

COMPARISON OF LINGUAL NERVE INJURY DURING SURGICAL EXTRACTION OF IMPACTED MANDIBULAR THIRD MOLAR WITH AND WITHOUT LINGUAL FLAP RETRACTION

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ABSTRACT

Surgical removal of impacted third molar is the most common surgical procedure performed by Oral & Maxillofacial surgeons. Impacted mandibular third molars are associated with various problems among which lingual nerve damage is one of the common complications of third molar removal. Study was conducted on 160 patients at Lahore Medical and Dental College, Lahore in the year of 2013-2014 based on questionnaires developed by a team of senior faculty members.

The incidence of lingual nerve injury in study group, where both lingual and buccal flap were raised, was 12.5% whereas in control group, where only buccal flap was raised, the incidence of lingual nerve injury was 6.25%.

Key Words: *Impacted mandibular third molar, lingual nerve injury.*

INTRODUCTION

Surgical removal of impacted third molar is the most common surgical procedure performed by Oral & Maxillofacial surgeons.¹ An impacted tooth is one which fails to erupt into the dental arch within expected time due to lack of space in the dental arch, dense overlying bone, excessive soft tissues, genetic abnormalities and different pathologies related to the erupting tooth.² Impacted mandibular third molars are associated with various problems including pericoronitis, dental caries, periapical infection and root resorption of adjacent tooth. They can also give rise to different pathological lesions necessitating the removal of the impacted tooth.³

Many complications are associated with removal of impacted third molar for example pain, hemorrhage, dry socket, injury to regional nerves and fracture of mandible.⁴ Lingual nerve damage is one of the common complications of third molar removal.⁵ Age of the patient, angulation and depth of impacted tooth, presence of overlying ramus bone, skill

of surgeon and surgical approach used are certain factors which increase the chances of lingual nerve injury during removal of third molars.⁶ In literature, the reported incidence of temporary lingual nerve deficit after third molar surgery widely ranges from 0% to 23% and reported incidence of permanent lingual nerve sensory disturbance varies between 0% and 8%.⁷ The exact mechanism of lingual nerve damage during third molar surgery is controversial and among the most cited causes are: damage by injection needle, usage of lingual flap retractor, usage of chisel by lingual approach associated with lingual plate fracture and supra crestal incision because the nerve can be located in this region in some cases and may be sectioned.⁶ The symptoms vary from difficulties in speech, swallowing, ability to maintain food and liquid competence and alteration of taste.⁸ There has been much discussion about how to prevent lingual nerve injury during third molar surgery. Lingual flap retraction improves access to the surgical site and can simplify the third molar removal. In the study of Cheung et al, the frequency of lingual nerve damage during surgical removal of impacted mandibular third molar with lingual flap retraction was found to be 0.91% whereas without lingual flap retraction was 0.58 % with a sample size of 4338 cases. There was no significant difference (P=0.58) between both groups.⁹ In a local study, the frequency of lingual nerve injury during surgical extraction of impacted mandibular third molar with lingual flap retraction was found to be

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10% whereas without lingual flap retraction was 1% with a sample size of 300 cases.¹⁰ Previous local literature did not address confounding variable like depth of impacted tooth.¹⁰ This factor can affect the incidence of lingual nerve injury.^{1,12}

As stated above there is controversy in data regarding lingual nerve injury in with and without lingual flap retraction during surgical extraction of impacted mandibular third molar. Through this study we want to confirm that whether lingual flap retraction is beneficial or not regarding lingual nerve injury. So rationale of the study is to evaluate that which surgical technique is better and associated with minimum frequency of lingual nerve injury in our population. This surgical technique may be implemented to improve surgical management of impacted mandibular third molar.

METHODOLOGY

The present study was conducted on 160 patients at Lahore Medical and Dental College, Lahore in 2013. It was a quantitative research based on questionnaires developed with the help and guidance of senior faculty members.

