Nerve Injury Following a Mandibular Block: A Case Report

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Nerve Injury Following a Mandibular Block: A Case Report

LEARNING OBJECTIVES:

After reading this article, the individual will learn:

- The causes and available treatment of trauma to the mandibular nerve.
- Clinical management of a case of traumatic mandibular nerve injury.

ABOUT THE AUTHORS

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Disclosure: Dr. Brown reports no conflicts of interest.

INTRODUCTION

A significant portion of the lower jaw is innervated by the mandibular nerve, which branches off from the trigeminal nerve before entering the mouth through the mandibular foramen in the jaw.¹ Due to the nerve’s widespread innervation, dentists regularly anesthetize the mandibular nerve prior to beginning dental treatment by utilizing the “mandibular block,” which is also known as an inferior alveolar nerve block. During the administration of local anesthesia, the lingual or inferior alveolar neurovascular bundle may be traumatized.

This article discusses the causes and available treatment of trauma to the mandibular nerve, and presents a case report describing such trauma and its clinical management.

Causes of trauma to the mandibular nerve can include the sharp needle-tip, the movement of the needle itself, extraneural or intraneural hemorrhage from trauma to the blood vessels, or neurotoxic effects of the local anesthetic.² According to dental literature, nerve trauma from a mandibular block can occur anywhere from one in 26,000 inferior alveolar nerve blocks to one in 800,000 inferior alveolar nerve blocks. If nerve trauma does occur from a mandibular block, the lingual nerve is affected approximately 70% of the time, whereas the inferior alveolar nerve is affected roughly 30% of the time.³ In general, lingual nerve trauma is more incapacitating than inferior alveolar nerve trauma.⁴

Nerve injury trauma can lead to numbness and paresthesia, defined as a feeling consistent with swelling, tingling, and itching of the affected area. In addition, there can be oral dysfunction and/or pain. Oral dysfunction includes phenomena such as tongue biting, drooling, loss of taste, and speech impediment.²

CASE REPORT

A 65-year-old female reported to an oral medicine specialist with the chief complaint of “severe tongue pain.” The condition began 2 weeks previously in December of 2008 after her general dentist administered a right mandibular block injection prior to initiating a crown preparation. The patient reported immediate shooting pain followed by numbness and pain in the right side, along with decreased taste. The tongue was described as being “on fire.” The
patient indicated that she experienced pain from the tip of the tongue backwards. Interestingly, the patient noted that the condition affected predominantly the right side of the tongue, but a small portion on the left side was affected as well.

When the patient returned home, other symptoms became evident, such as difficulty eating and brushing teeth. Lastly, the patient noted that certain toothpastes elicited a strong burning sensation.

At the time of the follow-up appointment with the oral medicine specialist, no lymphadenopathy was noted. The right lateral border of the tongue was noted for crenulations (irritations and ridges from being pushed against the teeth). The right submandibular region was tender and painful on palpation. The remaining oral tissues appeared to be within normal limits.

The diagnosis was right mandibular (trigeminal) nerve injury secondary to the administration of a mandibular block preceding dental treatment. The clinician prescribed prednisone as an anti-inflammatory (No. 45 20 mg Prednisone tablets, 3 tablets taken daily with a glass of water upon awakening) and Tramadol (Ultram) for pain (No. 60 50 mg tablets, one tablet taken twice a day). Clotrimazole was prescribed in order to prevent candidiasis secondary to the Prednisone prescription. Further, the patient was advised to treat herself with an over the counter antifungal vaginal remedy in order to prevent a candidiasis infection secondary to systemic steroid utilization. A further prescription was written for a 2% viscous lidocaine rinse to be utilized by the patient prior to eating and oral home care.

The patient was counseled as to the expectations of her condition and given therapeutic options. The patient was informed that mandibular nerve trauma secondary to a local anesthesia injection generally improves within a 6-month time frame. Furthermore, the patient was cautioned that if there was no improvement within 6 months, more than likely none would occur. Treatment options consisted of systemic steroid therapy and referral for evaluation for nerve anastomosis microsurgery. The benefits and drawbacks of microsurgery were discussed. The patient was instructed to report her progress in 2-week intervals.

After the third day of the treatment regimen, the patient reported being unable to tolerate the Prednisone due to insomnia, and discontinued taking it. The Tramadol was successful for the management of the patient’s pain, which the patient initially described as severe. However, without medication, the patient did not note any improvement in pain symptoms for approximately 2 months. After this initial 2-month period the condition gradually improved, and after 3.5 months the pain began to diminish. After 4.5 months from date of injury, the patient indicated that she was nearly pain free.

**DISCUSSION**

In decades past, the phrase “no paresthesia, no anesthesia” was widely proclaimed for certain peripheral nerve blocks such as the mandibular block. According to early researchers, not obtaining paresthesias (electric-like sensations) with these blocks resulted in a lower incidence of satisfactory analgesia. This short-term paresthesia is very different from the longer lasting paresthesia secondary to nerve trauma from a mandibular local anesthesia injection.

Longer lasting paresthesia is associated with a number of factors, including the position of the needle in relation to the nerve and the concentration of the local anesthetic. Pogrel, et al reported that 70% of permanent nerve injuries secondary to inferior alveolar nerve block occur in the lingual nerve and approximately 30% in the alveolar nerve. They reported that the rationale for the differing incidences in injury in nerves that are essentially the same size may be due to nerve position. They proposed that because the lingual nerve is exposed below the mandibular foramen, it is therefore more likely to be damaged by a needle. They also noted that the vast majority of cases of needle contact with the nerve do not result in long-term injury.

