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Article

Caries and premature loss of the first permanent molar in grade school children, and parents' knowledge level, in Vargas state, Venezuela.

Caries y pérdida prematura del primer molar permanente en niños de escuela primaria, y nivel de conocimiento de los padres, en el estado de Vargas, Venezuela.

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Abstract: Introduction: The first permanent molars are the most affected due to age of eruption and their anatomical characteristics. Objective: to determine the prevalence of caries and premature loss of the first permanent molar in a group of grade school children 6 - 12 years of age, and to determine the level of prevention knowledge of the parents, in Vargas state, Venezuela. Materials and Methods: observational study with 182 children between 6 and 12 years old who underwent a clinical evaluation. The parents were asked about their knowledge regarding caries, methods of prevention and chronology of eruption of the child's first permanent molar. Study was approved by the Bioethics Committee of the Faculty of Dentistry at Universidad Santa María. Results: 6.60% of children presented caries in tooth 16, 6.08% in tooth 26, 24.85% in the tooth 36 and 15.62% in tooth 46. Regarding premature loss, 0.55% had lost tooth 26, 4.95% tooth 36 and 4.40% tooth 46. None presented loss of tooth 16. It was observed that 90.11% of parents had knowledge about dental caries and 44.51% knew how to prevent them. However, only 12.09% knew the age of eruption of the first molar and only 7.69% knew that it has no predecessor. Conclusions: The highest percentage of caries was in tooth 36. The lower molars were the most commonly extracted. The majority of parents demonstrated to have little knowledge about caries and permanent first molars.

Keywords: Dental caries; molar; dentition, permanent; prevalence; child.

Resumen: Introducción: Los primeros molares permanentes son los más afectados debido a la edad de erupción y a sus características anatómicas. Objetivo: determinar la prevalencia de caries y pérdida prematura del primer molar permanente en un grupo escolares de 6 – 12 años y el nivel de conocimiento en prevención de los padres, Estado Vargas, Venezuela. Materiales y Métodos: estudio observacional con 182 niños entre 6 y 12 años a los que se les realizó una evaluación clínica. Se interrogó a los padres sobre el nivel de conocimiento de la caries, métodos de prevención y cronología de erupción del primer molar permanente. Se contó con el aval de Bioética de la Facultad de Odontología de la Universidad Santa María. Resultados: El 6,60% presentó caries en la UD 16, el 6,08% en la UD26, el 24,85% en la UD 36 y el 15,62% en la UD 46. Respecto a la pérdida prematura, el 0,55% había perdido la UD 26, el 4,95% la UD 36 y el 4,40% la UD 46. Ninguno presentó pérdida de la UD 16. Se observó que el 90,11% de los padres tenía conocimiento sobre la caries dental y el 44,51% conocía los medios para prevenirlas. Sin embargo, solo el 12,09% conocía la edad de erupción del primer molar y únicamente el 7,69% sabía que no tiene antecesor. Conclusiones: El mayor porcentaje de caries lo tuvo UD-36. Los molares inferiores fueron los más extraídos. La mayoría de los padres demostró poseer escasos conocimientos sobre caries y primeros molares permanentes.

Palabras Clave: *Caries dental; diente molar; dentición permanente; prevalencia; niños.*

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INTRODUCTION.

Prevention is undoubtedly one of the key elements in the control of human disease, of particular importance when it comes to the health of the stomatognathic system during childhood, since many of the oral problems can and should be prevented from an early age.[1]

The prevalence of tooth decay in permanent teeth in children has decreased significantly since the 1980s. This decline has been greatest among older adolescents (16 to 19 years old) and children living in families 200 percent above the federal level of poverty. On the other hand, the presence of dental caries has increased in Hispanic and black populations mainly among children living in or near poverty.[2,3]

One of the last documents issued by the World Health Organization (2015) reports that despite the efforts made in prevention, between 60-90% of school age children have dental caries, a figure that according to the American Dental Association (2016), it is similar for the American continent, particularly in developing countries.[4]

In Venezuela, the situation is not very different. Several studies report that more than 70% of children either have or have had caries in the past.[5,6] These figures are very high and illustrate the importance of continuing to undertake epidemiological studies in pediatric populations, since it usually represents the most vulnerable group.

