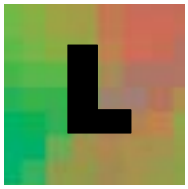
Mandibular

Newtom QR-DVT 9000 Imaging Used to Confirm a Clinical Diagnosis of Iatrogenic Mandibular Nerve Paresthesia

Michael Erickson, DDS; Joseph M. Caruso, DDS, MS; and Leroy Leggitt, DDS, MS

Abstract

This article describes conventional orthodontic treatment of an adult patient leading to lower lip paresthesia. The paresthesia subsided when the cross elastics to correct the patient's single molar crossbite were removed. It was determined with Digital Volumetric Tomography that the inferior alveolar nerve was located lingual to the lower second molar root and was impinged upon with the tipping force of the cross elastic. Treatment to resolve the crossbite without further paresthesia is discussed.



Loss of sensation in the lower lip is an occasional occurrence in a general dentist's office when anesthetic is being used and is seen as frequently as 60-70 percent of the time after orthognathic surgery. However, during conventional orthodontic treatment it is extremely rare.[1,2] Numbness of the lower lip has been reported to be the first sign of a tumor impinging upon the inferior alveolar nerve.[3] Multiple myeloma, Burkitt's lymphoma, Central squamous cell carcinoma, and odontomas have all been reported to cause paresthesia.[4,5,6] Many dental problems have been reported to cause lower lip paresthesia as well.

Authors / Michael Erickson, DDS, is with Graduate Orthodontics at Loma Linda University School of Dentistry. He also maintains a private dental practice.

Joseph Caruso, DDS, MS, is with Graduate Orthodontics at Loma Linda University School of Dentistry.

L. Leggitt, DDS, MS, is with Graduate Orthodontics at Loma Linda University School of Dentistry.

Periapical inflammation, large restorations, endodontic treatment, and a non-vital tooth have all been reported in the literature to induce paresthesia.[7,8,9,10] Because of the numerous etiologies reported with similar symptom, it is imperative a thorough investigation be given when any complaint of facial paresthesia is given.

Figure 1. Patient photograph. Patient has a Class II molar relationship due to absent maxillary canines and a buccal crossbite of her right second molars.

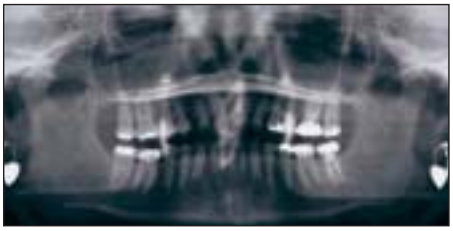


Figure 2. A Panorex revealing no significant information about root/nerve proximity.

Case History

A 57-year-old Hispanic female came to a Graduate Orthodontic clinic with a chief complaint that her upper incisors were flared and there were spaces developing between her teeth. She had orthodontic treatment 15 years prior and had her maxillary canines removed to resolve her protrusion. She presented with a Class II molar relationship due to the absent maxillary canines and a buccal crossbite of her right second molars (**Figure 1**). Pocket depths were all between 2-3mm and mobility did not exceed Class I. The patient had a strong brachyfacial pattern.

The lower first molars were banded and lower 5-5 were bonded with orthodontic brackets. A lingual button was bonded to the lingual of her lower right second molar and a button was bonded to the buccal of her upper right second molar. Elastics were given to the patient to wear 24 hours a day until the crossbite corrected (⅚ 4 ounce). A utility arch with ideal buccal segments was placed in order to intrude lower incisors. No appliances were placed on the upper arch except the button on the buccal of the upper right second molar.

She was seen one month later and the crown of her lower right second molar had become noticeably more upright but had not moved buccally. The mobility had become Class I. It appeared that her strong musculature was keeping the second molars locked in crossbite while the root of the lower right second molar was moving lingually.

