ORIGINAL ARTICLE

FREQUENCY OF LINGUAL NERVE INJURY IN MANDIBULAR THIRD MOLAR EXTRACTION: A COMPARISON OF TWO SURGICAL TECHNIQUES

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Background: Surgical removal of impacted mandibular third molar is associated with a number of complications including postoperative bleeding, dry socket, postoperative infection, and injury to regional nerves. Lingual nerve damage is one of the main complications. To prevent this complication different techniques had been used. Lingual flap reflection is one of these procedures in which lingual soft tissue is reflected and retracted deliberately, the nerve is identified and is kept out of the surgical field. The objective of this study was to evaluate a surgical technique for third molar removal which is associated with minimum frequency of lingual nerve damage. **Methods:** A randomized controlled trial was performed. A total of 380 patients with impacted mandibular third molars were included in this study. Each patient was allotted randomly by blocked randomization to group A where procedure was performed by reflection and retraction of lingual flap in addition to buccal flap and group B where procedure was performed by retraction of buccal flap only. **Results:** Lingual nerve damage occurred in 8.94% in Group A in which lingual flap retraction was performed but damage was reversible. In group B, 2.63% lingual nerve damage was observed and nature of damage was permanent. The difference was statistically significant (p=0.008). **Conclusions:** Lingual flap retraction poses 3.4 times increased risk of lingual nerve damage during extraction of mandibular third molar when lingual flap is retracted but the nature of damage is reversible.

Keywords: Lingual Nerve, mandibular third molar, peripheral nerve injuries

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INTRODUCTION

Injury to lingual nerve is a well-recognized complication of surgical removal of impacted mandibular third molars. The reported incidence of this complication ranges from 1%[1] to over 10%, i.e., 11%[2], 11.5%[3] 13%[4], and 23%[5]. In most cases, the nerve heals spontaneously but permanent damage has been described in approximately 0.5% of the patients.[2] Injury to lingual nerve raises serious therapeutic and legal issues. The exact mechanism of injury is still controversial but most common causes are perforation of lingual plate, reflection and retraction of lingual flap, trauma to lingual flap during bone removal and tooth sectioning. Supra-crestal incision may result in damage as nerve can be located in this region in certain cases and may get sectioned.[6]

Lingual nerve damage can result in drooling, tongue biting, burning sensation of tongue, burns on the tongue from hot food and drinks, change in speech pattern and change in taste perception of food and drink.[7]

The traditional approach to remove impacted mandibular third molar is buccal approach avoiding exposure or surgery on the lingual side of the crest of the ridge. Second technique is to expose the lingual tissues deliberately and retract the lingual nerve during tooth removal keeping the nerve out of surgical field. The advantage of lingual flap reflection is that nerve is identified and protected away from the surgical field. This has been a subject of debate since decades but still there is no technique which can assure protection of lingual nerve during third molar removal. A few comparative studies have been done before to solve this problem but no study was done in Pakistan so the basic purpose of our study was to compare the two techniques so that a safe technique can be used in future for removal of impacted mandibular third molars in regard to lingual nerve damage.

MATERIAL AND METHODS

In this randomized controlled trial (RCT), 380 patients were operated for third molar removal at department of Oral & Maxillofacial surgery of Punjab Dental Hospital, Lahore. Patients who were clinically and radiographically diagnosed as having impacted mandibular third molar were included in the study. Patients with medically compromised conditions which affect wound healing for example Diabetes Mellitus, anaemia, patients on steroid therapy and uncooperative patients who were not willing to come for follow up were excluded from the study.

Patients were randomly allocated to group A and B, each having 190 patients by blocked

randomization. Patients in Group A were treated by reflection and retraction of lingual flap in addition to buccal flap while in group B, procedure was performed by reflecting buccal flap only. The patients were informed about the procedure and surgical technique and risk benefit ratio was explained. Patients were warned about possibility of having altered sensation in the tongue as well as altered taste sensation. An informed consent was taken in writing. Study approval was taken from ethical committee of de'Montmorency College of Dentistry, Lahore. Patients were operated under local anaesthesia through regional block of inferior alveolar, lingual and buccal nerves.

The buccal flap was raised in all cases and Bowdler Henry retractor was placed. In group A, lingual flap was raised by means of Howarth's periosteal elevator. Once an adequate lingual flap was raised, the same was used to retract the flap.

Sensory disturbance was evaluated on 7th postoperative day. Lingual nerve function was assessed by light touch, pin prick, two point discrimination and taste. Lingual nerve was labelled injured if there was absence of any of the above mentioned sensations and results were recorded on a specially designed *pro forma*. All collected data was entered on SPSS-11 and analysed. Data on continuous variables (age of the patient) was presented as mean±SD and data on categorical variables (gender) was presented as percentage/proportion. Characteristics of the patients undergoing surgical removal of impacted third molars with and without lingual flap retraction were compared. Comparison was made with chi-square. *p*-value ≤0.05 was considered significant.

RESULTS

A total number of 380 patients with impacted mandibular third molars were included. The mean age was 25.58 years (SD±5.11) ranging from 18 years to 38 years. Mean age of males was 25.63 years (SD±4.77 years) while mean age of females was 25.54 years (SD±5.41 years). Majority of patients fall in age range of 23–27 years, i.e., 52.9%.

Among the 380 patients in total, there were 179 males, i.e., 47% and 201 females, i.e., 53% showing female gender to be predominant regarding impacted teeth. There were 83 males (44%) and 107 females (56%) in group A. In group B, there were 96 males (51%) and 94 females (49%).

