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**PREVALENCE OF SUPERNUMERARY TEETH AMONG DENTAL PATIENTS - A
RETROSPECTIVE STUDY**

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ABSTRACT

Supernumerary teeth are those teeth that occur in addition to the normal set of dentition. Based on the appearance and region of occurrence, they're of different types such as mesiodens, parapremolar, paramolar and distomolar. The aim of the study was to determine the prevalence of supernumerary teeth among dental patients and to assess the gender based differences. The retrospective study involved analysis of case records of patients with supernumerary teeth and assessment based on the parameters - type, quadrant involved gender, age, and eruption status. Using SPSS Version 20.0, categorical variables were expressed as frequency and percentage, continuous variables as mean and SD; and Chi-square test was used to determine the association between categorical variables. A p-value <0.05 was considered statistically significant. The sample size of the study was 69. The overall prevalence of supernumerary teeth is 0.17% with male : female ratio of 3.31 : 1. Mesiodens showed highest prevalence among all types (36.2%). Among quadrants, the 2nd quadrant had the highest prevalence of supernumerary teeth (31.9%). The association between gender and type of supernumerary teeth with p-value 0.027 and quadrant and type of supernumerary teeth with p-value 0.001 was statistically significant.

According to our study it can be concluded that in the South Indian population, prevalence of supernumerary teeth was reportedly higher in males than in females with mesiodens being the most common type. A statistically significant association between gender and the type of supernumerary teeth; and quadrant and type of supernumerary teeth was observed.

Keywords: Gender; mesiodens; prevalence; quadrant; supernumerary teeth

INTRODUCTION

A supernumerary tooth is one which is additional to the normal complement of dentition. Supernumerary teeth are one of the most commonly encountered dental anomalies and can be located in any part of arch and in either of the two jaws or both. These are identified mostly during a routine clinical examination, in case they are impacted. The term supernumerary teeth is at times confused with supplemental teeth, wherein the former does not resemble any tooth in the arch while the latter does.

There are many etiological theories that have been proposed towards the development of supernumerary teeth such as - Dichotomy of tooth, conditioned hyper-activity of dental lamina and also hereditary patterns like Atavism. Garvey *et al* [1], claims that the inheritance does not follow a simple Mendelian pattern. The supernumerary teeth can be classified based on their form as: Conical, Tuberculate, and Odontome [complex or Compound]. Based on location, they can be Mesiodens, Parapremolar, and Distomolar [2]. The supernumerary teeth can

be single or multiple in occurrence. Multiple impacted supernumerary teeth have frequent association with syndromes like cleft lip and cleft palate, Cleidocranial Dysplasia and Gardner syndrome [3].

The incidence and prevalence of supernumerary teeth has been showing variations according to the population being studied. In a literature review by Rao *et al* [4] it has been quoted that the prevalence in Caucasians ranged from 0.3 to 3.8%, while in Chinese and Japanese it is between 2.7 and 3.4%. He also stated that the highest prevalence of 4.8% has been reported in the South African population. Celikoglu *et al* [5], in his study on a Turkish population, reports a prevalence of 1.2%, with a male to female ratio of 1.8:1. However, Fardi *et al* [6], reports a 15.1% prevalence of impacted supernumerary teeth in a Greek population with majority being Mesiodens. Pertaining to the Indian population, Gopakumar *et al* [7], has carried out a study in South Kerala, revealing a prevalence proportion of only 0.39%, with a male predilection.

Thus, supernumerary teeth don't have a consistent prevalence proportion and are subjected to high population based variability [8-10]. However, there are very few studies reporting the variations and characteristics of supernumerary teeth in an Indian adult population. There is also lack of evidence regarding the gender based variations of type of supernumerary teeth.

The aim of the study was to determine the prevalence of supernumerary teeth in dental patients and to assess the gender based differences.

MATERIALS AND METHODS

Study design and Study setting

This retrospective cross-sectional study was conducted in the department of oral and maxillofacial surgery, Saveetha Dental College and Hospital, Saveetha University, Chennai, to analyse the prevalence of supernumerary teeth among dental patients visiting our institution from June 2019 to April 2020. The study was initiated after approval from the institutional review board [SDC/SIHEC/2020/DIASDATA/0619-0320].

Study population and sampling

After assessment in the patient database of Saveetha Dental College, all case records of patients who had supernumerary teeth were included in the study with a total of 69 patients. All missing or incomplete data and

patients with congenital anomalies and syndromes were excluded from the study. Cross verification of data for errors was done with the help of an external examiner.

