

Orthodontic Treatment of Impacted Dilacerated Maxillary Central Incisors: A Case Report

Nadia Madhi^{1*}, Housseem Hmida¹, Mahmoud Qalalwa¹, Wiem Ben Amor², Ines Dallel³, Samir Tobji³, Adel Ben Amor³

¹Resident, Department of Orthodontics, Dental Clinic of Monastir, Tunisia

²Assistant Professor, Department of Orthodontics, Dental Clinic of Monastir, Tunisia

³Professor, Department of Orthodontics, Dental Clinic of Monastir, Tunisia

DOI: <https://doi.org/10.36348/sjodr.2025.v10i11.001>

Received: 07.09.2025 | Accepted: 30.10.2025 | Published: 07.11.2025

*Corresponding author: Nadia Madhi

Resident, Department of Orthodontics, Dental Clinic of Monastir, Tunisia

Abstract

Impaction of maxillary permanent central incisors is not a frequently reported case in dental practice, but its treatment is challenging because of its importance to facial esthetics. Early detection of such teeth is most important if complications are to be avoided. We report a case of a 14-year-old male with impacted maxillary central incisors. After correct planning of the case, the impacted central incisors were pulled using a combined approach with surgical exposure and the application of an orthodontic force, restoring the patient's function and aesthetics, with good preservation of the supporting structures.

Keywords: Incisor, Maxillary, Impacted, Surgical-Orthodontic Treatment, Class II d'Angle, Hyperdivergent Patient.

Copyright © 2025 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

An impacted tooth is defined as a tooth that fails to reach the occlusal plane after the normal age of eruption or when its contralateral tooth has already erupted for at least six months with a fully developed root [1].

Although the maxillary canine is the most impacted tooth in the front part of the mouth, the impacted maxillary central incisor presents an issue at a younger age, since the maxillary central incisor typically erupts several years before the canine. A previous study reported that the incidence of unerupted maxillary incisors in the 5- to 12-year-old age group as 0.13% [2].

This article presents a clinical case report that demonstrates the successful orthodontic treatment of an impacted dilacerated maxillary central incisors, detailing the diagnostic process, treatment planning, and outcomes.

PRESENTATION OF THE CASE

Clinical Examination and Diagnosis

A 14-year-old boy presented himself at the Dento-Facial Orthopedics Department of dental clinic of

Monastir, Tunisia. His demands were both esthetic and functional. He had a chief complaint about the absence of maxillary incisors. He was in good general health. He reported no contraindications to orthodontic treatment in his medical history and no history of TMJ disorder.

*Extraoral examination from the frontal revealed a symmetric face with parallelism of the horizontal lines of the face and a straight medial sagittal plan and increased lower anterior facial height with a passive lip competence.

The profile analysis showed a slightly convex profile. A normal nasolabial angle and an extended "S" shaped labiomental groove. (Figure1A)

Intraoral examination showed unsatisfactory oral hygiene and a healthy periodontal status, with no bleeding on probing but with thin periodontal tissues. Furthermore, an oval maxillary arch with absence of the central incisors. The mandibular arch was U shaped with the presence of a supernumerary incisor and a short lingual frenum. (Figure1B)

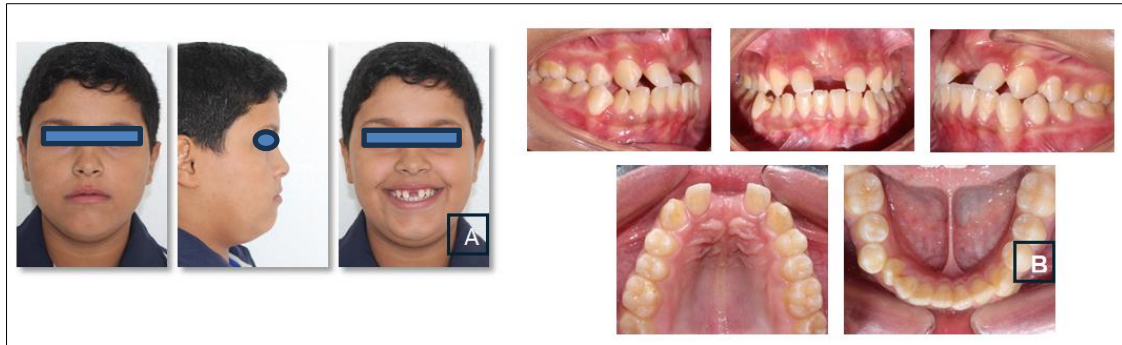


Fig. 1: Pretreatment photographs. A, facial photographs B, intra-oral photographs

Moreover, the occlusal examination shows that the patient had Class I molar and canine in the left and class I molar and end-on Class II canine relationship on the right, with overjet of 0 to -2mm. The patient had an anterior infraclusion, a reverse bite between the upper right canine (tooth 13) and the lower right canine (tooth 43).

