Case Report

Mental Paresthesia and Orthodontic Treatment

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Abstract: This article reports a case of mental paresthesia during orthodontic treatment. It also discusses which cases may be at risk for developing mental paresthesia and its prevention and management. (*Angle Orthod* 2006;76:533–537.)

Key Words: Paresthesia; Orthodontic; Lower premolar; Second premolar; Prevention

INTRODUCTION

When considering orthodontic treatment, all possible risks and side effects should be explained to the patient. Mental paresthesia is a well-known possible occurrence in fields of oral-facial surgery[1,2] and maxillofacial surgery,[3,4] endodontology,[5] implantology,[6] and restorative dentistry.[7–9] The paresthesia may be as a result of iatrogenic, traumatic, bacterial,[10,11] or systemic factors[12–14] irritating the mental nerve followed by permanent or temporary symptoms. However, because of its rare occurrence, mental paresthesia has been underestimated as a finding during orthodontic treatment.

CASE REPORT

The patient was a 23-year-old female referred for orthodontic treatment in 2003. She presented with a Class II division 2 incisor relationship on a mild Class II skeletal base, average FMA, and chin point to the left. The molar relationship was 1/2 unit Class II on the left and Class I on the right with mildly crowded upper and lower labial segments. The lower midline was to the left. Both the upper and the lower left second deciduous molars and the upper left deciduous canine were still present, having deflected the eruption paths of their successors.

The lower right second premolar was lingually displaced and impacted. The aims of treatment were extraction of the remaining deciduous teeth, alignment of the upper and lower arches with preadjusted edgewise fixed appliances on a nonextraction basis, freeing the lower right second premolar, and correcting the molar relationship and midline shift with intermaxillary elastics.

After 10 months of treatment, sufficient space was provided for the lower right second premolar, which had erupted lingually. A 0.014-inch NiTi piggyback wire over a full 0.019 × 0.025–stainless steel archwire was used to achieve the initial movement. Eight weeks later, it was replaced by a 0.018-inch HANT (heat-activated nickel titanium wire). Six weeks later, the patient returned complaining of numbness on the right side of the chin and the lower lip. The numbness had started 2 weeks after placing the previous archwire.

Clinical investigation revealed a decrease in light touch and pinprick discrimination in an area shown in Figure 1. All the teeth and gingiva demonstrated normal sensation. There was no increased sensitivity to hot and cold. No dental treatment had taken place in the preceding weeks. The lower right second premolar showed a positive response to vitality testing.

A sectional panoramic image of the lower right quadrant was taken (Figures 2 and 3), and this showed a very close proximity of the root of the lower right second premolar and the mental foramen. It was therefore assumed that the root of the lower right second premolar was irritating the mental nerve, leading to the symptoms.

The orthodontic force was removed and the patient told to contact if the symptoms did not resolve within 10 days. The patient was seen again after 2 weeks, now reporting that the symptoms had resolved 48 hours after removing the force.

A scanora cross-sectional image of the lower right second premolar was exposed (Figures 4, 5) to locate the root in relation to the mental foramen and the inferior alveolar nerve (IAN) in three dimensions (together with sectional panoramic) to be able to direct the force on the lower right second premolar without irritating the nerve again. A force was then applied to

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FIGURE 1. Area of altered sensation.

extrude the tooth in the direction of the long axis. Treatment was continued without recurrence of any symptoms.

DISCUSSION

This case demonstrates the treatment of a mild malocclusion complicated by an impacted and lingually displaced lower second premolar. An impacted tooth is defined as one that is not expected to erupt in a reasonable time,[15] which occurs in between 5.6% and 18.8% in permanent teeth.[16–19]

The lower second premolar is the second most often impacted tooth after the maxillary canine when the third molar is not taken into account. An occurrence of 24% of total tooth impactions[20] has been reported with lingual displacement the most common presentation.

In this case, the root of the lower right second premolar was positioned to the buccal in relation to the IAN (Figure 4), whereas the crown was positioned lingually in relation to adjacent teeth and the line of the arch. On placing a round archwire to move the crown into the line of the arch, a combination of extrusion and uncontrolled tipping (moment/force = 0) can be expected. The scanora cross-sectional image shows very close proximity of root and nerve (Figure 4). It is suggested that as a result of the uncontrolled buccal crown tipping, the root moved lingually leading to even closer proximity of root to the mental nerve. This resulted in the symptoms of numbness of the chin and lower lip.

It was not possible to demonstrate direct contact between the tooth root and the nerve on the radiographs. So what exact mechanism led to these symptoms? Is it compression of the nerve? Or an interruption of the blood supply? Or are inflammatory mediators such as prostaglandins leading not only to bone resorption but also to irritation of the nerve? There are reported examples for all these theories.

Exposing the dental pulp,[8,9] periradicular bacterial inflammation,[10,11] direct mechanical irritation of the nerve because of overextended root fillings,[21] inaccurately placed implants,[6] and mandibular sagittal split osteotomies[3,4] have resulted in mental paresthesia. However, the predisposing factors for mental paresthesia in patients undergoing orthodontic treatment are not clear.

