

MANAGEMENT OF MAXILLARY IMPACTED CANINE : A CASE REPORT

Dr. Manidipa Das*, Dr. Samiran Biswas**, Dr. Partha Pratim Choudhury***
 Prof.(Dr.) Rup Kumar Das****, Prof. (Dr.) Amal Kumar Chakrabarti*****
 Dr. Soubhik Pakhira*****

ABSTRACT

Maxillary canines are the cornerstone of the occlusion. A fully erupted maxillary canine supports the facial muscles and lip of an individual. Thus it plays a pivotal role in providing aesthetic facial harmony and aids in oral function. Its position is a turning point in the occlusion and act as guidepost by virtue of its location. Sometimes canine may fail to erupt in time and those unerupted canines are designated as 'impacted canine'. Impacted canine is a common finding in the general population. Impacted canine in an adult person gives rise to numerous psychological and social issues. There is no sole concrete procedure regarding its management. Different orthodontic guidelines were advocated in the literature to surface impacted maxillary canine to its ideal position. All the methods were subjected to modification due to individual variation. In this article, a case of impacted maxillary canine from Dr R Ahmed Dental College and Hospital, Kolkata is elaborated.

KEY WORDS

canine, impacted tooth, orthodontic anchorage preparation

ABOUT THE AUTHORS

*Final year PG student, Dept of Orthodontics, Dr. R. Ahmed Dental College & Hospital, Kol-14

**Dental Surgeon (MDS, Orthodontics), West Bengal Dental Service

***Assistant Professor, Dept of Orthodontics, Dr. R. Ahmed Dental College & Hospital, Kol-14

****Professor & HOD, Dept of Orthodontics, Dr. R. Ahmed Dental College & Hospital, Kol-14

*****Professor, Dept of Orthodontics

Dr. R. Ahmed Dental College & Hospital, Kol-14

*****PGT, Department of Oral and Maxillofacial Surgery,

Dr. R. Ahmed Dental College & Hospital, Kol-14

CORRESPONDING AUTHOR

Dr. Soubhik Pakhira

PGT, Department of Oral and Maxillofacial Surgery

Dr. R. Ahmed Dental College and Hospital

INTRODUCTION

A full set of permanent teeth is necessary for stable occlusion. But certain tooth impaction like non erupted canine may jeopardise oro-facial harmony. Clinically missing maxillary canine affects both aesthetic and functional balance of an individual as a whole¹. The cause of maxillary canine impaction may be attributed to its long path of eruption and the additive influence of genetic factors, lack of space in the dental arch or other impediments, trauma and consequences of concerned systemic diseases^{3,4}. It is estimated that the incidence of palatal impaction exceeds that of labial impaction by a ratio of at least 2:1 or 3:1¹. Before framing a treatment plan for the management of maxillary canine impaction it is necessary to examine the each case meticulously with the help of radiographic and/or cone beam computed tomography (CBCT). Preliminary clinical assessment like retention of deciduous canine, delayed eruption of maxillary canine, buccal or palatal bulging, midline deviation may provide a hint of hopeless maxillary canine eruption⁵. If not observed in time, the impacted maxillary canine may lead to secondary problems. The interdisciplinary management should be started at the earliest⁶. Such cases are managed initially by surgical exposure of the impacted canine followed by calculated orthodontic traction. Logically biomechanical knowledge is required to emphasize an optimal system of forces for each desired movement⁷. In certain cases the decision to extract the impacted canine is taken when the location is in an unfavourable position which may cause complications⁸. Such decision should be taken very seriously because of its role in smile aesthetics and masticatory functions.

In the literature there is a mixed consensus regarding the management of maxillary impacted canine. The treatment protocol should be decided by the clinician based on the need of the subject considering all the factors like treatment time period, expenditure, expectation of the patient and availability of the infrastructure. Here a case of maxillary canine impaction and its sequential management is reported. Multidisciplinary approaches were taken to bring the impacted canine to its desired position.



Fig. 1A



Fig. 1B



Fig. 1C



Fig. 1D



Fig. 2A



Fig. 2B



Fig. 2C



Fig. 2D



Fig. 2E

CASE REPORT

A female patient of 16 years age, came to the Department of Orthodontics and Dentofacial Orthopaedics, Dr. R Ahmed Dental College and Hospital, Kolkata with a complaint of irregularly placed upper front teeth. She had no relevant medical history so as to contraindicate any orthodontic or surgical treatment.

Extra oral examination:

On extra oral examination, she had a straight profile with a typical leptoprosopic face. Lips were competent. Face was apparently symmetrical. Hertemporo-mandibular joint appeared to be normal on examination. There was no deviation on opening and closing of mandible (Fig. 1A-1D).

