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Laser-assisted uvulopalatoplasty: an assessment of a technique

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Abstract

The Kamami technique of laser-assisted uvulopalatoplasty has recently been introduced into British practice as an office-based multistage procedure for the treatment of snoring and, in certain cases, for obstructive sleep apnoea. We have treated 50 patients with simple snoring, with a minimum follow-up of six months. Six-month telephone interview follow-up has assessed partner and patient satisfaction, as well as willingness to undergo the procedure again. We have found the procedure easy to perform with no serious intra-operative complications. Thirty-four (68 per cent) of patients' partners have been definitely satisfied with the results of treatment, with 11 (22 per cent) definitely unsatisfied. However, only 25 of these 34 satisfied patients (76 per cent) would be prepared to undergo the treatment again with post-operative pain and discomfort cited as the reason in those who would not. The failure rate doubled between one and six months post-operatively. There have been no serious complications but a 40 per cent minor side-effect rate is noted. These results are discussed in the context of previously reported results, with consideration of future strategies to improve outcome.

Key words: Snoring; Palate, soft; Uvula; Laser surgery

Introduction

Uvulopalatopharyngoplasty (UPPP) has been widely used as a treatment for snoring and obstructive sleep apnoea (OSA). It has a reported success rate in snoring patients of 76–86 per cent. Success, however, depends on patient selection and patients with OSA are known to have a lower success rate (Katsantonis *et al.*, 1990; Macnab *et al.*, 1992). The complications of UPPP have been well described and it is apparent that significant morbidity is associated with the procedure. (Croft and Golding-Wood, 1990). This has lead to a search for less radical alternatives and recently Kamami (1990, 1994) has described laser-assisted uvulopalatoplasty (LAUP) for the treatment of snoring. He has reported success rates comparable to, or better than, conventional UPPP. We have treated over 100 patients by this method and this paper presents our experiences of the Kamami technique and six months follow-up in the first 50 of these patients.

Methods

Patients referred with a primary complaint of snoring underwent our standard assessment, comprising structured history taking, with particular emphasis on responses liable to indicate the presence of obstructive sleep apnoea, and full otolaryngological examination with particular attention focused on:

(1) Nasal abnormalities such as septal deviation or nasal polyposis;
(2) The size and configuration of the soft palate and uvula;
(3) The configuration of the tonsils and tonsillar pillars;
(4) Tongue base configuration;
(5) Extent of gag reflex.

This was supplemented by flexible nasendoscopy to allow performance of the Müller manoeuvre in both the sitting and lying position, with classification of this according to Pringle and Croft's (1991) modification of Sher *et al.*'s, original grading (1985). Weight, height and collar size were noted.

Those patients in whom sleep apnoea was felt to be present were referred on for 'mini sleep studies' comprising overnight screening oximetry, pulse recording and observation. Patients in whom this was not suspected, who had no more than 50 per cent oropharyngeal collapse (scoring Grade 1 or 2) on the Müller manoeuvre, who had no significant nasal abnormalities and appeared to be snoring at the palatal level were offered surgical intervention to their soft palate in the form of a laser palatoplasty by the Kamami technique.

The Kamami technique of laser palatoplasty has recently been introduced into British practice after

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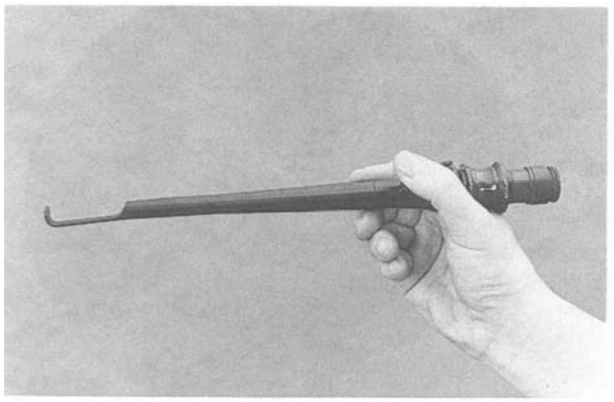

FIG. 1
Defocusing laser handpiece with backstop.

