

Original research article

A retrospective assessment of the radiographic records to analyze the prevalence of supernumerary teeth among non-syndromic patients

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Abstract

Aims: The aim of the present study to analyze the prevalence of supernumerary teeth in a group of Bihar, India non-syndromic population.

Methods: A retrospective study was conducted in the Department of Dentistry, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar, India, for 12 months. Total 50 non syndromic patients were included in this study. Panoramic radiographs and clinical records of patients above the age of 18 years and without any syndromic features were selected for the study. All the radiographs were examined for the presence of supernumerary teeth, their location, morphology, and number.

Results: Among the 4000 radiographs selected only 50 radiographs showed the presence of supernumerary teeth with a prevalence rate of 1.25%. Number of supernumerary teeth varied from 1 to 9 with a total of 100 supernumerary teeth. 45% of patients showed single supernumerary teeth whereas 24% showed two supernumerary teeth. One patient had 9 impacted supernumerary teeth. Prevalence of supernumerary teeth was more in males compared to females with a ratio of 1.5:1. Among the 100 teeth, 90% were impacted, and 10 % were erupted. Maxillary posterior region (52%) was the most common location, followed by mandibular posterior region (33%). Maxillary right quadrant (40%) had a higher incidence of supernumerary teeth followed by maxillary left quadrant (27%). 40% of them were fully developed, whereas 22% of them had an evidence incomplete crown formation and 23% showed incomplete root formation. Based on morphology, supplemental form (60%) was the most common type followed by 32% showing tuberculate form and 8% odontomas.

Conclusion: We concluded that the knowledge about the supernumerary teeth is important for dental clinicians as they are relatively common but are detected as an incidental finding in a radiograph. A routine screening panoramic radiograph is mandatory for every patient to unveil this condition so as to enable the dentist in early diagnosis, intervention and prevent the possible complications associated with it.

Introduction

Teeth with more than normal number of teeth are called supernumerary (SN) teeth. This is a dental abnormality, also called hypoerdontia, that affects the number of teeth (another number

abnormality is hypodontia/congenital tooth agenesis). Traditionally, SN teeth are defined as teeth that originate from the odontogenic tissues of a dental lamina, consisting of more than a normal number in any type of tooth.¹ It can be seen both in primary teeth and permanent teeth, and can be observed unilaterally or bilaterally in the maxilla, mandible or both. In more advanced versions, it occurs in multiple in both jaws, and this is frequently encountered in syndromes such as Cleidocranial dysplasia,² Gardner's syndrome,³ Incontinentia Pigmenti,⁴ which often accompanied by SN teeth. Although the etiology of SN teeth has not been fully elucidated, both genetic and environmental factors play a role. There are several theories explaining the development of different SN teeth. According to the "dichotomy theory", a single tooth germ is divided into two, and two symmetrical or asymmetrical teeth are formed.⁵ In addition, the type of SN tooth is divided according to the state of division of the tooth germ; when the tooth germ is divided into two equal parts, it causes the formation of two geomorphic teeth, also known as the "supplemental tooth". However, when the tooth is divided into two unequal parts, differently sized and shaped (heteromorphic) SN teeth can form. Another obvious etiological hypothesis is "atavism theory". According to this theory, while the number of teeth in our ancestors was higher in the past, the number of teeth decreased in time and its normal number decreased over time, and in some people, SN teeth can be found as an extension of the teeth we had in ancient times. Recently, SN teeth are thought to develop mostly with the "hyperactivity theory of the dental lamina".⁶ Accordingly, with the induction of the hyperactivity of the dental lamina or its remnants, the dental papilla develops and then the enamel organ matures and a SN tooth is formed. In this theory, heteromorphic teeth are formed by the hyperactivity of the dental lamina residues and geomorphic teeth from the lingual extension of additional tooth germ.⁷ SN teeth can be classified according to different parameters. In the last classification in the literature based on the morphology, position, and direction of the SN teeth; they are classified into conical, tuberculate, supplemental and odontomas according to their shape; they are also classified into mesiodens, distomolar, paramolar and Para premolar according to their location.⁸ They can be positioned labially, buccally or palatally in jaws; can be vertical, horizontal or inverted. The treatment need may vary depending on the type of SN teeth, impaction and other factors. SN teeth can be clinically asymptomatic and may cause complications such as crowding, delayed eruption, midline diastema, dental caries, root resorption as well.⁹ Hyperdontia constitutes approximately 1-3% of all dental anomalies, its prevalence in permanent teeth is reported to be 3.8% and the prevalence in primary teeth is 0.35-0.6%.¹⁰ The prevalence of SN teeth varies according to demographic factors, gender and race. Its prevalence in populations of Asian¹¹ and African¹² descent has been shown to be higher than that of the white race. SN teeth are most frequently found on the midline of the maxilla, and secondly the maxillary molar region.¹³

Material and methods

A retrospective study was conducted in the Department of Dentistry, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar, India, for 12 months, after taking the approval of the protocol review committee and institutional ethics committee.

Methodology

Total 50 non syndromic patients were included in this study. Panoramic radiographs and clinical records of patients above the age of 18 years and without any syndromic features were selected for the study. These radiographs were taken with a digital panoramic system (Kodak 8000C Digital Panoramic and Cephalometric System made in France by Trophy for Care stream Health, Inc., Toronto, Canada) under standard exposure factors, as recommended by the manufacturer. A total 3000 radiographs were considered for the study. All the radiographs were examined for the presence of supernumerary teeth, their location, morphology, and number.

