Tonsillectomy for Recurrent Sore Throats in Children: Indications, Outcomes, and Efficacy

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Abstract

Objective. To perform a comprehensive narrative review of the literature to provide a better understanding of the indications, outcomes, and efficacy of tonsillectomy for recurrent sore throats in children. This article explores the reasons why there is a lack of robust clinical evidence for its efficacy despite good evidence of positive reported outcomes from parents of children who undergo the procedure.

Data Sources. Articles published between 1960 and July 2013 were searched in PubMed and Cochrane databases.

Review Methods. A narrative review method was adopted to provide a comprehensive overview of articles. Only individual, interventional studies on children (0-16 years old) undergoing tonsillectomy or adenotonsillectomy for recurrent sore throats with greater than 1 month of follow-up were included.

Conclusions. The inclusion criteria and outcome measures in the studies were varied, but most investigated changes in symptoms related to sore throats or illness episodes. Quality-of-life tools validated for measuring pediatric outcomes were used in a number of more recent studies. None of the outcome measures were specific for recurrent sore throats in children. No qualitative method designed studies were identified.

Implications for Practice. The disparity between parental satisfaction rates and published clinical efficacy can be explained by a lack of parent/child outcome measures specific to tonsillectomy for recurrent sore throats. A more parent/child-centered approach may establish what tonsillectomy could offer this group of children.

Keywords
tonsillectomy, indications, outcome measures, efficacy, quality of life

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closely interrelated. This review will assess the currently available evidence to provide an insight into what is known and where the evidence falls short.

**Methods**

We chose to pursue a narrative overview rather than a formal systematic review, since our objective was to gain an insight into all types of studies relating to children undergoing tonsillectomy for RST. Specific inclusion criteria were used to provide the most objective overview possible. PubMed and Cochrane databases were searched for articles from 1960 to July 20, 2013. The search terms were *tonsil* or *tonsillectomy* or *adenotonsillectomy* with each of the terms *indications* or *outcomes* or *efficacy* or *effectiveness* or *experience* or *satisfaction*. A manual search of reference lists of the main articles was also performed to identify articles that were not found during the literature search. The search included both quantitative (numerical) data and descriptive data from qualitative designed studies that provide an interpretation of personalized accounts from individuals presented in a nonnumerical way.

The criteria used for this review with regard to the participants, interventions, comparisons, outcomes, and study design (PICOS) were as follows:

- **Participants**: Children 16 years and younger who had “recurrent sore throats” as defined in each study.
- **Interventions**: Tonsillectomy or adenotonsillectomy.
- **Comparisons**: This would depend on each study design. All comparisons were included to provide the widest possible overview of outcomes.
- **Outcomes**: All outcomes were included, but follow-up must have been greater than 1 month.
- **Study design**: Only individual, interventional comparative studies were included. Only English or English-translated articles were included.

**Discussion**

The initial search produced 1794 articles. Reading each of the titles or abstracts of these articles excluded a further 1713 articles. The 81 remaining articles were fully reviewed. Fifty-four of these articles were rejected, since they did not fulfill the inclusion criteria: they were studies exclusively on adults, were noninterventional studies, or had a short follow-up period. The remaining 27 articles were included in the final review (see Figure 1).

**Randomized Controlled Trials**

**Results.** Eleven RCTs met the inclusion criteria for this review (see Table 1 and Suppl. Table S1, available at otou-journal.org). Eight studies primarily assessed the efficacy of tonsillectomy (Suppl. Table S1), and 3 studies primarily assessed the cost-effectiveness of the procedure (Table 1).

**Inclusion criteria.** The inclusion criteria for all of these studies included symptoms of sore throat, such as different severities, number of days, frequencies, and length of history of sore throat episodes.

**Outcome measures**

1. Number/severity of episodes: 7 studies specifically analyzed the number and/or severity of sore throat episodes as the primary outcome measure.  
2. General illness episodes: 4 of the earlier studies were less specific and analyzed generalized illness episodes of the individual children.  
3. Family cost implications: 1 study analyzed the financial implications for the families of the individuals.  
4. Quality of life (QoL) assessment tools: 3 studies used validated QoL assessment tools to assess the impact of the procedure on children. As seen in Supplemental Table S1, the tools were varied and included the PedsQL assessment tool, the TAPQoL (for preschool children), and the TACQoL (for ages 6-11 years) tools.  
5. School absence: 4 studies also assessed school days lost.
6. Child-reported outcome measures: no RCTs assessed child self-reported outcomes specifically.