As such, it is important to point out that although tooth decay may involve any tooth, the first permanent molars are the most affected since they are the first permanent teeth to erupt, around the age of six, transforming with their presence the primary dentition into mixed dentition, and characterized by a five-sided coronal anatomy, with cusps and numerous pits and grooves, which implies a greater possibility of biofilm accumulation, one of the main etiological agents of carious lesions and periodontal disease.[7,8]

The risk of caries in the first permanent molar is complex due to several characteristics particular to this tooth are preset, such as a distinctive morphology, and the early exposure to an acidic oral environment, hence their greater susceptibility to the onset, progression of dental caries and the subsequent destruction or early loss of the tooth. Likewise, there are a number of endogenous factors (attributable to the patient, such as diet and presence of cariogenic bacteria) and exogenous or modulating factors, including time, presence of caries in primary dentition, socioeconomic level, oral hygiene habits and absence of sporadic medical dental check-ups.[9,10]

Thus, when one or more of the aforementioned risk factors are present, the first permanent molar is affected by carious disease and if no timely treatment is received its destruction is precipitated, to the point where it is not possible to restore it and it must be removed.[11]

The premature loss of the first permanent molar generates a series of adverse consequences for the oral and whole health of the child. This tooth is one of the most important structures for the development of physiological occlusion and the basis of an adequate masticatory pattern throughout life, as it performs most of the work of chewing and crushing food. Therefore, sequelae of its decay or loss due to carious lesions include potential mesial migration, supraeruption, premature contacts, dental guidance problems, bone loss and temporomandibular joint disorders, as well as periodontal disease.[12]

As such, the objective of the present research was to determine the prevalence of caries and premature loss of the first permanent molar in a group of grade-school children 6-12 years old, as well as the level of prevention knowledge of parents, in Vargas State, Venezuela.

MATERIALS AND METHODS.

The present research is an observational study with a transversal design carried out in the Martin Luther King Educational Unit, located in the Naiguatá parish of Vargas state, in Venezuela during the 2016-2017 school year. The population consisted of 197 primary school students ranging from 6 to 12 years of age. An extensive anamnesis was taken, a thorough clinical examination took place. The children's parents or legal guardians took a survey to assess their knowledge of dental caries, and of methods to prevent them, as well as the age of eruption of the first molar.

The dental examination was carried out with the help of artificial light and a clinical mirror to evaluate the presence of caries. The number of affected teeth was analyzed through the decay-missing-filled teeth (DMF-T) index using the criteria of the World Health Organization. Inclusion criteria were signing of an informed consent by the parents/legal guardians, as well

as the previous eruption of the first permanent molars, even though these could have already been lost. The final sample consisted of 182 children who met the inclusion criteria. The study was approved by the Bioethics Committee of the School of Dentistry of the Universidad Santa María, Venezuela.

The variables analyzed included: age, gender, hygiene habits, presence or absence of caries in the first permanent molars, and the absence of such molars due to caries. At the end of the clinical evaluation, a survey of the parents of each patient was conducted, where it was sought to determine what information they had in relation to dental caries, methods to prevent them, the age of eruption of the first permanent molar, and if they knew of the absence of a predecessor of the first permanent molar. The questionnaire was designed by the authors, in such a way that the respondent did not know the general objective of the research work, in fact the term "caries or loss of the first molar" was never mentioned, since this could influence the parent when answering the survey. This questionnaire was validated by three professionals: two pediatric dentists and a methodologist.

Collected data were tabulated and statistically processed using the program SPSS version 20.0. Descriptive statistics was used to analyze the data.

RESULTS.

The first permanent right upper molar (tooth 16) showed a discrete carious status in the studied sample, accounting for 6.60% of the sample, in which the highest proportion of caries was observed in children of seven years of age, with a rate of 2.19%, followed by those eight years of age, accounting for 1.64% of the total.

