

DENTAL ANOMALIES IN CHILDREN IN NORTH JORDAN

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ABSTRACT

The study was carried out to determine the prevalence of tooth agenesis, supernumerary teeth, molar incisor hypomineralisation and talon cusp in the northern Jordanian population. This was prospective study which was conducted over a period of one year and involved both clinical and radiographic examinations. 3660 non-syndrome patients were screened for the presence of any of the selected dental anomalies. Age ranged from 5–12 years. 1920 were males and 1740 females. Of the 3660 patients who were screened, 544 (14.9%) had at least one of the dental anomalies. The prevalence was 8.85% for tooth agenesis, 4.5% for supernumerary teeth, 3.9% for molar incisor hypomineralisation and 0.82% for talon cusps. The male to female ratio was 1:1.56 for tooth agenesis, 1.86:1 for supernumerary, 1.44:1 for molar incisor hypomineralisation and 4:1 for talon cusps. It was concluded that dental anomalies were frequent dental findings (14.9%). Tooth agenesis was the most prevalent (8.85%) followed by supernumerary teeth (4.5%), molar incisor hypomineralisation (3.9%) and talon cusps (0.82%).

Key words: *Tooth agenesis, supernumerary, molar incisor hypomineralisation, talon cusp*

INTRODUCTION

Tooth agenesis, supernumerary teeth, molar incisor hypomineralisation (MIH) and talon cusps are conditions that may present a major challenge for the child patient and complex treatment challenges for the dental practitioner.^{1,2,3,4,5}

Tooth agenesis is the term used to describe the congenital absence of one or more primary or permanent teeth, excluding the third molars,¹ while supernumerary teeth are extra teeth that appear in addition to the normal complement.⁶ The etiology of these two conditions is still unknown, but is thought to be caused by both genetic and environmental factors.^{7,8}

Tooth agenesis may result in dental malposition, periodontal damage, lack of maxillary and mandibular bone height development, aesthetic and functional

consequences⁴ which can seriously disable a young person both physically and emotionally, sometimes requiring extensive dental and orthodontic treatments.¹ Supernumerary teeth, particularly in the maxillary anterior region, may cause failure of eruption, permanent teeth displacement or rotation, crowding, abnormal diastema or premature space closure, dilacerations, delayed or abnormal root development of permanent teeth, cystic formation and eruption into the nasal cavity.⁵

Molar incisor hypomineralisation is defined as a hypomineralization of systemic origin that affects one to all of the first permanent molars consisting of asymmetric, well demarcated defects affecting the enamel of the first permanent molars and is often associated with affected permanent incisors.² The remaining permanent dentition is usually not affected.

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MIH molars can create serious problems for the dentist as well as for the affected child. These problems include rapid caries development which may lead to complete coronal breakdown, hypersensitivity, difficulties with gaining proper anaesthesia and restoration difficulties due to continuous disintegration of the enamel and difficulties with bonding.²

Distinguishing MIH from other developmental disturbances of enamel is important to reach a proper diagnosis. This condition can sometimes be confused with amelogenesis imperfects,⁵ dental fluorosis,⁹ and enamel hypoplasia.¹⁰ Talon cusp is a well-delineated additional cusp or tubercle on the surface of an anterior tooth that extends half the distance from the cemento-enamel junction to the incisal edge composed of normal enamel and dentin containing varying extensions of pulp tissue that can extend to the center of the tubercle.¹¹ Talon cusp may be a condition of important significance. It appears as a projection from the cingulum of incisor teeth sometimes causing occlusal interferences and once fractured the pulp is exposed leading to pulp necrosis.³ The cleaning of the area between the talon cusp and the tooth is also difficult, and caries is often found.

METHODOLOGY

This prospective study was conducted during the period from (December 2004 to November 2005) at Prince Rashid bin al-Hasan military hospital in the north of Jordan.

A total of 3660 subjects (1920 males and 1740 females) were examined in the pediatric dentistry clinic for the presence of tooth agenesis, supernumerary teeth, MIH and talon cusps. Appropriate radiographs were also taken when considered necessary.

Exclusion criteria included:

1. Patients with a history of tooth loss due to trauma or dental extraction.
2. Patients with syndromes such as Down's syndrome, ectodermal dysplasia.
3. Patients having cleft lip and palate.
4. Dental anomalies secondary to disturbance in tooth structure i.e hypoplasia secondary to

amelogenesis imperfect, dentinogenesis imperfecta or dental fluorosis. Patients intraoral examination was made by a specialist in pediatric dentistry with clinical experience of more than ten years.

Tooth agenesis was examined using longitudinal panoramic radiographs. A tooth was diagnosed as presenting agenesis when no mineralization of the tooth crown could be identified on the panoramic radiographs and when no evidence of extraction was recognized. Supernumerary teeth were diagnosed on the panoramic radiographs. Diagnostic criteria to establish the presence of MIH included the presence of a demarcated opacity, post-eruptive enamel breakdown and atypical restorations.¹² Diagnosis of talon cusp teeth was determined by means of an intraoral examination. Data were analyzed using Statistical Package for the Social Sciences SPSS version 15.

RESULTS

The total number of subjects in this study was 3660 of which 1920 were males and 1740 were females with an age range of 5-12 years. Table 1.

611 subjects comprising 16.69% of subjects examined had at least one of the four dental anomalies. 310 subjects were males and 301 subjects were females. Table 2.

323 patients had congenitally missing teeth with a prevalence of 8.83% and a male/female ratio of 39% to 61% respectively. Table 3.