Out of total 380, there were 358 patients, i.e., 94.2% who did not show any signs of lingual nerve damage including 170 (44.8%) males and 188 (49.8%) females. Twenty two patients, i.e., 5.8% showed damaged lingual nerve including 9 (2.37%) males and 13 (3.42%) females. The patients in group A, showed damaged lingual nerve in 17 (8.94%) patients who include 7 males and 10 females. The patients in group B, showed damaged lingual nerve in 5 (2.63%) patients who include 2 males and 3 females. There is no association between the gender and nerve damage as (x^2=0.0360, *p*=0.549)

Among total of 380 patients, 22 patients (5.79%) presented with lingual nerve damage while 358 (94.2%) had no signs of nerve damage. Among these 22 damaged nerves, 17 belongs to Group A, i.e., where lingual flap was retracted while 5 belong to group B, i.e., where only buccal flap was reflected. (Table-1) All patients showed signs of recovery within three to six months after injury while only one patient had permanent nerve injury. The patient with permanent nerve injury belongs to group B, where lingual flap was not retracted. There is significant association between the lingual flap technique and rate of nerve damage(x^2= 6.948, *p*=0.008) but nature of damage is reversible. Thus results show that the use of lingual flap has 3.4 times more chances of lingual nerve damage as compared to the use of buccal flap only. But it was also observed that the nature of injury is temporary in case of lingual flap retraction while permanent nerve damage occurred where lingual flap was not reflected.

Table-1: Status of Lingual Nerve after Surgery in two groups

Group	Damage	No Damage	Total
A	17	173	**190**
B	5	185	**190**
Total	**22**	**358**	**380**
x^2 = 6.948, *p*=0.008			

DISCUSSION

The variation in the incidence of lingual nerve damage after third molar removal reported in literature has generated much confusion over the true incidence of this postoperative complication and the measures that should be taken to prevent it. Loss of sensations after third molar removal is a disaster and there are serious medico-legal implications.

Different methods have been used for surgical removal of third molar in the last decade. One of these is retraction of lingual flap in addition to buccal flap. The concept of using this technique is to identify a structure thought to be damaged during surgery and deliberately retracted out of way for protection. Although the raising of lingual flap and placement of retractor can cause traction injury to the nerve which will resolve

within few weeks after procedure but it protects the nerve from irreversible damage from drills, instruments or lingual plate or tooth fracture.[15]

Pogrel MA and Goldman KE[8] removed mandibular third molars of 250 patients in Oral & Maxillofacial Surgery Clinic at the University of California, San Francisco. They reflected and retracted lingual flap with specially designed lingual retractor in all those patients in which distal bone removal or tooth sectioning was anticipated. The study showed transient lingual nerve paraesthesia in 1.6% of cases and 0% permanent lingual nerve damage. The results of our study show that the incidence of nerve damage is 8.94% when lingual flap was reflected and retracted by a periosteal elevator. So results are consistent with those who report higher chances of lingual nerve associated with reflection and retraction of the nerve but we have found this injury to be temporary.

D Gulicher and colleagues[9] performed 1106 procedures in 687 patients with lingual flap reflection and retraction by insertion of periosteal elevator. They agree that protection of the nerve is mandatory for third molar removal and a periosteal elevator should be placed at the rim of the retromolar trigone so that it does not come in contact with nerve itself and results in damage.

Conversely, studies of Gomes *et al*[10] in 2005, Gargallo-Albiol[11] *et al* in 2000 and Carmicheal & McGowan[12] in 1992, showed that a significant increase in incidence of lingual nerve damage was found when a lingual flap was retracted and reflected. In addition to these two techniques for removal of third molar, Rud[13] and Yeh[14] advocated the lingual split technique where lingual cortex is deliberately fractured to protect the lingual nerve. But this technique was reported to be associated with increased incidence of lingual nerve damage by Pichler *et al*.[15] In present study lingual plate was preserved in all cases.

Varieties of instruments were being used for retraction of lingual flap in different studies. Pogrel, *et al*[8] and Greenwood, *et al*[16] supported the use of broad retractors which can protect the whole length of lingual plate. Walters[17] designed a new lingual retractor and complimentary periosteal elevators by mid 1990s. The elevator formed was broad enough to protect the whole aspect of lingual nerve in third molar region, had no sharp edges on it and had a notch that fits into the internal oblique ridge of the mandible which prevents it from slipping deep into the mylohyoid nerve. In present study Howarth's periosteal elevator was used for separation and retraction of lingual flap. The percentage of injuries was higher among the group where lingual flap was reflected and retracted (8.94%) compared to the group where Buccal flap retraction was performed only (2.63%). This difference was statistically significant. (p=0.008). But the nature of injury was reversible in cases of lingual flap retraction.

All patients with damaged lingual nerve were followed up for one year postoperatively and 21 out of total 22 damaged nerves showed spontaneous recovery within three to six months while only one case belonging to Group A (where lingual flap was not reflected) still had deficient sensations.

CONCLUSION

This study concludes that there is higher incidence of lingual nerve injury when lingual flap is retracted but the nature of injury is temporary while there are more chances of permanent injury when lingual flap is not reflected and retracted away from the surgical field.

AUTHOR'S CONTRIBUTION

SS, SMHS: collected data and compiled results. A: helped in write up of the manuscript. MMA: did the literature review.

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