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**Research Article**

# SENSORY IMPAIRMENT OF THE LINGUAL AND INFERIOR ALVEOLAR NERVE FOLLOWING REMOVAL OF IMPACTED MANDIBULAR THIRD MOLAR

**Gokkulakrishnan Sadhasivam[1]., Meera Thinakaran[2]., Benjamin Prem Kumar[3]., Srinivasulu Pabbaraju[4]., Abhishek Balaji[5] and Shaik Srikanth[6]**

[1,4,5]Department of OMFS, Adhi Parasakthi Dental College & Hospital, Melmaruvathur. Tamilnadu Dr. MGR Medical University
[2]Department of OMFS, Karpaga Vinayagar Institute of Dental Sciences, Kancheepuram District
[3]Department of OMFS, Arupadai Veedu Dental College & Hospital, Pondycherry
[6]Private Practioner, Vizianagaram

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**ABSTRACT**

**Aims & Objectives:** This study was performed to evaluate the sensory impairment of lingual and inferior alveolar nerve following surgical removal of impacted mandibular third molar.
**Materials and Methods:** The study included 276 patients with impacted mandibular third molars all of which were surgically removed under local anesthesia, and all the patients were followed up at intervals of 1st day, 3rd day, 1 week, 2nd week upto 24 weeks.
**Results:** None of the patient had statically significant paresthesia of lingual or inferior alveolar nerve. Only one patient (0.7%) showed temporary paresthesia of inferior alveolar nerve which resolved 3 days after surgery. Most common impaction was mesioangular (54.1%). Males were predominantly (64.49%) involved.
**Conclusion:** It is observed that if anatomic structures are kept in mind and surgery is done carefully in the region, nerve injury is a rare complication following surgical removal of impacted mandibular third molar. It is also important to note that the skill of the surgeon plays a vital role in prevention of these complications.



## INTRODUCTION

Mandibular third molars show 20-30%[40] incidence of impaction and have been held responsible for periodontal defects in relation to second molars, dental caries, neurogenic or myofacial pains, cysts, tumors, crowding of dentition and nerve injuries[2,3,4]. Early removal of these teeth to prevent such problems is therefore widely acknowledged. The close proximity of the inferior alveolar nerve and lingual nerve to the impacted lower third molar make them susceptible to injury during surgical removal of the tooth.

As these operations are carried out very frequently, this problems affects a considerable number of patients. The reported incidence of inferior alveolar nerve injury after surgical removal of impacted lower third molar ranges from 0.4% to 8.4%[7, 8].

Many factors have been suggested as predisposing to the complications during the removal of third molar (ex: close anatomic relationship and the surgical technique adopted). Assessment of these predisposing factors pre operatively, forms the basis of the principles that can minimize the rate of damage to Inferior alveolar nerve intra operatively.

The Aim and Objectives of this study were to determine the incidence of postoperative sensory impairment of Lingual and Inferior Alveolar Nerve, to evaluate the degree and duration of sensory loss and to find out factors predictive of postoperative alterations of sensation.

## MATERIALS AND METHOD

276 Patients in the age group of 16 to 40 years that reported to the Department of Oral and Maxillofacial Surgery, Melmaruvathur for the removal of impacted mandibular third molar were included in this study. Patients were selected randomly. The subjects were screened for any local or systemic contraindications for the surgery. All the subjects were operated under local anaesthesia by the same operator and

**Corresponding author: Gokkulakrishnan Sadhasivam*
*Department of OMFS, Adhi Parasakthi Dental College & Hospital, Melmaruvathur. Tamilnadu Dr. MGR Medical University*

given comparable prescriptions for analgesics and antibiotics coverage. Standard Ward's and modified Ward's incision were taken for all the cases. To protect the lingual nerve periosteal elevator was inserted beneath lingual flap wherever deemed necessary. The tooth was sectioned one or more times when required, buccal and distal guttering of bone around the 3rd molar according to the need was done using a bur. During the first postoperative review appointment the possibility of any impairment of labial and/or lingual sensation was investigated. In case of diminution of sensation, neurological examinations were instituted for assessment of the degree of the deficit. Light-touch sensation was checked with a wisp of cotton wool, tactile discrimination with the sharp and the blunt end of a dental probe, and pain awareness with a forceps. Finally, the patients was reviewed until complete recovery or at least until postoperative week 26,