Morphologically, teeth were classified as conical, tuberculate, supplemental, and odontoma.¹⁴ Supplemental forms were further classified as those resembling incisor, canine, premolar, and molar.

Data analysis was performed using the statistical Package for the Social Sciences (SPSS) version 21 (IBM Corp, USA).

Results

Among the 4000 radiographs selected only 50 radiographs showed the presence of supernumerary teeth with a prevalence rate of 1.25%. Number of supernumerary teeth varied from 1 to 9 with a total of 100 supernumerary teeth. 45% of patients showed single supernumerary teeth whereas 24% showed two supernumerary teeth. One patient had 9 impacted supernumerary teeth (table 1).

Table 1: Distribution of supernumerary teeth, according to number

Number of teeth	Percentage
1	45
2	24
3	26
4	6
9	4

Prevalence of supernumerary teeth was more in males compared to females with a ratio of 1.5:1. table 2.

Table 2: Gender Distribution

Gender	Number	Percentage
Male	60	60
Female	40	40

Among the 100 teeth, 90% were impacted, and 10 % were erupted. Maxillary posterior region (52%) was the most common location, followed by mandibular posterior region (33%) [table 3].

Table 3: Distribution of supernumerary teeth, according to location

Location	Number	Percentage
Maxillary Anterior	11	11
Maxillary posterior	52	52
Mandibular Anterior	4	4
Mandibular posterior	33	33

Maxillary right quadrant (40%) had a higher incidence of supernumerary teeth followed by maxillary left quadrant (27%). 40% of them were fully developed, whereas 22% of them had an evidence incomplete crown formation and 23% showed incomplete root formation [table 4].

Table 4: Distribution of supernumerary teeth, according to formation

Formation	Number	Percentage
Crown under formation	22	22
Developed crown	15	15
Root under formation	23	23
Fully developed	40	40

Based on morphology, supplemental form (60%) was the most common type followed by 32% showing tuberculate form and 8% odontomas (table 5).

Table 5: Distribution of supernumerary teeth, according to morphology

Morphology	Number	Percentage
odontomas	8	8
tuberculate	32	32
supplemental form	60	60

Discussion

Non syndromic hyperdontia is a relatively common dental anomaly encountered in dental practice. The reported prevalence of supernumerary teeth in various populations ranges from 0.1% to 3.8%.¹⁵ Minimal studies are available about the prevalence of supernumerary teeth in Indian population. Our study showed a prevalence rate of 1.25%, which is similar to the prevalence rate in a previous study conducted on the Indian population.¹⁶ The etiology for supernumerary teeth remains unclear. Both genetic and environmental factors are considered as the etiology of supernumerary teeth. Accordingly, various concepts have been suggested for their occurrence, such as, heredity, atavistic tendency, dichotomy of the tooth bud, genetic syndromes, “post permanent” dentition and dental lamina hyperactivity. Localized and independent hyperactivity of the dental lamina is the most accepted theory for the development of supernumerary teeth.¹⁷

Various studies have shown the prevalence of single supernumerary teeth in 76–86%, double supernumeraries in 12–23% and multiple supernumeraries in <1% of cases.¹⁷ In our study number of supernumerary teeth varied from 1 to 9 with a total of 100 supernumerary teeth. 45% of patients showed single supernumerary teeth whereas 24% showed two supernumerary teeth. One patient had 9 impacted supernumerary teeth. In our study, male to female ratio is 1.5:1 similar to the male predominance seen in other studies.¹⁴ Although some studies have mentioned that there are no differences in the number of teeth, according to gender,¹⁸ our study clearly showed the incidence as well as the number to be more in 60% males when compared to females 40%.

In most of the cases, supernumerary teeth are incidental findings on panoramic examination. Similarly, in our study, among the 100 supernumerary teeth, 90 were impacted, and 10 were erupted. Location wise, most of the previous studies have mentioned anterior maxilla as the most common location for the presence of supernumerary teeth. However in our study, Maxillary posterior region (52%) was the most common location, followed by mandibular posterior region (33%). Maxillary right quadrant (40%) had a higher incidence of supernumerary teeth followed by maxillary left quadrant (27%). In contradiction to previous studies, supplemental was the most common morphological type observed in our study. Based on morphology, supplemental form (60%) was the most common type followed by 32% showing tuberculate form and 8% odontomas. Most other studies have mentioned conical form as the most prevalent morphological form.¹⁹

Supernumerary teeth, whether impacted or erupted may remain in position for years together, without causing any disturbances and clinical manifestations. However, in some cases, they may cause complications like impaction of permanent teeth, delayed or ectopic eruption of adjacent teeth, malocclusions like midline diastema, or crowding and formation of cysts with bone destruction and root resorption of adjacent teeth.²⁰ In our patients crowding was the only complication noted due to supernumerary teeth.

It is important to diagnose correctly such conditions and institute suitable treatment to these patients at the appropriate time. Treatment of the supernumerary teeth can be achieved with either of the following options: (1) Removal of the supernumerary teeth, if

complications are found or anticipated. (2) Leaving the supernumerary teeth *in situ* with periodic follow-up, if they are asymptomatic and without any associated pathology.¹⁷

Conclusion

The present study concluded that the knowledge about the supernumerary teeth is important for dental clinicians as they are relatively common but are detected as an incidental finding in a radiograph. A routine screening panoramic radiograph is mandatory for every patient to unveil this condition so as to enable the dentist in early diagnosis, intervention and prevent the possible complications associated with it.

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