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Multiple impacted supernumerary teeth in a non-syndromic patient: A case report and literature review

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Abstract

Supernumerary teeth, also known as hyperdontia, are additional teeth that develop beyond the normal count of 32 and can occur in the maxilla, mandible, or both, manifesting as either single or multiple extra teeth, and may be unilateral or bilateral. This case report presents a rare occurrence of multiple impacted supernumerary teeth in a non-syndromic patient, featuring two supernumerary teeth adjacent to an impacted mandibular third molar, an impacted supernumerary mandibular premolar, and an impacted maxillary distomolar. This unique combination emphasizes the variability in supernumerary tooth development and the need for thorough diagnostic assessment and precise treatment planning.

Keywords: Supernumerary teeth, hyperdontia, non-syndromic multiple impactions

Introduction

Supernumerary teeth (ST) are an odontogenic anomaly characterized by the presence of extra teeth beyond the typical dental formula [1]. In clinical cases, these teeth are found to occur as single teeth in 76-86% of instances, as pairs in approximately 12-73% of cases, and as multiple teeth in less than 1% of situations. They can present unilaterally or bilaterally and may involve the maxilla, mandible, or both jaws [2]. In this condition, males are more frequently affected, with a male-to-female prevalence ratio of 2:1. The occurrence of supernumerary teeth in primary dentition has been reported to range from 0.3% to 0.8%, while in permanent dentition, it is observed in approximately 1.5% to 3.8% of cases [3]. Supernumerary teeth may present as mesodermal, conical, tuberculate, or supplemental teeth, or they may manifest as odontomes, including complex composite odontomes and compound composite odontomes. Conical mesiodens are the most common type [4].

Research indicates that supernumerary teeth are likely the result of increased activity within the dental lamina, where prolonged persistence of epithelial cells promotes the development of additional tooth structures. While most cases of supernumerary teeth are idiopathic, some are associated with autosomal dominant non-syndromic inheritance, autosomal recessive transmission, or the X chromosome. The occurrence of multiple supernumerary teeth, whether impacted or erupted, is a rare clinical observation. This dental anomaly is frequently associated with various genetic syndromes, including Rubinstein-Taybi syndrome, familial adenomatous polyposis, cleidocranial dysplasia, Nance–Horan syndrome, autosomal dominant Robinow syndrome, type I trichorhinophalangeal syndrome, and oculofaciocardiodental syndrome [5].

The precise etiology of supernumerary teeth remains undetermined, despite various proposed theories. Among these, the dichotomy theory of tooth germs proposes that supernumerary teeth result from the bifurcation of a single tooth bud into two distinct components, potentially leading to the formation of either two teeth of comparable size or one normal tooth alongside a dysmorphic counterpart. This theory is substantiated by *in vitro* studies utilizing split tooth germs in animal models. Another significant theory, the Hyperactivity Theory, suggests that supernumerary teeth may develop due to localized, autonomous, or conditioned hyperactivity of the dental lamina [6]. Additional theories include phylogenetic reversion, autosomal recessive inheritance, X-chromosome linkage, response to local trauma, and environmental factors, in addition to the dichotomy and hyperactivity of the dental lamina.

Cone Beam Computed Tomography (CBCT) is a critical diagnostic modality that provides detailed three-dimensional multiplanar reconstructions, enhancing precision in treatment planning and clinical assessments. While conventional panoramic radiographs are useful for initial visualization of the dentition, osseous structures, and anatomical relationships, CBCT is preferred for complex cases requiring detailed imaging. CBCT enhances diagnostic accuracy with comprehensive 3D visualization and provides images comparable to conventional radiographs, including panoramic, periapical, bitewing, occlusal, and cephalometric (lateral and frontal) radiographs [7].

The management of supernumerary teeth is determined by various factors, including their eruption status, stage of crown and root development, proximity to the roots of adjacent teeth, and the overall condition of the dentition, such as the presence of malocclusion, crowding, or edentulous spaces. The classification and location of

supernumerary teeth, as well as their potential effects on adjacent hard and soft tissues, play a significant role in determining the appropriate treatment strategy.

Complications, such as carious lesions in adjacent teeth, may necessitate restorative interventions or endodontic therapy. Surgical extraction is commonly indicated for supernumerary teeth; however, asymptomatic supernumerary teeth that do not affect function, occlusion, or aesthetics may be managed through periodic radiographic surveillance. This approach helps mitigate the potential risks associated with surgery, such as damage to adjacent teeth, injury to critical anatomical structures, and postoperative hemorrhage.

