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Original Article

Comparison of Two Techniques in Simple Snoring and Obstructive Sleep Apnea Syndrome Patients: Palatal Implant or Uvulopalatal Flap

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ABSTRACT

Compare postoperative achievement of pillar palatal implant and uvulopalatal flap by polysomnographic and subjective methods after 1 year in obstructive sleep apnea and snoring patients. This study was retrospectively performed on 117 patients. An Epworth sleepiness scale for patients, obtained after the polysomnograpy during the preoperative and the 1st year of postoperative periods were filled. Patients answered a scale for daytime sleepiness and the spouse filled another scale for the snoring and apnea grading. The pillar palatal implant technique was used in 59 patients and 58 had an uvulopalatal flap. Preoperative and 1st postoperative year data was compared. The level of satisfaction of patients was determined. No any changes were determined in the pillar palatal implant group, while a significant decrease was determined in apnea hypopnea index levels in the uvulopalatal flap group. A significant decrease was obtained at the postoperative Epworth level in the pillar palatal implant group. The decrease is significant in the uvulopalatal flap group. The uvulopalatal flap was preferable for apnea and daytime sleepiness of patients in mild and moderate obstructive sleep apnea syndrome groups. For simple snoring patients, the pillar palatal implant method is preferred.

Key words: *Snoring, obstructive sleep apnea, uvulopalatal flap, pillar palatal implant*

Basit Horlama ve Obstrüktif Uyku Apne Sendromlu Hastalarda Palatal İmplant ve Uvulopalatal Flep Tekniklerinin Karşılaştırılması

ÖZET

Obstrüktif uyku apneli ve basit horlam hastalarında uygulanan pillar palatal implant ve uvulopalatal flep uygulamaları başarılarının polisomnografik ve subjektif metodlarla karşılaştırılması. 117 hastanın retrospektif analizine dayanan çalışmamızda hastalar; Epworth skalasına, preoperatif ve postoperative polisomnografi sonuçlarına ve gün içindeki uykululuk, gece horlama ve apne derecelerine göre değerlendirildiler. Çalışmaya dahil edilen hastaların 59 tanesine palatal implant uygulaması, 58 tanesine ise uvulopalatal flep cerrahisi yapıldı. Ameliyat öncesi ve sonrası datalar ve hasta memnuniyetleri karşılaştırıldı. Palatal implant grubunda ameliyat öncesi apne hipopne indeksi seviyelerinde anlamlı bir değişiklik saptanmamasına rağmen uvulopalatal flep grubunda değişiklikler anlamlı şekilde azalmıştı. Hem palatal implant hem de uvulopalatal flep gruplarındaki Epworth skorlarında anlamlı düşmeler saptandı. Hafif ve orta obstrüktif apne sendromlu grupta uygulanan uvulopalatal flep apne ve gündüz uykululuk halinde tercih edilebilir. Basit horlama hastaları için ise palatal implant metodu tercih edilebilecek bir yöntemdir.

Anahtar kelimeler: *Horlama, obstrüktif uyku apne, uvulopalatal flep, pillar palatal implant*

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INTRODUCTION

Obstructive sleep apnea syndrome (OSAS) is a common public health care concern affecting 1% to 5% of the community (1-3) An uvulopalatopharyngoplasty (UPPP) is the most-frequently used procedure for snoring and obstructive sleep apnea surgery (4,5). Several studies have been conducted to develop more successful methods that can be applied easier and with lower morbidity. The pillar palatal implant (Restore Medical Inc, St. Paul, MN) is a minimally invasive technique. The technique is believed to be more successful in select patients compared with UPPP. A reactive fibrotic state is made by inserting 3 implants into the soft palate. This intervention reduces vibration of the soft palate and decrease air flow-induced turbulence, thereby leading reduced snoring (6,7,8,9). It can be done under local anesthesia in an office setting with minimal preoperative and postoperative pain. Friedman and associates (10) reported that the pillar procedure was also successful in patients with mild and moderate apnea like snoring.

