Case Report

AHB Advances in Human Biology

Adv Hum Biol. 2015;5(3):92-101.

Supplementary Tooth: To Extract or Observe? Evidence Based Practice with the Literature Review

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ABSTRACT

Background: Supernumerary teeth are the teeth present in addition to the normal set of teeth. They may be single, multiple, unilateral or bilateral, erupted or unerupted present in one or both jaws and may or may not be associated with other disease or syndrome. Multidisciplinary approach is necessary to meet the treatment challenges of supernumerary teeth. Supernumerary teeth can be managed either by removal/ endodontic/ orthodontic therapy or by maintaining them in the arch and frequent observation. Removal of supernumerary teeth is recommended where there is compromised esthetic and functional status. This article reviews case series of supernumerary teeth with no associated disease or syndromes.

Keywords: Etiology, Nonsyndromic, Supernumerary teeth.

INTRODUCTION

Dental anomalies are associated with the primary as well as the permanent dentition. Although these anomalies occur infrequently, they can cause esthetic, spacing and periodontal problems[1]. Supernumerary teeth or hyperdontia, are defined as teeth that exceed the normal dental formula, regardless of their location and morphology and can be found in almost any region of the dental arch both in the primary and permanent dentition[2,3]. They may appear as a single tooth or multiple teeth, unilaterally or bilaterally, erupted or impacted either in mandible/maxilla or both the jaws[4,5].

AETIOLOGY

Environmental and Genetic factors have been considered with several theories as follows[6-8].

Atavism: supernumerary teeth were the result of phylogenetic reversion to extinct primates with three pairs of incisors.

Dichotomy theory: The tooth bud splits into two equal or different-sized parts, resulting in the formation of two teeth of equal size, or one normal and one dysmorphic tooth respectively.

Dental lamina hyperactivity theory: This involves localized, independent, conditioned hyperactivity of the dental lamina. A supplemental form would develop from the lingual extension of an accessory tooth bud, whereas a rudimentary form would develop from the proliferation of epithelial remnants of the dental lamina

Genetic factors: These are considered important in the occurrence of supernumerary teeth within the same family and inheritancy. A sex-linked inheritance has been suggested by the observation that males are affected more than females.

Received: July. 15, 2015: **Accepted**: Oct. 21, 2015
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pISSN 2321-8568
eISSN 2348-4691

PREVALENCE

Supernumerary teeth are more commonly found in the Mongoloid racial group with frequency higher than 3%[9,10]. Koch et al[11] reported that the prevalence of supernumerary teeth in the permanent dentition is 1-3% and the prevalence in primary dentition according to Primosch is 0.3-0.6%. Rajab and Hamden[8] stated the prevalence in the primary dentition as 0.3-0.8% and in the permanent dentition as 0.1-3.8%[4]. Supernumerary teeth occur in 0.3 to 3.8 percent of different populations in these 90 to 98 percent occur in the maxilla with a particular predilection for the premaxilla.

The conditions with high prevalence commonly included are cleft lip and palate, cleidocranial dysplasia and Gardner syndrome. Supernumerary teeth associated with cleft lip and palate result from fragmentation of the dental lamina during cleft formation. The frequency of supernumerary permanent teeth in the cleft area in children with unilateral cleft lip or palate or both was found to be 22.2%[12]. The frequency of supernumeraries in patients with cleidocranial dysplasia ranged from 22% in the maxillary incisor region to 5% in the molar region[13]. In addition, there is a significant association between supernumerary teeth and invaginated teeth (teeth with an exaggerated cingulum pit) and talon's cusp[14]. Major prevalence studies on supernumerary teeth are summarized in Table 1[15-26].

SITE/NUMBER

Occurrence may be single or multiple, unilateral or bilateral, erupted or impacted, and in one or both jaws. Multiple supernumerary teeth are rare with no other associated diseases or syndromes[27]. Supernumerary teeth are estimated to occur 8.2 times more frequently in the maxilla than the mandible[28,29]. Multiple supernumerary teeth are mostly found in the mandibular premolar region (Tables 2-4)[30].