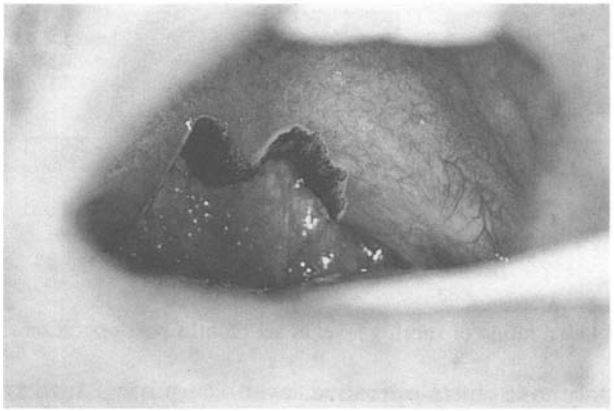

FIG. 2
Immediate post-operative appearance of soft palate.

gaining popularity in France and the USA. The technique was performed under local anaesthetic as a multiple out-patient procedure. This was in either a laser dedicated clinic room or an operating theatre with appropriate laser safety facilities. The patient was seated upright in a chair. Following lidocaine spray to a maximum dose of 100 mg or a benzocaine lozenge to provide surface anaesthetic, the soft palate was injected with 2 per cent lignocaine/ 1:80 000 adrenaline from a dental syringe. After ensuring satisfactory local anaesthesia the CO_2 laser, at 20 watts in continuous mode, was used to cut vertical trenches either side of the uvula, through the full thickness of the soft palate. Specially designed handpieces for the laser facilitate this, in particular one with a backstop to prevent injury to the posterior pharyngeal wall (Figure 1) (Sharplan Laser Corp). After cutting these trenches a 'neo-uvula' was formed by excising the uvula but leaving a U-shaped remnant (Figure 2). On the first treatment the vertical incisions were 1 cm long. Further treatments to control the snoring were performed as required removing palatal tissue in 0.5 cm increments.The laser vaporization was also extended to the tonsils and the faucial pillars if it was felt these were contributory. Patients were warned that the throat often becomes very sore post-operatively and were given diclofenac sodium 50 mg t.d.s., assuming no contraindications. In addition, they were prescribed dexamethasone 2 mg b.d. for three days, Benzydamine hydrochloride spray 1.5 to 3 hourly and soluble paracetamol 500 mg/codeine phosphate 30 mg tablets i-ii q.d.s.

There were no fixed number of treatment cycles but patients were reassessed a month after each treatment. If still snoring to a troublesome amount, and further shortening of the palate was considered feasible, then a further treatment was offered and performed. Completion of treatment was arrived at by fulfilling one of the following criteria:

(1) Snoring disappeared/untroublesome;
(2) Patient unwilling to undergo further treatment;
(3) Palate unable to be further shortened, determined by direct and nasendoscopic examination.

Patients were then followed-up at one month post-treatment completion. At this stage their snoring level was assessed by asking them to score their current snoring level out of 10, with 10 being their pre-intervention level and 0 being no snoring. They were encouraged to do this after consultation with their partner.

Further follow-up was then performed six months post treatment completion by direct telephone interview by one interviewer. At this stage patients were again asked the level of their snoring. They were also asked the following direct questions:

(1) Was the operation worthwhile?
(2) Is your partner happy with the results of the operation?
(3) Knowing everything that you do now, would you go through the operation again?
(4) Has the quality of your sleep worsened, improved or stayed the same?

Enquiry was also made into any side-effects noticed from the treatments.

Results

Fifty patients have been followed-up. These have been consecutively treated patients who have been able to be contacted by telephone. Three further patients were lost to follow-up due to inability to contact them for telephone interview (the patient having moved or having an incorrect phone number in their notes). No patient refused to answer questions over the telephone. Forty-five (90 per cent) were male and five (10 per cent) were female. The average age was 47 years (range 22 to 75 years). Three patients in the group had been found to have mild OSA on mini-sleep screening but were felt to have significant snoring at the palatal level amenable to palatoplasty.

The procedure was well tolerated with intra-operative pain being well controlled by local anaesthetic although patients occasionally described a sensation of heat whilst the excision was carried to its lateral extent. Bleeding was minimal and well controlled by the defocusing handpiece. There was

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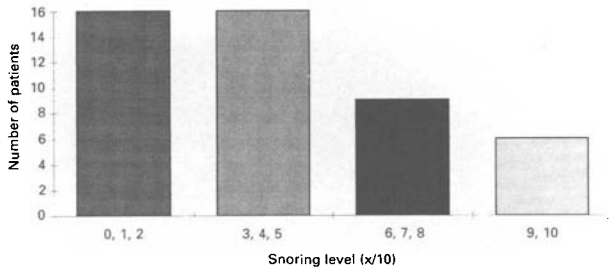

FIG. 3
Distribution of snoring level at six months post-operation.

only one intra-operative event requiring further treatment: bleeding which was controlled by bipolar diathermy. Taking the group as a whole the mean snoring level six months post treatment was 4.3 (range 0–10). The distribution of this is demonstrated in Figure 3. Patients underwent 1.62 procedures on average with 25 undergoing one procedure, 19 undergoing two and six undergoing three procedures.