The uvulopalatal flap (UPF) technique was first described by Powell in 1993 (11). The UPF technique is a reversible modification of the pharyngopluvulopalatoasty technique. Repositioning and stabilizing the uvula with an uvulopalatal flap creates an opening between the postnasal spin and soft palate. Furthermore, the UPF allows the opening of the retropalatal airway, and reduces soft palate vibration and snoring by shortening and tightening the soft palate (11,12). The technique is a reliable and effective and can be implemented in a short time under general anesthesia; it does not require expensive surgical appliances. Neruntarat (12) reported a statistically significant improvement in postoperative Epworth Sleepiness Scale (ESS) results and a success ratio of 88% after the UPF was used in 56 patients with snoring.

These two surgical technique are two of the several surgical methods that can be used palatal obstructions for simple snoring, mild and moderate obstructive sleep apnea patients and there is not a clear algorithm which methods should be used in certain circumcentes. We attempted to assess success rates by comparing the results from polysomnographic and subjective techniques that were applied to mild and moderate OSAS and simple snoring patients.

MATERIALS AND METHODS

The current retrospective study was performed at the Dr. Lutfi Kirdar Kartal Training and Research Hospital, Otolaryngology Head Neck Surgery Clinic between June 2008 and May 2010. After detailed information was given written informed consent forms about the procedures and the study were signed by all patients. The study was approved by instutional review board.

A detailed history was obtained from patients and their spouses who were referred to our clinic for complaints of snoring and apnea. Patients were requested to answer the questions in the ESS. Additionally, patients were requested to fill out a scale that classified their daytime state of sleepiness, while their spouses were requested to grade the snoring and apnea states of their spouses. These scales ranged from 10 cm visual analog scales (where 0 corresponds to no complaints) to 10 (where 10 correspond to extremely intensive complaints).

All patients were given a routine ear, nose, and throat examination. During the examination, the structure of the nose and the opening of the nasal passage, the status of the soft palate, the length of the uvula, the mallampaty score, the dimensions of the tonsilla palatina, the circumference of the neck, and body weight and height of patients were assessed. A flexible, fiberoptic nasopharyngoscopy was done to each patient, and the positions of the nasopharynx, oropharynx, hypopharynx, tongue base, and epiglottis were examined.

The obstructive site was determined by a Mueller maneuver. Patients with a septal deviation underwent a septoplasty before a polysomnography was given. Polysomnography was performed on these patients postoperatively at month 6. Free T3, free T4, TSH, allergic skin tests, chest radiographs, and pulmonary function tests of patients were assessed. Patients with any other disease were excluded from the study.

Polysomnographic studies of all the patients were obtained from a sleep laboratory at Sureyyapasa Chest Diseases Hospital. Patients were classified in 3 subgroups according to their apnea hypopnea index values (simple snoring 0-5, mild obstructive sleep apnea syndrome 5-15, moderate obstructive sleep apnea syndrome 15-30). Patients who were to undergo soft tissue palatal surgery (UPF) were selected according to the criteria in Table 1. The UPF was applied under general anesthesia to patients who had a uvula length longer than 25 mm

***Table 1**. Surgical and exclusion criteria related with soft palate surgery*

Surgical criteria for soft palate	*Exclusion criteria related with soft palate surgery*
Patient with snoring, witnessed apnea and daytime sleepiness complaints	*Length of soft palate < 25 mm*
Age > 18	*Dysphagia and speech disorders*
AHI < 30*	*Active upper respiratory tract infection*
*BMI** < 30 kg/m2*	*Accompanying neurologic disorders*
Length of soft palate > 25 mm	*Positive pregnancy term or nursing period*
If the sizes of the tonsils blockless than 50% of the respiratory tract	*BMI** > 30 kg/m2*
If nasal stenosis is absent	*Uncontrollable psychiatric disorders*
If examination revealed the presence of retropalatal obstruction	*Severe cardiovascular disease or pulmonary disorders*

** AHI: apnea hypopnea index, ** BMI: body mass index*

and who showed retropalatal obstruction during physical and endoscopic studies. Instead, the Pillar Palatal Implant technique was done under local anesthesia to patients who did not show any signs of retropalatal obstruction. Operations were applied according to a classic route (6- 12).

