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SENSORY IMPAIRMENT OF INFERIOR ALVEOLAR, MYLOHYOID NERVES AND LINGUAL NERVE AFTER MANDIBULAR THIRD MOLAR REMOVAL SURGERY

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Abstract:
Objective: *The aim of this study was to investigate the sensory deterioration rate of the lingual, inferior alveolar and mylohyoid nerves after removal of the inferior third molar and to compare the results with other studies. The protocol, if specified, and routine post-operative follow-up to estimate the need and cost effects.*
Study Design: *A prospective study.*
Place and Duration: *In the Department of Oral Surgery, Nishtar Institute of Dentistry Multan for two years duration from March 2017 to March 2019.*
Methods: *A total of 5856 third mandibular molars were removed; 585 of them were operated under general anaesthesia and 690 underwent local anaesthesia with or without sedation.*
Results: *Of the 1275 patients, 58 (4.57%) had a transient sensory disorder affecting only one or a combination of these nerves. Only 15 patients (1.18%) had anaesthetic impairment and the remaining 43 patients (3.42%) were paraesthetic in nature. All of these were completely resolved during the study, with the exception of one patient experiencing permanent impairment of lingual nerve function and the patient in the general anaesthesia group.*
Conclusion: *Permanent sensory impairment was not recorded for inferior alveolar and mylohyoid nerves. Surgical criteria and the rationale for treatment are discussed with appropriate information form and follow-up need for the patient.*
Key Words: *Lingual nerve, Lower alveolar nerve, Mylohyoid nerve, Third molars, Paresthesia, Sensory disorder.*

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INTRODUCTION:

Surgical removal of the third molar teeth is the most common surgical procedure performed in most oral and maxillofacial units[1]. Mandibular third molars are the most commonly affected teeth. 91.9% of the extractions are performed without serious complications. Lesion of the lingual, inferior alveolar and sensory branches of myeloid nerves resulting from surgical removal of mandibular third molars is a rare but unpleasant complication[2-3]. The aim is to reduce nerve injuries with a careful surgical technique. Damage to these nerves is a common cause of complications and is increasing[4]. The lingual nerve carries the sensory and sweetening sensations of the anterior two-thirds of the tongue, the adjacent base of the mouth and the lingual gingiva. Studies by Pogrel et al and McGeachie on human cadavers have shown that the lingual nerve is at an average distance of 27.7 mm on the inner surface of the jaw and that only the periosteum is separated from the bone[5]. 15% of the bodies may be on top or above the lingual plate of the jaw[6]. They also found the opposite variability in the position of the lingual nerve in the same body. Kiesselbach and Chamberlain also found that in 17.6% of human cadavers, the lingual nerve was on or above the alveolar ridge and, in some cases, retromolar tissues[7]. These anatomical variations and the close approach of the lingual nerve to the third molar ensure that the mandibular third molar is at risk during surgery[8]. The incidence of nerve complications increases with age and surgical difficulty. Osborn et al; The general sensory impairment observed was 6.5 times higher for patients older than 24 years than for those younger than 24 years. Martis et al; In the presence of acute infection, they found surgically 0.1% and 0.3%, respectively, in the presence of acute infection, 3% of the lingual nerves, and 2% of the paresthesia of the inferior alveolar nerve, respectively. Howarth elevator is probably the cause of this injury[9-10].

MATERIALS AND METHODS:

This prospective study was held in the Department of Oral Surgery, Nishtar Institute of Dentistry Multan for two years duration from March 2017 to March 2019.

A total of 1351 patients participated in the study and 76 patients were excluded because their medical history was compromised. Of the 1275 patients, 512 (40%) were male, 763 (60%) were between the ages of 16-40 and the mean age was 23 years. A total of 2456 lower third molars were removed.