Data collection and Tabulation

Data collection was done using the patient database with the timeframe work of 1st June 2019 to 30th April 2020 by a single calibrated examiner. Case records of around 41,438 patients were reviewed. The collected data was tabulated based on the following parameters: Patient details, name, age, gender and type, quadrant and eruption status of supernumerary teeth.

Statistical analysis

The collected data was validated, tabulated and analysed with Statistical Package for Social Sciences for Windows, version 20.0 (SPSS Inc., Chicago, IL, USA) and results were obtained. Categorical variables were expressed in frequency and percentage; and continuous variables in mean and standard deviation. Chi-square test was used to test associations between categorical variables. P value < 0.05 was considered statistically significant.

RESULTS AND DISCUSSION

The prevalence of supernumerary teeth in the study population was found to be 69 patients (0.17%) (out of 41,438 patients).

The age wise distribution of supernumerary teeth in dental patients has been shown in **Figure 1**, with an age range of 5-65 years and a mean age of 29.0 ± 11.6 years. The prevalence of supernumerary teeth was highest in the age group of 21-30 years [40.6% (n=28)] and least in the age group of 51 - 60 years [1.8 % (n=1)].

The gender wise distribution of supernumerary teeth as depicted in **Figure 2**, reveals a male predilection with prevalence of [76.8% (n=53)] and only [23.2% (n=16)] in females. The male -to-female ratio of supernumerary teeth in dental patients was 3.31 : 1.

The quadrant wise distribution of supernumerary teeth is depicted in **Figure 3** with highest prevalence observed in the 2nd quadrant [31.9% (n=22)], and least in the 3rd quadrant [10.1% (n=7)]. The prevalence of supernumerary teeth in multiple quadrants was 17.3% (n=12).

The distribution of supernumerary teeth based on eruption status is depicted in **Figure 4** with highest prevalence of erupted supernumerary teeth [76.8% (n=53)], than impacted ones [23.2% (n=16)].

Based on the type of supernumerary teeth, the distribution is as follows: Mesiodens was the most prevalent type of supernumerary teeth in dental patients [36.2% (n=25)]

followed by parapremolars [29.0% (n=20)]. The prevalence of parapremolars was [17.4% (n=12)] and that of multiple types of supernumerary teeth in a single patient was [2.9% (n=2)] [**Figure 5**].

Evaluating the association between gender and type of supernumerary teeth [**Figure 6**], females showed high prevalence of parapremolar and paramolar, both with equal prevalence of 8.6%(n=6), while in males, mesiodens was the most prevalent type of supernumerary teeth [31.9% (n=22)]. This association was found to be statistically significant. [Chi-square test, p-value $0.014 < 0.05$].

Figure 7 reveals the association between quadrant and type of supernumerary teeth, with parapremolar being most prevalent in 4th quadrant [16.7% (n=9)], paramolar in first quadrant, [7.4% (n=4)] and mesiodens in the 2nd quadrant [22.2% (n=12)]. This association was statistically significant [Chi-square test, p-value $0.001 < 0.05$].

The association between age group and type of supernumerary teeth is described in **Figure 8**, with parapremolars seen mostly in the age group of 21-30 years [11.6% (n=8)], paramolars again in 21-30 years [10.1% (n=7)], mesiodens also in 21-30 years [16.7%(n=9)] and multiple supernumerary teeth with equal prevalence of [1.8% (n=1)]

in 11-20 years and 21-30 years. However, this association was statistically not significant [Chi-square test, p-value 0.560 > 0.05].

The pattern of supernumerary teeth prevalence shows a population based variation. This study was conducted with the aim of observing the pattern, gender based and age based variation in the prevalence of Supernumerary teeth among the south Indian population. It has been observed that about 76.8% of supernumerary teeth were reported in males and based on age group 40.60% of supernumerary teeth were seen in the age group of 21-30 years. The supernumerary teeth were most frequently found in the 2nd quadrant with a prevalence proportion of 31.9%. About 76.8% of supernumerary teeth were erupted and 23.2% were impacted. Mesiodens was the most prevalent type of Supernumerary teeth, 36.2%. The association between gender and type of supernumerary teeth revealed that in females parapremolar and paramolar were highly prevalent while in males Mesiodens was the most prevalent type of Supernumerary teeth. This association was statistically significant.

