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CLINICAL SECTION

The development of supernumerary teeth in the mandible in cases with a history of supernumeraries in the pre-maxillary region

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This article presents four cases in which delayed formation and late eruption of supernumerary teeth in the mandible occurred in patients with a history of supernumerary formation in the premaxilla region. In all cases, the premaxillary supernumeraries prevented eruption of the associated permanent incisor(s).

Key words: Delayed formation mandibular supernumeraries, impeded eruption of maxillary incisors, pre-maxillary supernumeraries

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Introduction

A knowledge of the chronology of tooth development and eruption is essential to the understanding of the clinical features and aetiology of many of the developmental dental abnormalities. For instance, it is known that first premolars begin to calcify at 18 months to 2 years, with completion of crown formation at 5–6 years. Calcification of second premolars begins slightly later, between 2 and 2½ years, with crown completion at 6–7 years. Eruption of premolars normally occurs between 10 and 12 years of age. The formation of normal premolar teeth is not usual after the dental age of 8–9 years[1] and many dental anomalies have been detected as early as 5 years of age.[2]

Supernumerary teeth are in excess of the usual dental number and may be of abnormal form. This term is often used to cover supplemental teeth, which are extra teeth that resemble those of the normal series. The aetiology of supernumerary teeth is not fully understood. Both genetic and environmental factors have been proposed and a sex-linked mode of inheritance has been suggested as supernumerary teeth are twice as common in males as in females in the permanent dentition.[3] The general pattern since the primitive mammalian dentition has been a reduction in the number of teeth. It could be postulated that subjects with supernumeraries present are reverting toward a primitive mammalian dental formula of three incisors, one canine, four premolars and three molars.

Supernumerary premolars may occur as an isolated dental finding or as part of a syndrome such as cleidocranial dysplasia and Gardener's syndrome. In 1990, Yusof reported that multiple supernumerary teeth without associated systemic conditions or syndromes had the highest frequency of occurrence in the mandibular premolar region having reviewed cases reported in the English language literature from 1969 to 1990.[4] However, the final sample size was small with only 11 cases identified.

The presence of supernumerary teeth may cause complications such as delayed eruption, displacement including rotations of permanent teeth and, less commonly, development of odontogenic cysts and resorption of adjacent teeth. Supernumerary premolars are usually of normal form, and 75% are impacted and generally unerupted.[5]

This paper reports on four cases of delayed formation of supernumerary teeth in the mandible in patients with a history of supernumerary formation in the premaxilla region.

Case report 1

A young female, RD was referred to the Maxillofacial department by her general dental practitioner for

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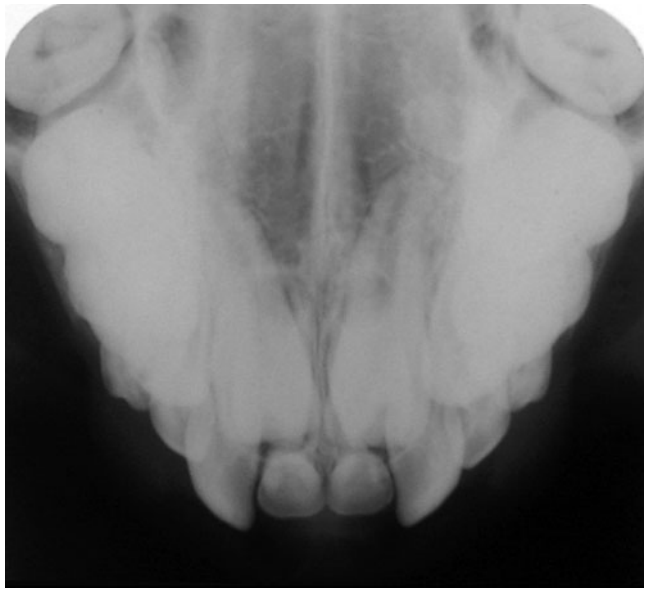

Figure 1 RD upper anterior occlusal

investigation of unerupted upper central incisors in November 1989 at age 10 years 3 months.

Intra-oral radiographs supplied (Figure 1) revealed the presence of two anterior maxillary supernumeraries preventing the eruption of both maxillary central incisors. The supernumeraries and remaining upper anterior deciduous teeth were removed in May 1990 at age 10 years 9 months. Follow-up appointments were recommended but RD failed to attend in September 1991 and February 1992. However it transpired that RD had attended elsewhere for exposure of maxillary central incisors and upper fixed orthodontic appliance therapy was carried out from September 1991 to 1993. An orthopantomograph was taken prior to treatment (Figure 2).

