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TO DETERMINE THE INCIDENCE OF LINGUAL NERVE INJURY DURING THIRD MANDIBULAR MOLAR EXTRACTION UNDER LOCAL ANAESTHESIA

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Abstract:

Objective: *To determine the incidence of lingual nerve injury during third molar surgery and to correlate various factors associated with lingual nerve paraesthesia.*

Study design: *A cross-sectional study.*

Place and Duration: In the Oral and Maxillofacial department of Liaquat University Hospital Jamshoro Hyderabad for two years duration from June 2017 to June 2019.

Methods: *A prospective audit was performed and documented the frequency of paraesthesia as patients were treated by different consultants, specialist registrars, and post graduate residents.*

Results: *A total of 250 patients were evaluated. From these, two patients reported transient lingual nerve paraesthesia and one patient stated enduring lingual nerve paraesthesia. There were no reports of patients with transient and inferior alveolar nerve permanent paraesthesia.*

Conclusion: *It was concluded that the factors causing temporary or permanent paraesthesia are in fact difficult to extract. Other parameters such as operator age and medical condition of the patient, gender, level of effect, flap type, and the side of the tooth associated with the hand of the operator had a minimal effect on the outcome.*

Key words: *lingual nerve injury, sensory impairment, third molar extraction, inferior alveolar nerve injury.*

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INTRODUCTION:

Third molar surgery is one of the supreme usual procedures performed by oral surgeons / mouth and plastic surgeons [1-3]. There is a documented complication of inferior alveolar nerve and lingual nerve damage, paraesthesia of the lower lip, chin and tongue [4-5]. In oral and maxillofacial surgery; third mandibular molars removal is the most common procedures. Despite the improvement in preoperative evaluation of impacted lower grooved teeth and extraction techniques; the lower lingual nerve and alveolar nerve damage remains an important factor in third molar surgery with serious medical and legal effects [6-7]. In previous studies, the lingual nerve (LN) damage prevalence ranged from 0% to 23%. This lesion may include transient or permanent lingual sensory disorders. The incidence of transient deficiency is between 0-23% and permanent 0-8% compared to transient (0.4 to 8.4%) and permanent (<1%) lesions of the inferior alveolar nerve [8]. The causes of postoperative paraesthesia of the lip, chin and tongue after mandibular molar extraction vary between inadequate protection and inadequate assessment and operator's age [9]. This study was conducted to determine the incidence of lingual nerve injury and to correlate various factors associated with lingual nerve paraesthesia during surgery.

MATERIALS AND METHODS:

This cross-sectional study was held in the Oral and Maxillofacial department of Liaquat University Hospital Jamshoro Hyderabad for two years duration from June 2017 to June 2019. Approval for the proposed study from ethical committee was taken. After explaining the nature of the procedure and its possible complications, especially the temporary or permanent risk like postoperative paraesthesia, informed verbal and written informed consent was obtained from the patient. The data was kept confidential because the patient's name was not used. The instructions given by the National Institute of Clinical Excellence for Third Clinical Extraction Indications were followed. Therefore, the inclusion criteria for this study were unresolved third mandibular molars, history of pain, percussion sensitivity, radiographic periapical pathology, and healthy patients willing to continue treatment. Exclusion criteria were patients under 18 years of age, presence of systemic disorders that prevent administration of lignocaine as an anesthetic agent, restorable teeth. The WHO formula calculated a sample size of 250 patients. After clinical and radiographic examination, 250 patients who met the inclusion criteria and were randomly assigned with random assignment software (version 1.0, May 2004) were divided into 3 groups according to different levels of operators, i.e. consultants, apprentices. A total of 250 mandibular extractions, aged 15-80 years, were performed, 125 patients were male and 125 women. Prediction variables for the study were age, sex, effect level (soft tissue, partial bone or total bony), raised buccal flap type (in surgical extractions), retraction and preservation of lingual flap, surgeon's experience (experts, residents) according to the operator's hand (R / L). The outcome variable was post-operative lingual sensorineural deficit and inferior alveolar nerve deficit. After determining the difficulty level according to Pel and Gregory classification and Periapical radiography, the teeth were extracted surgically and non-operatively using local tissue infiltration and blockage of the inferior alveolar nerve (2% lignocaine with 1: 100,000 adrenaline). The technique used for both extraction types was standard. After extraction, each patient was instructed to care. Most patients received ibuprofen and / or codeine as an analgesic and adjusted the dose according to the usual guidelines. The patients were contacted by telephone 48 hours after the operation and verbal questions were asked about their postoperative conditions. They were followed up one week later and were asked about any changes in sensations of the lower lip, chin, and tongue. Patients with paraesthesia were followed up weekly and improvement was observed. If paraesthesia remained beyond eighteen months, it was considered permanent without any signs of recovery. The recorded data were analyzed statistically using chi-square test. The null hypothesis for each factor was rejected or accepted based on the "P" value, i.e., greater than or less than 0.05.

RESULTS:

At the first postoperative visit, LN paraesthesia was diagnosed in 2 (6.5%) of 31 surgical extractions and in 1 (0.5%) of 219 non-surgical extractions. Lower alveolar paraesthesia was not reported (Table I).

