JCO-Online Copyright 2003 - VOLUME 35 : NUMBER 11 : PAGES (657-662) 1998

CASE REPORT Ectopic Eruption of Mandibular Incisors

RICHARD A. NEWMAN, DMD
GEORGE V. NEWMAN, DDS

Ectopically erupting mandibular lateral incisors tend to become transposed with the adjacent cuspids and thus seem to warrant early orthodontic intervention. Early treatment may obviate later extractions or transposition of the incisors and canines in the permanent dentition.1

Angle treated such a case, in which the permanent left canine and lateral incisor were partially transposed, by leaving the canine mesial to the lateral incisor.2 Greenberg and Orlian reported an unerupted mandibular right canine that required surgical removal.3 Platzer showed preventive treatment of transposed mandibular lateral incisors using a lingual arch followed by an edgewise appliance,4 and other authors have presented similar techniques.5-8

Mandibular permanent incisors are the teeth most likely to erupt ectopically.9 The reason for such eruption is not clearly understood,3 but it may involve either prolonged retention of the deciduous predecessor10 or premature exfoliation of deciduous teeth.4 The following case supports the involvement of a genetic factor.11

Diagnosis

A 10-year-old boy presented with his mother's complaint that "his lower teeth don't look right". Examination from the front showed a symmetrical and well-balanced mesocephalic facial pattern. The patient exhibited a straight profile and a competent lip seal (Fig. 1).

Clinical examination revealed a Class I malocclusion with a deep overbite and moderate overjet. The dental midlines were not coincident, and there was a maxillary midline diastema.

The mandibular right lateral incisor had erupted ectopically between the deciduous cuspid and second molar. The deciduous right lateral incisor was over-retained, and the permanent cuspid was migrating mesially, anterior to the permanent lateral incisor.

The patient had a 5mm mandibular arch-length discrepancy, indicating insufficient arch length to accommodate the unerupted mandibular left lateral incisor. Cephalometric measurements were within normal limits (Table 1).

Treatment Plan

The treatment objectives were to create arch length for the permanent dentition while maintaining a Class I occlusion, align the teeth in their proper positions by avoiding transposition, and achieve ideal overbite and overjet. The treatment plan involved a maxillary biteplate with an anterior ledge, a lower lip bumper, and edgewise appliances.

Treatment Progress

The maxillary first molars were banded, with .022" X .028" X .050" double tubes. A biteplate with an anterior ledge was placed to promote bite opening and eliminate occlusal interferences. The incisors were later bonded and leveled using .022" preadjusted edgewise brackets.

The over-retained deciduous mandibular right lateral incisor and canine were extracted. The mandibular anterior teeth were bonded with .022" preadjusted edgewise brackets. On the first molar bands, the .022" X .028" occlusal tube was used for the main archwire, and the .050" gingival tube for an .045" lip bumper. The bumper uprighted the mandibular molars, prevented them from migrating mesially, and supplied anchorage. Passive expansion was added on the left side with .046" comfort tubing.

After the eruption of the left lateral incisor, the mandibular incisors were ligated together, and a 100g elastic chain was extended from the malposed right lateral incisor to the right central incisor (Fig. 2). This light force was continued until the right lateral incisor contacted the central incisor.

A lingual button was bonded to the right lateral incisor to produce mesiolabial rotation. Nickel titanium open-coil springs were used to maintain arch length until the eruption of the mandibular right first premolar (Fig. 3). The lip bumper also helped maintain arch length throughout treatment by taking advantage of the "E" space and by permitting passive expansion of the premolars through lingual pressure.

The dental eruption pattern was slow, as indicated by the apparently impacted mandibular second molars (Fig. 4). To facilitate the eruption of the mandibular right first premolar, the mandibular right second deciduous molar was reproximated on its mesial surface. Once sufficient space had been created, the right canine erupted.

The mandibular second molars were bonded with .022" X .028" buccal tubes. Mandibular leveling and alignment and bite opening were carried out with .016" nickel titanium and .016" and .018" stainless steel archwires. The mandibular right first and second premolars were reproximated for final alignment.

A reverse-curve .018" looped maxillary archwire was placed to open the bite further and to close the remaining spaces (Fig. 5). The midline was corrected with anterior crossbite elastics.

Rectangular archwires were not used for finishing because the IMPA and $\underline{1}$-NS measurements from the progress cephalogram indicated favorable esthetics, stability, and function.

Treatment Results

Active treatment took two years, due to the delayed eruption of the mandibular permanent premolars, the displaced canines, and the second molars (Fig. 6). A preformed tooth positioner was used for retention.

Growth and orthodontic treatment produced favorable mandibular expansion and downward and forward movement (Fig. 7). The maxillary and mandibular molars were extruded. Three and a half years after the completion of treatment, the results remained satisfactorily stable.

