

*Original Article*

## Quality of Life in Under-14-Year-Old Children After Adenotonsillectomy

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### **Abstract**

#### **Introduction:**

Tonsillectomy with or without adenoidectomy is one of the most frequent surgical procedures especially in children. Several indications and contraindications have been suggested for this procedure. The benefits and the negative results of this operation have been studied by different researchers; nevertheless, to date, it is still a common procedure.

The main purpose of this study is to obtain extensive information on the outcomes of adenotonsillectomy, according to the patient's physical, emotional and behavioral changes and also on the overall changes in his/her quality of life (QOL).

#### **Materials and Methods:**

All the children, aged 1-14, referred to the Besat Hospital clinics (Hamadan, Iran) between March 2008 and March 2009 were included in this study. Overall, 86 children with documented indications underwent adenotonsillectomy, and were followed up for one year. Two modified standard questionnaires for QOL were completed before and one year after the tonsillectomy. Upon the completion of this two-year study, statistical analyses were performed, and the demographic data of the study groups were compared with those of a same-age group.

#### **Results:**

Changes were observed in five main complaints as follow: Acute Recurrent tonsillitis was present in 86 patients preoperatively, but in only three cases postoperatively (pharyngitis). Confirmed chronic sinusitis was present in 24 patients preoperatively, but only in three cases during the year after the surgery. Oral breathing was seen in 82 patients preoperatively, but only in one patient during the year after the surgery. Nocturnal snoring was seen in 83 children preoperatively, but in 25 cases during the year after the surgery. Halitosis was present in 71 patients, while and halitosis was seen in 27 during the year after the surgery.

#### **Conclusion:**

Overall, the majority of the parameters studied showed significant differences after surgery.

#### **Keywords:**

Adenoid, Sinusitis, Snoring, Tonsils, Tonsillitis.

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### **Introduction:**

Tonsillectomy is one of the most common surgical procedures in children and young adults all over the world. The adverse effects of enlarged adenoids and their frequent infection have probably a significant effect on the patient's Health-Related Quality of Life (HRQL).

After adenotonsillectomy, the resulting significant reduction in antibiotic consumption, reduction in school and work absenteeism and reduction in medical visits will also benefit these patients economically (1). The decrease in sore throat incidence leads to a significant growth in children's appetite, leading to 20% increase in weight compared with the normal trend (2). Emotional and behavioral disorders caused by respiratory problems during sleep disappear after adenotonsillectomy and children will enjoy a significant improvement in their QOL (3).

Based on numerous studies and also the author's own experience (of 20 years) on the positive results of this surgery particularly on children, This survey was performed to prove the positive effects of adenotonsillectomy on the patients.

### **Materials and Methods:**

In this study, 1-14-year-old children, with adenotonsillar problems and diseases who were referred to the ENT clinics of the Besat Hospital in Hamadan from 2008 to 2009, who had been candidates for adenotonsillectomy, and who had the following criteria were selected. The maximum age (14 years) was established so as to have all the questionnaires completed by children's parents, and those up to 16, who could answer the questions personally were excluded. Although the initial study group was estimated to consist of 70 patients, 86 patients with surgical indications were eventually selected, and for each case, one year after the surgery, the same questionnaire was completed again.

Several questionnaires including Ped Qol 4, TAHSI and CHQ-PF28 were analyzed to be used for this study. TAHSI (Tonsil and Adenoid Health Status Instrument) (4) includes 18 items, categorized into six subgroups:

Air-way  
Infection  
Health services  
Eating and swallowing  
Medical services value and cost  
Child's behavior

Each of these subgroups is scaled as follows:

0= no problem

1= no significant problem

2= moderate problem

3= significant problem

4= severe problem

Each subgroup can score between 0 and 100.

CGQ-PF28 (Child Health Questionnaire-PF28) (5) includes questions such as sore throat incidences, antibiotic administration, the number of medical visits and the number of days absent from school.

