

A study of characteristics of supernumerary teeth and their association in Indian population over a period of 10 years¹Parul Singhal, MDS Pedodontics, Senior Resident, Dept of Pedodontics, PGIDS, Rohtak²Heena sarangal, MDS student, Dept of Pedodontics, PGIDS, Rohtak³Ritu Namdev, MDS Pedodontics, Senior Professor and Head, Dept of Pedodontics, PGIDS, Rohtak⁴Nancy Goel, MDS student, Dept of Pedodontics, PGIDS, Rohtak⁵Shruti Jha, MDS student, Dept of Pedodontics, PGIDS, Rohtak**Corresponding Author:** Parul Singhal, MDS Pedodontics, Senior Resident, Dept of Pedodontics, PGIDS, Rohtak**Citation of this Article:** Parul Singhal, Heena sarangal, Ritu Namdev, Nancy Goel, Shruti Jha, “A study of characteristics of supernumerary teeth and their association in Indian population over a period of 10 years”, IJDSIR- August - 2020, Vol. – 3, Issue -4, P. No. 309 – 315.**Copyright:** © 2020, Parul Singhal, et al. This is an open access journal and article distributed under the terms of the creative commons attribution noncommercial License. Which allows others to remix, tweak, and build upon the work non commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.**Type of Publication:** Original Research Article**Conflicts of Interest:** Nil**Introduction**

Tooth development is a continuous process in which a number of physiologic growth processes and various morphologic stages interplay to consummate the final form and structure. Any clogging in the interim can lead to multifarious anomalies¹. Supernumerary teeth are subtle transmutation of odontogenesis process resulting in extra number of teeth than in standard dental formula². The etiology of supernumerary teeth is uncertain but various theories have been suggested for its inception like atavism, hyperactivity of dental lamina, dichotomy of tooth bud, heredity and general diseases. They can be found associated with conditions like Cleidocranial Dysplasia, Ehlers-Danlos syndrome Type III, Ellis- Van Creveld syndrome, Gardner’s syndrome, Goldenhar syndrome, Orofaciodigital syndrome type I, Incontinentia

pigmenti, Marfan syndrome, Nance Horan syndrome, Trichorhinophalangeal syndrome cleft lip and/or palate³.

These can be substantiated in discrete forms, number, location, position and orientation and may either remain as a silent member of the dentition or may result in delayed eruption, displacement, crowding, spacing, dilacerations, root resorption, diastema, rotation, cyst formation /or nasal eruption leading to significant impediments in occlusion and mastication².

Discrete studies have been conducted for reckoning prevalence of supernumerary teeth reporting it to be 0.3% to 0.66% in primary dentition and 1.5% to 3.5% in permanent dentition⁴. While there is no significant sex variation in primary supernumerary teeth, males are afflicted twice than females in permanent dentition. Although copious studies have been conducted to surmise the prevalence, clinical features and complications of

supernumerary teeth, only few handful studies have centralized on the correlation between the disparate variables of supernumerary teeth. Throwing more light on these perspective of supernumerary teeth can avail in formulating assertive guidelines which in turn can help for more comprehensive long term treatment planning, more favorable prognosis and in certain instances, less extensive interception. Keeping in view the above, the present study was outlined to figure out the prevalence, clinical features, and complication and in accession to relate the various variables of supernumerary teeth that can help in premier diagnosis, judicious management and unequivocally surpassing results.

Materials and Methods

The study was presided for a time period of ten years (2008 to 2018) in the Department of Paedodontics and Preventive Dentistry, Post Graduate Institute of Dental Sciences Rohtak, Haryana. A total of 96170 patients (53,906 boys and 42,264 girls) aged 6-12 years who reported in OPD with the chief complaint of malocclusion, esthetic problem and pain were screened for the presence of supernumerary teeth and intraoral radiographs were taken for the subjects where supernumerary was present or questionable based on the clinical evaluation. Intra-oral periapical, occlusal, panoramic radiographs and CBCT were considered according to the location of supernumerary teeth and as per patient's need and clinician decision. Verbal informant consent of the patients was taken. Patients with syndromes predisposed to supernumerary teeth such as Cleft lip and palate, Cleidocranial dysplasia, Gardners syndrome were excluded from the study.

Demographic data of the individual, clinical characteristics of the supernumerary teeth including number, morphology (supplemental, rudimentary), shape (conical, tuberculate, molariform), location (midline

region, lateral incisor region, canine region, premolar region and molar region), sagittal position (palatal, labial, within arch), orientation (inverted, vertical and transverse), eruption status (erupted, impacted), root development (complete, incomplete) and complications associated with them were noted for each subject.