Figure 2 RD panoramic radiograph following removal of supernumeraries at UR1 and UL1, and prior to orthodontic treatment

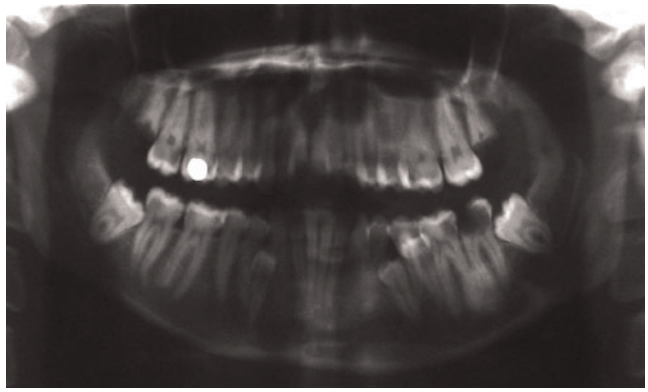

Figure 3 RD Panoramic radiograph showing late forming mandibular premolars

In September 2003 at 24 years 3 months, RD was referred once more, this time for a supernumerary tooth erupting lingual to LL5 and LL6. This had been present for 16 months according to the patient. An orthopantomograph film taken showed three fully formed supernumerary premolar teeth of normal morphology between LR4, LL4 and 5, and LL5 and 6 (Figure 3). Fortunately, the orthopantomograph film taken prior to orthodontic treatment to retrieve UR1 and UL1 was available (Figure 2), and was compared with the current September 2003 film. On closer examination this earlier film showed, in addition to the unerupted upper central incisor teeth, a faint image of a calcified cusp tip pertaining to the supernumerary, which developed at LR4 region. No sign of any calcification or crypt formation was apparent in the lower left premolar region.

However, RD also had several carious molar teeth and, therefore, in March 2004 some of these and the erupted supernumerary between LL5 and 6 were removed. The supernumeraries at LR4, and LL4 and 5 were left *in situ* being unerupted and asymptomatic.

Case report 2

In December 2001 Maxillofacial colleagues referred LW, a female aged 7 years 11 months, to the orthodontic department for investigation of unerupted maxillary central incisors and a supernumerary in the lower right first premolar region. The radiographs supplied revealed two supernumeraries preventing eruption of the maxillary central incisors and early development of a supernumerary adjacent to the crown of lower right first premolar (Figure 4). Treatment consisted of surgical removal of the two upper anterior supernumeraries at age 8 years, and this was followed by a period of

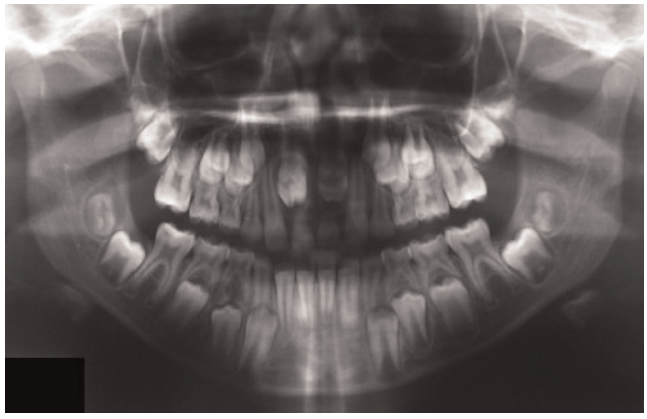

Figure 4 LW panoramic radiograph

monitoring of the eruption of the upper central incisors and the development of lower right first premolar supernumerary.

Twenty-eight months later, delayed eruption of the maxillary central incisors prompted a further orthopantomograph to be taken on review in May 2004 at age 10 years 4 months (Figure 5). This showed eruptive progress of the maxillary central incisors, but there was mucosal impedance of the upper left incisor and the (then) more developed supernumerary premolar was inhibiting eruption of LR4.

Surgery was performed in October 2004 to expose UL1 submucosally together with upper labial fraenectomy and removal of the supernumerary premolar.

Case report 3

A consultant in Paediatric Dentistry referred LC, a girl aged 9 years 4 months, to the Orthodontic Department in November 2004. LC had originally been referred to the Paediatric Department for restoration of some

Figure 5 LW panoramic radiograph. Delayed UL1, supernumerary LR4 region

Figure 6 LC panoramic radiograph showing supernumeraries UR1, LR2, and LL2 and LL3 regions

primary molars and, investigation of unerupted upper right central incisor.

Radiographs taken on examination at age 9 years 3 months showed an anterior maxillary supernumerary plus two conical shaped but not fully formed mandibular supernumeraries in the LR2 and LL2 and 3 regions (Figure 6).

The treatment plan for LC consisted of the surgical removal of the supernumerary in the upper right central incisor region and extraction of URC and LLC and E. The mandibular supernumeraries are to be left *in situ* for the present as they are asymptomatic and will be kept under review when following up the progress of UR1.