Supernumerary teeth can be considered as one of the highly discussed dental anomalies in literature. Etiology wise, the tooth bud splits into two during development giving

rise to two teeth of equal size or one one normal tooth and the other being dysmorphic [Dichotomy theory] [11, 12]. It can also be due to proliferation of epithelial remnants of dental lamina, according to the theory of hyperactivity of dental lamina [13, 14]. Hereditary patterns have also been attributed to etiological factors making its occurrence multifactorial. Rajab *et al* [15], points out the occurrence of supernumerary teeth associated with syndromes like cleft lip\ palate, Cleidocranial dysplasia, gardner's, Ellis-Van-Creveld Syndrome, Ehler-Danlos Syndrome, Fabry-Anderson's Syndrome, Incontinentia pigmenti and Tricho-Rhino-Phalangeal syndrome.

The study by Rajab *et al.*, also reveals the prevalence of supernumerary teeth in the Jordan population aged between 5-15 years. It shows a male female ratio of 2.2:1 with 92.8% being a Mesiodens which is way higher than the prevalence of Mesiodens in the current study (36.2%) though a difference in the study's age group exists. Comparing the results of studies carried out in a pedodontic population, Anthonappa *et al.* [16], reveal male to female ratio of 3.1:1 in Chinese children with supernumerary teeth, and 81.4% being Mesiodens. In contrast to this in a Finnish pediatric population as assessed by Jarvinen *et al.* [17], the

prevalence was only 0.4% without any significant gender predilection. However, in a Turkish pediatric population, the prevalence of supernumerary teeth is reported to be very high (2.7%) with about half of them (51.2%) being Mesiodens [18]. This prevalence of mesiodens in Turkish pedodontic patients is higher than in current study, but lower than in Jordan and Chinese pediatric population. In a similar study in Brazil's pediatric population, the prevalence is 1.7% with 56.7% being Mesiodens and no statistically significant sex predilection [19-21].

Observing prevalence of supernumerary teeth in Indian pediatric population, Gupta *et al.* [22], have recorded a prevalence of 3.93%, male : female ratio of 2.85 : 1 and 93.6% being mesiodens in the school children of Rohtak, Haryana. These results are similar to the study results of Sharma *et al* [23], in the same population (i.e) school children of Rohtak, Haryana, showing a male : female ratio of 2.9:1 and 93.8% being mesiodens.

However, in the South Indian population of paediatric patients, prevalence ratio shows a sharp decline to just 1.24% and male to female ratio being only 1.55:1. Though the most common supernumerary teeth remain Mesiodens, prevalence is only 82.8%. These

findings were reported by Anegundi *et al.* [24, 25].

The current study focussed on the adult population, but on observing at the results of age groups of 1-20 years, 14 patients were in this age group out of the sample size of 69. Thus 20.2% of the sample size was between 1 and 20 years of age, and 9 out of these 14 patients had mesiodens (64.2%). Though this is quite low when compared to the prevalence in other paediatric populations, it can't be generalised as the current study was not focused exclusively on the paediatric population.

Demiriz *et al.* [26] describes the prevalence of supernumerary teeth in Turkish population to be 2.14% with a female predilection (1.28:1). This is contradictory to the findings of Bereket *et al.* [27], in the same population according to which, the prevalence is 0.76 percentage with the male to female ratio of 1.28:1, which is exactly the reverse of findings. The most common type in the Turkish population is Mesiodens (3.37%), followed by distomolars (23.97%) and para premolars (17.16%). The prevalence of Mesiodens is however much lower in the Spanish population, being only 46.9% and the prevalence of para premolars and distomolars being 24.1% and 18.0% respectively [28-30].

The prevalence of supernumerary teeth is higher in the Swiss community, with a prevalence of 1.5%, 75% being Mesiodens and a male predilection ratio of 2.75: 1, as reported by Schmuckli *et al.* [31].

The prevalence of supernumerary teeth in the South Indian population, according to the current study was only 0.17% which is way lower than the prevalence proportions mentioned in other population based studies, as described previously. The most prevalent type was Mesiodens with a prevalence proportion of 36.2% which was higher than in the Turkish population but lower than in the Spanish and Swiss communities. Also the male to female ratio is the highest of all being 3.31: 1.0.

Mesiodens is basically a supernumerary tooth that is located in the midline between two maxillary central incisors. The high prevalence of Mesiodens unanimously in all populations, including that of current study is of high clinical importance. This is because Mesiodens are associated with a wide range of complications like delayed eruption, infection of permanent incisors, crowding, midline diastema, cystic transformation, root resorption of adjacent teeth (impacted Mesiodens) and at times, eruption of incisor in the nasal cavity [32]. One of the most common lines of treatment is the extraction

of Mesiodens followed by the orthodontic appliance therapy for space closure and to relieve crowding. However, if identified at an earlier age of around 7-8 years, the Mesiodens can be extracted and the maxillary central incisor can be allowed to erupt naturally into the space, without any orthodontic treatment. This treatment modality has been described to be successful in a case report of an eight year old girl by Chevitaese *et al.*, [33].

