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Uvulopalatopharyngoplasty: The Leicester experience

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Abstract

Twenty-nine patients undergoing uvulopalatopharyngoplasty (UPPP) for snoring are presented. Ninety per cent expressed an overall improvement in their symptoms: 21 per cent had complete abolition of snoring. Post-operative complications included nasal regurgitation of food/fluids and hyponasal speech development.

Key words: Snoring; Sleep apnoea syndromes; Uvulopalatopharyngoplasty

Introduction

The International Classification of Sleep Disorders defines snoring as loud upper airway breathing sounds in sleep, without episodes of apnoea or hypoventilation (American Sleep Disorders Association, 1990). This occurs when excessive inspiratory effort is required to overcome obstruction of the upper airway. However patients with obstructive sleep apnoea invariably snore and it seems likely that snoring and sleep apnoea form part of the same continuum (Lugaresi *et al.*, 1983; Issa and Sullivan, 1984).

Twenty-four per cent of men and 14 per cent of women may snore, although in the obese and those over 60 years the prevalence is much greater (Lugaresi *et al.*, 1980). Snoring is also common in children. Surgical intervention may be required despite lack of symptoms (Mauer *et al.*, 1983); adenotonsillectomy usually being all that is necessary.

Although snoring is generally regarded as harmless, severe collapse of the airway can occur resulting in obstructive sleep apnoea (OSA). Impairment of sleep, together with hypertension and ischaemic heart disease may follow. It is generally felt that palatal surgery for OSA is inappropriate as subsequent attempts at nasal CPAP (continuous positive airway pressure) often fail due to velopharyngeal incompetence.

In 1969, Kuhlo and his coworkers proposed tracheostomy for correction of obstructive sleep apnoea (Kuhlo *et al.*, 1969). Ikematsu (1964) reported a surgical procedure to correct snoring which was modified by Fujita and his coworkers which they described as uvulopalatopharyngoplasty (Fujita *et al.*, 1981).

This paper describes the Leicester experience with this operation over the last five years.

Methods

Thirty-four patients undergoing uvulopalatopharyngoplasty (UPPP) between January 1987 and June 1992 were reviewed and the results evaluated. In 29 patients full pre- and post-operative details including assessment by questionnaire were available for analysis.

A multidisciplinary approach was adopted for the pre-operative assessment. All patients were evaluated for their suitability for UPPP with overnight sleep recording, radiographical assessment of the airway and clinical examination. Nasal patency was also evaluated including measurement of the peak inspiratory flow rate (Gleeson *et al.*, 1986).

Sleep study

Patients were studied in the Sleep Disorders Laboratory, Leicester General Hospital. Minimum parameters monitored were oxygenation by pulse oximetry, respiratory movements using a single channel plethysmograph (Hanning *et al.*, 1986) and EEG and EOG for sleep staging. All subjects were observed overnight by a trained technician using closed circuit television with infrared illumination. Physiological signals were recorded on a computer (CARDAS, Oxcams) for later analysis.

The severity of obstructive sleep apnoea (OSA) was graded using the four point scale as described by Lugaresi *et al.* (1983) (Figure 1). Quality of sleep, night wakening, morning headache, and daytime somnolence were also assessed.

Radiology

Pharyngeal dimensions were assessed using CT scans of the head and neck in the awake patient with the head in a neutral position. Lateral cephalometry was also included. The size and position of the smallest part of the airway was noted as was the size of the posterior air space behind the tongue (see Riley *et al.*, 1987). A quantitative clinical scale to grade the severity of snoring was used in further assessment of snorers using their partners to help in the grading (Figure 2).

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GRADE	SEVERITY OF APNOEAS
0	SNORING WITH OCCASIONAL OBSTRUCTIVE APNOEAS
1	SNORING WITH REPETITIVE APNOEAS ONLY IN ONE SLEEP STAGE (usually REM sleep)
2	REPETITIVE APNOEAS THROUGHOUT SLEEP WITH OXYHAEMOGLOBIN SATURATION RETURNING TO BASELINE AFTER EACH APNOEA
3	REPETITIVE APNOEAS THROUGHOUT SLEEP WITH PERSISTENT HYPOXAEMIA IN SOME SLEEP STAGES (usually REM sleep)

FIG. 1
Severity of obstructive sleep apnoea (from Lugaresi *et al.*, 1983).

