

## Tonsillectomy may cause altered tongue sensation in adult patients

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### Abstract

**Objectives:** To determine the frequency of altered tongue sensation following tonsillectomy, and its relationship to different surgical techniques.

**Design:** Case–control study.

**Setting:** District general hospital.

**Participants:** One hundred and four consecutive adults undergoing tonsillectomy, and 43 control patients.

**Main outcome measures:** Altered tongue sensation.

**Results:** Twenty-eight of 100 patients described altered tongue sensation post-tonsillectomy. No patients in the control group experienced altered tongue sensation. There was a difference in rates of altered sensation between tonsillectomy patient groups undergoing bipolar diathermy and ‘cold steel’ techniques ( $p < 0.019$ ). Three months after surgery, 22/23 contactable patients reported complete recovery of tongue sensation. One patient experienced tongue paraesthesia persisting until one year post-tonsillectomy.

**Conclusion:** Tonsillectomy resulted in altered tongue sensation in 28 per cent of our study group. Bipolar diathermy dissection was significantly more likely to cause altered sensation than cold steel dissection. Ninety-six per cent of these disturbances resolved by three months, all by one year. Possible alteration of tongue sensation should be discussed whilst obtaining consent for tonsillectomy.

**Key words:** Tonsillectomy; Tongue; Sensation; Numbness; Complication

### Introduction

Altered sensation of the tongue is rarely mentioned when obtaining consent for tonsillectomy. This is because it is perceived by many surgeons to be uncommon; this may be because patients fail to report it amidst the immediate post-operative pain, and because these patients are not routinely followed up. There are a number of published case reports of altered taste and numbness of the tongue following tonsillectomy.<sup>1–6</sup>

The two nerves at risk during tonsillectomy are the lingual nerve and the lingual branch of the glossopharyngeal nerve. The lingual nerve is a branch of the mandibular division of the trigeminal nerve, emerging from the foramen ovale to descend between the lateral and medial pterygoid muscles deep to the ramus of the mandible. It continues medial to the mandible and roots of the teeth, and it has a close relationship to the tongue base as it passes beneath the tongue across the submandibular duct. It provides: sensory innervation to the anterior two-thirds of the tongue, the floor of the mouth, and

the lingual surfaces of the lower alveolar margin; taste fibres to the anterior two-thirds of the tongue; and secretomotor fibres to the submandibular salivary gland. The lingual nerve is most susceptible to damage approximately halfway down the anterior faucial pillar of the tonsil, where it lies deep to the middle constrictor and medial to the ramus of the mandible.

The lingual branch of the glossopharyngeal nerve emerges between the stylopharyngeus and styloglossus to cross the lower tonsillar fossa lateral to the superior constrictor muscle and to reach the tongue base, where it supplies sensory and taste fibres to the posterior third of the tongue. An anatomical study demonstrated that in about one-quarter (23.4 per cent) of cases, the lingual branch of the glossopharyngeal nerve travelled inferior to the styloglossus muscle and lateral to the superior constrictor pharyngeal muscle over its whole course to the base of the tongue, so that the palatine tonsil was clearly separated from the lingual branch of the glossopharyngeal nerve.<sup>7</sup> However, in 55.1 per cent of

cases there was a space between the superior and middle constrictors which left the lingual branch of the glossopharyngeal nerve only loosely covered by muscle bundles from the stylopharyngeus, palatopharyngeus and the superior constrictor. Moreover, in 21.5 per cent of cases the tonsillar bed lacked a muscle lining altogether in this area, and the nerve was firmly adherent to the tonsillar capsule. The distance between the lower pole of the palatine tonsil and the lingual branch of the glossopharyngeal nerve was 2–4 mm.

Previous case reports have failed to undertake quantitative evaluation of the risk of altered tongue sensation in tonsillectomy patients. Therefore, we decided to perform an observational questionnaire study on a group of tonsillectomy patients, in order to establish the frequency of this problem and whether it was related to the main mode of surgical dissection.