Intra oral examination:

On intra-oral examination, end on molar relationship and end on canine relationship on right side and on left side canine relation is not established as deciduous canines are present. The occlusion was

having 3.5 mm of overjet and 6 mm of deep bite. A complete deep bite was noted. The maxillary and mandibular incisors were retroclined. The maxillary dental midline appears to be coincident with the facial midline but there is a deviation of 2 mm of lower midline towards left side. There were retained maxillary deciduous canines. The maxillary right canine was on the verge of eruption and left untreated and predicted to erupt during the course of orthodontic correction of malocclusion and canine bulge is palpable labially. There was a distopalatal rotation of maxillary lateral incisors. Scissor bite noticed in right premolars region (Fig. 2A-2E). There was a mesiopalatal rotation of maxillary right canine. A moderate crowding in maxillary anterior region and mild crowding in lower anterior region were noted.

Radiographic examination:

The panoramic radiograph showed a complete permanent dentition with left maxillary canine impaction (Fig. 3A-3C). There was no pathology observed radiographically associated with the impacted canine.

PROBLEMLIST

Soft tissue problems:

1. Everted upper lip
2. Deep mentolabial sulcus

Dental problems:

1. Distopalatal rotation of 12 and 22 teeth.
2. Mesiopalatal rotation 13 tooth.
3. Mesiolingual rotation of 32 and 43 teeth.
4. Moderate crowding in upper anterior region and mild crowding in lower anterior region.
5. Inadequate space for canine.



Fig. 3A



Fig. 3B



Fig. 3C



Fig. 4



Fig. 5A

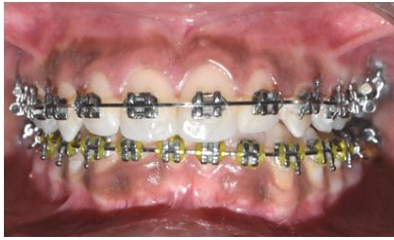


Fig. 5B

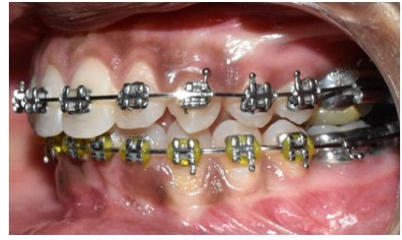


Fig. 5C



Fig. 5D



Fig. 5E



Fig. 5F



Fig. 5G



Fig. 5H



Fig. 5I



Fig. 5J



Fig. 5K

TREATMENT OBJECTIVES

1. To establish the class I molar relation and class I canine relation bilaterally.
2. To attain normal overjet and overbite.
3. To correct scissor bite in 45 region.
4. To correct the inclination and align of the upper and lower anteriors in the basal bone.
5. To correct the rotation of 12,22,13,32,43
6. To improve the smile and aesthetics and overall appearance

CLINICAL EVALUATION

Clinical assessment and visual inspection revealed the presence of canine bulge between the lateral incisor and first premolar on the left side (Fig.

2C). However, the canine bulge was not so prominent and there was a mesial and labial angulation of the left maxillary lateral incisor.

Prognostic evaluation of canine position was assessed by radiograph (Fig. 3A-3C). The prognostic factors investigated by McSherry⁹, Pitt, Hamdan and Rock¹⁰ and Counihan, Al-Awadhi and Butler were used as references¹¹. The prognosis of the impacted canine was calculated to be favourable.

TREATMENT PLAN

Patient was planned to be treated after extraction of maxillary retained deciduous teeth. The left impacted canine was decided to expose surgically followed by orthodontic guided eruption. The case was decided to be treated by MBT preadjusted edgewise mechanics using .022 SLOT in continuous arch mechanics.

Moderate anchorage was needed. Banding to be

Intraoral pictures post retention

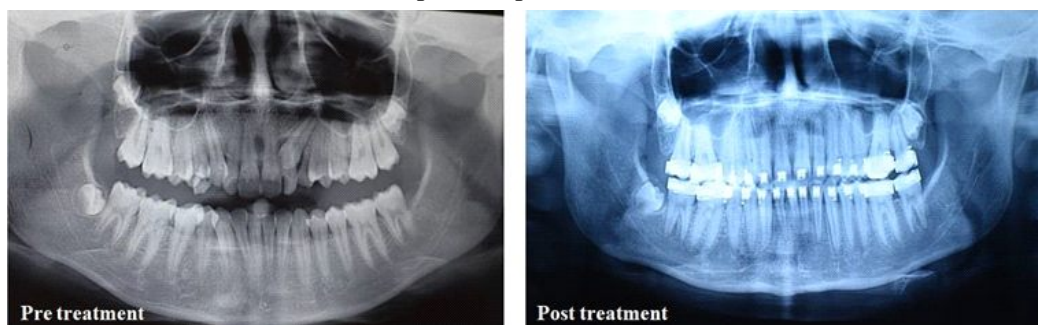


Fig. 7



Fig. 8A



Fig. 8B



Fig. 8C

done on 17, 27, 16 and 26 teeth. In retention phase a spiral wire retainer to be fixed in upper arch.

