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Surgical and Orthodontic Management of Impacted Maxillary Central Incisor Associated with Supernumerary Tooth - A Case Report

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ABSTRACT:

Impaction of maxillary central incisor is a rarely occurring case in dental practice, but its treatment is challenging as it significantly impacts the patient's self-esteem and aesthetic concern. The most common etiology of impacted maxillary incisors is the presence of the supernumerary teeth. Other etiologies include: root dilaceration, odontoma, malpositioned tooth germ & odontogenic cyst.

Most of the times supernumerary teeth are asymptomatic, and are routinely found during radiographic examination.Early detection of such teeth is most important if complications need to be avoided.The surgical-orthodontic approach is the optimal strategy for the management of impacted maxillary central incisors.

This case report describes a 14 year old male patient with an impacted supernumerary tooth in the maxillary anterior region, which was interfering with the eruption of the permanent left central incisor. The impacted supernumerary tooth was surgically removed. With the application of orthodontic traction, impacted left maxillary central incisor was brought into its proper position in the dental arch.

KEYWORDS:- Impacted incisor, supernumerary teeth, spontaneous eruption, orthodontic traction.

I. INTRODUCTION-

An impacted tooth refers to a tooth which is completely or partially unerupted and is positioned against another tooth, bone or soft tissue, so that it's further eruption is unlikely, described according to its anatomical position (Archer).Among impacted teeth, maxillary third molars is commonly impacted tooth followed by maxillary canine and central incisor impaction is rare, accounting for around 0.06%–0.2% of all cases[1].

Central incisor impaction can be associated with a range of causative factors,such as presence of supernumerary tooth,root dilaceration, fusion of tooth roots, disruptions in the normal eruption mechanisms, presence of tumour & cysts, or underlying systemic conditions such as hormonal imbalances, vitamin deficiencies, or genetic predisposition.[1]Supernumerary teeth are considered as the main cause for the impaction of maxillary central incisors with an incidence rate of upto 56-60%.[3]The absence of a central incisor interferes with facial aesthetics and has negative impact on self-esteem, functionality, and social interactions[6].Therefore, it is crucial to diagnose and manage it at an early stage.

Orthodontists often face a dilemma while deciding whether to extract the impacted tooth or guide it into its correct position.Spontaneous eruption of impacted maxillary incisors occursin 54-76% of cases when supernumerary tooth is

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removed and there is enough space in the dental arch.[8]In cases where the central incisor is ankylosed to the surrounding bone, positioned unfavourably, or severely curved, extraction is usually recommended.

We reported a case of an impacted supernumerary tooth in the maxillary anterior region, interfering with the eruption of the permanent leftcentral incisor. Combined surgical and orthodontic approachis employed, to bring the impacted left maxillary central incisor into its proper position in the dental arch.

II. CASE REPORT-

A 14year old male patient reported to the department of orthodontics and dentofacial orthopaedics of PCDS & RC, Bhopal with the chief complaint of missing upper left front tooth,which had caused difficulties in biting food and impaired his ability to smile. Patient had no significant medical& dental history.Extra oral examination revealed that the patient had a symmetrical face and with a straight profile(fig.1). Intra oral examination revealed U-shape Maxillary and Mandibular arch. Angle's Class I molar and canine relation present bilaterally with missing upper left central incisor (fig.2).

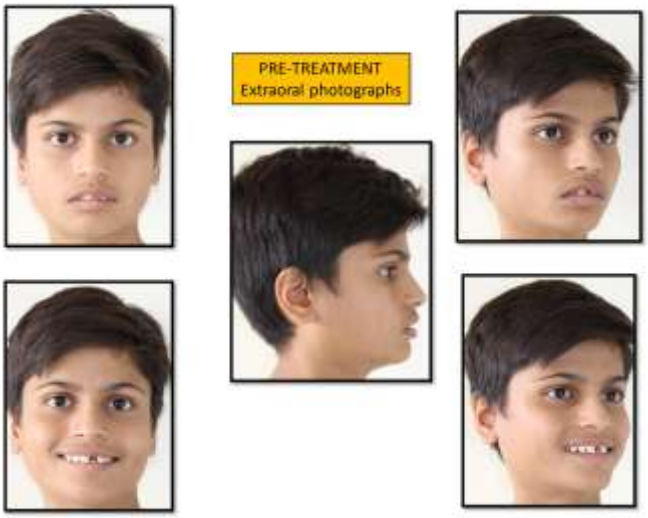

Fig:1. Pre-treatment extraoral photographs.