Summary of findings (based on the outcome measures in the articles)

1. Number/severity of episodes: the number of episodes of sore throats is reduced by tonsillectomy in those severely affected, but only a modest reduction is seen in those moderately affected, and no significant reduction is seen in those with mild symptoms (degree of symptoms as defined in the Paradise study). 5,9,13,15,16

2. General illness episodes: most symptoms related to the illness episodes improve with tonsillectomy, but sore throat episodes appear to improve the most. 10,12,14

3. Family cost implications: in children with mild to moderate symptoms, a cost increase is seen with little relevant clinical benefit. 16

4. QoL assessment tools: the effect of tonsillectomy is small on changes in QoL measures. 5,15,17

5. School absence: these were greatly variable and dependent on the inclusion criteria. 11-14

Other Quantitative Studies

Results. Sixteen studies that met the inclusion criteria for this review were non-RCT quantitative studies (see Table 2, Table 3, and Suppl. Table S2, available at otojournal.org). Fourteen of these assessed the degree of parental satisfaction and change in children’s QoL (Table 2 and Suppl. Table S2). One study assessed the psychological changes after tonsillectomy, and a further study assessed the effect of tonsillectomy on growth in children (Table 3).18,19

Inclusion criteria. The inclusion criteria and indications for these studies were much less specific. Many studies did not
specify the criteria for “chronic tonsillitis” or “recurrent tonsillitis,” and a number of studies included children and/or adults with other indications. Only 6 studies evaluated children with sore throats exclusively.\textsuperscript{20-25}

**Outcome measures.** All studies used a questionnaire to assess the outcomes in the individuals undergoing tonsillectomy, 5 of which were validated (Table 2).\textsuperscript{23,25-28}

1. Structured outcome assessment tools: a number of outcome assessments were specifically used for the purposes of each study’s design and included the Tonsil and Adenoid Health Status Instrument,\textsuperscript{23,27} Pediatric Throat Disorders Outcome Test or t14,\textsuperscript{27} Glasgow Children’s Benefit Inventory,\textsuperscript{25,28} and Child Behavior Checklist.\textsuperscript{26}

2. Generalized satisfaction outcome measures: 5 studies assessed parental overall satisfaction with the outcomes of tonsillectomy for the indications described.\textsuperscript{24,29-32} In the work by Robb et al,\textsuperscript{24} parental comments provided an insight into how they perceive the effectiveness of the procedure.

3. Child-reported outcome measures: no studies assessed children’s views on the effect of the operation on their preoperative problems.

### Table 2. Non-RCT Quantitative Studies: Validated Questionnaire Studies.

<table>
<thead>
<tr>
<th>Primary Author</th>
<th>Population (Number)</th>
<th>Child Age Range, y</th>
<th>Indications</th>
<th>Assessment Tools and Timing</th>
<th>Outcome Measures</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goldstein,\textsuperscript{26} 2002</td>
<td>Parents of children (64)</td>
<td>2-18</td>
<td>Recurrent tonsillitis and sleep-disordered breathing</td>
<td>OSA-18 and CBCL before surgery and 3 months after surgery</td>
<td>OSA-18 scores and how they correlate with CBCL scores</td>
<td>Behavior and emotional difficulties improve with tonsillectomy.</td>
</tr>
<tr>
<td>Goldstein,\textsuperscript{23} 2008</td>
<td>Parents of children (38 at 1 year)</td>
<td>2-16</td>
<td>3/1 documented episodes of tonsil infections, 3/1 courses of antibiotics, or 3/1 months of continuous sore throat</td>
<td>CHQ-PF28 (validated) TAHSL preoperatively and 6 and 12 months postoperatively</td>
<td></td>
<td>Tonsillectomy improved disease-specific and global quality of life in children with recurrent sore throats.</td>
</tr>
<tr>
<td>Hopkins,\textsuperscript{27} 2010</td>
<td>Parents of children (126)</td>
<td>1-16</td>
<td>Obstructive symptoms and “Paradise criteria” sore throats</td>
<td>Validation of the 14-item Paediatric Throat Disorders Outcome Test (t14)</td>
<td></td>
<td>Improvement in all parameters and improvement in total scores 6 months postoperatively</td>
</tr>
<tr>
<td>Kubba,\textsuperscript{28} 2004</td>
<td>Parents of children (670)</td>
<td>1-15</td>
<td>Children having undergone tonsillectomy for unspecified indications or ventilation tube insertion</td>
<td>Questionnaire for parents of children who had undergone tonsillectomy within 5 years</td>
<td></td>
<td>Overall parental satisfaction</td>
</tr>
<tr>
<td>Schwentner,\textsuperscript{25} 2008</td>
<td>Parents of children (447)</td>
<td>1-18</td>
<td>Chronic tonsillitis; no other details</td>
<td>Questionnaire for adeno/tonsillectomy within 10 years</td>
<td>Total GCBI total scores and subscales for parents’ assessment of physical health, emotion, learning, and vitality</td>
<td>Operation is highly effective. Positive and durable impact on health-related quality of life and other areas not directly associated.</td>
</tr>
</tbody>
</table>

