PREVALENCE OF MOLAR INCISOR HYPOMINERALIZATION IN THE CITY OF BUENOS AIRES

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ABSTRACT

The prevalence of Molar Incisor Hypomineralization (MIH) still remains unknown in Argentina. The objectives of this work were to: estimate prevalence of MIH in a group of children seeking dental care in the city of Buenos Aires, analyze distribution according to year of birth and compare prevalence and severity of MIH in children with different access to health care services. A prospective, observational, transversal, descriptive study was designed, to be conducted on children seeking attention at Department of Comprehensive Children's Dentistry at the School of Dentistry of Buenos Aires University and at 3 pediatric dentistry offices attended by members of the team, located in Buenos Aires city (Kappa 0.933 0.911-0.952), from April to August 2010. The study included all children born between 1993 and 2003, whose 4 first molars and 8 permanent incisors had erupted. After prophylaxis and drying, the teeth were clinically evaluated and specially designed charts were used to record sex, year of birth, type of access to dental care, presence of MIH, number of affected incisors and molars, and maximum degree of severity for each tooth. The data obtained were analyzed using percentages, Fisher's Exact Test and Linear regression. 1098 children, mean age 11.3 years (11.08-11.39) were evaluated. Prevalence of MIH in this study was 15.9% (13.8-18.2). A highly significant positive correlation was obtained between MIH and year of birth (p< 0.0001). Group A (private sector: prepaid medical insurance) was made up of 586 children (age: 10.92 6.22-15.62) while group B (public sector: university hospital) was made up of 512 children (age: 11.59 5.31-16.90). In Group A, MIH prevalence was 24.40% (20.9-27.9) while in Group B it was 6.44% (4.31-8.56) (p< 0.0001). Of the affected molars, 37% (32.2–42) in A and 13.7% (6.7-23.8) in B had grade 3 lesions, with loss of enamel (p< 0.0001). In this study, MIH was a frequent pathology (15.9%) and a significant increase was found according to year of birth during the study period. Patients with better access to health care had greater prevalence and degree of severity of MIH.

Key words: Hypomineralization- Dental enamel, Epidemiology.

PREVALENCIA DE HIPOMINERALIZACIÓN MOLAR INCISIVA EN LA CIUDAD AUTÓNOMA DE BUENOS AIRES

RESUMEN

La prevalencia de la Hipomineralización Molar Incisiva (MIH), es en nuestro país aún desconocida. Los objetivos de este estudio fueron: estimar la prevalencia de MIH en un grupo de niños que demandaron atención en la Ciudad Autónoma de Buenos Aires; analizar su distribución de acuerdo al año de nacimiento; y comparar prevalencia y severidad de acuerdo a la accesibilidad a los servicios de salud. Se diseñó un estudio prospectivo, observacional, transversal, y descriptivo, sobre la población infantil que demandó atención en la Cátedra de Odontología Integral Niños y en 3 consultorios odontopediátricos de los miembros del equipo de trabajo ubicados en la ciudad de Buenos Aires (Kappa 0.933 0.911-0.952) en el período comprendido entre abril y agosto de 2010. Fueron incluidos todos los niños nacidos entre 1993 y 2003, que presentaban erupcionados los 4 primeros molares y los 8 incisivos permanentes. Después de una profilaxis, las piezas fueron clínicamente evaluadas con luz del foco, previamente secadas, registrando en planillas diseñadas para tal fin, sexo, fecha de nacimiento, tipo de acceso a la atención, presencia de MIH, número de incisivos y molares afectados, y máximo grado de severidad registrado en cada pieza. Para el análisis de los datos obtenidos se utilizaron porcentajes, Test Exacto de Fisher y regresión lineal. Fueron evaluados 1098 niños de 11.3 años (11.08-11.39). La prevalencia obtenida fue de 15.9% (13.8-18.2). Con respecto al año de nacimiento se observó una correlación positiva y altamente significativa (p< 0.0001). El grupo A (Modalidad Prepago) quedó conformado por 586 niños y el B (Hospital Público Universitario) por N= 512. En A la prevalencia de MIH fue del 24,40% y en B de 6,44% (p< 0,0001). El 37% (32.2–42) de los molares afectados de A y el 13.7% (6.7-23.8) de B presentaban lesiones de grado 3, con pérdida de esmalte (p< 0,0001). En este estudio la MIH se presentó como una patología frecuente (15.9%) observándose un aumento significativo con el año de nacimiento durante el periodo bajo estudio. Los pacientes con mejores condiciones de acceso a la salud, mostraron mayor prevalencia, y grado de severidad de MIH

Palabras clave: Hipomineralización. Esmalte dentario- Epidemiología.