Unfortunately, many of the questions were not consistent with the cultural and social conditions of the patients' families, and we could not obtain reliable responses from parents. Besides, a number of parents were illiterate, which rendered subtle questions difficult for them to answer. For instance, for such questions as "health services", "the value and cost of medical services" or even "child's behavior", we could not effectively communicate with the parents to secure precise answers. Therefore we made some changes in the revised questionnaire, excluding items meant to evaluate the children's physical, emotional, social and educational functions before and after adenotonsillectomy, and as the emotional function was not assessable with this questionnaire, it was omitted.

Similar to other studies, it was difficult to select an external control group (a group of children with tonsillar disease who do not undergo the surgery) (6).

We, therefore, examined the preoperative and postoperative conditions of the adenotonsillectomy patients. Further, their demographic data (height and weight) were compared with those of the standard group of the same age.

Before starting the project, patients' parents gave their consent for their children's participation in the study, and they were told that this study involved no additional interventions other than the already planned pre-op services (i.e., adenotonsillectomy and postoperative care). The plan was approved by the Medical Ethics Committee of the Besat Hospital and Hamedan University of Medical Sciences.

Ninety cases were observed and evaluated to the end of the study, but four cases were excluded because of their own withdrawal, so finally, 86 cases were analyzed statistically. All these patients underwent adenotonsillectomy, and there was no isolated case of adenoidectomy or tonsillectomy, but in some patients with serous otitis, ventilation tubes were also employed.

The indications for adenotonsillectomy mainly included: acute and frequent throat infection, chronic sinusitis, peritonsillar abscess, open-mouth breathing, nocturnal snoring, apnea and halitosis.

However, certain other complaints were recorded along with the main criteria: Skeletal disorders of the jaw, face and teeth; nocturnal enuresis; lack of normal physical growth; daytime drowsiness; number of days of school absenteeism over the past year; number of days of hospitalization over the past year; the incidence of otitis media over the past year; the incidence of throat infection; and anorexia. Patients' demographic data

included age, sex and their parents' education.

The following cases were excluded from the study:

All contraindications of adenotonsillectomy that have been mentioned as standard and classic in ENT references.

Emergency surgeries (e.g., emergency surgeries in mononucleosis)

All cases who dropped out of the follow-up.

Finally, all the patients underwent adenotonsillectomy performed by ENT specialists at the Besat Hospital, Hamedan, and the same questionnaire was completed again for each patient exactly 12 months after the surgery. Chi-square and t-test were used to compare independent groups, and McNemar test, Wilcoxon Signed-Rank test and paired t-test were used to compare the pre and post-intervention data.

### **Results:**

Eighty-six children, 46 girls (53.5%) and 40 boys (46.5%) were evaluated in this study. Patients were aged 2-14, with a mean age of 7.16 ( $\pm 2.7$ ). The girls' mean age was 7.56 ( $\pm 2.7$ ) and the boys' was 6.61 ( $\pm 2.5$ ), and applying the T-Test showed no significant difference ( $P=0.1$ ). There was no difference between girls and boys in terms of the pre- and postoperative analysis of other observed variables (Table 1).

Forty-eight patients (55.8%) seemed to show lack of proper and normal growth. Likewise, skeletal disorders in the jaw, the face and teeth were quite evident in 17 patients (19.8%). Interestingly, no peritonsillar abscess was observed in any of the patients. Serous otitis, both cases presented as the patients' complaint and cases confirmed during thorough clinical examinations, was seen in nine patients (10.5%), whose surgery included the use of a ventilation tube.

Acute and frequent throat infection (between one and 12 times over the past year) was the most common surgical indication (86 patients). Further, 66 patients (76.7%) had had throat infection five times or more a year before adenotonsillectomy, whereas it happened only in three patients (3.5%) a year after the surgery ( $P=0.0002$ ).

The mean of throat infection incidence during the year before adenotonsillectomy was 5.99 ( $\pm 2.3$ ), and 1.55 ( $\pm 1.99$ ) a year

after the surgery, a difference was shown to be significant using the Wilcoxon Signed-Rank test ( $P<0.0001$ ).