SEXUAL PREDILECTION

Rajab and Hamdan reported that males were more commonly affected than females, the ratio being 2.2:1[8]. Mitchell[31] reported a 2:1 ratio in favour of males. Hogstrum and Andersson[32] reported a 2:1 ratio of sex distribution, whereas Luten[15] found a sex distribution of 1.3:1. So LL[33] stated a greater male to female distribution of 5.5:1 in Japanese and 6.5:1 in Hong Kong children. Males are affected approximately twice compared to females with respect to permanent dentition.

CASE SERIES

Case 1

A 10-year-old boy (Figure 1) reported to the Department of Pedodontics and Preventive Dentistry with the chief complaint of abnormal tooth position in upper arch. Medical and family histories were non-contributory. A thorough general examination was carried out to rule out the presence of any syndrome. Intraoral examination revealed permanent dentition with a supernumerary tooth present palatally in between the left lateral incisor and left canine (Figure 2). Radiographic examination by occlusal view (Figure 3) revealed presence of supernumerary tooth. Buccal object rule of IOPA (Figure 4) was applied to rule out the palatal position of extra tooth. The diagnosis was made of partially erupted, odontome type of supplemental tooth. The treatment was decided to remove supplemental tooth (Figure 5) by minor surgical procedure followed by orthodontic alignment of remaining upper teeth for correction of malocclusion (Figure 6).

Fig 1: Lateral profile.

Fig 2: Intraoral view of supernumerary tooth.

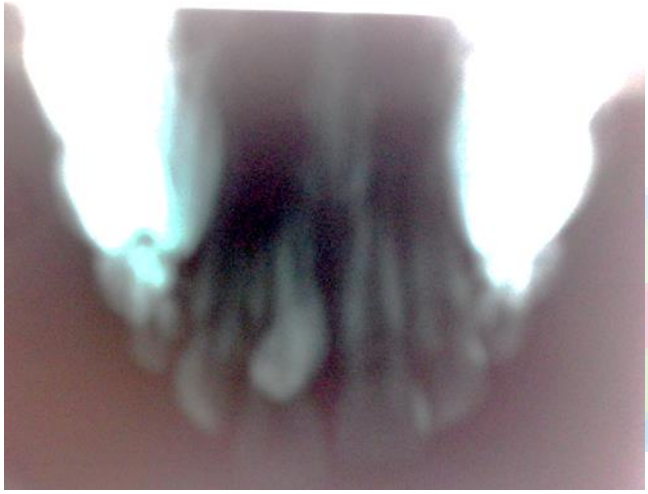


Fig 3: Occlusal view showing supernumerary tooth.

Fig 4: IOPA showing supernumerary tooth.

Fig 5: Extracted supernumerary tooth.

Fig 6: Postoperative intraoral view.

Case 2

A 14-year-old female (Figure 7) visited to department with a chief complaint of un-aesthetic smile. On examination, patient had mixed dentition with a supernumerary tooth in between the maxillary central incisors (Figure 8). The extra tooth resembled a central incisor which was the bucco-lingually rotated. The over retained 53 with erupting 23 was present. OPG (Figure 9) showed an erupted, supplemental mesiodens between 11 and 21.The supernumerary tooth was extracted (Figure 10) and orthodontic treatment was planned to align and close the diastema between the maxillary central incisors (Figure 11). The patient was under regular review after fixed orthodontic treatment.

Fig 7: Lateral profile.

Fig 8: Intraoral view of supernumerary tooth.

Fig 9: OPG Showing supernumerary tooth.

Fig 10: Extracted supernumerary tooth.

Fig 11: Postoperative intraoral view.

Case 3

A 9-year-old (Figure 12) male presented with a chief complaint of rotated tooth in upper anterior arch. On examination, patient revealed mixed dentition with a supernumerary tooth in between the maxillary central incisors (Figure 13). The extra tooth did not resemble any of the other teeth in the dentition and was conical in shape. Intra oral periapical radiographic (Figure 14) examination showed a supernumerary tooth that was erupted, conical shaped mesiodens between 11 and 21. Extraction of mesiodens (Figure 15) had been done and the orthodontic treatment was carried out. The patient was assessed three months after treatment.

Fig 12: Lateral profile.

Fig 14: IOPA showing supernumerary tooth.

Fig 13: Intraoral view of supernumerary tooth.

Fig 15: Extracted supernumerary tooth.

Table 1: Major prevalence studies on supernumerary teeth.

