

TEXAS CHILDREN'S HOSPITAL
EVIDENCE-BASED OUTCOMES CENTER
Tonsillectomy & Adenoidectomy: Perioperative Medical Management
Evidence-Based Guideline

Definition: Tonsillectomy is a surgical procedure that removes all or part of the tonsil tissue, by dissecting the peritonsillar space with either extra-capsular or intra-capsular approaches. ⁽¹⁾ Adenoidectomy or removal of the adenoids is often performed at the same time as tonsillectomy. Indications for tonsillectomy include recurrent tonsillitis and sleep disordered breathing.

Epidemiology: Tonsillectomy (with or without adenoidectomy) is one of the most common surgical procedures performed in children. ⁽¹⁾ At TCH, over 2,500 tonsillectomies are performed each year.

Inclusion Criteria

- Children 0-18 years

Exclusion Criteria

- Sickle cell disease or known bleeding disorder

Critical Points of Evidence*

Evidence Supports

- Consider dexmedetomidine or midazolam for children with documented severe OSA if premedication is needed. Use midazolam with caution in children with documented severe OSA, children with undocumented but suspected OSA, or other children at increased risk for OSA (i.e., those requiring admission). If dexmedetomidine is administered preoperatively, do not administer intraoperatively. ^(2,3) – Weak recommendation, low quality evidence
Remarks: For many of the outcomes studied (i.e., satisfactory mask induction, SpO₂, emergence agitation), dexmedetomidine and midazolam showed equivalence. Dexmedetomidine showed slightly favorable outcomes regarding ease of separation from parents, satisfactory IV cannulation, and the need for postoperative rescue analgesia.
- Administer 0.5 mg/kg dexamethasone (max: 16 mg) intraoperatively to reduce pain and postoperative nausea and vomiting. Lower doses (to 0.15 mg/kg) may be equally effective if concerned for hypertension or hyperglycemia. ^(1,3-25) – Strong recommendation, moderate quality evidence
- Consider intraoperative administration of acetaminophen. If given, acetaminophen toxicity should be considered prior to postoperative administration of acetaminophen or medications containing acetaminophen. ^(1,3,20-22,26-46) – Weak recommendation, moderate quality evidence
- Administer dexmedetomidine intraoperatively to reduce opioid requirements. ^(1,3,20-22,26-46) – Strong recommendation, moderate quality evidence
- Administer dexmedetomidine intraoperatively to reduce minor airway complications in high risk patients with documented severe OSA. ^(24,29,45,47-49) – Strong recommendation, moderate quality evidence
- Utilize a reduced dose of opioids or eliminate the use of opioids altogether in children with documented severe OSA, children with undocumented but suspected OSA, or other children at increased risk for OSA (i.e., those requiring admission), as these children may have a heightened sensitivity to opioids. Codeine or codeine-containing products should not be given to tonsillectomy patients under 12 years of age. ^(24,45,47,48,50) – Strong recommendation, low quality evidence
- Administer 0.1 mg/kg ondansetron intraoperatively to reduce postoperative nausea and vomiting. Ondansetron may be given postoperatively as a rescue medication if the previous dose was given ≥6 hours prior; otherwise, metoclopramide should be given. ^(6,10,20,23,25,51,52) – Strong recommendation, high quality evidence
- Utilize ibuprofen and acetaminophen for postoperative pain management. ^(1,3,20-22,31-33,36,41,53-65) – Strong recommendation, moderate quality evidence
Remarks: The risk/benefit ratio for ibuprofen seems favorable, although a slightly increased risk of post-tonsillectomy bleeding cannot be ruled out.
- Consider scheduled dosing of ibuprofen for 48-72 hours to ensure consistent administration of analgesia. Acetaminophen may be given PRN for breakthrough pain (up to 5 doses/day). ^(1,3,20-22,31-33,41,53-65) – Weak recommendation, low quality evidence
Remarks: At this time, there is no evidence to support the utilization of opioids as a rescue pain mediation. A rescue dose of hydrocodone or oxycodone may be considered in the appropriate patient for uncontrolled pain. Opioid use is cautioned in the following populations: young age, severe OSA, severe obesity. Codeine or codeine-containing products should not be given to tonsillectomy patients under 12 years of age. Though widely embraced, scheduled dosing of pain medications has not been proven superior to PRN dosing; however, scheduled dosing ensures that children are not being undertreated.
- Utilize ibuprofen ± acetaminophen for postoperative pain management in patients with documented severe OSA. ^(3,22,24,47,49,50,66) – Strong recommendation, moderate quality evidence
- Consider administering 1 teaspoon of honey 3-4 times per day as an adjunct therapy for children ≥1 year. ⁽⁶⁷⁾ – Weak recommendation, low quality evidence
- Admit patients with the following: age <3 years OR >3 years with comorbid conditions (e.g., craniofacial anomaly, Down syndrome, neuromuscular disease, chronic lung disease, sickle cell disease, metabolic disease, obesity), BMI >99th percentile, or severe obstructive sleep apnea (AHI ≥20 obstructive events/hour, peak Co₂ > 60 mmHg O₂ saturation nadir <80%, or both). ^(1,21,22,24,47,49,65,68-91) – Strong recommendation, very low quality evidence

