

**Original Research Article****Evaluation of multiple impacted supernumerary teeth with an inverted supernumerary causing maxillary incisor impaction—a CBCT based study****Harvinder Singh¹, Yenika Manchanda^{1*}, Vinay Dua¹, Amanjot Kaur¹, Navjot Kaur²**¹Dept. of Orthodontic and Dentofacial Orthopedics, National Dental College and Hospital, Punjab, India²Dept. of Orthodontic and Dentofacial Orthopedics, Rayat Bahra Dental College and Hospital, Punjab, India**Abstract**

Impaction of maxillary incisors is a frequent concern in dental practice and is most commonly associated with the presence of supernumerary teeth in the anterior maxilla. While single supernumerary teeth are relatively common, the occurrence of multiple impacted supernumerary teeth—particularly with inverted orientation—is rare and poses significant diagnostic and treatment challenges. This case report describes a non-syndromic presentation of multiple impacted supernumerary teeth, including an inverted supernumerary tooth, resulting in impaction of a permanent maxillary central incisor.

An 11-year-old male patient presented with non-eruption of a permanent maxillary central incisor. Clinical examination revealed absence of the incisor with no signs of eruption, while the remaining dentition was appropriate for the patient's age. Cone beam computed tomography (CBCT) was performed for precise localization and assessment, which revealed two palatally impacted supernumerary teeth in the anterior maxilla. One of the supernumerary teeth exhibited an inverted orientation, with its crown directed toward the nasal floor, causing mechanical obstruction of the eruption pathway of the permanent maxillary central incisor. No clinical or radiographic features suggestive of syndromic association were identified.

A multidisciplinary treatment plan involving surgical removal of the impacted supernumerary teeth followed by orthodontic traction of maxillary central incisor using fixed mechanotherapy was formulated. This case highlights the diagnostic value of CBCT in identifying the number, orientation and spatial relationship of impacted supernumerary teeth and underscores its importance in guiding appropriate management of complex eruption disturbances.

Keywords: Supernumerary teeth, Inverted supernumerary tooth, Delayed eruption, Maxillary central incisor, Cone beam computed tomography**Received:** 12-02-2026 **Accepted:** 23-04-2026 **Available Online:** 23-05-2026

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Normal eruption of the maxillary incisors is a critical event in the development of functional and esthetic occlusion. This process depends on a coordinated interaction between tooth development, available space and the absence of physical or pathological obstruction. Any disruption in this balance may result in delayed eruption or impaction of the permanent incisors.

Among the various etiological factors responsible for eruption disturbances—such as retained primary teeth, odontogenic pathologies, trauma and developmental anomalies—supernumerary teeth represent the most common cause affecting the anterior maxilla. Supernumerary teeth are defined as teeth present in excess of the normal dental complement and are known to interfere mechanically with the eruption path of permanent incisors. Their prevalence varies across populations and shows a male predilection, with the majority occurring in the premaxillary region where they exert a direct influence on incisor eruption.^{1–3}

The effect of supernumerary teeth on eruption is not determined solely by their presence but is strongly influenced by their number, morphology and spatial orientation. Morphologically, supernumerary teeth may be classified as conical, tuberculate, supplemental or odontome-like.

Tuberculate and mal-positioned supernumerary teeth are more frequently associated with delayed eruption and impaction due to their larger size, delayed root development and tendency to occupy the eruptive pathway of permanent incisors. Clinically, this may result in prolonged retention of primary teeth, displacement or impaction of permanent incisors, root dilaceration and ectopic eruption.⁴

Tooth impaction occurs when a tooth fails to erupt into its normal functional position within the dental arch. While impaction of teeth is a relatively common finding, inversion of an impacted tooth is rare. An inverted tooth is characterized by an abnormal orientation in which the crown is directed superiorly toward the nasal floor and the root apex toward the alveolar crest. The exact etiology of inversion in supernumerary teeth is not fully understood; however, several developmental and local factors have been proposed to explain this unusual orientation.⁵

Supernumerary teeth are believed to arise from disturbances during the early stages of odontogenesis, particularly involving hyperactivity of the dental lamina or abnormal proliferation of odontogenic tissue.⁶ When this aberrant tooth germ develops in an altered position or orientation, it may result in an inverted eruption pattern.

One of the most accepted explanations for inversion

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is abnormal positioning of the tooth germ during early development. If the tooth germ is initially oriented upside down or displaced superiorly toward the nasal floor, subsequent growth and root formation occur in that altered direction, leading to an inverted tooth.²

Another contributing factor may be lack of eruptive space and physical constraints within the premaxillary region. The anterior maxilla is a confined area and the presence of adjacent developing teeth may redirect the path of least resistance for the supernumerary tooth, causing it to develop in an inverted orientation.²

Delayed or arrested eruption of a supernumerary tooth may also play a role. As surrounding permanent teeth continue to erupt and develop, the supernumerary tooth may become secondarily displaced or rotated, ultimately assuming an inverted position.