The calculated sample size is 160 cases; 80 cases in each group, with 95% confidence level, 80% power of study taking expected percentage of lingual nerve injury i.e. 10% in group with lingual flap retraction and 1% in group without lingual flap retraction.¹⁰

Patients were included in study of age 18-40 years of both genders with impacted mandibular third molars that require surgical extraction, up to the bony depth of 5mm assessed by using red line of winter's classification. Preoperatively normal clinical neurosensory testing done in lingual nerve region.

RESULTS

In this study 160 patients with impacted mandibular third molars were recruited as per inclusion criteria. The mean age was 29 ± 5.34 . Standard deviation ranges from 18 years to 40 years. 82 male and 78 female patients were included in this study. The incidence of lingual nerve injury in study group, where both lingual and buccal flap were raised) is 12.5% whereas in control group (only buccal flap raised) the incidence of lingual nerve injury is 6.25%. In control group only 2 males and 3 females got lingual nerve damaged whereas in study group 5 males and 5 females got lingual nerve damaged.

TABLE 1: GENDER WISE INCIDENCE OF NERVE INJURY

Sex	Total	Damage	No damage	Percentage
Male	82	7	75	8.5%
Female	78	8	70	10%

TABLE 2: AGE WISE DISTRIBUTION OF PATIENTS MEAN AGE 29 ± 5.34 (STD. DEVIATION)

Age	No. of patients	Percentage (%)
19	1	0.6
20	3	1.8
21	6	3.6
22	7	4.2
23	5	3
24	9	5.4
25	11	6.6
26	11	6.6
27	12	7.2
28	8	4.8
29	17	10.2
30	6	3.6
31	11	6.6
32	7	4.2
33	9	5.4
34	4	2.4
35	6	3.6
36	4	2.4
37	6	3.6
38	9	5.4
39	4	2.4
40	4	2.4
Total	160	100

TABLE 3: DISTRIBUTION OF PATIENTS ACCORDING TO GENDER AND FLAP TECHNIQUE USED

	Female	Male	Total
Group A (Buccal + Lingual flap)	40	40	80
Group B (Buccal flap only)	38	42	80
Total	78	82	160

DISCUSSION

Sensory impairment of lingual nerve is one of the important clinical problems in oral and maxillofacial surgery and has serious medical and legal implications. In fact, damage to the lingual nerve is a common cause of litigation in dentistry.⁷ This study was conducted in Oral and Maxillofacial surgery department, Lahore Medical and Dental College where 160 patients were taken consisting of 80 patients in study group where

TABLE 4: LINGUAL NERVE STATUS (DAMAGE OR NOT DAMAGE) DISTRIBUTION ACCORDING TO FLAP TECHNIQUE USED

	Dam- age	No damage	Total	Dam- age %
Study group (Buccal+ Lin- gual flap)	10	70	80	12.5
Control group (Buccal flap only)	5	75	80	6.25
Total	15	145	160	

TABLE 5: LINGUAL NERVE STATUS (DAMAGE OR NOT DAMAGE), DISTRIBUTION ACCORDING TO GENDER AND FLAP TECHNIQUE USED

	Flap Technique				
	Group	Yes injury	No in- jury	Total	
Lin- gual nerve status	Male	Con- trol	2	45	47
		Study	5	30	35
		Total	7	75	82
	Fe- male	Con- trol	3	30	33
		Study	5	40	45
		Total	8	70	78

both buccal and lingual flaps were raised whereas 80 patients were taken in control group where only buccal flap was raised for extraction of impacted mandibular third molar. The results show that 10 (12.6%) patients presented with signs of damaged lingual nerve when both lingual and buccal flap is reflected while 05 (6.25%) patients showed damage when only buccal flap was reflected.

