Ectopic eruption of lower lateral incisors: initial treatment with removable appliance – case report

Erupção ectópica de incisivos laterais inferiores: tratamento inicial com aparelho removível – relato de caso

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Keywords:

RESUMO
O objetivo deste artigo foi apresentar uma alternativa de tratamento para correção de incisivos laterais inferiores com erupção ectópica através do uso de aparelho removível com molas digitais. O artigo demonstrou a eficácia deste tipo de aparelho no caso clínico apresentado – estágio precoce da dentadura mista – evitando o estabelecimento de uma transposição dentária e facilitando a finalização do caso com o uso de aparelho ortodôntico fixo.

INTRODUCTION
During the mixed dentition, significant teeth alterations can be observed. These alterations may affect occlusion development. Ectopic eruption and transposition are some of the disturbances observed in this period. Ectopic eruptions occur when the natural sequence of eruption is altered, leading to teeth transpositions in extreme cases.

Transposition is a positional anomaly of the teeth which is described as a positional interchange of two adjacent teeth. Also, a tooth development or eruption in a position normally occupied by a non-adjacent tooth may cause transpositions. Amongst all the possibilities of transpositions, the mandibular lateral incisor-canine transposition is the rarest, affecting only 0.03% of the cases, showing a clear preference to women. Unilateral transpositions have been reported more frequently than bilateral transpositions, and the left side has been involved more often than the right side. Interchange in position of the developing tooth buds, lack of the deciduous teeth root resorption, and mechanical interferences to the erupting permanent teeth are commonly correlated with transpositions. Genetic heritage, trauma and bone pathologies are also accepted as etiologic factors in the development of transpositions.

Transposition in the mandible is typically a result of distal migration of the mandibular lateral incisor, and they can be classified as complete or incomplete. In a complete transposition case, both crowns and roots of the involved teeth are in a transposed position, whereas in an incomplete transposition only the crowns are transposed, and the root apices remain in a normal position.

Early detection and diagnosis plays an important role in ectopic eruption. When the transposition is prematurely discovered, orthodontic correction can be attempted, which can also avoid root resorption of adjacent teeth. The three main clinical findings observed in the early stages of the mandibular lateral incisor ectopic eruption are: distal tipping, coronal displacement and severe mesiolingual rotation. At this point, in order to avoid a mandibular lateral incisor - canine transposition, an interceptive procedure is important to achieve teeth aligning in their correct positions. However, if the transposition is already present in the beginning of the treatment, simple teeth alignment in their current transposed position is preferred. Dramatic teeth movement carries a higher risk of damaging the teeth and supporting structures.

In the present work, a mandibular lateral incisive canine transposition was avoided by using a removable appliance with digital springs, followed by fixed appliance.

CASE REPORT
An eight years girl was referred by her clinical dentist to orthodontic treatment due to the ectopic eruption of the permanent mandibular lateral incisors. Clinical examination showed a patient in the early mixed dentition stage with a Class II dental relationship, a 3.0 mm overjet and a 3.5 mm overbite. The mandibular dental midline was deviated 3.5 mm.
mm to the left of the maxillary dental and facial midlines. The primary mandibular right canine and lateral incisive were not exfoliated.

The analyze of dental casts, intraoral photographs (Figures 1a, 1b, 1c, 1d, 1e), panoramic and periapical radiographs (Figure 2) and lateral cephalometric radiograph revealed that first mandibular premolars and permanent canines were impacted by the severe inclination of the mandibular lateral incisors. According to this, a treatment plan was made to avoid a dental transposition, allowing the eruption of the impacted teeth.

Primary lower right lateral incisor and canine were surgically extracted before the beginning of the treatment in order to increase the space for the alignment of the permanent lateral incisor and to correct the mandibular dental midline. After the extractions, a removable appliance with springs in both sides and a screw in the middle (Figure 3) was used to provide the mesial movement of the permanent mandibular lateral incisors, allowing the eruption of the first mandibular premolar and canine, bilaterally. The screw was used to increase the lower arch length. The patient was monthly scheduled for recall appointments. Activations of the springs were made for a period of ten months and six activations of ¼ turn were made in the screw.

Concomitant with the use of the removable appliance, the patient used a high-pull headgear appliance. This appliance was used overnight (eight hours/day), for fifteen months and with a 300g charge in both sides. The headgear was used to correct the dental Class II and to provide enough space for the eruption of the upper permanent canines.

Follow-up periapical and panoramic radiographs were performed to evaluate the movement of the mandibular permanent teeth.
lateral incisors and their relationship with the adjacent teeth. After five months of treatment, right canine and lateral incisor were still crossed and the left canine was impacted, as shown by periapical radiographs (Figure 4). After ten months using the removable appliance, the permanent lateral incisors were closer to the central incisors. At this time, the treatment with the removable appliance was interrupted and a lingual arch was used to maintain the dimensions of the mandibular arch. After eleven months, follow-up panoramic and periapical radiographs were performed (Figure 5), showing a satisfactory result at this time point. Three months after the installation of the lingual arch, a lower fixed appliance was used to get the proper alignment and leveling and to provide space for the eruption of the lower premolars and canines.

Figura 3. Removable appliance with springs in both sides to provide the mesial movement of the permanent mandibular lateral incisors and a screw in the middle used to increase the lower arch length. Note the digital spring in zoomed image.

Figura 4. Periapical radiographs after 5 months of the treatment. Right canine and lateral incisor were crossed. Left canine was impacted.

Figura 5. Panoramic and periapical radiographs after 11 months of the treatment, showing a consider improvement in dental position at this time point.
The case was finished with a complete fixed appliance (lower and upper) to get the correct alignment of the teeth and to get a good intercuspitation and occlusion (Figure 6). The final result was functionally (Figure 7) and esthetically (Figures 8a, 8b, 8c, 8d, 8e) satisfactory. Total treatment was completed in 48 months and was followed by placement of a maxillary Hawley retainer and a lingual-bonded canine-to-canine retainer.

**DISCUSSION**

Lateral incisor-canine transpositions are rare, mainly in the mandible, where the high density of bone might difficult tooth transposition\(^1\)\(^2\). When this type of transposition occurs, it is often associated with a distal migration of the man-
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