*The functional examination revealed a mixed ventilation with mouth breathing predominance, atypical swallowing due to tongue interposition and a normal phonation.

*The analysis of plaster models showed negative dentoalveolar discrepancy in the mandibular arch. The overjet was irregular (0 to -2 mm).

Initial panoramic radiographic evaluation showed impacted dilacerated maxillary central incisors

and the third molars under development. There was a supernumerary mandibular incisor. The crown-root ratios were normal with good alveolar bone levels, no bone pathology and no root resorption. In addition, the mandibular condyles, nasal floor and maxillary sinuses appeared normal. However, we note the convergence of the roots of the lower anterior teeth (Figure2A).

The lateral cephalometric radiograph examination indicated a skeletal class I base ($ANB = 4^\circ$), with maxillary and mandibular retrognathia ($SNA = 79^\circ$ and $SNB = 75^\circ$). In addition, we noted a severe high vertical dimension $GOGN/SN = 43^\circ$ with an increased mandibular plane angle and a hyperdivergent growth pattern. The maxillary and mandibular incisors presented increased axial inclination and were protruded in relation to their alveolar base ($I/F = 125^\circ$ and $IMPA = 90^\circ$) (Figure 2B).

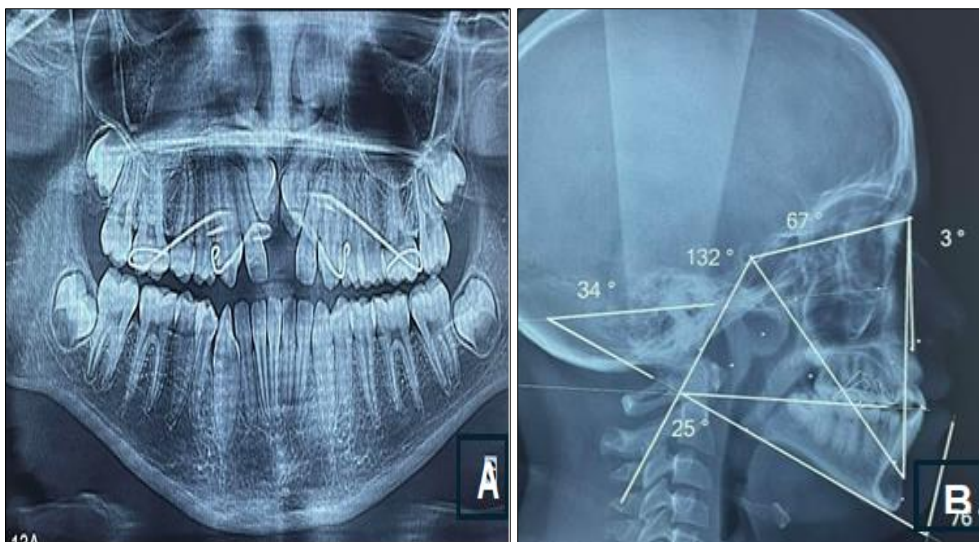


Fig. 2: Pretreatment radiographs. A, panoramic radiograph. B, lateral cephalometric radiograph

Treatment Objectives

The treatment goals for this patient were as follows: (1) To obtain functional swallowing (2) To establish normal Class I canine and molar relationships with normal overjet and overbite (3) To restore a functional anterior guide by placing the impacted incisors (4) To resolve the dental crowding (5) To

improve facial aesthetics and smile (6) To obtain stable results.

Treatment Plan

The following treatment plan was discussed with the patient and his parents considering the treatment

objectives and correlating with the patient's requirements.

Therefore, to achieve these treatment goals, the selected treatment plan was an orthodontic treatment with extraction of the supernumerary mandibular incisor, surgical exposure and orthodontic traction of the impacted central incisors and lingual frenectomy. The treatment was planned for continuous leveling and alignment of the upper and mandibular arch, and orthodontic traction of the impacted incisors on a rigid arc 0.18x0.25 SS.

Treatment Progress

After obtaining the patient's consent, bands and preadjusted 0.022*0.028-in brackets were placed to the maxillary teeth up to the second molars. A 0.014-in nickel-titanium wire was engaged as the initial arch wire to start leveling and aligning. Then, .018 NiTi, was used successively.