Nevertheless, other types of supernumerary teeth namely, the distomolars, the para premolars and the paramolars possess equal risk of causing complications, with permanent teeth displacement being the most prevalent (36.0%), as reported by Gomes *et al.* [34]. The prevalence of these types as recorded in the current study is para premolars 29.0% and paramolars 17.4%.

The literature evidence discussed so far, point to two important findings, irrespective of the population: Prevalence of supernumerary teeth shows a male predilection and Mesiodens is the most common type of supernumerary teeth. Apart from these findings, the current study has also revealed two significant associations, one between gender and type of supernumerary teeth and the other between quadrant involved and type of supernumerary

teeth (p value < 0.05). The existing literature lacks evidence of such associations and their significance in different populations [35].

Though the current study poses few limitations, in the sample size being small and the inability to generalise the results to a larger population, there are few studies that have studied supernumerary teeth in such an elaborate manner. Most studies have limited themselves to the prevalence of different

types of Supernumerary teeth and gender predilections. This literature and evidence narrows down further in case of the south Indian population. Hence, the current study will serve as an eye opener for future research.

Future scope of the study permits the assessment of position of impacted supernumerary teeth and associated complications.

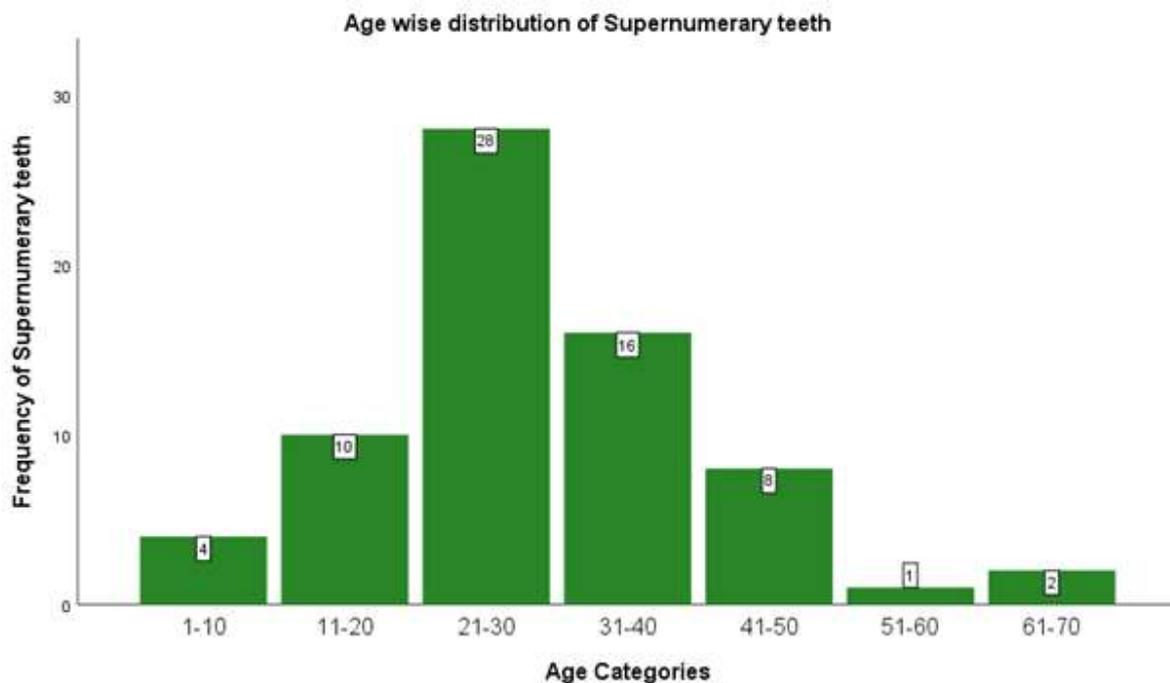


Figure 1: Bar chart depicting the age wise distribution of supernumerary teeth with X-axis showing the age categories (in years) of patients with supernumerary teeth and Y-axis showing the total number of supernumerary teeth. Highest prevalence was observed in the age group of 21-30 years.