Discussion

Most reports of ectopically erupted mandibular lateral incisors have been anecdotal. A review of the accumulated evidence, however, supports the scenario of prolonged retention of the deciduous lateral incisors and canines causing the permanent incisors to erupt along the path of least resistance. In this case, the lateral incisor erupted into the first deciduous molar area, and the canines migrated mesially.

According to Sperber, the order of location of the incisors, canines, and premolars is genetically predetermined by DNA coding.12 He believes that genetic "fields" cause tooth transposition as a result of family field gene function.

The younger brother of the patient shown here was first observed at age 9, after his parents became aware of the older brother's malocclusion. His mandibular right and left lateral incisors were seen to be migrating and rotating distally into the first deciduous molar spaces, and the canines were beginning to migrate mesially (Fig. 8). Based on the experience with the older brother, early intervention was undertaken. This patient is still under treatment, but we expect the results to be similar to his brother's (Fig. 9).

Conclusion

These two cases lend credence to the hypothesis of genetic determinants in ectopic eruption of mandibular incisors.11 Early intervention can eliminate the need for later extractions and prevent problems such as impaction, canine migration, and incisor-canine transposition. Although treatment may be lengthened by awaiting the eruption of the permanent canines and second molars, this disadvantage must be weighed against the possible consequences of delay. □

FIGURES

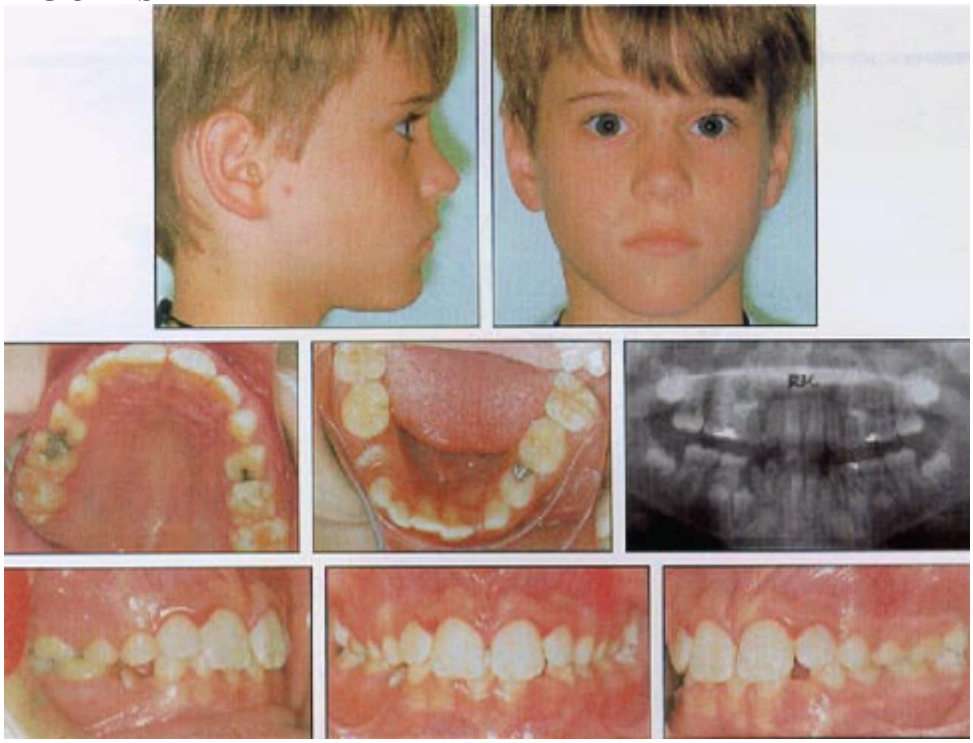

Fig. 1 10-year-old male with ectopically erupting mandibular right lateral incisor before treatment.

Fig. 2 Maxillary biteplate with anterior ledge to open bite. Note lower lip bumper and elastic chain from right lateral incisor to anterior unit.

Fig. 3 A. Nickel titanium open-coil springs used to maintain arch length. B. Distalizing spring used to create space for unerupted right canine.

Fig. 4 Progress panoramic radiograph shows apparent impaction of mandibular second molars. Mandibular canines have uprighted and are erupting into proper positions.

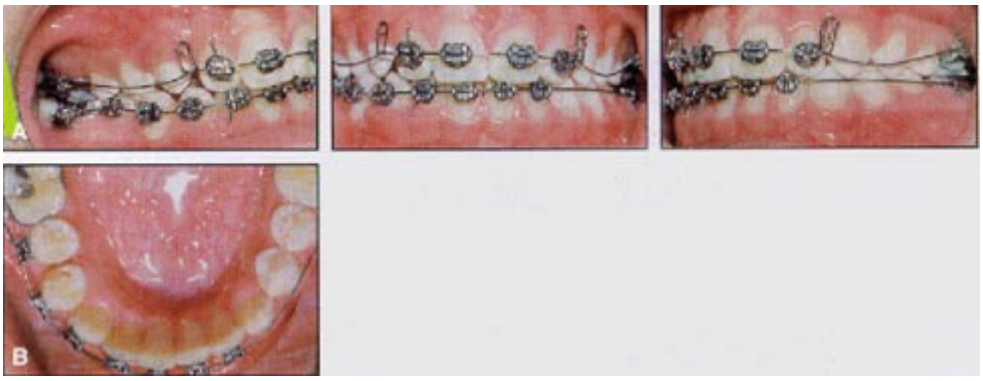

Fig. 5 A. Reverse-curve .018" looped maxillary archwire used to open bite and close remaining spaces. B. Reproximation of mandibular right first and second premolars.