INTRODUCTION

The term Molar Incisor Hypomineralization (MIH) was accepted at the meeting of the European Academy of Pediatric Denstistry[1] (2003), to define qualitative defects of the enamel which affect permanent first molars and incisors, caused by alteration in the initial mineralization or during maturation of ameloblasts, with as yet unknown etiology. It is characterized by limited white, cream, yellow or brown opacity of the enamel, with increased porosity, which causes hypersensitivity and pain. The molar enamel occasionally cracks, making it easy for caries to develop.

Studies by Weerheijm and Mejàre[2] in Europe in 2003; Crombie, Manton, Weerheijm and Kilpatrick[3] in Australia and New Zealand in 2008, and Biondi and Cortese[4] in Latin America in 2009 , used questionnaires to evaluate pediatric dentists' knowledge and perception of this recently defined clinical entity. The study by Biondi and Cortese concluded that MIH is widely recognized as a clinical entity and considered a problem in the zone of residence of different Latin American Universities; expressing interest in future studies of regional prevalence. In Latin America, only one study from Brazil[5], on 249 children aged 7 to 13 years in Río de Janeiro, has revealed a 40.2% prevalence of MIH; while some European studies have found values ranging from 3 to 25%[6,-9]. MIH seems to have increased in recent years.

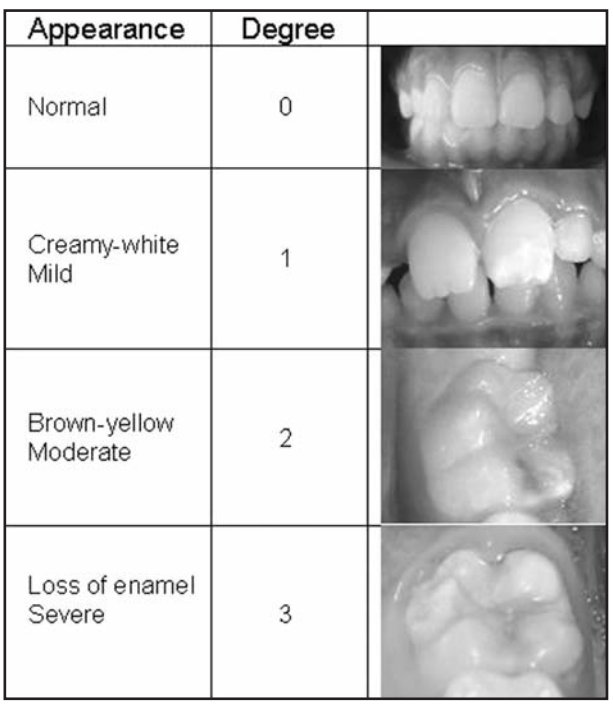


Fig. 1.

The aims of this study were to estimate the prevalence of MIH in a group of children seeking dental care in Buenos Aires City, analyze its distribution according to year of birth and compare prevalence and severity according to access to health services.

MATERIALS AND METHODS

A prospective, observational, transversal, descriptive study was designed, to be conducted on children seeking attention at the Department of Comprehensive Children's Dentistry at the School of Dentistry of Buenos Aires University (public sector) and 3 pediatric dentistry offices attended by members of the team, located in Buenos Aires city (private sector) from April to August, 2010. A team of 9 pediatric dentists (Kappa 0.933 0.911-0.952) collected data. The study included all children born between 1993 and 2003, whose 4 first molars and 8 permanent incisors had erupted. Exclusion criteria were children with amelogenesis imperfecta, tetracycline stains or enamel hypoplasia, patients with extensive destruction due to caries which prevented adequate clinical examination, and those with orthodontic bands, crowns or space maintainers on first permanent molars, which would prevent correct diagnosis. After prophylaxis and drying, the teeth were clinically evaluated under a lamp and specially designed charts were used to record sex, year of birth, type of access to dental care, presence of MIH, number of affected incisors and molars, and maximum degree of severity for each tooth. Severity was quantified according to appearance as: normal (0), creamy-white (1), brown-yellow (2) and loss of enamel (3)[10] (Fig. 1).