Patients were reassessed 1 year later according to an ESS and a polysomnography. During the preoperative term, scales filled in by patients and their spouses were redone at this time to simplify assessment of postoperative results. Results were compared separately according to every type of OSAS. At this time, an additional scale was used, varying from 1 to 4 to determine patient satisfaction regarding the procedure. In this scale, 1 corresponds to "I'm really satisfied and I recommend this procedure to others" , 2 corresponds to "Results are moderately good and I recommend this procedure" , 3 corresponds to "It did not reach my expectations so I do not recommend this procedure" and 4 corresponds to "I felt uncomfortable during and after the procedure and I do not recommend this procedure to others".

Statistical analyses were performed with SPSS software for Windows (Statistical Product and Service Solutions, version 15.0, SSPS Inc, Chicago, IL, USA). During the assessment, a t test and a Mann-Whitney U Testing were used in addition to descriptive statistical methods (mean, standard deviation) to determine quantitative features. A paired sample test and a Wilcoxon signed rank test were also used to compare intragroup parameters. A chi-square test was used to compare qualitative features. Values for $p<0.05$ indicated statistical significance.

***Table 2**. Assessment of operation types according to demographical characteristics*

Operation Type		*PILLAR (Mean ±SD)*	*UPF (Mean ±SD)*	*p value*
**Age*		*46.54±8.72*	*43.60±9.42*	*.083*
***Sex*	*Male*	*28 (47.5%)*	*21 (36.2%)*	*.217*
	Female	*31 (52.5%)*	*37 (63.8%)*	

** t test ** Chi-square test*

RESULTS

The study was performed on 117 patients (aged, 21 to 64 years; 49 females (41.9%) 68 males (58.1%); mean

***Table 3**. Assessment of preoperative-postoperative apnea hypopnea index (AHI), body mass index (BMI), Epworth sleepiness scale (ESS).*

Operation Type		*PILLAR (Mean ±SD)*	*UPF (Mean ±SD)*	*p value*
AHI	*Preoperative*	*11.10±8.16*	*11.95±8.29*	*.582*
	Postoperative	*12.25±8.32*	*9.98±7.25*	*.119*
	P	*.108*	*.005***	
BMI	*Preoperative*	*23.72±2.49*	*24.39±2.55*	*.149*
	Postoperative	*24.28±2.20*	*24.35±2.06*	*.869*
	P+	*.002***	*.792*	
ESS	*Preoperative*	*7.95±3.49*	*8.60±3.05*	*.283*
	Postoperative	*7.42±3.34*	*6.89±3.20*	*.385*
	P#	*.050**	*.001***	

p: t test
p: AHI comparison according to preoperative - postoperative surgery type (Paired Sample t Test), +: Assessment of preoperative - postoperative BMI values according to type of surgery. (Paired Sample t Test), #: Assessment of preoperative - postoperative ESS values according to type of surgery (Paired Sample t Test),
**p<0.05*
***p<0.01*

***Table 4**. Assessment of preoperative - postoperative apnea hypopnea index (AHI), body mass index (BMI) and Epworth Sleepiness Scale (ESS) in simple snoring, mild obstructive sleep apnea syndrome (OSAS) an moderate OSAS groups.*

Operation Type		AHI PILLAR (Mean ±SD)	AHI UPF (Mean ±SD)	p value	BMI PILLAR (Mean ±SD)	BMI UPF (Mean ±SD)	p value	ESS PILLAR (Mean ±SD)	ESS UPF (Mean ±SD)	p value
Simple Snoring	Preoperative	1.56±1.45	3.38±1.46	.001**	22.56±2.02	22.64±1.04	.875	3.80±1.24	5.42±2.19	.009**
	Postoperative	4.26±2.78	4.10±2.36	.853	23.11±1.62	23.28±1.35	.719	3.85±1.60	4.26±3.28	.624
	p value	.001**	.188		.010*	.026*		.888	.092	
Mild OSAS	Preoperative	12.04±2.27	10.58±3.28	.110	24.31±2.50	25.11±2.52	.320	9.05±1.57	8.85±1.60	.692
	Postoperative	13.39±4.85	9.02±4.54	.006**	24.95±2.30	24.72±2.17	.741	8.55±1.93	7.10±1.89	.021*
	p value	.241	.042*		.046*	.098		.304	.001**	
Moderate OSAS	Preoperative	20.16±4.26	21.95±4.37	.210	24.31±2.62	25.39±2.82	.228	11.16±1.92	11.52±1.46	.511
	Postoperative	19.45±7.92	16.86±7.20	.298	24.81±2.23	25.02±2.20	.772	10.00±2.58	9.31±2.11	.377
	p value	.680	.005**		.243	.327		.035*	.001**	

age, 45.08 ± 9.16 years). A pillar palatal implant was applied to 59 patients (50.4%), and UPF to 58 (4.65%). No statistically significant difference was determined between the pillar palatal implant and UPF groups when compared by mean age and sex (p>0.05) (Table 2).