During the second appointment, after extraction of the supernumerary mandibular incisor, a maxillary .018 NiTi was used and the orthodontic fixed appliances with Roth prescription brackets (slot 0.022" x 0.028") were placed to the mandibular teeth up to the first molars shunting the right mandibular canine (Figure3).



Fig. 3: Progress photographs: maxillary and mandibular leveling

Then, dental leveling and alignment of the maxillary and the mandibular dental arches were performed using the following orthodontic arch wire sequence: 0.014", 0.016", 0.018" and 0.017" x 0.025"

Nickel Titanium arch wire followed by 0.017" x 0.025" and 0.018" x 0.025" stainless steel arch wire.

Once a 0.017" x 0.025" maxillary arch is used, the left upper central incisor was aligned by means of mechanics using an overlay wire (figure 4).



Fig. 4: Progress photographs: the incisor traction by an overlay



Fig. 5: Follow-up panoramic

Following the placement of the left central incisor, a new panoramic radiograph is obtained (figure 5), and traction of the right central incisor is initiated.

At this time, surgical intervention was done for bonding the orthodontic device in the impacted right incisor and the traction protocol began using the 0.018 x

0.025" steel arch with a bend to support the elastic and traction through a chain elastic.

Once the tooth had erupted, a bracket was bonded, and traction was continued using an overlay. This was followed by a return to the leveling phase, during which an anterior vertical elastic was used to maintain and enhance traction. (Figure 6)



Fig. 6: Progress photographs: photographs: Traction of the right central incisor



Fig. 7: Progress Finalization phase

In the following months, 0.014", 0.016", 0.018", 0.020" and 0.018x0.025" steel wires were used.

During the finalization phase, a rectangular archwire was used to incorporate the torques in both arches, in addition to the elastic chain segment. (Figure 7)

At the end, minor bends were placed in .018*.025 SS arch wire for detailing both alignment and occlusion.

After finishing and detailing, the appliance was debonded, retention was performed with a bonded

stainless steel lingual canine-to-canine fixed retainer in both the maxillary and the mandibular arches and final records were taken.

Treatment Results

The results showed that the patient had a satisfactory and pleasing esthetic outcome, with resolution of his chief complaint. All the predefined objectives were fulfilled. The impacted incisors were successfully extracted, and his smile esthetics were significantly improved (Figure 8A).

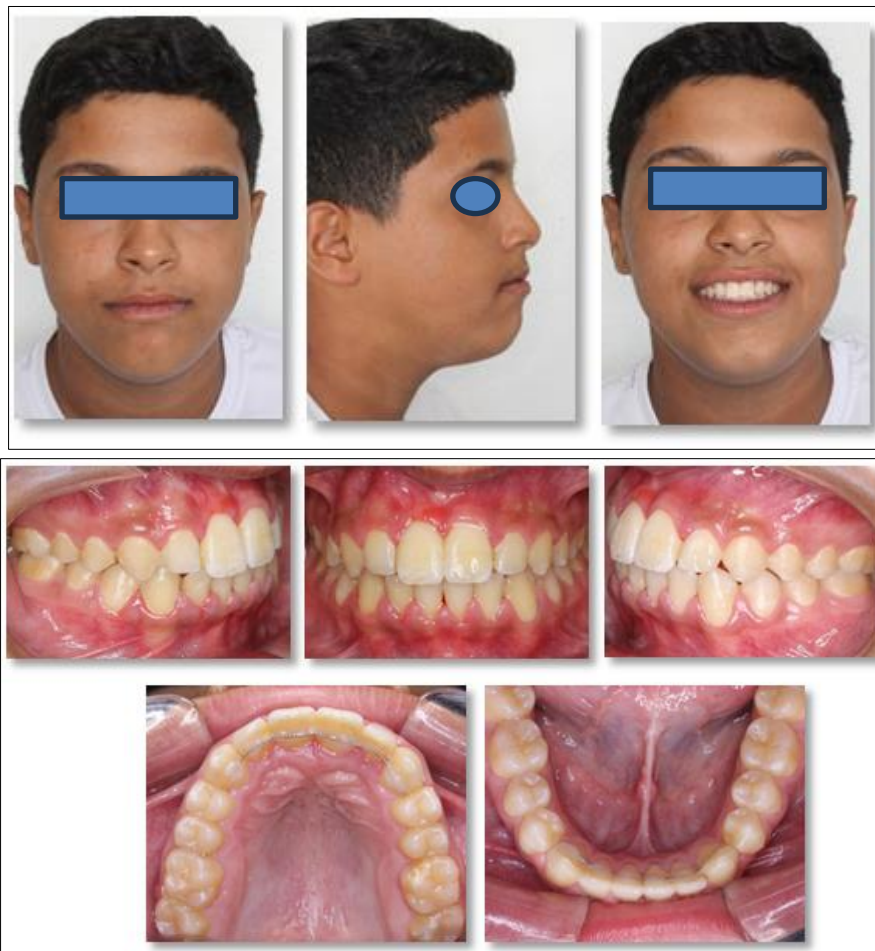


Fig. 8: Post-treatment photographs. A, facial photographs. B, intra-oral photographs