It is shown that paresthesia in general affects women thrice more often than men. A summary of previously reported cases of mental paresthesia during orthodontic treatment[22–25] shows a female:male relationship of 4:2. The only involved teeth seem to be lower second premolars and lower second molars, with a distribution of 4:2 for the lower second premolar of which three were lingually and one mesially displaced. These findings could lead to an assumption that female patients with lingually displaced lower second

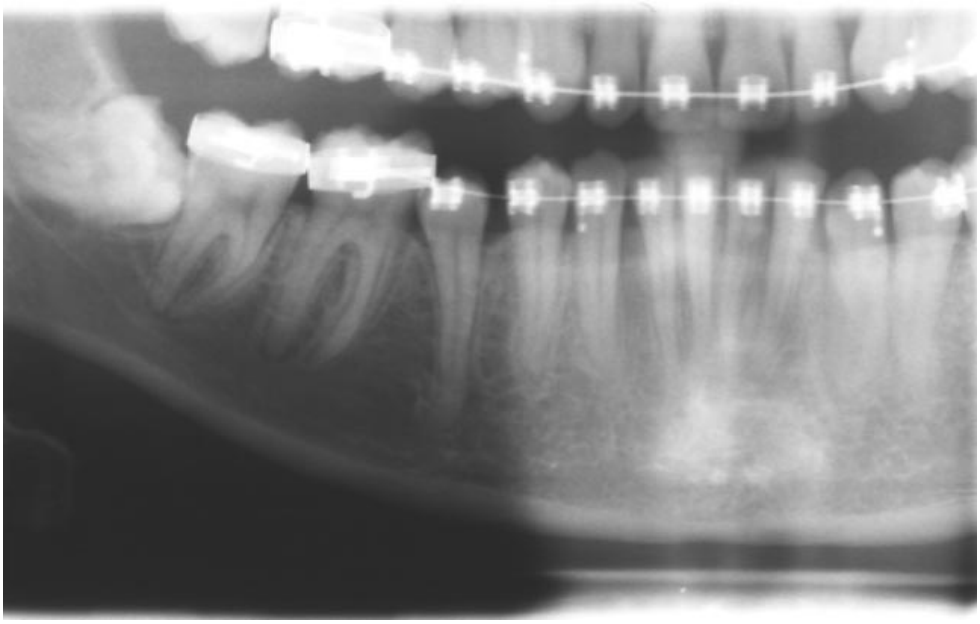

FIGURE 2. Sectional panoramic image of lower right quadrant.

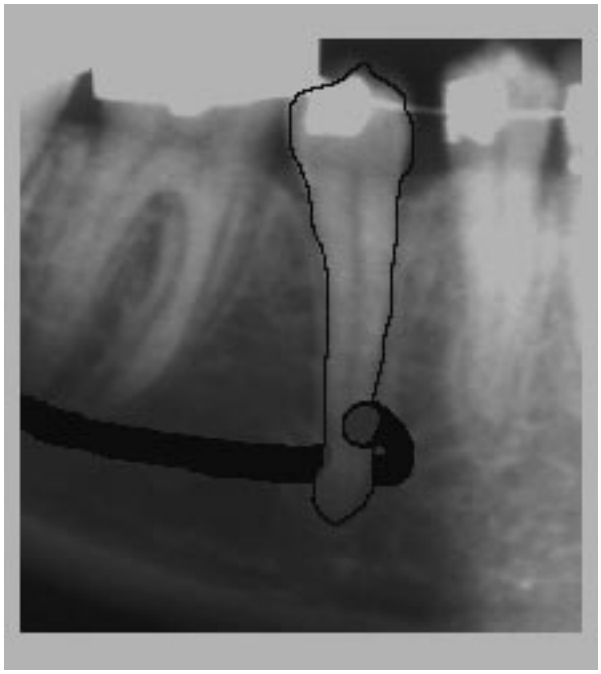

FIGURE 3. Schematic drawing of lower right second premolar and IAN. The IAN runs anteriorly lingually through the mandible, turning around the root of the lower right second premolar, passing through the mental foramen pointing in a posterior, superior, and buccal direction.

premolars are at higher risk to experience mental paresthesia. Other possible explanations are atypically long roots,[23] anatomical variation of the position of the IAN, additional branches of the IAN, lack of a bony wall around the IAN,[26] or a combination of these factors.

Patients who are at higher risk (female, lingually impacted/displaced lower second premolar) should be informed about the possibility of transient paresthesia before commencing treatment. In these patients, extensive root movements should be avoided if a close proximity between root and nerve is demonstrated. They should be advised to report any altered sensation immediately so that appropriate action can be taken. If the force direction cannot be altered, alternative strategies may need to be considered.

FIGURE 4. Scanora cross-sectional image. Two millimeter slice through the LR5.

FIGURE 5. Schematic drawing added to scanora cross-sectional seen in Figure 4 to demonstrate the close proximity of root and nerve.

In cases where symptoms remain for longer than 14 days after inactivation of any orthodontic forces, orthodontic treatment as the primary cause of the symptoms is unlikely. The patient should be referred for more specialist advice.

CONCLUSIONS

- Mental paresthesia is a rare finding in orthodontic treatment. Nevertheless, the literature shows that there are clinical situations where there is an increased risk of developing mental paresthesia during orthodontic treatment, especially when fixed appliances are used.
- Mental paresthesia may be a sequela of orthodontic tooth movement in a female patient with a lingually impacted lower second premolar.
- Patients in this group should be informed of this possible occurrence and advised to report symptoms immediately. They should be reassured that these symptoms are temporary and that a treatment protocol exists for management.
- In such cases, movement of the apices toward the IAN/mental foramen should be avoided, and the teeth extruded along the long axis before commencing extended root movements such as torquing and uncontrolled tipping.
- If mental paresthesia has occurred, immediate inactivation of the force system is advised. If there is a history of neuropathies or the symptoms do not resolve to normal after two weeks, the patient should be referred to an appropriate specialist.

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