## Materials and methods

### Study

One hundred and four consecutive adult patients undergoing elective, bilateral tonsillectomy for recurrent chronic tonsillitis at a district general hospital were asked to complete a questionnaire on the first post-operative day. A group of 43 patients undergoing appendicectomy were used as controls. This particular control group was chosen on the basis that these patients had a similar age profile, had undergone a procedure of similar duration, may have received the same broad spectrum antibiotics if required and had all been intubated.

### Intervention

The tonsillectomies were performed by experienced senior surgeons using well established tonsillectomy techniques, comprising either (1) conventional or 'cold steel' tonsillectomy with snares or ties, with or without sparing use of bipolar diathermy for haemostasis, or (2) bipolar diathermy dissection. The technique was determined according to the surgeon's preference. All patients were intubated during the procedure. Patients were blinded to which dissection technique was used. Control group patients were also intubated for their appendicectomy.

On post-operative day one (prior to discharge), the patients completed a questionnaire consisting of seven questions relating to tongue sensation (Table I). No clinical test of tongue sensation was

performed, as this study sought to establish patients' subjective awareness of altered sensation. The method of tonsillectomy was also recorded – in particular, whether or not bipolar diathermy was the main tool of dissection. No patients received any topical analgesia during their recovery.

### Follow up

Any patients reporting altered sensation were contacted by the ENT department specialist nurse (CC) at three and 12 months post-operatively, and the same questionnaire was completed by telephone.

### Statistical methods

Data are shown in Tables II to IV. Group comparisons were made using *t*-tests for the age of each group and chi-square tests for the gender comparison. The rates of altered tongue sensation were compared with chi-square testing.

## Results

### Study population

One hundred and four patients were recruited into the tonsillectomy arm of the study.

Two patients were excluded at this stage because they reported altered sensation prior to the tonsillectomy. One complained of a numb lower lip which resolved after six weeks. The other had tongue numbness prior to tonsillectomy as a result of dental treatment two weeks earlier. This recovered at two weeks post-tonsillectomy. Two further patients were excluded from the study since it was not clear from the operation record which method of dissection had been employed.

Forty-three patients were recruited into the control arm of the study.

The average age and gender of the patients in both the tonsillectomy and control groups are shown in Table II. Statistical analysis demonstrated no significant age differences between each group (bipolar *vs* control,  $p = 0.91$ ; bipolar *vs* cold steel,  $p = 0.81$ ; cold steel *vs* control,  $p = 0.78$ ). Likewise, there was no significant difference in gender distribution between the case and control groups ( $p = 0.15$ ).

### Altered sensation

On post-operative day one, altered tongue sensation was reported by 28 of 100 tonsillectomy patients (Table III). All these patients complained of general altered sensation, and some were able to

TABLE I

QUESTIONNAIRE USED TO DETERMINE ALTERED TONGUE SENSATION

Do you have altered sensation in your tongue?
Is your sense of taste affected?
Can you tell the temperature of food and drink over the affected area?
If you rub your tongue over your teeth, can you tell if they are clean or dirty?
Do you bite your tongue by accident?
Do you have a sensation of tingling of your tongue?
Is your speech affected?

TABLE II

PARTICIPANT DATA

Parameter	Bipolar diathermy	'Cold steel'	Control
Mean age (yrs)	26.5	25.5	26.2
Gender ( <i>n</i> )			
Male	32	32	20
Female	17	19	23

Yrs = years

TABLE III  
FREQUENCY OF ALTERED TONGUE SENSATION\*

Dissection type	Altered sensation (n (%))
Bipolar <sup>†</sup>	19 (39)
'Cold steel' <sup>‡</sup>	9 (18)
Control <sup>**</sup>	0 (0)
Total <sup>§</sup>	28 (28)

\*On post-operative day one. <sup>†</sup>n = 49; <sup>‡</sup>n = 51; <sup>\*\*</sup>n = 43; <sup>§</sup>Tonsillectomy only; n = 100.

give a more detailed account of their disturbance (Table IV).

A flowchart of study findings is shown as Figure 1. At three months post-tonsillectomy, 23 of the 28 patients reporting tongue sensation disturbance (82 per cent) were contactable. Of these, 22 (96 per cent) reported that their tongue sensation had returned to normal. None of these 23 patients had experienced any other post-operative complications such as secondary haemorrhage. No details were available for the other five patients (of the 28 patients with tongue disturbance; 18 per cent).

