

# Prevalence and Pattern Occurrence of Supernumerary Teeth in the North-East Heilongjiang Population of China

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## Abstract

**Aims:** The objective of the current research was to determine the prevalence of supernumerary teeth and investigate its characteristic and complications in the Chinese population from the North-East Heilongjiang region. **Materials and Methods:** It was a descriptive and retrospective study which used registered notes and panoramic radiographs of 12,984 patients who visited the Department of Oral and Maxillofacial Surgery in the 2<sup>nd</sup> Affiliated Hospital of Jiamusi University, China between June 2011 to November 2015. Patients diagnosed with any syndrome or hereditary diseases were excluded from the study. The features of supernumerary teeth were noted and the data were analyzed using SPSS program, (version 20, Inc., Chicago, USA). The Chi-square test was used to determine the differences in the distribution of supernumerary teeth. It was tested at the 5% level of significance. **Results:** The prevalence was 5.2% and the most prevalent supernumerary teeth was incisor with 3.39% (n = 441). The supernumerary teeth were seen more in maxilla than mandible. The male to female ratio was 2.9:1. Specifically, higher prevalence of supernumerary teeth in male gender was statistically significant (p = 0.03). The supernumerary teeth mostly occurred in children of 5 - 10 years (62.3%), followed by young adolescent between 11 - 16 years (26.5%). **Conclusion:** The prevalence of supernumerary teeth was widely seen in children

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**and young adolescent of Chinese population. The occurrence was mostly seen in maxilla than mandible and significantly higher in male than female.**

## **Keywords**

**Prevalence, Occurrence, Supernumerary Teeth, Features**

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## **1. Background**

Supernumerary teeth are a dental anomaly of number characterized by the presence of an additional tooth in the normal series. This condition is also called hyperdontia. The aetiology is unknown, yet various theories have been suggested for the presence of supernumerary tooth, such as dichotomy of the tooth bud, hyperactivity of the dental lamina and genetic effect and environmental factors combined [1] [2]. These teeth have been found in both primary and permanent dentition. However, the appearance of supernumerary teeth is higher in the permanent dentition than the primary dentition [3].

According to various studies, supernumerary teeth are more frequently seen among males than females with a proportion of 1:8 to 2:6 [4]-[7]. It may be found in any region of the dental arch, but the most common site in the midline between the 2 maxillary central incisors, where it is referred as mesiodens. This is commonly followed by maxillary lateral incisor, maxillary fourth molar, mandibular third premolar, maxillary premolar, and maxillary canine and mandibular fourth molar in a descending order. They might occur on one or both jaws and vary from single or double to multiple in number. It can be unilateral or bilateral [8]. Supernumerary teeth are also widely seen in association with syndromes, such as cleft lip and palate, Cleidocranial dysplasia, Down's syndromes, Gardner's syndrome, Gorlin-Sedano syndrome, etc. [9] [10]. They account for 80% of all supernumerary teeth [3].

The presence of supernumerary teeth results in different well-known complications such as uneruption or delayed eruption, ectopic eruption, displacement, diastemas, occlusal problems, rotated neighboring teeth, radicular resorption and cyst formation [8] [11]. But in some cases, supernumerary teeth are asymptomatic and they cannot be diagnosed without routine radiographic examination, if they do not appear in the oral and maxillofacial region.

Many studies showed that, the prevalence of supernumerary teeth was diversely reported and varies according to race, ethnicity and geographic situation. The prevalence reported in the literature of hyperdontia varied between 0.2% - 0.8% in the primary dentition, and between 0.5% to 5.6% in the permanent dentition of the general population [11]-[16]. No study has been done for to assess the prevalence and occurrence of supernumerary teeth in the North-East Chinese population from Heilongjiang Region.

The objective of the present research was to determine the prevalence of supernumerary teeth and investigate its characteristic and complications in the Chinese population from the North Heilongjiang region.

## **2. Materials and Methods**

A survey was performed on 12,984 patients (9584 males and 3400 females) with age ranging from 5 to 76 years and without any story previous surgical extraction attending the Department of Oral and Maxillofacial Surgery, 2<sup>nd</sup> Affiliated Hospital of Jiamusi University, Heilongjiang Province, China over a period of four years was examined for the present retrospective and descriptive study. Out of 12,984 in total patients, 681 of them (510 were male and 171 were female) who had supernumerary teeth were randomly selected and included in our study. The reasons for their visit to our Hospital was dental caries, malocclusion, delay or lack of the eruption of permanent teeth, trauma of maxillofacial region and a routine dental check-up. Patients diagnosed with any syndrome or hereditary diseases and those who had any injury were excluded from the research work. Deciduous supernumerary teeth were included that justify the non-evaluation of the permanent supernumerary teeth classification.