Additionally, genetic and hereditary influences have been suggested, as supernumerary teeth and their unusual orientations are more commonly observed in certain populations and often show a male predilection.⁶

Trauma and local environmental factors during early childhood have also been proposed, although their role remains less clearly defined. Inverted supernumerary teeth pose additional diagnostic and surgical challenges due to their atypical orientation and close proximity to vital anatomical structures.

The presence of multiple impacted supernumerary teeth, particularly when associated with inversion, significantly increases the risk of eruption failure of permanent incisors and complicates clinical management. Accurate localization and assessment of their relationship with adjacent teeth and anatomical structures are therefore essential. Cone beam computed tomography (CBCT) provides precise three-dimensional visualization, enabling effective diagnosis and treatment planning.

This case report describes a rare presentation of two impacted supernumerary teeth, one of which was inverted, leading to impaction of the maxillary central incisor in an 11-year-old male patient, highlighting the diagnostic value of CBCT in such complex eruption disturbances

2. Objective

To report a rare case of multiple impacted supernumerary teeth, including an inverted supernumerary tooth, causing impaction of the maxillary central incisor in a pediatric patient, and to highlight the role of cone beam computed tomography in accurate diagnosis and treatment plan

3. Case Report

Case Report: A male patient aged 11 years reported to the Department of Orthodontics and Dentofacial Orthopedics, National Dental College and Hospital, Derabassi with the chief complaint of absence of a permanent maxillary central incisor. The patient and parents expressed concern regarding delayed eruption of the anterior tooth, while all other permanent teeth appropriate for the age had erupted normally.

The patient's medical history was non-contributory. There was no history of systemic illness, syndromic association, dentofacial trauma, or family history of delayed

eruption or impacted teeth. The patient had not undergone any prior dental or orthodontic intervention for the present complaint.

Intraoral examination (Figure 1) showed permanent dentition with absence of eruption of the permanent maxillary central incisor(1). The surrounding mucosa showed no bulging or signs suggestive of imminent eruption. The remaining teeth in the arch were clinically present and appeared to be in normal alignment.



Figure 1. Intra-oral photographs

In order to determine whether the missing permanent tooth was impacted or congenitally absent, radiographic evaluation was advised. For precise localization and assessment of the spatial relationship of the impacted teeth with adjacent structures, a cone beam computed tomography (CBCT) scan of the maxilla was performed.

3.1. Radiographic evaluation (CBCT findings)

Cone Beam Computed Tomography (CBCT) (Figure 2) of the maxilla was performed, and three-dimensional volume-rendered reconstructions were evaluated to assess the dentoalveolar structures and the etiology of delayed eruption.

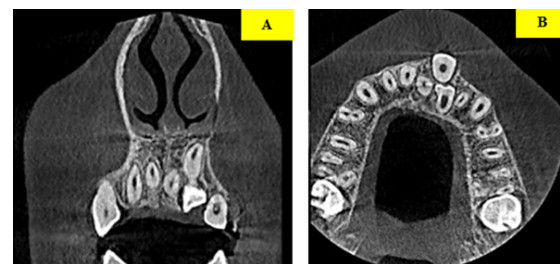


Figure 2. a: Coronal CBCT sections revealed multiple impacted supernumerary teeth in the anterior maxilla, one of which was inverted and located palatal to the maxillary incisors, in close proximity to the nasal floor, thereby interfering with the normal eruption pathway of the permanent incisors. 2b: Axial CBCT section demonstrates multiple palatally positioned, tooth-like radiopaque structures with independent follicular spaces in the anterior maxilla, consistent with impacted supernumerary teeth likely arising from dental lamina hyperactivity and obstructing normal incisor eruption.

