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RESEARCH ARTICLE

UNLOCKING THE HIDDEN: A CASE REPORT OF MANAGING AN IMPACTED MAXILLARY CENTRAL INCISOR

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Abstract

Impaction of maxillary central incisors, although relatively uncommon (0.13–2.6%), presents a significant esthetic and psychological concern due to its impact on the “social six” during adolescence. Early diagnosis and a well-coordinated interdisciplinary approach are essential for predictable outcomes. This case report describes the management of an impacted maxillary left central incisor in a 14-year-old female patient using a closed surgical exposure technique with orthodontic traction. Clinical and radiographic evaluation, including CBCT, confirmed the position and near-complete root development of the impacted tooth, indicating limited potential for spontaneous eruption.

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Introduction:-

Maxillary central incisors are critical determinants of facial aesthetics, phonetics, and psychosocial development, owing to their dominant position in the smile arc. Impaction of these teeth, although relatively uncommon, presents a significant clinical challenge due to its impact on both function and appearance. Lack of an incisor can cause problems with function, especially when speaking and making sounds like "s." Therefore, both appropriate phonetics and aesthetics need the regular eruption, location, and morphology of these teeth. Between the ages of seven and nine, the mixed dentition period is when the failure of maxillary incisor eruption usually manifests itself. The aetiology of impacted maxillary incisors is multifactorial, with local factors such as supernumerary teeth, odontomas, trauma to primary predecessors, and space deficiency being the most frequently implicated. Accurate localization of the impacted incisor is essential for effective treatment planning. Advances in three-dimensional imaging, particularly cone-beam computed tomography (CBCT), have significantly improved diagnostic precision by allowing detailed assessment of tooth position, angulation, root development, and proximity to adjacent structures. Contemporary evidence underscores that treatment planning should be individualized based on these parameters, along with the patient's age and available arch space. A multidisciplinary approach integrating precise diagnosis, appropriate surgical technique, and biomechanically sound orthodontic intervention is essential for achieving optimal aesthetic and functional outcomes. This case report illustrates the successful management of an impacted maxillary left central incisor in a 14-year-old female patient using a closed surgical exposure technique

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combined with guided orthodontic traction, highlighting the effectiveness of this approach in cases with limited eruptive potential.

Case Report:-

A 14-year-old female patient reported to the Department with the chief complaint of a missing upper front tooth. The patient's medical and dental histories were non-contributory. Extraoral examination revealed a mesoprosopic facial type with a convex profile. Lips were competent. The lower lip line was at the junction of the incisal and middle third of the maxillary central incisor, while the upper lip height corresponded to the middle third of the maxillary central incisor, indicating acceptable lip posture and smile dynamics. Intraoral examination showed a Class I molar and Class I canine relationship bilaterally. The maxillary left central incisor was clinically absent. The patient exhibited decreased overjet and overbite, contributing to compromised anterior aesthetics. Radiographic evaluation, including orthopantomogram and cone-beam computed tomography (CBCT), confirmed the presence of an impacted maxillary left central incisor with normal root morphology and adequate surrounding alveolar bone. Cephalometric analysis revealed a skeletal Class I relationship with average growth pattern. Soft tissue analysis was within acceptable limits. Model analysis revealed a tooth size discrepancy on Bolton's analysis, with maxillary tooth material excess in the overall ratio and mandibular anterior tooth material excess in the anterior ratio. Based on clinical and radiographic findings, the case was diagnosed as a skeletal Class I malocclusion with vertical growth pattern, associated with impaction of the maxillary left central incisor and reduced overjet and overbite.



Pre Treatment Extraoral and Intraoral Photographs



Pre Treatment OPG, Lateral cephalogram, and CBCT

Diagnosis:-

The patient was diagnosed with Angle's Class I malocclusion on a Class II skeletal base with vertical growth pattern. There is impacted left upper central incisor along with decreased overjet and overbite.

Treatment Objectives:-

1. Disimpaction and traction of tooth 21.
2. Obtaining normal appearance of the impacted tooth and gingival tissue.
3. To attain normal overjet and overbite.
4. To maintain the class I molar, class I canine relation bilaterally.
5. Achieve soft tissue balance and harmony.

Treatment Plan:-

Patient was planned to be treated by MBT 0.022" slot Pre Adjusted Edgewise Appliance. Initial levelling and alignment was done. After reaching 0.019 x 0.025 inch Stainless Steel base arch wire surgical exposure of the impacted central incisor using closed eruption technique, followed by orthodontic traction using light force to guide eruption.

Treatment Progress:-

The patient was treated using 0.022" MBT prescription. Trans-platal arch was fabricated and cemented to upper first molars, from the initial phase to provide anchorage and facilitate eruption path for the impacted incisor. After initial levelling and alignment and maintaining the space for left maxillary central incisor surgical exposure was done with 0.019 x 0.025 inch Stainless Steel base arch wire. Followed by the closed eruption technique, after removal of the bony obstruction, orthodontic traction was given with light forces to guide the eruption pathway. After one year the incisor had erupted to a good level, after which the traction was discontinued and bracket on tooth 21 was bonded. Starting of leveling and alignment. Followed by Space closure and lastly Finishing and detailing.