138 patients had supernumerary teeth with a prevalence of 4.5%. The male/female ratio was 65% to 35% respectively. Table 4.

120 subjects showed MIH with a prevalence of 3.28%. The male to female ratio was 59% to 41%. Table 5.

Talon cusps were found only in 30 patients with a prevalence of 0.82%. The male to female ratio was 80% to 20%. Table 6.

The most prevalent anomaly in this study was tooth agenesis followed by presence of supernumerary teeth, MIH and talon cusps. Table 7.

TABLE 1: TOTAL NUMBER OF PATIENTS BY AGE AND GENDER

Patient age (years)	Total (3660)	Female	Male
5-6	332	154	178
6-7	1027	467	560
7-8	844	357	487
8-9	288	164	124
9-10	370	180	190
10-11	418	217	201
11-12	381	201	180

TABLE 2: NUMBER, GENDER OF PATIENTS SHOWING DENTAL ANOMALIES IN THE STUDY

Subjects in the study	Males	Females	Subjects with dental anomalies	Males	Females
3660	1920	1740	611	310	301

TABLE 3: NUMBER, PREVALENCE, GENDER, MALE/FEMALE RATIO OF SUBJECTS WITH AGENESIS

Number of subjects with tooth agenesis	Prevalence%	Males	Females	Male-female ratio
323	8.85%	125	198	39%/61%

TABLE 4: NUMBER, PREVALENCE, GENDER, MALE/FEMALE RATIO OF SUBJECTS WITH SUPERNUMERARY TEETH

Number of subjects with supernumerary teeth	Prevalence%	Males	Female	Male-female ratio
138	3.77%	90	48	65%/35%

TABLE 5: NUMBER, PREVALENCE, GENDER, MALE/FEMALE RATIO OF SUBJECTS WITH MOLAR INCISOR HYPOMINERALISATION

Number of subjects with MIH	Prevalence%	Males	Females	Male-female ratio
120	3.28%	71	49	59%/41%

TABLE 6: NUMBER, PREVALENCE, GENDER, MALE/FEMALE RATIO OF SUBJECTS WITH TALON CUSPS

Number of subjects with talon cusp	Prevalence	Males	Females	Male-female ratio
30	0.82%	24	6	80%/20%

TABLE 7: PERCENTAGE OF TOOTH AGENESIS, SUPERNUMERARY TEETH, MOLAR INCISOR HYPOMINERALISATION, TALON CUSP TO THE TOTAL NUMBER OF ANOMALIES IN THE STUDY

Dental anomaly	Total	Percentage
(Total) Agenesis	323	52.86%
Supernumerary Teeth	138	22.59%
Molar Incisor Hypomineralisation	120	19.64%
Talon Cusp	30	4.91%

DISCUSSION

Prevalence studies demonstrated that some dental anomalies are not an infrequent finding in routine dental practice.^{3,5,8,13,14,17,30} The occurrence of which is of clinical significance.

Large differences in the prevalence of tooth agenesis have been reported, varying from 0.3 to 36.5%.¹³ Large, population-based studies have shown that it occurs in between 6.1% and 8.0% of the population,¹⁴ and more frequently in females than in males.¹³ It is more frequent in the permanent dentition.¹⁵ The most frequently encountered congenitally missing tooth after the third molar is the mandibular second premolar⁴ followed by the maxillary second premolar or maxillary lateral incisor.¹⁶ In the present study the prevalence rate of 8.85% was higher than results obtained from other large population-based studies which ranged between 6.1% and 8.0%.¹⁴ Figures of this study were relatively lower than results obtained from studies in Japan 9.40%¹⁶, Saudi Arabia 9.41%¹⁷, Korea 11.3%¹⁸, Iran 9.1%¹⁹ while studies in Britain¹, Denmark¹⁴, Spain²⁰, Hong Kong²¹, Hungary²² showed lower prevalence rates of 6.5%, 7.9%, 7.25%, 6.9%, 7.68% respectively.

Epidemiological studies show that the frequency of supernumerary teeth is higher for the permanent dentition. The frequency is 3.8% compared to 1.8% for the primary dentition.²³ The most frequent location is in the maxilla. 80% of all supernumerary teeth are found in the anterior region.²⁴

Males are more commonly affected than females, the ratio being 2:1.⁶ Ethnic background is also an important factor. In an epidemiological study of super-

numerary teeth in American blacks and whites, American blacks had significantly higher prevalence of supernumerary teeth.²⁵

In the present study the prevalence of supernumerary teeth was 3.77% which is higher than results obtained from other studies^{21,24,26,27,28,30,31} in which the prevalence rates ranged between 0.43 in India and 3.2 in Mexico.

Most prevalence studies on MIH have been carried out in Northern Europe with prevalence rates of 3.6%-25%.¹⁰ The prevalence of MIH in this study was 3.28% which was comparable with studies carried out in Germany 2003, Libya 2006, and Hong Kong 2006.^{12,23} But other studies had higher prevalence rates compared with the present study.^{33,34,35}

Studies that have addressed the prevalence of talon cusps in populations were scarce. Results ranged from less than 1% to 8%³⁰ of the population with a greater predilection for the maxilla³, predominantly in the permanent dentition where the maxillary lateral and central incisors are the most common sites of occurrence.³⁶ In this study the prevalence of talon cusps was about 0.82% compared to 0.07% in India²⁶, 2.5%³⁴ in Hungary, 2.4% in Jordan (in other areas)³⁴, 5.2% in Malaysia³⁶ while in a study in Minnesota/USA³ no cases were found.

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