The results to our specific questions are presented in graphical form in Figures 4–9. The highest response was obtained from the partners satisfied with the procedure, with 34 (68 per cent) being definitely satisfied, and 11 (22 per cent) unsatisfied (Figure 4). In general, a successful result in terms of partner satisfaction equates with a snoring level of 5 or less. Only one patient scoring 5 or less had an unsatisfied partner. Conversely an unsuccessful result equates to scoring 7 or more. No patient scoring at this level had a successful result, although patients whose partners were 'maybe happy' all scored 5, 6 or 7. We consider a successful result to be one in which there is a 'yes' answer to this question. Excluding patients with a mild degree of OSA improved the results slightly (Figure 5).

The patient's perception of whether the procedure was worthwhile was only slightly less, (Figure 6) but when asked whether they would undergo the procedure again with their knowledge about the success of the operation, as well as the post-procedural pain and any side-effects, 29 (58 per cent) said they would, but 18 (36 per cent) said they would not (Figure 7). In all cases where there had been a successful result but patients would be

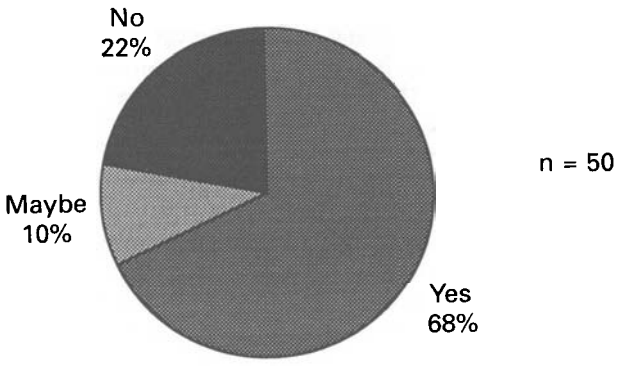

FIG. 4
Is your partner happy with the results of the operation? (All patients).

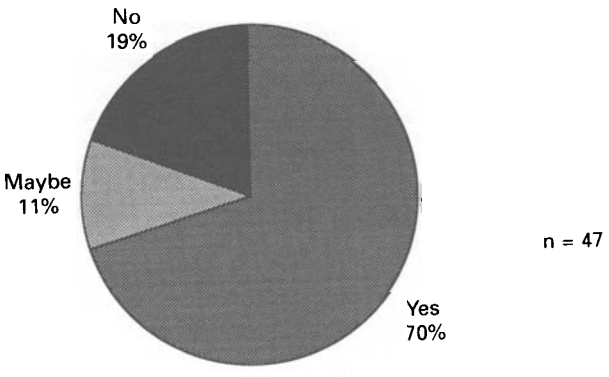

FIG. 5
Is your partner happy with the results of the operation? (Excluding OSA patients).

unwilling to undergo the procedure again, the reason cited was the post-operative pain and discomfort. In the 'typical' patient pain started one to three days post-operatively and reached a peak at days 6–9 before disappearing at day 14. All patients described their pain as being severe at some stage during its course.

The first 12 patients in this series were not questioned about any change in their sleep quality. In subsequent patients, 22 out of 38 (58 per cent) felt their quality of sleep had improved (Figure 8) and no patients felt that their quality of sleep had got worse. One patient who had an unsuccessful result in terms of his partner's satisfaction had noted improved sleep. In the group with a successful result 23 out of 34 patients (68 per cent) noted improved sleep (Figure 9).

Comparing the results at one month and six months, it is interesting to note that five out of 11 patients in the 'partner unhappy' group initially seemed to have a good result, scoring their snoring at 4/10 or better at the one month visit. In the 'partner maybe happy' group this was the case in two out of five patients. This equates to a success rate at one month of 82 per cent. In this cohort there were no serious post-operative complications. However, direct questioning did reveal a high rate of minor side-effects (present in 40 per cent of patients). These are presented in Table I.