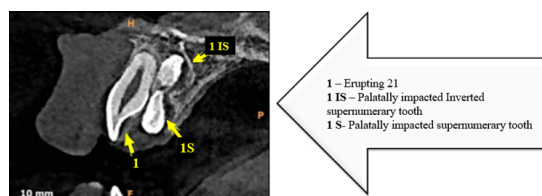
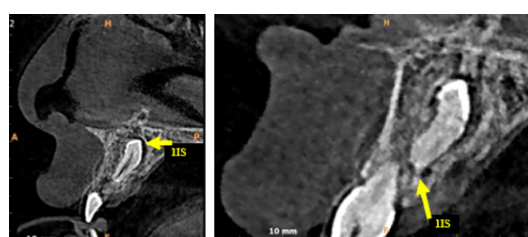


Figure 3. CBCT images revealed the presence of multiple supernumerary teeth in the anterior maxillary region

The CBCT images revealed the presence of multiple supernumerary teeth in the anterior maxillary region (Figure 3). Among these, one supernumerary tooth was identified in an inverted orientation, located in close proximity to the maxillary central incisor. The inverted supernumerary tooth (1IS) (Figure 4) was positioned superior to the crown of the permanent central incisor, with its crown directed superiorly toward the nasal floor and the root oriented inferiorly.



Inverted, palatally impacted supernumerary tooth at midline, with the crown directed superiorly, open root apex and close proximity to the apices of maxillary central incisor, resulting in delayed eruption

Figure 4. CBCT images revealing inverted supernumerary tooth

This inverted supernumerary tooth was found to mechanically obstruct the eruption pathway of the permanent maxillary central incisor, resulting in its failure/delay of eruption. The permanent central incisor exhibited complete crown formation with altered eruption trajectory due to the presence of the obstructing supernumerary tooth. The spatial relationship between the supernumerary tooth, the impacted central incisor and the surrounding alveolar bone was clearly delineated on the three-dimensional reconstruction.

Additional supernumerary tooth was noted in the anterior maxilla, contributing to localized crowding and alteration of normal tooth alignment (Figure 5). The CBCT images allowed accurate assessment of the number, position, orientation, and morphology of the supernumerary teeth, as well as their relationship to adjacent roots, cortical plates and the nasal floor.

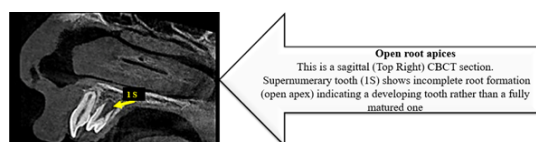


Figure 5. Additional supernumerary teeth were noted in the anterior maxilla

CBCT sagittal sections revealed the presence of two palatally impacted supernumerary teeth in the anterior

maxillary region (Figure 6). One supernumerary tooth (1IS) exhibited an inverted orientation, with the coronal portion positioned approximately 2.6 mm from the nasal floor, while its root apex was located near the apical region of tooth 11. The second supernumerary tooth (1S) was also palatally impacted, with its crown situated approximately 2.7 mm from the alveolar crestal level and the root apex directed toward the nasal floor at a distance of about 4.4 mm. Additionally, this tooth demonstrated incomplete root development with open apices, indicating an early stage of root formation. These CBCT findings clearly illustrate the spatial orientation, proximity to adjacent anatomical structures, and developmental status of the impacted supernumerary teeth, which are important considerations for diagnosis and surgical planning.

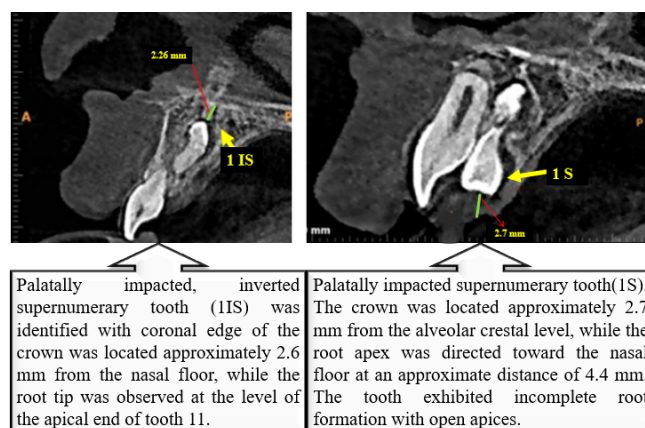


Figure 6. a: CBCT image revealing distance of inverted supernumerary tooth crown from nasal floor. 6b: CBCT image revealing distance of supernumerary tooth crown from alveolar crest level.

Overall, CBCT played a crucial role in identifying the multiple supernumerary teeth and the inverted supernumerary tooth directly responsible for eruption disturbance of the maxillary central incisor, thereby facilitating precise diagnosis and aiding in appropriate surgical and orthodontic treatment planning.

Based on the clinical and radiographic findings, a multidisciplinary treatment plan was formulated. The recommended treatment involved surgical removal of two impacted supernumerary followed with orthodontic traction of central incisor using fixed mechanotherapy. As treatment is currently in progress, final treatment outcomes could not be evaluated at the time of writing. The detailed treatment results and follow-up will be reported in a subsequent article.

