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SUPERNUMERARY TEETH - AN UNPRETENTIOUS MISCREANT

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ABSTRACT

Supernumerary teeth are those that are formed in excess of the normal dental formula. It is a developmental anomaly that arises due to multiple etiologies. These teeth may remain embedded in the alveolar bone or can erupt into the oral cavity. Supernumerary teeth may cause functional or aesthetic problems. Complications that are usually reported are delayed eruption of succedaneous teeth, displacement or rotation, crowding of the affected region, abnormal diastema, dilacerations, cystic formation and sometimes eruption into the nasal cavity. This study was performed to showcase different treatment modalities of supernumerary teeth by using different case scenarios. Patients from the outpatient department of a private dental college were screened for the presence of supernumerary teeth. A set of 10 cases reported with supernumerary teeth were chosen and discussed. Awareness of different treatment modalities of supernumerary teeth is less among dental practitioners. Clinicians should be aware of early identification, proper management of supernumerary teeth and associated complications of the same. The treatment modalities discussed in this study include surgical extractions, esthetic management and orthodontic treatment of the supernumerary teeth. This article reports a case series of patients with supernumerary teeth discussing its etiology, frequency, classification, diagnosis and management.

INTRODUCTION

Supernumerary tooth (ST) is a tooth or a structure resembling a tooth arising from the dental lamina in addition to the normal dental formula [1–3]. Previous researches have documented the prevalence rate of supernumerary teeth to be 0.2%–0.8% and 0.5%–5.3% in deciduous and permanent dentition, respectively. The male-to-female ratio for the incidence of ST was reported to be in the range between 1.18 :1 and 1.5 :1[4].

Classification of supernumerary teeth may be on the basis of position and morphology.

Table 1: Positional variations of Supernumerary teeth [5]

SUPERNUMERARY TEETH	POSITION	SHAPE
Mesiodens	Located between maxillary central incisors	Conical or peg shaped
Paramolar	Buccally/Lingually or Palatally in between maxillary second and third molars, rarely in between first and second maxillary molars	Conical or Supplemental
Distomolar	Distal or distolingual to third molar (maxillary or mandibular)	Conical or tuberculate
Para premolar	Additional tooth in premolar region	Supplemental
Paramolar root	Additional root often in mandibular molar	Rudimentary or fully formed

Paramolar tubercle	Additional cusp present on buccal surface of a permanent molar *Parastyle*– If additional cusp is present in maxillary molar *Protostylid*- If additional cusp is present in mandibular molar	

Table 2: Supernumerary teeth based on morphology:[5]

Conical	**Small or peg shaped tooth with normal root**
Tuberculate	Barrel shaped crown with a rudimentary root and often paired
Supplemental	Resemble normal teeth incisor, premolar or molar
Odontome	No regular shape, a disorganized diffuse mass of dental tissue

Table 3: Supernumerary teeth based on eruption and orientation:[5]

Based on Eruption	Based on Orientation
Erupted: Complete coronal aspect is seen in the oral cavity clinically	*Vertical:* Oriented as normal series of dentition
Partially erupted: Only occlusal part is visible	*Transverse:* Horizontally placed
Impacted: Cannot be seen in oral cavity clinically. Can only be diagnosed with a radiograph	*Inverted:* Upside down

Several theories have been suggested for the occurrence of, such as the phylogenetic theory[6], the dichotomy theory[7], the atavism theory, occurrence due to hyperactive dental lamina [8] and due to a combination of genetic and

environmental factors[9]. Generally, multiple supernumerary teeth are associated with diseases or syndromes[10]. Supernumerary teeth show strong association with developmental disorders such as cleft lip and palate, cleidocranialdysostosis, Gardner syndrome and less commonly with Ehlers-Danlos syndrome, Fabry Anderson's syndrome, chondroectodermal dysplasia, incontinentiapigmenti and tricho rhino-phalangeal syndrome [11–13].

