

# 1 **Unlocking the Hidden: A Case Report of Managing an Impacted** 2 **Maxillary Central Incisor.**

## 3 **ABSTRACT:**

4 Impaction of maxillary central incisors, although relatively uncommon (0.13–2.6%), presents  
5 a significant esthetic and psychological concern due to its impact on the “social six” during  
6 adolescence. Early diagnosis and a well-coordinated interdisciplinary approach are essential  
7 for predictable outcomes.

8 This case report describes the management of an impacted maxillary left central incisor in a  
9 14-year-old female patient using a closed surgical exposure technique with orthodontic  
10 traction. Clinical and radiographic evaluation, including CBCT, confirmed the position and  
11 near-complete root development of the impacted tooth, indicating limited potential for  
12 spontaneous eruption.

## 13 **1. INTRODUCTION**

14 Maxillary central incisors are critical determinants of facial aesthetics, phonetics, and  
15 psychosocial development, owing to their dominant position in the smile arc. Impaction of  
16 these teeth, although relatively uncommon, presents a significant clinical challenge due to its  
17 impact on both function and appearance. Lack of an incisor can cause problems with  
18 function, especially when speaking and making sounds like "s." Therefore, both appropriate  
19 phonetics and aesthetics need the regular eruption, location, and morphology of these teeth.  
20 Between the ages of seven and nine, the mixed dentition period is when the failure of  
21 maxillary incisor eruption usually manifests itself.

22 The aetiology of impacted maxillary incisors is multifactorial, with local factors such as  
23 supernumerary teeth, odontomas, trauma to primary predecessors, and space deficiency being  
24 the most frequently implicated. Accurate localization of the impacted incisor is essential for  
25 effective treatment planning. Advances in three-dimensional imaging, particularly cone-beam  
26 computed tomography (CBCT), have significantly improved diagnostic precision by allowing  
27 detailed assessment of tooth position, angulation, root development, and proximity to  
28 adjacent structures. Contemporary evidence underscores that treatment planning should be  
29 individualized based on these parameters, along with the patient’s age and available arch  
30 space. A multidisciplinary approach integrating precise diagnosis, appropriate surgical  
31 technique, and biomechanically sound orthodontic intervention is essential for achieving  
32 optimal aesthetic and functional outcomes.

33 This case report illustrates the successful management of an impacted maxillary left central  
34 incisor in a 14-year-old female patient using a closed surgical exposure technique combined  
35 with guided orthodontic traction, highlighting the effectiveness of this approach in cases with  
36 limited eruptive potential.

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## 38 **2. CASE REPORT**

39 A 14-year-old female patient reported to the Department with the chief complaint of a  
40 missing upper front tooth. The patient's medical and dental histories were non-contributory.

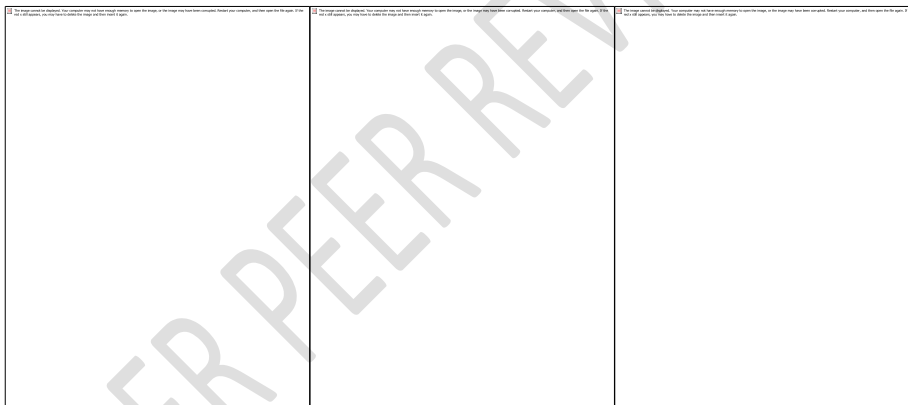
41 Extraoral examination revealed a mesoprosopic facial type with a convex profile. Lips were  
42 competent. The lower lip line was at the junction of the incisal and middle third of the  
43 maxillary central incisor, while the upper lip height corresponded to the middle third of the  
44 maxillary central incisor, indicating acceptable lip posture and smile dynamics.