4. Discussion

4.1. Tooth impaction and supernumerary teeth

Supernumerary teeth represent a developmental alteration in tooth number and are frequently associated with delayed eruption or impaction of adjacent permanent teeth. Their presence may cause mechanical obstruction, displacement, rotation, root resorption, or cystic changes. When located in the anterior maxilla, supernumerary teeth are a well-recognized cause of delayed eruption of maxillary central incisors. Early diagnosis through radiographic

evaluation is therefore essential to prevent long-term esthetic and functional complications.⁷

In the present case, multiple supernumerary teeth were identified in the anterior maxillary region, resulting in impaction of the permanent maxillary central incisor. The mechanical obstruction created by these teeth significantly compromised the natural eruption pathway of the permanent incisor.

4.2. Inverted supernumerary tooth

An inverted supernumerary tooth represents an uncommon developmental anomaly in which the tooth is positioned in a reversed orientation, with the crown directed superiorly and the root apex oriented inferiorly or vice versa depending on location. Inversion is more frequently reported in mesiodens but may also occur in other supernumerary teeth.

The abnormal orientation may further complicate eruption patterns by creating a mechanical obstruction to adjacent permanent teeth, altering eruption pathways, or increasing the risk of cystic changes. Radiographic evaluation is essential for accurate localization, assessment of proximity to adjacent roots and anatomical structures, and treatment planning.⁸

In the present case, the inverted positioning of the supernumerary tooth contributed significantly to the impaction of the maxillary central incisor. Its orientation and spatial relationship with the adjacent structures reduced the likelihood of spontaneous correction and reinforced the need for surgical intervention followed by orthodontic management.

4.3. Complexity due to multiple and inverted supernumerary teeth

While single supernumerary teeth are relatively common in the anterior maxilla, the presence of multiple supernumerary teeth—particularly with inversion—significantly increases treatment complexity. In the present case, the inverted orientation and spatial positioning of the supernumerary teeth created a substantial mechanical obstruction, not only preventing eruption but also altering the eruption trajectory of the permanent maxillary central incisor.

Unlike cases where removal alone permits spontaneous eruption, the combined factors of inversion, number of supernumeraries, and patient age reduced the likelihood of passive correction. This emphasizes the importance of individualized treatment planning rather than relying solely on conventional eruption expectations.⁹

4.4. Therapeutic considerations

Management options for impacted teeth associated with supernumerary teeth include:

1. Surgical removal of the supernumerary tooth followed by observation for spontaneous eruption.
2. Surgical removal combined with orthodontic traction of the impacted permanent tooth.
3. In rare cases, extraction of a non-viable or severely compromised permanent tooth followed by prosthetic replacement.

The choice of treatment depends on several factors, including patient age, stage of root development, position and

orientation of the impacted tooth, degree of obstruction, and overall occlusal considerations.

In younger patients with incomplete root formation and minimal displacement, spontaneous eruption following removal of the supernumerary tooth may be expected. However, when eruption is unlikely due to significant displacement, complete root development or prolonged impaction, active orthodontic intervention becomes necessary.

5. Rationale for Treatment Selection

In the present case, the presence of multiple supernumerary teeth created a substantial mechanical barrier to eruption. Although spontaneous eruption following surgical removal was considered, the patient's age and the advanced stage of root development reduced the predictability of passive eruption.

Extraction of the permanent maxillary central incisor with prosthetic replacement was not considered appropriate. The impacted incisor was morphologically normal and potentially functional. Extraction of a healthy permanent central incisor, particularly in a growing patient, is generally contraindicated due to the esthetic, functional, and psychological implications, as well as the limitations associated with prosthetic rehabilitation at a young age.

Furthermore, achieving optimal anterior guidance and long-term occlusal stability is best accomplished by preserving and aligning the natural tooth whenever feasible.

5.1. Therapeutic approach

Based on clinical and radiographic findings, surgical removal of the obstructing supernumerary teeth followed by orthodontic traction of the impacted central incisor was considered the most appropriate and conservative treatment option.

This approach aimed to eliminate the mechanical obstruction, facilitate controlled eruption, and achieve functional and esthetic rehabilitation while preserving the natural dentition. Early interdisciplinary management was essential to ensure a predictable and stable outcome.¹⁰

5.2. Timing of intervention and eruption potential

The probability of spontaneous eruption following supernumerary removal depends largely on patient age and stage of root development.¹¹ Literature suggests that teeth with incomplete root formation have a higher chance of erupting naturally once obstruction is eliminated.¹²

In the present case, the advanced stage of root development and prolonged impaction decreased this predictability. Delayed intervention could have further compromised periodontal health, increased risk of root resorption of adjacent teeth, or resulted in space loss. Therefore, early surgical exposure combined with orthodontic traction was considered more predictable than a wait-and-watch approach.