Our study highlights various cases of supernumerary teeth and their treatment modalities to highlight the importance of appropriate treatment and the complications due to improper treatment and failure to notice the supernumerary teeth. Previously we have worked on plenty of topics [14–26] and now we plan to showcase different treatment modalities of supernumerary teeth in various case scenarios.

MATERIALS AND METHODS

Patients from the out patient department of Saveetha Dental College and Hospitals were screened for the presence of supernumerary teeth from October to December 2019. A set of 10 cases reported with supernumerary teeth were chosen. The cases collected were analyzed and discussed the treatment measures to showcase different treatment modalities of supernumerary teeth.

CASE SERIES

4.1.Casereport 1:

A 34 yearold patient presented with a chief complaint of pain in the lower front tooth region for the past one month. Clinically a disto-labially rotated supernumerary central incisor was seen to have erupted in the place of 21. Permanent, impacted 21 was seen erupting over the supernumerary tooth(Fig 1). Radiographs show disto-labially rotated supernumerary incisor with protrusion of dilacerated 21 over the supernumerary tooth. 31,41 showed mild external root resorption due to trauma from occlusion(Fig 2). Treatment suggested was the extraction of permanent maxillary incisor and orthodontic de-rotation of supernumerary tooth in alignment with the arch. Patient was unwilling for this treatment. Hence, coronoplasty followed by composite build up of the labial surface of supernumerary incisor to aesthetically resemble a central incisor in line with the arch was carried out(Fig 3). Pain in 31,41 gradually subsided after coronoplasty was done.

Figure 1: Intraoral images of Case 1 depicting distolabially rotated supernumerary central incisor.