83 patients (96.5%) suffered from nocturnal snoring and sleep disorders before adenotonsillectomy. However, it was reported in 25 cases (29.1%) a year after the surgery ( $P<0.0001$ ).

Eight-two children (95.5%) had nocturnal open-mouth breathing, according to their parents', but only one child (1.2%) suffered from this problem after adenotonsillectomy ( $P<0.0001$ ).

**Table 1:** Evaluation of preoperative variables according to sex

	Girl	Boy	Total	P
<b>Bad breathing</b>	(%80.4)17	(%85.0)34	(%82.6)71	0.39
<b>Open-mouth breathing</b>	(%95.5)43	(%97.5)39	(%95.3)82	0.36
<b>Snoring</b>	(%95.7)44	(%97.5)39	(%96.5)83	0.55
<b>Apnea</b>	(%28.3)13	(%30.0)12	(%29.1)25	0.52
<b>Drowsiness</b>	(%17.4)8	(%17.5)7	(%17.4)15	0.6
<b>Anorexia</b>	(%39.1)18	(%47.5)19	(%43.0)37	0.28
<b>Enuresis</b>	(%17.4)8	(%27.5)11	(%22.1)19	0.19
<b>Frequent tonsillitis</b>	(%100.0)46	(%92.5)37	(%96.5)83	0.09
<b>Jaw and face disorders</b>	(%23.9)11	(%15.9)6	(%19.8)17	0.22
<b>Earache</b>	(%47.8)22	(%45.0)18	(%46.5)40	0.48
<b>Hospitalization history</b>	(%10.9)5	(%12.5)5	(%11.6)10	0.53
<b>Lack of appropriate growth</b>	(%60.9)28	(%50.9)20	(%55.8)48	0.21
<b>Otitis media</b>	(%13.0)6	(%7.5)3	(%10.5)9	0.31
<b>School absenteeism</b>	(%58.8)20	(%53.6)15	(%56.5)35	0.43
<b>Chronic sinusitis</b>	(%28.3)13	(%27.5)11	(%27.9)24	0.56

Twenty-four patients (27.9%) showed positive signs and symptoms of chronic sinusitis. After the surgery these symptoms were seen only in three cases (3.5%) ( $P<0.0001$ ).

Seventy-one patients (82.6%) suffered from halitosis before adenotonsillectomy. This problem was persistent in 27 patients (31.4%) during the year after the surgery ( $P<0.0001$ ).

As for the appetite question on the questionnaire, which was totally dependent on the parents' satisfaction with their child's food intake and appetite, 49 children (57%) had a good appetite before the surgery, whereas after adenotonsillectomy this number increased to 70 cases (81.4%) ( $P<0.0001$ ).

Daytime drowsiness was reported by parents in 15 cases (17.4%) before adenotonsillectomy, whereas after the surgery, there was only one patient (1.2%) with this problem ( $P<0.0001$ ). According to the parents, 25 children (29%) suffered from apnea before the surgery, but only three patients (3.5%) showed the problem after that ( $P<0.0001$ ).

Nineteen patients (22.1%) suffered from nocturnal enuresis before adenotonsillectomy. (In the +5-year-old group, which is more realistic, 11 children (16.2%) had this problem), whereas a year after the surgery, the symptoms were observed only in six patients (7%), four (5.9%) of which were above 5 years old).

As for the next item on the questionnaire concerning the frequency of hospitalization, ten cases (11.6%) had a history, whereas no hospitalization history was reported a year after that ( $P=0.0001$ ).

As for earache, a year before being selected for adenotonsillectomy, 40 cases (46.5%) suffered from this problem, whereas 11 cases (12.8%) had earache a year after that ( $P<0.0001$ ).