The statistical analysis using chi square test was done and $P < 0.005$ was considered as statistically significant.

Results

The prevalence of supernumerary teeth was found to be 5.29% with male (3124) to female (1973) ratio of 1.58:1. A total of 5600 supernumerary teeth were found in 5097 children of which 4484 children (87.9%) had single whereas 603 (11.83%) had double supernumerary teeth. The results are shown in table 1.

Out of 5600 supernumerary teeth 5590(99.82%) were present in maxillary arch and 10(0.17%) in mandibular arch with 89.5% (5006) in anterior maxillary region and 10.45% (584) in posterior maxillary region. 94.6% of the teeth were located in the midline (mesiodens), 4.25% were paramolars, 0.11% were distomolars.

A total of 5002 (89.32%) were rudimentary including 78% conical, 16.67% tuberculate and 5.32% molariform teeth whereas 578 (10.32%) were supplemental in shape. 2309 (41.23%) of the supernumerary teeth were palatally positioned, 1115(19.9%) were labially placed and 2176 (38.8%) were within the arch. 4660 (83.21%) of supernumerary teeth were vertically oriented; 928(16.57%) were inverted and 12(0.21%) were transversally oriented. 80% supernumerary teeth were clinically erupted whereas 20% were impacted.

Root formation was complete in 3920 (70%) supernumerary teeth however, 1680 (30%) had incomplete root formation. Most recurrently observed complication was displacement of adjacent teeth (32.14%) followed by diastema (20.89%), impaction (20%), rotation (11.78%),

cystic changes (5.5%), crowding (5.3%) whereas 0.7% had no associated complications. The results are shown in table 1 and 2.

The inter-relationship of various characteristics of teeth are shown in table (3 -9). In our study, vertically oriented supernumerary teeth had an eruption rate of 93.5% compared to inverted (12.9%) and transverse (0%) and the result was statistically significant whereas transversely oriented teeth were significantly impacted (100%) as shown in table 3.

Similarly conical teeth showed significant eruption (93%) compared to tuberculate (29.7%) and molariform teeth (46.3%). More case of impaction were seen in tuberculate (70.23%) and molariform (53.7%) but impaction of tubercular teeth was significant when compared with erupted teeth (29.7%) as shown in table 4.

The teeth which were positioned within the arch (85.5%) or placed palatally (74.7%) were more erupted than labially oriented (74.3%) teeth but were not significantly related (Table 5).

Teeth with complete root formation (74.1%) were significantly less erupted than teeth with incomplete root formation (92.7%)(Table 6).

Analysing the relationship between shapes with orientation statistically, the result showed that conical teeth were present significantly in erect position (87.4%) compared to inverted (12.36%) or transverse (0.18%) position and were also significantly present in erect position compared to tuberculate (68.9%) and molariform (65.7%) teeth. Similarly tuberculate and molariform teeth were also present more in erect position compared to inverted and transverse and showed significant relation whereas tuberculate teeth were significantly in erect position compared to molariform teeth (table 7) .

Conical teeth were positioned more in palatal position (46.22%) than in labial (10.48%) or within arch (43.29%).

Moreover conical teeth were significantly present in palatal direction compared to tuberculate(17.34%) and molariform teeth(42.9%).However, tuberculate teeth were positioned more in labial direction(11.33%) and molariform within arch(67.98%) when compared with other positions. when compared with location and root development results were statistically non significant (Table 8).

Root status is also variable in different shapes. In our study conical (65.01%) and tubercular (97.8%) teeth had complete root significantly than incomplete root (34.98%, 2.35% respectively) but when comparing the different shapes, conical teeth cases had more of complete root than tuberculate and molariform (55.9%) and result was statistically significant (Table 9).

Discussion

Supernumerary teeth or Hyperdontia are an unusual developmental alteration of teeth, which may involve any tooth and any region of the oral cavity. These teeth are most commonly associated with syndromic conditions, but non-syndromic occurrences have also been reported in the literature. Various theories have been postulated for the identification of etiologic factor of supernumerary teeth⁵.