Abbreviations: CBCL, Child Behavior Checklist; CHQ, Child Health Questionnaire; GCBI, Glasgow Children’s Benefit Inventory; GP, general practitioner; OSA-18, Obstructive Sleep Apnea–18; RCT, randomized controlled trial; TAHSL, Tonsil and Adenoid Health Status Instrument.
Summary of findings (based on the outcome measures in the articles)

1. Structured outcome assessment tools: generalized and specific QoL measures improve in most cases. 23,25-28

2. Generalized satisfaction outcome measures: there is a high rate of satisfaction with the procedure. In the Robb et al. 24 study, 45 of 48 parents reported that their child’s health improved after the operation. Faulconbridge et al. 30 state that 92% of the 2189 patients undergoing tonsillectomy for RSTs felt that their throat was better after the operation, although this included adults. Parental satisfaction was 91% (524/576) postoperatively in the Wolfensberger et al. 31 study. All of these studies included patients who had 3 or more episodes of tonsillitis per year.

Qualitative Studies

There were no qualitative designed, descriptive, patient-derived studies that assessed tonsillectomy for recurrent sore throats in children.

Current Guidelines

This review provides an overview of where we stand with regard to the current evidence for tonsillectomy for RSTs in children. A range of study designs have been used in an attempt to improve our understanding of the indications, outcomes, and efficacy.

Guidelines for tonsillectomy have been developed from studies that provide the best evidence for its efficacy. The 1984 Paradise et al. 6 study provides the clearest evidence of improved outcomes in children fulfilling the specific inclusion criteria for that study: the “Paradise criteria.” 7,8 These criteria have been used in the United States and United Kingdom to help with surgical decision making for tonsillectomy, since no other robust evidence exists to suggest that children outside of these criteria would benefit sufficiently from the procedure. 7,8 A Cochrane review by Burton and Glasziou 33 agrees that the benefit of tonsillectomy in severely affected children is clear, but they quote a reduction of only 5 sore throat days per year in moderately affected children after the procedure. A further systematic review and meta-analysis suggests that tonsillectomy reduces the incidence of recurrent pharyngitis by approximately 43% and that 11 tonsillectomies would have to be performed to prevent 1 sore throat per month in the first year after tonsillectomy. 34

Parental Preference

Level 1 evidence exists in favor of tonsillectomy for only severely affected children. However, we know from a number of observational studies that overall parental satisfaction following tonsillectomy is high. Studies quote satisfaction levels in excess of 90%, and some studies include children who do not necessarily meet the “Paradise criteria.” 23,24,30-32,35,36

In addition to this, parents have shown a strong preference for surgical intervention. 37 Lock et al. 17 performed a “utility/willingness-to-pay study” and found that parents are willing to pay a high price for a procedure (not specifically tonsillectomy) to improve their child’s health if they are suffering. A qualitative study by the same authors as part of their larger trial identified a variation in the impact of RSTs on children and their families. 17,38 A clear demand for tonsillectomy by parents to reduce a child’s suffering was evident in a large number of cases in the main study. Despite the risks involved, parents continue to request the procedure. In the study by van Staaij et al. 15 34% of individuals changed from the watchful waiting group to the...
treatment group. In the RCT by Lock et al,17 36 of 137 patients randomized to medical management changed to the surgical arm, and 9 of the 74 who initially requested medical management in the cohort study also resorted to surgery.

The Observed Paradox

Review of the literature reveals a disparity between the measured efficacy of tonsillectomy and the parental satisfaction rate. Is this because of parental anticipated gains and the placebo effect, or perhaps that aspects important to children and their parents are not being measured? Randomized controlled trials, by their very nature, use specific inclusion criteria and outcome measures. Sore throat episodes were measured in all RCTs identified in this review and are the main focus in evaluating the efficacy of tonsillectomy. However, when parents or carers describe the problem of children’s RSTs to clinicians, they describe a collection of symptoms and consequences of the sore throats. The frequency of sore throat episodes is just one of an array of problems reported by the family and possibly the children themselves. It is interesting to note the absence of studies assessing outcomes reported by children themselves for this commonly performed procedure.

