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ORIGINAL ARTICLE

# Characteristics of supernumerary teeth among nonsyndromic dental patients

Szu-Ting Chou [a,b], Hong-Po Chang [a,c*], Yi-Hsin Yang [d], Chih-Yin Lung [a], Yu-Chuan Tseng [a,b], Chin-Yun Pan [a,b], Jung-Husan Cheng [b]

[a] *Faculty of Dentistry, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan*
[b] *Department of Orthodontics, Dental Clinics, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan*
[c] *Department of Dentistry, Kaohsiung Municipal Hsiao-Kang Hospital, Kaohsiung, Taiwan*
[d] *Division of Medical Statistics and Bioinformatics, Department of Medical Research, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan*

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**Abstract** *Background/purpose:* A literature review reveals limited data for supernumerary teeth in Taiwan. Therefore, this study aimed to analyze the characteristics of nonsyndrome associated supernumerary teeth in a Taiwan population.
*Materials and methods:* A retrospective study analyzed 6423 nonsyndromic patients (3300 males and 3123 females; age range: from 4 years, 7 months to 76 years, mean age: 25.03 ± 16.32 years). Diagnosis of supernumerary teeth was based on panoramic radiographic examination. Chi-square test, Chi-square test for trend, and multiple logistic regression analysis were used for statistical analysis.
*Results:* The prevalence rate was 2.6% (248 supernumerary teeth in 167 patients), with a male predominance (1.69:1; $P < 0.001$). Most supernumerary teeth were single (67.66%), conical (47.98%), and unerupted (79.84%). Supernumerary teeth also tended to be located in the premaxilla (52.82%), fully developed (54.44%), normally oriented (59.27%), sagittally placed in a palatal/lingual position (76.96%), and adjacent to the root and root apex of permanent teeth (63.71%).
*Conclusion:* The prevalence of supernumerary teeth in this study was 2.6%, the most frequent location being at the anterior maxilla. Numerous factors should be considered when evaluating supernumerary teeth. Specifically, the demographic profiles of patients with supernumerary teeth provide useful epidemiological information.


* Corresponding author. Department of Orthodontics, Faculty of Dentistry, Kaohsiung Medical University, Kaohsiung 80708, Taiwan.
*E-mail address:* hopoch@kmu.edu.tw (H.-P. Chang).


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## Introduction

Supernumerary teeth are extra teeth or tooth-like structures. Single, double, or multiple teeth that occur in one or both jaws may be erupted or unerupted and unilateral or bilateral.[1] Supernumeraries are less common in primary dentition than in permanent dentition.[2] In the general Caucasian population, the prevalence of supernumerary teeth is 1—3%,[3] and the prevalence of supernumerary teeth in primary dentition is 0.3—0.8%.[4] In Asian populations, the estimated prevalence is relatively higher (2.7—3.4%).[5]

Morphological classifications of supernumerary teeth include conical, tuberculate, or supplemental.[6] A fourth category, odontoma, was proposed in Howard[7] but is not universally accepted. In primary dentition, the typical morphology is normal or conical. In permanent dentition, morphological variation is greater. Despite improved knowledge of tooth morphogenesis and differentiation, relatively little is known about the etiology and molecular mechanisms underlying supernumerary tooth formation.[8]

A literature review reveals limited data for supernumerary teeth in Taiwanese children.[9—12] Therefore, the purpose of this study was to analyze the prevalence and characteristics of nonsyndromic supernumerary teeth in a dental population. Hopefully, the study findings can aid us not only in clinical diagnosis and treatment planning but also in future research of supernumerary teeth.

## Materials and methods

This study retrospectively analyzed all nonsyndromic patients who had received a panoramic radiographic examination at the Dental Clinics of Kaohsiung Medical University Hospital (Kaohsiung, Taiwan) from January 2006 to December 2007 (6423 patients; 3300 males and 3123 females). A manual database search of both digital and conventional panoramic radiographs revealed 248 supernumerary teeth in 167 of these patients. The records review included any periapical films, occlusal films, and cephalometric radiographs used to determine the position and direction of the supernumerary teeth.