Clinical examination

Height, weight and collar size (Davies *et al.*, 1991) were recorded. The palate, uvula and pharynx were examined and the presence of excessive pharyngeal mucosa or enlarged tonsillar tissue noted.

Selection for surgery

Patients were selected for surgery if they fulfilled the following criteria:

(1) OSA of grade 0 and 1 only (see Figure 1).
(2) Evidence from the radiological examination that the narrow point in the airway was at the level of the palate and that the posterior air space behind the tongue was >8 mm on lateral cephalometry.
(3) Not obese (body mass index <30; collar size <16.5).
(4) Clinical examination suggesting surgically remediable narrowing of the palatal airway.

Patients with severe retrognathia or macroglossia were excluded from surgery. If nasal obstruction was considered troublesome (by clinical examination and Peak Flow measurements) then nasal surgery was offered in the first instance. Obese patients were asked to see a dietician and reduce weight before surgery was considered.

The surgical procedure was the same (with slight modification) as that described by Fujita *et al.* (1981) ensuring that the initial vertically orientated posterior pharyngeal folds were tightened to just produce slight horizontal ridges. Resultant complications of surgery were noted. Overall patient satisfaction was assessed using a visual analogue scale.

GRADE	DESCRIPTION OF SLEEP DISTURBANCE
0	NO SNORING
1	OCCASIONAL MILD SNORING OR SNORING ON BACK ONLY. NO BREATH HOLDING OR DAYTIME SOMNOLENCE
2	HABITUAL SNORING IN ALL POSITIONS. NO BREATH HOLDING OR DAYTIME SOMNOLENCE
3	HABITUAL SNORING ASSOCIATED WITH SOME EPISODE OF BREATH HOLDING, DISTURBED SLEEP PATTERN OR DAYTIME SOMNOLENCE
4	SNORING WITH BREATH HOLDING THROUGHOUT NIGHT

FIG. 2
Clinical grade of snoring.

Results

There were 29 patients (26 men and three women) with a mean age of 46.5 years (range 22–74 years; SD 11.6) in this study. The men weighed 77.4 kg (range 61–100 kg; SD 8.9): the women 90 kg (range 67–127 kg; SD 32.4). The mean duration of snoring was 194 months (range 48–480 months; SD 120). According to the patients' partners 27 (93 per cent) suffered with breath holding episodes, 14 (48 per cent) having episodes lasting 10 s or more. Oximetry suggested however that apnoeic episodes occurred in 18 (62 per cent) patients (grade 1), the other 11 (38 per cent) being simple snorers only (grade 0), as defined in Figure 1 (Lugaresi *et al.*, 1983).

Daytime somnolence occurred in 23 (79 per cent) patients; seven (24 per cent) also suffered with morning headaches; 20 (69 per cent) had poor quality sleep pre-operatively, this was reduced to only three (10 per cent) patients post-operatively; 24 (83 per cent) patients had had nasal surgery at some time, 15 (63 per cent) of these subsequently had an improved nasal airway.

On clinical grading most patients are now occasional mild snorers i.e. grade 1 (mean 1.17 ± SD 1.04) whereas before UPPP they were habitual snorers i.e. grade 3 (mean 2.83 ± SD 0.81) with episodes of breath holding $p<0.001$ (Wilcoxon signed rank test: see Figure 3). A summary of clinical grading pre- and post-operatively is shown in Figure 4.

Nasal regurgitation of food and fluid proved troublesome in 20 (69 per cent) patients immediately post-operatively, this was reduced to only three (10 per cent) patients at the six-month follow-up: 10 (35 per cent) patients also complained of hyponasal speech at the six-month follow-up.

Twenty-six (90 per cent) patients noted an overall improvement in their symptoms, six (21 per cent) having complete abolition of snoring (Figures 3, 4 and 5).