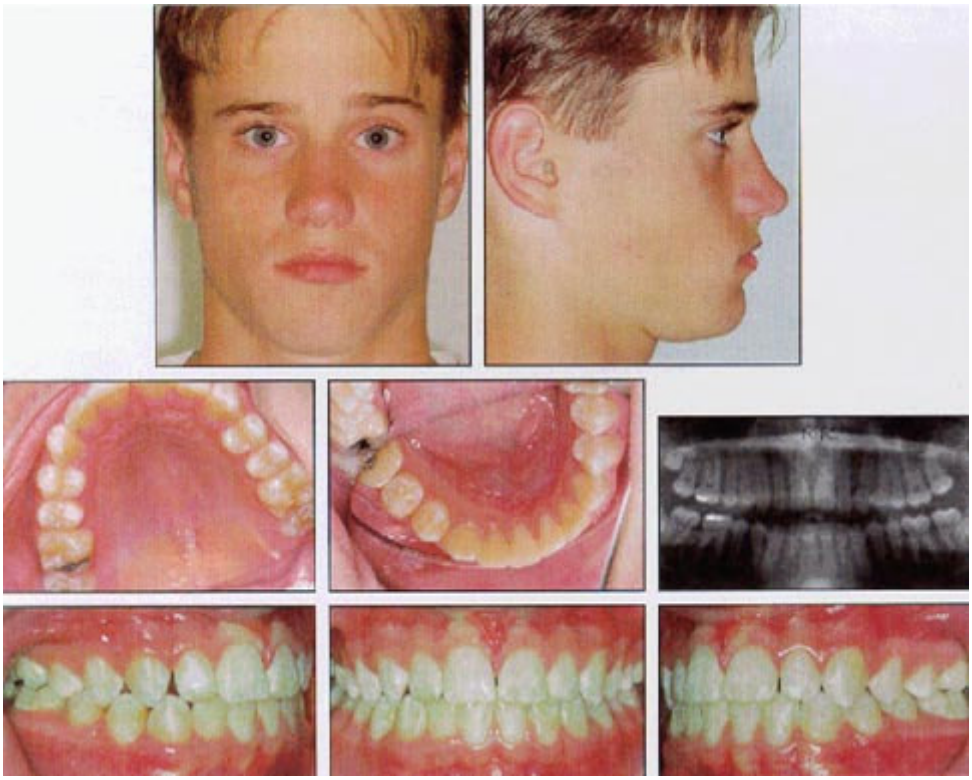

Fig. 6 After 24 months of treatment, mandibular lateral incisors and canines are properly aligned.

Fig. 7 Superimposition of cephalometric tracings before and after treatment indicates favorable downward and forward mandibular growth.

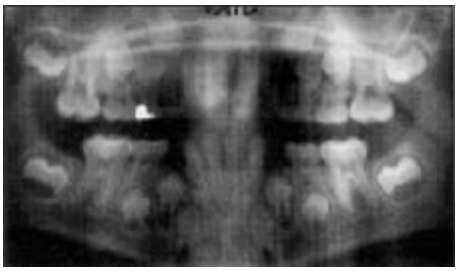

Fig. 8 Brother of first patient at age 9. Note distal eruption of mandibular lateral incisors and mesial migration of mandibular canines.

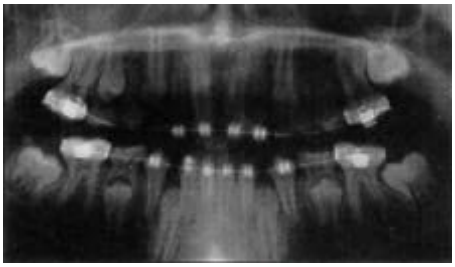

Fig. 9 Progress panoramic radiograph shows alignment of mandibular incisors and vertical eruption of mandibular canines.

TABLES

TABLE 1
CEPHALOMETRIC DATA

	Pretreatment	Post-Treatment
SNA	77°	78°
SNB	75°	77°
ANB	2°	1°
FMA	28°	23°
Y-axis	58°	56°
1-NS	100°	105°
IMPA	88°	90°
Interincisal angle	135°	130°
T-NB	3.5mm	3.0mm
NB-Po	0mm	1mm
STA	8°	7°

Table. 1

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FOOTNOTES

1 General Orthodonic Supply, Inc., P.O. Box 298, West Orange, NJ 07052.