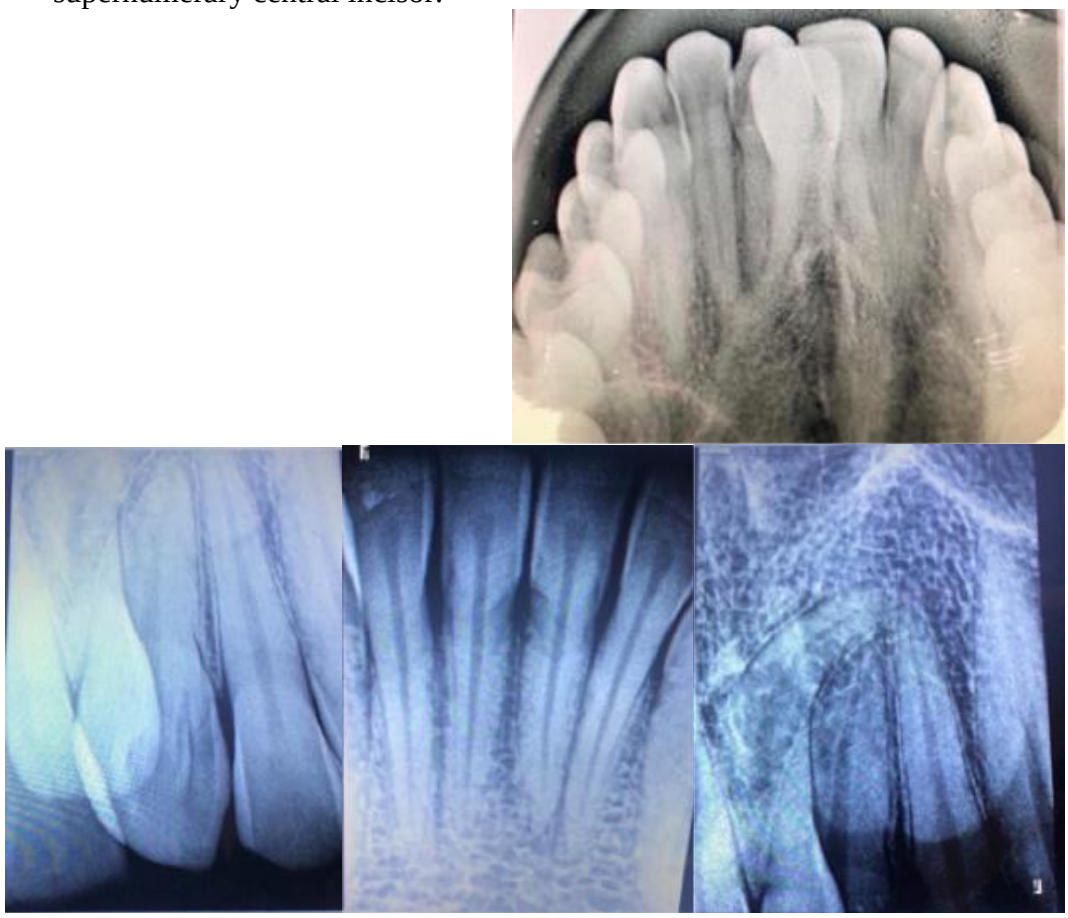

Figure 2: Radiographic images of Case 1 depicting dilacerated permanent central incisor, 21

Figure 3 – Treatment for Case 1 depicting composite build up of disto-labially rotated supernumerary incisor.

4.2. Case report 2:

Supernumerary central incisor was seen erupting palatal to 11 causing protrusion of 11 from the arch (Fig 4,5). Treatment decided was the extraction of supernumerary central incisor and orthodontic treatment for alignment of 11 into the arch.

Figure 4: Intraoral images of Case 2 depicting palatally placed supernumerary maxillary central incisor

Figure 5: Radiographic image of Case 2 depicting palatally placed supernumerary maxillary central incisor

4.3.Casereport 3:

Patient reported with a chief complaint of pain in the lower front teeth. On intraoral examination, a swelling measuring 3x3 cm was visible in the lower

labial vestibule. This was due to the presence of impacted supernumerary teeth periapical to 31,41 seen through the overlying mucosa(Fig 6,7).

On thermal pulp testing, which infer the pulp health by sensory response with the use of a heated GuttaPercha stick, 31 and 41 were found to be nonvital. Treatment decided was the extraction of supernumerary teeth erupting periapical to 31 and 41, followed by root canal treatment and placement of full veneer crowns in 31 and 41.

Figure 6: Clinical image of a swelling in the lower labial sulcus due to presence of impacted supernumerary teeth periapical to 31,41.

Figure 7: Radiographic image depicting impacted supernumerary teeth periapical to 31,41.

4.4.CaseReport 4:

Patient presented with a chief complaint of pain in the lower right and left back teeth region. OPG revealed the presence of horizontally impacted 38 and 48 and presence of impacted para premolars in between 15,16 and 25,26 (Fig 8). Extraction of 38,48 was carried out. Since the patient is asymptomatic, no treatment was carried out for the supernumerary teeth.

The para premolars were not seen to be impinging into the maxillary sinus. However, if they were, the patient would be enduring pain due to sinusitis and

rhinitis. In such a case, Caldwell Luc procedure would have to be performed to remove the teeth from the maxillary sinus.

Figure 8: OPG of Case 4 depicting impacted para premolars in between 15,16 and 25,26.

4.5.Casereport 5:

Patient presented with a chief complaint of pain in the lower right back teeth region for the past one month. On intraoral examination, there was a lingually placed para premolar located between the second premolar and first molar of the fourth quadrant causing food lodgement which led to the formation of caries in 46. Class II dental caries was identified in 46. Treatment suggested was the extraction of the para premolar (Fig 9) followed by Class II restoration of 46.

Figure 9: Intraoral images of Case 5 depicting pre and post extraction of supernumerary tooth between 45,46

4.6.Casereport 6:

Patient presented with a chief complaint of pain in the lower right back tooth for the past two weeks. OPG revealed radiolucency involving enamel, dentin and pulp in 46 and an impacted para premolar in between 44 and 45 (Fig 10). The treatment suggested was root canal treatment in relation to 46. The para

premolar can be left untreated as it is asymptomatic. When pain arises, evidence of root resorption in 44 needs to be reassessed. Extraction of para premolar followed by root canal treatment of 44,45 must be carried out if 44 is not resorbed, as per the treatment plan. A CBCT must be advised to check the distance of para premolar from 44 and the inferior alveolar nerve prior to extraction. If 44 is resorbed and mobile, extraction of 44 can be done, followed by orthodontic extrusion of the para premolar into the place of 44 in alignment with the arch.