Remarks: This recommendation was adapted from the American Academy of Otolaryngology: Clinical Practice Guideline: Tonsillectomy in Children (2019 Update).

- Consider a phone call on postoperative day 1. (21,22,92-93) – Weak recommendation, low quality evidence
Remarks: If resources permit, a phone call on postoperative day 1 will likely improve patient experience.
- Administer a single dose of intravenous steroids to reduce postoperative nausea and vomiting, along with pain and swelling. (22,94-97) – Strong recommendation, moderate quality evidence

Evidence Against

- Do not routinely administer ketamine intraoperatively. (1,3,20-22,26-46) – Strong recommendation, moderate quality evidence
- Do not administer or prescribe perioperative antibiotics. (1,98-105) – Strong recommendation, moderate quality evidence
Remarks: This recommendation was adopted from the American Academy of Otolaryngology: Clinical Practice Guideline: Tonsillectomy in Children (2019 Update). The potential benefit of administering prophylactic antibiotics (i.e., a possible reduction in postoperative fever) is outweighed by the risks of increasing bacterial resistance, allergic reactions and other side effects, cost, and patient burden of swallowing another medication. Exceptions to this recommendation include patients with cardiac conditions requiring perioperative antibiotics for prophylaxis and patients undergoing tonsillectomy with concurrent peritonsillar abscess.
- Do not routinely administer opioids postoperatively for pain. Tramadol and acetaminophen/codeine are contraindicated in all children following tonsillectomy and/or adenoidectomy. (1,3,20-22,31-33,36,41,53-65) – Strong recommendation, low quality evidence
- Do not administer opioids postoperatively to children with documented severe OSA. (3,22,24,47,49,50,66) – Strong recommendation, low quality evidence
- Do not routinely admit patients to the PICU. (24,49,65,71,88,106) – Strong recommendation, very low quality evidence

Evidence Lacking/Inconclusive

- Utilization of ketorolac for postoperative pain management, dependent on provider preference. Current literature shows that ketorolac does not have an impact on hemorrhage rates and may reduce the use of opioid medication⁽¹⁰⁷⁾ – Consensus recommendation
- Unable to make a recommendation regarding the use of local anesthetics due to conflicting evidence. (3,20-22,26-46)
- Discharge patients at increased risk from OSA from the recovery area to an unmonitored setting (i.e., home or unmonitored hospital bed) only after they are no longer at risk of postoperative respiratory depression. (49) – Consensus recommendation
- Consider a higher level of care for patients with the following: Need for noninvasive ventilation or nasopharyngeal airway, higher oxygen requirement, known difficult/critical airway, tracheostomy, baseline home ventilator or BiPAP/CPAP dependence. (65) – Consensus recommendation
- Use continuous pulse oximetry monitoring after discharge from the recovery room for hospitalized patients who are at increased risk of respiratory compromise from OSA. (49,91) – Consensus recommendation
- Educate practitioners caring for patients postoperatively on the management/expectations of postoperative pain and respiratory complications. (106) – Consensus recommendation

*NOTE: The references cited represent the entire body of evidence reviewed to make each recommendation.

