Orthodontic Camouflage Management of Buccally Erupted Ectopic Canine with Multiloop Archwire

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ABSTRACT

Background: Maxillary canines are known as the corner stones of mouth. They are important for esthetics, consonant smile line and for functional occlusion. Any disturbance in the eruption process leading to an aberrant position from their normal position is known as ectopic eruption.

Case presentation and management: Any permanent tooth can be ectopic, and the cause may be both genetic and environmental. Diagnosis and treatment of ectopically erupting permanent maxillary canines requires timely management by the orthodontist. Internal or external root resorption of teeth adjacent to the ectopic canine is the most common sequel. Malocclusion with severe crowding is difficult to treat without extraction. Non-extraction treatment of ectopic canines can compromise the patients profile and esthetics. This article represents two cases of buccally displaced or ectopic canine in a patient with severe crowding in both maxillary and mandibular arch management by camouflage extraction therapy.

Conclusion: Both cases are managed successfully. Patients were fully satisfied with orthodontic management.

KEY WORDS

buccally erupted ectopic canine, camouflage extraction therapy, comprehensive orthodontic treatment, multiloop archwire

INTRODUCTION

The prevalence of buccally erupted ectopic maxillary canines is one of the most frequently encountered conditions in general population is approximately 1%. Palatally displaced canines (PDC) occur twice as frequently as buccally. However, buccally displaced canines (BDC) are commonly seen in practice.

Ectopic canines are believed to occur with a wide variety of systemic and local etiologies. Environmental factors may contribute to this anomaly during the long, tortuous eruption path of a canine. Another possible explanation is that a disturbance associated with the follicle of the unerupted tooth may influence the direction of eruption and contribute to the displacement of the maxillary canine. Specific etiologies include a lack of space, early loss of a primary canine, ankylosis, neoplastic formation, root dilacerations, and an abnormal lateral root position in relation to an erupting canine.

Orthodontic tooth movement of an ectopically erupted canine can be difficult as it is usually seen in cases with severe crowding, for such instances extraction is the choice of treatment plan with comprehensive orthodontic treatment, thus high buccally placed canines can be moved distally and occlusally using horizontal and vertical loop in archwire orthodontic treatment, thus high buccally placed canines can be moved distally and occlusally using horizontal and vertical loop in archwire thereby utilize light continuous orthodontic force. A multiloop archwire may be defined as a combination of one or more loops of different design to suit the malocclusion requirements. The multiple looped wires are tied to bracket to exert moving forces on the tooth roots. This approach is called friction free when activated, the archwire loops distort from their original configuration, as the tooth moves, the loop gradually returns to its pre-activated position, delivering the energy stored at the time of activation. Group of teeth can therefore be moved with more accurately defined force systems for more precise anchorage control to achieve treatment goals more readily than methods in which friction plays a role.

CLINICAL EXAMINATION AND DIAGNOSIS

Both case had the almost similar extra oral and intra oral feature. Describe below one by one.

Case 1:

A 15 year old boy reported to the Orthodontic Department of Dhaka Dental College and Hospital with the chief complaint of irregularities of the upper and lower teeth and friends calling him dracula. Extraorally the patient had no apparent facial asymmetry. He had mesoprosopic facial form and straight profile with competent lip. Intra oral Examination revealed that gingival recession is present on lower left central incisor and right canine tooth. Class I molar relationship with severe crowding on both upper and lower jaw. Tooth arch discrepancy was - 12.8 mm in upper jaw, and - 12.2 mm in lower jaw. Lock bite present between upper lateral incisor and lower canine teeth on both side, and also between upper central incisor and lower central incisor in left side.

Orthopantomogram confirmed the presence of all permanent teeth including the third molar tooth with normal alveolar bone level. In the cephalometric assessment, SNA (84°), SNB (81°), ANB (3°), MPA (31°) was within normal range and indicated skeletal class I malocclusion and Jarabak’s ratio (70%) indicated a horizontal growth pattern.

Case 2:

A 24 year old male patient reported to the Orthodontic Department of Dhaka Dental College and Hospital with the chief complaint of irregularities of the upper and lower teeth. Extraorally the patient had no apparent facial asymmetry. He had mesoprosopic facial form and straight profile. Intra oral Examination revealed that gingival recession is present on lower left central incisor and right canine tooth. Class I molar relationship with severe crowding on both upper and lower jaw. Tooth arch discrepancy was - 12.8 mm in upper jaw, and - 12.2 mm in lower jaw. Lock bite present between upper lateral incisor and lower canine teeth on both side, and also between upper central incisor and lower central incisor in left side.