Extraction is indicated if supernumerary teeth cause displacement, impede eruption, or are involved in significant orthodontic planning, alveolar bone grafting for cleft lip and palate, or obstruct implant placement. Conversely, extraction may be deferred if the teeth are asymptomatic and do not lead to displacement, hinder eruption, or other pathological conditions.

Case Presentation: A 29-year-old male patient presented to the department of dentistry at the All India Institute of Medical Sciences, Hyderabad, with a chief complaint of persistent pain localized to the right mandibular posterior region over the past three days. The patient reported experiencing sharp, throbbing, and persistent pain, with an intensity rated at 7 out of 10 on the Visual nalog Scale (VAS). This pain notably compromised masticatory function and speech. The patient reported that the pain, initially mild, had progressively intensified over three days. There was no associated facial swelling, trismus, or dysphagia. The patient denied any recent trauma or dental interventions in the affected area. Over-the-counter analgesics provided minimal relief.

The patient's medical history was unremarkable with no known drug allergies and no regular medications. He reported intermittent pain in the mandibular right third molar region over the past month, which he had previously ignored. Systemic manifestations of infection, such as fever or malaise, were absent, and no cervical lymphadenopathy were observed upon examination. Intraoral examination demonstrated a partially erupted, severely carious mandibular right third molar. The surrounding gingival tissue exhibited signs of inflammation without evidence of any purulent discharge. Periodontal probing revealed deep pockets around the tooth, though no significant mobility was noted. Left lower third molar was missing.

Fig 1: Panoramic radiograph illustrating the presence of multiple impacted teeth in both the maxilla and mandible

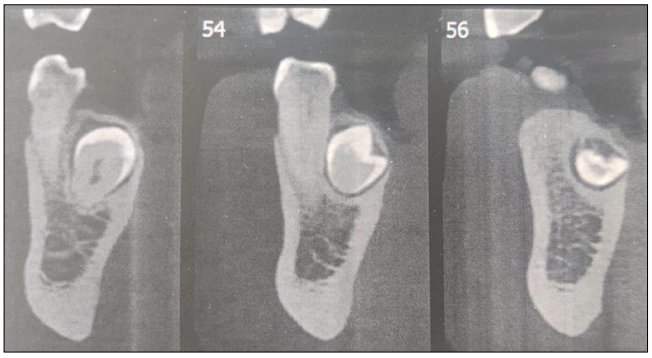

Fig 2: CBCT coronal view demonstrating the alignment and position of the supernumerary premolar.

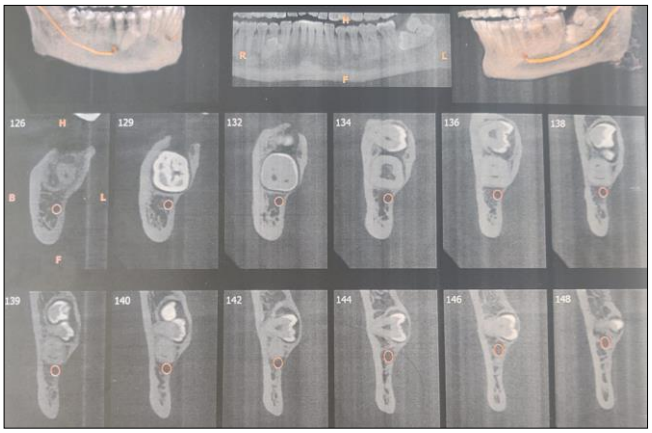

Fig 3: CBCT coronal view demonstrating the alignment and position of supernumerary teeth adjacent to tooth #38.

Radiographic Examination

The orthopantomograph (OPG) revealed that bilateral mandibular third molars were horizontally impacted. The crown of tooth #48 was directed towards the distal surface of the adjacent second molar, with its root positioned safely away from the inferior alveolar nerve canal. Carious involvement in the crown of tooth #48 extended into the pulp chamber, and similar carious damage was observed on the distal surface of tooth #47. OPG revealed two supernumerary teeth associated with the left mandibular third molar (#38), located superior and distal to the impacted third molar. These supernumerary teeth had crowns facing lingually and roots towards the buccal cortex. (figure1) Despite their small size, both exhibited well-developed crown and root structures. Additionally, the inferior alveolar nerve canal was found to be closely related to the mesial surface of tooth #38. Completely impacted supernumerary tooth in the left maxillary tuberosity region was also revealed in OPG. The tooth was obliquely positioned, with its crown oriented towards the cemento-enamel junction at the distal aspect of the left upper third molar.