Authors	Sample Size	Country Of Study	Age Of Subject	Reported prevalence Of Supernumeraries	Male-Female ratio	Location
Parry & Iyer (1967)[15]	2000 Orthodontic Patients	India	6-26 years	0.05%		
Brook (1974)[16]	1,331 Children	Britain	11-14 years	2.1% Permanent teeth 0.8% Primary Teeth	1.4:1	
Von Arx (1992)[17]	90 children with anterior maxillary super numerary teeth	Switzerland	6-10 Years		2.6:1	
Liu JF (1995)[18]	112 children with supernumerary teeth in the premaxillary	Taiwan	4-14 years		2.8:1	

	regions					
Roychaudhary A et al (2000)[19]	50 children with mesiodens	India	Up to Age 12 years		1.5:1	
Rajab & Hamdan (2002)[08]	152 children diagnosed with supernumerary teeth	Jordan	5-15 Years		2.2:1	89.6% premaxilla 6.5% premolar region 2.5% canine reion 1% mandibular central incisor region 0.5% maxillary molar region
Ersin NK et al. (2004)[20]	24 children with mesiodens	Turkey	7-13 Years		3:1	
Tyrologoue et al. (2005)[21]	97 children with diagnosed Mesiodens	Sweden	3-15 years		2:1	
Montenegro et al.(2006)[22]	145 Supernumerary teeth in 102 patients	Barcelona	5-56 years		1.4:1	46.9% mesiodens 24.1% Supernumrary premolars 18% supernumerary Fourth molars 5.6% Paramolars
Carlos De Oliveira Gomes et al.(2007)[23]	460 Supernumerary teeth in 305 children	Brazil	3.7-16 years	Permanent 97.6% Primary 2.4%	2.1:1	91.3% maxilla of which 86.7% involving the Premaxilla 8.7% mandible
Kaan Gunduz (2008)[24]	23,000 children	Turkey	4-14 years	0.3% mesiodens	2.1:1	
Padro EF et al. (2009)[25]	113 Supernumerary teeth in 79 children	Barcelona	5-19 years		1.8:2.1	Mesiodens 53.16% Superior Incisors 18.99% Superior canines-5.06% Inferior canines-1.27% Inferior premolars-10.13% Inferior paramolar-2.53% Superior distomolar-6.33% Paramolar & premolar-1.27%
Anthonappa RP Et al.(2008)[26]	283 Super numerary teeth in 208 children	China	2-16 years		3.1:1	95.0% located in the premaxilla

Table 2: Supernumerary teeth based on location.

Mesiodens	Located between maxillary central incisors (pre-maxillary region)	Conical or peg Shaped
Paramolar	Buccally/lingually or palatally in between second and Third maxillary molars, rarely in between first and Second maxillary molars	Conical or supplemental
Distomolar	Distal or distolingual to third molar(maxillary or mandibular, in mandibular often impacted)	Conical or tuberculate
Parapremolar	Additional tooth in premolar region	Supplemental
Paramolar root	Additional root often in mandibular molar	Rudimentary or fully formed
Paramolar tubercle	Additional cusp present on buccal surface of a	Tuberculate

	Permanent molar parastyle: if additional cusp is present in maxillary molar protostylid: if additional cusp is present in mandibular molar

Table 3: Supernumerary teeth based on morphology.

Morphology	Appearance	Occurrence (%)
Conical	Small/peg shaped tooth with normal root	70-80
Tuberculate	Barrel shaped crown with rudimentary root, often paired	10-12
Supplemental	Duplication of tooth in the normal series (mostly in deciduous dentition and in permanent maxillary Lateral incisor and mandibualr premolar)	6-8
Odontome	No regular shape, disorganized diffuse mass of dental tissues	3-4

Table 4: Supernumerary teeth based on eruption and orientation.

Supernumerary teeth according to Eruption	Supernumerary teeth according to Orientation
Erupted: Complete coronal aspect is seen in oral cavity clinically	Vertical: Oriented as series of dentition
Partially erupted: Only occlusal part is visible	Inverted: Upside down
Impacted: Cannot be seen in oral cavity clinically, can only be diagnosed using radiograph	Transverse: Horizontally placed

Table 5: Summary of timing of removal of supernumerary teeth.

