ISSN: 0976-3031

Available Online at http://www.recentscientific.com

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 9, Issue, 9(E), pp. 28962-28964, September, 2018

International Journal of Recent Scientific Research

DOI: 10.24327/IJRSR

CASE REPORT

MANAGEMENT OF BILATERALLY TRANSPOSED CANINES- A CASE REPORT

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DOI: http://dx.doi.org/10.24327/ijrsr.2018.0909.2769

ARTICLE INFO

Article History:

Received 6th June, 2018
Received in revised form 15th July, 2018
Accepted 12th August, 2018
Published online 28th September, 2018

Key Words:

Transposition, Mini implant, Orthodontic management, Ectopic eruption

ABSTRACT

"Transposition" is defined as an interchange in the position of two teeth within the same quadrant of the dental arch. Canines are the most frequently transposed teeth (1) in dental arch owing to the fact that they have slower development, longer eruption pathway and last anterior teeth to erupt in the mouth hence, have insufficient amount of space, which often results in ectopic eruption. This case report illustrates the treatment of a 14 year old female patient with transposed maxillary canines and premolars. The treatment progressed through mini-screw supported anchorage to orthodontically move 13 to the normal anatomic position and to maintain 23 in the transposed position between the 1st and 2nd premolar in the 2nd quadrant. The treatment duration was 24 months at the end of which debonding was carried out and stable occlusion was established. The case report also presents an one-year follow up of the occlusion. The treatment gave an acceptable esthetic result, occlusion, patient comfort, patient and parent satisfaction, treatment duration, periodontal support. The patient and her parents were extremely satisfied with the results.

INTRODUCTION

Canines are the most frequently transposed teeth (1) in dental arch owing to the fact that they have slower development, longer eruption pathway and last anterior teeth to erupt in the mouth hence, have insufficient amount of space, which often results in ectopic eruption.

"Transposition" is defined as an interchange in the position of two teeth within the same quadrant of the dental arch (2). Maxillary canine-premolar transposition (MxC.P1) is the most frequent transposition and shows higher prevalence in maxilla and may occur as a result of displacement of developing tooth bud (3) , ectopic eruption of the maxillary canine (4) , genetic influence during its development (5) , tumors and cysts (6), retained deciduous canines, lack of deciduous canine root resorption, supernumerary teeth and might lead to patient dissatisfaction both functionally and esthetically. Transposition can be complete or incomplete. In true transposition, the entire dental structure (root and crown) is in an ectopic position. In psuedo transposition, the crowns are ectopic, but the roots are in the correct position.(7) Peck, EM Miel was the first to describe the maxillary canine- first premolar transposition in 1817.

This case report illustrates the treatment of a 14 year old female patient who reported to the department of orthodontics with a chief complaint of irregularly placed teeth in the upper front tooth region. On extra oral examination patient had good facial proportions, competent lips, non-consonant smile and reduced lower facial height. Profile and divergence of the patient was straight with low clinical FMA.

Clinical examination revealed bilateral over retained primary canines 53, 63, Transpositioned permanent canines 13 (labially positioned in relation to 12), 23 (located between 24 and 25), classified as Psuedo transposition on the right (Mx.C.I1) and true transposition of canine and premolar on the left (Mx.C.P1) according to Peck and Peck. Rotated 14, 15, 25 along with crowding in the upper and lower anteriors was also observed. Overjet of 2mm and overbite of 3mm was noted.

Diagnosis

Patient was diagnosed with angle's class I dentoalveolar malocclusion on a class I skeletal base with orthognathic maxilla and orthognathic mandible. Cephalometric analysis revealed class I skeletal base with ANB of 2 degrees and low vertical proportions (FMA=20 degrees). OPG revealed bilateral retained deciduous canines and transposition in relation to 13

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and 23 and root resorption was observed in 11 in the apical third prior to the start of orthodontic treatment.

Fig.1 - Pretreatment records of a 14 year old female patient who presented with bilaterally transposition permanent canines

Treatment Alternatives

Treatment alternatives considered were, correcting the order of transposed teeth or maintaining the order of transposed teeth after considering the prognosis in preventing root resorption. Bearing in mind the good profile characteristics and the sufficient space availability for correction of crowding, non-extraction treatment plan was considered depending on the viability of the treatment option to prevent root resorption.

The treatment goals were to maintain

- Class-I molar relationship
- Achieve ideal overjet and overbite
- Maintain the order of transposed teeth by substituting maxillary first premolar as canine on the left maxillary quadrant,
- To achieve normal anatomic position of the 13 on right maxillary quadrant
- Achieve good facial balance.
- A good mutually protected occlusion was considered as the functional goal.

Treatment plan

The orthodontic goal, after considering the complete nature of the transposition, facial profile, lip position, smile height, crowding, cephalometric values and dental casts was to focus on improving the facial esthetics along with the dental relations.

Plan was to initiate extraction of 53 and 63.

