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# Treatment of Simple Snoring Using Radio Waves for Ablation of Uvula and Soft Palate: A Day-Case Surgery Procedure

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***Objective:*** **Uvulopalatoplasty, performed with high-frequency radio waves, was evaluated as a treatment for social snoring.** ***Methods:*** **Forty male social snorers were included in this prospective, nonrandomized study. Patients' subjective complaints before, during, and 3 months after radio-assisted uvulopalatoplasty were recorded on a visual analogue scale.** ***Results:*** **Complications were negligible. Snoring sounds and daytime tiredness reduced significantly. Considering effect and suffering during and after surgery, a high number of patients (93%) were willing to undergo the procedure again if necessary.** ***Conclusions:*** **The results of radio-assisted uvulopalatoplasty (RAUP) seem to be similar to other surgical methods used to reduce snoring. The relative small investments needed and its simplicity makes RAUP a good alternative to known treatment strategies.** ***Key Words:*** **Snoring, soft palate surgery, radio frequency.**

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## INTRODUCTION

Habitual snoring is a common complaint. Snoring reduces sleep quality and is socially incapacitating. For the last 2 decades several methods of surgical treatment have been described. Ikematsu[1] in 1964 and Fujita[2] in 1984 published a successful treatment for snoring by cold steel ablation of the uvula and parts of the soft palate, the so-called uvulopalatopharyngoplasty (UPPP). More recently there have been published short- and long-term results from this procedure.[3,4] Results from laser-assisted ablation of the uvula and parts of the soft palate (LAUP) for the treatment of snoring were published in 1994.[5,6] The treatment is now in use worldwide. Although long-term follow-up results still are few and have been criticized for methodology, many snorers undoubtedly have been relieved from snoring by this procedure. However, every ear, nose and throat clinic or practice is not equipped with a laser. A $CO_2$ laser costs at least $50,000 US. This is why less expensive tools have been researched for ambulatory treatment of simple snoring. The Ellman Surgitron (Ellman International, Hewlett, NY) is an electrosurgical device. It generates high-energy and high-frequency radio waves, which enables dissection with high power and little heat formation. This results in a clear cut with no damage to the surrounding tissues. The instrument has been used in gynecologic, plastic surgical, and dermatologic practice for more than 30 years and is a well-established and valuable tool in these fields of medicine.[7,8] The cost of the Ellman Surgitron is approximately $15,000 US. The surgery is done by cutting, in contrast to low-frequency radio waves, which leads to shrinkage of the soft tissue. Considering the large number of snorers who are relieved by reducing pharyngeal soft tissue, an instrument at a cost of less than 10% of a laser would be convenient for outpatient use under local anesthesia, especially in small outpatient clinics. We present the surgical method of radio-assisted uvulopalatoplasty (RAUP) and the short-term results at a 3-month interval.

## PATIENTS AND METHODS

### *Patients*

Forty non-apneic snorers were recruited. None of the patients had previous surgery for snoring. The patients had no known bleeding disorders or used anticoagulants. The patients were selected by history, physical examination, and overnight pulse oximetry. Oxygen saturations below 90% during a full night recording with representative sleep periods led to exclusion. All procedures were performed in day care surgery. No economic obligations existed between doctor and patient.

### *Surgical Technique*

Premedication with 100 mg Diclofenac natrium and 500 mg acetaminophen with 80 mg codeine phosphate was given 30 minutes before each surgical procedure started. No topical anesthesia to the oropharyngeal mucosa or sedation of the patients was necessary in all cases. The soft palate and posterior pillars were infiltrated with 2–5 mL of lidocaine 20 mg/mL HCl with 0.00125 mg/mL adrenaline. The procedure started

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approximately 20 minutes after infiltration allowing sufficient hemostatic and analgetic effects. In some cases a stay-suture was placed through the uvula to avoid contact with the posterior pharyngeal wall while pulling the uvula anteriorly. The Surgitron unit was set the entire time on a combination program of cut and coagulation at a medium power level. A snare-wire loop, originally designed for gynecologic procedures, was used as a knife. The soft palate was primarily transected 4 to 8 mm bilaterally parallel to the uvula. A well-estimated tissue mass of the posterior pillars and the uvula were resected (Fig. 1A, B). Hemostasis was performed by sealing the involved vessels or ligation if necessary. After surgery all patients received Diclophenac and acetaminophen with codeine phosphate as analgesics. After inspection of the oropharynx, all patients were discharged 1 hour postoperatively. All procedures were performed by a selected team of surgeons under standardized conditions. During the follow-up period the patients were seen by the surgeons after 2 and 12 weeks.

### *Data*

A questionnaire using a Visual Analogue Scale (VAS) from 0 to 100 was used for symptom registration. Sound intensity during snoring according to bed partner, sleep quality, and daytime sleepiness were scored. Subjective complaints as pain level at rest and during swallowing were also recorded on a VAS scale at the time of the procedure and 1, 3, 5, 7, and 12 days after surgery. Early and late complications were assessed at occurrence. Discomfort symptom level as noted in Table I were evaluated at intervals of 12 days and 3 months after surgery.

