



## CLINICAL STUDY

# ANY RELATION BETWEEN POOR ORAL HYGIENE AND TONSILLAR HYPERTROPHY?

Esra ERYAMAN, MD<sup>1</sup>; Banu OTER, MD<sup>2</sup>; Erdinç AYDIN, MD<sup>3</sup>

<sup>1</sup>Başkent Üniversitesi, KBB, İstanbul, Turkey <sup>2</sup>Başkent Üniversitesi, Pedodonti, İstanbul, Turkey <sup>3</sup>Başkent Üniversitesi, KBB, Ankara, Turkey

### SUMMARY

**Objective:** The purpose of this study is to evaluate the relation between poor oral hygiene and tonsillar hypertrophy.

**Methods:** 80 children of ages between 3 and 12 who consulted with Pedodontics at Baskent University Istanbul Hospital, were included in this study. For data analysis of dental caries, dft index for primary teeth (d = decayed, f = filled, t = teeth) and DMFT index for permanent teeth (D = decayed, M = Missing due to caries, F = filled, T = Teeth) were used in accordance with WHO (World Health Organization) criteria for oral health surveys. The oral hygiene status was determined by using Simplified Oral Hygiene Index of Greene and Vermillion. The oral hygiene index scores of 0-1 were classified as low, and of 2-3 as high oral hygiene index scores. The low oral hygiene index score group was taken as the control group (42 patients). The high oral hygiene index score group was taken as the study group (38 patients). Tonsil sizes were evaluated on the Brodsky L. Scala.

**Results:** There was no statistically meaningful difference between the control and study groups, with the p value being 0.642 (p>0.05) and the chi square value being 2.483.

**Conclusion:** We conclude from these clinical results that there is no statistically meaningful relation between oral hygiene and tonsil size.

**Keywords:** Dental caries, palatine tonsil, oral hygiene

### KÖTÜ ORAL HİJYEN İLE TONSİL HİPERTROFİSİ ARASINDA BİR İLİŞKİ BULUNABİLİR Mİ?

#### ÖZET

**Amaç:** Bu çalışmanın amacı kötü oral hijyen ile tonsil hipertrofisi arasındaki ilişkiyi değerlendirmektir.

**Yöntemler:** Başkent Üniversitesi İstanbul Hastanesine başvuran 3-12 yaş aralığında 80 çocuk hasta çalışmaya dahil edilmiştir. Primer dişler için çürük data analizi WHO (World Health Organization)'nun ağız içi sağlığı kriterlerine göre düzenlenen dft indexine (d = çürük, f = dolgu, t = diş) göre yapılmıştır. Oral hijyen durumu "Simplified Oral Hygiene Index of Greene and Vermillion" kullanılarak belirlenmiştir. 0-1; düşük oral hijyen index skoru, 2-3; yüksek oral hijyen index skoru olarak tanımlanmıştır. Düşük oral hijyen index skoru (42 hasta) kontrol grubu, yüksek oral hijyen index skoru (38 hasta) çalışma grubu olarak belirlenmiştir. Tonsil boyutları Brodsky L. Scala'ya göre değerlendirilmiştir.

**Bulgular:** İstatiksel olarak kontrol ve çalışma grupları arasında, p değeri 0.642 (p>0.05) ve chi square değeri 2.483 olmak üzere anlamlı bir fark bulunmamıştır.

**Sonuç:** Çalışmamızda oral hijyen ve tonsil hipertrofisi arasında bir ilişki görülmemiştir.

**Anahtar Sözcükler:** Dental çürükler, palatin tonsil, ağız hijyeni

## INTRODUCTION

Diseases of the tonsils are one of the most common pediatric ENT diagnoses. Tonsillectomy is still among the most popular surgical procedures and tonsillar hypertrophy is the most frequent indication for tonsillectomy. Hyperplasia itself is not a disease, it may be due to secondary chronic infections or to immune activity. Tonsillar hyperplasia may cause sleep apnea, snoring, malocclusion, deglutition problems. Group A - beta-hemolytic streptococcus is the most popular microbiological agent in the tonsils followed by Staphylococcus Aureus and Haemophilus Influenzae<sup>1</sup>.

In the micro flora of the oral cavity, Streptococcus Mutans and Streptococcus Sobrinus, collectively known as mutans streptococci (MS), and Lactobacillus are responsible for the oral diseases such as caries and periodontitis<sup>2</sup>. Dental plaque in children with caries does not for sure signify the good oral hygiene and may influence chronic infections of the tonsils, ending up with hypertrophy in tonsils. If this argument is supported, prevention of tonsillar diseases and avoidance of inessential operations may be achieved by simple dental therapies.