The inherent focus in the tonsillectomy RCTs may therefore be their weakness. Strict inclusion criteria and outcome measures will never capture the whole spectrum of cases. This review highlights the attempt by some authors to try to assess other factors that may be affected when a child undergoes the procedure. Nonrandomized quantitative studies are capable of exploring a wider range of issues, and Table 2, Table 3, and Supplemental Table S2 provide an insight into some of these. The outcomes measured include clinical factors and also social, psychological, educational, and financial issues. These studies are, however, more at risk of bias.

Assessment Tools

A group of outcomes can be measured together using a questionnaire as a QoL assessment tool. Some of the RCTs and a number of the nonrandomized trials have used questionnaires validated for assessment of tonsillectomy. For example, the study by Hopkins et al27 reporting the 14-item Paediatric Throat Disorders Outcome Test has demonstrated internal consistency, reliability, responsiveness to change, and construct validity. The questions within this tool were agreed on by a panel of experts and modified from the Tonsil and Adenoid Health Status Instrument.23 Eight questions relate to RSTs, and they cover aspects including frequent medical visits and phone calls, antibiotic use, ear and throat infections, and school absence. In the United Kingdom, patient-reported outcome measures (PROMs), which use a number of QoL outcome tools, have been introduced to assess health care consumer satisfaction rates for certain procedures.39 These are likely to form a basis for assessment of outcomes for surgical procedures, including tonsillectomy.40

Quality-of-life assessment tools go some way toward providing a greater depth of measurable outcomes for tonsillectomy. Even though these tools are validated, it could be argued that they assess what clinicians feel to be important, rather than what the families or patients actually experience. Also, none of the tools in this review include opinions and experiences from children themselves. These two observations could mean that important viewpoints are not included in the questionnaires. Although some studies have addressed some issues by employing physician-derived questionnaires, no study has extracted the in-depth opinions of the child or the parent as to how recurrent tonsillitis affects them.

Implications for Practice

Perhaps the measured benefits in the large studies are not measuring the benefits that parents and children themselves observe. Tonsillectomy may have an effect on an individual’s overall well-being that is not being properly measured by currently available trials. This issue is raised in both the Burton and Glasziou33 Cochrane review and a review by Marshall.41 In most RCTs, outcomes are based on the number of sore throat episodes. A different approach to exploring the tonsillectomy process would be to perform a qualitative study. This would provide a better understanding of what parents and their children experience. The authors of this review believe that this is now needed and are currently undertaking work in an attempt to answer some of these questions.

A qualitative study by Lock et al17,38 was performed in conjunction with their RCT to examine what families experience when a child has RSTs. They observed a number of themes, including an overriding need to request a tonsillectomy in affected children. Previous personal experiences provided strong influencing factors for parents to request a tonsillectomy. The free text section in the questionnaire from the study by Robb et al24 provides an insight into the true feelings of parents of children who undergo the procedure. A qualitative study performed after tonsillectomy would further explore these themes.

Current guidelines may not consider the full impact of the disease process on the patient’s QoL.42 A patient/parent-centered approach could help in developing a set of criteria used as indications or outcome measures for tonsillectomy; these patient/parent-driven criteria would be more likely to reflect the observations and anticipated gains of the parents and children involved in the process. There is an increasing requirement for justification of surgical interventions. It is our belief that an increased understanding of their outcomes with the use of subjective methods could be used to develop more valid and reliable objective outcome measures.

Conclusion

There appears to be a difference in parental satisfaction rates and the published clinical outcomes, efficacy, and clinical effectiveness of tonsillectomy for RSTs in children. Some studies in the current literature have provided
an insight into the numerous interactions at play. A new approach may be required to establish what tonsillectomy has to offer this group of children. If the effectiveness of tonsillectomy relates to child/parental satisfaction, their view should form a basis in the selection criteria. Therefore, studies with a child/parent-centered approach are needed to provide a better understanding of this complex process.

**Author Contributions**

James Barraclough, derived design and concept of manuscript, performed article search, read and reviewed all papers, collected and aligned data groups, continuously revised piece after critical appraisal by second author, approved the final version; Shahram Anari, significantly contributed to original idea and focused reading of first author, read many of the original manuscripts and contributed significantly to the data interpretation and discussion, critically appraised the piece throughout the process, approved the final version.

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**Supplemental Material**

Additional supporting information may be found at http://oto.sagepub.com/content/by/supplemental-data

**References**


