ORTHODONTIC PULL OUT OF AN ECTOPIC CANINE THROUGH A NOVEL “HUJ” LOOP — A CASE REPORT

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ABSTRACT

This case report describes the effective management of a palatally impacted canine in a girl, having Class I malocclusion whose problem has been exclusively addressed through a newly designed loop named “HUJ” loop, after the name of the inventor, Hameed Ullah Jan.

Key words: Impacted Canine, HUJ Loop, Class I Malocclusion.

INTRODUCTION

Failure of frontal teeth to erupt can compromise facial esthetics and may pose a challenging clinical dilemma. The clinician must be able and prudent enough to localize the teeth accurately and use an effective traction system that brings the teeth into occlusion without damaging the soft and hard tissue structures in the vicinity.

Teeth normally erupt when half to three quarter of their roots have developed. Teeth with delayed eruption are those which are more fully developed but are nevertheless expected to erupt spontaneously without any need or application of an external force of traction. Impacted teeth on the other hand are teeth whose root development might have finished but not yet erupted or expected to be erupted without application of an external force. These type scenarios must be first thoroughly assessed and confirmed both clinically and radiographically. The attainment of an enough space right at the outset of treatment and then with the help of an appropriate means of traction and guidance, the orthodontist is able to potentiate their often attenuated natural eruptive force. These teeth will generally erupt and take their place as an integral unit of the dentition. In face of an extra effort required for the proper management of impacted teeth, such malocclusion usually take longer time than similar situations, where all the teeth are fully erupted with out any evidence of impaction.

Most patients seeking and undergoing orthodontic treatment are children and young adults. Impaction of maxillary canine occurs in approximately 1% to 2% of white population, this figure however appears lower among Asians. It has been a popularly held belief in the past that among adults, impacted maxillary canines that hence been buried for many years might not respond to orthodontic treatment and must be extracted at all costs. Today experience and state of the art technology has proven that many can be successfully managed in the third, fourth, fifth and in even sixth decade of life. Several anecdotal case reports have been published to illustrate and support treatment of impacted maxillary canines.

CASE REPORT

Diagnosis and Clinical Findings:

A young girl of age 16 years 5 months presented to AFID, with a chief complaint of malaligned teeth. She was introersive and greatly worried about her unesthetic smile. Her medical history showed no contraindication to orthodontic therapy. Patient’s extraoral examination showed convex facial profile, mesiofacial

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to brachyfacial form, competent lips at rest and normal TMJ activity (Figure-1).

Histories showed normal growth without any medical problem or trauma to the deciduous dentition. It was hypothesized that an aberrant spatial relation of the tooth germ might have caused this impaction.

**Treatment Objective**

1. To bring the impacted right maxillary canine into normal occlusion.
2. Correction of all midlines
3. Level and align arches
4. Normalize an optimal overjet and overbite
5. Restore Class I relationship

**Treatment Options**

1. After leveling and alignment, space will be created on foremost priority basis
2. The impacted tooth will be surgically exposed, bonded with an attachment and then brought to its normal position by means of orthodontic traction.

**Treatment alternatives**

1. Surgical removal of impacted tooth.
2. Auto transplantation of impacted tooth once sufficient space is created.

Patient and her parents opted for the orthodontic option

**Treatment Consideration:** A successful treatment of an impacted tooth depends upon:

1. A wise clinical diagnosis
2. Proper assessment of the tooth position
3. Its relation with the surrounding tissues.
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4 Proper patient selection
5 Comprehensive treatment planning
6 Patient’s willingness for the mode of treatment.

Treatment Plan: Orthodontic treatment with fixed mechanotherapy was planned. After leveling and alignment of arches, space was created for the accommodation of impacted tooth which was deemed to be surgically exposed and then brought into arch through a different mode of orthodontic traction device called “Huj” loop. This special loop was fabricated using a heavy rectangular stainless steel wire. The results were maintained with a bonded canine to canine retainer.

Treatment Progress: All the maxillary and mandibular first molars were banded and 0.22\textsuperior slot edgewise appliance was put into place. Initial alignment process of the arches was started with a 0.12\textsuperior Ni Ti arch wire and then sequentially continued with 0.14\textsuperior Ni Ti and 0.18\textsuperior.

Second premolars were banded to bolster the anchorage. Treatment was continued in progressive mode. Finally a 17x25\textsuperior SS arch wire was placed in the maxillary arch with an open coil spring to create adequate space for the impacted right maxillary canine. After space creation for impacted canine surgical exposure was undertaken. A bracket was bonded on to the canine soon after the crown exposure. A special “Huj” Loop was fabricated and engaged for orthodontic traction of the impacted tooth. The mesial and downward traction with the help of loop was applied initially to mobilize and disengage the impacted canine from the neighboring soft and hard tissue structures. The forced but controlled eruption of the canine in the desired direction was performed in a manner that no pileup of the mucosal tissue took place. Once tooth was fully extruded labial movement of the tooth was initia-ted through Huj version II Loop. The photographs of the patient in the finishing stages show favorable occlusal results of the right maxillary canine with no periodontal compromise on the palatal side (Figure-5). Midlines were made coincident and an edge to edge bite on the left side was corrected to a normal overjet and overbite. The treatment outcome for this patient led to an improved facial esthetics with no symptoms of TMJ dysfunction or any other detection of occlusal interference. The interim OPG of the patient showed well angulated and a perfectly aligned right maxillary canine (Figure 6). No tooth mobility was evident. The gingival health and its attachment in the right

Fig 3: Diagnostic radiographical images

Fig 5: Post treatment intraoral photographs

Fig 4: Treatment progress

Fig 6: Post treatment orthopantomograph
maxillary canine region was sound and intact. The patient felt fully satisfied with the end results which are to be maintained with the bonded retainers.