Local anesthetic concentration is also a factor in dental nerve trauma. Haas reported that local anesthetics with 4% local anesthesia concentrations appear to be more problematic with regard to nerve damage compared to those in 2% concentrations. Similarly, it has been noted that 4% prilocaine concentrations have a disproportionate incidence in association with nerve damage secondary to local anesthetic injections. Other reports indicate that the 4% concentration of articaine may also be a contributing factor with regard to neural toxicity due to increased...
concentration with respect to nerve injury following local anesthetic procedures.\textsuperscript{8}

Tips for avoiding nerve damage when seeking appropriate levels of anesthesia include moving the needle slowly to prevent impaling nerves, immediately stopping the needle’s forward motion if a paresthesia occurs, and not exceeding the recommended concentration of the local anesthetic.\textsuperscript{9} Moreover, the more slowly an injection is given, the less traumatic it is to the tissues of the injection site and therefore the more comfortable the injection is to the patient.\textsuperscript{9}

Both new and experienced practitioners can benefit from a review of the anatomy associated with administering mandibular blocks. Misjudging the anatomy during local anesthetic administration can lead to inadequate anesthesia and other complications such as paresthesia, bleeding or hematoma formation, or even more serious systemic complications.\textsuperscript{10} While administering an injection, paresthesia may occur if the patient complains of a sensation described as electric shock along the path of the nerve that is contacted by the needle.\textsuperscript{2} If nerve trauma and ensuing paresthesia occur, symptoms can last for weeks or even months and can significantly alter a patient’s lifestyle. Although most mandibular nerve needle trauma-induced paresthesias tend to resolve without treatment within a few months, permanent paresthesia is possible. It is important to inform the patient of the various consequences and possible treatments.

Steroid therapy may be utilized to decrease the inflammatory process secondary to nerve trauma. Systemic Prednisone drug therapy has been utilized for more than 20 years and is generally believed to be helpful in decreasing numbness and paresthesia symptoms. However, systemic Prednisone is known to have such problematic side effects as steroid-induced insomnia, increased hypertension, increased fluid retention, promotion of candidiasis infections, and decreasing the signs and symptoms of infection.\textsuperscript{11}

Surgical repair is a questionable treatment option. According to Blanton and Jeske,\textsuperscript{10} microsurgical repair for lingual nerve paresthesia symptoms is controversial in that there is the potential for exacerbated symptomatology. However, Robinson and colleagues\textsuperscript{12} studied 53 patients who underwent surgical lingual nerve repair. They reported that patients generally considered the operation to be worthwhile. Rutner, et al\textsuperscript{13} evaluated the long-term outcome with regard to microsurgical therapy for lingual nerve injury. They evaluated 20 patients with a diagnosis of lingual nerve injury treated with microsurgery. The time from injury to surgery ranged from 2.5 to 7 months post-injury. The patients were followed for an average of 9 months post-surgery and reported no statistical difference in outcome as a function of time from injury to repair; 90% of the patients reported some improvement in neurosensory function.

**CONCLUSION**

It is important for the general dentist to appropriately manage patients with nerve trauma complications. The dentist should reassure patients by informing them that transient loss of sensation can and does occur, and that it may persist for several months but will generally resolve. The dentist should inform the patient of treatment options, including a possible surgical option and that the timeliness of this option may be critical.\textsuperscript{4,14} The general dentist should document the altered sensation of the patient, including outlining the area of altered sensation as well as a description of the altered sensation in the patient's own words.\textsuperscript{14} Lastly, the general dentist should refer the patient to an oral surgeon or oral medicine specialist so that the patient’s neurological deficit can be monitored and appropriate medication can be prescribed to alleviate symptoms.

**REFERENCES**


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1. A significant portion of the lower jaw is innervated by the mandibular nerve. This nerve branches off from the trigeminal nerve.
   a. The first sentence is true, the second is false.
   b. The first sentence is false, the second is true.
   c. Both sentences are true.
   d. Both sentences are false.

2. Causes of trauma to the mandibular nerve can include:
   a. Sharp needle-tip injury.
   b. Movement of the injection needle.
   c. Neurotoxic effects of local anesthetic.
   d. All of the above.

3. If nerve trauma occurs from a mandibular block injection, the lingual nerve is affected approximately ____% of the time.
   a. 30.
   b. 50.
   c. 70.
   d. 90.

4. The lingual nerve is affected less often than the inferior alveolar nerve in cases of nerve trauma from mandibular blocks. Lingual nerve trauma is less incapacitating than inferior alveolar nerve trauma.
   a. The first sentence is true, the second is false.
   b. The first sentence is false, the second is true.
   c. Both sentences are true.
   d. Both sentences are false.

5. In the case report presented, the patient was prescribed clotrimazole for what reason?
   a. Pain management.
   b. To prevent secondary candidiasis.
   c. As an anti-inflammatory drug.
   d. None of the above.

6. In the case report presented, the patient was unable to tolerate Prednisone for what reason?
   a. Insomnia.
   b. Nausea.
   c. Diarrhea.
   d. All of the above.

7. Local anesthetic concentration may be a factor in dental nerve trauma. Local anesthetics with 4% concentration appear to be more problematic than 2% concentrations.
   a. The first sentence is true, the second is false.
   b. The first sentence is false, the second is true.
   c. Both sentences are true.
   d. Both sentences are false.

8. In general, mandibular nerve trauma secondary to a local anesthesia injection improves within what timeframe?
   a. 6 months.
   b. 9 months.
   c. 12 months.
   d. 18 months.
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