

# Tonsillectomy: Patient Response-based Assessment and Results in Urban Indian Population

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## ABSTRACT

**Introduction:** Tonsillectomy has been considered a controversial surgical procedure due to absence of unequivocal evidence in favor of its benefits. We carried out a standardized patient response-based assessment study to evaluate the benefits.

**Materials and methods:** A total of 62 patients in the age group of 4 to 11 years underwent a preoperative assessment of their symptoms [three groups: recurrent upper respiratory infection (URI), sleep-disordered breathing (SDB), or both] on a T-14 standard questionnaire and, if they met the standard criteria, were taken up for coblation-assisted tonsillectomy and/or adenoidectomy. Their postoperative responses were assessed and benefits compared statistically.

**Results:** A total of 62 patients in three groups underwent the procedure and their postoperative T-14 responses at 3 and 6 months were evaluated. There was a statistically significant improvement in their scores at 3 months in all three groups. However, the improvement was static and did not continue at 6 months.

**Conclusion:** Tonsillectomy, with or without adenoidectomy, is a beneficial procedure for all three categories of patients (based on symptoms) and brings significant improvement on a standardized patient response-based assessment scoring system in patients selected based on a standard criteria.

**Keywords:** Benefits, Patient-reported outcome measure, Tonsillectomy.

**How to cite this article:** Maggon NV, Sethi A. Tonsillectomy: Patient Response-based Assessment and Results in Urban Indian Population. *Int J Head Neck Surg* 2017;8(3):89-92.

**Source of support:** Nil

**Conflict of interest:** None

## INTRODUCTION

A surgical procedure to remove diseased tonsils was described by Celsus as early as 14 AD<sup>1</sup> and the procedure described was to either remove them by dissection using

finger nails or by pulling them out with a hook. It gained wide popularity in England after it was performed on Queen Victoria's grandchildren in the nineteenth century. This led to an era when tonsillectomies began to be performed routinely for variety of reasons, many of which probably did not merit surgery. However, doubts were raised regarding the purported benefits of the surgery vis-à-vis the potential morbidity and mortality associated with it. This controversy and disrepute associated with a very common surgical procedure led to formulations of certain guidelines in an attempt to perform the surgery only in situations where the potential benefits would outweigh the associated morbidity and mortality.

Tonsillectomy has been placed on top of a list of relatively ineffective interventions suggesting that this procedure could be reduced by between 10 and 90%.<sup>2</sup> We conducted a study on pediatric patients (4–11 years) who met the American Academy of Otolaryngologists and Head–Neck Surgeons (AAOHNS) criteria for undergoing tonsillectomy/adenotonsillectomy.<sup>3</sup> The parents were required to fill pediatric throat disorders outcome test (T-14) before the surgery, at 3 months, and 6 months after the surgery to assess the benefits following surgery. The T-14 questionnaire is a validated patient-reported outcome measure (PROM) used to assess the value of pediatric tonsillectomy from the patient's perspective.<sup>4</sup> Aim of this study was to evaluate the efficacy in terms of patient response in cases treated by tonsillectomy/adenotonsillectomy adhering to AAOHNS selection criteria.

## MATERIALS AND METHODS

This study was carried out in a tertiary care hospital in an urban setting in a tier-1 Indian city from January 13 to June 15. Patients in the age group 4 to 11 years who reported to our otolaryngology department with complaints of recurrent URIs and/or symptoms of SDB were evaluated. Those who met the AAOHNS criteria of symptomatology were evaluated with a detailed history, a complete systemic and ear, nose, and throat (ENT) examination that included flexible and rigid endoscopy, relevant imaging, and investigations. Surgery was advised to 88 patients based on AAOHNS criteria and of these, 62 parents (70.45%) gave consent for a surgical intervention. Patients were divided into three groups based on their presentation into group I (symptoms predominantly

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recurrent URI), group II (symptoms predominantly SDB), and group III (symptoms of both). A standard coblation-assisted tonsillectomy/adenotonsillectomy (hereafter called procedure) was performed under general anesthesia followed by 5 days of antibiotics.

**Exclusion Criteria**

- Age less than 4 years
- History of bronchial asthma
- Otitis media with effusion
- Systemic morbidities like diabetes mellitus or obesity
- Hemoglobin < 10 gm%
- Absolute contraindication to general anesthesia

Of the 62 patients, 34 were boys and 28 were girls. Totally, 31 patients suffered from only recurrent URIs (group I), 18 suffered from SDB (group II), and 13 had features of both (group III). A total of 37 patients underwent adenotonsillectomy and 25 underwent tonsillectomy alone.