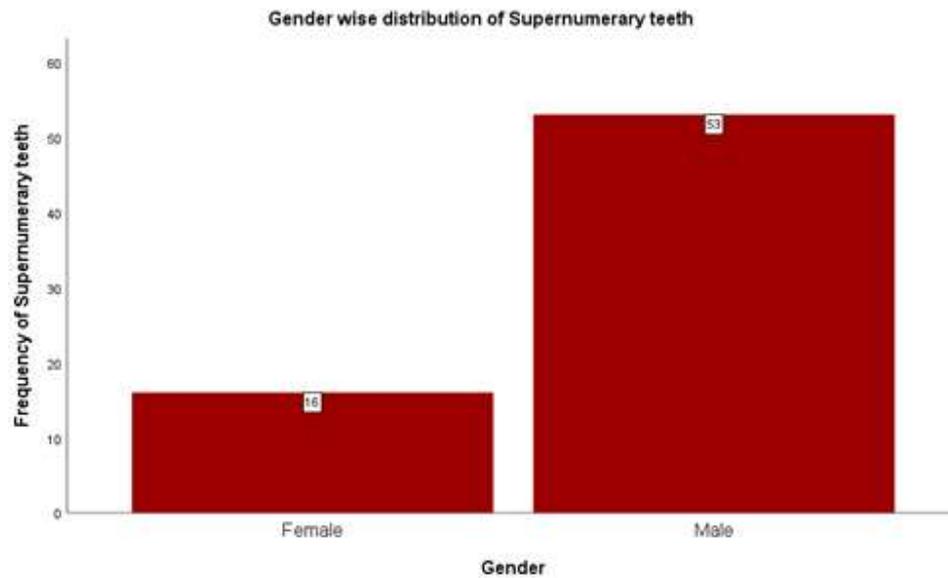


Figure 2: Bar chart depicting the gender wise distribution of supernumerary teeth with X-axis showing the gender of patients with supernumerary teeth and Y-axis showing the total number of supernumerary teeth. Highest prevalence was observed in males [76.8%]

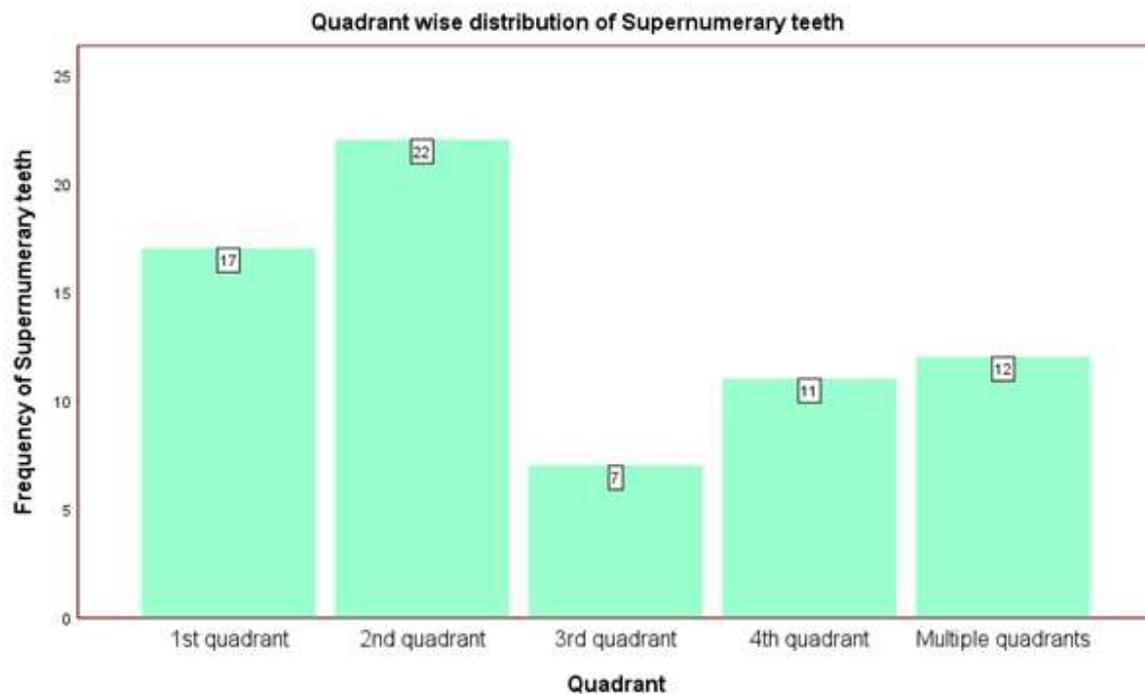


Figure 3: Bar chart showing the quadrant wise distribution of supernumerary teeth with X-axis showing the quadrant of supernumerary teeth and Y-axis showing the total number of supernumerary teeth. Highest prevalence was observed in the 2nd quadrant [31.9%].