Surgical Exposure



Initial Traction

Treatment Results:-

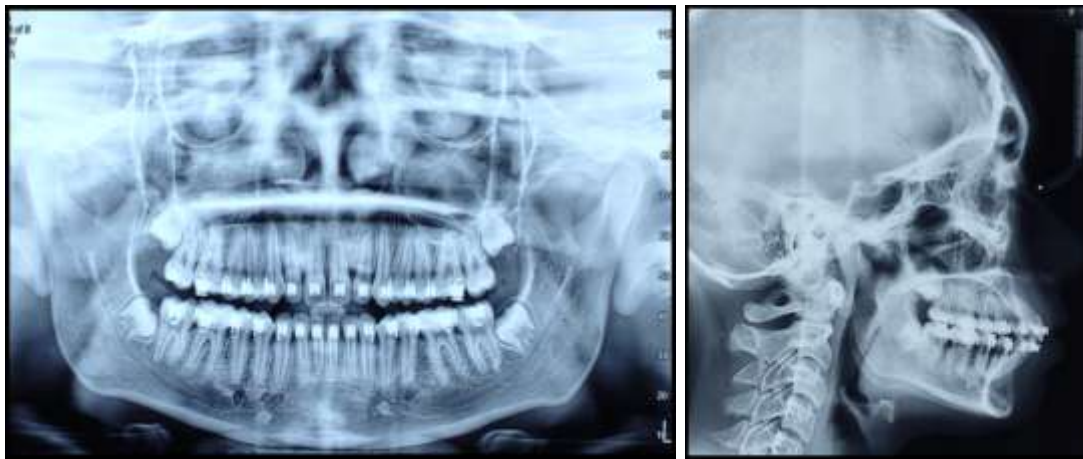
At the completion of treatment, the impacted maxillary left central incisor was successfully guided into the arch, resulting in a marked improvement in smile esthetics and anterior dental harmony. The tooth exhibited favorable gingival contour and satisfactory periodontal health, validating the effectiveness of the closed eruption technique.

A stable and functional occlusion was achieved with maintenance of Class I molar and canine relationships bilaterally. The previously reduced overjet and overbite were corrected to normal values, establishing optimal anterior guidance. Superimposition analysis revealed controlled eruption of the impacted incisor along its intended path, with minimal undesirable tooth movement and stable skeletal bases. Post-treatment panoramic radiograph demonstrated good root parallelism with no significant root resorption, confirming the biological safety of the applied orthodontic forces. Overall, the combined surgical-orthodontic approach resulted in successful disimpaction and alignment of the maxillary central incisor, with stable occlusion, controlled vertical dimension, and improved facial and dental aesthetics.





Post Treatment Extraoral and Intraoral Photographs



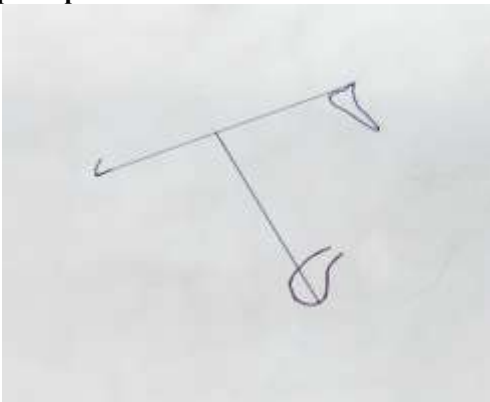
Post Treatment OPG and Lateral Cephalogram

Cephalometric Values:-

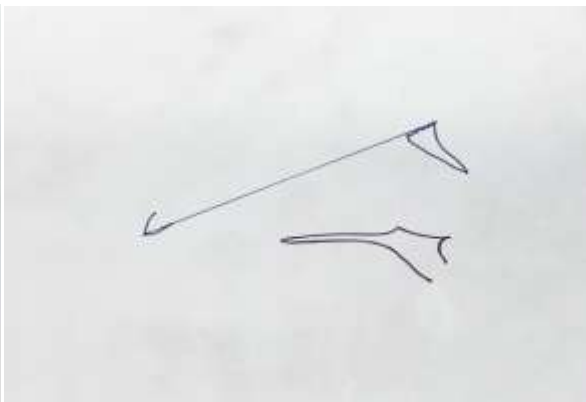
Parameter	Mean	Pre - Treatment	Post Treatment
SNA	82° ± 2°	83°	83°
SNB	78° ± 2°	79°	79°
ANB	2° ± 2°	+4°	+4°
NA perp - A	0mm-1 mm	-1mm	0mm
NA perp - Pog	(-4 to 0)mm	-4mm	-4mm
With Appraisal	(-2 to +2)mm	+4 mm	+4mm
Jarabak's Ratio	62%-65%	69.69%	68.8%
SN-MP	32°±5°	26°	27°
LAFH	65mm-67mm	56mm	59mm
U1-L1	131°±5°	117°	113°
U1-SN	104°±2°	104°	109°
U1-PP	110°±6°	112°	113°
U1-NA	22°	21°	27°