Children six, eleven and twelve years old accounted for less than 1% of caries in such teeth, while children aged nine and ten years old accounted 1.10%, while those of six and twelve years of age did not show any sign of caries in said molar. (Figure 1)

Regarding the first upper left molar (tooth 26), the highest prevalence of caries was observed in infants seven, nine and ten years of age, each accounting for 1.65% of total sample. Also it was observed that children eight years of age accounted for less than 1% of the caries in said molar, and no case of caries was observed in children ages six and eleven years, with 6.08% of the total sample presenting caries in this tooth. (Figure 2)

The prevalence of carious lesions in the first lower left permanent molar (tooth 36) was important, since it was present in 24.85% of the evaluated sample. the The highest prevalence of first lower left molars caries was observed in children nine years old (6.94%), followed by nine years old (5.20%).

Eleven and twelve year old children accounted for 4.62% of caries in tooth 36, while the lowest representation was 0.58% corresponding to a single seven year old child. None of the twenty-two six years old children presented carious lesions in this tooth. (Figure 3)

In summary the total prevalence of caries in any first permanent molar is 53.15% with a DMF-T index of 2.98. The left quadrant was the most affected quadrant, the first permanent molar with the most caries being located in the lower arch (tooth 36) and mostly in children ten years old and older, which suggests an evolution of the disease that started with the eruption of the tooth, taking into account that according to the literature, an incipient carious lesion becomes clinically apparent in about one to two years, depending of certain factors, such as previous caries experience, diet and oral hygiene habits, and dental health check-ups.

Regarding the loss of the first permanent molar, there was a 0.55% prevalence of loss of the first upper left molar, 4.95% of the left lower molar and 4.40% of the right lower first molar. None of the children presented absence of the first upper right molar. (Figure 5)

As evidenced by the data collected, the majority of surveyed parents (90.11%) reported knowing what dental caries is; however, only 55.49% acknowledged knowing the methods to prevent caries. (Table 1)

These findings demonstrate the lack of clear and adequate guidance of families by experts in oral care, and also accounts for the high rates of caries and loss of permanent first molars identified in the children in this study. As can be observed, the lack of knowledge about the first permanent molars among the surveyed families is general, since only 12.09% reported knowing at what age the first permanent molar erupts. Likewise, only 7.69% (14 parents) answered that they were aware that the first permanent molars do not have predecessors. (Table 2)

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Figure 1. Distribution of frequencies of decayed and healthy maxillary right permanent first molars (tooth 16) according to age of the students evaluated in the Martin Luther King Educational Unit.

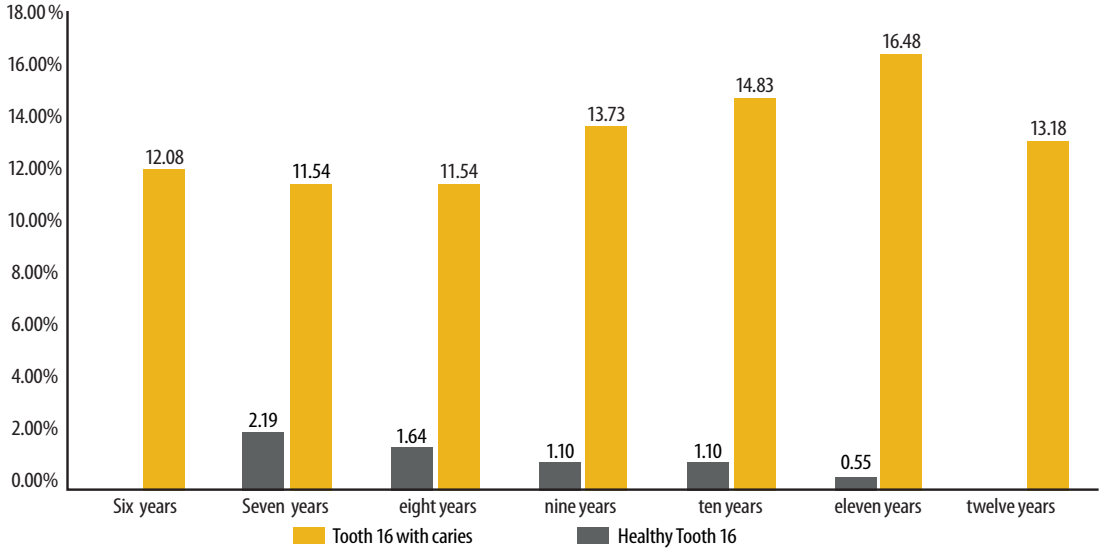

Figure 2. Distribution of frequencies of decayed and healthy maxillary left permanent first molars (tooth 26) according to age of the students evaluated in the Martin Luther King Educational Unit.

