

***TRABAJO DE FIN DE GRADO***

***Grado en Odontología***

**ESTUDIO RETROSPECTIVO SOBRE DATOS  
EPIDEMIOLÓGICOS (ÍNDICES DE CARIES,  
ÍNDICE GINGIVAL Y DE PLACA,  
TRAUMATISMOS, MALOCLUSIONES, HIM) DE  
LAS HISTORIAS CLÍNICAS Y EXPLORACIONES  
REALIZADAS EN LA POLICLÍNICA  
UNIVERSITARIA EN EL AÑO 2019 A NIÑOS  
PERTENECIENTES A LA COHORTE 5-7 AÑOS, Y  
7-9 AÑOS.**

Madrid, curso 2020/2021

## **Resumen:**

**Introducción:** En España vienen diseñados estudios epidemiológicos de caries dental y de su tratamiento desde el año 1971, con trabajo de campo desde 1969. A partir de entonces, se publicaron distintas series transversales realizadas en España.

**Objetivo:** El objetivo primario en esta investigación era delinear y confrontar índices de caries, índice gingival y de placa, traumatismos faciales y dentarios, maloclusiones, y HIM en niños de la policlínica universitaria en 2019 con 5-7, y 7-9 años.

objetivos secundarios: determinar el motivo de consulta más frecuente; establecer el porcentaje de obturaciones y exodoncias hechas; la media del cepillado diario, utilizzo de pasta dental, frecuencia de enjuague diario/semanal y aplicación de flúor por profesional.

**Material y métodos:** Fue elegido como tipo de diseño de estudio, uno observacional, retrospectivo y transversal que fue pensado para estudiar niños con edades comprendida entre 5-7 y 7-9 años, que acudieron en 2019, en la policlínica universitaria.

**Resultados:** Obtuvimos un Índice cod de: 4.58; CAOD: 2,07; IP: 17%; IG: 11%; Los niños con obturaciones realizadas anteriormente fue el 75%, y el 29% acudieron con exodoncias previas; La mayoría se cepillan los dientes 2 veces al día y el 98% usa pasta dental, el 17%, usa enjuague diario, y el 8% semanal. Solo el 11% resulta la aplicación de flúor profesional.

**Conclusiones:** Los Índices en esta población presentaron un valor alto, superiores a los datos de las encuestas españolas, y similares a los países

asiáticos. Los traumatismos resultaron ligeramente superiores comparados a estudios españoles y en menor medida en el mundo. La maloclusión resultó mucho menor en comparación a Madrid y otros países, como también el porcentaje de HIM.

**Palabras Clave:** Estudio Epidemiológico, Índices de Caries, Índice gingival, Índice de placa, Traumatismos, Maloclusiones, Him.

### **Abstract:**

**Introduction:** Since the year 1971 in Spain, have been studied the epidemiology of dental caries and its treatment, with field surveys since the 1969. In fact, were published many transversal studies.

**Objective:** The first ambition of this study was to define and match the caries indexes (DFMT's), Gingival Index, and plaque index, facial and dental traumas, malocclusions, and MIH in children of the university policlinic, in 2019 with 5-7, and 7-9 years.

Secondary objectives: Determine the most attend reason for dental appointment; establish percentage attributed to fillings and extraction previously made, the average of daily brushing, use of toothpaste, daily and weekly frequency of rinsing, and professional application of fluoride.

**Materials and Methods:** It's an observational, retrospective, cross-sectional investigation, that was designed to study infants among 5-7 and 7-9 oldness, which attended to the university policlinic in 2019.

**Results:** We obtained those Indexes: df=4.58; DMFT: 2.07; PI:17%; GI:11%; the children with previously performed fillings was 75%, and 29% attended with previous extractions; Most of them brushed their teeth twice a day, and 98% used

toothpaste, 17% used daily rinse, and 8% weekly rinse. Only 11% of them resulted to have done professional fluoride application.

**Conclusions:** The indexes of this population presented high values, higher than data obtained from the Spanish national surveys, and similar to those of Asian countries. Traumatismos were slightly higher compared to Spanish studies and a little bit lower compared to the studies used from the other countries. The malocclusion was much lower compared to Madrid and other countries, as well as the percentage of MIH

**Key words:** Epidemiologic study, Caries Index, Gingival Index, Plaque Index, Traumatismos, Malocclusions, Molar Incisor Hipo Mineralization.