In the present study, among the 96,170 patients examined, 5,097 patients were having supernumerary teeth, with prevalence of 5.29%. According to the various literature sources, the reported prevalence of supernumerary teeth varies according to the population studied between 0.1-3.8%. Reason of high prevalence in the present study may be due to regional variation and age group distribution. Moreover, to the best of our knowledge, no study solely has reported the prevalence of supernumerary teeth in mixed dentition period. Our study findings showed that males were more significantly affected than females ($P < 0.001$) with a ratio of 1.58:1, which is in accordance with the result reported by Anegundi RT et al⁶ (1.55:1 male to

female ratio) and Rani A et al⁷ (62.5% males and 35.5% females). Brook et al⁸ reported that supernumerary teeth are present more frequently in males than females. Celikoglu M et al⁹ in their study on Turkish population of 3491 subjects reported 1.8:1 male female ratio ($P < .001$). Leco-Berrocal MI et al¹⁰ in their longitudinal observational study on 2000 patients reported greater frequency of supernumerary teeth in males. A review of literature and survey of 152 cases done by Rajab LD et al¹¹ also reported males predominance than females for supernumerary teeth with a male to female ration of 2.2:1. Mason et al¹² also reported a 2:1 ratio of male to female. These all studies showed males predominance than females, which are in accordance with the present study.

In the present study, 99.82% supernumerary teeth were present in maxillary arch and 0.17% in mandibular arch. In maxilla, 89.5% were present in anterior maxillary region and 10.45% in posterior maxillary region. The most common supernumerary teeth were mesiodens with frequency of 94.6%, 4.25% were paramolars, 0.11% were distomolars. A longitudinal observational study conducted by Mahabob MN et al¹³ on 2216 patients over a period of 4 months also reported greater proportion of supernumerary teeth in maxillary anterior region (77.8%), out of which 87.5% were classified as mesiodens, as in agreement with the present study.

Saha et al¹⁴ in their prevalence study on Bengali population reported that 70.1% supernumerary teeth were present in the upper arch, which is little less than present study, 22.0% in the lower arch and 7.9% were present in both the arches. In the present study, 89.32% supernumerary teeth were rudimentary including 78% conical, 16.67% tuberculate and 5.32% molariform teeth whereas 10.32% were supplemental in shape. 87.9% patients had single supernumerary teeth whereas 11.83% patients had double supernumerary teeth. Anegundi RT et

al⁶, in their prevalence study of 790 south Indian pediatric patients reported that 92.53% patients presented with supernumerary teeth in anterior maxilla out of which 82.28% teeth were mesiodens and 8.35% were supplemental in type. 88.61% patients had one supernumerary tooth and 11.14% patients had double supernumerary teeth. The results reported in this study are in agreement with present study.

Our study findings showed that 80% supernumerary teeth were clinically erupted whereas 20% were impacted, which is in contrary to prevalence study on 7,551 non-syndromic patients done by Arikan V et al¹⁵ which reported that 77.4% supernumerary teeth were unerupted and 22.6% were fully erupted. Frequently observed complication in present study was displacement of adjacent teeth (32.14%) followed by diastema (20.89%), impaction (20%), rotation (11.78%), cystic changes (5.5%), crowding (5.3%) whereas 0.7% had no associated complications, which run parallel with the results reported by De Oliveira Gomes C et al¹⁶ in their study and observed that displacement was seen in 55.7% cases, failure of eruption in 50.8/5 cases, abnormal diastema in 21.0%, rotation in 18.7%, clinical retention of primary teeth in 7.9%, root resorption in 0.3%, and crown resorption in 0.3%.

The study also evaluates interrelation among various variables and characteristics of supernumerary teeth. Eruption status of supernumerary teeth may be influenced by its morphology, orientation, sagittal position and root completion. Vertical orientation, conical morphology, palatal or within arch position and complete root favoured the eruption of supernumerary teeth. The shape of supernumerary teeth seems to play a role in eruption as tuberculate form has an inclination to be impacted (70.23%) whereas conical form favors eruption despite that 97.8% tuberculate form had complete root formation.

Majority of conical teeth (87.4%) were found in erect orientation which also favors eruption of supernumerary teeth as 93.5% of teeth with erect orientation got erupted. Interestingly, palatal position of supernumerary teeth was more common than labial position and more frequently associated with eruption (74.7%) and conical form of shape (46.22%). Also, majority (67.98%) of the tuberculate form of supernumerary teeth were located labially.