The patient's dental records and radiographs were examined in order to detect all types of supernumerary teeth. All panoramic radiographs were taken with the Dentsply Gendex Orthoralix 9200 (Dentsply Asia, Milford, US), and the magnification factor was 1.23. The first group of researchers examined the radiographs at the same

time on standard light boxes to determine the supernumerary tooth. And the second groups researches were inspected the patient's register and the consult form.

All supernumerary teeth were noted and diagnosed with a detailed clinical and panoramic radiographic examination. For each patient we recorded the demographic variables including age and gender and all information collected was recorded in a special form. According to the diagnosis, all supernumerary teeth were classified under several categories such as: location (maxilla or mandible, specifying the region from anterior to posterior), orientation (vertical, angled, horizontal, and inverted). The data was entered into computer and analyzed using SPSS program, (version 20. Inc., Chicago, USA). The differences between the groups were tested using the Chi-square test. It was tested at the 5% level of significance.

### 3. Results

All of 12,984 patients were examined, among which 9584 were males (73.8%) and 3400 were females (26.2%), with an age range of 5 - 76 years and a mean age of 18 (SD  $\pm$  4) years. Out of the 12,984 patients, a total of 681 patients (510 males and 171 females) were included in our study (**Table 1**).

The prevalence of supernumerary teeth was 5.2% and the incisor was the most prevalent supernumerary teeth with 3.39% (n = 441), followed by premolars (0.75%; n = 98), canines (0.46%; n = 61) and by molars (0.42%; n = 54). The deciduous teeth was noted by (0.20%; n = 27) (**Table 2**). The prevalence of supernumerary teeth was most in maxilla than mandible.

In **Table 3**, the frequency of supernumerary teeth was more in maxillary (90.5%; n = 708) than mandible (9.5%; n = 74) and more in male (74.6%; n = 583) than female (25.4%; n = 199) with a ratio of 2.9:1. The precisely higher prevalence of supernumerary teeth in male gender was statistically significant (P = 0.03). And A significant difference was found between localisation of supernumerary teeth in maxilla and mandible (P = 0.01).

The Supernumerary teeth mostly occurred in children between 5 - 10 years (62.3%; n = 487), followed by young adolescent population between 11 - 16 years (26.5%; n = 207) (**Table 4**).

**Table 5** shows the characteristics of supernumerary teeth. In 75.7% (n = 592) of patients, one supernumerary tooth was observed and in 21.9% (n = 86) of patients two supernumerary teeth were observed. Three patients (2.3%; n = 18) had three or more than three supernumerary teeth. In terms of orientation, 65.7% (n = 514) of all supernumerary teeth were vertical. Regarding to the state of eruption within the arch, 280 supernumerary teeth (35.8%) had erupted and 478 supernumerary teeth (61.1%) did not cause any complications. However, 243 teeth (31.1%) caused impaction and 61 teeth (7.8%) caused displacement of the adjacent teeth.

**Table 1.** Distribution of patients and supernumerary teeth depending to gender.

Gender	Number	Number of patients Had supernumerary teeth	Number of teeth
Male	9584 (73.8%)	510	583 (74.6%)
Female	3400 (26.2%)	171	199 (25.4%)
<b>Total</b>	12,984	<b>681 (100%)</b>	<b>782 (100%)</b>

P value = 0.03.

**Table 2.** Distribution of patients according to the type of impacted teeth and prevalence of supernumerary teeth.

Supernumerary teeth	Male	Female	No. of patients	Prevalence
Incisor	371	70	441	3.39
Canines	39	22	61	0.46
Premolars	51	47	98	0.75
Molars	30	24	54	0.42
Deciduous teeth	19	8	27	0.20
<b>Total</b>	<b>510</b>	<b>171</b>	<b>681</b>	<b>5.2</b>

Legend: No., number.