## RESULTS

Subjective symptoms related to snoring were substantially reduced at follow-up intervals of 3 months (Fig. 2). Statistical analysis revealed significant reduction for all variables (Paired Student $t$ test $P < .0001$). The majority of patients regarded 3 to 5 days after surgery as the most painful period. On day 12 only slight discomfort during swallowing was reported (Fig. 3). Symptoms such as mucous retention, speech quality deterioration, and palatal stiffness were negligible at this time interval (Table I). None of the patients experienced bleeding postoperatively that needed any medical attention. None of the patients had velopharyngeal insufficiency at the 3-month follow-up visit. One patient developed a mild postoperative wound infection. He was treated successfully with oral antibiotics. From a group of 40 patients, 37 were willing to undergo the same procedure again if necessary, 2 did not respond to this question, and 1 was not willing to undergo the procedure again. Thirty-six would recommend this procedure to a friend who snores. One patient was in doubt on this issue, whereas 1 responded negatively. Two did not answer the question.

## DISCUSSION

In adults, snoring is a common reason for seeking medical advice and treatment. Recommended lifestyle changes such as weight reduction, avoidance of evening alcohol ingestion, and use of sedative medication reduces snoring. Better sleep habits, such as a prone sleeping position, may relieve snoring.[10] Proper medical treatment for obstructed nose and endocrine dysfunction may furthermore improve snoring.[11,12] Nevertheless, a great number of social snorers will ultimately need surgery. Traditional uvulopalatopharyngoplasty (UPPP) is a well-documented surgical method for social snoring and some cases of sleep apnea.[4,10] This method is performed under general anesthesia and usually requires hospitalization. Also, significant postoperative morbidity is reported.[9,10] Uvulopalatoplasty performed

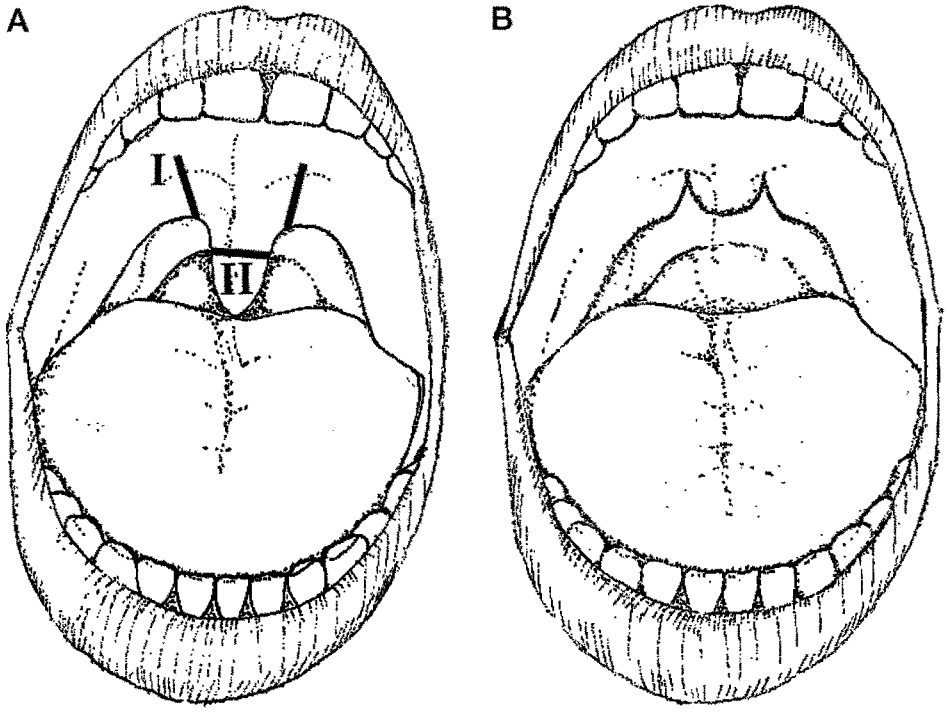


Fig. 1. (**A**) I: RAUP technique. I: Site of parauvula transections (4–8 mm). II: Site of amputation of the uvula. (**B**) Appearance of the palate after RAUP technique.

