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ORIGINAL RESEARCH

Evaluation of Incidence of lingual nerve paraesthesia following mandibular third molar surgery

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ABSTRACT:

Introduction: The surgical removal of impacted mandibular third molar is associated with minor but expected complications like pain, swelling, bruising and trismus. The lingual nerve damage sometimes occurs after the removal of mandibular third molar producing impaired sensation or permanent sensory loss. Hence: the present study was undertaken for determining the clinical incidence of lingual nerve injury following mandibular third molar removal and to analyze possible factors for the lingual nerve injury. **Material and methods:** A total of 200 patients who underwent extraction of mandibular third molar through surgical procedure were included. Complete demographic and clinical details were obtained. Incidence of lingual nerve paraesthesia was recorded. All the results were recorded and analysed by SPSS software. **Results:** A total of 200 patients were assessed. Out of these two patients reported Lingual nerve paraesthesia that was temporary and one patient reported permanent lingual nerve paraesthesia. There was no patient reporting with temporary and permanent inferior alveolar nerve paraesthesia. **Conclusion:** It was concluded that the factors leading to temporary or permanent paraesthesia is actually difficulty of extraction. Other parameters like operator's seniority, age and medical condition of the patient, gender, level of impaction, type of flap and the tooth side in relation to the handedness of the operator had minimal effect on the outcome.

Key words: Lingual nerve injury, Sensory impairment, Third molar extraction

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INTRODUCTION

The removal of impacted symptomatic third molars is the most common surgical procedure in dentistry and is one of the most common day case and in-patient surgical procedures in the National Health System¹. The reasons for extraction of these teeth are; pain, infection, acute or chronic pericoronitis, presence of cysts or tumor, unrestorable caries/fracture, pulpal involvement and periodontal problems which require extensive treatment.²⁻⁵ Most of the times, these problems are associated with mandibular third molars making their extraction mandatory. Often third molar

surgery is accompanied by pain, swelling, trismus and general oral discomfort which require reassurance to the patient. The common complications are alveolitis, infection, hemorrhage and nerve injury, and most of these are temporary.^{3, 6} Among the most serious and often discussed postoperative complications that arise from third molar surgery is trigeminal nerve injury, specifically, involvement of either the inferior alveolar or lingual nerve.^{3,7-9} Lingual nerve being main sensory nerve of tongue and tongue coordinating speech, mastication, swallowing, taste sensation, any disturbance in lingual sensation can affect patient

functionally as well as psychologically. The reported incidence of sensory disturbance to lingual nerve during third molar removal is 0.2–23 %^{8, 10, 11}. Most often sensory disturbances due to nerve injury undergo spontaneous regeneration and sensory recovery. Some injuries may lead to incomplete and altered nerve regeneration resulting in permanent or temporary paraesthesia, hypoaesthesia and sometimes dysaesthesia causing mastication and speech disturbances affecting quality of patient's life. Factors influencing these complications include age, health and habits of the patient, degree of impaction, the surgeon's experience, time taken for the procedure and the surgical technique used.^{2,6,9} Hence this prospective clinical study was undertaken to evaluate the incidence and various risk factors influencing the sensory deficit in case of lingual nerve injury (LNI) in individuals who have undergone surgical extraction of impacted mandibular third molars under local anesthesia.

MATERIALS AND METHODS

This study was conducted for evaluating the incidence and various risk factors influencing the sensory deficit in case of lingual nerve injury (LNI) in individuals who have undergone surgical extraction of impacted mandibular third molars under local anesthesia. An informed verbal and written consent of the patient was obtained after explaining the nature of the procedure and the potential complications involved, particularly the risk of temporary or permanent paraesthesia postoperatively. Data was kept confidential as no name of the patient was used. Guidelines given by National Institute of Clinical Excellence regarding the indications of third molar extractions were followed¹² Hence, the inclusion criteria of this study was healthy patients with non-restorable mandibular 3rd molar, history of pain, tenderness to percussion, periapical pathology radiographically and willing to continue their treatment. Exclusion criteria were patients younger than 18 years old, presence of any systemic disorders that prevented administration of lignocaine as the anesthetic agent, teeth which can be restored. A

sample size of 200 patients were selected randomly, amongst the patients, who reported to our department from January 2020 to may 2020 for the surgical removal of impacted mandibular third molar.

After clinical and radiographic examination 200 patients that fulfilled the inclusion criteria were selected. A total of 200 mandibular extractions were performed with the age range from 15-80. 100 patients were males and 100 were females. The predictor variables for the study were age, gender, level of impaction (soft tissue, partial bony or total bony), type of buccal flap raised (in surgical extractions), lingual flap retraction and protection, surgeon's experience and the tooth side (right or left) in relation to the handedness of the operator (R/L). The outcome variable was the presence of postoperative lingual neurosensory deficit and inferior alveolar nerve deficit. After periapical radiograph and determining the level of difficulty according to Pel and Gregory classification, teeth were extracted surgically and nonsurgically using local tissue infiltration and inferior alveolar nerve block (2% lignocaine with 1: 100,000 adrenaline). Technique used for both type of extractions was standard.¹³ Sensory disturbance was evaluated on 1st and 7th postoperative day and any complaint concerning sensory disturbance of the lingual gingiva and mucosa of the floor of the mouth and tongue was recorded. Assessment of postoperative deficit was carried out by standard questioning, for example: "Do you have normal feeling in your tongue" and pin prick test was used to confirm nerve injury. Patient with any complaint concerning sensory disturbance on postoperative evaluation were advised for regular follow up at the interval of one month and observed up to 6 months. Patients who reported paraesthesia were kept under follow-up weekly and any improvement was noted. Paraesthesia was deemed permanent if it stayed beyond eighteen months with no signs of improvement.^{14,15} The information recorded was analyzed statistically by applying chi-squared test. Null hypothesis made to each factor was either rejected or accepted depending on the "P" value, i.e., whether it was greater or less than 0.05.