Data collection from the radiographs and other patient records included age, sex, and the following eight characteristics of supernumerary teeth: (1) number and location; (2) erupted or unerupted; (3) morphology (conical, tuberculate, or supplemental); (4) primary or permanent; (5) sagittal position; (6) orientation; (7) vertical relationship with adjacent permanent teeth; and (8) developmental stage.

Statistical analysis of the patient data was performed using JMP Statistical Discovery Software (SAS Institute Inc., Carry, NC, USA). The distributions of supernumerary tooth characteristics and correlations were analyzed by Chi-square test and by Chi-square test for trends. Multiple logistic regression analysis was used to detect multifactorial influences on different clinical characteristics in relation to the eruption of supernumerary teeth.

This study was approved by the ethics committee of Kaohsiung Medical University Hospital (KMUH-IRB-20130207).

## Results

Among the 6423 patients analyzed, 167 (2.60%) patients had 248 supernumerary teeth. Supernumerary teeth significantly differed by sex ($P < 0.001$; 105 males vs. 62 females; 1.69:1). The 167 patients with supernumerary teeth had a mean age of 25.03 $\pm$ 16.32 years (range, from 4 years, 7 months to 76 years). Supernumerary teeth were most common in the group aged 20—29 years (26.35%; Table 1). In the 167 patients with supernumerary teeth, 122 (73.05%) patients were in permanent dentition stage, 36 (21.56%) were in mixed dentition stage, and only nine (5.39%) were in the primary dentition stage.

Table 2 compares the patients by sex and by number of supernumerary teeth. The table shows that 113 patients (67.66%) had one supernumerary, 42 patients (25.15%) had two, and the remaining 12 patients (7.19%) had three or more supernumeraries. Ten out of 12 patients had multiple supernumerary teeth in the mandibular premolar regions. Fig. 1 shows a case of five supernumerary teeth. The average number of supernumerary teeth in the 167 patients was 1.49 $\pm$ 0.90, and the average number did not significantly differ ($P = 0.8162$) by sex (1.47 $\pm$ 0.09 in males and 1.50 $\pm$ 0.11 in females).

The most common site of supernumerary teeth was the premaxillary region ($n = 131$, 52.82%) followed by the mandibular premolar region ($n = 73$, 29.44%), the maxillary molar region ($n = 19$, 7.67%), the maxillary premolar region ($n = 10$, 4.03%), the mandibular molar region ($n = 10$, 4.03%), and, finally, the mandibular anterior region ($n = 5$, 2.02%; Table 3). Of the 131 supernumerary teeth identified in the premaxillary region, 61 (24.60%) were mesiodens.

Of the 248 supernumerary teeth analyzed, the shape was conical in 119 (47.98%), supplemental in 103 (41.54%), and tuberculate in 26 (10.48%). Fifty (20.16%) supernumerary teeth were erupted and 198 (79.84%) were unerupted (Fig. 2, Table 4). Erupted teeth were observed in 13.45% of the conical teeth, in 26.21% of the supplemental teeth, and in 26.92% of the tuberculate teeth. The rate of eruption was higher in supplemental- and tuberculate-shaped supernumerary teeth compared to conical-shaped supernumerary teeth. Morphology type significantly correlated with the rate of erupted supernumerary teeth ($P = 0.04$).

In terms of location, 174 (70.16%) supernumerary teeth were palatally/lingually located, 34 (13.71%) were within the arch, 18 (7.26%) were buccally/labially located, and 22 (8.87%) were unclassified. Erupted teeth comprised 61.76% of supernumeraries located within the arch, 22.22% of

**Table 1** Distribution of patients with supernumerary teeth by age.

| Age (y) | *n* | % |
|---|---|---|
| 0—9 | 38 | 22.75 |
| 10—19 | 34 | 20.36 |
| 20—29 | 44 | 26.35 |
| 30—39 | 15 | 8.98 |
| 40—49 | 18 | 10.78 |
| ≥50 | 18 | 10.78 |
| Total | 167 | 100.00 |