

Diagnosis and Management of Supernumerary Teeth in Children, Review

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Abstract: The present study was aimed to overview the Supernumerary teeth in children in general and from specific aspects such highlighting the diagnosis procedures and techniques used in dental practice, also discussing the evidence supporting the management options of ST in children. Comprehensive review was conducted using evidence published in several electronic databases such; PubMed, Embase, and Google scholar, up to March 2017. This study is based on a review of the current dental and medical literature related to pediatric dental diagnosis and management of supernumerary teeth, the search was performed using following Mesh Terms: “Pediatric, Children, oral surgery, supernumerary teeth”. Supernumerary teeth are existing as well as reasonably common a range of problems. The clinician ought to have comprehensive knowledge of signs recommending the visibility of supernumerary teeth consisting of non- or postponed eruption, modifications in the eruptive pattern, diastema development, midline change, and also crowding. On appropriate diagnosis, early treatment is called for in the form of orthodontic or medical therapy and also mix in order to reduce undesirable negative effects to the creating dentition.

Keywords: Supernumerary teeth in children, dental practice, diastema development, midline change.

1. INTRODUCTION

Supernumerary tooth (ST) is defined as "any tooth or odontogenic structure that is formed from tooth germ in excess of usual number for any offered area of the dental arch" ⁽¹⁾. They may be bilateral or unilateral and single or numerous, in circulation, happen in any part of the tooth bearing locations in both oral arches, and might take place in primary and irreversible dentition ⁽²⁾. These ST could happen at any region of the dental arch and most commonly in premaxilla. There are several hypotheses which have actually been proposed to discuss the occurrence of ST, and their etiology stays uncertain ^(1,3). A mix of genetic and environmental factors has been proposed to explain ST event ⁽⁴⁾.

Several studies have actually reported that there is a racial distinction in the occurrence of ST. In primary dentition, the reported occurrence was between 0.1% and 1.8% for Caucasians, where in Mongolian origin, 0.1% was reported for Japanese while the prevalence of ST for Chinese children in Taiwan was 7.8% ⁽⁵⁾ and 2.8% in southern Chinese ⁽⁶⁾. It is essential for dental professionals as well as anthropologists, geneticists and other health professionals to know the occurrence of oral abnormalities in various neighborhoods. A couple of epidemiological research studies have been performed and there is significant variation between their findings. The reported frequency in general population varieties between 0.15% and 1.9% and it is reported to be more common in males instead of women ⁽⁷⁾. Variations due to differences in environmental and group vulnerabilities might have influence on the reported prevalence. It has actually been reported that in a study carried out on 9-year-old children in Italy, the frequency of this problem has actually increased from 0.64 to 1.06 in recent years ⁽⁸⁾.

Supernumerary teeth are estimated to occur 8.2 times more regularly in the maxilla than the mandible and frequently impact the premaxilla ^(9,10). Several supernumerary teeth are commonly discovered in the mandibular premolar area ⁽¹¹⁾. Supernumerary teeth can be discovered throughout a regular scientific or radiographic examination. If issues develop, they may consist of the following: Prevention or delay of eruption of associated permanent teeth; crowding/malocclusion; insufficient area closure during orthodontic treatment; dilaceration, delayed or abnormal root advancement of associated permanent teeth, root resorption of nearby teeth; ^(11,12,13) complications with supernumerary teeth itself like cyst

development, migration into the nasal cavity, maxillary sinus or tough taste buds, and late forming supernumerary teeth (11,12,13,14).

This study was aimed to overview the Supernumerary teeth in children in general and from specific aspects such highlighting the diagnosis procedures and techniques used in dental practice, also discussing the evidence supporting the management options of ST in children.

2. METHODOLOGY

Comprehensive review was conducted using evidence published in several electronic databases such; PubMed, Embase, and Google scholar, up to March 2017. This study is based on a review of the current dental and medical literature related to pediatric dental diagnosis and management of supernumerary teeth, the search was performed using following Mesh Terms: "Pediatric, Children, oral surgery, supernumerary teeth". Our search was limited to articles with humans' subject, and English language clinical trials. In addition to our search we have manually reviewed the references list of included studies to add more relevant articles that could be useful for our review.