Table I: Incidence of lingual nerve injury related to surgical procedures			
Level Of Difficulty	**No. Of Patients**	**Altered Lingual Sensations**	**Percentage**
Surgical	31	02	6.5%
Non-surgical	219	01	0.5%
Type of buccal flap raised in surgical cases	**No. Of cases**	**Altered lingual sensations**	**Percentage**
3RD molar flap	22	02	9.1%
Triangular flap	09	00	0.0%
Lingual Flap Raised			
Yes	06	02	33%
No	25	01	4.0%

When assessing the overall difficulty of extraction, it was seen that in 219 cases, the flap was not raised, no cutting tools were used, and no sutures were applied and only 1 transient nerve injury. In addition, there were 19 cases performed with only buccal flap was raised (or a distal relaxation incision), two cases had damage to the lingual nerve, and both had a third molar buccal flap design. This suggests that the difficulty in extraction is also the most important factor in the production of lingual nerve injury. In these cases, the lingual nerve was protected by Howarth retractor in 25 cases and the lingual flap was not removed in 6 cases. Two of the three cases had transient paraesthesia and recovered completely within 2 weeks postoperatively. Only one case had permanent paraesthesia of the lingual nerve and was followed for 18 months. During these eighteen months, no intervention has been performed to aid recovery. (Table I) Patients were more likely to be exposed to transient neurosensory damage to lingual paraesthesia in 2 (33%) of 31 patients who underwent lingual retraction when the lingual tissues were withdrawn and the lingual nerve was preserved, paraesthesia developed in only one (4.0%) of 219 patients without retraction. In this study, the total incidence of nerve damage was not associated with age as shown in Table II.

Table II: Incidence of lingual nerve injury related to age			
Age group	**No. Of patients**	**Altered lingual sensations**	**Percentage**
15-20	09	00	0.0%
21-30	84	01	1.2%
31-40	81	01	1.2%
41-50	42	01	2.4%
51-60	22	00	0.0%
61-70	09	00	0.0%
71-80	03	00	0.0%

As for gender, no significant difference was found between men and women in the incidence of tongue nerve injury, as shown in Table III.

Table III: Incidence of lingual nerve injury related to gender			
Gender	**No. Of patients**	**Altered lingual sensation**	**Percentage**
Male	125	01	0.8%
Female	125	02	1.6%

The effect of operator experience on the appearance of lingual nerve injury is also negligible. No patient had pre-selection and no operator could escape this complication. (Table IV). The rate of transient or permanent paraesthesia of the inferior alveolar nerve was reported to be zero.

Table IV: Incidence of lingual nerve injury related to operator's seniority

Operator's seniority	No. Of cases	Altered lingual sensations	Percentage
consultants	02	00	0.0%
Postgraduate trainees	60	03	5.0%
House officers and students supervised by consultants	188	00	0.0%

DISCUSSION:

In this study, if the lesion of the lingual nerve injury was found to be 6.5%, frequency of transient paraesthesia 0.8%, and permanent paraesthesia rate 0.4%. This figure was close to the study by Lata (2011), which reported 6.6% of lingual nerve paraesthesia [10]. In this study, the incidence of paraesthesia of the inferior alveolar nerve was reported as 0.0%. Rood (1983) reported 6.6% of lingual nerve injury, 6% of Blackburn and Bramley, and 22% of Vonrx and Simpson (1997). In another study, 5% of cases of non-permanent lingual nerve injury were reported, and all patients with lingual nerve injury recovered within three months [11]. Oral questions were asked to determine the damage of the lingual nerve. In 1992, FA Carmichale extracted the third molar in 1339 and detected sensory changes by direct interrogation on 6 to 24 hours and 7 to 10 days, and the frequency of nerve damage by mail survey at 12 to 18 months [12]. For 40 years, Bruce 1980 suggested that the incidence of lingual nerve injury increased with age. However, the incidence in this study was the same in different age groups. The lower the operator experience, the greater the likelihood of lingual nerve damage due to a difficult surgical procedure [13]. Damage to the lingual nerve may occur due to a third lower molar that is completely affected by the bone, with longer retraction of the flap longer. Similarly, a large bone segment can cause nerve damage. In some studies, no statistical difference was found between different operators and the frequency of modified lingual sensation. The frequency of lingual nerve injury was lower when operated by professors and associate professors (3.6%) [14]. This study also showed that the damage to the lingual nerve was greater when used by graduate trainees compared to consultants. A case of permanent paraesthesia of the lingual nerve was also operated by graduate trainees. When the lingual flap was elevated, the incidence of lingual nerve injury was 33% (Table 2) and 4% when only the buccal flap was removed. The result was very important and consistent with the results of other studies. Lingual nerve paraesthesia was transient when the lingual flap was lifted and did not raise the lingual flap in the case of permanent paraesthesia. Lifting the buccal flap and protecting the nerve with an appropriate retractor is an important part of the surgery [15]. However, we must consider that lingual flap increase in more complex situations, so the risk of temporary or permanent paraesthesia increases. Lingual flaps should be avoided and, when raised, the nerve should be adequately protected. A detailed study of the raising of the lingual flap is necessary to find a better technique for raising it. This study shows that operational factors are the strongest predictors of transient LN damage. However, careful use of lingual retraction in selected cases may be responsible for protection against permanent damage. This study suggests that a single factor cannot cause lingual nerve damage, except for the complexity of extraction (for example, elevation or retraction of the lingual flap). No relationship was found between age, sex and operated sides.

CONCLUSION:

Our study also concluded that the risk of lingual nerve paraesthesia was higher than postoperative inferior alveolar nerve paraesthesia after the third molar extraction.

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