By one year post-operatively, all contactable patients had made a complete recovery. The median time for return of normal tongue sensation was two weeks, with a range of two days to one year.

The control group experienced no altered tongue sensation post-operatively. There was a highly statistically significant difference in rates of altered tongue sensation, comparing the study and control groups ( $p < 0.0001$ ; 95 per cent confidence intervals, 17–38 per cent).

*Method of dissection*

A secondary outcome measure examined whether bipolar diathermy dissection lead to an increased rate of altered tongue sensation when compared with 'cold steel' dissection.

Of the 28 patients who reported altered tongue sensation at day one post-operatively, 19 had undergone bipolar diathermy dissection and nine had undergone 'cold steel' dissection (Figure 1). Patients undergoing tonsillectomy using bipolar diathermy dissection were more likely to suffer altered tongue sensation (39 per cent) than those undergoing 'cold steel' dissection (18 per cent). This difference was statistically significant ( $p < 0.019$ ; 95 per cent confidence intervals, 4–37 per cent).

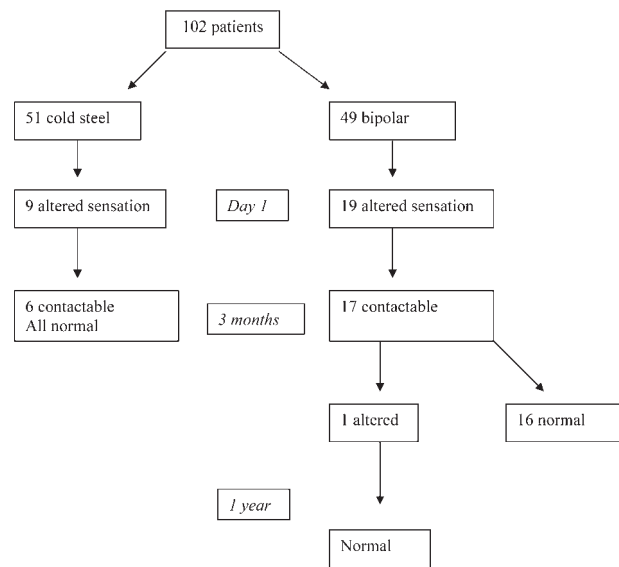


FIG. 1  
Flowchart of study findings.

**Discussion**

In our survey, over one-quarter of our tonsillectomy patients reported altered sensation of the tongue following their tonsillectomy. This rate was significantly higher in the group undergoing tonsillectomy with bipolar diathermy dissection.

It is likely that the lingual branch of the glosso-pharyngeal nerve may be damaged if there is extensive dissection of the tonsillar bed, particularly in those individuals in whom the nerve is adherent to the tonsillar capsule. Bipolar dissection produces more thermal damage beyond the tonsillar capsule compared with 'cold steel' techniques, and this may explain the significantly greater incidence of damage reported following use of this technique.

Ohtuka *et al.*<sup>6</sup> reviewed patients presenting to a taste disturbance clinic and found that 11 of 3583 patients suffered taste disturbances following tonsillectomy. Three of these patients had their disturbance attributed to inflammation or scarring due to the tonsillectomy procedure. Three cases were thought to be attributable to lack of dietary zinc, two were caused by medication taken following tonsillectomy and in three patients the cause was not identified. The authors also suggested that nerve injury could be caused by tongue pressure during insertion of a tongue depressor or laryngoscope. However, we believe that nerve injury is unlikely to

TABLE IV  
DETAILS OF ALTERED TONGUE SENSATION\*

Dissection type	Altered sensation	Altered taste	Altered temp	Altered touch	Resultant biting	Tongue tingling	Altered speech
Bipolar <sup>†</sup>	19 (36)	7 (14)	1 (2)	0 (0)	2 (4)	9 (18)	7 (14)
'Cold steel' <sup>‡</sup>	9 (18)	4 (8)	0 (0)	0 (0)	2 (4)	8 (16)	6 (12)
Total <sup>**</sup>	28 (28)	11 (11)	1 (1)	0 (0)	4 (4)	17 (17)	13 (13)

Data are shown as n (%). \*On post-tonsillectomy day one; <sup>†</sup>n = 49; <sup>‡</sup>n = 51; <sup>\*\*</sup>n = 100; Temp = temperature

be caused solely by intubation, in view of the results from our control group.

