± SD and median (IQR) were shown.

\*first number indicates the total amount of patients that had recorded value in chart / second number is the amount of patients in opioid group with recorded value in chart / third number is the amount of patients in opioid-free group with recorded value in chart.

Table 2. This table represents the clinical outcomes of the entire cohort as well as the individual outcomes for both the opioid and opioid-free groups.

## Results Continued

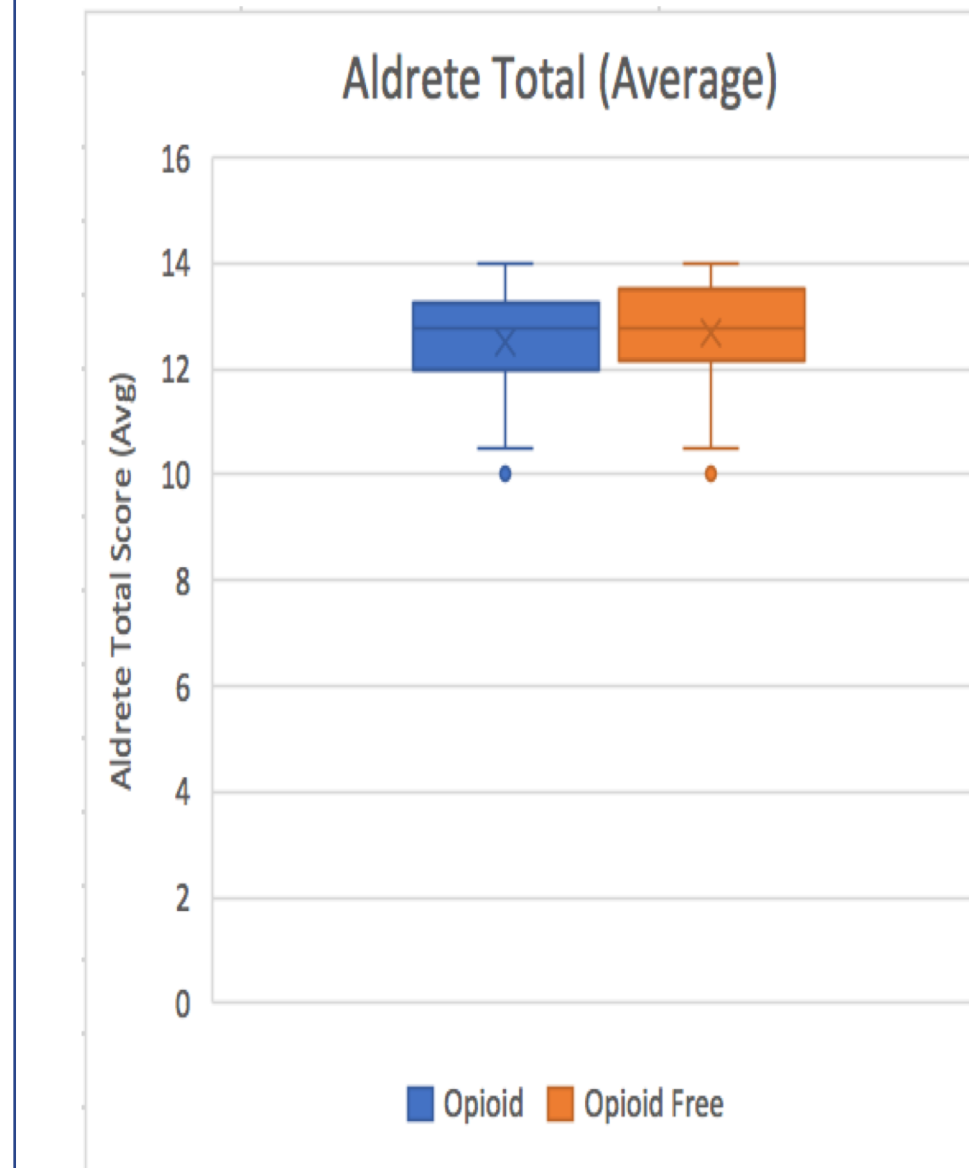


Figure 1: Scores on the Aldrete Scoring System for opioid and opioid-free groups. Range is 0-14 with a score of 14 signifying a patient is most ready for discharge from the post-anesthesia care unit (PACU). Each individual in the study had one mean Aldrete score recorded. No significant difference between groups