Figure 10: OPG of Case 6 depicting an impacted para premolar in between 44 and 45

4.7. Case report 7:

Patient presented with a chief complaint of unaesthetic and misshapen upper front teeth. Clinical examination revealed mesiodens between 11 and 21 (Fig 11, 12). Root canal treatment of 11 and 21 followed by crowns mimicking lateral incisors can be planned. Composite build up of supernumerary teeth can be done that mimic central incisors.

Figure 11: Intraoral image of Case 7 depicting Mesiodens between 11 and 21

Figure 12: Radiographic image of Case 7 depicting mesiodens between 11 and 21

4.8. Case report 8:

Patient presented with a chief complaint of decayed teeth. A para premolar present adjacent to 34 and 35 was identified clinically (Fig 13). OPG revealed the presence of another para premolar impacted in between 44 and 45 (Fig 14). Treatment suggested was the extraction of para premolar between 34 and 35 since it can lead to food lodgement resulting in caries and/or pocket formation. The para-premolar in between 44 and 45 can be left untreated as it is asymptomatic. In case of pain, extraction of para premolar followed by root canal treatment of 44 and 45 must be done. If 45 is resorbed and mobile, extraction of 45 can be done, followed by orthodontic extrusion of the para premolar into the place of 45 in alignment with the arch.

Figure 13: Intraoral image of Case 8 showing presence of para premolar present adjacent to 34 and 35 in the lingual aspect.

Figure 14: OPG of Case 8 showing presence of para premolar impacted in between 44 and 45 and para premolar present adjacent to 34 and 35.

4.9.Casereport 9:

Patient presented with a chief complaint of an unaesthetic and misshapen upper front tooth. On clinical examination, mesio-dens between 11 and 21 was diagnosed (Fig 15,16). Esthetic management suggested the extraction of the mesio-dens followed by the orthodontic closure of the space between 11 and 21 with a fixed appliance. If spacing is reduced to less than 1.5mm between the teeth, composite veneers can be placed and if the spacing is more than 1.5mm, laminate veneers can be advised. The veneers can be placed from 13 to 23 for better esthetics.

Figure 15: Intraoral image of Case 9 depicting Mesiodens between 11 and 21

Figure 16: Radiographic image of Case 9 depicting Mesiodens between 11 and 21

4.10.Casereport 10:

Patient reported with a chief complaint of decayed teeth. On clinical examination, an impacted supernumerary tooth in between 11 and 12 was identified (Fig 17,18). Since the tooth was asymptomatic, it was left untreated. When pain arises, extraction of the supernumerary tooth must be carried out.

Figure 17: Intraoral image of Case 10 depicting impacted supernumerary tooth in between 11 and 12

Figure 18: Radiographic image of Case 10 depicting impacted supernumerary tooth in between 11 and 12

5. Discussion:

The etiology of supernumerary teeth is not understood completely. Several theories such as atavism theory, dichotomy theory, and dental lamina hyperactivity theory have been suggested to explain the development of supernumerary teeth[27].

Atavism theory[27] proposed that supernumerary teeth were the result of phylogenetic reversion to extinct primates with three pairs of incisors. Dichotomy theory 27 stated that the tooth bud splits into two equal or different-sized parts, resulting in the formation of two teeth of equal size, or one normal and one dysmorphic tooth, respectively. Both atavism and dichotomy theories have been largely discounted.

The dental lamina hyperactivity theory involves localized, independent, conditioned hyperactivity of the dental lamina. According to this theory, a supplemental form of the tooth would develop from the lingual extension of an accessory tooth bud, whereas a rudimentary form would develop from the proliferation of epithelial remnants of the dental lamina. Another theory is the genetic theory; evidence of which lies in the reports of mesiodens in twins and siblings[27]. Niswander and Sujaku[28] also proposed the presence of an autosomal recessive gene which explains the familial tendency to supernumerary teeth.