Fig:2. Pre-treatment intraoral photographs.

International Journal Dental and Medical Sciences Research
Volume 6, Issue 2, Mar - Apr 2024 pp 407-414 www.ijdmsrjournal.com ISSN: 2582-6018

Cone beam computed tomography (CBCT) imagingof upper anterior region revealed that the maxillary left central incisor was impacted on the labial side, and there was supernumerary tooth positioned palatally in the same region. The position of the impacted central incisor was found to be favourable both in relation to the mid-sagittal plane and the vertical alignment in relation to the adjacent tooth(fig.3).

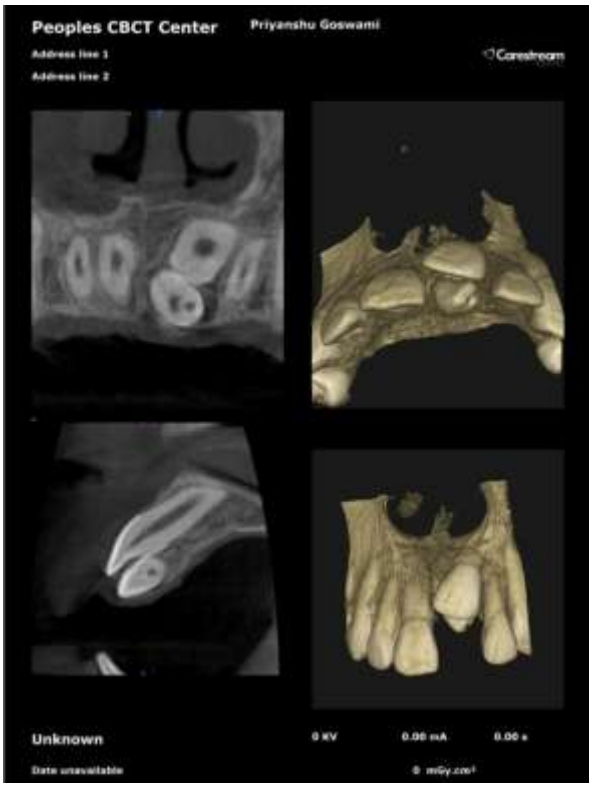

Fig:3. CBCT images

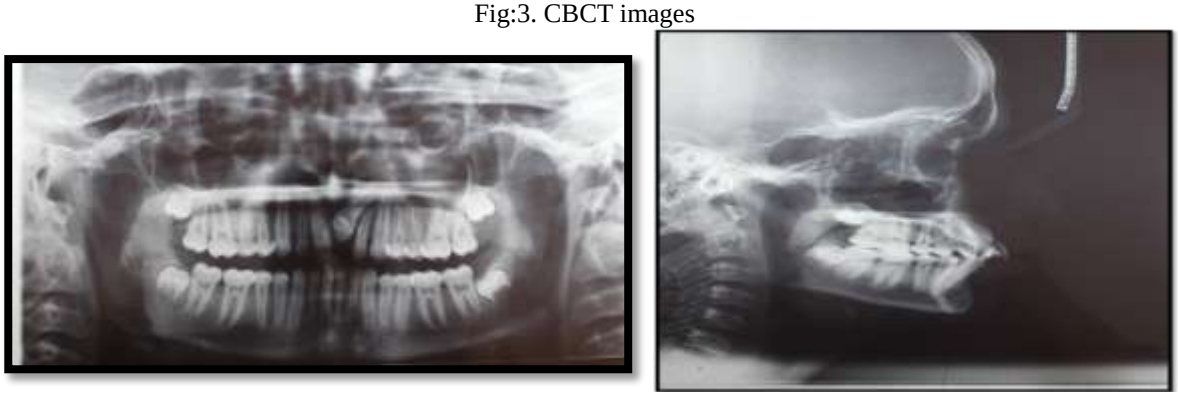

Fig:4. Pre-treatment OPG & Lateral Cephalogram

The treatment objectives were-

- Extraction of impacted supernumerary tooth.
- Orthodontic alignment of impacted maxillary left central incisor.
- Closure of spacing in the upper arch.