Intraorally, A class I bilateral angle canine and molar relation was achieved with good interdigitated occlusion, crowding was corrected, and an adequate overjet and overbite were achieved. The upper and lower dental midline coincidence was obtained (Figure 8B).

Additionally, functional dynamic occlusion was procured with lateral movement guided by the canines and protrusive movement by the incisors.

Moreover, the post treatment cephalometric evaluation and superimposition confirmed a positive

change in the profile. There was also a significant change in skeletal measurements in both sagittal and vertical dimensions.

Final cephalometric analysis showed a class I relationship with a change in values of the ANB angle from 4° to 5° and of the GoGn/SN angle from 43° to 41°. The maxillary incisors were retruded (I/F from 125° to 115°), as well as the mandibular incisors had their axial inclination decreased (IMPA from 90° to 86°) (Figure 9).

Cephalometric Values	Initial values	Final values
SNA	79°	84°
SNB	75°	79°
ANB	4°	5°
AoBo	1mm	1mm
FMIA	56°	62°
IMPA	90°	86°
FMA	34°	32°
GoGn/SN	43°	41°
I/i	112°	125°
I/F	125°	115°



Fig. 9: Final cephalometric analysis

The final panoramic (Figure 10) showed good root parallelism except the dilaceration of the roots of maxillary central incisors, without significant root

shortening or development of other pathologies. The patient reports no development of signs or symptoms of TMJ disorder.



Fig. 10: Post-treatment panoramic radiograph

DISCUSSION

The most common etiological factors of impacted maxillary incisors are mechanical obstruction along the eruption path or general diseases of the child. The most common causes are supernumerary teeth, mucogingival structures (cysts), tooth decay treatment or primary tooth ankylosis, and tumours [3].

Moreover, there can be no question that the absence of maxillary incisors has serious consequences such as esthetic, phonetic and occlusal problems for the young patient.

In terms of treatment, the available options for this condition include (1) extraction of the tooth followed

by prosthodontic rehabilitation; (2) extraction of the tooth and realignment of the lateral incisor into the central incisor position, with the canine and premolar sequentially moved mesially and anatomically modified by grinding, crowning, and so on; or (3) the orthodontic-surgical modality [4].

Notably, most patients seeking treatment for impacted central incisors are young children. As a result, any prosthodontic solution provided will be temporary and will require multiple modifications and updates over time. In this context, surgical exposure, along with the use of light force orthodontic traction to reposition the impacted tooth into proper occlusion, is widely accepted and documented as a contemporary treatment approach.

However, it is important to properly inform the patient and the parents of the possibility of failure before extensive measures are undertaken to save a severely impacted tooth [6].

Furthermore, several reports have indicated an impacted tooth can be brought into proper alignment in the dental arch. The following factors are used to determine whether successful alignment of an impacted tooth can take place: (1) the position and direction of the impacted tooth, (2) the degree of root completion, (3) the degree of dilacerations, and (4) the presence of space for the impacted tooth [5].

In the present case, it is undeniable that forced eruption of the impacted teeth was a clinical challenge as it requires close collaboration between an orthodontist and an oral surgeon and, not least, skilled management because it mainly involves a young patient.

Just as revealed in the present case, the dilaceration of the root would be a factor that complicates the success of treatment. Therefore, the case must involve carefully planned procedures and good compliance.

Furthermore, the success rate of the impacted dilacerated tooth further depends on the degree of dilaceration, position of the tooth, and root formation of the tooth. A dilacerated root with an obtuse angle, lower down position, and incomplete root formation of the tooth would have a better prognosis for orthodontic traction [7].

In this case, the impacted tooth is diagnosed with its root completely formed and dilacerated, with sufficient available space for tooth alignment.

The attempt to move an impacted tooth involves a risk of ankylosis, pulp devitalization, discoloration, external root resorption, injuries to adjacent teeth, alveolar bone loss, gingival recession, clinical crown enlargement, and tooth sensitivity problems [8].

