

Lingual nerve protection during surgical removal of lower third molars

A prospective randomised study

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Abstract. A prospective randomised study was designed to evaluate the efficacy of protecting the lingual nerve by subperiosteal insertion of a retractor in 300 patients. All operations were performed under local anaesthesia and only one molar was removed at a time. In one group, the lower third molar was removed with protection of the lingual nerve and in another group, without protection. Molars which did not need to be sectioned were excluded from the study. The position of the molar, the degree of surgical difficulty and patient gender and age were also recorded. The results indicate 1.33% incidence of temporary lingual nerve dysaesthesia – this being low in comparison with other studies. No permanent disturbances were found. The intergroup percentage difference was not significant. It is suggested that routine application of a lingual protecting instrument during surgical removal of a third molar is not necessary in the hands of an experienced surgeon.

Key words: lingual nerve; third molar; impacted tooth; tooth extraction.

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Surgical removal of lower third molars is the most frequently carried out procedure in oral surgery. Knowing the incidence of sensitivity disturbances is, therefore, of particular importance for the surgeon as well as for the patient because of possible litigation.

Routine application of an instrument to protect the lingual nerve during this kind of surgery has been subject to controversy^{1,2,10}. While the use of a lingual flap protector is recommended by several authors^{2,8,12}, it is also argued that this procedure is one of the factors related to the etiology of lingual nerve damage^{2,10,13,14}. There is currently a trend not to raise a lingual flap, in an attempt to reduce the incidence of lingual nerve dysaesthesia^{3,14}.

The incidence of reported postoperative dysaesthesia of the lingual nerve

varies widely in published studies. The incidence of temporary disturbances ranges from 0.278% to 13%^{2,3,7,10,12}. In some studies surgery was performed by many different surgeons^{2,4,6,8,11,12}, the surgical technique was not standardised, or no mention was made of the need for osteotomy or tooth sectioning^{2,8,11,12,14}. Other studies fail to provide details on inclusion criteria, or appear to be based on surgery performed under general anaesthesia.

This prospective, randomised study was designed to evaluate the efficacy of retracting the lingual flap in order to prevent lingual nerve injury during removal of lower third molars. The number of surgeons participating was limited and the same surgical technique was used throughout the study.

The teeth involved all presented a

certain degree of surgical difficulty, as assessed beforehand.

Material and methods

The study group comprised a total of 300 consecutive patients. Molars which did not need to be sectioned were excluded from the study. All operations were performed by two senior surgeons. The procedures were carried out under local anaesthesia and only one molar was removed at a time. Technique A consisted of surgical removal of the lower third molar, with protection of the lingual nerve by subperiosteal insertion of a retractor (Fig. 1). Technique B consisted of removal of the lower third molar without protection (Fig. 2). Patients were strictly randomised. The degree of inclusion, position of the molar and patient gender and age were recorded. The measurements of depth and angle of impaction were obtained from or-



Fig. 1. Technique A, involving protection of the lingual flap.



Fig. 2. Technique B, without protection of the lingual flap.

thopantomographic radiographs, using the classification of PELL & GREGORY⁹ and WINTER¹⁵ (Table 1). According to this classification, the degree of surgical difficulty (slight, moderate or severe) can be described⁶ (Table 1).

The surgical techniques were based on the commonly used methods including incision, elevation of a mucoperiosteal flap, bone removal and sectioning of the tooth with a surgical burr, elevation of the tooth in different parts, wound cleaning with sterile saline solution and closure with non-reabsorbable suture. The medication prescribed in all cases after surgery was: 750 mg amoxicillin, 3 times daily for 4 days; 50 mg diclofenac, 3 times daily for 4 days; 650 mg acetaminophen every 6 hours where necessary and 0.12% chlorhexidine as mouthwash.

Lingual nerve function was tested at one week in the course of postoperative assessment and was carried out by the same surgeon who performed the procedure. The method for evaluating sensory deficit included a verbal questionnaire (Table 2) and a method of recording sensation, as described by FERDOUSI & MACGREGOR⁵ (Table 3).

The data recorded on the study forms were tabulated for each factor and analysed for significant effects (SPSS[®] statistical package for Windows 95[®]). The χ^2 test was applied for individual factors, but since they were not strictly independent, a supplementary logical analysis was used to identify influencing factors.

Results

The records were completed for 300 consecutive patients: 160 women (53%) and 140 men (47%). The mean patient age was 27.4 years (range 14–59). A total of 300 lower third molars were removed: 155 (52%) from the right side and 145 (48%) from the left side. Eighty molars (27%) were totally impacted in bone, and 220 (73%) were partially impacted in bone. A total of 153 (51%) were partially erupted, and 147 (49%) were completely unerupted. The angle and the horizontal and vertical position

of the molars are shown in Table 4. In Table 5, the molar distribution according to the degree of surgical difficulty is depicted. The range was from 4 to 9, with a mean of 6. A total of 142 lower third molars (47%) were removed with retraction of the lingual flap, and 158 (53%) were removed without protec-

Table 2. Verbal questionnaire for assessing sensory tongue deficit

1. Do you have normal feeling in your tongue?
2. Is it completely affected on one side or just at the tip?
3. Is it numb, tingling or painful?