The total sample was divided into two groups according to what kind of health care the patients had access to. Percentages with their corresponding 95% confidence intervals were used to describe prevalence and other qualitative variables; Fisher's exact test to compare proportions, and linear regression to correlate year of birth with prevalence of MIH.

The project was approved by the Ethics Committee of the School of Dentistry at Buenos Aires University.

RESULTS

We evaluated 1098 children, mean age: 11.3 years (11.08-11.39), (male-female ratio: 0.9:1). The MIH prevalence found in this study was 15.9% (13.8-18.2). The highest value for prevalence was found

in the year 2003 (32.65% 19.91-47.57) and the lowest in 1994 (1.66% 0.02-8.95).

A highly significant positive correlation (p<0.0001) was found for year of birth (Fig. 2). In patients who had MIH, 66.4% (62.78-69.93) of the molars and 18.7% (16.6-20.8) of the incisors were affected. Group A (private sector: prepaid medical insurance) was made up of 586 children (age: 10.92 6.22-15.62) while group B (public sector: university hospital) was made up of 512 children (age: 11.59 5.31-16.90); with 46.6% male in A and 48.4% in B. In Group A, MIH prevalence was 24.40% (20.9-27.9) while in Group B it was 6.44% (4.31-8.56) (p<0.0001). In patients with MIH, 68.5% (64.5-72.3) of the molars were affected in A and 58.9% (49.6-67.6) in B (p=0.0493); while 17.5% (15.3-19.8) of the incisors were affected in A and 24.6% (19.3-30.4) in B (p=0.0120). Of the affected molars, 37% (32.2–42) in A and 13.7% (6.7-23.8) in B had grade 3 lesions, with loss of enamel (p<0.0001) (Figs. 3, 4, 5 and 6).

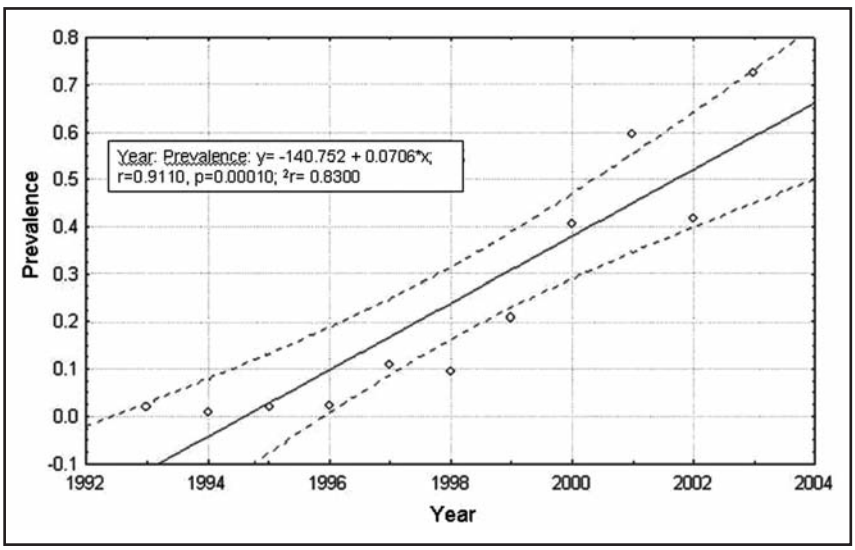
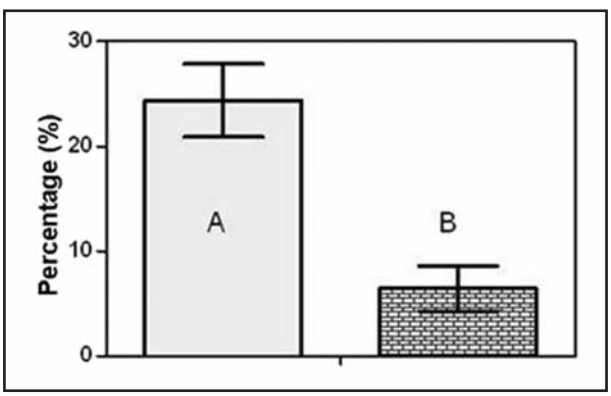


Fig. 2.



