



CASUISTIC PAPER

An anomalous case report of canine impaction resultant of supernumerary fusion to mandibular incisor

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ABSTRACT

Introduction and aim. Anomalies in dental characteristics such as size, shape, number, structure, and eruption are commonly observed in clinical conditions. One such anomaly is the presence of supernumerary teeth found in various regions of the dental arch. Although frequently asymptomatic, supernumerary teeth are routinely identified during radiographic evaluations. Among the most common causes of impacted maxillary incisors is the presence of supernumerary teeth.

Description of the case. Herein, we present a rare case of lower left canine impaction subsequent to a supernumerary fusion to the mandibular left incisor in a 10-year-old Caucasian female.

Conclusion. This case contributes to the current knowledge regarding supernumerary fused teeth, emphasizing the importance of early intervention and multidisciplinary collaboration in effectively managing such developmental dental irregularities.

Keywords. fusion, impacted maxillary incisors, supernumerary tooth

Introduction

The development of occlusion and tooth eruption in pediatric dentistry often presents complex challenges characterized by deviations from the typical eruption sequence, positional irregularities, and tooth morphology abnormalities.^{1,2} Various factors can influence occlusion development that disrupt tooth alignment and the harmonious relationships with neighboring teeth. Dental anomalies of numbers, particularly supernumerary teeth, have been commonly associated with delayed eruption of maxillary incisors.¹

Supernumerary teeth, defined as teeth exceeding the standard set, have been documented since ancient times, with descriptions dating back to 23–70 A.D.^{1,2} Hyperdontia, characterized by supernumerary teeth

exceeding the average tooth count, is a developmental anomaly with various etiologies.^{1–17} It predominantly occurs in the maxilla, with rare cases reported in the mandible.^{5,6} Prevalence rates in the general population are from 0.15 to 1.9%, with a higher occurrence among males than females.¹⁰ Occurrence rates of supernumerary teeth vary among different racial and ethnic groups.⁵ In the Caucasian population, the reported prevalence ranges between 1 and 3%.⁵ Among Caucasians, 90–98% of supernumerary teeth occur in the premaxillary region.⁴ Asians exhibit a slightly higher frequency, exceeding 3%.⁴ Black children show a prevalence of 0.42%, while children of Hispanic descent have a preponderance of 5.6%.⁵ In permanent dentition, the prevalence ranges from 0.15 to 1%, with a male predominance ratio

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of 2:1.⁶ Despite extensive research, the etiology of supernumerary teeth remains uncertain. However, evidence suggests a genetic basis, supported by the higher occurrence of hyperdontia among related families and its association with syndromes such as Gardner's syndrome and cleidocranial dysostosis.¹²

Supernumerary teeth can be classified according to their location, morphology and orientation.¹⁵ According to the position of supernumerary teeth, they can be categorized as mesiodens, paramolar, and distomolar.¹⁵ One of the most common types of supernumerary teeth are distomolars presented in the OPG below (Fig. 1).

Mesiodens are the most prevalent type of supernumerary tooth and are attributed to many complications such as maxillary central incisors impaction.¹¹ The mere

presence of a supernumerary tooth does not solely account for delayed eruption. The shape, number, and position of supernumerary teeth play significant roles in the eruption process.¹⁻¹⁷ Four morphological types have been identified: conical or peg-shaped, tuberculate or invaginated, supplemental or incisiform, and odontoma-like.¹⁶ Notably, tuberculate or invaginated supernumerary teeth have shown a higher correlation with delayed eruption of maxillary incisors.¹¹⁻¹⁶ Therefore, a thorough determination of etiology and the development of appropriate treatment plans become crucial when incisors fail to erupt within the expected timeframe.