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of Dhaka Dental College and Hospital with the chief complain of unesthetic smile due to irregularities of the upper and lower anterior teeth. Extraorally the patient had leptoprosopic facial form and convex profile with competent lip. He had no apparent facial asymmetry (Fig-3). Intra oral Examination revealed that gingival recession is present on all four canine and left lateral incisor tooth. Class I molar relationship with severe crowding on both upper and lower jaw. Tooth arch discrepancy was +12.6 mm in upper jaw, and +11 mm in lower jaw. Lock bite present between upper lateral incisor and lower canine teeth on right side (Fig-3).

Orthopantomogram confirmed the presence of all permanent teeth including the third molar tooth with normal alveolar bone level. In the cephalometric assessment, SNA (86°), SNB (80°), ANB (6°), MPA (24°) was indicated skeletal class II malocclusion and Jarabak's ratio (73%) indicated a horizontal growth pattern (Fig-4).

From these findings, both case was diagnosed as an Angle class I malocclusion with severe crowding present in anterior segment on both upper and lower jaw.

Aim of Treatment for both case
- Relieve crowding
- Correction of lock bite
- Established normal overjet and overbite
- Improve functional occlusion
- Improve aesthetics

Treatment mechanics and progression for both case:

Considering all aspects of the case in detail, camouflage extraction treatment plan was established and started with fixed orthodontic appliance. The treatment plan was extraction of both maxillary and mandibular first premolars and bring canine to proper level and alignment with multiloop archwire. The first molars were banded in both jaw, the 0.018” slot standard edgewise brackets were bonded from 2nd premolar to 2nd premolar of both maxillary and mandibular teeth. Initial alignment & levelling of both jaw was done by using 0.014” ss multiloop archwire with incorporated posterior bite block to free the anterior lock bite. After initial alignment & levelling placed a 0.016” ss round wire with stop loop, toe in and tip back bend to retract the upper canine by sliding mechanics with powerchain followed by lower canine retraction for 7 months. Again alignment and levelling was initiated both upper and lower arch (Fig 2 & 4). For first case, box loop was build to bring the lingually placed lower both sided lateral incisor when second time alignment and levelling was initiated (fig-2). Lower arch contraction did not perform cause all extraction space was required for crowding eliminating. Upper arch contraction was performed by 0.016” x 0.022” ss rectangular arch wire with tear drop loop. Then arch co-ordination was done in both jaw by placing first order bend in the arch wire. Final
occlusal settling was done by 0.016” ss round wire with vertical elastic for proper interdigititation, inclination and intercuspation (Fig 2 & 4). After satisfactory interdigititation and detailing occlusion the fixed appliance were removed and maxillary and mandibular fixed retainer were placed. The total active treatment period was 20 months for both cases.

RESULTS

Case 1 & 2

The post-treatment facial photograph showed a dramatic change in the smile view and face profile of both patient. Post-treatment intra oral photograph shows a satisfactory dental alignment with class I molar and canine relationship on both side and ideal intercuspation was established. The periodontal tissues was remained healthy during and after active orthodontic treatment (Fig-1 & 3). Panoramic radiograph showed no or less root resorption and root parallelism was satisfactory (Fig-2 & 4).

DISCUSSION

In the above two case reports adequate results were achieved through an camouflage extraction treatment approach with fixed appliance incorporation multiloop archwire.

Most of the cases are treated with NiTi flexible wire engaged in rotated and highly placed canine during the leveling and alignment stage. There are some drawbacks by using flexibility of the NiTi wire, it pulls the canine in proper level and alignment with the anchorage from the adjacent tooth; in which lateral incisors and premolars are usually the anchor teeth and get some intrusion movement according to the Newton's third law of motion. Finally leaving with a distorted occlusal plane8-10). In contrary, the retrieval of rotated and highly placed canine with multi-loop in a stainless steel arch wire resulted to a minimal chance of distortion of the occlusal plane. The multi-loop creates a break in continuity of arch wire resulting in minimal side effect to the anchorage unit. The stainless steel multi-loop wire provides flexibility without compromising the strength of the wire providing stability to the anchorage unit, as a result, there is minimal distortion to the occlusal plane8-10).

CONCLUSION

The successful treatment of a patient with an ectopic tooth and severe crowding can be a challenging task for an orthodontist. Proper treatment of an ectopic canine patient with severe crowding requires careful treatment planning by the orthodontist. The decision to extract the premolars is to be good aesthetically, functionally, and for more stable results in these patients. The comprehensive orthodontic treatment with horizontal and vertical multiloop archwire bring buccally placed ectopic canine to normal arch position with less treatment time and minimal side effect to the anchorage unit.

REFERENCES

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