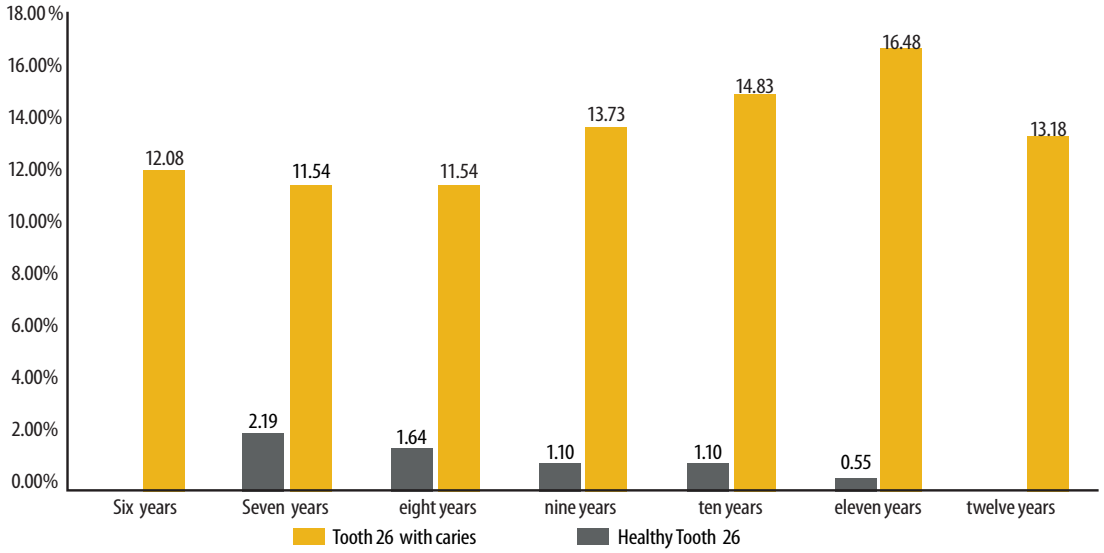

Figure 3. Distribution of frequencies of decayed and healthy mandibular left permanent first molars (tooth 36) according to age of the students evaluated in the Martin Luther King Educational Unit.

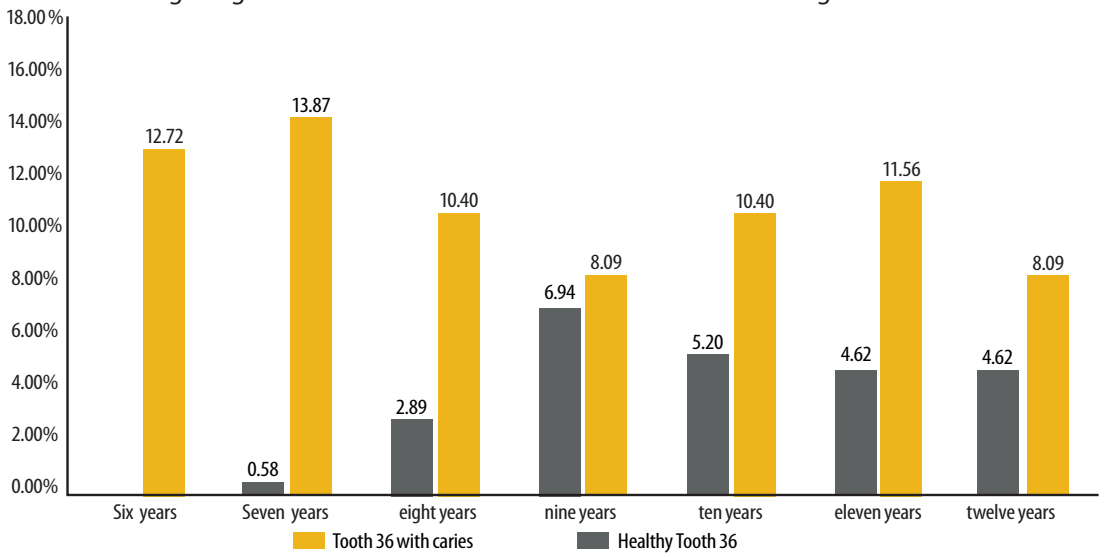

Figure 4. Distribution of frequencies of decayed and healthy mandibular left permanent first molars (tooth 46) according to age of the students evaluated in the Martin Luther King Educational Unit.

