



## Oral health in children. Should we improve their education?

Júlia Morata Alba<sup>a</sup>, Laia Morata Alba<sup>b</sup>

<sup>a</sup>Department of Paediatrics. Hospital Lluís Alcanyis. Játiva. Valencia. Spain • <sup>b</sup>Family physician. CS Enguera. Health District of Xàtiva-Ontinyent. Valencia. Spain.

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Júlia Morata Alba:  
juliamorataalba@gmail.com

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- Oral hygiene
- Sodium fluoride

### Abstract

Dental caries is an infectious disease characterized by the destruction of hard dental tissues. It is the most common chronic disease in children, yet it is preventable and curable. Oral health is defined as the absence of orofacial pain, mouth sores, infections, caries and periodontal disease. A good oral health is essential to enjoy a good overall health and quality of life. We performed a descriptive study of the oral health and hygiene in a paediatric population.

## Salud bucodental en los niños: ¿debemos mejorar su educación?

### Palabras clave:

- Caries dental
- Fluoruro de sodio
- Higiene bucal

### Resumen

La caries dental es una enfermedad infecciosa caracterizada por la destrucción de los tejidos duros dentarios. Es la enfermedad infantil crónica más común, pero es prevenible y curable. La salud bucodental se define como la ausencia de dolor orofacial, llagas bucales, infecciones, caries y enfermedades periodontales. Disponer de una buena salud bucodental es fundamental para gozar de una buena salud y buena calidad de vida. Se realiza un estudio descriptivo de la higiene y salud bucodental de una población pediátrica.

## INTRODUCTION

Oral health is defined as the state of being free from mouth and facial pain, oral sores and infection, tooth decay and periodontal diseases. A good oral health is essential to enjoy a good overall health and quality of life, but it is sometimes neglected.

Dental caries is the most common chronic disease in children, yet it is preventable and curable. According to the latest National Oral Health Survey of

Spain, from 2015, the prevalence of caries in deciduous teeth is of 25% in children aged 5 to 6 years, while the prevalence in permanent teeth is of 1.8% in children in this age group, 14.6% in children aged 12 years and 18.6% in children aged 15 years.<sup>1</sup>

According to the World Health Organization (WHO) and the Pan American Health Organization (PAHO), the prevalence of caries in the Region of the Americas has declined from 85% in 2006 to 40% in 2017<sup>2</sup> thanks to the implementation of different strategies.

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Oral and dental problems tend to be more frequent in poor and disadvantaged populations both in children and adults. The risk factors for oral and dental problems include poor nutrition, tobacco use, alcohol use, poor oral hygiene and social determinants.

### Objective

The primary objective of our study was to analyse data on the oral health and oral hygiene habits of the paediatric population under study.

## MATERIALS AND METHODS

We conducted a cross-sectional observational and descriptive study through the administration of questionnaires to children of both sexes (assisted by their parents as needed) in the health district of Xàtiva-Ontinyent (Valencia, Spain).

- Inclusion criteria: children aged 5 to 17 years managed in primary care and hospital-based paediatrics services.
- Exclusion criteria: children with neurologic diseases or motor impairment limiting autonomy.

## RESULTS

We administered a total of 266 questionnaires. The age of the children under study ranged from 5 to 17 years, with a mean of 8 years. Of all respondents, 53.4% ( $n = 142$ ) were male.

Most children (98.5%,  $n = 262$ ) reported brushing their teeth: 24.4% did it 3 times a day ( $n = 65$ ), 47.4% twice a day ( $n = 126$ ) and 26.7% once a day ( $n = 71$ ).

Children brushed teeth assisted by parents in 5.6% of cases ( $n = 15$ ) and unassisted in 93.6% of cases ( $n = 249$ ); only 2 children (0.75%) reported requiring parental assistance only sometimes.

In the sample, 42.5% of children ( $n = 113$ ) reported brushing teeth immediately after meals, 35.5% ( $n = 94$ ) waiting 30 minutes before brushing, 9.8% ( $n = 26$ ) brushing 1 hour after and 12.4% ( $n = 33$ ) brushing more than 1 hour after meals.

At the time of the study, 64.3% of respondents ( $n = 171$ ) used a manual toothbrush, 35% ( $n = 93$ ) and electric toothbrush, and only 2 (0.75%) both types.

Most respondents used toothpaste (98.9%,  $n = 263$ ). A high percentage (54.9%,  $n = 146$ ) did not respond to the question on the amount of fluoride contained in the toothpaste that they used, while 39.8% ( $n = 106$ ) reported using a toothpaste that did not have an adequate amount of fluoride for their age, in all cases a lesser amount than recommended. Only 5.3% of respondents ( $n = 14$ ) reported using toothpaste with an appropriate amount of fluoride for their age.