According to another theory, mutant genes give rise to supernumerary teeth and this is supported by the finding of increased supernumeraries in patients associated with dental and facial anomalies such as cleft lip and palate. The development of bilateral supernumeraries also suggests they may be controlled by a mutant gene[28]. Moreover, the presence of multiple supernumerary teeth should always raise suspicion to the presence of any craniofacial syndromes or systemic disorders. Syndromes commonly associated with supernumerary teeth are Cleft lip and palate cases, Cleidocranialdysostosis, Gardner's syndrome, Ehlers-Danlos syndrome, IncontinentiaPigmenti and Tricho-Rhino-Phalangeal syndrome[29].

Rajab and Hamdan[11] and Liu *et al.*[30] stated that supernumerary teeth are frequently normally orientated. DiBiase[31] suggests that most teeth experiencing delayed eruption will spontaneously erupt within 18 months of supernumerary removal alone, provided the delayed tooth is not excessively displaced and has a potential to erupt. If the roots of the permanent incisors are completely or nearly formed, there may be diminution of eruptive potential that will necessitate orthodontic treatment[32].

Periapical radiographs represent two-dimensional (2D) dental imaging and cannot be accurate and conclusive for the diagnosis of supernumerary teeth [33,34]. Orthopantomogram has been the preferred modality of choice for investigating the status of supernumerary teeth, but the introduction of Cone Beam Computed Tomography (CBCT) to radiographic technology has been proved to be the most effective three dimensional means of examining dental and associated osseous structures. CBCT is an interesting alternative because it provides 3D dental imaging [35,36].It can reveal the level of union of the supernumerary tooth and the number of roots, the anatomy of the pulp chamber (single vs 2 separate chambers) and the anatomy of the radicular pulp (single vs 2 or more pulp canals). Toureno et al. proposed a guideline to use three-dimensional imaging modalities (cone beam computerized tomography) along with two dimensional imaging modalities for better assessment of Supernumerary Teeth, planning surgical intervention with minimal treatment errors [37]. Clark and Richards [9,38,39] had suggested the horizontal and vertical tube shift technique, respectively, to determine the exact location of supernumerary teeth using conventional radiography.

Regarding management issues of supernumerary teeth,Hogstrom and Andersson suggested two different options for supernumerary teeth removal. According to them, the teeth either should be removed as early as it is identified or after completion of the adjacent tooth's root formation[40]. If the teeth are asymptomatic with no radiographic evidence of any pathologies and not likely to interfere with orthodontic tooth movement, they can be monitored with periodic radiographic examination. However, if the patient does not want to risk any complications, extractions can be considered. If associated with roots of permanent teeth, waiting till the completion of root development should be considered to minimize the chances of root damage[41]. However, if the supernumerary teeth are associated with any sort of complications like cysts or tumors, obstruction to normal teeth eruption, hindrance to orthodontic tooth movement and unaesthetic appearance, extraction is a logical management in those cases[42].

The mere presence of a supernumerary tooth is not an indication for extraction. Owing to the abnormal shape and size of the crowns and roots as well as malalignment, treatment usually requires a multidisciplinary approach to address both endodontic and aesthetic considerations[43]. The clinician should be familiar with the early clinical manifestations of the presence of supernumerary teeth in the dentition so that necessary early intervention could be taken to prevent any possible complications[41]. After diagnosis and treatment, a periodic long-term observation of the dentition is of prime importance to obtain favorable results.

CONCLUSION

Supernumerary teeth are uncommon and generally present without causing any complications like our cases. This study showcased the various treatment modalities of different cases to avoid further complications. Although complications are rare, clinicians should be aware of early identification, proper management, and associated complications with the same.

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AUTHORS CONTRIBUTION

R.L contributed to study conception and design, collection of cases, interpretation and drafted the work. A.M contributed to the collection of cases, interpretation and study design. M.J contributed to study conception and design. All authors critically reviewed the manuscript and approved the final version.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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