3. RESULTS

○ Etiology of supernumerary:

The precise etiology of the supernumerary teeth has not yet totally understood. A number of theories have actually been suggested for their incident, such as the phylogenetic theory (15) the dichotomy theory, (16) event due to hyperactive oral lamina (17) and due to a combination of genetic and environmental factors. Typically, numerous supernumerary teeth are associated with diseases or syndromes (4). A hereditary basis for supernumerary teeth was suggested considering observation of a higher rate of hyperdontia among related families (18). Existing research reveals that some genes might alter the risk of occurrence of oral anomalies, each expressed differently. In some syndromes, such as cleidocranial dysostosis and Gardner's syndrome, when mesiodens happens as part of its symptoms, the genetic basis may play a crucial role (19). The observation that supernumeraries are more common in relative suggests heredity as an etiologic factor; however, it does not follow a basic Mendelian pattern. It has been suggested that environmental factors may have influence on hereditary vulnerability (20).

The possibility of hereditary transmission through an autosomal dominant trait with absence of penetration has actually been observed and an X-linked inheritance has even been recorded which can explain sex supremacy in this abnormality (21). It has actually also been mentioned that environmental factors might contribute in the incident of mesiodens along with splitting of the tooth bud or the dichotomy theory. According to the dichotomy theory, Taylor argued that splitting of the tooth bud into 2 equal or unequal sections may either form 2 equivalent sized teeth or one typical and one dysmorphic tooth (17). The hyperactivity theory, which is the limited increase in the activity of dental lamina, might be thought about as the most appropriate etiologic consider the development of mesiodens (17).

○ Diagnosis of supernumerary teeth in children:

It is gone over in the literature that the faster the diagnosis the better the prognosis. The clinician's knowledge of typical anomalies and their place in the blended and primary dentition will lead to early diagnosis and may consequently avoid additional issues. The medical diagnosis may be possible as early as age 2 and onwards as recommended by some authors (22). In case of asymmetry, mesiodens should be presumed. It is likewise probable that over-retention of the maxillary primary incisors, specifically if uneven or in case of significant ectopic eruption of one or both long-term maxillary incisors is due to the presence of mesiodens (12). In primary dentition, mesiodens often have regular shape and emerge usually and this is the reason that these teeth are often overlooked. The other possible reason for the less frequent reporting of primary mesiodens might be the trouble in its detection by the caregiver. It prevails that anterior primary mesiodens appears and exfoliates typically prior to detection and could be misinterpreted with gemination or blend abnormalities (23).

Radiographs for determining supernumerary teeth in children:

Supernumerary teeth are common scientific and radiographic findings that are normally an element of the syndrome (24,25). They trigger particular medical issues such as crowding, displacement of a permanent tooth, failure to appear, or dentigerous cyst development (26,27). They may exhibit ectopic eruption, may be impacted or appears spontaneously. There are different opinions about the treatment options of ST. Some authors recommended that if ST do not cause any

discernable negative result on adjacent teeth and if no future orthodontic treatment anticipated, it is reasonable to suggest that immediate surgical intervention is not important. Other suggested that ST tend to resorb and vanish if left neglected (28,29).

Sometimes, supernumerary teeth are asymptomatic and might be spotted as a chance finding during radiographic assessment. Comprehensive history, scientific assessment, thorough investigation, early diagnosis and appropriate treatment of supernumerary teeth are compulsory. Unerupted supernumerary may be found by chance throughout radiographic evaluation. Often, clinicians might presume the presence of supernumerary teeth, if there is failure of eruption or ectopic eruption of permanent tooth, determination of milk tooth, broad diastema and apparent existence of extra teeth (30). An anterior occlusal or periapical radiograph (Figures 1 & 2) using paralleling technique and panoramic view (OrthoPantomoGraph) (Figure 3) are the most beneficial radiographic investigations to imagine supernumerary teeth. Recently, computed tomography has also been utilized to spot the existence of supernumerary teeth (31,32). A total radiographic survey of the whole oral cavity is essential to determine the presence of all affected supernumerary teeth due to the fact that the ratio of affected to appeared supernumerary teeth varies from 3 to 1. Radiographs alone are not sufficient for the conclusive medical diagnosis. Their interpretation needs to constantly be conducted in conjunction with clinical findings. Treatment depends on the type and place of the supernumerary teeth and on its prospective impact on surrounding difficult and soft tissue structures (31,32).