When it came to mouthwash with fluoride, 66.5% participants ( $n = 177$ ) reported not using them, compared to 33.5% that did (occasional use reported by 35.9%,  $n = 32$ ; weekly use by 26.9%,  $n = 24$ ; daily use by 37%,  $n = 33$ ). Only 24 of surveyed children (9%) reported flossing their teeth.

Of all respondents, 61.6% ( $n = 164$ ) did not know what a dental sealant was. Only 5 (1.9%) reported having used dental sealants. In addition, 62.8% ( $n = 167$ ) of children did not know what dental plaque disclosing products were. Only 5 (1.9%) reported having used them.

When it came to visiting the dentist, 86.5% ( $n = 230$ ) had made at least 1 visit in their lives: 32.7% ( $n = 87$ ) once a year; 56.4% ( $n = 150$ ) more than once a year; 7.1% ( $n = 19$ ) less than once a year and 3.7% ( $n = 10$ ) only once since birth. As for the time elapsed from the last visit to the dentist, we found the same percentage for less than 6 months and more than 12 months (46.6%,  $n = 124$ ), while 18 children (6.8%) had last seen a dentist more than 6 months but less than 12 months ago.

Only 33 of respondents (12.4%) wore braces, of who 70.3% ( $n = 187$ ) did not have caries and 1.5% ( $n = 4$ ) did not know whether they did. The 28.2% that did have dental caries had them from a mean age of 7 years (range, 2 to 15 years).

As for a diet rich in carbohydrates, 83.8% of respondents ( $n = 223$ ) reported consuming sugary drinks (carbonated drinks, juices). Of those that consumed sugary drinks, 46.2% ( $n = 103$ ) reported

occasional consumption; 26% ( $n = 58$ ) weekly consumption and 27.8% ( $n = 62$ ) daily consumption. Also, 72.2% ( $n = 192$ ) reported consuming candy: occasional consumption in 67.7% ( $n = 130$ ); weekly in 27% ( $n = 52$ ) and daily in 5.2% ( $n = 10$ ). Also, 74.8% ( $n = 199$ ) reported eating sweets and baked goods: 51.1% ( $n = 136$ ) on occasion; 16.9% ( $n = 45$ ) weekly and 6.8% ( $n = 18$ ) daily.

## DISCUSSION

The most frequent oral and dental problems are caries dental, periodontal disease (gum disease), oral and dental infections, and cancerous, traumatic and congenital lesions.

The activities of the Global Oral Health Programme of the WHO are integrated in the framework of the broader strategic directions of the organization aimed at the prevention of chronic diseases and health promotion.<sup>3</sup> Dental caries can be prevented by maintaining a low concentration of fluorides in the oral cavity. This can be achieved by the addition of fluoride to the water supply, milk, mouthwash or toothpaste or by the application of fluoride varnishes by dental professionals.

For all the above reasons, it is important to educate and raise awareness in the population from an early age on the subject of adequate oral hygiene.

It is essential that we all understand and teach very young children why we must brush our teeth. Children must be taught that the purpose of brushing teeth is to remove bacterial plaque, which is a sticky film of bacteria that forms over the teeth and gums. This plaque generates acids that attack tooth enamel and that may give rise to caries and gum irritation (what is known as gingivitis). Over time, gingivitis causes a disease (periodontal disease) that is the main cause of tooth loss in adulthood.<sup>4</sup>

The best method for plaque removal is to brush teeth and floss between the teeth every day. In the first 6 years of life, children should receive help from their parents. To be able to assist children correctly, adults need to learn proper technique first.

The recommendations of the Colegio Oficial de Odontólogos y Estomatólogos (Official Board of Odontologists and Stomatologists) of Spain are the following<sup>5</sup>:

- Apply tooth paste to the brush.
- Brush following a sequence: start with the top row, brushing the outer surfaces of teeth. The brush should be placed horizontally and perpendicular to the teeth, slightly tilted towards the gum.
- Brush with a downward motion, always from the gum to the edge of tooth, let brush come off the tooth, go back to the top and repeat brushing motion from gum to tooth edge (not the other way around), one tooth at a time.
- After brushing the outer surfaces, brush the inner surfaces with the same technique.
- Move on to the chewing surfaces, which are brushed horizontally with back-and-forth strokes.
- Move on to the next quadrant in the upper row and repeat the process.
- Move on to the lower row and repeat the process.
- Use the tip of the toothbrush to clean the inner surface of the upper and lower incisors.
- After brushing teeth, it is recommended that the tongue is also brushed with the toothbrush at a perpendicular angle, always brushing forward towards the tip of the tongue. The tongue should be stuck out as far as possible to avoid gagging during brushing.

Cleaning between the teeth is the ideal complement to tooth brushing. It removes the food residues trapped between the teeth. This should be done once a day.