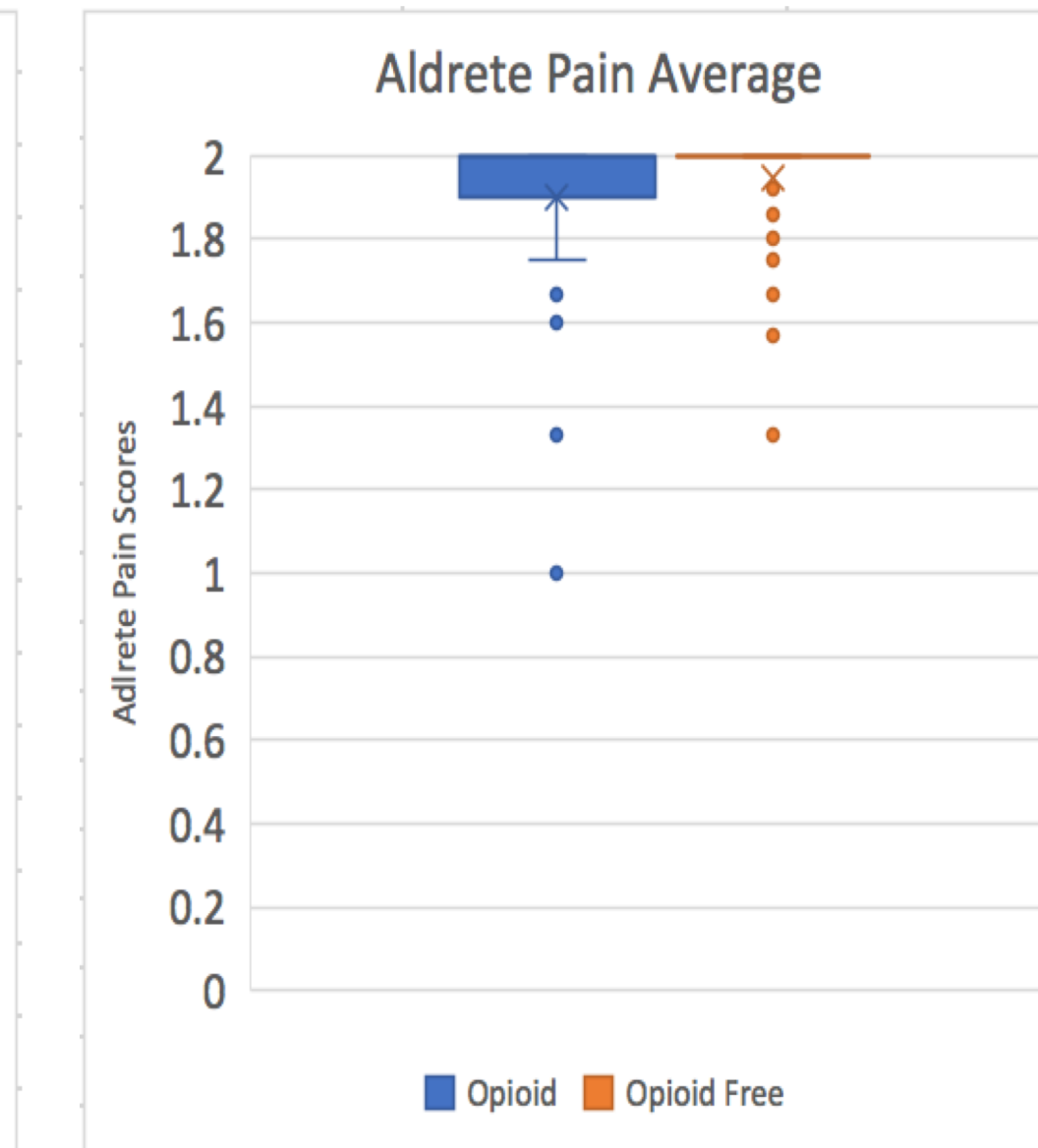


Figure 2: Aldrete pain average score; range 0 (maximum pain) to 2 (no apparent pain). All patient in study had an Aldrete pain average score documented. There was no significant difference in Aldrete pain scores between opioid and opioid-free groups.