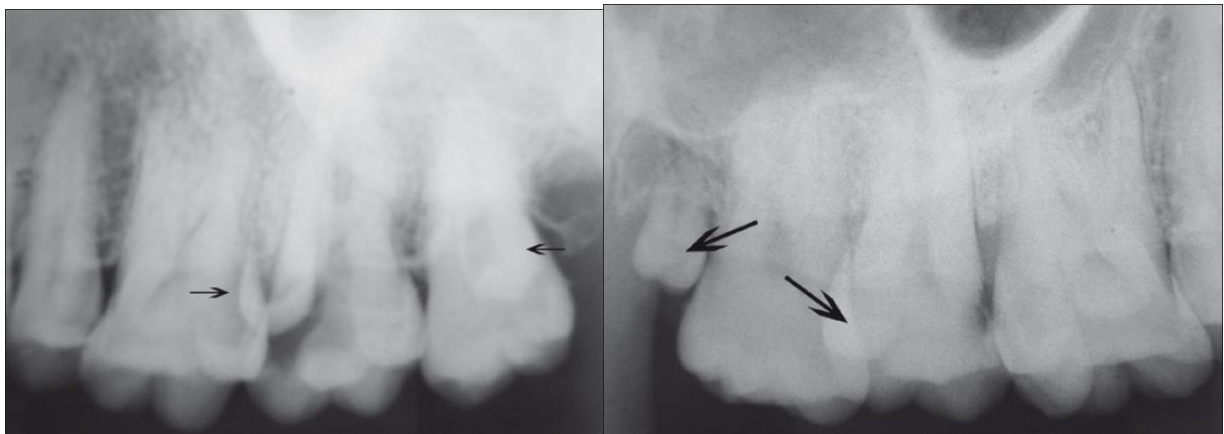


Figure1&2: peri-apical radiograph showing carious maxillary right second molar & left second molar

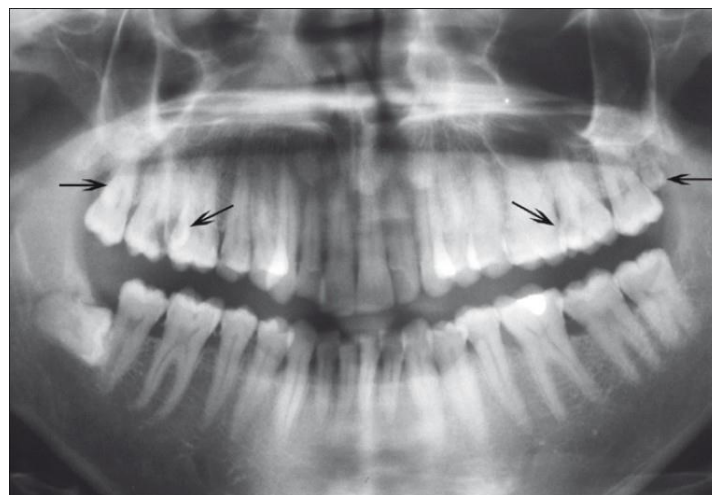


Figure 3: Radiograph showing maxillary bilateral paramolars and distomolars

○ Management of supernumerary teeth:

Occasionally, Supernumerary teeth may lead to problems such as deep caries in the adjacent teeth, which might require restoration or endodontic therapy of the surrounding teeth. Supernumerary teeth can be handled either by removal/endodontic treatment or by preserving them in the arch and frequent observation (Figure 4) (11,33). 2 treatment alternatives for delayed eruption of surrounding teeth due to the existence of supernumerary teeth include removal of just

the supernumerary tooth if sufficient space is offered for the tooth to emerge or the removal of supernumerary tooth followed by a surgical-orthodontic treatment to re-establish area for the delayed tooth ⁽³³⁾. The timing of surgical elimination of supernumerary teeth is controversial and 2 alternatives exist. First, to get rid of the supernumerary tooth as soon as it has actually been detected and second, to leave the supernumerary tooth as such till the root advancement of surrounding teeth is total in order to prevent damage to their root apices. Nevertheless, no proof of root resorption, loss of vitality or any disruption to root advancement has been reported by Hogstrom and Andersson ⁽³⁴⁾.

Extraction should be carried out carefully to prevent damage to surrounding long-term teeth, which may cause ankylosis and maleruption of these teeth. The clinician must take care to prevent problems such as harmful nerve and capillary during manipulation of the tooth, perforation of maxillary sinus, pterygomaxillary space, orbit and fracture of maxillary tuberosity. Clinicians should likewise look out as sometimes supernumerary teeth are fused with the adjacent tooth structure at crown or root level, which might make the extraction difficult ^(35,36). Supernumerary teeth can also be kept under observation without extraction when satisfactory eruption of related teeth has accompanied no associated pathology and not triggering any functional and esthetic disturbance ⁽³⁷⁾.