**Table 3.** Distribution of supernumerary teeth according to gender and localisation.

Supernumerary teeth	Male	Female	Total	Maxilla	Mandible
Central incisor	330 (42.2%)	68 (8.7%)	<b>398 (50.9%)</b>	374 (47.8%)	24 (3%)
Lateral incisor	82 (10.5%)	18 (2.3%)	<b>100 (12.8%)</b>	91 (11.6%)	9 (1.2%)
Canines	49 (6.3%)	25 (3.2%)	<b>74 (9.5%)</b>	67 (8.6%)	7 (0.9%)
Premolars	58 (7.4%)	55 (7%)	<b>113 (14.5%)</b>	99 (12.7%)	14 (1.8%)
Molars	37 (4.7%)	24 (3%)	<b>61 (7.8%)</b>	44 (5.6%)	17 (2.2%)
Deciduous teeth	27 (3.5%)	9 (1.2%)	<b>36 (2.59%)</b>	33 (4.2%)	3 (0.4%)
<b>Total</b>	<b>583 (74.6%)</b>	<b>199 (25.4%)</b>	<b>782 (100%)</b>	<b>708 (90.5%)</b>	<b>74 (9.5%)</b>

**Table 4.** Distribution of Supernumerary teeth according to age group.

Agegroup	Supernumerary
5 - 10	487 (62.3%)
11 - 16	207 (26.5%)
17 - 22	30 (3.8%)
23 - 28	38 (4.9%)
29 - 34	6 (0.6%)
35 - 39	0 (0%)
40 - 45	0 (0%)
46 - 51	11 (1.4%)
52 - 57	0 (0%)
≥58	3 (0.4%)
<b>Total</b>	<b>782 (100%)</b>

**Table 5.** Feature of supernumerary teeth.

Supernumerary teeth feature	Number of teeth	Percentage
<b>Total number</b>	<b>782</b>	<b>100</b>
<b>Orientation</b>	Vertical	65.7
	Angled (Mesio or Disto-angular)	18.3
	Transverse	8.6
	Inverted	7.4
<b>Number</b>	<b>Teeth number</b> 1	<b>Patient number</b> 592
	2	86
	≥3	3
<b>Status</b>	Impacted	64.2
	Erupted	35.8
<b>Complications</b>	Asymptomatic	61.1
	Impaction	31.1
	Crowding	7.8

## 4. Discussion

Supernumerary teeth or hyperdontia is described as abnormal alterations of the teeth formed excess in number either in the primary or permanent dentition. They are mostly seen in association with syndromes and the aetiology is unknown, but various theories have been suggested [1] [2] [9] [10]. The clinical complications are not

uncommon in patients with supernumerary teeth; whereas teeth displacement and failure of eruption are the most frequently seen complications [17].

Although this study may not represent the North-East Heilongjiang population as a whole, the results are useful for primary health workers because the patients studied represent the range of dental patients presenting to Second Affiliated Hospital (Dental Hospital) of Jiamusi University. Many studies showed that, the prevalence of supernumerary teeth are differently reported and varies among different racial and ethnic groups. The prevalence was between 1% - 3% in Caucasian population, greater than 3% in Asians and between 0.42% to 5.6% in Africa [18] [19].

In our study, the prevalence in the North-East Heilongjiang Chinese population was 5.2% in which the central incisor presented 3.39%. This higher rate of prevalence can be explained by the fact that the variations due to differences in demographic and environmental factors and different sample size susceptibilities that may have impact on the reported prevalence rate. Those studies which found this variation of prevalence are not close with our study. This difference can also be explained by the fact that the included population in those studies was only the children and young population but the recent study included all patients of the different age from 5 to 76 years old and hence may be justify this increased prevalence rate.

In the literature till date, the incidence of supernumerary teeth is usually higher in males than in females and the reported male to female ratio was between 1.18:1 to 4.5:1 which is similar to the present study that showed male to female ratio was 2.9:1. It is also reported correspondingly by other study in Caucasians and study by Patil S and Maheshwari S [4] [5].