U1-NA (MM)	4 mm	4 mm	6.5mm
L1-NB	25°	29°	32°
L1-NB (MM)	4 mm	6 mm	7mm
UL-E-Line	-4mm±2mm	-3mm	-2mm
LL-E-Line	-2mm±2mm	+0.5mm	+1.5
UL-S-Line	Lips behind – Flat Lips anterior - Protrusive	+1mm	+1mm
LL-S-Line	Lips behind – Flat Lips anterior - Protrusive	+1.5mm	+2mm
NLA	90°-110°	109°	101°

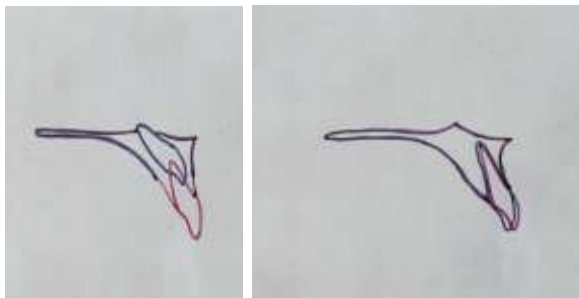
Superimpositions:-



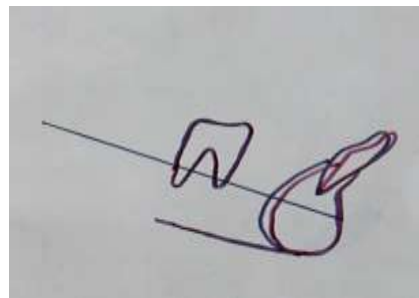
**Area 1 - Super imposition at Na Ba
Registered at CC point**



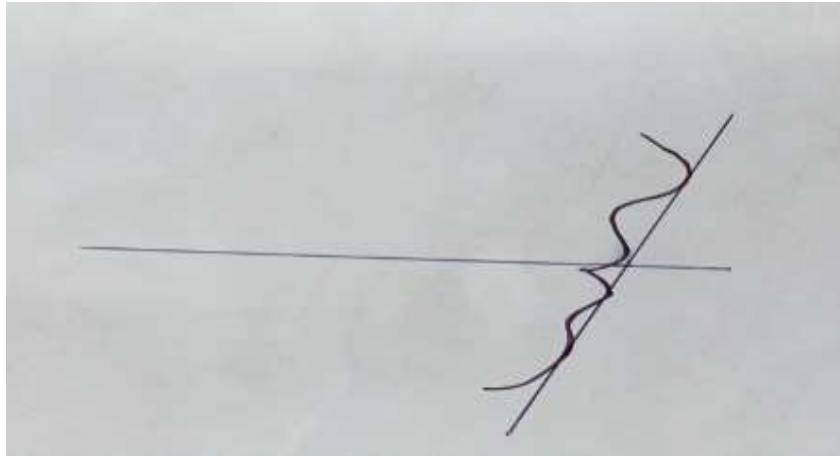
**Area 2 - Super imposition at Na Ba plane
Registered at Na plane**



Area 3- Super imposition at ANS PNS plan



Area 4- Super imposition at Xi-Pm



Area 5- Esthetic plane superimposition

Discussion:-

Immediate surgery with orthodontic traction is often recommended when the apex of the impacted tooth is nearly or fully closed, or when it is believed that the impacted tooth has a low potential for spontaneous eruption. This approach has the benefit of early eruption of the impacted tooth, reducing the psychological impact resulting from a long waiting period for the spontaneous eruption of a missing anterior tooth. Impaction of the maxillary central incisor, although less common than canine impaction, presents a significant clinical challenge due to its critical role in facial aesthetics, phonetics, and psychological development. Early diagnosis and timely intervention are essential to prevent complications such as space loss, midline deviation, and alveolar bone deficiency. In the present case, the patient reported at 14 years of age, a stage at which the eruptive potential of the impacted incisor is reduced, thereby necessitating an active surgical-orthodontic approach. Overall, this case reinforces the importance of a multidisciplinary approach in managing impacted maxillary incisors. The combination of precise diagnosis, appropriate surgical technique, and controlled orthodontic mechanics resulted in successful eruption, alignment, and integration of the impacted incisor into the dental arch. The outcomes are consistent with contemporary evidence, supporting the closed eruption technique as a predictable and aesthetically favourable method for managing impacted anterior teeth.

Conclusion:-

Timely diagnosis combined with a meticulously planned interdisciplinary approach can transform a challenging impaction into an aesthetic success. This case highlights that the closed eruption technique with controlled orthodontic traction enables biologically sound tooth movement, preserves periodontal integrity, and achieves harmonious smile outcomes. Ultimately, guided eruption of an impacted maxillary incisor is not merely alignment of a tooth, but restoration of function, aesthetics, and patient confidence.

Declaration of Patient Consent:-

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of Interest:-

There are no conflicts of interest.

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