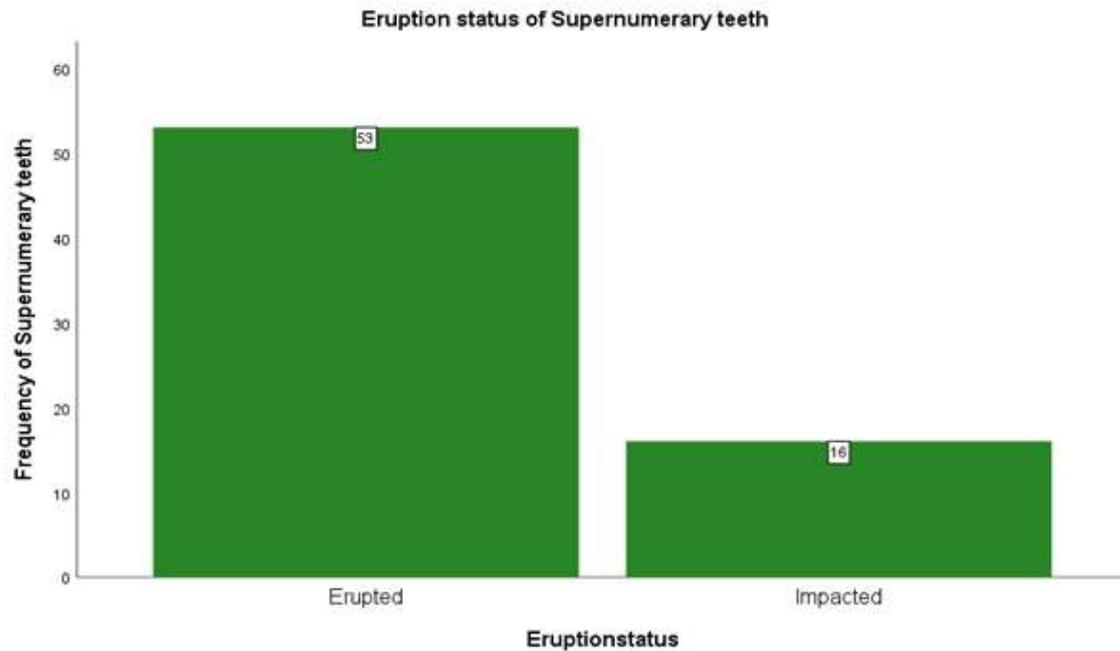


Figure 4: Bar chart depicting distribution of eruption status of supernumerary teeth with X-axis showing the eruption status of supernumerary teeth and Y-axis showing the total number of supernumerary teeth. Erupted supernumerary teeth were more prevalent than impacted ones.

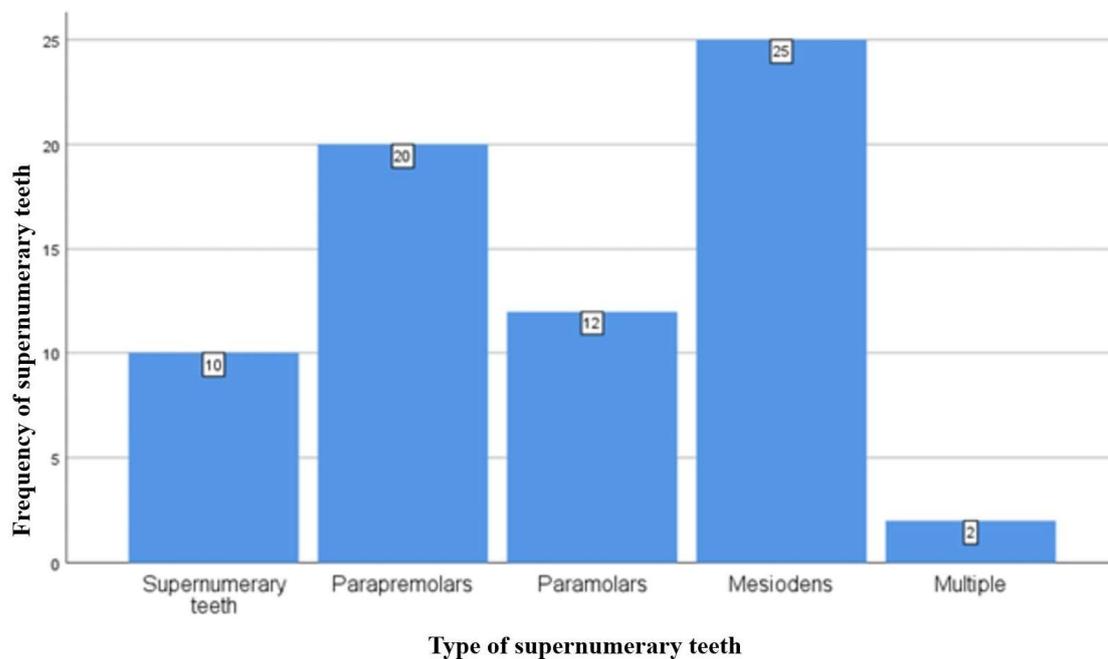


Figure 5: Bar chart depicting the distribution of type of supernumerary teeth with X-axis showing the type of supernumerary teeth and Y-axis showing the total number of supernumerary teeth. Highest prevalence of Mesiodens was observed.