No statistically significant mean differences were attributable to preoperative apnea hypopnea index (AHI), body mass index (BMI), or the ESS between pillar palatal implant and UPF groups (p>0.05). Also, there was no significant difference between the 2 groups regarding postoperative mean values of AHI, BMI, ESS (p>0.05) (Table 3).

No significant change was observed in postoperative AHI in the pillar palatal implant group when compared to preoperative AHI levels (p>0.05). The decrease observed in the postoperative AHI levels in the UPF group was statistically significant (p<0.01) (Table 3). In the pillar palatal implant group, the increase observed in postoperative BMI levels compared with preoperative BMI levels was found to be statistically significant (p<0.01). In the UPF group, no statistically significant change was observed at postoperative BMI levels (p>0.05) .The decrease seen in postoperative ESS levels in the pillar palatal implant group was statistically significant (p<0.05). The decrease observed in postoperative ESS levels in the UPF group was significant (p<0.01) (Table 3).

In the simple snoring group, the preoperative mean AHI value in the UPF group was statistically significant than the pillar palatal implant group (p<0.01). There was no statistically significant difference with regard to post-

***Table 4**. Assessment of preoperative - postoperative partner apnea score, partner snoring score and patient daytime sleepiness score*

		Operation Type PILLAR Median (Min-Max)	UPF Median (Min-Max)	P
Partner Apnea	Preoperative	5 (0-9)	5 (0-9)	.203
	Postoperative	4 (0-8)	3 (0-8)	.403
	Preoperative-Postoperative++P	.017*	.001**	
Partner Snoring	Preoperative	6 (3-9)	7 (5-9)	.001*
	Postoperative	3 (0-7)	2 (0-6)	.140
	Preoperative-Postoperative++P	.001**	.001**	
Daytime Sleepiness	Preoperative	4 (1-8)	5 (1-8)	.024*
	Postoperative	4 (0-8)	3 (0-8)	.230
	Preoperative-Postoperative++P	.212	.001**	

+ Mann-Whitney U test
++ Wilcoxon signed rank test
*P < .05 **P < .01

***Table 6**. Preoperative and postoperative partner apnea, partner snoring and patient daytime sleepiness score assessment in simple snoring, mild obstructive sleep apnea syndrome (OSAS) and moderate OSAS groups.*

		Partner Apnea Operation Type			Partner Snoring Operation Type			Daytime Sleepiness Score Operation Type		
		PILLAR Median (Min-Max)	UPF Median (Min-Max)	P	PILLAR Median (Min-Max)	UPF Median (Min-Max)	P	PILLAR Median (Min-Max)	UPF Median (Min-Max)	P
Simple Snoring	Preoperative	1.5 (0-4)	2 (0-5)	.201	5 (3-7)	7 (5-9)	.001**	2 (1-5)	4 (1-6)	.080
	Postoperative	2 (0-5)	2 (0-5)	.886	2 (1-7)	2 (0-6)	.081	3 (0-6)	2 (0-6)	.179
	Preoperative-Postoperative++P	.475	.218		.001**	.001**		.176	.064	
Mild OSAS	Preoperative	5 (1-7)	5 (2-7)	.832	7 (4-8)	8 (5-9)	.038*	4 (2-6)	5 (1-8)	.021*
	Postoperative	5 (1-7)	3.5 (1-8)	.126	3 (1-6)	3 (1-6)	.323	4 (1-6)	4 (1-7)	.401
	Preoperative-Postoperative++P	.323	.001**		.001**	.001**		.863	.003**	
Moderate OSAS	Preoperative	7 (5-9)	8 (6-9)	.065	7.5 (5-9)	8 (6-9)	.271	7 (5-8)	7 (6-8)	.272
	Postoperative	5 (0-8)	4.5 (2-8)	.448	3.5 (0-7)	3 (1-6)	.430	5 (0-8)	4 (1-8)	.351
	Preoperative-Postoperative++P	.004**	.001**		.001**	.001**		.009**	.001**	

operative mean AHI values between the pillar palatal implant and UPF groups (p>0.05). The increase observed postoperatively in the AHI level in the pillar palatal implant group compared to the preoperative AHI level was statistically significant (p<0.01). No significant change was observed in the postoperative AHI level in the UPF group (p>0.05) (Table 4).

