Case Report

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Orthodontic Management of Impacted Mandibular Canine By Using Custom Made Mini Implant Supported Spring.

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ABSTRACT

An Impacted tooth can be defined as a tooth which fails to erupt partially or completely to its correct position in the dental arch and its eruption potential has been lost. Incidence of mandibular canine impaction is less compared to maxillary canine impaction . Orthodontic management of impacted canine is a very common procedure and a variety of techniques had been introduced in the field of orthodontics for disimpaction of canine. It is always better to do orthodontic disimpaction without engaging the attachment from impacted canine directly to arch wire to prevent arch wire disintegration and unwanted effects on the adjacent tooth.

Through this case report we are introducing a specially designed mini implant supported disimpaction spring to manage mesioimpacted buccally placed mandibular canine. The spring can be made with 0.017*0.025 SS or TMA wire. It delivers a slow continuous force and it can be reactivated in each appointment if necessary. Force delivery has to be maintained throughout at 100 gm of force. It gives vertical as well as uprighting force on the impacted canine.The action of this spring is completely independent of arch wire. This Spring will take its support from 2 mini implants placed in the mesial and distal interdental area of same side mandibular molar. This spring can also be used in maxillary arch by changing the angulations of the spring depending on the position of impacted canine.

Keywords: orthodontic management, mandibular impacted canine, mini implant supported spring

INTRODUCTION

An Impacted tooth can be defined as a tooth which fails to erupt partially or completely to its correct position in the dental arch and its eruption potential has been lost. Incidence of mandibular canine impaction is less compared to maxillary canine impaction.[1,2,3] Orthodontic management of impacted canine is a very common procedure and a variety of techniques had been introduced in the field of orthodontics for disimpaction of canine. It is always better to do orthodontic disimpaction without engaging the attachment from impacted canine directly to arch wire to prevent arch wire disintegration and unwanted effects on the adjacent tooth. Disimpaction spring for mandibular canine is less in number compared to maxillary canine.[3,4] There are many available literature on impacted canines. The recent available literatures on impacted canines[4, 5, 6] treat the subject from different points of view. The physiology of eruption, the etiologic factors of the impaction, the sequelae of impaction, the diagnosis and the different techniques are well-documented in different manners.[7-12]

Through this case report we are introducing a specially designed mini implant supported disimpaction spring to manage mesioimpacted buccally placed mandibular canine. The spring can be made with 0.017 X 0.025 SS or TMA wire. It delivers a slow continuous force and it can be reactivated at each appointment if necessary. Force delivery has to be maintained throughout at 100 gm of force (figure no 6). It gives vertical as well as uprighting force on the impacted canine (figure no.7).The action of this spring is completely independent of arch wire. This spring takes its support from 2 mini implants placed in the mesial and distal interdental area of same side mandibular molar. The canines can be disimpacted within 3 to 4 months. This spring can also be used in maxillary arch by changing the angulation of the spring depending on the position of impacted canine.

DIAGNOSIS AND ETIOLOGY

A 22 year old female patient reported to the department of orthodontics with a chief complaint of irregularly placed front teeth with no relevant medical history. Extra oral examination showed a straight profile with prominent chin ,short upper lip, deep mentolabial sulcus and potentially incompetent lips (figure no.1).Intra oral examination showed Class I molar relation bilaterally, crowded upper and lower anteriors, clinically missing 33,retroclined upper central incisors and lower anteriors , proclined upper lateral incisors, overbite of 70%, over jet of 0.5 mm, lower midline shifted to left side by 3mm and barrel shaped maxillary central incisors (figure no.1).Cephalometric analysis showed class I skeletal pattern with orthognathic

maxilla and orthognathic mandible, average growth pattern, retroclined upper and lower anteriors (Figure no.2).OPG indicated presence of 3rd molars in all quadrants, vertically as well as mesially impacted 33 impinging on apical root portion of 32 and root apex of 33, lies apical to root apex of 34 and also lies within the inferior alveolar canal, severely tilted 32 with signs of root resorption in relation to 32 (figure no 3)

Patient was diagnosed as Angles class I malocclusion with anterior deep bite and proclined upper lateral incisors,retroclined upper central incisors with crowded lower anteriors and impacted 33.