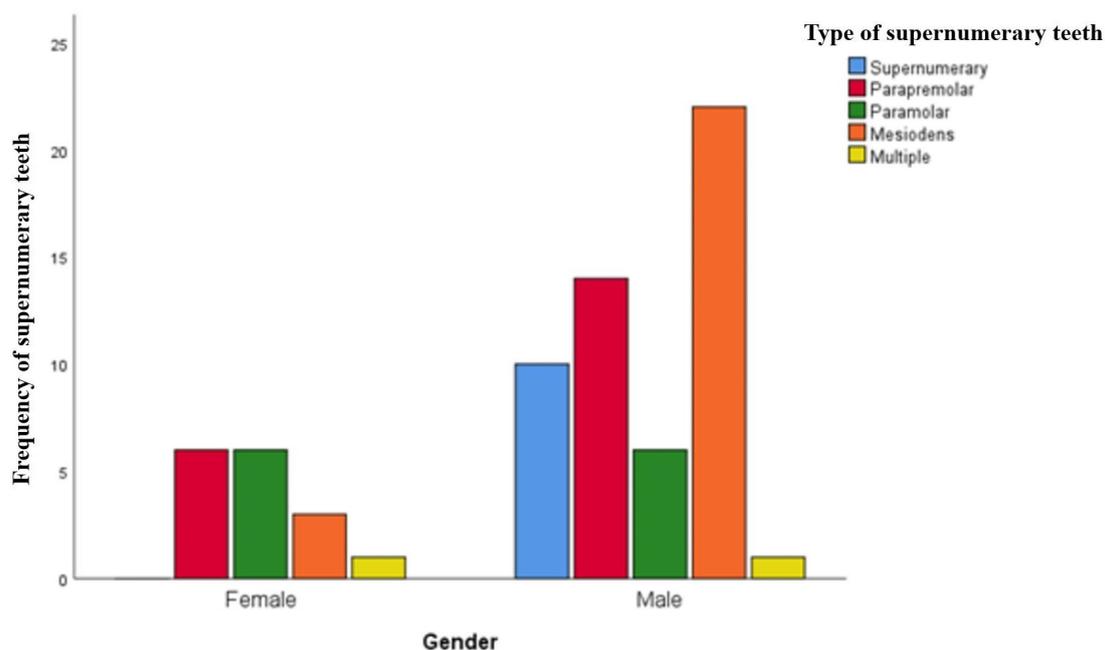


Figure 6: Bar chart depicting the association between gender and type of supernumerary teeth. X-axis denotes the gender of patients with supernumerary teeth and Y-axis shows the frequency of different types of supernumerary teeth. Females showed high prevalence of parapremolar and paramolar, while in males mesiodens was the most prevalent type of supernumerary teeth. Chi-square test, p-value 0.014 (<0.05), and the results were statistically significant.