## MATERIAL and METHODS

80 (43 female, 37 male) children who consulted with the Pedodontics Clinic at Baskent University Istanbul Hospital were included in this study. The age interval was between 3 and 12. The patients had no craniofacial anomalies, no allergies, no acute tonsillar and adenoid diseases, and no systemic other diseases. The parents were questioned

Corresponding Author: Esra Eryaman MD Başkent Üniversitesi, KBB, İstanbul, Turkey, E-mail: esraer@superonline.com

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simply about the previous chronic otolaryngologic problems and informed consents were taken. The ones operated for adenoids were not included in the study. Finally ASA I and II patients were included (American Society of Anesthesiologists).

The oral health status was determined by assessing the caries status and the oral hygiene status by a single examiner. For data analysis of dental caries, dft index for primary teeth and DMFT index for permanent teeth was used in accordance with WHO (World Health Organization) criteria for oral health surveys[3]. dft/DMFT indices are general indicators of dental health status of the population (particularly among children). DMFT refers to permanent teeth: D = decayed, M = Missing due to caries (not from trauma, orthodontic extraction, congenitally missing, etc), F = filled, T = Teeth. dft refers to primary teeth: d = decayed, f = filled, t = teeth. DMFT score for any individual can range from 0 to 32 in whole numbers. dft score can range from 0 to 20. The oral hygiene status was determined by using Simplified Oral Hygiene Index of Greene and Vermillion<sup>4</sup>. The six surfaces were stained with basic fuchsin and subsequently examined from four posterior and two anterior teeth. In the posterior portion of the dentition, the first fully erupted tooth usually is the first molar, no16, and sometimes is the second, no17. The buccal surfaces of the selected upper molars and the lingual surfaces of the selected lower molars were inspected. In the anterior portion of the mouth, the labial surfaces of the upper right, no11, and the lower left central incisors, no 31, were scored. In the absence of either of these anterior teeth, the central incisor (21 or 41 respectively) on the opposite side of the midline was substituted. The oral hygiene index scores (OHI-S) range from 0 to 3 as follows.

OHI-S 0 = No debris or stain present

OHI-S 1 = Soft debris covering not more than one third of the tooth surface or presence of extrinsic stains without other debris regardless of the surface area covered

OHI-S 2 = Soft debris covering more than one third but not more than two thirds of the exposed tooth surface.

OHI-S 3 = Soft debris covering more than two thirds of the exposed tooth surface

After the scores for debris were recorded, the index values were calculated. For each individual, the debris scores were totaled and divided by the number of surfaces scored. The patients were divided into two groups according to caries activity and oral hygiene. Patients with OHI-S 0-1 were grouped as

the control group, with good oral hygiene. Patients with OHI-S 2-3 were designated as the study group, with poor oral hygiene<sup>3,4</sup>.

The tonsil size was estimated by placing the tongue depressor in anterior to the circumvallate papillae or if possible, just by inspection without the use of tongue depressor.

Tonsil sizes were evaluated by the same observer using the Brodsky L. Scala conceived as follows;<sup>5,6</sup>

0: Tonsils are situated in the tonsillar fossa, with no impingement on the oropharyngeal airway.

+1: Tonsils sit just outside of the tonsillar fossa with obstruction of less than 25% of the oropharyngeal airway.

+2: Tonsils are readily seen in the airway where 25 to 50% of the airway is obstructed.

+3: Tonsils obstruct 50 to 75% of the oropharyngeal airway.

+4: Tonsils obstruct more than 75% of the oropharyngeal airway.

NCSS (Number Cruncher Statistical System) 2007&PASS 2008 Statistical Software (Utah, USA) package has been used for the statistical analyses when the results were being evaluated. The quantitative data were evaluated using Chi-square test and Fisher's Exact test. Significance was accepted at  $p < 0.05$  level.

This study is compatible with Helsinki Declaration 2008 principles.

This study was approved by the Baskent University Institutional Review board (project no: KA 10/59) and supported by the Baskent University Research Fund.

## RESULTS

80 children who consulted with the Pedodontics Clinic at Baskent University Istanbul Hospital, were included in this study. 42 patients were grouped as the control group (low OHI-S), 38 patients were grouped as the study group (high OHI-S).

In the control group, 33.3% (14/42) were primary teeth, 52.3% (22/42) were mixed teeth, 14.2% (6/42) were permanent teeth. In total, in 19% (8/42) of the control group tonsil sizes were +1, in 47.6% (20/42) tonsil sizes were +2, in 21.4% (9/42) tonsil sizes were +3, in 11.9% (5/42) tonsil sizes were +4. The highest hypertrophy rate was found as +2,



meaning tonsils obstructing 25 to 50% of the oropharyngeal airway.