Condition-Specific Elements of Clinical Management

Admission Criteria

- Age <3 years
- Comorbid conditions (e.g., craniofacial anomaly, Down syndrome, neuromuscular disease, chronic lung disease, sickle cell disease, metabolic disease, obesity)
- BMI ≥99th percentile
- Severe obstructive sleep apnea (AHI ≥20 obstructive events/hour, peak Co₂ > 60 mmHg, O₂ saturation nadir <80%, or both)
- PICU/TICU admission criteria:
 - Severe OSA w impaired gas exchange
SpO₂ < 80%, Co₂ > 50 mmHg
 - Neurologic/neuromuscular disease (syndromic patients)
 - Dysphagia/aspiration, g-tube dependence
 - Known difficult airway or craniofacial anomaly

Measures

Process

- Proportion of patients receiving antibiotics

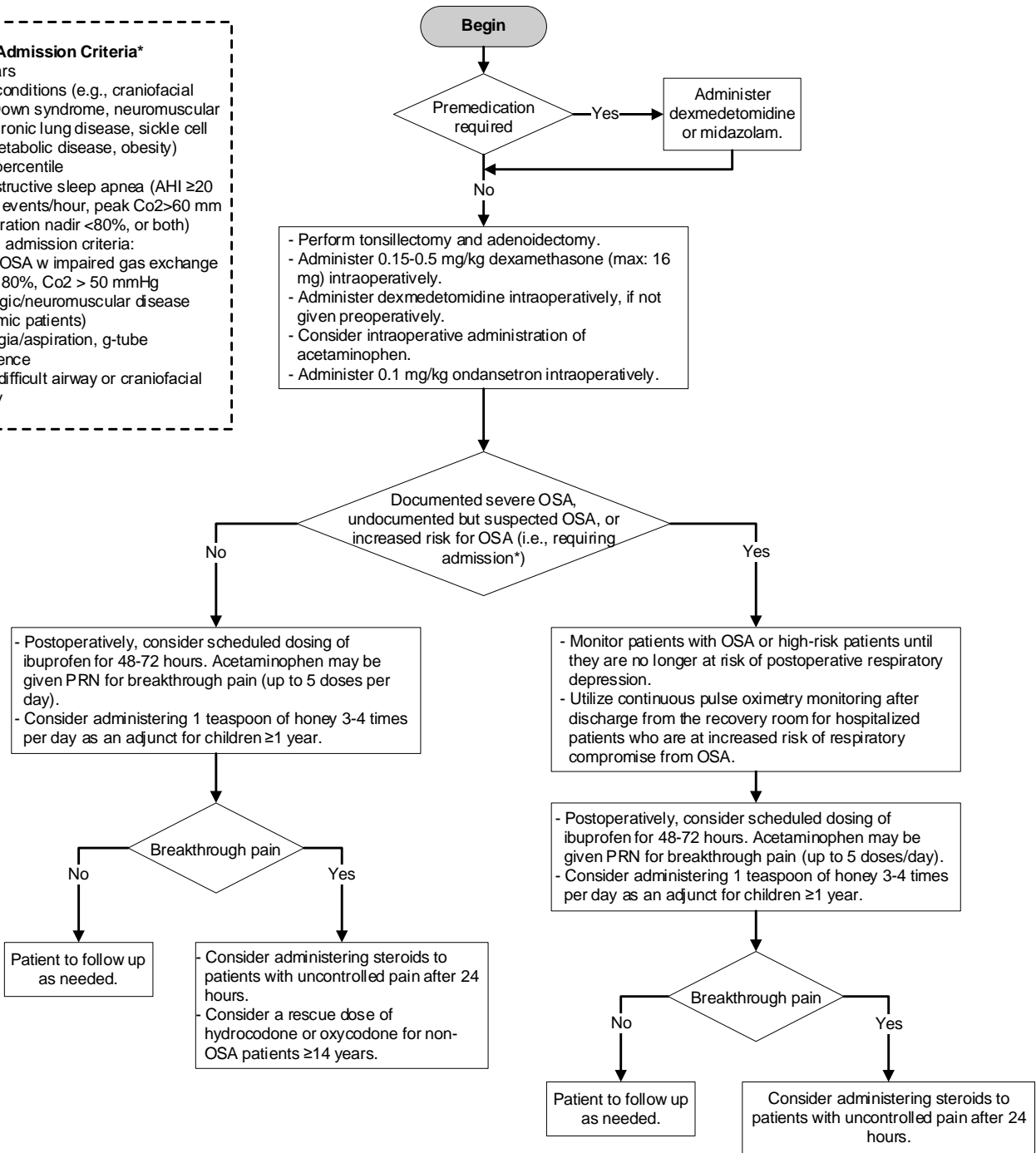
Outcome

- EC visit within 30 days postoperatively for condition related to tonsillectomy/adenoidectomy
- Proportion of patients experiencing postoperative respiratory compromise (O₂ required on the floor, RRT or escalation of care required, reintubation)
- Proportion of patients experiencing postoperative hemorrhage
- Proportion of patients requiring return to OR for postoperative hemorrhage
- Admission rate
- Length of PACU stay
- Proportion of postoperative phone calls from patients

TCH Evidence-Based Outcomes Center Clinical Algorithm for Tonsillectomy & Adenoidectomy: Perioperative Medical Management

- Admission Criteria***

 - Age <3 years
 - Comorbid conditions (e.g., craniofacial anomaly, Down syndrome, neuromuscular disease, chronic lung disease, sickle cell disease, metabolic disease, obesity)
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 - o Dysphagia/aspiration, g-tube dependence
 - o Known difficult airway or craniofacial anomaly



Clinical standards are developed for 80% of the patient population with a particular disease. Each practitioner must use his/her clinical judgment in the management of any specific patient.

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Clinical Standards Preparation

This clinical standard was prepared by the Evidence-Based Outcomes Center (EBOC) team in collaboration with content experts at Texas Children's Hospital. Development of this clinical standard supports the TCH Quality and Patient Safety Program initiative to promote clinical standards and outcomes that build a culture of quality and safety within the organization.