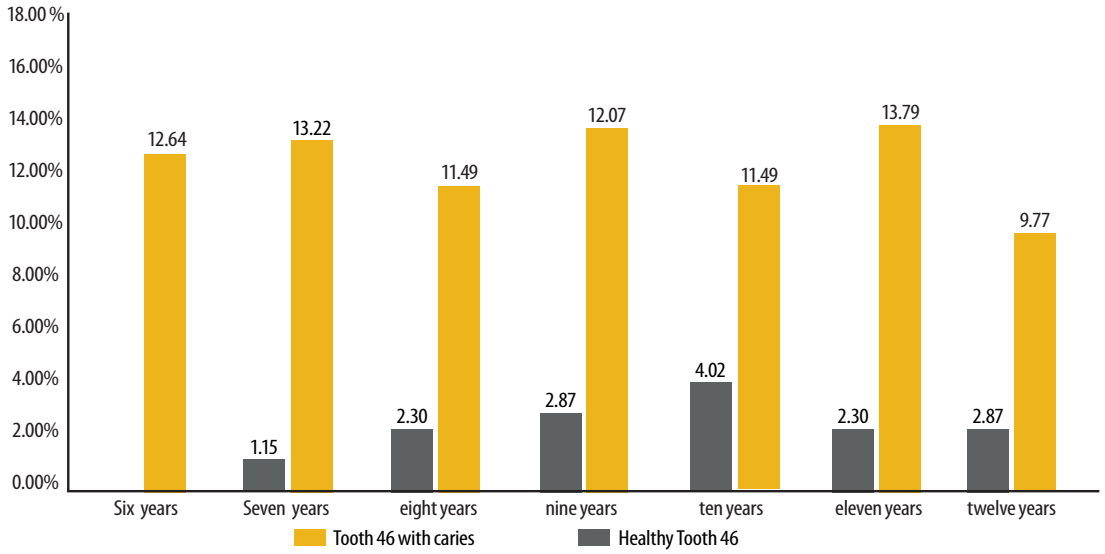

Figure 5. Prevalence of first permanent molar loss in the students evaluated at the Martin Luther King educational unit.

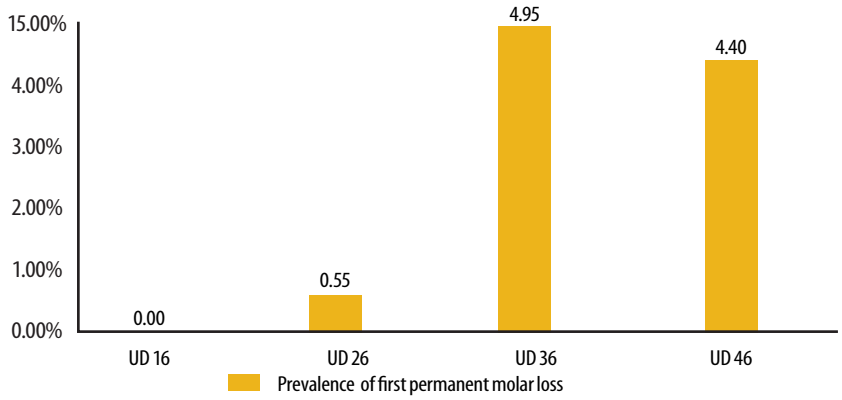

Table 1. Distribution of frequencies regarding knowledge about caries, in parents of children aged 6 to 12 years attending the Martin Luther King Educational Unit.

	Questions	yes		No		total	
		n	%	n	%	n	%
1	Do you know what tooth decay is?	164	90.11	18	9.89	182	100.00
2	Do you know methods to prevent tooth decay?	81	44.51	101	55.49	182	100.00

Table 2. Distribution of frequencies regarding knowledge about the first permanent molar, in parents of children aged 6 to 12 years attending the Martin Luther King Educational Unit.