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Legend Tables

Table 1: Various parameters regarding supernumerary teeth

FACTORS		Total	%		
SEX	Males	3124	61.29		
	Females	1973	38.70		
AREA	Rural	4092	80.2		
	Urban	1005	19.71		
PATIENTS WITH SUPERNUMERARY	Pt. with 1 SN	4484	87.9		
	Pt. with 2 SN	613	12.02		
JAW AFFECTED	Maxilla	5590	99.82	Anterior	5006(89.5%)
				Posterior	584 (10.45%)
	Mandible	10	0.17	Anterior	2 (20%)
				Posterior	8 (80%)
SAGITAL LOCATION	Labial	1115	19.9		
	Palatal	2309	41.23		
	Within arch	2176	38.8		
LOCATION IN ARCH	Mesiodens	5302	94.6		
	Paramolars	238	4.25		
	Distomolars	60	0.11		
	Parapremolars	0	0		
SHAPE	Conical	4368	78		
	Tuberculate	934	16.67		
	Molariform	298	5.32		
ORIENTATION	Erect	4660	83.21		
	Inverted	928	16.57		
	Transverse	12	0.21		
MORPHOLOGY	Supplementary	578	10.32		
	Rudimentary	5002	89.32		
ERUPTION STATUS	Erupted	4480	80		
	Impacted	1120	20		
ROOT STATUS	Complete	3920	70		
	Incomplete	1680	30		

Table 2: Complications associated with supernumerary teeth.

COMPLICATIONS	NO. OF TEETH	PERCENTAGE (%)
Displacement	1800	32.14
Rotation of adjacent teeth	660	11.78
Diastema	1170	20.89
Impaction	1120	20.00
Root resorption of adjacent teeth	200	3.5
Crowding	300	5.3
Cystic changes	310	5.5
No complication	40	0.7

Table 3: Association of orientation and eruption status of SNteeth

orientation	erupted	impacted	total	chi square value	p value
erect	4360(93.5%)	300(6.4%)	4660	31.92.691	0.000**
inverted	120(12.9%)	808(87%)	928		
transverse	0(0%)	12(100%)	12		
total	4480	1120	5600		
1 vs 2	89.58 & 0.001**	-21.460.001			
1 vs 3	92.15 & 0.001**	17.57, 0.001**			
2 vs 3	11.02 & 0.001**	34.91, 0.001**			

Table 4: Association of shape and eruption status of SN teeth

Shape	Erupted	Impacted	Total	Chi Square Value	P Value
conical	4064(93%)	304(7%)	4368	2148.805	0.000**
tuberculate	278(29.7%)	656(70.23%)	934		
molariform	138(46.3%)	160(53.7%)	298		
total	4480	1120	5600		
1 vs 2	80.031, 0.0001**	-15.0280.0001			
1 vs 3	83.112, 0.0001**	7.507 & 0.0001**			
2 vs 3	7.029, 0.0001**	21.774 & 0.0001**			

Table 5: Association of position and eruption status of SN teeth

Position	Erupted	Impacted	Total	Chi Square Value	P Value
labial	829(74.3%)	286(25.6%)	1115	161.183	0.000**
palatal	1725(74.7%)	584(25.2%)	2309		
within arch	1926(88.5%)	250(11.4%)	2176		
total	4480	1120	5600		
1 vs 2	-20.960.001	-12.910.001			
1 vs 3	-25.1140.001	1.782, 0.07#			
2 vs 3	-4.320.001	14.598, 0.001**			

Table 6: Association of root status and eruption status of SNteeth

Root Status	Erupted	Impacted	Total	Chi Square Value	P Value
complete	2921(74.5%)	999(25.4%)	3920	244.527	0.000**
incomplete	1559(92.7%)	121(7.3%)	1680		
total	4480	1120	5600		
1 vs 2	37.37, 0.001**	37.1023, 0.001**			

Table 7: Association of shape and orientation of SN teeth

shape	Erect	inverted	transverse	total	chi square value	p value
conical	3820(87.4%)	540(12.36%)	8(0.18%)	4368	259.511	0.000**
tuberculation	644(68.9%)	288(30.8%)	2(0.2%)	934		
molariform	196(65.7%)	100(33.5%)	2(0.67%)	298		
total	4660	928	12	5600		
1 vs 2	65.85, 0.001**	11.767, 0.001**				
1 vs 3	75.80, 0.001**	21.487, 0.001**				
2 vs 3	16.205, 0.001**	10.73, 0.001**				

Table 8: Association of shape and position of SN teeth

Shape	Complete	Incomplete	Total	Chi Square Value	P Value
conical	2840(65.01%)	1528(34.98%)	4368	421.165	0.000**
tuberculate	914(97.8%)	22(2.35%)	934		
molariform	166(55.7%)	132(44.3%)	298		
total	3920	1680	5600		
1 vs 2	43.543, 0.001**	52.11, 0.001**			
1 vs 3	62.3114, 0.001**	48.17, 0.001**			
2 vs 3	24.511, 0.001**	-9.0740.001			