The presence of supernumerary teeth in the anterior maxillary region often leads to various complications, including prolonged retention of deciduous teeth,



Fig. 1. Panoramic radiograph showing fourth molars in the maxilla and right distomolar in the mandible-growing horizontally

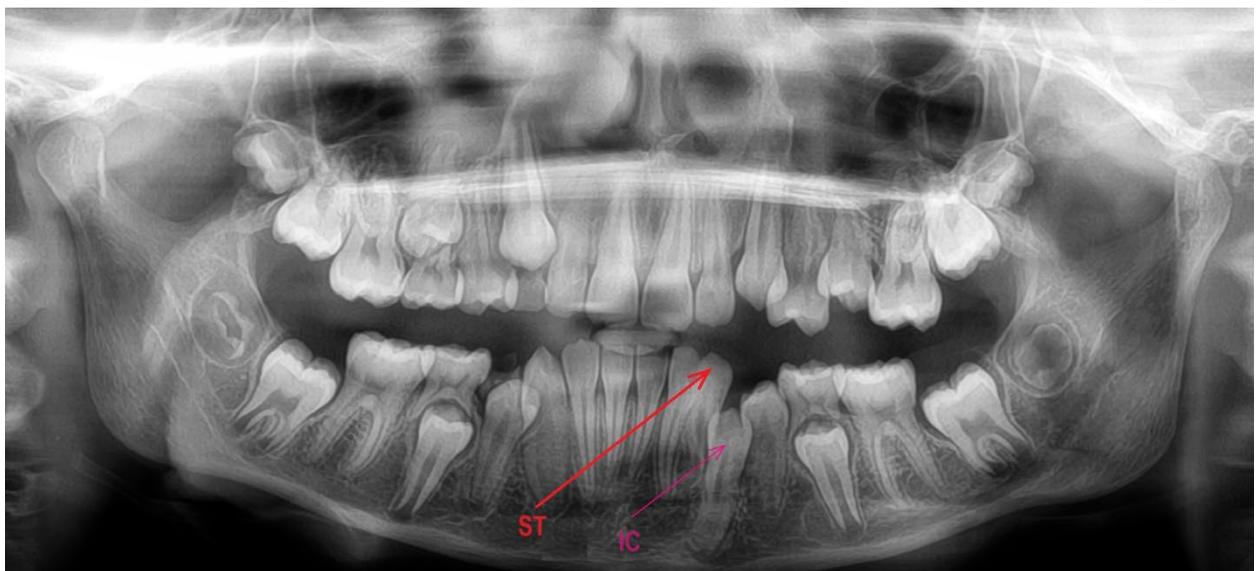


Fig. 2. Panoramic radiograph of a 10-year-old female patient showing supernumerary tooth (ST) fusion with 32 and the impaction of tooth 33 (IC): IC – impacted canine, ST – supernumerary tooth



Fig. 3. A–C: CBCT scans of a 10-year-old female patient confirming the supernumerary tooth fusion to tooth number 32

delayed eruption of permanent teeth, impaction of permanent incisors, ectopic eruption, root dilaceration, and other forms of malformation.¹⁻¹⁸ Such complications pose unique challenges for dental professionals. Literature reports analogous cases of supernumerary tooth fusion to permanent dentition and subsequent impaction of permanent teeth. The aforementioned published literature emphasizes the possibility of complications and the need for multidisciplinary treatment modalities.^{4,9,13-18} Given the significant implications of hyperdontia and tooth impaction, this research article presents a case study that offers valuable insights into the impact of supernumerary teeth on the eruption of permanent teeth.

Aim

This study aims to present a unique case report of canine impaction resultant of supernumerary fusion to mandibular incisor. We discuss a multidisciplinary approach, incorporating surgical intervention, to resolve the impaction and achieve proper alignment within the dental arch.