## RESULTS

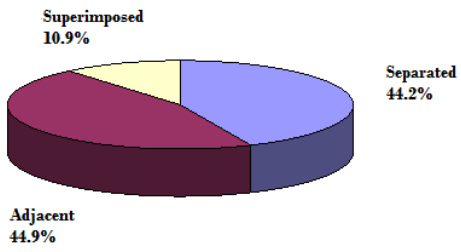
In this prospective study, a total of 276 impacted mandibular third molars were removed from 178 patients. Postoperatively, the morbidity of inferior alveolar and lingual nerve sensation was noted, in order to assess sensory deficit. Complete restitution occurred, or, if the sensibility failed to recover, for at least 6 months.The subjects were followed up till 24 weeks. The results obtained have been shown as under:

Majority of subjects were in the age group 21-30 years (67.4%) followed by age group ≤20 years (18.8%), and 31-40 years (13.8%). Majority of subjects in present study were males (64.5%) with male to female ratio of 1.82:1.

Mesioangular impaction was the most common impaction seen in more than half (54.1%) cases. Inverted impaction was the least common. (2.9%). Distoangular (27.5%), vertical (8%) and horizontal (7.2%) angulations were the other types of impaction found respectively. On the basis of relative depth of the impacted mandibular third molar the most common position was Position A (56.5%) followed by position B (30.4%) and then position C (13%). On the basis of space available distal to second molar and the anterior border of ramus of the mandible majority of impactions were Class II (76.8%) followed by Class I (19.6%) and class III (3.6%) respectively.

**Table 1** Relationship with Third Molar to Inferior Alveolar Canal

| SN | Relationship | No. | % |
|---|---|---|---|
| 1. | Separated | 122 | 44.2 |
| 2. | Adjacent | 124 | 44.9 |
| 3. | Superimposed | 30 | 10.9 |




In our study on the basis of relationship of mandibular third molar to the inferior alveolar canal, inferior alveolar canal was adjacent in (44.9%) patients where as it was separated in (44.2%) and superimposed in (10.9%) (Table 1). Inferior Alveolar nerve was found to be impaired in one subject at day 1. By week 1, this patient showed recovery. From thereafter in none of the patients Inferior Alveolar nerve was found to be impaired (Table 2). None of the patients had involvement of lingual nerve at any time interval (Table 3).

**Table 2** Change in Inferior Alveolar Nerve Impairment

| S.No. | Time | No. | % | Statistical significance of change from baseline | |
|---|---|---|---|---|---|
| | | | | $\chi^2$ | p |
| 1. | Day 1 (Baseline) | 2 | 0.7 | – | – |
| 2. | Day 3 | 2 | 0.7 | 0 | 1 |
| 3. | Week 1 | 0 | 0 | 1.004 | 0.316 |
| 4. | Week 2 | 0 | 0 | 1.004 | 0.316 |
| 5. | Week 6 | 0 | 0 | 1.004 | 0.316 |
| 6. | Week 24 | 0 | 0 | 1.004 | 0.316 |

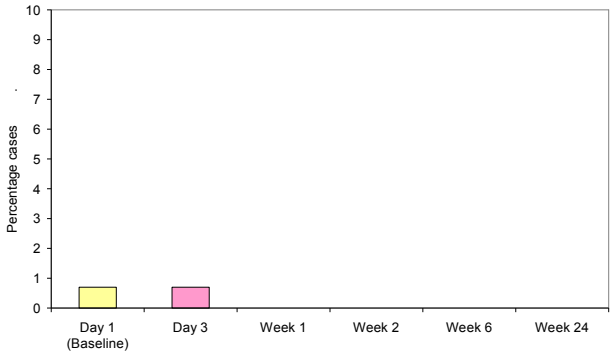



**Table 3** Change in Lingual Nerve Impairment

| S.No. | Time | No. | % | Statistical significance of change from baseline | |
|---|---|---|---|---|---|
| | | | | $\chi^2$ | p |
| 1. | Day 1 (Baseline) | 0 | 0 | – | – |
| 2. | Day 3 | 0 | 0 | – | – |
| 3. | Week 1 | 0 | 0 | – | – |
| 4. | Week 2 | 0 | 0 | – | – |
| 5. | Week 6 | 0 | 0 | – | – |
| 6. | Week 24 | 0 | 0 | – | – |