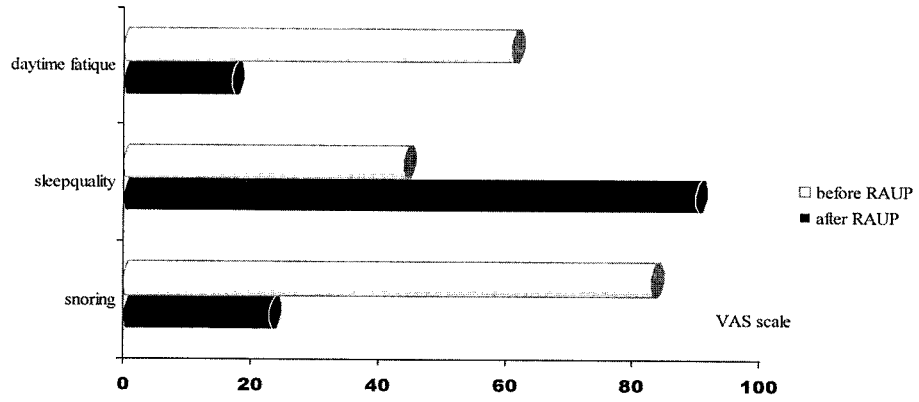


Fig. 2. Conditions before and 3 months after the procedure registered on a 0 to 100 VAS scale. 1: Snoring according to the patient's partner. 2: Sleep quality. 3: Daytime fatigue.

by laser-assisted surgery has also a more or less well-documented efficacy. The short-term results are comparable to the reported results achieved by a classically performed UPPP.[13] Infiltration anesthesia is sufficient to perform the procedure in a painless way. The operation time is short and the postoperative observation time can be limited to several hours. This makes laser-assisted uvulopharyngoplasty (LAUP) suitable as an outdoor clinic procedure.

High-frequency radio wave energy had been proved in different surgical fields and particularly in cosmetic surgery where it is important to perform surgery with minimal scarring.[7,8] Histology studies show a clear cut without any burning effects. In the facial plastic field this method offers better results than laser surgery in view of scars and risk of complications.[8] This was the reason we started to use high-frequency radio waves in the treatment of snoring. In this presentation we have used this surgical technique almost identically to the one described for laser surgery.[6] All the procedures were also performed under local anesthesia with little or no discomfort, without the need for sedation, and a limited postoperative observation time was needed. As for the other surgical methods, we observed remarkable reduced snoring and improved sleep quality. Studies dealing with pain and discomfort after LAUP procedures show similar results, although we know that postoperative pain and discomfort levels are hard to compare. The high number of patients (93%) who were willing to undergo the procedure again was striking and probably an important indicator for success when treating the subjective complaint of snoring. One of the benefits of RAUP is its simplicity. The equipment used for RAUP is mobile and inexpensive compared with the equipment used for LAUP. In contrast, $CO_2$ laser equipment investments are at least 10 times higher, whereas the apparatus is less easily transported between several treatment centers.

In our study, RAUP appears to be not only a good alternative for LAUP, but the technique is more cost efficient as well. However, long-term results of this procedure are yet to come. The follow-up time of our study is limited. Follow-up of our cohort of patients will ultimately assess the success of this procedure in the long run. So far, our results are encouraging, but further studies addressing

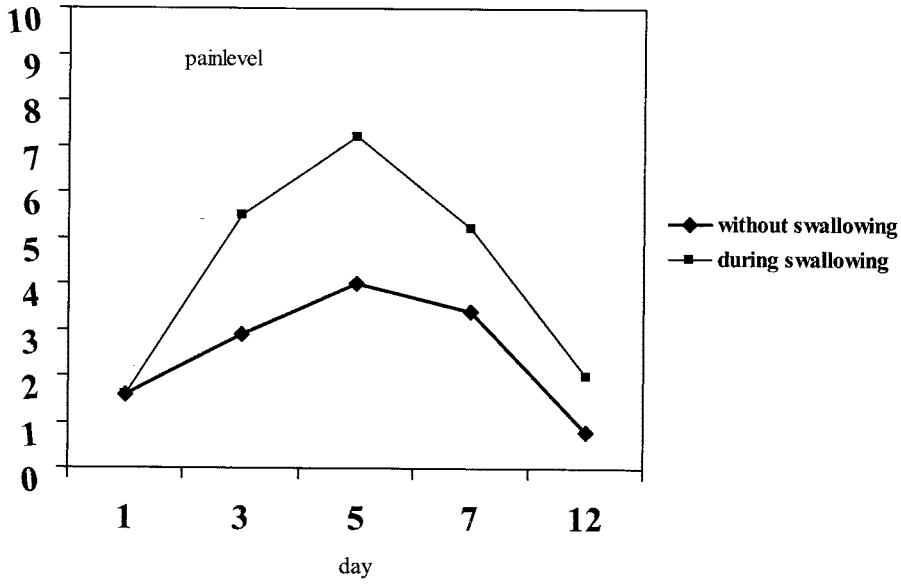


Fig. 3. Passive pain level and pain level during swallowing registered on a VAS scale ranging from 0 to 10 during the procedure and at days 1, 3, 5, 7, and 12 postoperatively.

TABLE I.
Visual Analog Discomfort Level 12 Weeks After Treatment.

| Subjective Complaints | VAS Score |
|---|---|
| Nasal leakage | 9/100 |
| Foreign body feeling | 2/100 |
| Speech difference | 3/100 |
| Taste changes | 1/100 |
| Mucous retention | 11/100 |
| Palatal stiffness | 11/100 |

the effects on the quality of sleep and the sound intensity level during snoring over time should be conducted.


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