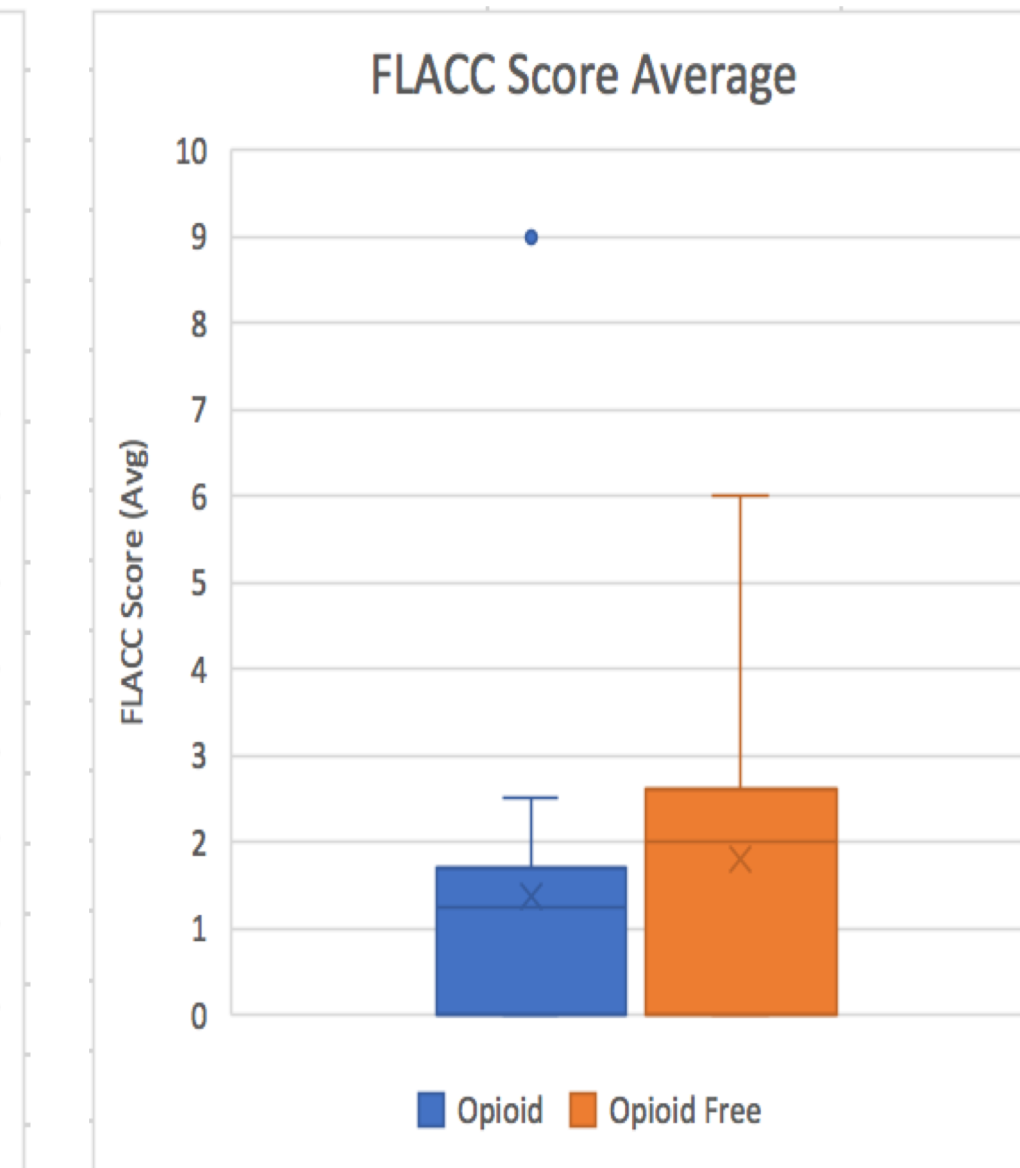


Figure 3: Scores on the Face, Legs, Activity, Cry, Consolability (FLACC) scale. The FLACC scale ranges from 0 (no apparent pain) to 10 (maximum) and is evaluated by PACU nurses for patients who cannot articulate their pain experience, i.e. children. No significant difference in FLACC scores between opioid and opioid-free groups.

## Conclusions

Tonsillectomy without the use of intraoperative or immediate postoperative opioids appears to be well tolerated by most children.

- Opioid-free surgery was associated with a shorter length of stay (median: 90.5 versus 75.0 minutes, p=0.07) in PACU, although, this was not statistically significant.
- There were no significant differences in pain scores (average Aldrete Pain or FLACC scores) between the groups, therefore, opioid-free tonsillectomy does not appear to add any immediate morbidity.
- For 51 patients who had FLACC (average) pain measure, compared to opioid-free patients, the higher proportion of minimal pain was observed on opioid recipients (80.9% versus 46.7%, p=0.01).
- There were no significant differences in postoperative outcomes, such as bleeding, unexpected office visits, or emergency room visits.
- More rapid emergence from anesthesia as well as enhanced recovery in the PACU resulting in a decreased length of stay can save anesthetic exposure to the patients as well as valuable healthcare resources.
- Due to the known risks of opioid-induced respiratory depression, nausea, vomiting, and overdose, a non-opioid protocol for anesthesia and analgesia may be better suited for this population. Further research is needed for more definitive conclusions.

## Contact

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