She wore the cross elastics for two more weeks and at that time came into the clinic because the lingual button had come off. She complained that the day before her lower right lip had gone numb. Using a wisp of cotton and an explorer, the zone of paresthesia was identified as all of the lower lip anterior to the second molar to the midline with the exception of the vermilion.

Observation of the panorex and periapical films revealed no significant information about root/nerve proximity (**Figure 2**). At that time, a scan was taken of the patient on the Newtom QR-DVT 9000. From this scan, it was evident that the inferior alveolar nerve ran lingual to the lower right second molar and that the root apex was penetrating the neurovascular canal (**Figures 3, 4**). The patient was then instructed to discontinue elastics. It was determined that the lower right second molar must be moved bodily and the occlusion must be unlocked to do so.

The patient returned seven days later (eight days since paresthesia started), and reported that the paresthesia was still present. At that time, a maxillary bite plate with relief above the lower right second molar was delivered. A 16x22 archwire was placed that had a horizontal coil distal to the lower right canine and an arm which bypassed the lower right first and second premolars and the first molar and engaged the lower right second molar. This arm was activated with 40 degree of buccal root torque and an occlusal buccal force vector (**Figure 5**). Two weeks following the delivery of these mechanics, the paresthesia subsided and the patient has normal sensation. However, her right second molars were still in crossbite.

Discussion

There are four previously reported cases of iatrogenic lower lip paresthesia caused by orthodontic treatment.[11,12,13] In each of these cases the paresthesia was temporary. It is intuitive that paresthesia resulting from tooth movement would be caused by impingement of the adjacent neurovascular structure. However only recently has dental imaging been able to provide a definitive view of how interosseous structures such as nerves and root apices are related. For example, the previous case reports on orthodontical-

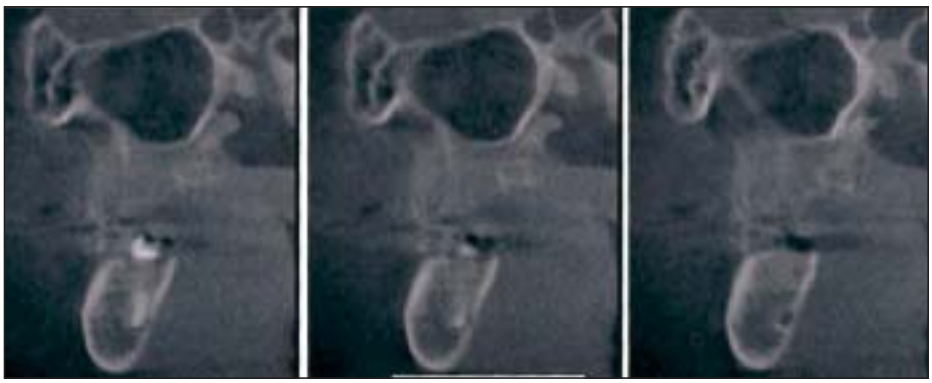


Figure 3.

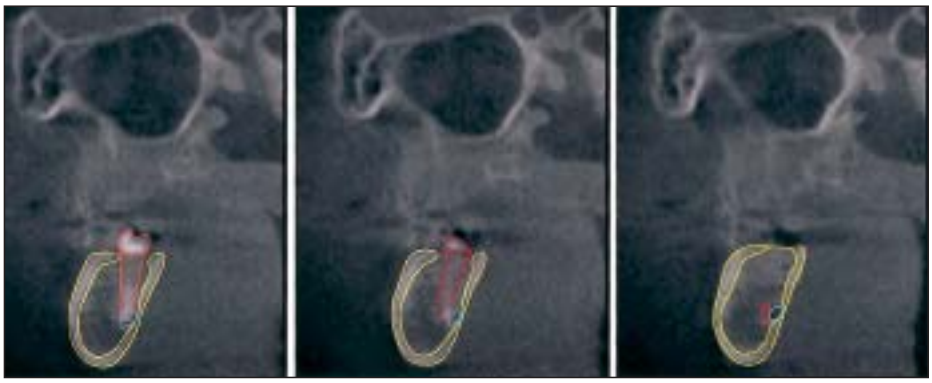


Figure 4.