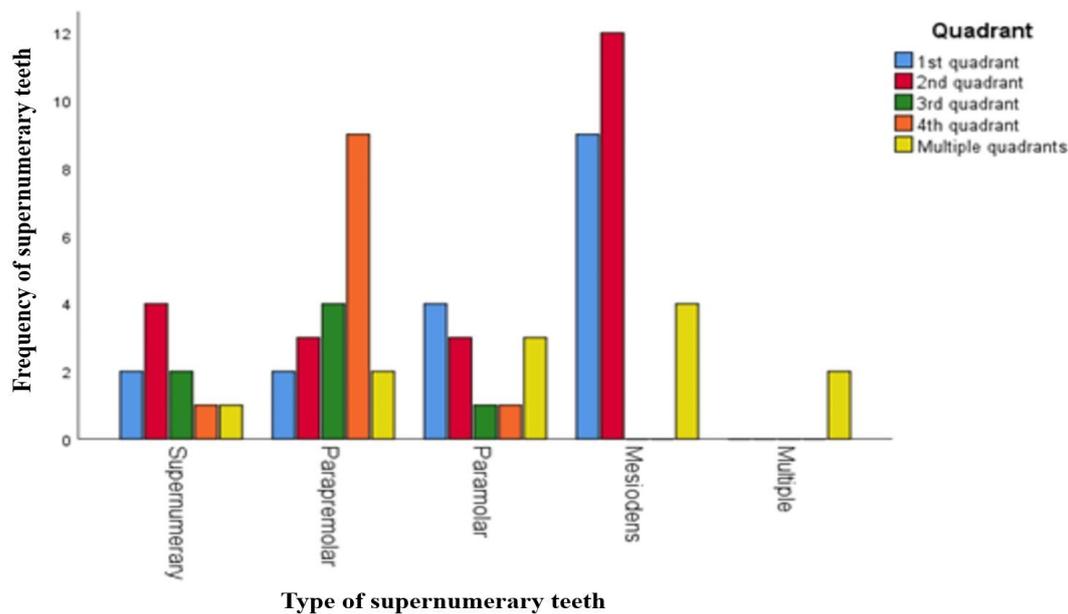


Figure 7: Bar chart depicting association between quadrant and type of supernumerary teeth. X-axis reveals the type of supernumerary teeth and Y-axis denotes the frequency of supernumerary teeth in each quadrant. Mesiodens was most prevalent in the 2nd quadrant [22.2% - red]. Para premolar was most prevalent in the 4th quadrant [16.7%-orange]. Chi-square, p-value 0.001(<0.05), and the results were statistically significant.

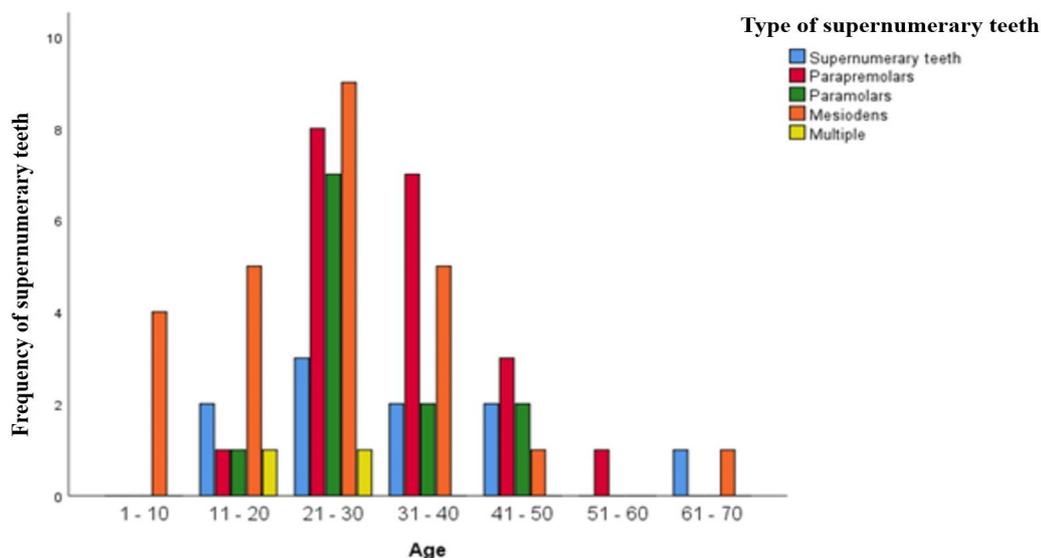


Figure 8: Bar chart depicting association between age and type of supernumerary teeth. X-axis denotes the age groups (in years) and Y-axis shows frequency of different types of supernumerary teeth. Supernumerary teeth were most prevalent in the age group of 21-30 years. Among the majority of the age groups the most common supernumerary teeth was mesiodens (orange). Chi-square test, p-value 0.560 (>0.05), and the results were statistically not significant.

CONCLUSION

Within the limitations of the study, the overall prevalence of supernumerary teeth in dental patients was 0.17%. Male predilection was observed in the prevalence of supernumerary teeth. Mesiodens is the most prevalent type of supernumerary teeth. A significant association between gender and type of supernumerary teeth; and quadrant and type of supernumerary teeth has been identified. Among females paramolars and parapremolars were most prevalent while in males mesiodens was the most prevalent type of supernumerary teeth.

AUTHORS CONTRIBUTIONS

First author (Kalyani. P) performed the analysis, and interpretation and wrote the

manuscript. Second author (Dr. M. P. Santhosh Kumar) contributed to conception, data design, analysis, interpretation and critically revised the manuscript. Both the authors have discussed the results and contributed to the final manuscript.

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CONFLICTS OF INTEREST

None declared

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