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No relevant financial or intellectual conflicts to report.

Development Process

This clinical standard was developed using the process outlined in the EBOC Manual. The literature appraisal documents the following steps:

1. Review Preparation
 - PICO questions established
 - Evidence search confirmed with content experts
2. Review of Existing External Guidelines
 - American Academy of Otolaryngology - Head and Neck Surgery Tonsillectomy in Children (2019 Update), Scottish Intercollegiate Guidelines Network Management of Sore Throat and Indications for Tonsillectomy (2010), French Oto-Rhino-Laryngology - Head and Neck Surgery Society Pediatric Tonsillectomy (2012, 2016 update on pain), National Tonsil Register in Sweden Swedish Guidelines for the Treatment of Pain in Tonsil Surgery in Pediatric Patients up to 18 Years (2015), American Academy of Pediatrics Diagnosis and Management of Childhood Obstructive Sleep Apnea Syndrome (2012), American Academy of Anesthesiologists Practice Guidelines for the Perioperative Management of Patients with Obstructive Sleep Apnea (2006, 2014 update), American Academy of Otolaryngology - Head and Neck Surgery Polysomnography for Sleep-Disordered Breathing Prior to Tonsillectomy in Children (2011), Society for Ambulatory Anesthesiology Consensus Guidelines for the Management of Postoperative Nausea and Vomiting (2014), American Society of Anesthesiologists Practice Guidelines for Postanesthetic Care (2013), Association of Paediatric Anaesthetists of Great Britain & Ireland Guidelines on the Prevention of Postoperative Vomiting in Children (2009), American Society of Health-System Pharmacists Clinical Practice Guidelines for Antimicrobial Prophylaxis in Surgery (2013), Scottish Intercollegiate Guidelines Network Antibiotic Prophylaxis in Surgery (2008, 2014 update), Children's Hospital of Philadelphia Tonsillectomy and/or Adenotonsillectomy Pathway to Triage Patients With or Without Preoperative Polysomnography (2016)
3. Literature Review of Relevant Evidence
 - Searched: PubMed, Cochrane Library
4. Critically Analyze the Evidence
 - 21 meta-analyses, 39 randomized controlled trials, and 31 nonrandomized studies
5. Summarize the Evidence
 - Materials used in the development of the clinical standard, literature appraisal, and any order sets are maintained in a Tonsillectomy & Adenoidectomy evidence-based review manual within EBOC.