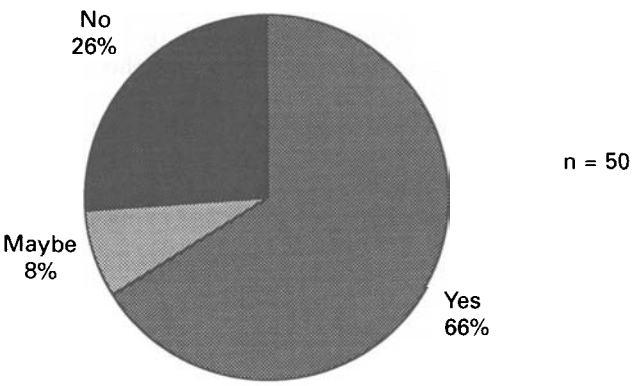

FIG. 6
Was the operation worthwhile? (All patients).

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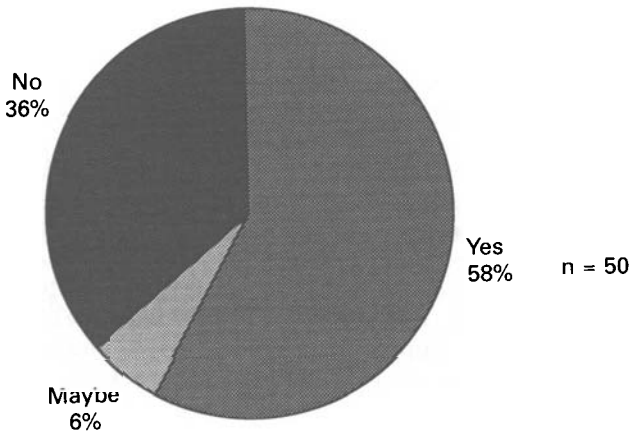

FIG. 7
Would you go through the operation again? (All patients).

Discussion

Uvulopalatopharyngoplasty (UPPP) has been the mainstay of surgical treatment for habitual snorers. Although successful in greater than three-quarters of patients, it is not without well described risks and complications (Croft and Golding-Wood, 1990), and this has prompted the search for less radical alternatives. In particular, the use of lasers has flourished with the perceived benefits of less haemorrhage and less oedema in the airway. Carenfelt has performed laser UPPP in a very similar fashion to the conventional operation but using the laser as a knife and not removing the tonsils (Carenfelt, 1991) He reports an 85 per cent improvement at three months. Ellis has performed a much less radical procedure with his palatal stiffening technique involving a vertical mucosal strip excision by Nd:YAG laser down to the muscular aponeurosis. Intermediate results in his series were encouraging with 14 out of 16 (88 per cent) patients showing significant improvement (Ellis *et al*, 1993) although a decline in effectiveness with time has subsequently been reported with a success rate dropping to 66 per cent with follow-up beyond a year (Ellis, 1994). This parallels the experience of UPPP and diminishing success as follow-up is extended. (Macnab *et al.*, 1992).

The Kamami technique of laser-assisted uvulopalatoplasty offers surgical treatment of snoring as an outpatient or office-based procedure. Carried out under local anaesthetic it is generally well tolerated

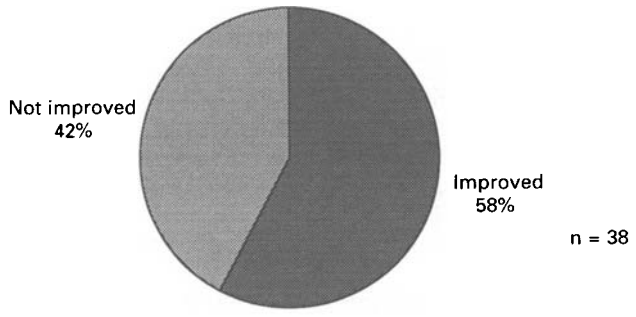

FIG. 8
Change in sleep quality (All patients).

