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Poster Session P07 – Dental Anomalies



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INTERNATIONAL JOURNAL OF PAEDIATRIC DENTISTRY

# Poster Session P07/Dental Anomalies

## P07–95

### Relationship between lower second pre-molars and molars in the formative stage

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**Introduction:** The aim of this study was to examine the relationship between the time of appearance of lower second pre-molars and the formative stages of lower second molars and review the associated literature.
**Patients and methods:** In all, 798 patients between the chronological ages of 3 and 13 years, who visited the Department of Pediatric Dentistry, Seoul National University Dental Hospital, Korea were examined. From pre-treatment panoramic radiographs we could get 1596 samples of lower second pre-molars and molars. Patients with systemic disease and generalized tooth anomalies were excluded. Total 1516 samples were selected and the formation stage of tooth germs was evaluated according to the method of Demirjian *et al*. (1973)
**Results:** Among 1516 samples, the percentage of the same formative stage was 49.3%, the later formation of lower second molars compared with lower second pre-molars was 44.6% and the earlier formation was 5.5%. The frequency of more than 3 stage difference was 4.5% and the congenital missing of lower second pre-molars was 45 (3.0%) and lower second molars was 2 (0.002%).
**Conclusions:** 1. The formative stage of lower second pre-molars is similar or slightly faster compared with that of lower second molars. 2. If the tooth germ of the lower second pre-molar has not appeared by stage D of lower second molar formation, the probability of congenital missing will be very high. 3. There will be a higher correlation between the congenital missing of lower second pre-molars and the formative stage of lower second molars rather than the chronological age.

## P07–96

### Intracellular calcium regulates enamel matrix expression via gap junctional communication

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**Introduction:** Gap junctional intercellular communication (GJIC) is important for tissue organization, especially in ectodermal tissue and cardiac muscle. Gap junctional proteins oligomerize to form gap junction membrane channels that span the extracellular space. They allow the direct transfer of ion, metabolites and other small second messenger from neighboring cells. Gja1 is one of the gap junctional proteins and highly expressed in tooth germ (Fukumoto E. *et al* IADR 2005). Further, Gja1 null-mice showed disturbance of tooth germ, salivary gland, and lung morphogenesis, as similar to the phenotype of occulodento digital dysplasia (ODDD). Gja1 may regulate proliferation and ameloblastin expression in dental epithelium. We have reported that ERK1/2 phosphorylation induced by TGF-β1 regulates expression of ameloblastin via GJIC (Yamada A. *et al* IADR 2008). Here, we focused on the ERK1/2 phosphorylation via intracellular movement of calcium ion.
**Materials and methods:** To analyse the effect of intracellular calcium concentration in TGF-β1 induced phosphorylation of ERK1/2, we used calcium signaling inhibitor, BAPTA-AM and calcium ionophore, ionomycin. ERK1/2 phosphorylation induced by TGF-β1 with or without gap junction inhibitor, oleamide was analyzed.
**Results:** TGF-β1 mediated ERK1/2 phosphorylation was reduced by increasing of intracellular calcium. On the other hand, ERK1/2 phosphorylation was induced by decrease of intracellular calcium.
**Conclusion:** Concentration of intracellular calcium level may regulate ERK1/2 phosphorylation and ameloblastin expression. This regulatory mechanism is important to understand the pathogenic mechanism of ODDD.