In the mild OSAS group, there was no statistically significant difference in preoperative mean AHI values between the pillar palatal implant and UPF groups (P > .05). The postoperative mean AHI value of the pillar palatal implant group was statistically higher compared with the UPF group (p<0.01). No statistically significant change was observed in the postoperative AHI level in the pillar palatal implant group (p>0.05). The decrease observed postoperatively in the AHI level in the UPF group was significant (p<0.05) (Table 4).

There was no statistically significant difference between the preoperative mean AHI values among pillar palatal implant and UPF groups in the moderate OSAS group (p>0.05). However, there was no statistically significant difference between postoperative mean AHI values in either group (p>0.05). No statistically significant change was observed in the pillar palatal implant group regarding postoperative AHI levels (p>0.05). However, the decrease in postoperative AHI levels was significant (p<0.01) (Table 4).

In the simple snoring group, an increase was observed in the postoperative BMI when compared with the preoperative BMI, in the pillar palatal implant and UPF groups and was statistically significant (p<0.05). In the mild OSAS group, in the pillar palatal implant group, the increase observed in the postoperative BMI was statistically significant when compared with the preoperative BMI (p<0.05). In the UPF group, no significant variation was observed in the postoperative BMI (p>0.05).In the moderate OSAS group, no statistically significant change was observed in the postoperative BMI in the pillar palatal implant and UPF groups when compared with the preoperative BMI (p>0.05) (Table 4).

In the simple snoring group, in the pillar palatal implant and UPF groups, no statistically significant variation was seen in the postoperative ESS when compared to preoperative ESS (p>0.05). In the mild OSAS group, no significant variation was observed postoperatively in the Epworth level in the pillar palatal implant group (p>0.05). In the UPF group, the decrease seen in the postoperative ESS was statistically significant (p<0.01). In the pillar palatal implant group, the decrease observed postoperatively in the ESS level was statistically significant, in the moderate OSAS group (p<0.05). In the UPF group, the decrease observed postoperatively in the ESS was also significant (p<0.01) (Table 4).

In the pillar palatal implant group, the decrease observed in the postoperative apnea score compared with the preoperative partner apnea score was statistically significant (p<0.05). In the UPF group, the decrease observed postoperatively in the apnea score was statistically significant (p<0.01).The decrease observed in postoperative snoring scores in the pillar palatal implant group was statistically significant when compared

Table 7. Assessment of recommendation score.

Recommendation Score	Operation Type PILLAR Median (Min-Max)	UPF Median (Min-Max)	P
All Cases	2 (1-4)	1 (1-3)	.137
Simple Snoring	2 (1-3)	1 (1-3)	.244
Mild OSAS	2 (1-4)	2 (1-3)	.294
Moderate OSAS	2 (1-4)	2 (1-3)	.625

OSAS: obstructive sleep apnea syndrome

with preoperative partner snoring scores ($p<0.01$). The decrease observed in the same scores (recovery) in the UPF group was statistically significant ($p<0.01$) (Table 5).

A statistically significant change was not observed in postoperative sleepiness scores when compared with preoperative sleepiness scores in the pillar palatal implant group ($p>0.05$). The decrease seen in postoperative sleepiness score in the UPF group was statistically significant ($p<0.01$) (Table 5).

Partner apnea, snoring, and daytime sleepiness patients in both groups were assessed in simple snoring, mild obstructive sleep apnea syndrome, and moderate obstructive sleep apnea syndrome patients (Table 6). In all cases, there was no significant difference between recommendation scores in pillar palatal implant or UPF procedures ($p>0.05$). There was no significant difference either between recommendation scores of patients in the simple snoring, mild OSAS, and moderate OSAS groups according to the type of surgery ($p>0.05$) (Table 7).