A comprehensive assessment was performed using CBCT to precisely determine the exact position of the supernumerary teeth. (figure 2) This facilitated an in-depth evaluation of the spatial relationship between the supernumerary teeth and surrounding anatomical structures. A mesioangularly impacted supernumerary premolar was identified within the right mandibular body, located between the roots of the right mandibular canine and the right mandibular second premolar, and positioned deep within the mandibular bone adjacent to the inferior alveolar nerve. The crown of this

supernumerary premolar is aligned at the level of the right mandibular second premolar (44), oriented anteriorly, with the root directed posteriorly. (figure 3) The tooth exhibits a premolar-like morphology, characterized by a well-developed crown and root structure, and remains fully encased in bone with no evidence of eruption into the oral cavity.

Transalveolar extraction of the horizontally impacted right mandibular third molar (tooth #48) was carried out. The patient chose to retain the remaining impacted and supernumerary teeth due to their asymptomatic presentation. The surgical site was meticulously irrigated, and hemostasis was achieved. The flap was then repositioned and secured with sutures. Antibiotics and analgesics were prescribed to manage postoperative pain and prevent infection. At the one-week follow-up visit, the patient reported no pain. Clinical examination demonstrated satisfactory healing with no evidence of infection or complications. The sutures were removed, and the surgical site was observed to be healing appropriately. Regular follow-up radiographs and clinical evaluations were at 6-month interval for two years ruled out potential pathological changes associated with another impacted ST.

Discussion

Each case of multiple impacted supernumerary teeth presents distinct challenges, necessitating individualized treatment planning to mitigate potential risks, and ensure patient safety. This case report highlights a rare presentation involving multiple supernumerary teeth in a nonsyndromic patient. Clinical and radiographic evaluations, including panoramic radiographs and CBCT, were instrumental in achieving an accurate diagnosis.

Non-syndromic multiple supernumerary teeth (NSMST), also referred to as multiple hyperdontia, is characterized by the presence of five or more supernumerary teeth or by the emergence of supernumerary teeth across various tooth groups in the absence of associated pathological syndromes or conditions. NSMST is a rare condition, typically reported in isolated cases or small case series [8]. In the non-syndromic south indian pediatric population, the prevalence of supernumerary teeth was documented at 1.24%, with a slight male predilection [9]. Batra *et al*. proposed that the occurrence of multiple supernumerary teeth may follow an autosomal dominant inheritance pattern, based on observations from familial cases [10]. In diagnosing supernumerary teeth in the incisor region, occlusal or periapical radiographs are critical. To determine the bucco-lingual position of an unerupted supernumerary tooth, the parallax technique, also known as the horizontal tube shift technique or the buccal object rule, is highly effective. This method requires obtaining two periapical radiographs of the same tooth from varying horizontal tube positions while keeping the vertical angle constant. A supernumerary tooth that shifts in the direction of the tube movement suggests a lingual position, whereas a shift in the opposite direction indicates a buccal location.

CBCT provided detailed three-dimensional visualization, allowing precise localization of the impacted and supernumerary teeth, identification of associated pathology, and assessment of spatial relationships with adjacent structures. This facilitated a more effective and minimally invasive approach, enhancing surgical planning and improving outcome predictability. Each impacted tooth should be individually evaluated, and asymptomatic impacted teeth without associated pathology can be monitored conservatively [11]. Studies indicate that supernumerary teeth are associated with complications in 88.5% of cases. The most frequently encountered complications include dental displacement (55.7%), delayed eruption (50.8%), midline diastema formation (21%), tooth rotations (18.7%), retention of deciduous teeth (7.9%), and root resorption (0.3%). Clinically, a significant concern with supernumerary teeth is their propensity to interfere with normal occlusal development [12]. Deeply positioned supernumerary teeth near the inferior alveolar nerve require meticulous planning to prevent complications.

Conclusion

This case highlights the importance of integrating advanced diagnostic modalities and patient-specific surgical strategies in the treatment of impacted supernumerary teeth to achieve optimal clinical outcomes. Detailed clinical assessment and advanced imaging techniques, including CBCT, enabled precise localization of each impacted tooth and its spatial relationship to adjacent anatomical structures, including nerves and surrounding dentition. Management requires careful consideration of the risks of retention versus the potential complications of surgical extraction, with options ranging from regular monitoring to prophylactic removal based on clinical evaluation and patient symptoms.

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