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Laser Palatoplasty versus Laser Palatoplasty and Laser Turbinectomy for Snoring and Mild Obstructive Sleep Apnea

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ABSTRACT

Background: Patients with obstructive sleep apnea (OSA) have both anatomic and physiologic dysfunction of the upper airway during sleep resulting in repeated airway obstruction and varying degrees of hypoxemia. In patients with obstructive sleep apnea suffering from both snoring and nasal obstruction, nasal surgery relieves snoring and improves apnea/hypopnea index (AHI), lowest O_2 saturation (LOS), epworth sleepness scale (ESS) and snoring severity scale (SSS) by different proportions.

Objective: To compare AHI, SSS, and ESS in laser palatoplasty and combined laser palatoplasty and laser turbinoplasty.

Patients and Methods: All patients underwent surgery had snoring and mild OSA symptoms, aged between 20 and 60 years with continuous positive airway pressure (CPAP) refusal, failure or non-compliance, classified according to type of surgical intervention into: group A 14 patients were treated with laser palatoplasty and laser turbinoplasty. Group B: 14 patients were treated with laser palatoplasty only. Pre and postoperative sleep study, Epworth sleepiness scale, and snoring score were reported and compared.

Results: As regard AHI there was no significant difference between 2 groups at pre or post, according to ESS (epworth sleepness scale) there was no significant difference between 2 groups pre and post. Regarding SSS the preoperative snoring score was reported to be significantly more in patients who had associated nasal obstruction (group A). But after surgery, the difference in postoperative values was nonsignificant reflecting the value of performing nasal surgery in this group of patients. **Conclusion**: Combined nasal and palatal surgery is more effective for snoring and mild OSA than palatal surgery only.

Keywords: Mild obstructive sleep apnea, Nose, Palatal surgery.

INTRODUCTION

More than one third of all people snore regularly. Snoring is a common accompaniment of obstructive sleep apnea (OSA) and is often disruptive for the bed partner [(1)]. Laser-assisted uvulopalatoplasty (LAUP) technique constituted first choice surgical treatment [(2)]. However, it is only able to improve the condition in 50% of all obstructive sleep apnea syndrome (OSAS) patients. **Friedman *et al.*** [(3)] reported a 41% success rate with this technique.

Laser turbinoplasty is a simple and well-tolerated treatment for nasal obstruction. It appears to be a safe and effective adjunct surgical procedure for snorer with nasal obstruction on an outpatient basis[(4)]. The nasal valve is the narrowest part of the upper airway. Because the upper airway accounts for two-thirds of the entire airway that extends down to the alveoli, simple widening of the nasal valve and the entire nasal passage would significantly contribute to a decrease in negative pressure at inspiration during sleep and contribute to improve OSA[(5)].

This study aimed to compare AHI, SSS, ESS (epworth sleepness scale) in laser palatoplasty and combined laser palatoplasty and laser turbinoplasty.

PATIENT AND METHODS

The present study is a comparative prospective study. It was conducted over the period from April 2020 to May 2021 in Otorhinolaryngology Head and Neck Surgery Department, Zagazig University Hospitals.

The study included twenty eight adult patients who had snoring and mild OSA symptoms, aged between 20 and 60 years with CPAP refusal, failure or non-compliance, body mass index (BMI) ≤ 35, being fit for general anesthesia, with anterior posterior retropalatal collapse, Friedman tonsillar size grade 0 and 1 with or without nasal obstruction due to inferior turbinate hypertrophy.

Patients were divided into two equal groups: Group A: was treated with laser palatoplasty and laser turbinoplasty, and Group B: was treated with laser palatoplasty.

We excluded patients with age < 20 and > 60 year, body mass index (BMI) >35, moderate or severe OSA, deviated nasal septum, hypopharyngeal collapse with prominent tongue base, concentric and transverse retropalatal collapse and Friedman tonsillar size grade 2,3 and 4.

After detailed history taking flexible nasoendoscopy during Muller maneuver, polysomnography, and drug induced sleep endoscopy was performed for all patients. Moreover, all patients had subjective analysis with the Epworth Sleepiness Scale (ESS) as a measure of daytime somnolence.

Six months after surgery, all patients underwent nasopharyngolaryngoscopy as part of the standard postsurgical protocol using the Muller maneuver. A postoperative sleep study, ESS (epworth sleepness scale), snoring score were also performed and assessed.

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Ethical consent:

An approval of the study was obtained from Zagazig University Academic and Ethical Committee. Every patient signed an informed written consent for acceptance of the operation and sharing in the study. This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Statistical Analysis

The collected data were coded, processed and analyzed using the SPSS (Statistical Package for the Social Sciences) version 22 for Windows® (IBM SPSS Inc, Chicago, IL, USA). Data were tested for normal distribution using the Shapiro Wilk test. Qualitative data were represented as frequencies and relative percentages. Chi square test (χ^2) was used to calculate difference between the two groups of qualitative variables. Quantitative data were expressed as mean ± SD (Standard deviation). Independent samples t-test was used to compare between two independent groups of normally distributed variables (parametric data). P value < 0.05 was considered significant.