5.3. Preservation of the natural Incisor: A conservative priority

One of the most critical treatment decisions was the preservation of the impacted permanent central incisor. Although prosthetic replacement may be considered in cases

of ankylosis, severe dilaceration, or non-restorable pathology, the incisor in this case was morphologically normal and strategically important for esthetics and occlusion.¹³

Extraction of a healthy maxillary central incisor in a growing patient carries long-term esthetic, functional, and psychological consequences. Moreover, prosthetic rehabilitation in adolescents presents limitations due to continued craniofacial growth. Therefore, maintaining the natural tooth aligned with conservative principles of pediatric and orthodontic management.

5.4. Comparison with contemporary literature

Supernumerary teeth remain a well-documented cause of eruption disturbances in the anterior maxilla, but the literature largely focuses on single or normally oriented supernumeraries, with only scattered reports of inverted supernumerary teeth. Recent observational studies of supernumerary teeth in children and adolescents have reinforced the role of CBCT in accurately localizing impacted teeth and assessing their relationship with adjacent structures, particularly in complex maxillary cases.¹⁴ A systematic review of the radiologic features of double and inverted mesiodens highlighted the relative rarity of inverted orientation and underscored the diagnostic challenges such presentations pose compared with common mesiodentes.¹⁵ Inverted supernumerary teeth are often asymptomatic and discovered incidentally on imaging, yet they can alter the eruption pathway of permanent incisors and complicate management strategies.

Case reports and series published in the last several years continue to emphasize individualized management depending on orientation and anatomical complexity. For example, surgical approaches for inverted mesiodens may include access through the nasal floor when conventional routes are technically difficult due to crown orientation.¹⁶ Similarly, multiple impacted supernumerary teeth in otherwise healthy, non-syndromic patients have been reported (e.g., multiple supernumeraries requiring surgical removal and orthodontic management), though inversion was not specifically described in the majority of these cases.¹⁷ The limited reporting of multiple impacted supernumerary teeth with an inverted orientation affecting eruption of a central incisor distinguishes the current report from these recent publications.

Unlike many contemporary reports in which a single supernumerary tooth was extracted to facilitate spontaneous or orthodontically guided eruption, the coexistence of a second supernumerary and an inverted orientation in this patient created a more significant mechanical obstruction to eruption. CBCT imaging was essential in this case, confirming the unusual orientation and complex spatial relationship with the impacted central incisor, in line with current guidance recommending three-dimensional imaging for complex supernumerary impactions. Thus, this case adds to contemporary evidence by demonstrating the rare clinical scenario of multiple impacted supernumerary teeth, one inverted, affecting maxillary central incisor eruption and highlights the diagnostic and management considerations unique to such cases.

5.5. Clinical significance and lessons from this case

This case highlights three important clinical considerations:

1. Multiple and inverted supernumerary teeth significantly reduce the predictability of spontaneous eruption.
2. Age and root maturity must guide decision-making regarding observation versus active traction.
3. Preservation of a viable permanent incisor should remain the primary objective whenever feasible.

5.6. Limitations and future directions

The principal limitation of this report is that active orthodontic treatment is ongoing. While the rationale for extraction and treatment planning is presented, the absence of final alignment and long-term follow-up reduces the immediate clinical applicability of the report. We acknowledge that definitive outcomes including periodontal health, stability and esthetic results are the most valuable component of any case report. A follow-up publication is planned to present treatment completion and long-term stability.

6. Conclusion

Delayed eruption of maxillary incisors should prompt careful evaluation for underlying local etiological factors, with supernumerary teeth being the most common cause in the anterior maxilla. The present case highlights a rare non-syndromic presentation of multiple impacted supernumerary teeth, including an inverted supernumerary tooth, resulting in impaction of a permanent maxillary central incisor. Such atypical orientations significantly increase diagnostic complexity and influence treatment planning.

This report emphasizes the critical role of cone beam computed tomography in accurately identifying the number, position, and orientation of impacted supernumerary teeth and their relationship with adjacent anatomical structures. CBCT allows precise localization that is often not achievable with conventional two-dimensional imaging, thereby facilitating informed clinical decision-making.

Early diagnosis and appropriate intervention are essential to prevent prolonged impaction, esthetic concerns, and potential complications affecting adjacent teeth. Reporting rare presentations such as this contributes to the existing literature and enhances clinician awareness, enabling timely recognition and effective management of complex eruption disturbances involving inverted supernumerary teeth.

7. Source of Funding

None.

8. Conflict of Interest

None.

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