Patients were evaluated clinically and surgery was recommended to remove only symptomatic molar teeth. The degree of difficulty was evaluated by surgical difficulty by evaluating the patient's clinical assessment for surgical access and cooperation and the position of the tooth on the orthopantomogram. According to perceived difficulty, the two groups were divided into local and general anaesthesia.

585 patients (46%) under general anaesthesia, 690 patients (54%) received local anaesthesia.

The distal incision was made along the outward-oblique ridge to the third molar gingival margin or along the partially erupted second molar tooth. A relaxation incision was made from the second molars running down and forward along the mucosa connected to the distal direction of the first molar tooth. A Howarth periosteal lift was slowly inserted into the retromolar tissues under the lingual distal periosteum and the sub-periosteal plane was easier to identify. The flap was then raised forward to the distal side of the second molar tooth. Care was taken not to tear the periosteum. The lingual flap was withdrawn without tension with a single Howarth periosteal lift and moved mesially or distally as needed to secure the lingual nerve during the procedure. The wound was closed with one or two 3.0 vicryl sutures on a cutting needle. Operational information was recorded in a specially designed format (Table 1).

TABLE 1. INFORMATION RECORDED ON THE STUDY FORM

Information recorded before operation

- Patients name, age, sex, hospital number and address
- Operation side - right, left or both
- Anaesthetic - general or local with / without sedation
- Lingual flap raised - yes or no

Information recorded at one week

- Sensory impairment for each nerve

Lingual - yes or no	If yes - right, left or both paraesthesia, anaesthesia, dysaesthesia
Inferior alveolar - yes or no	If yes - right, left or both paraesthesia, anaesthesia, dysaesthesia
Mylohyoid nerve - yes or no	If yes - right, left or both paraesthesia, anaesthesia, dysaesthesia

Follow up

1 month	recovered - improved - no change
3 months	recovered - improved - no change
6 months	recovered - improved - no change
1 year	recovered - improved - no change

At the time of hospital discharge, patients received verbal and written instructions for postoperative care in case of concern. The first postoperative evaluation was performed one week after the operation. The aim was achieved by using a separator as described by Ferdousi and McGregor to respond to light touch with cotton, sharp stimulation with the probe, and two-point separation. Patients with sensory insufficiency were required to undergo additional examination 1 month, 3 months, 6 months and 1 year after surgery or until full sensory recovery. Data were analyzed separately and together for local and general anaesthesia groups. Minitab software was used for statistical analysis. Chi-square test was used to analyze the level of differences between the groups. Results were considered significant if the P value was less than 0.05.

RESULTS:

Sensory changes of lingual, inferior alveolar and mylohyoid nerves for general procedures and local and anaesthetic groups one week after surgery are summarized in tables 2, 3 and 4.

TABLE 2: OVERALL INCIDENCE OF SENSORY IMPAIRMENT FOR **2456** MANDIBULAR THIRD MOLAR OPERATIONS FOR GENERAL AND LOCAL ANAESTHETIC GROUPS

Nerves	Numbers at one week	Numbers at one year
Lingual	74 (3%)	2 (0.08%)
Inferior alveolar	41 (1.7%)	0
Mylohyoid (sensory part)	5 (0.5%)	0.00

TABLE 3: INCIDENCE OF SENSORY IMPAIRMENT FOR **1097** MANDIBULAR THIRD MOLAR OPERATIONS FOR GENERAL ANAESTHETIC GROUP

Nerves	Numbers at one week	Numbers at one year
Lingual	60 (5.5%)	2 (0.08%)
Inferior alveolar	24 (2.2%)	0.00
Mylohyoid (sensory)	5 (0.5%)	0.00

TABLE 4: INCIDENCE OF SENSORY IMPAIRMENT FOR 1359 MANDIBULAR THIRD MOLAR OPERATIONS FOR LOCAL ANAESTHETIC GROUP

Nerves	Numbers at one week	Numbers at one year
Lingual	14 (1%)	0.00
Inferior alveolar	17 (1.2%)	0.00
Mylohyoid (sensory)	0.00	0.00

Nerve levels complications were significantly higher in general anaesthesia group (Table 5). Most of the nerves improved in the first month of the operation.