TREATMENT PROGRESS

Treatment was started with leveling process assisted by 0.016 NiTi wire. Open coil spring was used between left first lateral incisor and first premolar to regain the canine space. The crown of the maxillary left impacted canine was exposed by raising a full thickness flap under local anesthesia in Oral and Maxillofacial Surgery Department of our Institution and a Begg's bracket was bonded to an accessible site on the tooth before suturing the flap (Fig. 4). Power chain was used in 0.018 SS to apply traction to guide impacted canine. Once the impacted teeth broke through the gingival tissue, bracket on canine was finally bonded. Patient was recalled after three weeks later to adjust the power chain to maintain traction force. Six months later, when the teeth came close to the occlusion a box loop in 0.016 SS wire was given to correct the rotation. After rotation correction, residual space between left lateral incisor and canine was closed by 'elastomeric chain in 0.017"×0.025"SS. (Fig. 5A to 5E).

At the end of the treatment period, a functional

occlusion was observed. The clinical results included normal overjet and overbite, adequate intercuspation, nearly coincident midlines, normal maxillary and mandibular incisor proclination with class I molar relation and class I canine relation bilaterally (Fig. 6A to 6E). The patient was satisfied and the case was finalized. Figures 6 to 8 showing the radiographic and clinical changes (intraoral and extraoral) achieved with the treatment. The patient was referred to the Dept. of Periodontology for regaining periodontal health. After closing the space the brackets were removed and a fixed retainer was given for retention purpose.

DISCUSSION

Maxillary canines develop laterally to the piriform fossa and follow the deepest and longest eruption path. According to Coulter and Richardson the maxillary canines move almost 22 mm from 5 to 15 years of age in the three dimensional planes of space¹². Any tooth eruption comprises of complex and coordinated developmental process that needs a series of signaling effects between the dental follicle and osteoblast, and osteoclast cells found in the alveolar bone¹³. Owing to their long and tortuous path of eruption, maxillary canines are the most frequently

impacted teeth after the third molars, with a prevalence of approximately 2%¹⁴. The impaction of maxillary canines can be due to broad range of localized, systemic, genetic and environmental factors, ranging from delayed eruption to a total failure of eruption¹⁵. In such cases, the local hard tissue obstruction, presence of a local pathology, deviation from or disturbance of the normal development of the incisors and hereditary or genetic factors are important causes to be counted¹⁶.

Scenarios like febrile diseases, endocrine disorders, irradiation, arch length discrepancies, prolonged retention, tooth size, early loss of the deciduous canine, supernumerary teeth, ankylosis, alveolar cleft and apical periodontitis of deciduous teeth are also to be considered¹⁵.

In this case report, vital evaluations on the prognostic criteria for impacted maxillary canines like the horizontal overlap of the canine crown over the lateral incisor, vertical height of the canine crown, canine angulation to the midline, position of the canine root apex and sector analysis, were carried out prior to the start of the treatment (Fig. 3A to 3C). The only favourable prognostic factor identified in this patient was the correct position of the canine root apex. Based on this finding, it is decided not to extract the impacted left canine. The orthodontic guided eruption was chosen for this case. Moreover, the treatment of this impacted maxillary canine is completed along with alignment and levelling of the complete dentition. Another important point is that the final periodontal health is essential to assess the success of therapy for impacted maxillary canines¹⁷. In this patient, the periodontal health in the left maxillary canine region was restored after orthodontic treatment via periodontal therapy.

The combined treatment performed in our Institution was divided into six phases. These steps are indispensable for the success of any impacted maxillary canines and should be followed meticulously. The steps or phases are:

- Phase 1: Initial orthodontic treatment aimed at maintaining the space on the maxillary arch and alignment and levelling by means of fixed appliance therapy.
- Phase 2: Anchorage preparation by banding to be done on 17, 27, 16 and 26 teeth.
- Phase 3: Surgical exposure and orthodontic traction of the impacted maxillary canine towards the center of the alveolar ridge.
- Phase 4: Final orthodontic treatment to align the impacted tooth in the maxillary arch.
- Phase 5: Periodontal treatment after orthodontic therapy to restore the periodontal health.
- Phase 6: Placement of permanent retainer

CONCLUSION

The tendency to remove impacted maxillary canine should be nullified by every dental surgeon. Every dental surgeon should initially attempt to position the impacted maxillary canines based on the available techniques. Otherwise they should discuss the case specialist and should be referred for second opinion. A thorough treatment is necessary to achieve successful management. A successfully treated impacted canine will work like a normally erupted impacted canine.

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