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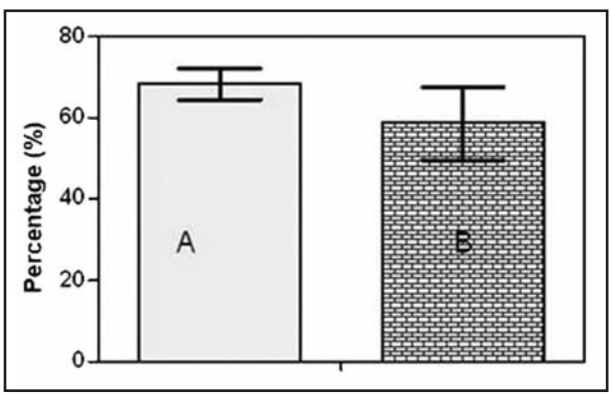

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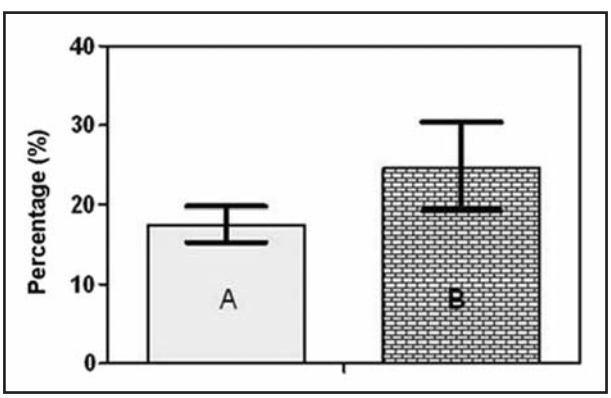

Fig. 5.

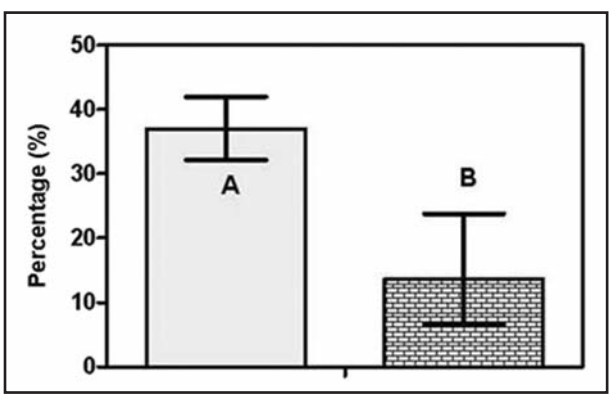

Fig. 6.

DISCUSSION

In this study, the prevalence of MIH was 15.9%, which is within the wide range of values reported in the literature. However, it should be noted that this study was performed on a population seeking dental care, as were the studies conducted in 2008 in Istanbul by Kusku et al.[11]; and in Athens by Lygidakis et al.[12], which revealed prevalence of 10.2% and 14.9%, respectively. The value for the group we evaluated may be higher than what would be found in the general pediatric population, therefore epidemiological studies are needed in populations not seeking dental care. Nevertheless, these results show that MIH is a common clinical finding in children and adolescents seeking dental services, and that the loss of enamel from molars at early ages may be a frequent finding. In most patients, grade 1 and 2 lesions were chance discoveries, and if the necessary care is not provided, grade 2 lesions may lead in the short term to the loss of hypomineralized enamel and the rapid progression of dental caries, with the ensuing need for complex treatment, even in children with low cariogenic risk. In some cases, grade 3 lesions may also be detected by chance during periodical checkups, when there is not yet symptomatology.

With regard to the increase in frequency, the results agree with those of Comes Martínez et al.[13] in Madrid in 2007, who reported an increase from 5.9% in children born in 1995 to 23.4% in those born in 1998.

The lack of health insurance is one of the relative indicators used by SESD (National Socio-Demographic Indicator System) for identifying population groups at social risk[14]. In Argentina, dental care is provided by 3 sub-sectors: government; union-run health care plans, and privately paid health insurance[15]. People who rely on government-run health care often seek dental care due to pain and infection, while those who have access to health care coverage only use emergency services exceptionally, and give priority to curative services and in second place, preventive services[16]. This might explain why higher levels of pathology were found in this study in children who sought care through the health coverage system than in those who were attended through the government service.

Because MIH originates during the first three years of life during crown mineralization, and its etiology is still unknown, prevention is the only option immediately available after the eruption of affected teeth.

CONCLUSIONS

In this study, MIH was a frequent pathology (15.9%) and a significant increase was found according to year of birth during the study period. Patients with better access to health care had greater prevalence and degree of severity of MIH.

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