Triad of Bilateral Duplicated Permanent Teeth, Persistent Open Apex, and Tooth Malformation: A Case Report

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Abstract

Aim: The aim of this article is to report a case of bilateral multiple impacted supernumerary teeth. A discussion of possible mechanisms of development is also presented along with a concise review of the literature.

Background: Supernumerary teeth occur in the context of various scenarios in the primary and the permanent dentition. Multiple supernumerary teeth are a rare finding especially in the absence of associated syndrome or disease.

Report: A case of bilateral multiple impacted supernumerary teeth localized to the mandibular premolar region is reported. Some of the supernumerary teeth as well as the erupted premolars had persistent open apices. Coronal malformation of the right maxillary first premolar was another interesting finding. There was an absence of any concomitant disease.

Summary: The aforementioned combination of findings has not been reported previously. The anatomical, geometrical, and spatial relationships of supernumerary teeth with their erupted equivalents may shed light on some controversial aspects of the etiology.

Keywords: Supernumerary teeth, open apex, tooth malformation, non-syndrome

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Introduction
A supernumerary tooth is additional to the normal complement of teeth in either a primary or permanent dentition and may be encountered in various regions of dental arches. These teeth are present in 0.8% of primary dentitions and in 2.1% of permanent dentitions. While there is no sex predilection for supernumerary teeth in the primary dentition, males are affected twice as often as females in the permanent dentition.\(^2\)

These teeth may be single or multiple, unilateral or bilateral, erupted or impacted, and in one or both jaws. Although multiple supernumerary teeth have been rarely reported,\(^3^\) their occurrence without any concomitant syndrome or disease is a more rare finding.\(^4\) The syndromes most commonly associated with supernumerary teeth include cleft lip and palate,\(^5\) Gardner's syndrome,\(^6\) and cleidocranial dysostosis.\(^7\) The majority of non-syndrome cases of multiple supernumerary teeth occur in the mandible and especially in the mandibular anterior region.\(^8\) The present report describes a young female patient with a triad of bilateral impacted supernumerary teeth with persistent open apices and individual tooth malformation.

Case Report

Diagnosis
A 13-year-old female patient presented at the School of Dentistry at Tabriz University of Medical Sciences in East Azarbaijan, Iran with a chief complaint of “severe pain in the right side of the lower jaw.” Clinical examination revealed a permanent mandibular right second premolar with severe dental caries on the distal aspect of the tooth. The tooth responded positively to the cold and hot sensitivity testing followed by intense pain lasting approximately 30-40 seconds. Her medical and dental histories were otherwise unremarkable, and the patient was in good health. Physical examination did not reveal any abnormalities.

On routine radiographic examination, several bizarre findings were identified. The patient had five impacted supernumerary teeth in the mandible; three of them were localized to an area corresponding to the left mandibular premolars and the rest were impacted in the contralateral equivalent side (Figure 1).

The morphology, size, and axial orientation of the analogous posterior teeth on both sides (teeth I.L and I.R) were nearly identical. A prominent feature of these teeth was a persistent open apex. The same property was observed in the erupted left and right second premolars. Axial rotation toward the mesial was evident in the adjacent anterior teeth (II.L and II.R) despite the uniformity of morphology with the erupted first premolars. Both teeth had completely formed roots. The follicular space around these teeth was enlarged. The anterior teeth on the left side (III.L) were smaller than other impacted teeth. A small

![Figure 1. Panoramic view of the dentition. Note the bilateral mandibular supernumerary teeth and malformed right maxillary first premolar (L: left, R: right).](image-url)
portion of its root was formed. The axial orientation of this tooth was approximately parallel to the
left mandibular first premolar. Another interesting finding was the malformation of the right maxillary
first premolar. Occlusal morphology of this tooth exhibited a marked deviation from normal, and its
mesiodistal width was significantly greater than the left maxillary first premolar.

Clinical and radiographic assessment of her parents and sister failed to reveal a similar finding.

Treatment
In the absence of any other compelling factors periodic monitoring of these teeth is preferred to
surgical removal. In the present case the decision was made to retain these teeth and perform
periodic follow-ups.

Discussion
Even though the exact etiology of supernumerary teeth is not known, several hypotheses have been
proposed. The phylogenetic theory of atavism (evolutionary throwback) is one of the speculated
pathways suggested by some authors to explain their development.\textsuperscript{11} However, ectopic development
and solitary occurrence present a serious hurdle to this theory.\textsuperscript{12} According to the dichotomy
theory, the cleavage of a single tooth bud to two homologous or heterologous parts is the key event
underlying the creation of supernumeraries.\textsuperscript{13} The implication is the dichotomized tooth bud may
be the origin of two equal teeth or a normal and a dysmorphic tooth. The most widely accepted
mechanism is the hyperactivity theory indicating supernumeraries are the result of localized,
independent, and conditional hyperactivity of dental lamina.\textsuperscript{14,15} Heredity seems to play a role
in this phenomenon but not through a simple Mendelian pattern. To be more precise, a
combination of environmental factors and genetics may lead to hyperactivity of dental lamina and the
cascade of events which follow.\textsuperscript{16}

Supernumerary teeth are classified according to morphology and location. In the primary dentition,
the morphology of these teeth may be normal or conical. Nonetheless, in the permanent dentition
the morphology exhibits more diversity and may be categorized as: conical (a small peg-shaped
tooth), tuberculate (barrel-shaped with incomplete root formation and often paired), supplemental
(duplicated tooth, located at the end of a tooth series and seldom impacted), or odontoma
(hamartomatous malformation).\textsuperscript{17,18} Various classes of supernumerary teeth are based
on their location and include the mesiodens, paramolar, and distomolar. In the present case
supernumeraries are of the tuberculate type with characteristic bilateral development and
incomplete root formation.

Supernumerary teeth may be associated with the following clinical problems:
\begin{itemize}
  \item Failure of eruption
  \item Displacement or rotation of permanent teeth
  \item Crowding
  \item Abnormal diastema or premature space closure
  \item Dilaceration, delayed or abnormal root development of the permanent teeth
  \item Cystic formation
  \item Eruption into the nasal cavity
  \item A jeopardizing alveolar bone graft in patient with a cleft lip/plate
  \item Compromised implant site preparation
\end{itemize}

In the present case the bilateral displacement of the mandibular canine and first premolar
along with diastema formation are evident. The existence of these teeth may compromise future
placement of implants.
\begin{itemize}
  \item Delayed eruption or displacement
  \item Associated patholgy
  \item Impediment to orthodontic alignment of permanent teeth
  \item Compromised alveolar bone grafting or implant placement
  \item Spontaneous eruption
\end{itemize}

Since none of these conditions existed the present case was monitored and extractions were
not performed.

Summary
The present clinical scenario has not been reported previously. Considering the symmetrical
bilateral development it may be concluded other factors are involved in the development of supernumerary teeth in addition to localized
hyperactivity of dental lamina. The clinical features of the present triad may be diverse
manifestations of a single mutation and might
serve as a defensible hypothesis.
References
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