In the case presented in this article, both impacted maxillary incisors were brought into the right anatomical position in the dental arch and no complications reported. The patient had a satisfactory periodontal pattern without significant loss of bone and attached gingiva. The erupted teeth showed no signs of a periapical lesion or discoloration of the crown. Additionally, the radiological control shows no signs of root resorption or lesions of the roots of the adjacent teeth despite the lack of parallelism of the roots due to the initial dilaceration of the roots of the central incisors.

CONCLUSION

The upper central incisors are very important for the overall smile aesthetics and their absence or impaction concerns the facial aesthetic, masticatory

function, phonetics and the psycho-social appearances of the patient [3]. The eruption of the impacted tooth gives to the patient confidence to smile and enhances self-esteem, which is a critical problem in early life [9].

Surgical exposure and orthodontic traction is the treatment most often used: this technique in fact can lead to suitable results at the periodontal, occlusal and esthetics levels at an early stage and more definitively than with other treatment options [10].

However, long-term monitoring of the stability and periodontal health of the dilacerated incisor is very important after orthodontic traction [9].

REFERENCES

1. Žarovienė, A., Grinkevičienė, D., Trakinienė, G., & Smailienė, D. (2021). Post-Treatment Status of Impacted Maxillary Central Incisors following Surgical-Orthodontic Treatment: A Systematic Review. *Medicina*, 57(8), 783. <https://doi.org/10.3390/medicina57080783>
2. Tan, C., Ekambaram, M., & Yiu, C. K. Y. (2018). Prevalence, characteristic features, and complications associated with the occurrence of unerupted permanent incisors. *PLoS one*, 13(6), e0199501. <https://doi.org/10.1371/journal.pone.0199501>
3. Yordanova G, Gurgurova G. Impacted upper central incisors – frequency and factors complicating the treatment protocol. *Folia Med (Plovdiv)* 2021;63(3):405-12. doi: 10.3897/folmed.63.e55145.
4. Chaushu, S., Becker, T., & Becker, A. (2015). Impacted central incisors: factors affecting prognosis and treatment duration. *American journal of orthodontics and dentofacial orthopedics : official publication of the American Association of Orthodontists, its constituent societies, and the American Board of Orthodontics*, 147(3), 355–362. <https://doi.org/10.1016/j.ajodo.2014.11.019>
5. Kannan, Prem Kumar Karupanna Pillai Subbiah; Palanisamy, Senthil Kumar Kullam Palayam1; Kumar, Tamizharasi Senthil1. A case of impacted maxillary central incisor and its management. *Journal of Pharmacy and Bioallied Sciences* 4(Suppl 2):p S174-S176, August 2012. | DOI: 10.4103/0975-7406.100263
6. Brand, A., Akhavan, M., Tong, H., Kook, Y. A., & Zernik, J. H. (2000). Orthodontic, genetic, and periodontal considerations in the treatment of impacted maxillary central incisors: A study of twins. *American journal of orthodontics and dentofacial orthopedics : official publication of the American Association of Orthodontists, its constituent societies, and the American Board of Orthodontics*, 117(1), 68–74. [https://doi.org/10.1016/s0889-5406\(00\)70250-2](https://doi.org/10.1016/s0889-5406(00)70250-2)
7. Lin Y. T. (1999). Treatment of an impacted dilacerated maxillary central incisor. *American*

journal of orthodontics and dentofacial orthopedics
: official publication of the American Association of
Orthodontists, its constituent societies, and the
American Board of Orthodontics, 115(4), 406–409.
[https://doi.org/10.1016/s0889-5406\(99\)70260-x](https://doi.org/10.1016/s0889-5406(99)70260-x)

8. Dourado, G. Bonfim , Souza Neta, E. Andrade ,
Barbosa, M. Castelucci , Fernandes, T. Maria Freire
, Souza, R. Alves de and Conti, A. C. de Castro
Ferreira (2023). Traction of Impacted Central
Incisor in an Adult Patient: Case Report. *Iranian
Journal of Orthodontics*, 18(1), 1-8. doi:
10.22034/ijo.2023.1989084.1104
9. Cozza, P., Marino, A., & Condo, R. (2005).
Orthodontic treatment of an impacted dilacerated
maxillary incisor: a case report. *The Journal of
clinical pediatric dentistry*, 30(2), 93–97.
[https://doi.org/10.17796/jcpd.30.2.n4uk8x7g8t42k3
8k](https://doi.org/10.17796/jcpd.30.2.n4uk8x7g8t42k38k)
10. Paoloni, V., Pavoni, C., Mucedero, M., Bollero, P.,
Laganà, G., & Cozza, P. (2013). Post-traumatic
impaction of maxillary incisors: diagnosis and
treatment. *Annali di stomatologia*, 4(2), 174–183.