## P07–97

### Prevalence of three-rooted primary mandibular first molars among Taiwanese children

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**Introduction:** Knowledge of tooth and root canal anatomy is important for dental practice and for identifying features of anthropologic significance. The occurrence of three-rooted permanent mandibular first molars is considered a racial characteristic of Mongoloid populations, but there is little information on three-rooted primary mandibular first molars. The aim of this study was to determine the prevalence of three-rooted primary mandibular first molars in Taiwanese children.
**Patients and methods:** The bite-wing radiographs of 227 subjects that had previously been obtained in the Department of Pediatric Dentistry, Taichung Veterans General Hospital in Taichung City, Taiwan, from January 2004 to December 2007 were retrospectively screened and examined. The gender, symmetry, and frequencies of occurrence of three-rooted primary mandibular molars were recorded. Images of 121 subjects (54 boys and 67 girls) with bilateral primary mandibular first molars were studied.
**Results:** Six (4.96%) three-rooted primary mandibular first molars were found in the 121 subjects (mean [range] age, 5.8 [2.4–10.4] years), with a bilateral incidence of a symmetrical distribution of 16.67%. The prevalence of three-rooted teeth did not differ significantly between the right and left sides of the mandible, or with gender.
**Conclusion:** The results of this study indicated that approximately 4.96% of Taiwanese subjects have three-rooted primary mandibular first molars and bilateral occurrence is about one-sixth of such individuals. Pediatric dentists should take into account the prevalence of these multirooted anomalies in primary mandibular first molars among the Taiwanese individuals.

## P07–98

### The study of impacted supernumerary teeth in infants by means of cone-beam CT

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**Introduction:** Clinical pediatric dentistry offers many opportunities for extracting supernumerary teeth. It is written in textbooks that the suitable time for removing impacted supernumerary teeth is when the permanent incisors exhibit 50% of their root development. But, impacted supernumerary teeth in the primary dentition may cause space and eruption problems in the adjacent teeth. We think that it is preferable to remove supernumerary teeth at an early stage. However, it was difficult to verify the positional relationship of supernumerary teeth to the adjacent normal unit. Then, we examined the position of supernumerary teeth in 3D images taken by cone-beam CT.
**Materials and methods:** The study cases consisted of 175 children (male: 136, female: 39) who visited Fukuoka Dental College, Medical and Dental Hospital. Three-dimensional images of dentition data for supernumerary teeth by cone-beam CT (3DX multi-image micro CT, Morita Co.) were utilized.
**Results:** 1. Cases of supernumerary teeth in infants at our pediatric clinic have increased since cone-beam CT was introduced in our hospital. 2. When extracting the impacted supernumerary teeth in an infant, we could confirm their position precisely and reduce damage to adjacent teeth. 3. In addition, cone-beam CT enabled us to measure distances precisely because an image is not distorted.
**Conclusion:** We can confirm supernumerary teeth and their positional relationship to a neighboring permanent tooth in three dimensions using cone-beam CT. As a result, the removal of the impacted supernumerary teeth was possible at an early stage without damaging the permanent dental germs.

## P07–99

### Double primary teeth and the correlation with the permanent successors

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**Introduction:** The existence of double primary teeth associated with further problems of the permanent successors may have deleterious effects on the developing occlusion and esthetics. The esthetic and functional problems in primary and permanent dentition often require proper treatments. The purpose of this study was to compare the distribution of the different types of double primary teeth and their relationship to the permanent successors.
**Patients and methods:** A total of 7868 patients from pediatric dental clinic of Chang Gung Memorial Hospital-Kaohsiung Medical Center were selected for this study. The children received oral examination and panoramic radiography, and the position of the primary double teeth and the condition of the permanent successors were recorded.
**Results:** 63% of the double teeth involved the mandibular lateral incisor and canine. Approximately 55% of the cases experience further problems in the permanent successors. Hypodontia is the most common problem occurring in the permanent successors.
**Conclusion:** The close relationship of the double primary teeth with the permanent successors would justify a radiographic examination to evaluate the number and condition of permanent successors in order to consider a proper treatment plan in advance.