Description of the case

A 10-year-old Caucasian female non-syndromic patient was presented to the Department of Dental Surgery with a case of permanent lower left canine impaction. The patient has not been treated orthodontically previously. As first a general dentist revealed the disturbances and asymmetry in eruption of canines. The patient's legal guardian's consent was taken, and no medical deviations were noted. Familial history was not contributory. The presence of a canine was already detected on the right side of the mandible. The patient did not report pain on the left side of her mandible. An extraoral examination did not reveal any facial asymmetry. Clinical intraoral examination revealed the presence of an asymptomatic supernumerary tooth in the area of the left anterior mandible and a slight painless protrusion of the bone in the area of the missing, unerupted tooth 33 without symptoms of bone crepitation. A panoramic radiograph (OPG) and cone-beam computed tomography (CBCT) scan confirmed the supernumerary tooth fusion to tooth number 32, resulting in tooth number 33 impaction (Fig. 2) and (Fig. 3), respectively. A CBCT scan helped assess the degree of tooth fusion and the precise planning of the surgical procedure. It turned out to be a complete fusion of the crown of the supernumerary tooth to the crown of tooth number 32 and a fusion of their beginning root compartments. A treatment plan was proposed and initiated after thorough communication with the patient and their legal guardian. The patient was provided with all the associated risks, including follow-up treatment modalities if the impacted tooth 33 did not erupt spontaneously within a few months. Failure of eruption would require surgical exposure of the

unerupted tooth and orthodontic treatment to re-establish sufficient arch space. A surgical management approach was adopted; the supernumerary tooth fused with 32 was surgically removed. The surgical procedure was performed under infiltration anesthesia with 4% articaine with norepinephrine without detachment of the mucoperiosteal flap. The fused fragment of the crown of the supernumerary tooth was cut off using a narrow drill in the area involved by enamel, and the initial fragments of the roots of both teeth were separated. Supernumerary tooth was removed (Fig. 4). The place of cut off was thoroughly smoothed. The prognosis regarding the post-surgical pulp vitality of tooth 32 was favorable. The enamel-dentin junction after the supernumerary tooth cut off was not exposed and thus, did not require any additional protection. The socket was secured with resorbable sutures. Routine postoperative indications were given. Surgical recovery of the tooth extraction was uneventful. Within a few months after the procedure, impacted tooth 33 erupted spontaneously. The patient currently does not require orthodontic treatment. No consequential loss of dental arch space was detected. Post-surgical pulp vitality tests of the remaining tooth did not show any disturbances. A long-term clinical observation did not reveal any post-surgical complications as well as any other disturbances.



Fig. 4. Supernumerary tooth after extraction

Discussion

Supernumerary teeth are a prevalent developmental dental anomaly resulting from factors such as hyperactivity of the dental lamina, dichotomy, environmental influences, or polygenetic processes of atavism.¹⁻¹² These additional teeth often present classical oral complications, including the impaction of adjacent teeth, dental crowding, diastema formation, tooth rotation, displacement, and occlusal interference.¹⁴⁻¹⁸ Dental fusion, clinically noted as a wide tooth, is a morphological dental anomaly associated with supernumerary teeth.¹³⁻¹⁴ Fused teeth present with a distinct unaesthetic tooth morphology and demand for differential diagnosis.¹⁴ Literature reports that fusion's prevalence is rare in posterior and permanent teeth and more predominant in primary dentition, often involv-

ing incisors and canines.¹⁴ The etiology of fused teeth remains speculated; many theories consider developmental, environmental factors, genetic factors, trauma or inflammation.¹⁻¹⁴ The presence of fused teeth is attributed to a high affinity for spacing, periodontal problems and dental caries.¹⁴ Hence, extensive radiographic and clinical evaluation is warranted for patients diagnosed with supernumerary and fused dentition to avert the aforementioned dental complications.

Herein, we present a case of a 10-year-old female patient attributed with both dental abnormalities, 33 canine impaction, and supernumerary fusion with tooth number 32. The etiological development of her supernumerary tooth was not clear. Additionally, no associated conditions such as a cleft lip and palate or syndromes such as cleidocranial dysplasia and Gardner's syndrome were reported. A panoramic radiograph (OPG) and cone-beam computed tomography (CBCT) scan were utilized to diagnose this complex case. CBCT imaging was a preferred mode of radiological investigation, in hindsight of its maxillofacial imaging and low radiation. Moreover, CBCT imaging aided in the diagnosis of dental fusion due to its ability to display the root canal systems and teeth morphology. In this case, CBCT imaging showed the conjunction of the crowns of 32 and the supernumerary tooth and the presence of separate pulp canals. CBCT imaging differential diagnoses confirmed fusion, not gemination, associated with a single pulp canal. The supernumerary tooth was confirmed to have an incisiform morphology.