	Questions	yes		No		total	
		n	%	n	%	n	%
3	Do you know at what age the first permanent molar erupts?	22	12.09	160	87.91	182	100.00
4	Did you know that the first permanent molar has no predecessor?	14	7.69	168	92.31	182	100.00

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DISCUSSION.

Regarding the prevalence of caries in the first molars, the results of the present study are similar to those of Xue *et al.,*[13] and Taboada *et al.,*[14] who reported a prevalence of 47.49% and 57.2% respectively. It was determined that the lower molars were more often affected compared to the upper molars; in the present study the first lower left molar was the most aften affected. These results coincide with most of the literature, such as the study by Batchelor *et al.,*[15] who in a four-year longitudinal study of 20,000 US schoolchildren five to six years of age, showed that the occlusal surfaces of the first permanent molars and the oral pits of the first permanent mandibular molars are the teeth at the highest risk of dental caries.

Regarding the 24.85%, prevalence of caries found in the first lower left permanent molar, it is similar to that reported by Chavarría *et al.,*[16] and Meneses *et al.,*[17] 45.3% and 15.6% respectively.

Studies such as Flores *et al.,*[18] and Hernández *et al.,*[19] although reporting a similar observation, state that the lower right molar had a greater caries prevalence, unlike the present study.

On the other hand, although caries of the first permanent molar was evident in all the ages except in children six years of age, they were more prevalent in older children, in the age range 10 to 12 years, and was more prevalent in females. We find both similarities and contrasts of our results to those of other researchers: Flores *et al.,*[18] also observed a higher prevalence of caries in females.

Gómez *et al.,*[20] reported a predominance of carious lesions in eleven-year-old children, with no difference found between sexes, and Morales *et al.,*[21] also did not find a relationship between gender and prevalence of caries. As such, age is probably a better predictor of risk for caries in the first permanent molars than gender, as time goes by the caries index increases given the longer exposure to the causal factors. This is more so if timely preventive measures, as well as regular dental check-ups, are not implemented.

The left lower molar was the most commonlly affected by premature loss; in agreement with several other studies carried out in similar pediatric populations. On the other hand, González[22] and Gómez *et al.,*[20] reported that tooth 36 was the first permanent molar with the highest number of extractions, followed by tooth 46.

Finally, the findings of the survey applied to the students parents revealed that the majority showed to have little knowledge of caries and particularly regarding the first permanent molars, illustrating that this lack of knowledge has been a key factor in the prevalence of caries found in this group of children.

Similar results were found by Gómez *et al.,*[20] who reported that in a sample of parents, 66.40% did not know about the existence of the first permanent molar, its susceptibility to dental caries and its importance for the positioning of the other teeth, and only 11.22% reported having received professional guidance regarding such teeth.

Regarding the level of knowledge about the age of eruption of the first permanent molar, Urbano *et al.,*[23] found more positive results than the present study, since 30.8% of their sample reported knowing at what age the first permanent molar erupts.

CONCLUSION.

La pérdida de primeros molares permanentes se presentó con preferencia en los infantes de diez a doce años de edad, encontrándose similar prevalencia de molares extraídos por indicación clínica en el género femenino y masculino, específicamente en la arcada inferior:

UD-36 en las niñas y UD-46 en los niños. Ten-, eleven- and twelve-years old schoolchildren had the highest prevalence of caries in permanent primary molars, and females were more likely to be affected, although there were more females tan males in the overall sample. The molar with the highest percentage of caries was tooth 36.

The loss of permanent first molars, particularly in the lower arch, was more common in children aged ten to twelve years of age, with no difference in sex: tooth 36 was more commonly missing in girls and tooth 46 in boys.

Most parents showed to have little knowledge about caries in permanent teeth and of first molars, which is probably linked to the rates of tooth decay and tooth loss found in the studied children.

Conflict of interests: The authors declare no conflict of interest.

Ethics approval: The study was approved by the Bioethics Committee of the School of Dentistry of the Universidad Santa María, Venezuela.

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