Table 3. Assessment of sensory tongue deficit

1. Light touch: using a nylon suture thread or a wisp of cotton wool.
2. Tactile discrimination: using sharp and blunt ends of a bi-angled probe.
3. Two-point discrimination: using blunt dividers.
4. Pain awareness: using light pressure from a sharp probe.

Table 1. Classification of degree of surgical difficulty according to PELL & GREGORY⁹ and WINTER¹⁵

Position	Degree of difficulty	
	mesioangular	1
Horizontal relationship 2nd molar	horizontal	2
	vertical	3
	distoangular	4
	I	1
Vertical relationship 2nd molar	II	2
	III	3
	A	1
Total	B	2
	C	3
	Slight (0–3)	
	Moderate (4–6)	
	Severe (7–10)	

Table 4. Molar distribution according to PELL & GREGORY⁹ and WINTER¹⁵

	N	%
Mesioangular	88	29
Horizontal	142	47
Vertical	60	20
Distoangular	10	3
I	27	9
II	226	75
III	47	16
A	42	14
B	205	68
C	53	18

Table 5. Molar distribution according to degree of surgical difficulty

	N	%
Slight	0	0
Moderate	206	69
Severe	94	31

tion. At day 7 postsurgery, 4 patients (1.33%) showed sensitivity disturbances of the lingual nerve. Three of these patients (2.11%) were operated upon using technique A, while 1 (0.63%) was subjected to technique B. There were no untoward incidents in the three cases in which technique A was used, whilst all third molars proved moderately difficult. The case where technique B was used involved a vertically impacted third molar with a horizontal and vertical relationship to the second molar of III and C, respectively, with a lingual bone perforation of approximately two millimeters.

No permanent disturbances were found. Three of the lingual disturbances resolved after 21 days and one showed complete sensory recovery after 60 days. The χ^2 analysis of the difference in proportions yielded no significant results. No significant association of lingual nerve disturbance with the degree of difficulty of extraction or third molar positioning could be established.

Discussion

This study is the first to prospectively compare results with regard to lingual nerve function after surgical removal of lower third molars, using lingual flap retraction *versus* no protection of the lingual nerve. There appeared to be little difference, but due to the small sample size and the low percentages of nerve disturbances, firm conclusions cannot be drawn because of lack of statistical significance.

A number of factors are involved when considering the aetiology of nerve damage, including the surgical approach, the technique used, the type of anaesthesia used and the surgical skill of the operator.

CARMICHAEL & MCGOWAN⁴ reported an incidence of temporary lingual nerve dysaesthesia of 1.9% (791 cases), which is similar to the results presented, but they did not mention whether the lin-

gual flap was retracted. TO & CHAN¹⁴ reported an incidence of 0.278% (3,600 cases), but they used lingual flap retraction. SCHULTZE-MOSGAU & REICH¹² also protected the lingual nerve by retraction of the lingual flap and reported an incidence of 1.4% (1,107 cases), similar to the present figures. MASON⁸ reported a relatively high incidence of 11.5% (1,040 cases) and mentioned an even higher incidence when the lingual flap elevation proved to be difficult. From these studies, one cannot conclude that lingual flap retraction really contributes to a lesser incidence of lingual nerve damage.

The technique used, i.e. lingual split technique *versus* splitting with a burr, certainly seems to be an important factor, but is of course also dependent on the skill of the surgeon. ROOD¹¹ reported an incidence of 12.8% of temporary lingual nerve dysaesthesia when using the lingual split technique and only 2.3% when using drills. MASON⁸, however, mentioned that there was no difference when using either technique. Finally, YEH¹⁶ did not find any single incident of damage to the lingual nerve using the lingual split-bone technique (1,500 cases). Splitting a tooth may also be associated with lingual nerve damage. The fact that a tooth needs splitting also indicates the degree of difficulty and, along with SCHWARTZ¹³, in this study no third molars were included that did not require sectioning. Some authors, however, fail to mention in their studies the degree of difficulty, the position and angulation and the need for sectioning^{2,12}.

Surgical skill is also an important factor when comparing results from different studies^{2,11}. This effect was eliminated in the present study by limiting the number of surgeons involved to two. The disadvantage is that the number of patients is smaller than in most other studies^{2,4,6,8,11,12}.

All patients were operated on using local anaesthesia. BLACKBURN & BRAMLEY² found a higher percentage of lingual nerve damage when patients were treated under general anaesthesia (22%) as opposed to local anaesthesia (6%). The choice of general anaesthesia, however, may also be related to the degree of expected difficulty when removing the third molar. MASON⁸ and ROOD¹¹ both exclusively used general anaesthesia and reported a higher incidence of nerve damage than in the present study.

The results of the present study seem to support a policy whereby lingual nerve protection by retracting a lingual flap should be preserved for selected cases, when possible nerve damage might be anticipated because of unfavourable circumstances.

This policy is in accordance with that of APPIAH-ANANE & APPIAH-ANANE¹ and with the recommendations of CARMICHAEL & MCGOWAN⁴ in that insertion of a lingual flap retractor already carries the inherent risk of induction of sensory deficit. A larger study, however, comprising a sufficient number of cases, would be necessary to unequivocally prove that raising a lingual flap does more harm than good.

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