Proper diagnosis of supplementary fusion with thorough radiographic examination is a prerequisite for successful surgical management.¹⁶⁻¹⁸ As observed in this case; surgical intervention was justified due to the interference of 32 and supernumerary tooth fusion in the eruption of 33. Supplementary fusion warrants a list of complications; prudent management of these teeth is necessary to maintain normal eruption and position patterns of adjacent permanent incisors.¹⁵⁻¹⁸ In such cases, immediate surgical intervention is recommended unless the supernumerary tooth is a non-inverted conical type or is positioned above the apices of an adjacent permanent tooth.¹⁶⁻¹⁸ Supplementary fusion imposes the challenge of mid-root connections between the root canals of fused teeth.¹⁷ Reported case studies describe the need for endodontic treatment, with a poor prognosis of pulp vitality. Additionally, supplementary fusion incorporating the root canals increases the risk of pulpal infection.¹⁷ In the present case, there was a low risk of iatrogenic damage as only the complete fusion of the crown and initial fusion of root compartments was detected.

The eruption of an impacted tooth post-surgical removal of a supplementary tooth calls for additional vigilance. The described case showed no significant delays in the eruption of impacted tooth 33, as it erupted

spontaneously within a few months. Literature, however, reports many instances of delayed eruption due to supernumerary involvement.⁵⁻¹⁸ Optimal treatment modalities in such cases are offered, including surgical exposure of the unerupted tooth and orthodontic treatment to re-establish sufficient arch space.¹⁶⁻¹⁸ Another treatment option is only to observe the unerupted tooth if it is symptomless and is not impacting in any way the dentition.¹⁶⁻¹⁸ Delayed eruption post supernumerary removal may occur within 18 months if the tooth has arch space and is not excessively displaced.¹⁸ This approach may, however, impose potential complications, such as crowding leading to a loss of dental arch space, midline shift, and the loss of eruptive force of adjacent teeth.¹⁶⁻¹⁸ Interceptive treatment is recommended if delayed eruption patterns are detected; therefore, follow-up appointments post-supernumerary removal are crucial for clinically detecting such a complication.

Conclusion

Supplementary fusion, leading to the impaction of a tooth, is a complicated case and requires a cautious and multispecialty approach from the clinician to provide the patient with a successful outcome. Hence, early surgical and orthodontic intervention is often necessary to minimize the side effects of delayed tooth eruption due to supernumerary teeth. The diagnostic tool, CBCT imaging, is recommended to detect the degree of root canal involvement in fused supplementary dentition. This case is exemplary in enhancing our understanding of the implications of supernumerary teeth on dental development and eruption patterns. Unlike other presented cases, the described patient is atypical as she had no associated syndrome; this alludes to the need for vigilance from clinicians when screening for fused supernumerary teeth. Our case underscores the significance of early diagnosis, interdisciplinary collaboration, and appropriate treatment planning in effectively managing dental anomalies associated with impaction due to supernumerary teeth.

Declarations

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Author contributions

Conceptualization, Oles. M., A.K., Olen. M. and K.B.; Methodology, Oles. M., A.K., Olen. M. and K.B.; Formal Analysis, Oles. M., A.K., Olen. M. and K.B.; Investigation, Oles. M., A.K., Olen. M. and K.B.; Resources, Oles. M., A.K., Olen. M. and K.B.; Data Curation, K.B.; Writing – Original Draft Preparation, Oles. M., A.K. and Olen. M.; Writing – Review & Editing, Oles. M. and K.B.; Supervision, K.B.

Conflicts of interest

The authors declare no competing interests.

Data availability

No datasets were generated or analyzed during the current study.

Ethics approval

Written informed consent for publication was obtained from the patient's parent. We complied with the policy of the journal on ethical consent.

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