Case report 4

A young boy, WR, aged 9 years 6 months, was referred in May 2002 to the Maxillofacial Unit from a Specialist Orthodontic Practitioner. The presenting problems were the failure of eruption of UR1, UL1, LR3 and LL3. Radiographs revealed four supernumerary teeth associated with these unerupted permanent teeth and the supernumeraries were placed at crown or incisal edge level (Figures 7 and 8).

At age 10 years, in October 2002 both upper deciduous lateral and central incisors, and both lower deciduous canine teeth were extracted and the four supernumerary teeth were also removed. WR was reviewed in January 2005, at 12 years 3 months, when the upper incisors had erupted naturally, but were crowded. However, LR4 and 3, and LL3 were unerupted and LRD was retained.

An orthopantomograph showed LR4 and 3 and LL3 to be low and vertical with significantly delayed eruption and, very early development of two more supernumeraries, one in LR4, and one in LL3 and 4 regions (Figure 9).

Figure 7 WR Upper anterior occlusal showing supernumeraries at UR1 and UL1

The patient has been referred for extraction of LRD and removal of the two lower supernumeraries. He will be reviewed 1 year after surgery to monitor progress of the teeth with delayed eruption.

It is also of interest to report that NW, younger sister to LW, was referred by her general dental practitioner in March 2004 at 8 years of age for investigation of unerupted maxillary central incisors.

An orthopantomograph taken showed two supernumeraries occlusal to the maxillary central incisors and these were lying superiorly compared with the maxillary lateral incisors (Figure 10). There was no sign of any

Figure 8 WR panoramic radiograph 27th August 2002. Supernumeraries at LR3 and LL3 regions

Figure 9 WR panoramic radiograph 5th April 2005. Two-and-a-half years later UR1 and UL1 erupted

supernumerary tooth development in the mandible or elsewhere in the maxilla, compared with NW's sister who showed signs of a mandibular premolar developing at 7 years 11 months.

The two supernumeraries associated with the maxillary central incisors are planned for surgical removal to facilitate eruption of these teeth and for the remaining upper deciduous incisors to be removed at the same time. Further review was to be arranged when NW would be 9 years old.

The father of NW and LW also had a history of delayed eruption of maxillary central incisors as a child associated with the presence of supernumerary teeth. Whether supernumerary premolars were present is unknown as no further information could be obtained.

Discussion

The most comprehensive study of supernumerary teeth, and one often quoted, is that conducted in Germany by Stafne in 1932.[5] This involved the survey of full-mouth

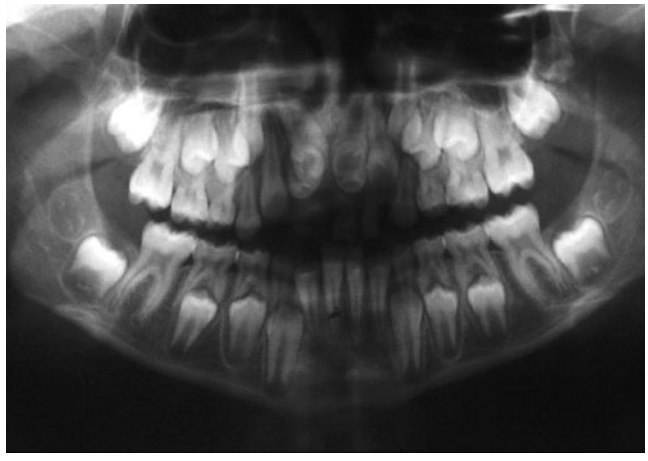

Figure 10 NW orthopantomograph. Supernumerary at UL1/UR1 region

radiographs of 48,550 adults. A total of 500 supernumerary teeth were identified (1%) including nine maxillary and 33 mandibular premolars (8.4% of all supernumerary teeth identified). Whether some subjects had multiple supernumeraries is not clear. With 42 supernumerary premolars per 48,550, the calculated occurrence rate would be 0.09%, assuming that Stafne did not discover any cases of multiple supernumerary premolar formations. Stafne also states that, unlike other supernumeraries, supernumerary premolars, as well as being more likely to develop in the mandible than in the maxilla, usually resemble normal premolars in shape and size.[5]

The study by Stafne involves only adults with an average age of 40 years and he stated 'at that age many of the supernumerary teeth have been removed, particularly those which tend to erupt'.

In 1961, Grahnen and Lindahl studied radiographs of 1052 adult Swedish dental students (male:female 812:240) and reported the prevalence of supernumerary premolars to be 0.15–0.28%, and to represent between 8.0 and 9.1% of all supernumerary teeth.[6]

A further study of the records and radiographs of 2000 orthodontic patients aged between 6 and 26 years in India in 1961 by Parry and Iyer reported only one case of a supernumerary mandibular premolar (0.05%).[7]

A more recent clinical and radiographic study conducted by Rubenstein *et al.* in 1991 in Georgia illustrated seven cases exhibiting supernumerary premolar development during a 2-year study of 1100 patients. This represents a prevalence of 1 in 157 or 0.64% orthodontic patients in 1991.[8] Ages at detection ranged from 11 to 14 years.