2. Correction of anterior deep bite
3. Orthodontic disimpaction of 33
4. Achieve a pleasing soft tissue profile
5. Achieve lip competency.

Treatment Plan: It was decided to start the treatment with extraction of 32 followed by disimpaction of 33. Extraction of 32 was prefered over 34 because of root resorption in relation to 32.

CEPHALOMETRIC VALUES (Table I)

Measurement	Average	Pre-treatment	Post-treatment
SNA	82 degree	80	80
SNB	80 degree	77	77
ANB	2 degree	3	3
SN to GoGn	32 degree	26	29
Y axis	59 degree	56	59
FMA	25to30 Degree	22	26
ANS to Me	55mm	60	63
Upper Incisor to SN	102 degree	85	104
UpperI to NA(Angle,Linear)	22 degree,4mm	9^0,2mm	27^0,6mm
Lower Incisor MP	95 degree	90	96
LowerI to NB(Angle,Linear)	25 degree,4mm	15^0,0mm	26^0,4mm
Upper Incisor to NF	31.5mm	35	32
Upper 1st Molar to NF	26.2mm	25	27
Lower Incisor to MP	45mm	37	36
Lower 1st Molar to MP	36.8mm	26	29
Naso labial angle	110 degree	96	90
Mento labial angle	130 degree	98	110
S line to Upper lip	0 mm	-3	-1
S line to Lower lip	0 mm	-1	1

TREATMENT OBJECTIVES

1. Leveling and aligning of maxillary and mandibular anteriors

TREATMENT PROGRESS

At the end of treatment we achieved a pleasing soft tissue profile with lip competency, upper facial midline matching with dental midline (figure no 11), class I molar and canine relation

bilaterally with normal overjet and overbite (figure no 11). Upper and lower dental midlines were not matching since Lower left lateral incisor was extracted. Patient smile has improved because of reduction in gingival display on smiling. Patient has got a pleasing soft tissue profile with better facial proportions and competent lips (figure no 11). Post cephalometric values (Table I, Figure 2,12) indicate normal upper and lower incisor proclination, intrusion of upper anteriors, extrusion of upper and lower molars by 1.5mm and increase in lower anterior facial height by 3mm. Post treatment OPG shows good root parallelism and no evident root resorption (figure no 13).

DISCUSSION

Fournier and colleagues recommended that a labially impacted tooth in a favorable vertical position should be surgically exposed without the application of orthodontic traction in a young patient, whereas immediate traction is almost always needed in an adult patient.[13,14] The risk of root resorption caused by impacted and displaced teeth has long been recognized.[15, 16] Successful extrusion and alignment of such teeth requires efficient mechanics with minimal side effects. Although vertical tooth movement with heavy forces further increases the possibility of root resorption [17], the mechanics illustrated in this article are statically determinate, ensuring clinical control by means of a simple technique. A stable anchorage unit is needed to prevent unwanted intrusive side effects during extrusion of the impacted tooth. Skeletal anchorage using mini-implants has been shown to provide reliable anchorage in various clinical situations. Side effects can be reduced by avoiding heavy force loads as long as the anchorage unit remains stable. One point of agreement by many authors is the lack of attached gingiva around the erupting canine leading to inflammation and serious periodontal consequences during orthodontic traction [12]. Surgical uncovering of impacted canine was performed by using Laser which has got advantages over apically repositioned flap[14].

Here we have introduced a specially designed Mini Implant Supported Canine Disimpaction Spring which is made up of 17 X 25 TMA wire or 17 x 25 SS wire. 2 mini implants (1.3 x 9 mm) with rectangular head slot had been placed in the mesial and distal interdental bone in realtion to 36. Rectangular wire was prefered for best fit in the implant head so that there won't be any rotation of spring in the Implant head slot. It was designed in such a way that, as the length of wire increases ,the range of action of spring increases. It gives a force of 100gm to 120 gm when it is activated and force can vary according to the amount of activation of spring. Occlusal sleeve was placed on the horizontal arms to prevent soft tissue disturbances.This spring helps in vertical movement as well as uprighting of impacted canine simultaneously.