In the study group (poor oral hygiene), 15.8% (6/38) were primary teeth, 55.2% (21/38) were mixed teeth, %28.9 (11/38) were permanent teeth. In total, in 2.6% (1/38) of the study group patients tonsil sizes were + 0, in 13.1% (5/38) tonsil sizes were +1, in 42.1% (16/38) tonsil sizes were +2, in 31.6% (12/38) tonsil sizes were +3, in 10.5% (4/38) tonsil sizes were +4. Here as well the highest hypertrophy rate was found to be +2 , meaning tonsils obstructing

25 to 50% of the oropharyngeal airway .However, there was no statistically meaningful difference between the control and study groups, with the p value being 0.642(p>0.05) and the chi square value being 2.483.(Table 1). Compared to the control group (good oral hygiene), the tonsil sizes in the study group (poor oral hygiene) were not significantly different.

**Table 1:** OHI score and tonsil size

	OHI-S		p
	0-1 n (%)	2-3 n (%)	
<b>Tonsil size +0</b>	0 (%0)	1 (%2,6)	<b><math>\chi^2: 2,483</math> p:0,642</b>
<b>Tonsil size +1</b>	8 (%19,0)	5 (%13,2)	
<b>Tonsil size +2</b>	20 (%47,6)	16 (%42,1)	
<b>Tonsil size +3</b>	9 (%21,4)	12 (%31,6)	
<b>Tonsil size +4</b>	5 (%11,9)	4 (%10,5)	

*Chi-square test*

## DISCUSSION

There are some studies investigating the dental and otorhinolaryngological pathologies simulatenously. In such a study, the children who had tonsillar hypertrophy showed also significant amount of milk teeth caries, milk teeth pulpitis and chronic milk teeth periodontitis. Simultaneous surgical treatment of dental and otolaryngological pathologies were advised to be effective for general health<sup>7</sup>.

The cellular immunity against Streptococcus pyogenes in human tonsils is investigated by measuring antigen-specific immunoglobulin-secreting cells and the production of cytokines from CD4+ T cells in response to M proteins. In the study of Kerakawauchi, M protein-specific immunoglobulin A (IgA) and immunoglobulin G spot-forming cells were found to be increased in patients with recurrent tonsillitis, compared to patients with tonsillar hypertrophy .These findings suggest that S. pyogenes is associated with the pathogenesis of recurrent tonsillitis and that immune responses against M protein may play an important role in preventing the colonization of these bacteria in tonsils<sup>8</sup>.So the dental pathogens, Streptococcus Mutans and Streptococcus Sobrinus, may induce this

immunologic process in the tonsils, and thus the question is would the chronic stimulation of poor oral hygiene cause hypertrophy of the tonsils.

In a study by Fukuizumi and friends, formalin-killed cells of S. sobrinus were inoculated on the surface of palatine tonsil of rabbits and then were injected intramuscularly in another group. The concentration of anti S. sobrinus salivary Ig A was found significantly higher after the tonsil application. So, immunization against S. sobrinus was achieved mostly by the tonsils. Then, the living S. sobrinus cells were inoculated in the oral cavity. However, the living S. sobrinus cell numbers and the caries areas in the rabbits were found to be decreased by one-fifth in the rabbits immunized by tonsillar application compared to nonimmune rabbits. This is a very important finding, showing the relation between dental caries and tonsils.<sup>9</sup>.

In an other study by the same authors, they examined the reaction of S. sobrinus antigens to the antibodies induced by the tonsillar application of S. sobrinus. The saliva and blood plasma selectively reacted to S. sobrinus after tonsillar application. The immunization through the intramuscular injection was not specific for S. sobrinus. The saccharide



antigens appeared to be involved in a specific reaction with *S. sobrinus*-specific streptococci and a selective reaction with serologically related streptococci. These antigens are probably involved in anti-caries reactions. The etiology of severe caries is often related to *S. sobrinus*. In research of anticaries vaccination, a serotype –selective polysaccharide antigen should be involved in elimination of *S. sobrinus*, and the way to it goes through the tonsils providing specific immunization<sup>10</sup>.

So, the assumption of the strong immunization process realized by the tonsils against *S. sobrinus* may be the reason for tonsillar hypertrophy. To prove this, we made a study based on clinical observation comparing tonsil sizes and oral hygiene indexes. Since tonsillectomy still remains as the most frequent operation performed and hypertrophic tonsils is the most important indication, avoiding surgery with mortality and morbidity risks through dental treatments seems an excellent benefit. However, our clinical findings did not support this hypothesis. In our findings, the sizes of the tonsils did not correlate with the OHI-Scores. The tonsil sizes in the study group (poor oral hygiene) showed great similarity with those of the control group.

## CONCLUSION

We conclude from these clinical results, that there is no statistically meaningful correlation between oral hygiene and tonsil size. We advise further studies comprising additional parameters which may affect caries activity such as salivary tests, and advanced microbiological and genetic studies concerning oral hygiene.

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