

A novel Erbium: YAG fractional laser treatment for reduction of snoring using „Romeo®“ handpiece: a pilot study

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Aim: To evaluate safety and effectiveness of the new laser handpiece for snoring reduction in order to establish a protocol for this kind of treatment and follow up

Patients and methods: This pilot study was conducted in Bagatin Clinic, Zagreb, Croatia from July 2016. to February 2017. Ten patients – 9 men and 1 woman (age range 25-55; mean 38,1 y.o.) with severe snoring were enrolled into study. Inclusion criteria were: socially unacceptable snoring due to fluttering of uvula, tonsillar pillars, and soft palate. Exclusion criteria were: Mallampati score >2, tonsils size according to Friedman > 2, severe nasal obstruction, craniofacial malformations and tumors. Snoring severity was measured by patients using Snore Lab v.3.7.3 app (Riveva Softworks Ltd.) starting 48 hours after laser treatment. The patients were self-measuring themselves every other night for the period of 4 weeks and once weekly during weekdays for the period of 4-6 months after the treatment. The results were sent electronically to the Clinic. All patients were treated by fractional YAG laser with newly designed handpiece in ambulatory facility without local anesthesia in sitting position. Handpiece was positioned on six points in anterior pillars, uvula and soft palate using [...] on Asclepion Erbium YAG MCL31 Dermablate Laser.

Results: No adverse effects were encountered. In all patients reduction of snoring was significant. Mean reduction of snoring in terms of time and amplitude was between 40% and 60% in 4-6 months interval, while more than 50% of the subjects and their bedpartners stated “excellent improvement”. At the time this abstract is written, 9 months post treatment results are still pending.

Conclusion: A novel Erbium: YAG fractional laser treatment using „Romeo®“ handpiece is safe and effective in treatment of simple snoring caused by fluttering of uvula, tonsillar pillars and soft palate. It is quick, easy to perform, has no downtime for the patients, can be done without local or topical anesthesia in ambulatory facility by any MD licensed physician with sufficient anatomical background.

Er:YAG laser for snoring: a systemic review and meta-analysis

Chairat Neruntarat, Kitsarawut Khuancharee, Parkkapus Shoowit. *Lasers Med Sci.* 2020 Aug;35(6):1231-1238. doi: 10.1007/s10103-020-02987-3. Epub 2020 Feb 28.

Abstract: A new outpatient non-surgical method using Er:YAG laser for snoring has been demonstrated. The aim of this systematic review and meta-analysis was to investigate the effects of this treatment on snoring. Relevant 1548 articles were searched from various databases from 1 January 2000 to September 2018 including PubMed, MEDLINE, EMBASE, Cochrane Library, Web of Science, and Scopus and reference lists. Meta-analysis was performed with RevMan software. Cochran's Q and I² statistics were used to assess heterogeneity. The overall effect was evaluated using z-tests. Seven studies and two hundred forty-seven participants treated with two to three sessions of Er:YAG 2940 nm laser (long pulse mode, 10 Hz, fluence 1.6 J/cm²) were included. There was a statistically significant reduction of pooled snoring VAS (mean difference (MD) (95% CI), - 6.89 (- 7.62, - 6.15)). Patient satisfaction rate after laser treatment was 80% (95% CI, 70.69, 89.05) of cases. A widening of the upper airway dimension was revealed; however, changes in apnea-hypopnea index (AHI) and respiratory disturbance index (RDI) were not significantly different. Mean follow-up period was three to 36 months. Patients tolerated the procedure well without anesthesia. There were minimal side effects without serious adverse effects. Er:YAG laser is shown to be effective in a way to reduce snoring without significant AHI or RDI changes. However, randomized controlled trials, objective data, multicenter cooperation, and long-term outcomes are needed to confirm the benefits of this laser for snoring.

Minimally invasive erbium laser treatment for selected snorers

Henryk Frelich, Wojciech Ścierański, Magdalena Marków, Jakub Frelich, Hanna Frelich, Misiotek Maciej. *Lasers Med Sci.* 2019 Sep;34(7):1413-1420. doi: 10.1007/s10103-019-02731-6. Epub 2019 Feb 14.