The latest radiographic evidence of mandibular supernumerary premolar formation is reported by McNamara *et al.* in 1997[9] where, in a male aged 15 years, a further supernumerary premolar developed in the left mandibular quadrant, which was not present at age 14.

Oehlers[10] described a case with continuing development of supernumeraries in the mandibular premolar region, which were not of normal premolar morphology and two were of conical form.

There are several documented cases where anterior maxillary supernumerary teeth were present in teenage and pre-teen patients, and these patients also developed mandibular premolar supernumerary teeth in their adolescent years. No associated syndromes were found in any of the cases.[9,11,12] All cases initially presented with disruption of the development of the anterior maxillary dentition.

British Orthodontic Society guidelines for orthodontic radiographs produced in 2001 state that with regards to population screening, 'There is no good scientific evidence to support any claimed benefit from radiographic screening for the purpose of assessing malocclusion and timing of orthodontic treatment'. Radiographic exposure is an invasive procedure and it is appropriate to seek a sensible risk/benefit balance in their use for orthodontic purposes.[13]

This is supported by papers published in 1997, which state that it is not routine practice to screen for the late development of supernumerary teeth during orthodontic treatment[14,15] and, therefore, the possibility of their interference with occlusal development or orthodontic mechanics such as space closure, should always be kept in mind. The reported incidence of late forming supernumerary premolars would obviously increase if post-orthodontic treatment radiographs were routine practice.

The presentation of RD, at 24 years of age, illustrates how difficult it is to determine exactly when a supernumerary tooth starts to form. The developmental lingual position makes detection on orthopantomograph films more difficult and the orthopantomograph taken in April 1991 at age 11 (Figure 2), showed a possible supernumerary cusp calcification in the mandible, which was only noted on re-examination several years later. Perhaps an opportune time for further radiographic review of the young adult with history of previous supernumerary teeth may be at around 16–18 years when assessment of the third molars is often desirable.[12] This could be easily performed in the general dental practice setting. The management of these late-developing supernumeraries will be influenced by the effect, if any, on the developing or developed dentition or any possible pathology. The patient should be advized of their presence and be made aware of the possible sequaelae.

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References

1. Proffit WR. *Contemporary Orthodontics*, 3rd edn. St Louis: CV Mosby, 1986.
2. Brook AH. Dental anomalies of number form and size: their prevalence in British school children. *Int Assoc Dent Child* 1974; **5**(2): 37–53.
3. Bruning LJ, Dunlop L, Mergele ME. A report of supernumerary teeth in Houston, Texas school children. *J Dent Child* 1957; **24**: 98–105.
4. Yusof WZ. Non-syndrome multiple supernumerary teeth: literature review. *J Can Dent Assoc* 1990; **56**(2): 147–49.

5. Stafne EC. Supernumerary teeth. *Dental Cosmos* 1932; **74**: 653–59.
6. Grahnen H, Lindahl B. Supernumerary teeth in the permanent dentition. A frequency study. *Odontol Revy* 1961; **12**; 290–94.
7. Parry RR, Iyer VS. Supernumerary teeth amongst orthodontic patients in India. *Br Dent J* 1961; **111**(7): 257–58.
8. Rubenstein LK, Lindauer SJ, Isaacson RJ, Germane N. Development of supernumerary premolars in an orthodontic population. *Oral Surg Oral Med Oral Pathol* 1991; **71**(3): 392–95.
9. McNamara CM, Foley TF, Wright GZ, Sandy JR. The management of premolar supernumeraries in three orthodontic cases. *J Clin Pediatr Dent* 1997; **22**(1): 15–18.
10. Oehlers FAC. A case of multiple supernumerary teeth. *Br Dent J* 1951; **90**(8): 211–12.
11. Breckon JJ, Jones SP. Late forming supernumeraries in the mandibular premolar region. *Br J Orthod* 1991; **18**(4): 329–31.
12. Chadwick SM, Kilpatrick NM. Late development of supernumerary teeth: a report of two cases. *Int J Paediatr Dent* 1993; **3**(4): 205–10.
13. Isaacson KG, Thom AR. *Orthodontic radiographs: guidelines*. London: British Orthodontic Society, 2001.
14. Cochrane SM, Clark JR, Hunt NP. Late developing supernumerary teeth in the mandible. *Br J Orthod* 1997; **24**(4): 293–96.
15. Scanlan PJ, Hodges SJ. Supernumerary premolar teeth in siblings. *Br J Orthod* 1997; **24**(4): 297–300.