Parents were required to fill the PROM T-14 questionnaire preoperatively, at 3 months, and at 6 months after surgery.

**RESULTS**

A total of 31 patients underwent the procedure for predominant URI symptoms and comprised group I. Their preoperative PROM scores averaged 30.13 (23–39) with a standard deviation (SD) of 3.45. These patients had significant reduction in their PROM scores 3 months after surgery with an average reduction of 25.29 on a paired t-test ( $p < 0.0001$ ). The reduction of scores at 6 months after surgery had an average of 26, which was not significantly different from 3-month scores (Table 1).

Totally, 18 patients underwent the procedure for predominantly SDB symptoms (group II). Their average preoperative PROM scores were 32.06 (SD 14.44). Post-operative scores at 3 months showed an average reduction of 28.11 (paired t-test;  $p < 0.0001$ ), while average reduction at 6 months was 27.72. There was significant reduction in PROM scores at 3 months compared with preoperative scores. There was no statistical difference between average scores at 3 and 6 months (Table 2).

Totally, 13 patients underwent the procedure for symptoms caused by both recurrent URI and SDB and had preoperative average PROM score of 35.15 (SD 5.83). Their average reduction in PROM scores at 3 months was 31 (paired t-test;  $p < 0.0001$ ), while it was 30.85 at 6 months after the procedure (Table 3).

**DISCUSSION**

One of the commonest complaints with which pediatric patients presenting to an otolaryngologist is related to

**Table 1: Group I (URI)**

Sl. no.	Preoperative	At 3 months	Diff P-3	At 6 months	Diff P-6
1	26	4	22	4	22
2	30	5	25	5	25
3	27	5	22	5	22
4	34	6	28	4	30
5	28	5	23	4	24
6	29	5	24	5	24
7	31	7	24	4	27
8	29	6	23	5	24
9	31	4	27	4	27
10	23	5	18	5	18
11	30	5	25	5	25
12	33	5	28	4	29
13	31	4	27	4	27
14	32	5	27	5	27
15	26	6	20	4	22
16	30	5	25	5	25
17	29	4	25	4	25
18	31	7	24	7	24
19	36	5	31	5	31
20	31	3	28	3	28
21	29	4	25	4	25
22	33	5	28	5	28
23	28	4	24	4	24
24	30	3	27	3	27
25	24	5	19	5	19
26	30	7	23	6	24
27	29	5	24	5	24
28	27	4	23	4	23
29	37	3	34	3	34
30	31	4	27	4	27
31	39	5	34	5	34
Mean	30.13	4.84	25.29	4.48	26
SD	3.45	1.07		0.85	

SD: Standard deviation

**Table 2: Group II (SDB)**

Sl. no.	Preoperative	At 3 months	Diff P-3	At 6 months	Diff P-6
1	24	4	20	4	20
2	34	2	32	4	30
3	27	3	24	5	22
4	31	4	27	5	26
5	35	5	30	5	30
6	34	7	27	4	30
7	34	5	29	5	29
8	30	3	27	3	27
9	36	4	32	4	32
10	31	4	27	4	27
11	34	3	31	5	29
12	29	4	25	5	24
13	32	4	28	4	28
14	33	3	30	5	28
15	34	4	30	4	30
16	36	3	33	3	33
17	31	5	26	5	26
18	32	4	28	4	28
Mean	32.06	3.94	28.11	4.33	27.72
SD	14.44	1.11		0.69	

SD: Standard deviation



**Table 3:** Group III (combined/mixed)

Sl. no.	Preoperative	At 3 months	Diff P-3	At 6 months	Diff P-6
1	27	5	22	5	22
2	32	4	28	4	28
3	26	7	19	5	21
4	34	4	30	4	30
5	41	5	36	5	36
6	37	4	33	4	33
7	43	3	40	5	38
8	44	3	41	3	41
9	40	4	36	4	36
10	30	3	27	3	27
11	31	3	28	5	26
12	36	4	32	5	31
13	36	5	31	4	32
Mean	35.15	4.15	31.00	4.31	30.85
SD	5.83	1.14		0.75	

SD: Standard deviation

the palatine tonsils and/or adenoids either in the form of recurrent or chronic infection, or their enlargement leading to SDB.<sup>5</sup> The treatment could be conservative or a surgical intervention depending on the severity and duration of symptoms. Tonsillectomy, with or without adenoidectomy, is an old surgical procedure and along with myringotomy is the most common procedure performed in children in the western countries.<sup>6</sup> The commonest indications are recurrent URI and SDB. For children with SDB due to adenotonsillar hypertrophy, an adenotonsillectomy has proven benefit, i.e., well documented. However, its benefit for recurrent URI lacks conclusive evidence.<sup>7</sup>