Electric toothbrushes can be as effective in eliminating plaque as manual toothbrushes as long as they are used meticulously.<sup>6</sup> There is no definitive evidence on which type of brush works best. There are dentists in favour and against the use of electric toothbrushes.

Which toothpaste to use, and how much? According to the current recommendations, issued in

2018,<sup>5</sup> a rice grain-sized amount of toothpaste with 1000 ppm fluoride for ages 0 to 3 years, a pea-sized amount of toothpaste (or for a more uniform criterion, the width of the bristles of the toothbrush) with 1000 to 1450 ppm fluoride starting from age 3 years, and a pea-sized amount (width of bristles) of toothpaste with 1450 ppm fluoride starting at age 6 years.

Recent studies<sup>4,5</sup> show that only toothpastes with fluoride concentrations of 1000 ppm or greater are effective in decreasing tooth decay.

Children at risk of tooth decay in whom treatment with oral fluoride or application of a fluoride varnish by the dentist is indicated include<sup>7-9</sup>:

- Children with active caries (in at least 3 deciduous teeth or 1 permanent tooth).
- Children with oral malformations.
- Children with fixed orthodontic devices (*braces*).
- Children with cognitive impairments that impact hygiene habits.
- Children with other risk factors that have caries (such as children with heart disease, immune disorders or haemophilia).

Children who are not at risk ought to receive fluoride in their toothpaste and, if old enough, can rinse with a fluoride mouthwash daily or weekly.

The prevention of dental caries requires intervention at different levels<sup>10</sup>:

- Reduce consumption of sugary foods. Sucrose is the most cariogenic carbohydrate. Sugary substances with a sticky or soft texture are more cariogenic than hard or liquid ones.
- The frequency of sugar consumption has a greater impact than the total amount consumed.
- Keep children from falling asleep while sucking on a bottle.
- Oral bacteria, mainly *Streptococcus mutans*: there are studies that show that children become colonised by *Streptococcus mutans* through their mothers, among other sources. Actions that facilitate transmission should be avoided, such as licking the child's pacifier or spoon, blowing on the child's food to cool it down, etc.

- Caries already developing: early intervention is key.<sup>11</sup>
- Irregular anatomy of tooth surfaces: the presence of depressions or fissures in the molars increases the risk of caries.

In our study, most surveyed children brushed their teeth daily, although only 24.4% did it 3 times a day. Nearly half (42.5%) brushed immediately after meals, and a low but not negligible percentage (12.4%), brushed more than 1 hour after meals. Slightly more than half of participants (64.3%) used manual toothbrushes. The vast majority used toothpaste (98.9%,  $n = 263$ ).

A high percentage of surveyed children did not know the right amount of fluoride that should be present in their toothpaste, and 39.8% reported using toothpaste with less fluoride than recommended for their age.

Only one third of respondents used mouthwash with fluoride.

Very few participants flossed their teeth or used plaque disclosing products or dental sealants. We ought to highlight that most children did not know what these last 2 products were.

Most children had visited the dentist at least once before, and slightly over one half visited the dentist more than once a year, a subset that was not limited to those undergoing orthodontic treatment.

A study by Finlayson *et al.*<sup>12</sup> found that very young children in particular (ages 2 to 5 years) had not visited the dentist in the past year and that cost was a barrier to care. Economic cost is sometimes one of the obstacles to seeking dental care, and this is also the case in Spain.

The prevalence of dental caries in the sample was 29.7%. This finding suggests that oral health education could be improved in this population. We ought to highlight the need to improve knowledge on the necessary amount of fluoride necessary at each age for effective toothbrushing.

According to a study conducted by Al-Mazyad M *et al.* in 2017,<sup>13</sup> children in the United Kingdom are exposed to a particularly large amount of advertisements of foods that are potentially deleterious

to their oral health during prime time for this age group and at the time of broadcasting of the most popular shows that they watch.

A high proportion of children in our study (83.8%) consumed sugary drinks, most of them occasionally, and also consumed candy (72.2%) and sweets and baked goods (74.8%). These data suggest that education efforts need to continue to improve oral health, with emphasis on reducing the intake of sugary foods, as recommended in the literature.<sup>4,5</sup>

Few studies like the one presented here have been conducted in Spain in recent years. We want to highlight the article published by Almerich-Silla JM *et al.* in 2014,<sup>14</sup> which concluded that both the dental caries index (at ages 6, 12 and 15 years) and the prevalence of dental caries had improved com-

pared to previous years, as the observed values were lower compared to 2004. The proportion of children receiving dental care continued to be low at age 6 years, but at ages 12 and 15 years the values were higher compared to 2004. Socioeconomic status continued to be a relevant factor in indicators of tooth decay in children.

## CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare in relation to the preparation and publication of this article.

## ABBREVIATIONS

**WHO:** World Health Organization.

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