## P07–100

### Management of dens evaginatus in pre-molars in the School Dental Service (Singapore)

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**Introduction:** Dens evaginatus is a developmental anomaly that occurs most commonly in pre-molar teeth, it consist of an enamel covered tubercle enclosing dentin and pulp tissue that protrudes from the occlusal surface of an otherwise normal tooth. Identification and management is clinically important because fractures or worn down tubercles can lead to pulpal necrosis or periapical lesions. In the School Dental Service (Singapore), dental therapists are the main service provider; hence they are likely to be the first to identify and manage the dens evaginatus. This retrospective cohort study aims to evaluate the ability of the dental therapists to identify and manage dens evaginatus of the pre-molars using the enamo-plasty preventive resin restoration method.
**Patients and methods:** A total of 705 pupils were treated by the dental therapists for prophylactic management of dens evaginatus from January 2008 to March 2008, 198 were selected to be examined by a dentist, out of which 120 pupils were examined 6 months post treatment.
**Results:** A total of 353 dens evaginatus were noted in the 120 pupils by the dentist, only 26 pre-molars (7.37%) were not identified and charted by the therapists. 86% of the composite resin restorations placed by the therapists were intact and only 4 dens evaginatus showed signs and symptoms, of which two developed buccal abscesses.
**Conclusion:** Hence this study showed that dental therapists are able to identify and manage dens evaginatus in their school dental clinics.

## P07–101

### Eculiarities of enamel formation in the first permanent molars of children living in an area of endemic fluorosis

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**Introduction:** The mineralization processes in permanent teeth with fluorosis and the degree of their caries resistance are poorly studied. This study examines the basic value of mineralization (BVM) and caries resistance in the first permanent teeth of children living in an area where fluorosis is endemic.
**Materials and methods:** Two groups of 20 children each, aged 6–8 years old living in an area where fluorosis is endemic (Moscow Region, Odintsovo) were examined. Children in the first group had very mild and mild forms of fluorosis according to Dean's Fluorosis Index (1942). Children in the second group had no fluorosis. While determining the BVM of erupting first molars, the electrometric method (Kiselnikova 1990) was applied. The degree of mineralization was determined using the electrometric device Dentest (manufacturer – Geosoft, Moscow, Russia).
Enamel Resistance Test (TER-test, Okyshko 1983) was used to determine the functional resistance of enamel. This method allows defining the degree of physiological acid resistance of enamel on a 10–point scale.
**Results:** Conductivity in teeth with fluorosis had an average value of 16.5 $\mu$A + 0.5. Teeth free of fluorosis had an average value of conductivity as 8.2 $\mu$A $\pm$ 0.47 (at $< 0.01$). Average values of the TER test in both groups were significantly different: 7.9 (low degree of resistance) and 2.33 (high degree of resistance) accordingly.

 

**Conclusion:** The BVM and enamel resistance of permanent teeth with fluorosis of children living in an area where fluorosis is endemic is noticeably lower than that of permanent teeth without fluorosis for children, living in the same area.

## P07–102

## Designing a clinical tool to record molar incisor hypomineralisation

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**Introduction:** Molar incisor hypomineralisation (MIH) is a well-recognised clinical problem and is an important reason for complex treatment in young children. The management of more severe cases of MIH requires a multi-disciplinary approach and is a major contributor in referrals to specialist centres. Furthermore, MIH accounts for a significant number of first permanent molar extractions. Accordingly, accurate clinical records of MIH are required to facilitate discussion between clinicians. Records are also important for medico-legal reasons. The aim of this project was to develop an accurate, succinct and user-friendly tool for recording and describing teeth affected by MIH.
**Materials and methods:** A clinical tool was introduced to audiences at dental seminars and conferences (general dentists, post-graduate students and paediatric dentists) and participants were asked to use it to record the details of teeth affected by MIH that were displayed on a projector screen. Five pilot studies have been conducted with groups in Australia and New Zealand using photographs of affected molars and incisors. The clinical tool has been refined according to feedback.
**Results:** Large inter-observer variability was observed for the recording of defects on posterior teeth, while the results for recording the defects on anterior teeth were more consistent.
**Conclusion:** Developing a clinical tool to measure dental defects is a complex process. The final version of the clinical tool is presented.