DISCUSSION

Snoring and obstructive apnea have become a major problem. However, there has been a large development in treatment of these conditions over the past 20 years (3). Currently, there are several publications that evaluate the success of the pillar palatal implant system, which is frequently used to treat snoring (6- 8). UPF surgery is usually recommended in patients who possess a convenient anatomic structure and a similar degree of respiratory disorder during sleep with the pillar palatal implant (in patients with a simple snoring, mild, or moderate apnea). Actually, it is possible to use both of these techniques for one instead of another as an alternative. No publications in the literature compared the success of UPF and pillar palatal implant techniques, whereas the UPF technique is a change of the UPPP, which is a less invasive and comparatively more-reversible procedure. The average age in our series was 45.08 years (2,3). In the present study, one can easily see that the number of snoring men is likely to have snoring to a greater degree than women of same age (1,3). In our study, there was no significant difference regarding preoperative BMI, ESS, sex, and age in patients who underwent a pillar palatal implant and a UPF procedure. Based on these data, we admit that the results obtained from the 2 groups in our study were similar because of their characteristics.

When we studied patients in the pillar palatal implant group, there were no significant decrease in postoperative AHI values, after patients were classified as simple snoring, mild, and moderate apnea. However, a significant increase was observed in BMI values in the same patients in simple snoring and mild apnea groups. The absence of a decrease in AHI may be related to the increase seen in BMI. Accordingly, a study done by Friedman et al. (6) found significant decrease AHI values 90 days after the pillar palatal implant group when compared with preoperative apnea hypopnea values. The follow-up that study is shorter than our follow-up. In a similar study by Maurer et al. (8), a significant decrease was observed in postoperative AHI values. Additionally, at the end of 1 year's follow-up, a significant decrease was reported in daytime sleepiness and snoring. In a study by Saylam et al. (13), 53% recovery was seen in VAS scores and 80% was seen in patient satisfaction in pillar palatal implant group of patients who were followed for 18 months.

In our study, preoperative and postoperative ESS results that subjectively described the daytime sleepiness state of patients, we observed a significant decrease in patients who had undergone both pillar palatal implant procedure ($p<0.05$) and UPF procedure ($p<0.01$). Additionally, in the scoring process where patients self-assessed their own daytime sleepiness, no significant decrease was seen in postoperative values in the pillar palatal implant group, while a significant decrease was seen at an advanced degree in the UPF group ($p<0.01$). This can be interpreted as UPF technique being more successful in treating daytime sleepiness when compared to the pillar palatal implant. We studied patients who had undergone a procedure according to their apnea

hypopnea values after dividing them into 3 groups: simple snoring, mild OSAS, and moderate obstructive sleep apnea. A significant increase was observed in postoperative AHI values in patients in the simple snoring group who had undergone a pillar palatal implant technique ($p<0.01$). However, we observed that BMI values showed a significant increase postoperatively, both in the pillar palatal implant and UPF groups, whereas ESS values remained unchanged. Postoperatively, even though AHI values tended to increase in the pillar palatal implant group, values remained below 5 in the simple snoring levels of patients.

Friedman et al. (6) suggest that AHI values are insufficient to denote the success of the operation in the simple snoring group, and that the primary complaint was snoring instead of apnea, and therefore, we should not consider the therapy as successful by the means of AHI. In the present study, as ESS values and the daytime sleepiness scales of patients in the simple snoring group did not change, and given that a significant decrease was observed at an advanced level in the UPF and pillar palatal implant groups regarding partner snoring scores, both techniques were found equal when treating snoring in patients in the simple snoring group, while no definite decision was held even though the UPF technique was more successful than the pillar palatal implant in treating snoring.