We conducted a prospective nonrandomized, non-controlled interventional study at a tertiary care center to classify pediatric patients in the age group 4 to 11 years into three groups based on their predominant presenting symptoms and took them up for tonsillectomy/adenotonsillectomy. All 62 patients met the standard AAOHNS criteria and their presenting symptoms and degree of morbidity were measured objectively using a standard validated PROM T-14 score. The patients were again assessed at 3 and 6 months after surgery using PROM scores and an attempt was made to determine

- If improvement occurred in all groups
- Degree of improvement in various groups
- If different groups have different degree of improvement
- How long the improvement in scores continued

In group I (recurrent URI), preoperative PROM score ranged from 23 to 39 with a mean of 30.13 (SD 3.45). At 3 months following surgery, PROM scores reduced by a highly significant 25.29 and improved to an average 4.84 ( $p < 0.0001$ ), indicating a strong justification for doing the surgery in patients with recurrent URI as the presenting symptom. Konieczny et al,<sup>8</sup> in their study of 54 pediatric

patients, found similar results in that 21 of their patients underwent the surgery for recurrent tonsillitis and achieved a mean drop of 31.8 at 6 months after surgery. They reported a continued significant improvement in PROM scores from 3 to 6 months also. However, in our study, though there was a further reduction in scores at 6 months, the difference at 3 (4.84) and 6 months (4.48) was not statistically significant ( $p < 0.05$ ). Thus, these results indicate that there is a strong case for surgery in patients of recurrent tonsillitis/URI and it significantly improves their quality-of-life. A Cochrane review in 2009 carried out systematic review of available randomized and nonrandomized controlled trials and concluded that though there were serious limitations in most of the studies, surgery did give an additional, but small, reduction of sore throat episodes, URI-associated school absence, and URI.

In group II SDB, there were 18 patients and they had a mean preoperative PROM score of 32.06 (24–36, SD 14.44). Interestingly, this was significantly higher than the preoperative PROM score in group I, thereby indicating that children with obstructive sleep disorder due to adenotonsillar hypertrophy had more severe symptoms. The mean scores at 3 months were 3.94 and reduction in scores at 3 months was highly significant at 28.11 (20–32, SD 5.66). The mean scores at 6 months were surprisingly marginally higher at 4.33, but were not significantly different from 3-month scores.

In group III (combined mechanism), 13 patients had a mean pre-op PROM score of 35.15 (26–44, SD 5.83) that reduced to a mean postoperative score of 4.15 at 3 months showing significant reduction and a mean score of 4.31 at 6 months postoperative. Again, in all 13 cases, the improvement in symptoms was the maximum at 3 months and scores did not improve further at 6 months.

The URI is an extremely common condition and accounts for enormous numbers of school days lost from school. Though Indian data are not available, data from England estimate an annual 35 million school days loss on a much smaller population base.<sup>9</sup> Though the number of tonsillectomies done has reduced drastically over the last few decades, there is still a strong opinion against it for want of unequivocal evidence.<sup>10</sup> Konieczny et al<sup>8</sup> in their PROM-based study using a T-14 questionnaire reported a highly significant reduction in preoperative T-14 score compared with that at 3 and 6 months postoperatively. In their study, difference between the T-14 at 3 months and 6 months was also statistically significant, thus implying continuous improvement. In our study, the difference at 3 and 6 months postoperatively was insignificant and in fact showed a marginal deterioration.

In another landmark study, Hopkins et al<sup>4</sup> used T-14 questionnaire for the first time to outline it as a validation

evidence for its application as PROM in otolaryngology. They found a preoperative mean score of 24.0, which dropped to 7.01 at 6 months. In our study, the mean preoperative score was 32.45 (31.13–35.15) and it dropped to a mean of 4.37 at 6 months, thus indicating that patients in Indian setting were more symptomatic at the time of presentation and, therefore, reported greater improvement on PROM scores. It is worth noting that in our study, maximal benefit appeared 3 months postoperatively and there was no continuous improvement at 6 months in contrast to observations by Konieczny et al.<sup>8</sup>

To conclude, T-14 PROM (for pediatric throat disorder scores) provides effective, objective, and measurable parameters for assessment of degree of morbidity and postintervention improvement following tonsillectomy and/or adenotonsillectomy. Postoperative improvement is maximal for children having predominant SDB, but improvement for recurrent URI is also highly significant, thus justifying the procedure in patients who meet the AAOHNS criteria strictly.

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