The treatment plan involved a surgical procedure to extract the supernumerary tooth and an orthodontic approach to guide the impacted tooth into proper occlusion. The treatment plan was explained to the patient and his parents. Informed consent was obtained for the same from the parents.

TREATMENT PROGRESS-

With the patient under local anaesthesia, full thickness mucoperiosteal flap on the labial & palatal side was reflected.After careful elevation of the flap, adequate amount of bone was removed using the rotary cutting instruments and the

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impacted supernumerary tooth was exposed.The supernumerary tooth was removed surgically and extraction socket was inspected for any pathology.The extracted supernumerary tooth was conical in shape.The labial and palatal flap was repositioned and was sutured at the same time. After a week, the healing was normal and the sutures were removed.

Fig:5. Extraction of Impacted supernumerary tooth done under LA

The orthodontic treatment was commenced with 0.022”x0.028” MBT pre-adjusted edgewise appliance in the maxillary& mandibulararch. Anchorage augmentation techniques were employed to ensure proper teeth movement. Initial levelling and alignment was done using round 0.014”, 0.016” nickel-titanium(NiTi)archwires(Fig.6.a). After three months of levelling and alignment, spontaneous eruption of maxillary left central incisor began. Begg’s bracket was bonded on 21, and traction was applied using bypass archwire(Fig.6.b).After two months of traction maxillary left central incisor was in alignment with the arch, and final levelling and alignment was done using rectangular 0.019”x 0.025” nickel- titanium (NiTi)followed by rectangular0.019x 0.025” stainless steelarchwire(Fig:6.c).

Fig:6.a) Initial levelling and alignment using 0.014 NiTiarchwire

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Fig:6.b) After 3 months, spontaneous eruption of maxillary left central incisor began. Begg's bracket bonded on 21&traction was applied using bypass archwire.

Fig:6.c.Final levelling and alignment using 0.019x0.025 SSarchwires.

Finishing and detailing case in class I molar and canine relation with ideal overjet and overbite with bonded fixed lingual retainer in upper and lower arch as shown in Figure 7a.) & b.)

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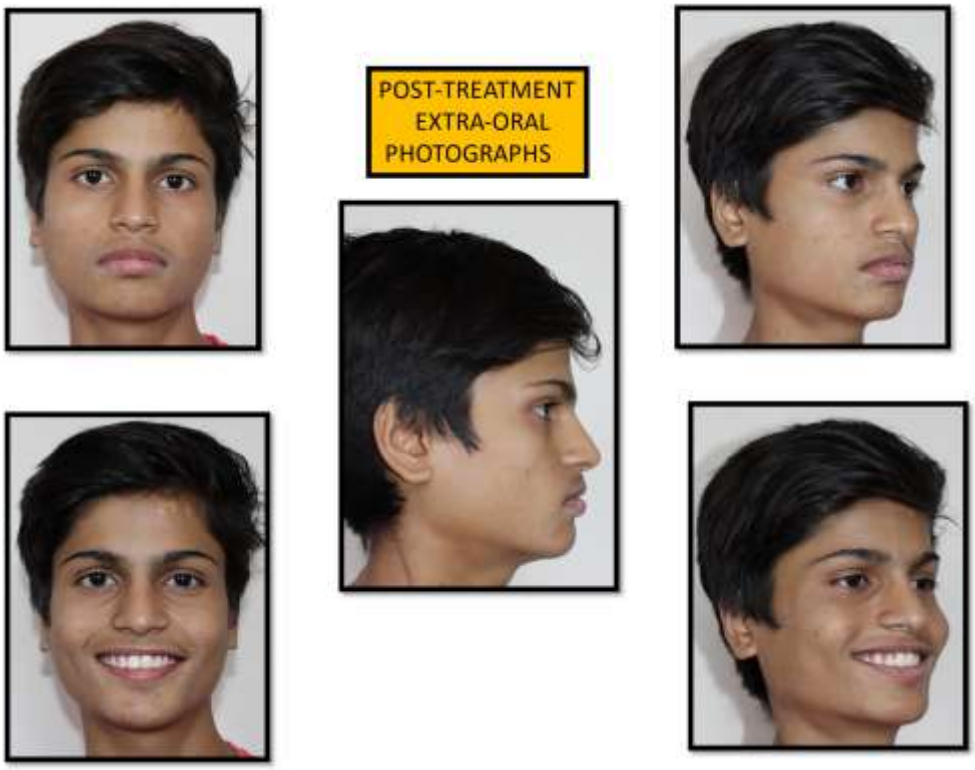

Fig:7.a) Post treatment extra-oral photographs

Fig:7.b) Post-treatment intraoral photographs.