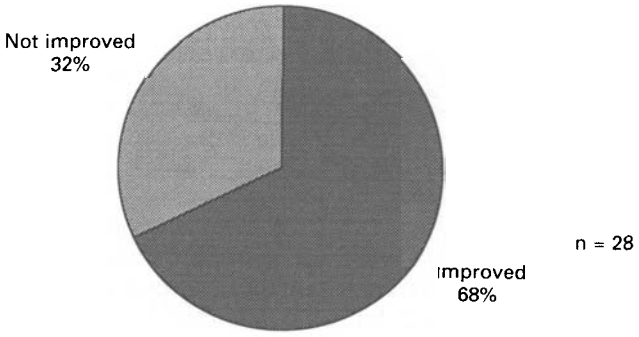

FIG. 9
Change in sleep quality in patients with a successful result

with obvious benefits due to the lack of need for hospitalization. Patients must, however, be prepared to undergo such a local anaesthetic procedure and those with a pronounced gag reflex should be selected out at the initial consultation to have a general anaesthetic procedure. We have encountered only one intra-operative event requiring additional treatment; diathermy for bleeding. There have been no major post-operative complications. However, the pain in the post-operative period cannot be understated and would appear to be best described as 'the worst sore throat that you've ever had'. Careful pre-operative counselling in this respect is mandatory. The problem of post-operative pain, starting a couple of days after the procedure, has also been encountered with the technique of vertical strip stiffening. Our experience with mucosal surface ablation tonsillectomy and the much lesser degree of pain these patients suffer suggests to us that it is the cutting of muscle with the laser that is the causative factor. It is this severe pain that accounts for some patients, even with a guaranteed successful result, being unwilling to undergo the procedure again. A comparison can be made with the observations of Katsantonis *et al.* (1990) who followed up a group of patients who had undergone UPPP for habitual snoring: Although 86 per cent of patients were satisfied with the outcome, only 60 per cent in retrospect would undergo the same treatment.

It is also important to acknowledge the 40 per cent level of minor complications that patients describe. This is similar to those described in relation to conventional UPPP (Croft and Golding-Wood, 1990) which is not surprising considering that the surgical target and ultimate goal of palatal tightening are the same. Again, pre-operative counselling will enable an informed decision as to the most appropriate management to be made.

Kamami (1990) initially reported a 97 per cent success rate for LAUP although the length of follow-

TABLE I
POST-OPERATIVE SIDE EFFECTS/SYMPTOMS AT SIX MONTHS

No side effects noted	30 (60%)
Dryness in throat	8 (16%)
Throat feels different, feeling of lump in the throat	6 (12%)
Difference in swallowing	3 (6%)
Slight tendency to nasal regurgitation	3 (6%)

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up was not mentioned in this cohort of 31 patients. Subsequently, he reported his results with 741 patients (Kamami, 1994) with an abolishment of snoring in 70 per cent and an improvement in snoring in a further 25 per cent, although again the time post-operatively that these results are being presented is unclear. We have not been able to reproduce the high levels of success reported by Kamami and our overall success rate of 70 per cent in snoring patients at six months accords more with the levels reported for UPPP. It may be that our patient selection procedure may account for some of these failures where we have not identified patients snoring at sites other than the soft palate. Assessment at six months post-operatively may also account for this lower figure, particularly because we have found a drop off in the success rate from 82 per cent at one month.

Although Sher *et al.* (1985) found that the use of the Müller manoeuvre could enhance the results of UPPP by allowing better patient selection, its reliability has more recently been called into question (Skatvedt, 1993). Although it may be accurate in identifying some of the patients who are not suitable for palatal surgery it does not identify all of them and may therefore allow some patients to have unsuitable surgery (Pringle and Croft, 1991). Sleep nasendoscopy may prove to be a more accurate method for reliably identifying the level at which snoring and/or obstruction take place, allowing direct visualization of the upper airways during induced sleep (Croft and Pringle, 1991). The major criticism of the technique lies in the use of hypnotic medication with known muscle relaxant properties to induce sleep with consequent potential for artefact. However, we have now introduced this into our practice to assess its efficacy in patient selection.

Like Kamami we have not relied on sleep studies to exclude OSA in all patients, believing that it is the site, not the degree of obstruction that is important in the selection of patients for palatal surgery. It is known from sleep nasendoscopy that there are subjects who obstruct solely at the level of the soft palate who are ideal candidates for palatal surgery (Pringle and Croft, 1993).

A further reason for a lower success rate than Kamami may be because these are the first patients we have treated i.e. the learning curve may be within this group. One obvious difference is that we have performed an average of 1.62 procedures per patient whereas Kamami performed an average of 3.7 sessions lasting five minutes each. Further assessment of subsequently treated patients may allow us to quantify this phenomenon.

We have assessed our patients by purely subjective measures because we feel that such measures may be the most relevant in terms of outcome for snoring patients. Surgery for snoring is usually carried out, at least partly, for the snorer's partner and their opinion as to the operative success must be considered. Whether telephone interview may encourage more honest reporting is a possibility that may also account for lower success rates.

The Kamami technique is a well tolerated procedure that is easy to perform under local anaesthetic. Although we have not achieved the high levels of success that Kamami has, we have obtained success rates broadly comparable to UPPP and other laser palatoplasty procedures. Key points, however, are the early drop off in the success rate and the severe degree of post-operative pain encountered.

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