



Assessment of clinical outcome of conservative treatment of injured inferior alveolar nerve during dental implant placement- An Original Research

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1687

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ABSTRACT

Background: One of the distressing complications of implant placement is damage to the inferior alveolar nerve (IAN). The present study was conducted to assess clinical outcome of conservative treatment of injured inferior alveolar nerve during dental implant placement.

Materials & Methods: 108 patients of inferior alveolar nerve of both genders were divided into 4 groups of 27 each. Group I included patients who reported within 9 months of nerve injury and group II included patients who visited 9 months after nerve injury. Group III included patients whose implants were surgically decompressed whereas group IV patients had not undergone any treatment or medication. Group I patients underwent conservative management. **Results:** Patients in group I, group II, group III and group IV had complaint of anesthesia in 7, 5, 4 and 2, dysesthesia in 5, 6, 6 and 3, hypoesthesia in 12, 7, 4 and 3, hypoesthesia in 2, 5, 3 and 7, paresthesia in 1, 4, 5 and 8. Functional deficit was chewing difficulty in 5, 3, 3 and 5, mouth opening difficulty in 4, 5, 2 and 1, tongue biting in 2, 3, 1 and 2 and speech difficulty in 1, 2, 5 and 7 respectively. **Conclusion:** Conservative treatment of injured inferior alveolar nerve during dental implant placement found to be effective.

Key words: inferior alveolar nerve, dental implant, paresthesia

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Introduction

The mandibular nerve is the third and most inferior division of the trigeminal, or fifth, cranial nerve. The trigeminal nerve is predominantly a sensory nerve, innervating most of the face.¹ The IAN is a branch of the posterior division of the mandibular nerve that contains both sensory and motor fibers. It enters the mandibular foramen, runs in the mandibular canal, and supplies the mandibular teeth. It leaves the mandibular canal through the mental foramen as the mental nerve. Within the canal, the nerve

is about 3 mm in diameter, and its course varies.²

One of the distressing complications of implant placement is damage to the inferior alveolar nerve (IAN). Various degrees of prevalence of altered sensation after the placement of mandibular implants have been published. These injuries may occur during preparation or placement of an implant. They may be directly related to the depth of preparation or implant length or width and may result from local anaesthetic application as well.³

Different degrees of nerve injury are available. Nerve injuries are divided into 3



types based upon the severity of tissue injury, prognosis, and time for recovery- neurapraxia, axonotmesis, and neurotmesis.⁴ Neurapraxia is the mildest form, with the best prognosis, while neurotmesis is the most severe. Sensory disturbances resulting from the injury will provide an unpleasant experience for both the doctor and the patient. Effective management of those cases is based on providing treatment-conservative or surgical, immediately upon diagnosis of damage. That is to say, early diagnosis is the key for successful treatment.⁵ The present study was conducted to assess clinical outcome of conservative treatment of injured inferior alveolar nerve during dental implant placement.

Materials & Methods

The present study comprised of 108 patients of inferior alveolar nerve of both genders. All gave their written consent for the participation in the study.

Results

Table I Assessment of parameters

| Parameters | Variables | Group I | Group II | Group III | Group IV | P value |
|---------------------------|--------------------------|---------|----------|-----------|----------|---------|
| Complaint | Anesthesia | 7 | 5 | 4 | 2 | 0.92 |
| | Dysesthesia | 5 | 6 | 6 | 3 | |
| | Hypoesthesia | 12 | 7 | 4 | 3 | |
| | Hypoesthesia | 2 | 5 | 3 | 7 | |
| | Paresthesia | 1 | 4 | 5 | 8 | |
| Functional deficit | Chewing difficulty | 5 | 3 | 3 | 5 | 0.35 |
| | Mouth opening difficulty | 4 | 5 | 2 | 1 | |
| | tongue biting | 2 | 3 | 1 | 2 | |
| | Speech difficulty | 1 | 2 | 5 | 7 | |

Table I, graph I shows that patients in group I, group II, group III and group IV had complaint of anesthesia in 7, 5, 4 and 2, dysesthesia in 5, 6, 6 and 3, hypoesthesia in 12, 7, 4 and 3, hypoesthesia in 2, 5, 3 and 7, paresthesia in 1, 4, 5 and 8. Functional deficit was chewing difficulty in 5, 3, 3 and 5, mouth opening difficulty in 4, 5, 2 and 1, tongue biting in 2, 3, 1 and 2 and speech difficulty in 1, 2, 5 and 7 respectively.

Data such as name, age, gender etc. was recorded. Patients were divided into 4 groups of 27 each. Group I included patients who reported within 9 months of nerve injury and group II included patients who visited 9 months after nerve injury. Group III included patients whose implants were surgically decompressed whereas group IV patients had not undergone any treatment or medication. Group I patients underwent conservative management. The radiographic proximity of the implant fixture to the IAN canal was examined, and the distance from the bottom of the implant to the roof of the inferior alveolar canal was measured. The neurosensory function such as hypoesthesia, anesthesia, paresthesia, dysesthesia, etc. was recorded Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.