45 Intraoral examination showed a Class I molar and Class I canine relationship bilaterally. The  
46 maxillary left central incisor was clinically absent. The patient exhibited decreased overjet  
47 and overbite, contributing to compromised anterior aesthetics. Radiographic evaluation,  
48 including orthopantomogram and cone-beam computed tomography (CBCT), confirmed the  
49 presence of an impacted maxillary left central incisor with normal root morphology and  
50 adequate surrounding alveolar bone.

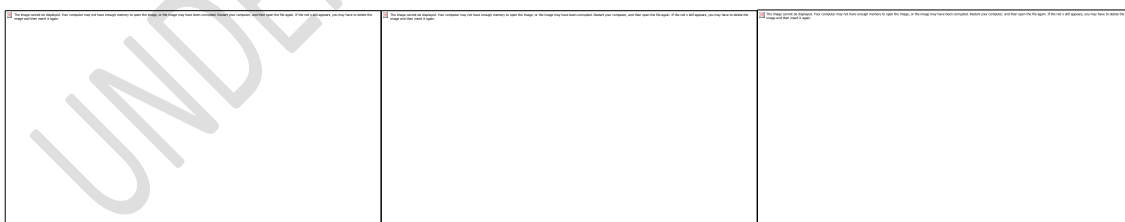
51 Cephalometric analysis revealed a skeletal Class I relationship with average growth pattern.  
52 Soft tissue analysis was within acceptable limits. Model analysis revealed a tooth size  
53 discrepancy on Bolton's analysis, with maxillary tooth material excess in the overall ratio and  
54 mandibular anterior tooth material excess in the anterior ratio.

55 Based on clinical and radiographic findings, the case was diagnosed as a skeletal Class I  
56 malocclusion with vertical growth pattern, associated with impaction of the maxillary left  
57 central incisor and reduced overjet and overbite.

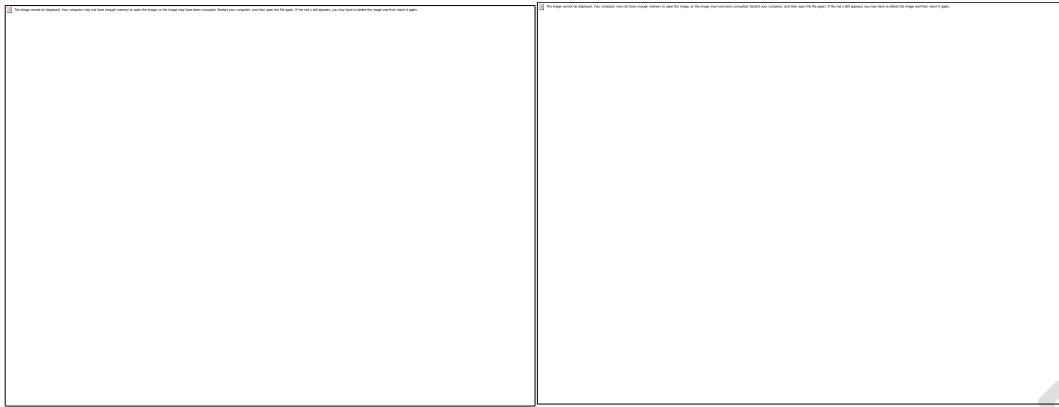
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62 **Pre Treatment Extraoral and Intraoral Photographs**