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### **Glosario de Acrónimos del estado Oral:**

**c/C:** Número de dientes temporales/permanentes cariados

**a/A:** Número de dientes temporales/permanentes ausentes

**o/O:** Número de dientes temporales/permanentes obturados

**d/D:** Dientes temporales/permanentes

**cod/CAOD:** Suma de dientes temporales/permanentes cariados, ausentes y obturados.

**ir/IR (%):** Índice de restauración = (dientes obturados/CAOD) x100.

**HIM:** Hipo-mineralización incisivo-molar

## **Introducción:**

La toma de conciencia, sobre el estado de la salud oral y buco-dental sobre todo en los niños, es imprescindible, ya no solo por sus consecuencias en el individuo y la población, también por el estudio y la prevención de sus repercusiones a nivel sistémico. Los estudios epidemiológicos, en niños y adolescentes, representan desde décadas una medida importante, por todos aquellos sistemas y programas de prevención que cada día van desarrollándose constantemente según las necesidades de una población.

Este estudio presenta los resultados epidemiológicos de una encuesta de salud oral retrospectiva sobre las historias clínicas y exploraciones realizadas en 2019, a niños que acuden como pacientes de edades comprendidas entre 5-7 años y 7-9 años de edad. El estudio se ha llevado a cabo en Madrid, durante el curso académico 2020/2021 en la Policlínica Universitaria de la Universidad Europea de Madrid.

“La identificación y cuantificación de las necesidades de salud oral de una población constituyen los primeros y necesarios pasos para llevar a cabo una adecuada planificación de la política sanitaria. En este sentido, las encuestas de salud son una herramienta imprescindible gracias a la cual pueden identificarse necesidades relevantes sobre las que construir futuros planes de acción<sup>1</sup>.”

En las últimas 5 décadas fueron realizadas una gran cantidad de estudios y encuestas epidemiológicas, sobre la salud oral y, especialmente, sobre la caries dental y las enfermedades periodontales. Siete de estos fueron de ámbito nacional, de los cuales los primeros tres respectivamente, de los años 1971, 1983 y 1990 fueron diseñados con parámetros diferentes y, por tanto, fue

imposible su comparación<sup>2</sup>. Con esta premisa surgió la necesidad de realizar encuestas de salud oral con ciertos parámetros bien definidos, a partir de las siguientes encuestas 1993, 2000, 2005<sup>3</sup>, 2010<sup>1</sup>, 2015<sup>4</sup> se emplearon las metodologías propuestas por la OMS por lo que ha sido posible la comparación de estos estudios.

## **Antecedentes epidemiológicos en España**

En España, el primer estudio de ámbito nacional sobre prevalencia de enfermedades bucales fue el publicado por Gimeno de Sande en 1971, con trabajo de campo de 1969<sup>2</sup>. A partir de entonces, se publicaron distintas series transversales realizadas en España con ámbito nacional.

En 1986, Cuenca publicó un informe sobre la salud bucodental española basado en una encuesta epidemiológica de ámbito nacional realizada en 1983 y encargada por el Ministerio de Sanidad y Consumo<sup>2</sup>.

Sicilia et al. publicaron en 1990 el tercer estudio con ámbito nacional, con trabajo de campo realizado en 1987.

El cuarto estudio epidemiológico de salud oral en España fue publicado por Noguerol et al. en 1995, con trabajo de campo efectuado en 1993. Encargado por el Consejo General de Dentistas de España, bajo supervisión de la OMS<sup>5</sup>.

En el 2002, Llodra-Calvo, Bravo-Pérez y Cortés-Martinicorena publicaron el quinto estudio con ámbito nacional, cuyo trabajo de campo fue efectuado en el año 2000<sup>2</sup>.

Bravo-Pérez et al. en el 2006<sup>3</sup>, publicaron la Encuesta de salud oral en España del 2005 y, finalmente, en el 2012, publicaron la encuesta de salud oral en España en el 2010<sup>1</sup>.

En el año 2015<sup>4</sup>, se realizaron las dos últimas encuestas, una nacional y otra de la Comunidad de Madrid, publicadas en 2016, y siempre financiadas por el Consejo General de Dentistas<sup>1-4</sup>.

Trascurridos 6 años publicaron la Encuesta de Salud Oral de España del 2020<sup>5</sup>.

### **Estudios Realizados en Comunidades Autónomas:**

Gracias a los métodos básicos propuestos por la OMS<sup>6</sup> ha sido posible diseñar estudios realizados en las Comunidades Autónomas (CC. AA.)<sup>7</sup>

Los estudios autonómicos realizados durante las últimas dos décadas, han sido basados en la población infantil, sobre todo para monitorear los programas de atención dental; de estas, sólo cuatro comunidades incluyeron adultos: Extremadura 2001, Canarias 2002, Valencia 2006 y Cantabria 2007.