CONCLUSIONS

Orthodontic disimpaction of canine by using mini implant supported springs have advantage over directly engaging to the arch wire since direct engagement of impacted canine to arch wire can cause arch wire disintegration, unwanted tooth movement and root resorption of adjacent tooth.This spring delivers slow continuous force and can be reactivated at each appointment if required. This type of spring can also be used in disimpaction of buccally and palatally impacted maxillary canine by changing the angulation of the spring depending on the position of impacted canine.

Fig.No.1. Pre Treatment Photographs

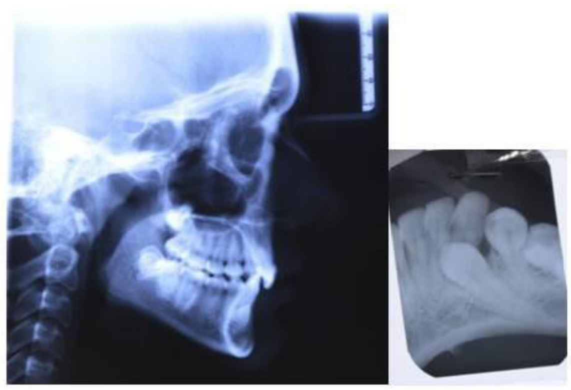

Fig.No.2. Pre Treatment Lateral Ceph And Iopa

Fig.No.3. Pre Treatment Opg

Fig.No.4. Mid Treatment Photos

Fig.No.5. Pre Disimpaction Spring Insertion Photos

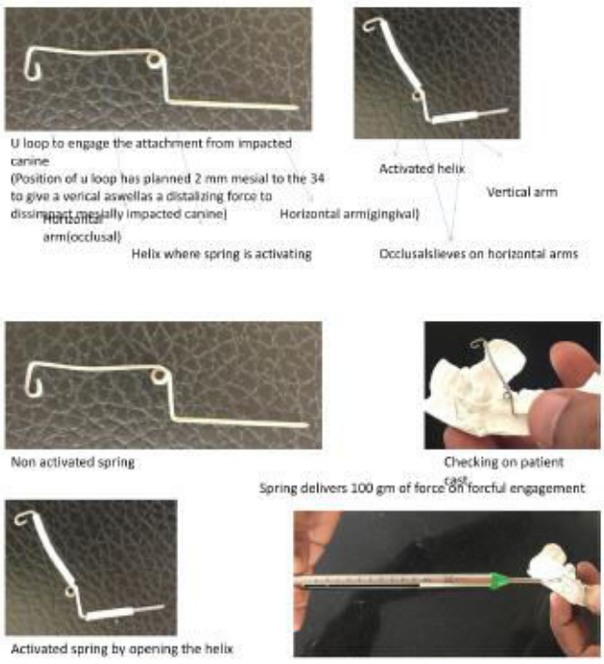

Fig.No.6. Disimpaction Spring Design.

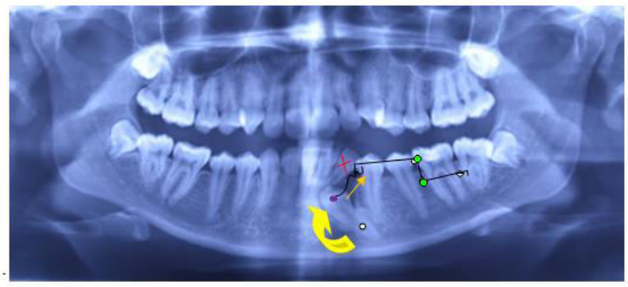

Fig.No.7.Biomechanics

Fig.No.8 Disimpaction Spring Insertion Photos

Fig.No.12. Post Treatment Lateral Ceph

Fig.No.9. Post Disimpaction Photos

Fig.No.10. Intrusion By Using Ans Mini Implant

Fig.No.11. Post Treatment Photos

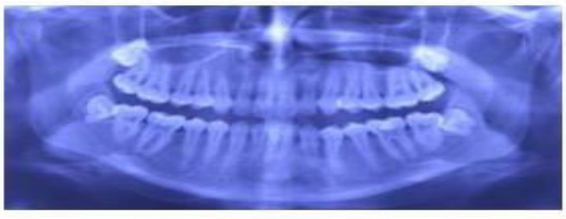

Fig.No.13. Post Treatment Opg

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