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ORTHODONTIC CORRECTION OF COMPLETE TRANSPOSITION BETWEEN MAXILLARY CANINE & LATERAL INCISOR : A CASE REPORT

Dr.Amit Shaw*	Assistant Professor Department Of Orthodontics And Dentofacial Orthopaedics Burdwan Dental College & Hospital. *Corresponding Author
Dr.Kasturi Mukherjee	Assistant Professor Department Of Orthodontics And Dentofacial Orthopaedics Burdwan Dental College & Hospital
Dr.Manas Banerjee	Associate Professor Department of Orthodontics and Dentofacial Orthopaedics Burdwan Dental College & Hospital
Dr.Samit Mondol	Assistant Professor Department of Orthodontics and Dentofacial Orthopaedics Burdwan Dental College & Hospital
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ABSTRACT Iransposition of maxillary teeth is not very uncommon finding in clinical practice and poses a chanenge to the clinical. Maxillary canine is the most commonly involved tooth in transposition exchanging its place with either lateral incisor or first premolar. This case report describes successful management of a case of transposition between maxillary canine and lateral incisor involving right side only with an insight into etiology, treatment alternatives and treatment procedure. This case had been treated with extraction of all four 1st premolars and involved teeth were successfully moved to their clinically normal position without any significant damage to supporting structures or roots.

KEYWORDS : Transposition, Maxillary Canine, Orthodontic Correction

INTRODUCTION

Transposition is an unusual type of ectopic eruption in which two adjacent permanent teeth have interchanged their location in the dental arch. It may be **Complete** when both the crown and entire root structure of the involved teeth are parallel in their transposed position, or **Incomplete** when crowns are transposed but root apices are in their normal position.⁸

Maxillary tooth transposition most frequently involves the canine with the 1st premolar (55%) and less often with the lateral incisor (42%). Unilateral occurrence is usual(88%) with a higher involvement of left side.¹⁰ In a study on Indian population transposition between canine and lateral incisor found to be most frequent (70%) followed by canine and premolar (30%)¹

The resulting occlusion, apart from the negative esthetic impact, is impaired since the protrusive and lateral mandibular excursions are frequently compromised and future stability of the dentition might be jeopardized.⁷

ETIOLOGY

Stafne "and Joshi and Bhatt⁴ suggested an interchange in position of the tooth bud of canine with that of another tooth at early anlage stage tooth development. In others' opinion, because the abnormality is reported most often unilaterally, it probably occurs as a result of change in the usual pre-eruptive path of canine.³ Long eruptive path of canine, in labial and mesial direction from under the orbit to its usual position in the dental arch, supports the later theory.

CASE PRESENTATION

An 11yr old boy was referred to Dept. of Orthodontics, Burdwan Dental College from Dept. of Pedodontics with the complaint of crowded teeth. On examination the boy was found to possess a class I malocclusion with crowding in both upper and lower arch anterior segment, deep bite and maxillary right canine ectopically erupted mesial to right lateral incisor. Canine relationship is class II on both sides. Maxillary arch midline is deviated to the right.





Pre treatment intraoral photographs Fig. 1(frontal), Fig.2(right lateral), Fig. 3(left lateral), Fig. 4(occlusal), Fig.5(occlusal)

After examination of OPG diagnosis of complete transposition between maxillary canine and lateral incisor is confirmed involving the right side, as the root of canine is completely mesial and parallel to root of lateral incisor.



(Fig. 6: Pre treatment OPG)

Treatment Objective

- To bring the ectopically erupted maxillary canine to its correct position in dental arch.
- 2. Correction of crowding
- 3. Correction of deep bite
- 4. Midline correction
- 5. Maintain esthetic harmony

Treatment Plan

The amount of space discrepancy and deep overbite dictates all four 1st premolars extractions. MBT prescription with 022 slot was used.