RESULTS

On the first post-operative visit, LN paraesthesia was diagnosed in 2 of the 21 surgical extractions (9.52%) and 1 of 179 non-surgical extractions (0.55%). There was no inferior alveolar paresthesia reported. (Table I)

Level Of Difficulty	No. Of Patients	Altered Lingual Sensations	Percentage
Surgical	21	02	9.52%
Non-surgical	179	01	0.55%
Type of buccal flap raised in surgical cases	No. Of cases	Altered lingual sensations	Percentage
3RD molar flap	15	02	13.33%
Triangular flap	06	00	0.0%
Lingual Flap Raised			
Yes	08	02	25%
No	13	01	7.69%

Age group	No. Of patients	Altered lingual sensations	Percentage
15-20	09	00	00%
21-30	64	01	1.56%
31-40	61	01	1.63%
41-50	33	01	3.03%
51-60	21	00	00%
61-70	08	00	00%
71-80	04	00	00%

When gender as considered no significant difference could be found between male and female regarding the incidence of lingual nerve damage as shown in Table III.

Gender	No. Of patients	Altered lingual sensation	Percentage
Male	100	02	2
Female	100	03	3

When overall difficulty of extraction is assessed it is seen that in 179 cases, no flap was raised, no cutting instruments used and no sutures placed and there was only 2 temporary lingual nerve damage. Also there are 19 cases where only buccal flap was raised (or distal relieving incision given) with no lingual flap raised had lingual nerve damage in two cases and both cases had 3rd molar buccal flap design. This reflects that difficulty of extraction is also the most important factor in producing lingual nerve impairment. In these cases the lingual nerve was protected with Howarth's Retractor in 13 cases and lingual flap wasn't raised in 8 cases. Out of the 3 cases, 2 cases were of temporary paresthesia and were fully restored within 2 weeks without postoperative therapy. Only one case was of permanent lingual nerve paresthesia and was followed-up for eighteen months. There was no intervention made in order to assist healing during these eighteen months.(Table I) Patients were 25 times more likely to sustain transient neurosensory damage to the LN when lingual tissues were retracted and lingual nerve was protected, out of 21 patients in whom lingual retraction was performed, 2 (25%) developed lingual paraesthesia, whereas only 1 (7.69%) of the 179 patients who had no retraction developed paraesthesia. (Table I)

In the present study, the incidence of lingual nerve damage could not be related to age as shown in table II.

DISCUSSION

The surgical removal of impacted mandibular third molars is one of the most commonly performed dentalveolar procedures in oral and maxillofacial surgery. Invariably, the surgeon may face various complications associated with the surgical removal of impacted mandibular 3rd molars, among which major postoperative complication is neurosensory deficit. It may affect either the inferior alveolar nerve or more commonly the lingual nerve that leads to numbness of the ipsilateral anterior two-thirds of the tongue and taste disturbance¹⁶.

In the present study lingual nerve injury was 9.52 % in surgical extraction cases, with the incidence of temporary paresthesia of 0.8% and permanent paresthesia of 0.4%. This figure was close to the study conducted by Lata (2011) in which he reported 6.6% of lingual nerve paresthesia¹⁷. Incidence of inferior alveolar nerve paresthesia was reported as 0.0% in the present study. Rood (1983) reported an initial incidence of 6.6% lingual nerve injury, Blackburn and Bramley 11% and VonArx and Simpson (1997) reported 22%.¹⁸ Another study reported 5% cases of lingual nerve injury that was not permanent and all the patients with lingual nerve damage had recovered within three months.¹⁹

The study of Anwar Bataineh showed postoperative lingual nerve paresthesia that occurred in 2.6% patients. There was a highly significant increase in the incidence associated with raising of a lingual flap. The incidence of inferior alveolar nerve paresthesia was 3.9%. The results of this study concluded that the elevation of lingual flaps and the experience of the operator rare significant factors contributing to lingual and inferior alveolar nerve paresthesia, respectively.²⁰ In a landmark article by Howe and Poyton²¹ in 1960, it was determined after evaluating 1,355 impacted mandibular molars clinically at the time of extraction and radiographically that a true relationship existed in approximately 7.5 percent. A "true relationship" was defined as the visualization of the neurovascular bundle at the time of tooth removal. An "apparent" relationship was defined by radiographs as a circumstance in which the roots of the teeth appeared to be in an intimate relationship to the IAN. This occurred in 61.7 percent of the teeth.

In the present study, elevation of lingual flap and protection of the nerve with an appropriate retractor is an important part of the surgery. However, we have to keep in notice that lingual flaps are raised in more complex cases thus; there is an increase risk of temporary or permanent paresthesia. Lingual flaps when can be avoided shall be and when raised then appropriate protection shall be given to the nerve. As

far as lingual flap elevation is concerned, a detailed study is required to find out a better technique for its elevation. This study demonstrates that operative factors are the strongest predictors of temporary LN damage. However, the careful use of lingual retraction in selected cases could be responsible for protection against permanent nerve damage. The present study suggests that no single factor can be attributed as a cause of lingual nerve damage, except for the complexity of extraction (e.g., lingual flap elevation or retraction). No relation could be found to age, sex and sides operated.

CONCLUSION

Our study also concludes that the risk of lingual nerve paraesthesia is higher than inferior alveolar nerve paraesthesia post operatively after third molar extractions

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