School or kindergarten absenteeism was observed in 35 cases (56.5%) a year before adenotonsillectomy, but this rate decreased to 19 cases (22.1%) a year after the surgery ( $P=0.0004$ ) (Fig 1).

In this study, 33 children (38.4%) aged 2-6 and 53 children (61.6%) aged 6-14 were evaluated. According to the Nelson Textbook of Pediatrics, the annual height and weight increases in 2-6-year-old children are 7cm and 2 kg, respectively, and those in 6-14-year-olds are 6cm and 3kg, respectively.

In this study, the mean weight gain in 2-6-year-old children was 2.31kg ( $\pm 0.95$ ), which was higher than the standard level, showed no significant statistical difference ( $P=0.07$ ). The mean weight gain in 6-14-year-olds was 2.83kg ( $\pm 0.97$ ) ( $P=0.2$ ). The mean height increase in 2-6-year-old children was 5.77 cm ( $\pm 1.9$ ), and that in 6-14-year olds was 4.24cm ( $\pm 1.5$ ) ( $P<0.0001$ ).

### **Discussion:**

Although there are many prospective studies showing improvements in the HRQL of patients with sleep respiratory disorders (7) and frequent chronic tonsillitis (8), our study was performed on a wide spectrum of patients with different adenotonsillectomy indications for adenoid and tonsil using HRQL questionnaires, with relevant modifications in TAHSI and CHQ-PF28 questionnaires and by adjusting them to the cultural and social conditions the city of Hamadan, Iran, and the study was not limited to air-way obstruction and throat infection indications. All scores show a distinct improvement in all the studied aspects during the one year after the surgery. Improvements are also shown in the children's nutrition and even behavior.

The beneficial effects of adenotonsillectomy on the improvement patients with airway problems or frequent

throat infection were already reported in previous studies (8).

Unfortunately, we have partially evaluated patients' HRQL according to their parents' descriptions (e.g. rate of daily activity, change in appetite, and daytime). However, most studies have focused on one or a certain number of aspects of patients' problems, and have reported different degrees of improvement after adenotonsillectomy.

For instance, Garetz and his colleagues showed changes in the growth hormone and an increase in children's growth after adenotonsillectomy in 96 children, aged 2-14, who had undergone the surgery due to adenotonsillar hypertrophy and sleep respiratory disorders (9). Thus, the American Academy of Pediatrics has recognized airway obstruction and untreated sleep apnea as contributors to growth failure in children (10).

In this study, weight gain in 2-6-year-old and 6-14-year-old children after adenotonsillectomy has been reported to match international standards, but height increase in these two groups does not conform to the standards of Nelson Textbook of Pediatrics. Weight gain after adenotonsillectomy was also reported by researchers in most previous studies.

Likewise, Landgraf JM. et al studied voice and behavior changes in 40 children, aged 4-14, with adenotonsillar hypertrophy, and showed the positive effects of adenotonsillectomy on children's hypernasality (11).

Upon the examination of the reports of the studies performed by 62 ENT surgeons on 664 children (under 16 years old), Kiris M. et al reported parents' satisfaction a year after adenotonsillectomy. There was evident both of a reduction in throat infection (with an average annual incidence of 6.7 before the surgery and 1.5 after the surgery) and of improvement in sleep respiratory disorders (e.g. sleep apnea and symptoms such as snoring,

restless sleep and, daytime drowsiness) (12).

However, in our study, 83 patients (96.5%) were suffering from frequent throat infection up to 12 times a year before adenotonsillectomy (one patient had only one instance of throat infection, but was candidate for adenotonsillectomy due to sleep apnea.), and after the surgery, frequent throat infection was observed five times during the year after adenotonsillectomy in three patients.

Similarly, preoperative snoring was observed in 83 patients (96.5%), and postoperative snoring in 25 cases (29%). (This can be related to familial predispositions or to the weight of such children.) In addition, 82 cases (95.3%) had open-mouth sleep breathing before adenotonsillectomy, whereas only one case was reported with that problem after the surgery. (As the reports are completed by the parents, and since their presence with the children during the night might have influenced the children's conditions, these findings are subject to doubt.)