RESULTS

As regard age and sex there was no significant difference between the 2 groups and the majority were male in both groups (Table 1). Neck circumference was 40.06±2.21 and 40.13±1.55 respectively with no significant difference between groups.

Table (1): Age and sex comparison between studied groups

			Group A	Group B	P
Age			44.66±8.44	42.66±8.03	0.502
Sex	Female	N	4	5	0.69
		%	28.5%	35.7%	
	Male	N	10	9	
		%	71.5%	64.3%	
Total		N	14	14	
		%	100.0%	100.0%	

Table 2 shows no significant difference between groups as regard Friedman tonsillar size.

Table (2): Friedman tonsillar size distribution between studied groups

	Group A	Group B	P
Grade zero	6 42.8%	7 50%	0.71
Grade I	8 57.2 %	7 50%	

Table 3 shows no significant difference between groups regarding retropalatal collapse Muller endoscopy. No significant difference between groups as regard Mallampati palatal position.

Table (3): Retropalatal collapse Muller endoscopy distribution between studied groups

	Group A	Group B	P
Grade I	2 14.3%	2 14.3%	0.83
Grade II	4 28.5%	3 21.4%	
Grade III	6 42.9%	5 35.8%	
Grade IV	2 14.3%	4 28.5%	

Regarding AHI there was no significant difference between groups at pre or post but there was significant decrease in both groups between pre and post **Figure 1**.

Regarding ESS (epworth sleepness scale) there was no significant difference between groups at pre and post. Regarding SSS the preoperative snoring score was reported to be significantly more in patients who had associated nasal obstruction (group A) (P ¼ 0.0113). But after surgery, the difference in postoperative values was nonsignificant (P ¼ 0.1296) reflecting the value of performing nasal surgery in this group of patients.

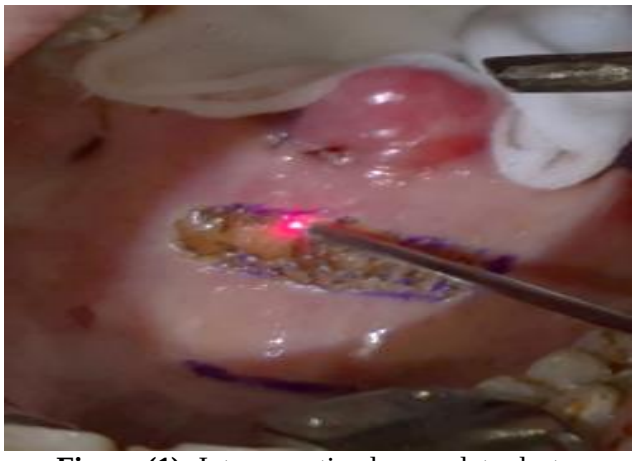

Figure (1): Intraoperative laser palatoplasty**.**

Figure (2): Palate after 1 week.

DISCUSSION

Laser assisted uvulopalatoplasty (LAUP): is a method of treatment for snoring and obstructive sleep apnea (OSA) that was first described in 1990 by **Kamami**. The procedure was based on progressive widening of the oropharynx by "successive vaporizations of the vibrating soft palate, wide posterior tonsil pillars, and redundant posterior pharyngeal mucosa" to prevent obstructions during sleep[(6)]. Studies also showed that in adults, artificial nasal obstruction decreased the quality of sleep and increased the number of arousals, apnea, and hypopnea[(7)].

In patients with obstructive sleep apnea suffering from both snoring and nasal obstruction, nasal surgery relieves snoring in 12% [(8)].

Laser-assisted turbinate surgery causes limited submucosal scarring and obliteration of the venous sinusoids, shrinking the turbinate and relieving nasal obstruction. The diode laser is the most portable and least expensive of the lasers available for rhinologic applications today[(9)]. Laser surgery has the advantages of limited tissue trauma and reduced bleeding. Different lasers, such as carbon dioxide (CO_2), neodymium: yttrium– aluminum garnet (Nd:YAG), holmium:yttrium–aluminum garnet (Ho:YAG), potassium titanyl phosphate (KTP), diode, and argon plasma lasers, have been used to treat ITH [(10)].

Our results are also consistent with the study by **Friedman *et al.*** who reported that symptoms of OSA improved after nasal surgery as regards nasal breathing, snoring, and day-time energy levels. Generally, correction of an obstructed nasal airway ameliorates symptoms in OSA patients[(11)].

CONCLUSION

Combined nasal and palatal surgery is more effective for snoring and mild OSA than palatal surgery only.

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Conflict of Interest: Nil.

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