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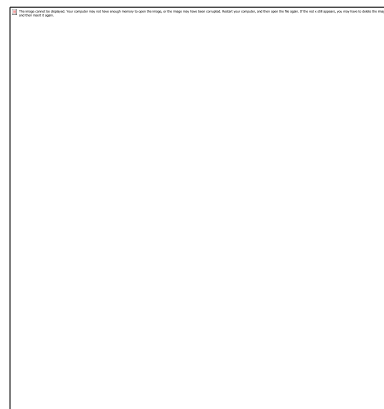
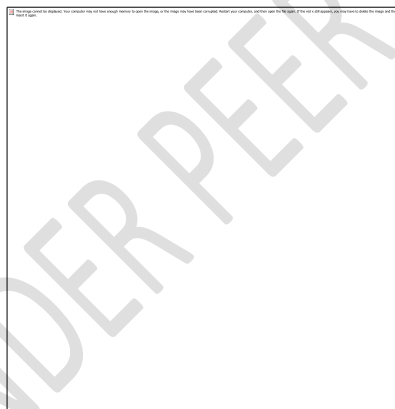
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72 **Pre Treatment OPG, Lateral cephalogram, and CBCT**

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74 **2.1 DIAGNOSIS**

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

78 **2.2. TREATMENT OBJECTIVES**

- 79 1. Disimpaction and traction of tooth 21.

- 80 2. Obtaining normal appearance of the impacted tooth and gingival tissue.
- 81 3. To attain normal overjet and overbite.
- 82 4. To maintain the class I molar, class I canine relation bilaterally.
- 83 5. Achieve soft tissue balance and harmony.

84

### 85 2.3. TREATMENT PLAN

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

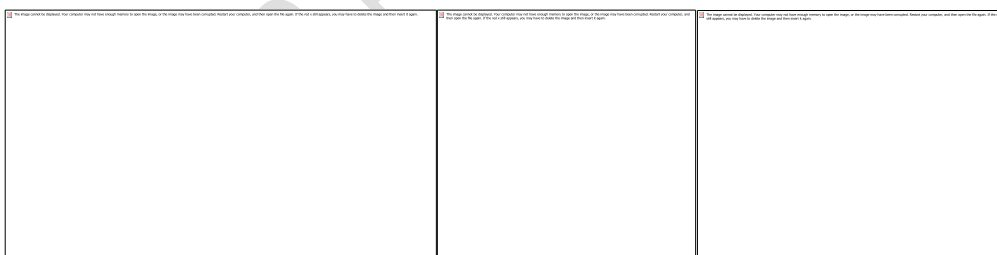
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### 91 2.4 TREATMENT PROGRESS

92 The patient was treated using 0.022" MBT prescription. Trans-platal arch was fabricated and  
93 cemented to upper first molars, from the initial phase to provide anchorage and facilitate  
94 eruption path for the impacted incisor. After initial levelling and alignment and maintaining  
95 the space for left maxillary central incisor surgical exposure was done with 0.019x 0.025 inch  
96 Stainless Steel base arch wire.

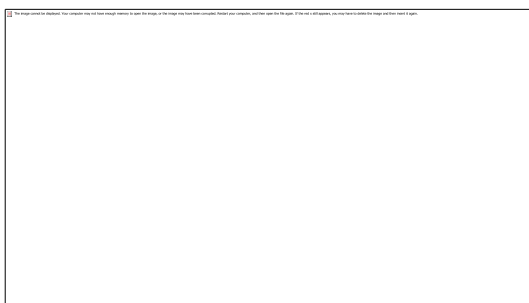
97 Followed by the closed eruption technique, after removal of the bony obstruction, orthodontic  
98 traction was given with light forces to guide the eruption pathway. After one year the incisor  
99 had erupted to a good level, after which the traction was discontinued and bracket on tooth 21  
100 was bonded. Starting of leveling and alignment. Followed by Space closure and lastly  
101 Finishing and detailing.