Evaluating the Quality of the Evidence

Published clinical guidelines were evaluated for this review using the **AGREE II** criteria. The summary of these guidelines are included in the literature appraisal. AGREE II criteria evaluate Guideline Scope and Purpose, Stakeholder Involvement, Rigor of Development, Clarity and Presentation, Applicability, and Editorial Independence using a 4-point Likert scale. The higher the score, the more comprehensive the guideline.

This clinical standard specifically summarizes the evidence *in support of* or *against* specific interventions and identifies where evidence is *lacking/inconclusive*. The following categories describe how research findings provide support for treatment interventions.

"Evidence Supports" provides evidence to support an intervention

"Evidence Against" provides evidence against an intervention.

"Evidence Lacking/Inconclusive" indicates there is insufficient evidence to support or refute an intervention and no conclusion can be drawn *from the evidence*.

The **GRADE** criteria were utilized to evaluate the body of evidence used to make practice recommendations. The table below defines how the quality of the evidence is rated and how a strong versus weak recommendation is established. The literature appraisal reflects the critical points of evidence.

Recommendation	
STRONG	Desirable effects clearly outweigh undesirable effects or vice versa
WEAK	Desirable effects closely balanced with undesirable effects
Quality	Type of Evidence
High	Consistent evidence from well-performed RCTs or exceptionally strong evidence from unbiased observational studies
Moderate	Evidence from RCTs with important limitations (e.g., inconsistent results, methodological flaws, indirect evidence, or imprecise results) or unusually strong evidence from unbiased observational studies
Low	Evidence for at least 1 critical outcome from observational studies, RCTs with serious flaws or indirect evidence
Very Low	Evidence for at least 1 critical outcome from unsystematic clinical observations or very indirect evidence

Recommendations

Practice recommendations were directed by the existing evidence and consensus amongst the content experts. Patient and family preferences were included when possible. The Content Expert Team and EBOC team remain aware of the controversies in the perioperative medical management of tonsillectomy and adenoidectomy in children. When evidence is lacking, options in care are provided in the clinical standard and the accompanying order sets (if applicable).

Approval Process

Clinical standards are reviewed and approved by hospital committees as deemed appropriate for its intended use. Clinical standards are reviewed as necessary within EBOC at Texas Children's Hospital. Content Expert Teams are involved with every review and update.

Disclaimer

Practice recommendations are based upon the evidence available at the time the clinical standard was developed. Clinical standards (guidelines, summaries, or pathways) do not set out the standard of care and are not intended to be used to dictate a course of care. Each physician/practitioner should use his or her independent judgment in the management of any specific patient and is responsible, in consultation with the patient and/or the patient's family, to make the ultimate judgment regarding care.

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Version History

Date	Comments
Jan 2018	Originally completed
Jul 2019	Incorporated the AAO 2019 guideline update
Aug 2023	Update