## P07–103

## Prevalence of dens evaginatus in pre-molars in Singapore

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**Introduction:** Dens evaginatus is a developmental anomaly that presents with an enamel covered tubercle enclosing dentin and pulp tissue that protrudes from the occlusal surface of posterior teeth and lingual surface of anterior teeth. The prevalence of dens evaginatus is between 1 and 4%, and it occurs most commonly in Mongoloids. All the previous prevalence studies were based on either examination of patients that presented for routine dental treatment or random sampling of children from primary schools. The School Dental Service of Singapore (SDS) provides free dental care to primary school children aged 7–12 years, about 97% of primary school children participated in the school dental service each year. Since 2005, the SDS has invested in a system (IDEAS-Integrated Dental Electronic Assessment for Students) to computerize the documentation and management of dental records. With these data, we aim to report the prevalence of dens evaginatus in Singapore.
**Patients and methods:** Only pupils aged 9 to 12 were included in this report. In year 2008, a total of 201 599 students were examined by the school dental therapists.
**Results:** 5483 students were found to have atleast 1 dens evaginatus; hence the prevalence of dens evaginatus is 2.72%. There were more females (3.29%) presenting with dens evaginatus than males (2.19%). The prevalence for Chinese, Indian and other races are 3.6%, 0.14% and 1.24% respectively.
**Conclusion:** This report has the greatest sample ever, capturing 97% of children from age 9 to 12, and the prevalence of dens evaginatus is 2.72% in Singapore.

## P07–104

## Enamel microstructure and genetic analysis of rough hypoplastic amelogenesis imperfecta

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**Introduction:** The main clinical manifestations of rough hypoplastic amelogenesis imperfecta (AI) are severely reduced enamel thickness and rough tooth surface.
**Materials and methods:** The aim of the study was to characterise, macroscopically and microscopically, the rough hypoplastic AI enamel observed in six patients (ranged in age from 6.5 to 15 years). Patients descended from three unrelated families, all with autosomal dominant mode of inheritance. Enamel microstructure was observed under light microscope (LM) and scanning electron microscope (SEM). In order to confirm the mutation we performed sequence analysis of polymerase chain reaction (PCR) amplified products of all exons and exon/intron boundaries of the enamelin (*ENAM*) gene of all patients ($n = 6$), their siblings ($n = 2$) and parents ($n = 6$).
**Results:** Five patients from two families had heterozygous ENAM gene mutation g.8344delG. Microstructural enamel changes of their teeth were similar: thin, prismless and very porous enamel layer of unrecognisable structure was laminated, and cracks were spreading perpendicular to dentin-enamel junction (DEJ). ENAM mutation was not found from the patient of the third family. The microstructure of the enamel of his tooth was also aberrant but it differed from the previous samples. Although also porous, with voids of different sizes were disseminated throughout the bulk of the enamel. Enamel prisms could be distinguished.
**Conclusion:** Characteristics of enamel microstructure of patients with clinically similar phenotype of rough hypoplastic AI can diverge. On the contrary, enamel microstructure seems to correlate well with the genotype.

## P07–105

## Prevalence of dental developmental anomalies: a radiographic study

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**Introduction:** Aim of the study was to determine the prevalence of developmental dental anomalies and the gender differences of these anomalies in patients attending the Near East University, School of Dentistry, Department of Pediatric Dentistry; a retrospective study based on panoramic radiographs of 274 patients was planned.

**Patients and methods:** Panoramic radiographs of children aged between 2 and 18 years were studied (mean age was 9.5 and SD was ±4.2) in detail for the presence of agenesis, supernumerary teeth, microdontia, infra occlusion of deciduous teeth, dilacerations, impacted teeth, taurodontism, fusion and germination. Also systemic diseases, trauma history, caries presence and the need for orthodontic treatment were recorded.

**Results:** It was found that 20.07% of the total group had at least 1 developmental dental anomaly. The distribution of these anomalies by sex was 30 boys (20.27%) and 25 girls (19.84%). The most common anomaly was agenesis and infra occlusion and was found to be more prevalent in males than females.

**Conclusion:** This retrospective study was the first attempt to investigate the developmental anomalies of children attending the pediatric dentistry clinic living in the northern part of Cyprus. Agenesis was the most common developmental anomaly in the Turkish population of northern Cyprus followed by impacted teeth.