Abstract: The aim of this paper is to present our results and experience in the treatment of snoring using the non-ablative Erbium: Yttrium Aluminium Garnet (Er:YAG) laser. Twenty-four patients (18 male and 6 female) with snoring problems due to soft palate hypertrophy were treated with 3 treatment procedures with Er:YAG 2940-nm laser (long pulse mode, 10 Hz, fluence 1.8-2.0 J/cm²) performed at 2-week intervals. The treatment procedures were performed in outpatient settings. One treatment session lasts 15-20 min. Subjective (questionnaires) and objective (polygraph) outcome measures were assessed at baseline and 3 months after the final laser treatment. Wilcoxon Signed Rank was used to compare before and after scores. All polygraph variables showed some improvement three months after the end of treatment; however, only the reduction of the number of hypopnea episodes per hour was statistically significant ($p = 0.034$). In 13/24 patients, snoring time accounted for less than 5% of the sleep time after the treatment compared to 6/24 patients at baseline. The questionnaire survey showed statistically significant improvement in the quality of sleep and life of the patients as well as their partners after Er:YAG treatment ($p < 0.001$). The assessment of daytime sleepiness using the Epworth scale also improved three months after the end of treatment ($p = 0.010$). Based on our observations, the treatment of snoring with the Er:YAG laser is an effective and non-invasive therapeutic method. Further studies with long-term follow-up and a control group are warranted to confirm the promising results obtained in case series.

Outpatient erbium:YAG (2940 nm) laser treatment for snoring: a prospective study on 40 patients

Storchi IF, Parker S, Bovis F, Benedicenti S, Amaroli A (2018), *Lasers Med Sci.* Feb;33(2):399-406

Abstract: Snoring is a sleep phenomenon due to the partial upper airway obstruction during sleep which causes vibration of the tissues of the rhino-oro-hypopharynx and less frequently the larynx. This study evaluated the use and effectiveness of the erbium:YAG 2940-nm laser as an adjunctive in providing treatment for patients suffering from chronic snoring-related sleep disorders. A prospective study of 40 consecutive patients with snoring and sleep disorders was performed, assessing data before and after three Er:YAG laser treatment sessions. During laser treatment, the pain was almost absent. There were no side effects, except a very mild sore throat in one out of 40 patients. The patient's evaluation of satisfaction of the results obtained after the treatments showed that 85% of cases were very satisfied, five patients (12.5%) reported being fairly satisfied with the treatment and only one subject (2.5%) was not satisfied. Mallampati, Friedman Tongue Position, and degree of O (oropharynx) at nose oropharynx hypopharynx and larynx classification were significantly decreased after the laser sessions. The decrease of Epworth Sleepiness Scale and Visual Analogue Scale for loudness of snoring, waking up during sleep because of snoring, dry mouth on waking, and choking was all statistically significant. The incidence of dreaming during the night also raised significantly; 30/40 (75%) of cases perceived less tightness in their throat and better breathing after treatment. These results were stable at 20 months follow-up (14-24 q) in 72% of cases. Nonsurgical and non-invasive Er:YAG laser treatment demonstrated to be a valid procedure in reducing the loudness of snoring.

Er:Yag Laser Treatment of Simple Snorers in an Outpatient Setting

Cetinkaya EA, Turker M, Kiraz K, Gulkesen HK. (2016) *ORL J Otorhinolaryngol Relat Spec.* 2016;78(2):70-6

Results: Laser treatment effectively reduced patients' snoring and achieved a 65% satisfaction rate after three treatments. The greatest improvement and satisfaction were experienced by patients aged ≥ 50 years. Patients reported additional benefits from this treatment including easier breathing, higher alertness, and increased focus.

Conclusion: Nonsurgical Er:YAG laser treatment is an effective and minimally invasive procedure to reduce patient snoring and other sleep-disordered breathing symptoms. Patients reported minimal disadvantages including minor discomfort and a low risk of side effects.