## DISCUSSION

Mandibular 3rd molars have been found to be impacted with a frequency of 20-30 %[40]. There are various indications for their removal for e.g.: pericoronitis, dental caries, associated pathologies or prophylactic etc. Surgical removal of Impacted Mandibular 3rd molars is known to be associated with the risk of various complications including excruciating pain, marked oedema, trismus and sensory impairment of lingual and inferior alveolar nerves as well.

The close proximity of the inferior alveolar nerve to the roots of the impacted mandibular third molar and lingual nerve to the alveolar margin on the lingual side of the impacted mandibular third molar is well known. Thus there are more chances of injury to these nerves during surgical removal of the teeth. In former studies, alterations of sensation persisting more than 6 months after injury were commonly considered to be permanent. But there are also reports of restitution occurring 7-9 months after the surgery. However after six months the incidence of spontaneous recovery seems to be slight.[33]

Chiapasco *et al.*[43] in their retrospective study to find out the complications and side effects associated with the surgery of impacted mandibular third molar, found incidence of inferior

alveolar nerve injury to be 0.7% in surgery of 1000 impacted mandibular third molars. In our study we encountered only one patient with injury to the inferior alveolar nerve out of 138 impacted mandibular third molars, incidence being about 0.7%. The different techniques used in the removal of impacted mandibular third molar tooth include surgical burs and chisel having their own advantage and disadvantages. The chisel technique may be associated with an injury to the inferior alveolar nerve, creating unnecessary trauma to the adjacent structures. Such a finding was seen in the study of F. A. Carmichael *et al*.[7] where they reported an incidence of inferior alveolar nerve injury in 5.5% cases in 1339 impacted mandibular third molar removal using both bur and chisel technique. In our study inferior alveolar nerve injury was seen in 0.7% of cases which resolved within a week, and this low incidence of inferior alveolar nerve injury may be attributed to the fact that we used bur only.

The injury to the lingual nerve may be because of traction pressure of retractor exerted on the lingual nerve as was seen in the study of M. Anthony *et al*.[47] In our study we did not find any lingual nerve paresthesia as we avoided traction pressure in most of the cases. In cases when was necessary to place retractor, it was placed with extreme case. F.A.Carmichael *et al*.[7] reported reported lingual nerve injury in 15% of the cases using lingual flap. In our study we have not found any lingual nerve injury in any of our patients. It can be attributed to the fact that we did not raise the lingual flap which results in unnecessary injury to the lingual nerve.

Anwar B. *et al*.[32] found 2.6% lingual nerve paresthesia, when surgical removal of mandibular third molar performed by either experienced surgeons or new trainees and the incidence of which increased with raising of lingual flap. In our study there was no lingual nerve paresthesia, and this may be attributed to the fact that all surgical removals were done by experienced operator without raising lingual flap. Robinson and Smith[49] using lingual plate splinting technique, found lingual nerve paresthesia to be in 6.9% of cases. In our study we followed the removal of impacted lower third molar with the bur technique using buccal approach and there was no incidence of lingual nerve paresthesia or any other kind of nerve injury.

## SUMMARY AND CONCLUSION

This study was performed to evaluate the sensory impairment of lingual and inferior alveolar nerve following surgical removal of impacted mandibular third molar. It was observed that if anatomic structures are kept in mind and surgery is done carefully in the region, nerve injury is a rare complication following surgical removal of impacted mandibular third molar. It is also important to note that the skill of the surgeon plays a vital role in prevention of these complications. In previous literature several indicators were found to increase the risk of postoperative sensory impairment of lingual and inferior alveolar nerve in impacted third molar surgery. These indicators help the operator to predict the outcome of his surgical procedure. The outcome of this study suggested that if the removal of impacted mandibular third molar was done by an experienced surgeon there was less chance of impairment of inferior alveolar & lingual nerve. Since the sample size in the study was relatively small therefore a larger sample size should be taken to validate the finding of this study.

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