Treatment Progress

Stage 1: alignment and levelling started in upper and lower arch without involving the transposed canine with 014 NiTi and progressed to 017/025 SS

Stage 2: A modified T-loop which has mesial leg shorter than distal leg

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is attached to the auxiliary molar tube at distal end and to high labially positioned canine at mesial end. The loop is positioned off-centre at the junction of distal 1/3rd and mesial 2/3rd of the distance between molar and canine bracket so that the canine experience an intrusive force during its distal traction. The force level is kept very low keeping in mind thin labial alveolar bone and to maintain high moment to force ratio.

At the same time a NiTi open coil spring is used in the base archwire (017/025 SS) to move the maxillary lateral incisor root in mesial direction and to correct maxillary arch midline which was deviated to the right. The built in palatal torque present in maxillary lateral incisor bracket (10°) helps in keeping lateral incisor root away from transposed canine during its mesial movement.

Stage 3: there was mild distal tipping and disto-lingual rotation of crown of transposed canine after retraction by T-loop which was corrected with an uprighting spring and a couple.



(Fig. 7: Uprighting and derotation of canine)

Stage 5: Alignment with a continuous 018 NiTi followed by closure of residual extraction spaces in 019/025 SS wire and finally settling of occlusion. An effort was made to lose anchorage to keep the upper and lower incisor in good labio-lingual position, supporting the lips in balance with the face



(Fig 8, 9,10: Occlusion before debonding of brackets)

The post-treatment results showed the correction of the crowding, the transposition, deep bite and the maxillary dental midline. The face and the smile were very pleasant.



Fig 11-15: Post treatment intraoral photographs



(Fig. 16: Post treatment OPG) 16



Fig 17,18: Smile – Before & After

DISCUSSION

Clinical management of Mx.C.I2 comprises the following treatment options:⁹

- If detected early enough at the age of 6-8 yrs in a radiograph, a 1. developing transposition can be intercepted by guiding the eruption of the transposed tooth to its normal position by extracting the deciduous canine and maintaining the space by a lingua arch or palatal arch. This option is favourable if the transposition is incomplete or pseudotransposition.
- 2 Alignment of teeth in their transposed positions followed by reshaping their incisal or occlusal surfaces and using composite materials for restorative camouflage.
- Extraction of one of the transposed teeth followed by orthodontic 3. correction. This strategy is useful when other factors such as crowding and caries indicate extraction.
- 4 Orthodontic tooth movement to the correct intraarch position.

The most preferable option, esthetically and functionally, is to move the transposed teeth to their normal position in the arch by orthodontic treatment but anatomic barriers do not make it feasible always. Shapira and Kutifenac⁹ recommend orthodontic correction for incomplete transpositions. In case of complete transposition with root apices in their transposed position, repositioning to their correct relationship is certainly more complex and may cause root resorption or dehiscence of labial alveolar bone, particularly if the canine is fully erupted. In such cases alignment of the teeth in their transposed position and reshaping incisal edges is an acceptable compromise.

A favourable situation for correction of complete Mx.C.I2 transposition exists if canine is not fully erupted, a greater width of alveolar bone is then available to make room for distal movement of canine while it is still in a high position.² Several authors 2, 5, 6, 7, 8recommend moving the transposed lateral incisor palatally and making enough bucco-lingual width of alveolar bone before moving the canine to its normal position. Once it is achieved the lateral incisor is again moved labially back to its normal position.

In this case as the transposed canine was high labially positioned sufficient alveolar bone around its root apex was expected and distalization with T-loop was tried. Mesial movement of lateral incisor with open coil spring clears the path for distal movement of canine. Correction of transposition was achieved uneventfully without any gingival recession, dehiscence or fenestration. However treatment time was long (appox. 3 yrs) and in post-treatment OPG root resorption of both the transposed teeth was evident.

CONCLUSION

Orthodontic correction of complete transposition between maxillary canine and lateral incisor can be tried if canine is not fully erupted in occlusion. It is most difficult and time consuming among all treatment options but gives best functional and esthetic result. Patient cooperation and chances of root resorption are of concern because of long treatment time and significant amount of root movement experienced by the transposed teeth.

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