TABLE 5: THE COMPARISON OF SENSORY IMPAIRMENT FOR LINGUAL AND INFERIOR ALVEOLAR NERVES FOR LOCAL AND GENERAL ANAESTHETIC GROUPS AT ONE WEEK POST OPERATION

Nerves	L A group	G A group	Significance level (P value)	x^2 and degree of freedom value
Lingual	14/1359	60/1097	<0.001	$x^2 = 40.9$, df = 1
Inferior alveolar	17/1359	24/1097	<0.07	$X^2 = 3.2$, df = 1

12 out of 14 for local anaesthesia group and 51 out of 60 for general anaesthesia group of lingual nerve paresthesia were improved within 12 weeks. Except for two patients in the general anaesthesia group, patients recovered completely within the next three months. The decrease in the area of paresthesia was a sign of good recovery. Two patients (0.08%) had no improvement in one year and were accepted as permanent. The difference between general anaesthesia and local anaesthesia group in one week was statistically significant (P <0.0001). Most cases of sensory insufficiency of the inferior alveolar nerve resolved within 12 weeks. However, for the general anaesthesia group, 3 patients extended to 6 months and one patient extended to one year for full recovery. One week after the operation, the difference between these groups was not statistically significant (P <0.07).

The sensory component of myeloid nerve was performed in only 5 (0.5%) of 1097 for the general anaesthesia group and no such complication was seen in the local anaesthesia group. All of them recovered within a month, one recovered within 13 weeks.

DISCUSSION:

The incidence of sensory deficiency was recorded for the first time in one week after the operational visit[11]. This protocol was accepted due to the patient's non-discomfort when calling the day after surgery and the difficulty in assessing sensory innervation in the presence of swelling and discomfort[12].

Several studies have been conducted to determine the incidence and possible causes of sensory impairment of the lingual and inferior alveolar nerve after mandibular third molar surgery, thus improving management in order to minimize this rare but complex complication[13]. In his survey, Schawartz mentioned the causes of 18 different language parestheses. The main causes are needle injection, retraction of the tongue, anatomic anomaly and loss of the tongue plate due to long-term infection, cysts, or damage caused by the inclined third molar in the tongue[14]. A single cause cannot be implied only for this complication. In some cases, surgeons were easily surprised by such sequelae. Other studies suggest that removal of the distal lingual bone, depth of effect and surgical techniques are common contributing factors. Rood concluded that the removal of bone with is more likely to cause permanent inferior alveolar damage and lingual nerves than the removal of mandibular wisdom teeth with chingles using the lingual division technique. On the other hand, Robinson and Smith argued otherwise.

The placement of Howarth's periosteal elevator can cause crush injury to the lingual nerve and is not large enough to protect the nerve during removal of the lingual bone. Permanent sensory impairment of the inferior alveolar nerve was not observed. It took up to one year for a patient to recover for general anaesthesia. The incidence of sensory impairment per

week for local and general anaesthetic groups was 1.2% and 2.2%, respectively, and all were parasitic in nature[15].

CONCLUSION:

Overall results are comparable to previous studies and support the surgical protocol we follow in the surgical treatment of mandibular third molars. Careful use of Howarth's periodic elevator gives an acceptable result. The operator's surgical experience does not appear to be directly related to the incidence of sensory impairment after mandibular third molar surgery. Using an accurate subperiosteal dissection technique, the lingual flap is a safe procedure that prevents prolonged damage to the lymphatic nerve. Simple and applicable to all surgical developmental levels. There was only one case of permanent sensory impairment of the lingual nerve. According to Pratt, a small number of postoperative complications in this series led us to conclude that routine follow-up is not mandatory and only a selective postoperative interview is recommended. It avoids discomfort for patients and protects the resources of health care.

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