DISCUSSION

Palatal displacement of maxillary canines can be defined as the developmental dislocation\(^8\) onto a palatal aspect. This often results in tooth impaction which most of the time require surgical and orthodontic treatment. 85% of impacted maxillary cuspsids are palatal and 15% are labial.\(^9,10\) Permanent maxillary canine impaction occurs in 1% to 2% of general population, second only to the impaction of third molars in frequency.\(^11\) This condition is more than twice as common in girls as in boys.\(^12\) 8%\(^13\) of all patients with maxillary impacted canines have bilateral impactions.

This case report shows successful treatment of palatally impacted canine. The challenges during treatment were adequate surgical exposure of impacted canine and getting hold of it in such a way that integrity of midlines should not be put at risk. An extra pace has to be taken to maintain and prevent intrusion of adjacent teeth and to preserve the overjet and overbite.

After accurate positional diagnosis of the impacted tooth, the application of light traction forces on the tooth in appropriate direction\(^14\) will always result in a positive movement of an impacted tooth, leading to the resolution of impaction. Accurate identification of the location of impacted teeth is always necessary. Patient should be examined at the age of 8 or 9 years to determine whether the canines are erupting in a normal position or is there some hidden risk potential for impaction.

Location methods can involve radiographic evaluation with the tube-shift technique,\(^15\) computerized tomography\(^16\) and stereo lithography.\(^17\) We also strictly adhered to the same tools of investigations. The conventional and time tested use of panoramic radiographic for diagnosis is not a new one; several research workers\(^18\)-\(^20\) extensively used panoramic films for the identification of diagnostic parameters. Radiographs are indicated when canine bulges are not present and when there is asymmetry in the development and eruption of right and left canines. Accurate radiographs will help us in determining the position of impacted canines.

Surgical exposure of impacted canine and use of fixed orthodontic appliance\(^21\) is most frequently used treatment. Surgical techniques are aimed to facilitate an easy access and then to guide the eruption of an impacted tooth with minimal damage to the tooth and adjacent soft tissue structures. This procedure involves three main stages.

1. **Pre-surgical stage\(^22\):** Begins with the application of fixed orthodontic appliances to fully utilize it for leveling, alignment and then to create space for the impacted tooth.

2. **Surgical stage\(^22\):** Surgical exposure of the crown of the impacted tooth is undertaken and an attachment has to be bonded to the exposed part of the tooth.

   Several techniques have been used for getting hold of an impacted tooth. Currently the most common procedure is bonding an orthodontic bracket/attachment directly to the enamel surface of impacted tooth. In the past threaded pins, lasso wires, eyelets and orthodontic bands were used. Recently magnets presented successful clinical results.

3. **Post surgical Orthodontics\(^22\):** After creation of space, bonding of an attachment to the surgically exposed tooth, it has to be actively pulled out of its bed, directed and moved into the arch so as to actively involve it into all functional activities of stomatognathic system.\(^22\)

   In most orthodontic traction techniques that were used in the past were not without drawbacks. In our case and other such situations where canines are impacted high in the palate the labially directed pull may damage the tooth itself and also associated structures.

   From a biomechanical perspective if sufficient space for the canine exists or has been created it is desirable to deliver a high point force in the occlusal direction (vertical pull) of arch to move the canine crown away from lingual surface of the incisors roots followed by labial traction to move the canine back into the arch. The same mechanics was
followed in this case with specially fabricated “HUJ” Loop.

Usually double arch wire technique\(^{23-25}\) with larger size SS arch wire an auxiliary wire usually Ni Ti used for the treatment of impacted canine are currently in practice. HUJ Loop is unique and dynamic in its design as no additional perplexing arch wire is used with this Loop. Loop is made from rectangular 17x25° SS wire which is fitting nicely in rectangular bracket slot for getting maximum anchorage. Extrusion and moving the root of impacted canine into upright position happen simultaneously.

In this patient when the tooth was fully extruded, labial movement of the tooth was executed through version II of “HUJ” Loop. This loop force delivery system allowed further adjustment so as to move the centre of force system in the desired direction. Careful application of force with HUJ Loop system allows successful and efficient treatment of palatally impacted canine without any significant side effects on the adjacent teeth.

On the basis of our meaningful results of this case and other cases alike, attained from use of “HUJ” Loop, we invite further research in future application and development of the precise control and optimal utility of the force system endowed in “HUJ” Loop. This will help orthodontist to manage difficult situations that in the past were considered as non amenable to orthodontic treatment and had had to fell an easy prey to surgical extraction.

**CONCLUSION**

Failure of anterior teeth to erupt can interfere with the function as well as the much demanded dento-facial esthetics. Permanent canines are foundation of esthetics, smile and function. They are the pillars and corner stones of dentitions. Their paramount significance should not be underestimated. Its presence in the arch must be rest assured. Once impacted they always pose not only a clinical dilemma, but also a big challenge to the treating orthodontist. Today with the advent of modern orthodontics, state of the art traction loops, we are not only able to avoid extraction of the impacted canines but can also maximally benefit our patients by enhancing their smile and esthetics.

**REFERENCES**

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