Graph I Assessment of parameters

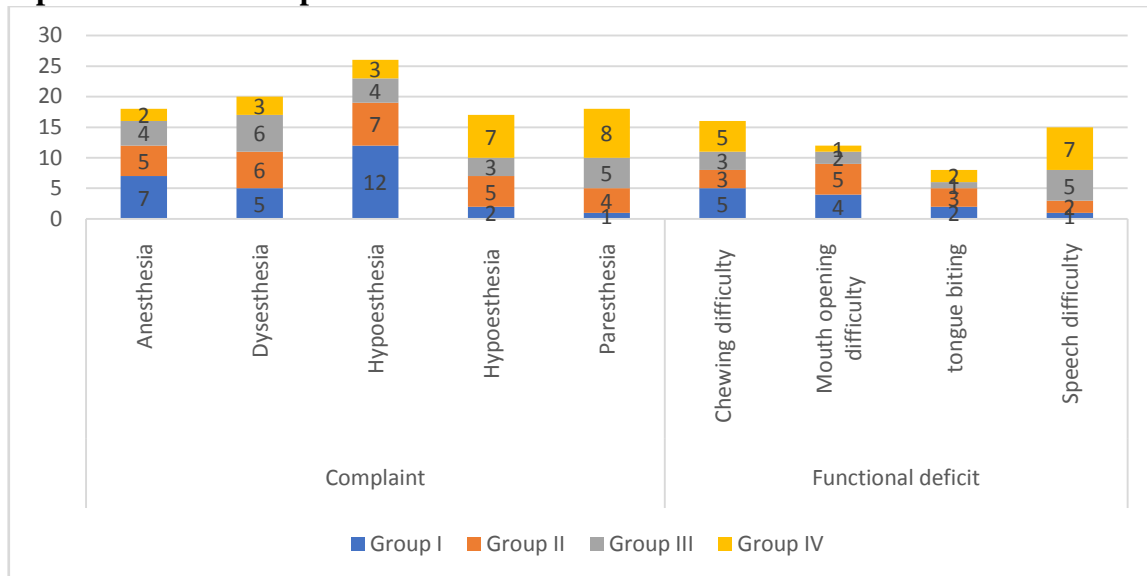


Table II Outcome of conservative management

| Change of symptoms | Group I | Group II | Group III | Group IV | P value |
|--------------------|---------|----------|-----------|----------|---------|
| Improved | 6 | 1 | 5 | 3 | 0.04 |
| Stationary | 13 | 20 | 14 | 15 | |
| Aggravated | 2 | 1 | 0 | 2 | |
| Change of symptoms | 6 | 5 | 8 | 7 | |

Table II shows that change of symptoms showed improvement in 6, 1, 5 and 3, stationary in 13, 20, 14 and 15, aggravated in 2, 1, 0 and 2 and change of symptoms in 6, 5, 8 and 7 in group I, II, III and IV respectively. The difference was significant ($P < 0.05$).

Discussion

Altered sensation in the lower lip area can be caused by several factors. One factor may be nerve compression through oedema as a result of the operation or by hematoma and scarring.⁶ In most cases, however, these types of disturbance are usually reversible. If implants are inserted closely to the IAN without directly damaging it, patients may experience periodic changes of sensation, such as when the area is exposed to a stimulating temperature during a meal.⁷ Nerve injury also occurred if unintended direct damage to the IAN occurred during implant insertion. In this case, damage may lead to permanent neurosensory damage or variable sensation of pain.⁸ The present study was conducted to assess clinical

outcome of conservative treatment of injured inferior alveolar nerve during dental implant placement.^{9,10} The present study was conducted to assess clinical outcome of conservative treatment of injured inferior alveolar nerve during dental implant placement.

We found that Patients in group I, group II, group III and group IV had complaint of anesthesia in 7, 5, 4 and 2, dysesthesia in 5, 6, 6 and 3, hypoesthesia in 12, 7, 4 and 3, hypoesthesia in 2, 5, 3 and 7, paresthesia in 1, 4, 5 and 8. Functional deficit was chewing difficulty in 5, 3, 3 and 5, mouth opening difficulty in 4, 5, 2 and 1, tongue biting in 2, 3, 1 and 2 and speech difficulty in 1, 2, 5 and 7 respectively. Kim et al¹¹ analyzed the outcomes of conservative management of



the injured nerve during dental implant procedure. Sixty-four patients of implant related IAN injury, who were managed by medication or observations. Among the 64 patients, 23 had a chief complaint of sensory disturbance and others with dysesthesia. The mean time until first visit to our hospital after the injury was 10.9 months. One year after nerve injury, the sensation was improved in 9 patients, whereas not improved in 38 patients, even 4 patients experienced deterioration. Better prognosis was observed in the group of patients with early visits and with implants placed or managed not too close to the IAN.

We found that change of symptoms showed improvement in 6, 1, 5 and 3, stationary in 13, 20, 14 and 15, aggravated in 2, 1, 0 and 2 and change of symptoms in 6, 5, 8 and 7 in group I, II, III and IV respectively. Hillerup¹² investigated the iatrogenic damage of the trigeminal nerve. The magnitude of neurosensory impairment and amount of neurologic malfunction (paresthesia, dysesthesia, etc.) were so troublesome that some patients suffered severe deterioration of the overall quality of life. At least 17% of patients suffered from chewing difficulty, whereas 15% had speech difficulty. Reduction or loss of sensation and painful triggers in the damaged nerve dermatome would result in unilateral chewing behavior, leading to concomitant temporomandibular dysfunction issues such as pain upon chewing. Pronunciation disability was also a frequently encountered problem that may follow the loss of sensory input from the IAN.

According to Seo et al¹³, there are two types of paresthesia: spontaneous and elicited paresthesia. Mechanical touch sensations conduct afferent stimuli through A β -fibers, and their elevation may imply a dysfunction of the fibers. These phenomena are usually thought to be associated with the spontaneous paresthesia observed in neuromas. According to Ellies and Hawker¹⁴, of the

23% of patients experiencing short-term changes, 90% reported that their symptoms had disappeared within 6 months.

The limitation the study is small sample size.

Conclusion

Authors found that conservative treatment of injured inferior alveolar nerve during dental implant placement found to be effective.

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