Hence, our research also shows that the proportion of supernumerary teeth in relation to sex was also more prevalent in male population ( $P < 0.001$ ). The ratio between males and females was found diverged than our study in some literature, such as study of Liu *et al.* in china with 2.64:1 (male/female), study of Esenlik *et al.* in turkey (1.13:1), study of Rajab & Hamdan (2.2:1) and in study made by Çelikoğlu who had noted 1.8:1 ration male to female [6] [7] [19] [20]. In addition, the male to female ratio was 6.5:1 in the different study of Chinese children [22]. The results of these research showing variables frequencies in sex ratio may be due to racial differences or possible sampling differences which also showed the variation of sex ratios in China. This situation can also be explained by the fact by there is differences between the age range, the number of examined patients, the limited number of the effected subjects and the methods used in these studies.

In the data from the literature the age of patients with supernumerary teeth ranges from 5 to 76 years; but most observed between the age group of 7 and 10 [7] [23]. Esenlik *et al.* reported in his research most cases were found between the age of seven and nine [20]. This affirmation are similar to our result, which most supernumerary teeth were found in age group between 5 - 10 years (62.3%;  $n = 487$ ), followed by age group between 11 - 16 years (26.5%;  $n = 207$ ). Even though the prevalence of supernumerary teeth was seen highest among age group of 5 - 10 years and 11 to 16 years, it was seen decreasing with increasing age and independent of gender.

Many studies has identified that the most commonly involved location of supernumerary teeth is the premaxilla [20] [23]. In our present study, the premaxillary regions was the predominant location of supernumerary teeth and 50.9% of this teeth were mesiodens which is similar to study reported by Montenegro *et al.* and Bäckman and Wahlin [24] [25]. This situation may be explained by obvious complications of mesiodens which makes it easily diagnosed by the parents and this affects the number of referrals.

Regarding the location of observed supernumerary teeth in this research, 90.5% ( $n = 708$ ) of the supernumerary teeth were found in the maxillary arch. These results were similar to these of the data reported by De Oliveira Gomes *et al.* who found that 91.3% of the supernumerary teeth were found in the maxillary arch [21]. Our results are also superposable to these studies of Hattab *et al.*, and Zhu *et al.* who showed that 90% of supernumerary teeth were found in the maxillary bone and this supports our conclusions [26] [27]. The incisor (63.7%;  $n = 498$ ) were the most commonly appearing supernumerary teeth which central incisor (50.9%;  $n = 398$ ) being the most common among them, like wise reported by Hyun *et al.* and Dermiriz *et al.* [28] [29]. The recent study noted an occurrence of supernumerary teeth in the deciduous dentition by a prevalence of 0.20% and all in maxilla analogous to others authors who had showed that, the prevalence of supernumerary teeth ranges from 0.2% to 0.8% in the deciduous dentition [7] [16].

From the literature data, supernumerary teeth may occur in either single or multiples number in any region of the jaws of the same person. It is well-known that, supernumerary teeth are more frequently single tooth, while multiple supernumerary teeth are normally two in number [7] [19] [21]. However, multiple supernumerary teeth

co-exist rarely without any diseases or syndromes. According to our results, 75.7% (n = 592) of the supernumerary teeth were found to be single and 21.9% (n = 172) were found double and multiples supernumerary teeth were found in 2.3%. Our conclusions coincide with the ones given in the literature data.

About the eruption status, we found out that 35.8% (n = 280) of the supernumerary teeth were erupted. Our results were close to other studies reported about erupted supernumerary teeth [7] [20] [23] [29]. All erupted supernumerary teeth were normally-orientated while none of the transverse or inverted supernumerary teeth were erupted. So, we verified that erupted supernumerary teeth were commonly vertical with 65.7% (n = 514). The detection of supernumerary teeth is very necessary but early diagnosis helps to prevent or minimize possible complications is even more important [7] [30]. Clinical complications were seen in 38.9% of the supernumerary teeth. Displacement and impaction were the most frequent complication which is also reported by many authors [7] [20] [23].

### The Limitations of This Study

We hope a larger size of sample which also includes from different city and hospitals of the North-East Heilongjiang province than used in this study.

### 5. Conclusions

The prevalence of supernumerary teeth in the North-East Heilongjiang region was higher and its frequency was mostly in children between 5 to 10 years followed young adolescent population between 11 to 16 years old.

The early diagnosis and the appropriate treatment should be considered to prevent the several complications of supernumerary teeth particularly the displacement of the surrounding teeth and failure to erupt the permanent teeth. However, an etiologic factor remains unidentified and therefore we expect a further study regarding its cause to determine the possible preventive measures that influence the prevalence.

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### Competing Interests

Authors have declared that there is no competing interest.

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