102



103

### 104 Surgical Exposure



105

106

## Initial Traction

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### 109 2.5 TREATMENT RESULTS

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

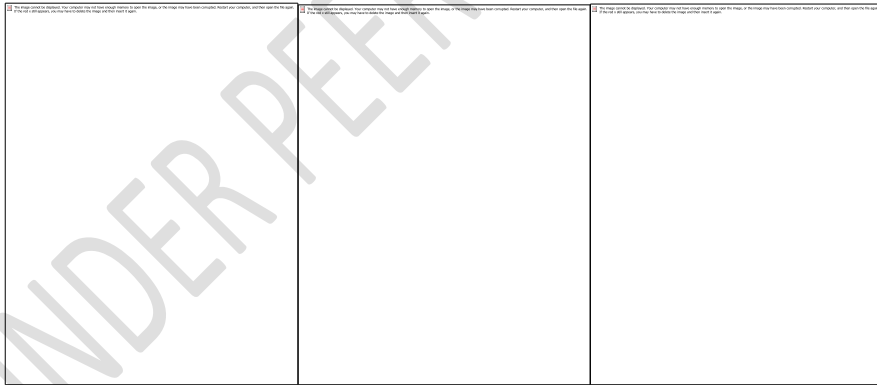
114 A stable and functional occlusion was achieved with maintenance of Class I molar and canine  
115 relationships bilaterally. The previously reduced overjet and overbite were corrected to  
116 normal values, establishing optimal anterior guidance.

117 Superimposition analysis revealed controlled eruption of the impacted incisor along its  
118 intended path, with minimal undesirable tooth movement and stable skeletal bases.

119 Post-treatment panoramic radiograph demonstrated good root parallelism with no significant  
120 root resorption, confirming the biological safety of the applied orthodontic forces.

121 Overall, the combined surgical-orthodontic approach resulted in successful disimpaction and  
122 alignment of the maxillary central incisor, with stable occlusion, controlled vertical  
123 dimension, and improved facial and dental aesthetics.

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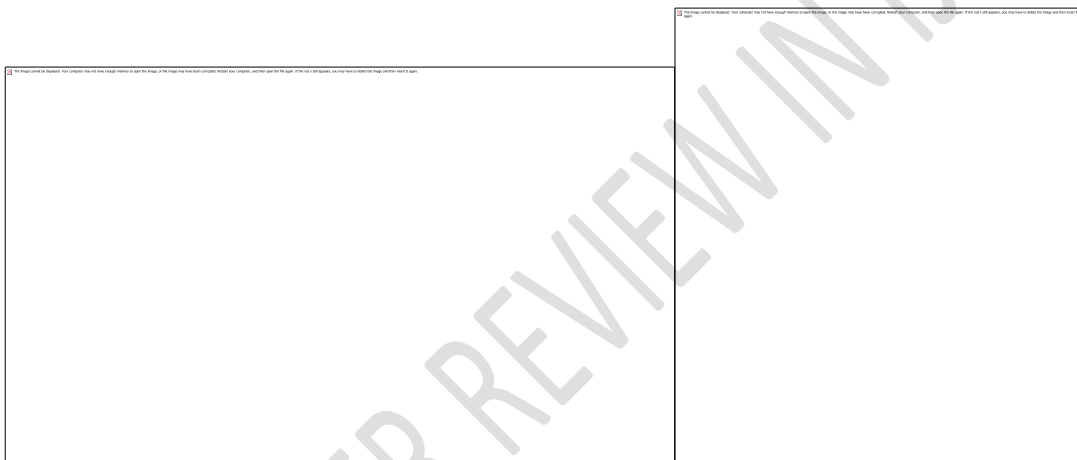
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Post Treatment Extraoral and Intraoral Photographs

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Post Treatment OPG and Lateral Cephalogram