Figures 3 and 4. Scan done with the Newtom QR-DVT 9000 showing that the inferior alveolar nerve runs lingual to the lower right second molar and that the root apex is penetrating the neurovascular canal.

ly induced paresthesia used panoramic, occlusal and periapical radiographs, to determine if the mandibular canal was buccal or lingual to the molar roots. While these investigators attempted to radiographically determine the location of the mandibular canal, they could only assume that the root had actually impinged upon the nerve. With the Newtom QR DVT 9000, we made the constructed cuts through the distal root and could see that the root apex had penetrated the neurovascular canal. CDA

Conclusion

This case illustrates the value of Digital Volumetric Tomography in analyzing the relationships of bone, root apex, and neurovascular canal in cases of iatrogenic mandibular nerve paresthesia.

References / 1. Nakagawa K, Ueki K, Matsumoto N, Takatsuka S, Yamamoto E, Ooe H. The assessment of trigeminal sensory nerve paraesthesia after bilateral sagittal split osteotomy. *J Craniomaxillofac Surg* 1997;25:97-101

2. Cunningham LL, Tiner BD, Clark GM, Bays RA, Keeling SD, Rugh JD, A comparison of questionnaire versus monofilament assessment of neurosensory deficit. *J Oral Maxillofac Surg* 1996;54:54-9

Figure 5. Patient photograph. A 16x22 archwire has been placed that has a horizontal coil distal to the lower right canine and an arm that bypasses the lower right first and second premolars and the first molar and engages the lower right second molar.

3. Shrioshita N, Kurosawa M, Okabe M, Chuuma M, Yamamoto Y, Sakurada K et al. Multiple myeloma with numb chin syndrome as the initial manifestation. *Rinsho Ketsueki* 1994;35:792-7

4. Fujiyama F, Matsuzaki M, Shimamoto Y, Noguchi T, Kurata Y. Burkett's type ALL with numb chin syndrome as an initial manifestation. *Rinsho Ketsueki* 1991;32:152-5

5. Ariji E. Ozeki S, Yonetsu K, Sasaguri M, Kanda S. Central squamous cell carcinoma of the mandible. Computed tomographic findings. *Oral Surg Oral Med Oral Pathol* 1994;77:541-8

6. Bodner L, Oberman M, Shteyer A. Mental nerve neuropathy associated with compound odontoma. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1987;63:658-60

7. Abbott PV. Lower lip paraesthesia following restoration of a second premolar tooth. Case Report. *Aust Dent J.* 1997;42:297-301

8. Di Lenarda R, Cadenaro M, Stacchi C. Paresthesia of the mental nerve induced by periapical infection: a case report. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2002;90:746-9

9. Morse Dr. Endodontic-related inferior alveolar nerve and mental foramen paresthesia. *Compend Contin Educ Dent*. 1997;18:963-8,970-3,976-8

10. Cohenca N, Rotstein I. Mental nerve paresthesia associated with a non-vital tooth. *Endod Dent Traumatol* 1996;12:298-300

11. Krogstad O, Omland G. Temporary paresthesia of the lower lip: a complication of orthodontic treatment. A case report. *Br J Orthod* 1997;24:13-15

12. Tang N, Selwyn-Barnett B, Blight S. Lip paresthesia associated with orthodontic treatment. A case report. *Br Dent Journal* 1993;124:29-30

13. Stirrups B Temporary mental paraesthesia: An unusual complication of orthodontic treatment. *Br J Orthod* 1985;12:87-89

To request a printed copy of this article, please contact / Michael Erickson, DDS, Graduate Orthodontics at Loma Linda University School of Dentistry, Loma Linda, CA, 92350.