Discussion

Assessment of snoring is hampered by the relative paucity of sleep laboratories in this country, and formal polysomnography is not available in most departments. Our policy is to provide 'sleep screening' (Moran and Orr, 1985) with a trained nurse who will observe apnoeas as they occur and correlate these with the transcutaneous

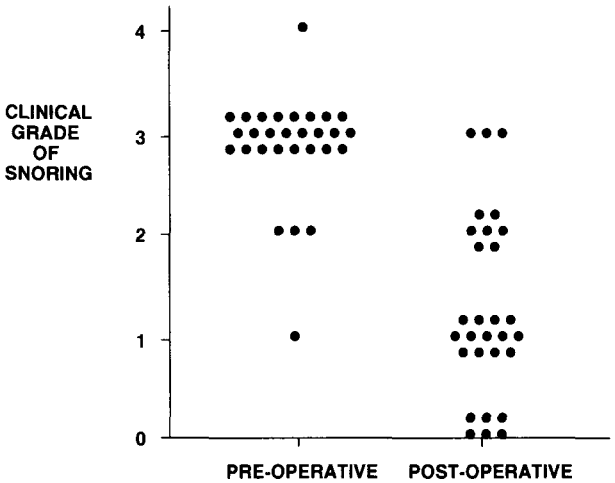

FIG. 3
Clinical grade of snoring pre- and post-operative.

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GRADE PRE-OP.	GRADE POST-OP.	NO. OF PATIENTS
4	1	1
3	3	3
3	2	7
3	1	9
3	0	5
2	1	2
2	0	1
1	1	1
		29

FIG. 4
Summary of clinical grade of snoring in 29 patients.

oxygen saturation of the blood. Direct observation is useful as hypoxaemic events can occur without any concurrent apnoeas.

It is necessary to take a careful history from the patient and partner as this can lead to helpful information regarding snoring, apnoeic events and duration, nightime wakening, morning headaches and daytime somnolence. The absence of somnolence does not mean the absence of sleep apnoea (Moran *et al.*, 1984). The patients' partners in our series reported breath holding episodes occurring in 93 per cent and also suggested that 48 per cent had episodes lasting 10 s or more. Even if these episodes are truely apnoeas, these figures might be somewhat misleading as exaggeration of events is likely. However other authors do state that up to two-thirds of snorers do suffer with apnoeic episodes of some sort (Simmons *et al.*, 1984).

If the nasal airway is obstructed then septal surgery is the treatment of choice in the first instance. The vast majority of snorers have significant nasal obstruction although they may not complain of any symptoms. As many as 31 per cent of snorers may be cured by nasal surgery alone (Ellis *et al.*, 1992). A long floppy uvula, with excessive redundant mucosa on the posterior pharyngeal wall, suggests that surgery could be beneficial. Some recommend the Muller manoeuvre as a reliable assessor of the site of obstruction (Golding-Wood *et al.*, 1990). Doubt has been cast on whether this test is a good predictor for successful UPPP (Sher *et al.*, 1985) as only the cranial extent of the obstruction can be seen. Some have placed value on lateral cephalometry (Lyberg *et al.*, 1989) or CT scanning (Shepard and Thawley, 1989). The principal criticism of this approach is that it is a static measurement in an awake patient. More recently, pharyngeal pressure measurements have become available with small multitransducer catheters (Skatvedt, 1992) and it is likely that this will be a more reliable method for determining site and extent of obstruction.

UPPP is an effective operation for simple snoring but not for OSA, not least because UPPP may preclude the subsequent use of nasal CPAP. The site of obstruction in the upper airway is generally at the level of the soft palate but may be behind the tongue. UPPP should be able to increase the cross-sectional area of the airway at the palatal level but cannot be expected to influence that behind the tongue. All patients were subjected to an overnight sleep study in order to determine the severity of the disorder and to exclude those with moderate and severe OSA (grades 2 and 3; Lugaresi *et al.*, 1983). Those excluded were treated with nasal CPAP and/or nasal surgery as clinically indicated. A sleep study was deemed to be essential as clinical examination alone is insufficient to accurately gauge the severity of the disorder.

We feel it is important that slight horizontal ridges on the posterior pharyngeal wall are produced during surgery. We resect approximately 1.5 cm, of soft palate, usually taking as a guide the upper extension of the anterior pillar of the fauces. It is difficult to be accurate as far as this measurement is concerned (although other authors have attempted various techniques) to ensure that only the correct amount of tissue is removed (Lusk, 1986).