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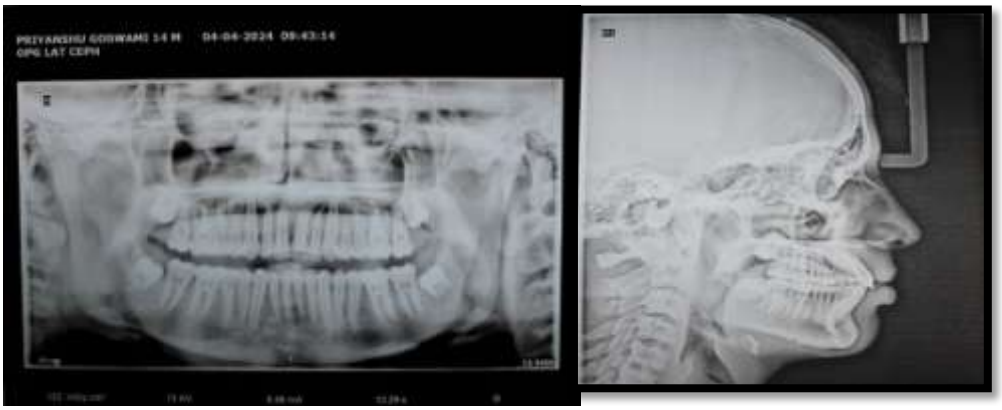

Fig:8. a) Post-treatment OPG&lateral cephalogram

III. DISCUSSION-

This case report showed that perfect alignment of impacted incisor can be achieved by careful diagnosis &treatment planning.Supernumerary teeth can be found in almost any region of the dental arch and can be erupted or unerupted, often found during routine radiographic examination. The etiologyof this condition remains controversial; however, this condition results from the interference during the initiation stage of tooth development.Multiple supernumerary teeth are rare in individuals with no other associated diseases or syndromes.[6]

To diagnose impacted teeth appropriately, a comprehensive approachinvolving patient history, visual examination, palpation, and essential radiographic imaging like intraoral periapical radiographs (IOPAR), orthopantomograms (OPG), and cone beam computed tomography (CBCT) should be employed.[3] OPG is considered the standard radiograph for assessing the dental status, position, depth, and angulation of impacted teeth.

The most common complication due to the presence of supernumerary teeth is the failure of eruption of maxillary incisors (Rajab and Hamdan 2002).[2]The successful management of the impacted central incisor is often a difficult task and requires the combined expertise of orthodontist and oralsurgeon.Several techniques are available for managing impacted teeth.Methods for management of impaction due to supernumerary tooth are; removal of supernumerary teeth and bone overlying impacted teeth, incision of fibrous tissue over the alveolar ridge to promote the eruption with or without orthodontic traction (Regezi et al., 2003; Bhat, 2006).[10]

Spontaneous eruption of impacted maxillary incisors occurs in 54-76% of cases when supernumerary tooth is removed and there is enough space in the dental arch (Crawford, 1997; Garvey et al., 1999).[2]Although research data indicate that the spontaneous eruption of impacted maxillary incisor may take up to 3 years and sometimes orthodontic treatment is necessary to achieve adequate alignment of the erupted tooth in the dental arch (Witsenburg et al., 1981; Mason et al,2000).

After thorough clinical and radiographic examination, it was decided that the present case required a combined approach involving both surgical and orthodontic treatment to bring an unerupted maxillary central incisor into occlusion as done by Cangialosi,1982; Kamakura et al.,2002; Kocadereli and Turgut, 2005[11].Hence, extraction of the impacted supernumerary tooth was done and was followed by an innovative orthodontic traction of the unerupted permanent central incisor to bring the tooth into proper position in the arch.

IV. CONCLUSION-

Impacted central incisor represent a relatively infrequent occurrence and can affect both the aesthetic appearance and functional aspects. Early diagnosis of the presence and removal of supernumerary teeth is essential.Multidisciplinary team approach should be utilized to ensure successfultreatment outcome.Maxillary permanent left central incisor was successfully positioned in the maxillary arch by surgical exposure and orthodontic traction, which showed good stability.

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