135 **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°

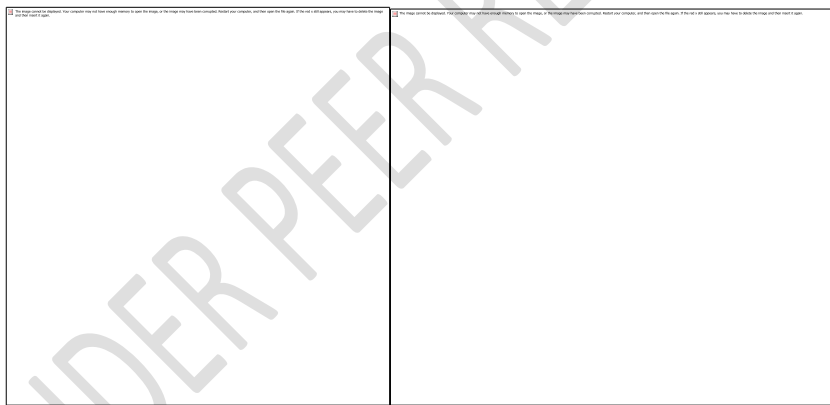
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139 SUPERIMPOSITIONS

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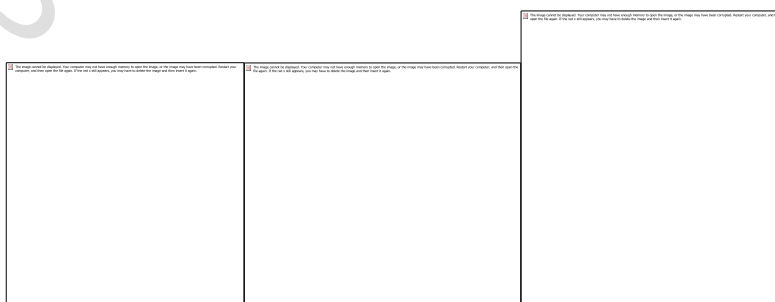


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142 Area 1 - Super imposition at Na Ba planeRegistered  
143 at CC point

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

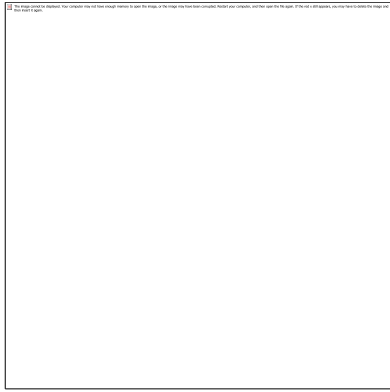
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145 Area 3- Super imposition at ANS PNS plane

Area 4- Super imposition at Xi-Pm



Area 5- Esthetic plane superimposition

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### 149 3. DISCUSSION

150 Immediate surgery with orthodontic traction is often recommended when the apex of the  
151 impacted tooth is nearly or fully closed, or when it is believed that the impacted tooth has a  
152 low potential for spontaneous eruption. This approach has the benefit of early eruption of the  
153 impacted tooth, reducing the psychological impact resulting from a long waiting period for  
154 the spontaneous eruption of a missing anterior tooth. Impaction of the maxillary central  
155 incisor, although less common than canine impaction, presents a significant clinical challenge  
156 due to its critical role in facial aesthetics, phonetics, and psychological development. Early  
157 diagnosis and timely intervention are essential to prevent complications such as space loss,  
158 midline deviation, and alveolar bone deficiency. In the present case, the patient reported at 14  
159 years of age, a stage at which the eruptive potential of the impacted incisor is reduced,  
160 thereby necessitating an active surgical-orthodontic approach.

161 Overall, this case reinforces the importance of a multidisciplinary approach in managing  
162 impacted maxillary incisors. The combination of precise diagnosis, appropriate surgical  
163 technique, and controlled orthodontic mechanics resulted in successful eruption, alignment,  
164 and integration of the impacted incisor into the dental arch. The outcomes are consistent with  
165 contemporary evidence, supporting the closed eruption technique as a predictable and  
166 aesthetically favourable method for managing impacted anterior teeth.

167

### 168 4. CONCLUSION

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

175

176 **5. DECLARATION OF PATIENT CONSENT**

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

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183 **6. SOURCE OF FUNDING**

184 No source of funding.

185

186 **7. CONFLICTS OF INTEREST**

187 There are no conflicts of interest.

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