We have noticed that considerable pain and distress follow surgery. Some have attributed this to possible muscle ischaemia secondary to the insertion of interrupted sutures (Sharp *et al.*, 1990). This is less likely in our patients as we only suture mucosa to mucosa. Good pre-operative counselling and adequate analgesia are essential. We have used a 'self-administered' morphine pump in a number of patients and we find this very useful. We generally advise against nasal surgery combined with UPPP due to the excessive discomfort that this causes. A combined procedure does prevent two separate anaesthetics and if undertaken then merocel packs with *in situ* ventilating tubes might reduce the risk of immediate post-operative airway obstruction.

We occasionally note the formation of adhesions but have not experienced complete closure of the nasopharyngeal isthmus as have other authors (Sharp *et al.*, 1990). Ten per cent of our patients had some sort of nasal regurgi-

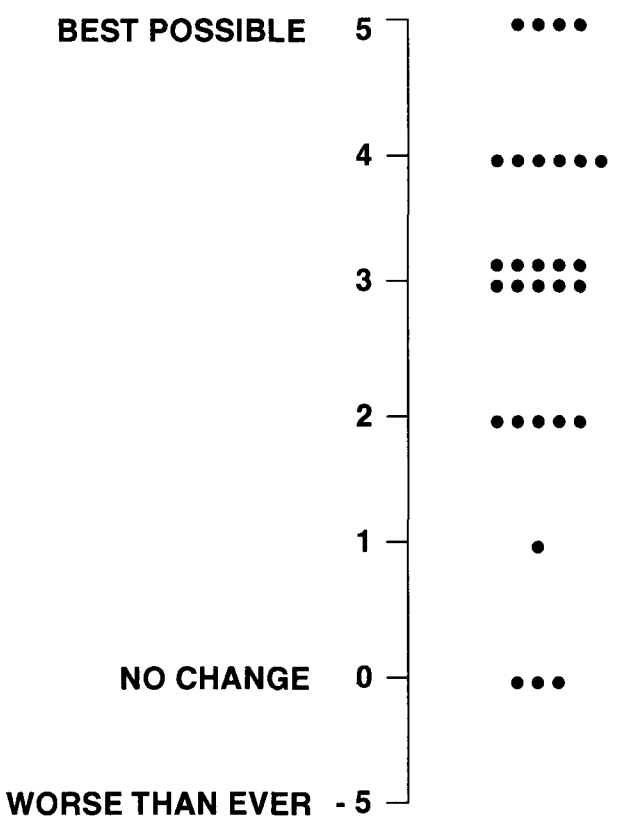

FIG. 5
Overall patient satisfaction.

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tation at the six-month follow-up, although this occurred only when ingesting fluids rapidly and not during 'normal' eating and drinking. This has also been found by others (Simmons *et al.*, 1984). Thirty-five per cent of our patients experienced some degree of hyponasal speech at follow-up. This was of a mild nature although no objective recordings were made. Coleman and Sly (1991) reported that UPPP does not produce significant voice or speech changes.

In our experience UPPP is effective in the treatment of habitual snoring. Ninety per cent of patients had their loud snoring abolished or markedly reduced. This compares favourably with other reports (Golding-Wood *et al.*, 1990; Sharp *et al.*, 1990). Clinical grade of snoring was determined with the assistance of the sleeping partner of the patient, thus eliminating the possibility of subjective bias of the surgeon or patient. This however may not be totally reliable (Stradling and Crosby, 1990).

UPPP (with or without nasal surgery) usually reduces or eliminates snoring but is less successful in obstructive sleep apnoea and has not been shown to reduce mortality (Rees, 1991). Nasal CPAP is successful in apnoeic patients and reduces the mortality from vascular complications (He *et al.*, 1988). Our patients with severe OSA are usually treated with CPAP. It is important to emphasize that CPAP is not so effective following UPPP due to the partial velopharyngeal incompetence that occurs (Conway *et al.*, 1985). We stress the need for formal polysomnography in those patients with proven obstructive sleep apnoea. They should be referred to a regional centre if no local facilities are available.

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