Gomes et al¹¹ in 2005 compared the lingual nerve damage with and without lingual flap retraction. Results of his study showed Sensory impairment of lingual nerve in 9.1% cases who were treated by lingual flap retraction while no Sensory impairment of lingual nerve was observed in those treated by buccal flap only. Thus frequency of lingual nerve injury in their study proved to be 9.1% in group where lingual flap was retracted. These results are in close proximity to our result because in both studies lingual flap retractor was used which may be a reason for high frequency of lingual nerve damage.

In consistency with our results Valmaseda-Castellón et al^{13,1} carried out a study to assess the risk of

lingual nerve injury after surgical removal of impacted lower third molars. Results of their study concluded that retraction of the lingual flap increases the risk of lingual nerve damage. Sectioning of tooth is a common factor in both studies which may significantly increase the risk of lingual nerve damage.

Similarly Pichler and Beirne¹⁴ concluded in their study that the lingual flap retraction during impacted lower third molar surgery could induce a higher risk of temporary lingual nerve damage than when a lingual flap retraction was not done 6.4%. The results of our study were 6.25% similar because the use of lingual nerve retractor significantly increased the risk of lingual nerve damage.

However in contrast to our study Cheung et al¹⁹ in their study raised buccal flap only in 2911 cases of impacted mandibular third molar extractions and lingual nerve deficit was reported in 0.58% cases whereas 0.91% deficit was reported when lingual flap was raised in surgical extraction of 1427 cases of impacted mandibular third molar. There was no significant difference in both groups. Trauma to the lingual flap during retraction, may be a factor responsible for lingual nerve damage in our study.

Similarly Chossegross and colleagues¹⁵ did 300 lower third molar extractions. Half of the procedures in one group were done with buccal flap reflection only and in other group half of the procedures were done where lingual flap was also reflected. Their result showed that incidence of lingual nerve damage was 0% with or without lingual flap retraction which is in contrast to our study 6.5% sensory impairment of lingual nerve reported in the control group which may be due to retromolar incision not ideally placed over lateral aspect of anterior border of mandibular ramus because the lingual nerve may be anatomically located closer to the lingual cortical plate.

Incidence of lingual nerve injury can be reduced through surgeon's experience, use of proper instrument, their handling especially drilling instruments as burr and hand piece at lingual plate of impacted lower third molar. Lingual nerve paresthesia can be caused by reflecting of lingual flap and lingual plate fracture during the surgical procedure. Positioning a periosteal elevator can avoid direct trauma with instruments to lingual nerve. The width and breadth of the retractor can affect the outcome of lingual nerve protection.¹⁶

Limitation of our study is unable to control a variable of angulation of impacted tooth which represents level of difficulty index of impacted mandibular third molar. We further recommend that a study should be conducted keeping in view the angulations of tooth as inclusion criteria.

CONCLUSION

Surgical extraction of impacted mandibular third molar can be done by reflecting buccal flap alone or along with lingual flap. Lingual flap retraction have advantage to improve access to the surgical site and can simplify the third molar removal. Lingual flap may increase the risk of lingual nerve injury as compared to reflection of buccal flap alone. According to our study, 10 (12.6%) of our patients who were treated by reflecting of lingual and buccal flap during surgical extraction of impacted mandibular third molar have sensory disturbance of lingual nerve, where as the 05 (6.5%) patients in which only buccal flap was raised have sensory disturbance of lingual nerve.

Reflection of lingual flap may predispose lingual nerve to injury, affecting the quality of life and may be subject of litigation and malpractice suits. Results of this study helps to evaluate that buccal flap reflection is better surgical technique and associated with minimum frequency of lingual nerve injury in our population. It further helps to establish our management guidelines regarding surgical extraction of impacted mandibular third molar.

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CONTRIBUTIONS BY AUTHORS

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| 1 Muhammad Ashfaq: | Developed the questionnaire, compiled data, documented and reviewed the article. |
| 2 Muhamad Saad Mateen Munshi: | Data collection and reviewed the article. |
| 3 Bilal Yousaf: | Performed surgeries and provided rough data. |