Orthodontically move 13 to the normal anatomic position.
To maintain 23 in the transposed position between the 1st and 2nd premolar in the 2nd quadrant so as to prevent root resorption, and simultaneously derotate the premolars, followed by decrowding of upper and lower anteriors.

Treatment progress

Treatment was initiated by banding of the permanent first molars followed by upper strap up excluding 23 with initial upper 0.014 NiTi archwire. A modified transpalatal arch for vertical control with extensions up to the lateral incisors, to prevent palatal tipping while canines are being retracted was given. Lingual buttons were given on to the palatal aspect of 15, 25 and engaged to the TPA via e-chain to facilitate derotation.

On the right side, after initial alignment, ligature tie was given from canine to molar hook in order to bring about distalization and bring it to occlusion. After adequate distalization was achieved on the right upper quadrant, ligature tie was given from the canine to the 1st premolar in order to bring it to occlusion. On the left side, an open coil spring was given on the upper quadrant in order to achieve enough space for the canine to come into occlusion.

After initial alignment, piggy back technique was used to engage 13 with 0.014 NiTi archwire and bypass bend was given using base archwire, 0.018 SS in relation to 23 in order to let the canine erupt without wire interference.
In the next appointment, miniscrew implant was given anteriorly, on the left side between the 21 and 22 root. E-chain was given from this implant to 13 in order to prevent buccal drifting of canine.

Miniscrew implant was given between 15 and 16 on the right side and a power chain was engaged on to the composite button placed gingivally on canine. Composite button was given in order to bring about pure translation of canine after which in the same appointment lower arch was strapped up.Finally, Box elastics were given for settling.

Fig.2 - During treatment records

Treatment results

Adequate facial proportions were obtained at the end of treatment with competent lips. The facial photographs showed a pleasant smile. The crowns and roots of the transposed teeth had been corrected to occupy desired positions and the gingivae of transposed teeth showed no signs of inflammation.

Radiographically, root parallelism was acceptable. Existing root resorption observed on 11 did not deteriorate due to the orthodontic treatment. A good overjet and overbite with Class I molar and canine relationship was obtained (Fig.3). The lingual cusp of the left first premolar was not contoured since it did not interfere during opening and sliding movements. 1 year post treatment photographs showed stable occlusal results with no mobility in relation to 11(Fig.4).

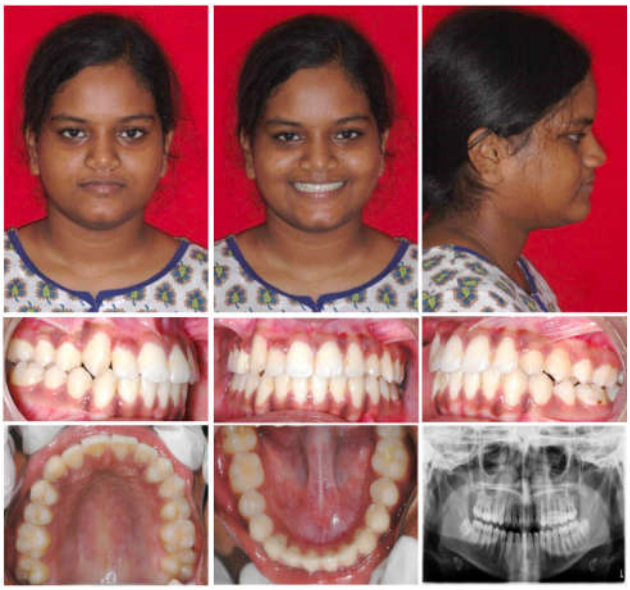

Fig.3 - Post-treatment records

Fig.4-One-year Follow-up Records

DISCUSSION

The maxillary permanent canine tooth is the most frequently involved in transposition and is considered most difficult to treat. Etiology of present case is due to retained deciduous canines Treatment plan, usually decided in such cases is to maintain the transposed position (8), correction of teeth to their normal position (9), or extraction is considered in case of arch length discrepancy. In this patient extraction treatment was not considered as there was no arch length deficiency.

It was decided to correct the tooth to their normal position on the right since sufficient space was available for the canine to be retracted. On the left side it was maintained in the transposed order since the transposition was complete and the following treatment plan would prevent root resorption and preserve the vitality of the tooth since its root may move out of bone support while moving across the transposed tooth (10) and it may increase the treatment duration significantly.

The disadvantages of aligning the teeth in the transposed order are esthetic and functional problems. Esthetic disadvantage resulted in cases of canine-premolar transposition on the left side due to the gingival contour and tooth size. There was no functional problem that was encountered since the lingual cusp of the first premolar did not create any functional interference. Patient did not give consent for gingival contouring in relation to 24. The residual distal tip in 13 was not negated due to patient's requirement on early debonding. Canine guided occlusion could not be established because of substituition. Group function occlusion was established.

The following treatment plan gave an acceptable esthetic result, occlusion, patient comfort, patient and parent satisfaction, treatment duration, periodontal support. The patient and her parents were extremely satisfied with the results.

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