However, treatment of supernumerary teeth depends upon the type and position of the tooth. Immediate elimination of mesiodens is normally suggested in the following circumstances; inhibition or delay of eruption, displacement of the adjacent tooth, interference with orthodontic devices, existence of pathologic condition, or spontaneous eruption of the supernumerary tooth. Munns et al ⁽³⁸⁾ mentioned that the earlier the mesiodens is removed, the much better the prognosis. There are 2 methods for extraction of mesiodens; early extraction prior to root development of the permanent incisors and late extraction after root development of the irreversible incisors ⁽³⁸⁾. Some authors advise extraction of mesiodens in the early mixed dentition in order to help with spontaneous eruption and positioning of the incisors ^(39,40,41). There is controversy in the literature regarding the time of elimination of any unerupted mesiodens. The instant removal versus delay in surgical intervention following root development of the central incisor and the lateral incisor about the age of eight to 10 years has been pointed out ⁽⁴²⁾. In order to promote eruption and correct positioning of adjacent teeth, it is advised to extract mesiodens in the early mixed dentition, which might lower the need for orthodontic treatment. It might take six months to three years for an unerupted tooth to appear after removal of the mesiodens ⁽³⁸⁾. When the peak of the central incisor nearly forms, Henry and Post et al ⁽⁴³⁾ recommended postponed extraction of the mesiodens about the age of 10. If treatment is delayed after this age, more intricate surgical and orthodontic treatment may be required. The type and position of the unerupted tooth, the space offered in the dental arch, in addition to the stage of root advancement may affect the length of time it considers an affected tooth to appear after surgical elimination of the mesiodens. Garvey suggested monitoring of mesiodens in the following scenarios; satisfying eruption of the being successful teeth, absence of any associated pathologic sores and risk of damage to the vitality of the related teeth. It has actually also been suggested to keep unerupted symptomless mesiodens, which do not affect the dentition. These teeth, which are typically found by chance, are better left in place under observation ⁽⁴⁴⁾. Clinician should consider patient condition in the decision, however a current study of Yagüe-García et al ⁽⁴⁵⁾ highlighted that the early removal of the supernumerary teeth in order to prevent complications is the treatment of choice.

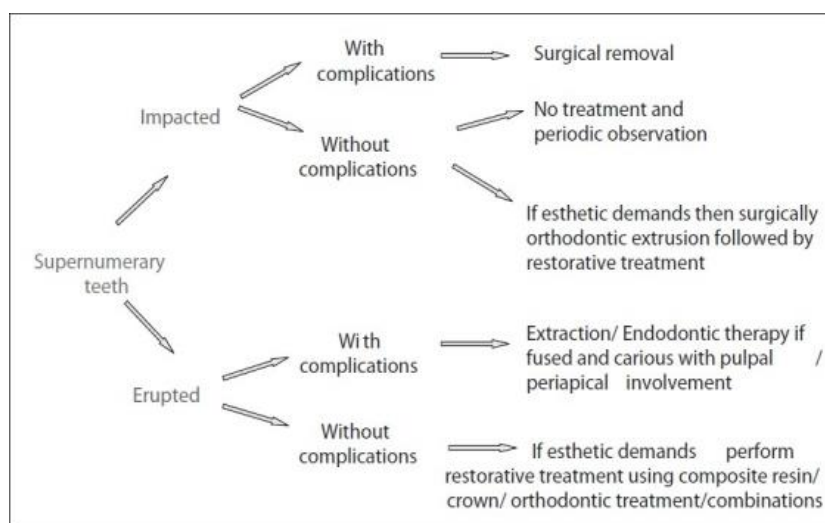


Figure 4: Summary of Management of supernumerary teeth

4. CONCLUSION

Supernumerary teeth are existing as well as reasonably common a range of problems. The clinician ought to have comprehensive knowledge of signs recommending the visibility of supernumerary teeth consisting of non- or postponed eruption, modifications in the eruptive pattern, diastema development, midline change, and also crowding. On appropriate diagnosis, early treatment is called for in the form of orthodontic or medical therapy and also mix in order to reduce undesirable negative effects to the creating dentition.

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