Author	Timing of removal of ST
Munnas D(1967)[37]	Earlier the offending supernumerary tooth is removed, better will be the prognosis
Rotberg (1984)[38]	Before 5 years of age so that root formation of permanent Incisors is incomplete
Koch (1986)[11]	Immediate removal of supernumeraries is not necessary if no pathology is present
Hogstrum and Andersson (1987)[32]	1 The first option involves removal of the supernumerary as soon as it has been diagnosed 2 The supernumerary could be left until root development of the adjacent teeth is complete
Scanlan and Hodges (1997)[39]	Early removal of supernumeraries in case of complication if not maintenance of the supernumerary *in situ*, with appropriate follow up
Garvey et al.(1999)[40]	Supernumerary may be monitored if there is no associated pathology
Shah et al.(2008)[30]	If the supernumerary teeth cause no complications and are not likely to interfere with orthodontic tooth treatment, they can be monitored with yearly radiographic review

De Oliveira Gomes et al.(2008)[23]	Supernumerary teeth should ideally be surgically removed only when already fully developed, regardless of the morphology Type
Omer RSM (2010)[41]	Surgical removal of the supernumerary teeth at Demirijjan Stage C (4-5 year old) exhibited minimal complications

MANAGEMENT

Supernumerary teeth are asymptomatic and may be detected as a chance finding during radiographic examination. An anterior occlusal or periapical radiograph using paralleling technique and panaromic view (Orthopantomograph) are the most useful radiographic investigations to visualize supernumerary teeth. Recently, computed tomography has also been used to detect the presence of supernumerary teeth[34,35]. Treatment depends on the type and position of the supernumerary tooth and its effect on adjacent teeth.

Indications for removal of the supernumerary teeth are when:

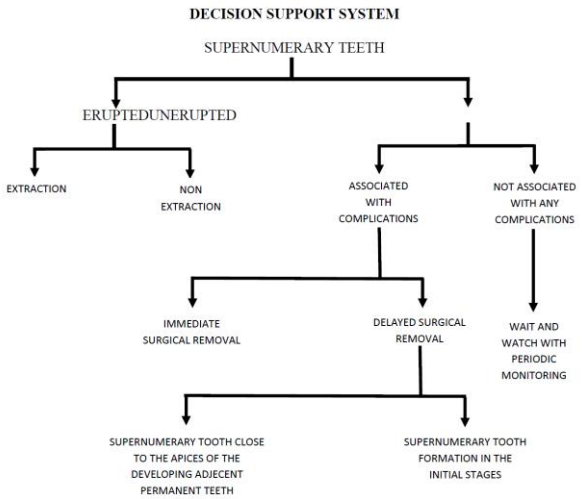
1. Central incisor eruption has been delayed or inhibited
2. Altered eruption or displacement of central incisors is evident
3. When there is associated pathology
4. Active orthodontic alignment of an incisor in close proximity to the supernumerary is envisaged
5. Its presence would compromise secondary alveolar bone grafting in cleft lip and palate patients;
6. When tooth is present in bone designated for implant placement
7. Spontaneous eruption of the supernumerary has occurred.

Indications for monitoring without removal of supernumerary teeth:

1. Satisfactory eruption of related teeth has occurred.
2. No active orthodontic treatment is desired.
3. When there is no associated pathology.
4. Removal would prejudice the vitality of the adjacent teeth[36].

Treatment of supernumerary teeth includes several controversies and varied opinions among authors, particularly with regard to the timing of removal in of SM teeth which has been given in Table 5[37-41].

DECISION SUPPORT SYSTEM



SUMMARY

Supernumerary tooth is a kind of dental anomaly which is relatively common and presents in diverse forms in the oral cavity. Clinical and radiographic identification of all the teeth is very important for a good treatment planning. Treatment may vary from just extraction of supernumerary teeth or extraction followed by orthodontic correction to establish a good occlusion. This article puts forward a decision support system which helps in overcoming the controversies regarding the timing of removal of the supernumerary tooth. Clinician should be aware of the presence and associated complications of the supernumerary teeth to make a correct decision regarding the management.

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How to cite this article:

Patel NG, Bargale S, Shah SH, Dave B. Supplementary Tooth: To Extract Or Observe? Evidence Based Practice with the Literature Review. Adv Hum Biol. 2015;5(3):92-101.