Mora R. et al, found no correlation between atopy increase and adenotonsillectomy. Our study did not include this item.

Numerous studies (14,15) have shown the positive effects of adenotonsillectomy on enuresis in children, which conforms to our finding in that 19 cases (22.1%) suffered from enuresis before adenotonsillectomy, and 6 cases (7%) after the surgery (13).

Purulent nasal discharge with coughs, nasal obstruction and halitosis were some of the accompanying signs, and in some cases were also considered indications for adenotonsillectomy. These patients were included in our study as suffering from chronic sinusitis provided that Water's view radiograph of paranasal sinuses showed maxillary sinus opacity. Interestingly, only three (3.5%) of these patients (27.9%) showed those symptoms one year after the surgery while 24 cases

(27.9%) did so before the surgery. Likewise, there are numerous studies showing the excellent effects of adenotonsillectomy on chronic sinusitis treatment (16,17).

Lack of school and kindergarten absenteeism was some of the most important factor in patients' HRQL. Absenteeism was seen in at least 35 cases (56.5%) a year before adenotonsillectomy (1-5 times a year) and 19 cases (22.1%) during the year after the surgery. (Such other factors as social or family problems may have led to absenteeism) (Fig1). Interestingly, 40 patients (46.5%) (aged 2-11 years old, the mean age of whom, however, was not different from that of those without a history of earache) suffered from a form of earache before the surgery, and this rate decreased to 11 cases after the surgery.

On the other hand, according to a study by Comen K. et al on 30 children, aged 2-8, adenotonsillectomy was found not to have any effects on the middle ear, and there was even no significant difference in patients with otitis media and hearing loss who underwent adenotonsillectomy and those who did not. Of practical value significance was identifying nine cases (10.5%) of serous otitis, previously confirmed through otoscopy and tympanometry; most of these diagnoses were made during thorough clinical examinations and after being candidates for adenotonsillectomy; in addition to adenotonsillectomy, ventilation tubes were also employed in these patients. Peritonsillar abscess, which was an indication for surgery, was seen in none of our 86 patients (18). However, in a study on 3-16-year-old children performed between 1970 and 1980, 41 cases were

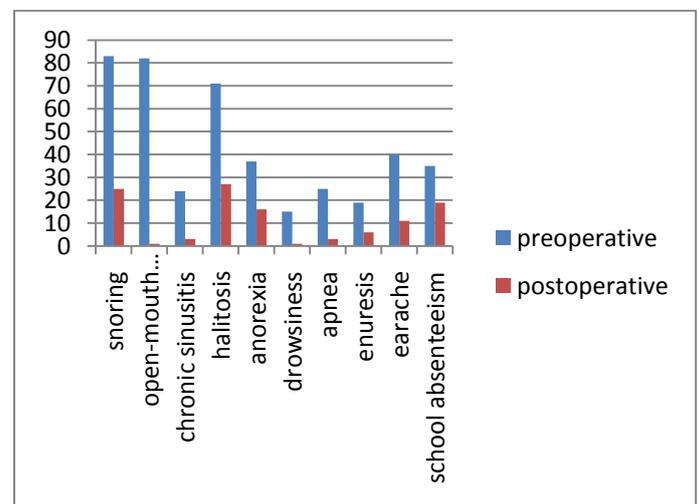
reported to have bilateral peritonsillar abscess (19).

It should be mentioned that the researcher responsible for this project with more than 20 years experiences in adenotonsillectomy and having performed more than 5000 surgeries has not observed even one case of bilateral peritonsillar abscess in young children. It seems that peritonsillar abscess has been confused with acute purulent tonsillitis.

### **Conclusion:**

According to our findings, adenotonsillectomy has significant positive effects on children who really needed adenotonsillectomy. Children with upper respiratory tract problems also tend to benefit from this surgery

**Fig 1:** Preoperative and postoperative variable



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