No significant change was seen in postoperative AHI levels in the pillar palatal implant group in the mild OSAS group, while a significant decrease was observed in the AHI levels in the UPF group ($p<0.05$). Partner apnea scoring, daytime sleepiness scoring of patients, and ESS values failed to show a significant change in the pillar palatal implant group, while a significant decrease was observed in the UPF group ($p<0.01$). This led us to think that the UPF technique was more successful in mild OSAS group when compared with the pillar palatal implant technique. Postoperative partner snoring scores in both surgical techniques decreased significantly ($p<0.01$). A slight decrease was seen in the moderate OSAS group between preoperative and postoperative AHI values of patients who had undergone a pillar palatal implant technique, but the mentioned decrease was not statistically significant. However, a significant decrease was observed in AHI levels in the UPF group ($p<0.01$). There was a significant decrease in ESS values in the pillar palatal implant group ($p<0.05$), while the decrease in the UPF group was significant ($p<0.01$). Partner apnea and snoring scores were assessed, and a significant decrease at an advanced degree, was established in both groups ($p<0.01$). A significant decrease also was observed at an advanced degree in daytime sleepiness in both groups ($p<0.01$). In the light of this, we feel that the UPF was more successful in this group of patients, in terms of the results of objective testing. When scales and ESS values were considered, it was obvious that UPF reduced ESS values at an extreme extent. However, the frequency of reoccurrence in snoring in the pillar palatal implant group that occurred after pillar palatal implant was reported as 12% by Maurer et al. (8) in an article published 1 year after the operation. In our series, no reaggravation was reported in any of the patients regarding snoring within the period of time that the pillar palatal implant method was done.

Friedman et al. (6) observed no dramatic recovery in ESS of patients who had undergone a pillar palatal implant. However, Nordgard et al. (7) reported a significant decrease in ESS values. In our study, excluding the moderate OSAS group, we found no significant decrease in other groups. Additionally, in daytime sleepiness scales and partner apnea scales, the simple snoring and mild OSAS groups did not undergo a change during the postoperative terms, while a significant decrease was seen in the moderate obstructive sleep apnea group. No significant decrease was determined postoperatively in AHI levels in any of the patients who had undergone a pillar palatal implant.

Classic information demonstrates that, in the event of a specific retropalatal obstruction, an UPPP is the primary surgical intervention for obstructive sleep apnea (14-16). Because of its postoperative morbidity ratios, plus swallowing difficulties, velopharyngeal failure, and the developmental risk of nasopharyngeal stenosis, the use of UPPP was slightly limited in the simple snoring, mild obstructive sleep apnea, and moderate obstructive sleep apnea groups (17,18). We used the UPF technique in our patients that were considered a modification of an UPPP. The technique is reversible and causes a lesser degree of tissue loss and besides, it has fewer complications. Additionally, as no muscle lacerations are made, a complication such as postoperative bleeding does not occur (11,12). As the mentioned technique is a mucosal-related technique, no speech or swallowing disorders were observed. Furthermore, the short duration of the operation is the most important advantage. It was reported that the pain was observed at a lesser degree in

the UPF when compared to UPPP, the success rate was 88%, and no complications were encountered (12). In our series of patients, we observed no significant decrease in AHI levels in the simple snoring group, while a slightly significant decrease was seen in the mild OSAS group ($p<0.05$) and a significant decrease in the moderate OSAS group ($p<0.01$). We encountered a partial suture opening problem in 2 of the patients out of 57 who had undergone a UPF technique. One of these patients recovered secondarily, while the other patient was reoperated on and the opened fragment was restored.

The advantages of the pillar palatal implant procedure are certain in specific circumstances and can be easily applied under local anesthesia, within a short time, and it possesses a lower rate of morbidity. However, the most important disadvantage is the high cost of the technique (8). In the present study, we applied UPF surgery under general anesthesia. Therefore, cost effective issues such as hospitalization, preoperative lab studies, and loss of work may allow similar studies that compare such techniques with one another. No difference regarding patient satisfaction was determined regarding the UPF or pillar palatal implant procedures in the entire group of patients or in simple snoring, mild obstructive sleep apnea, and moderate obstructive sleep apnea.

In conclusion, we understood that the UPF method was preferred in the treatment of mild obstructive sleep apnea and moderate obstructive sleep apnea with a retropalatal obstruction, with easier application, a shorter duration, and lower morbidity. The UPF was successful in treating apnea and daytime sleepiness in these patients. However, especially in the simple Snoring group, it may be preferable to choose the pillar palatal implant. The palatal implant method can be done in a shorter time, under local anesthesia, in patients without a retropalatal obstruction, and in patients who may be subject to a high degree of surgical risk.

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