Prolonged use of the tonsil gag may lead to compression, stretching or sheering of the lingual nerve as it courses around the tongue base.<sup>5</sup> The prognosis for recovery is good when the mechanism of injury is neuropraxia. Lingual nerve injury following orotracheal intubation has also been well documented, but this must be rare considering the vast number of intubations that take place with no known post-intubation problems.<sup>8–10</sup>

We did not expect patients to specify the precise location of sensory disturbance. Therefore, we were unable to determine whether such disturbance was caused by damage to the lingual nerve, the lingual branch of the glossopharyngeal nerve or both.

It has been hypothesised that altered tongue sensation following tonsillectomy may be related to post-operative complications such as infection.<sup>3</sup> This would not be consistent with the findings from our study since our patients had not experienced any such complications, either on the first post-operative day or at the three month follow up consultation.

- **Tonsillectomy is a common procedure performed in the UK**
- **Adequate informed consent for any procedure is crucial**
- **Previous case reports have not quantified the frequency of altered tongue sensation following tonsillectomy**
- **Over one-quarter of patients undergoing tonsillectomy in this study reported altered tongue sensation post-operatively**
- **There is a significantly greater risk of altered tongue sensation if bipolar diathermy is used as the main mode of dissection**
- **Altered tongue sensation should be discussed when obtaining consent for tonsillectomy**

It is important to appreciate the impact that altered tongue sensation can have upon patients. In reviewing the literature pertaining to this, it is of interest to read comments by patients experiencing this problem. A particularly useful source of such information is internet-based ‘chat rooms’. One female patient from the United States of America described her problems thus.

I had a tonsillectomy in September of 2005. The pain I suffered lasted for weeks. I lost 35 lbs in a matter of five weeks. When I started slowly back on solids foods, the food didn’t taste the same. When I mention this to the surgeon he said it was because I hadn’t eaten solids in a long time and it would come back. Well it didn’t come back, I hired a lawyer to file a law suit and when I went to his doctor, his findings were that because my nerve wasn’t cut there isn’t a good case. I can taste some sweet and bitter. But nothing else tastes good to me. I am an Italian

who cooks homemade sauces etc ... and now I can’t even taste my food!<sup>11</sup>

This is one of many similar internet chat room entries regarding altered tongue sensation following tonsillectomy, from the UK and elsewhere.

### Limitations

The limitations of our study include the fact that there was no standardised anaesthetic technique, and that there were many different anaesthetists intubating patients and different surgeons performing the procedures. Patients were not randomly allocated into bipolar diathermy or cold steel groups. Formal, objective testing of sensory and taste disturbance was not performed; the survey reported only the subjective alteration felt by patients. There was no standardised or validated questionnaire considered appropriate for this task.

There may have been a difference in patients’ reporting of their altered tongue sensation, comparing the written questionnaire on post-operative day one with the telephone questionnaire three months later. Only patients who initially suffered altered tongue sensation were telephoned three months later, although this would be more likely to result in under-reporting of altered sensation than otherwise.

### Suggestions

Based on our study findings, we suggest the following. Firstly, the tonsillectomy informed consent process should explain the risk of altered tongue sensation to the patient or their legal guardian. Secondly, if the tongue looks dusky during tonsillectomy, theatre staff should alter the position of or release the gag intermittently throughout the procedure, in order to relieve pressure. Thirdly, when using bipolar diathermy dissection, the surgeon should keep very close to the tonsillar capsule and should apply diathermy on the tonsil side, particularly in the mid- and lower pole areas.

### Conclusion

Transient alteration of tongue sensation following tonsillectomy is common. It occurred more commonly in our bipolar diathermy dissection tonsillectomy group than in our cold steel dissection group. Patients should be informed of this risk when consent is obtained for tonsillectomy.

### Acknowledgements

We would like to thank Nicola Alder at the Oxford Centre of Statistics for Medicine.

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Miss A Smithard takes responsibility for the integrity of the content of the paper.  
Competing interests: None declared

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