Los resultados obtenidos de estos estudios autonómicos eran muy diferentes entre ellos y también con los de ámbito nacional, debido diferentes métodos de selección de las muestras empleados y al tipo de exploración realizada.

En los últimos 25 años ha sufrido cambios en el contexto históricamente privado, se ha constatado un aumento de las prestaciones públicas, sobre todo las dirigidas a la población infantil y a grupos específicos.<sup>7</sup>

En la mayor parte de las CC. AA., la atención odontológica en la población adulta sigue estando limitada exclusivamente a la educación de la salud oral y al mero tratamiento de procesos agudos.

### **Antecedentes Epidemiológicos en Madrid:**

En el 2005 fue diseñada la primera Encuesta de Salud de la Ciudad de Madrid, una investigación exhaustiva sobre la salud general de los madrileños. Posteriormente usada como base para la Encuesta de Salud, de la Ciudad de

Madrid 2013, y luego, se realizó, utilizando los datos obtenidos de estos estudios, el Estudio de Salud de la Ciudad de Madrid 2014<sup>8</sup>.

En el 2008, la Sociedad de Prevención de Ibermutuamur, colaborando con la Universidad Complutense de Madrid, y la Sociedad Española de Periodoncia realizaron un estudio epidemiológico, sobre el estado de salud oral de la población laboral madrileña, para demostrar la asociación de las enfermedades periodontales y las cardiovasculares con los riesgos laborales<sup>8</sup>.

Fue publicado en enero 2009 un artículo, por Cristina Martín Cid et al, en la Universidad Complutense de Madrid, sobre la prevalencia de maloclusiones en la CC.AA. de Madrid. Con una muestra total de 203 niños, con edades comprendidas entre 6-15 años. Utilizando un muestreo oportunístico, ajustado con los relativos criterios de inclusión y exclusión, se cumplieron las medidas establecidas por el Área 4 de Salud de la CAM<sup>9</sup>.

Siempre en el 2009 fue publicado un estudio epidemiológico sobre la prevalencia de caries, por Tapias Ledesma MA. et al. con el objeto de estudiar y analizar la frecuencia y distribución de la caries, en una población escolar de 12 años, con sus relativos factores. Fue seleccionada una muestra de 452 escolares de 12 años, donde resultaron un índice CAOD: 0,61 y un índice COD: 0,33. Por tanto resultó que la prevalencia de caries en dicha muestra, constituida por niños de Móstoles ha disminuido con el tiempo<sup>10</sup>.

En el 2010 Járizon E. publicó por la Universidad Complutense de Madrid, su tesis doctoral donde se propuso de estudiar la salud oral y la calidad de vida en ámbito odontológico en los mayores<sup>11</sup>.

En el 2015, Maria Carrillo-Diaz et al. desde el departamento de Odontología Pediátrica de la Universidad Rey Juan Carlos Madrid, España, publicaron un estudio con el objetivo de analizar los mecanismos psicosociales y las percepciones de los niños que acuden en una consulta dental<sup>12</sup>.

Por último, en 2015, promovido, por Gerencia Asistencial de Atención Primaria de Madrid (GAAP), fue publicado un estudio sobre la salud bucodental de la comunidad de Madrid<sup>7</sup>.

### **Prestaciones de Salud Bucodental en Madrid:**

En la Comunidad Autónoma de Madrid las prestaciones en materia de salud bucodental vienen regladas por:

- **Unidades de Salud Bucodental (USBD):** Responsables del Programa de Salud Bucodental Infantil.
- **Unidades Especiales de Salud Bucodental:** Responsable de pacientes discapacitados.
- **Servicio de Cirugía Maxilofacial**

La Comunidad de Madrid, proporciona a su población una atención odontológica que incluye un programa específico para los niños, en el cual hay actividades preventivas y terapéuticas en la dentición permanente, prevista por la ley (RD 1030/2006, BOE 16 de septiembre 2006), y que se propone de mejorar para incluir en un futuro más tipos de prestaciones.<sup>13</sup>

Desafortunadamente la Comunidad Autónoma de Madrid carece de estudios tipo encuesta epidemiológica de salud bucodental que pueden servir como punto de partida para el estudio de su población infanto-juvenil de manera prospectiva en el tiempo.

## Índices de Caries Dental:

Los índices representan unidades de medida, y tienen unas características ideales:

- Sencillos
- Objetivos
- Registrarse en un corto periodo de tiempo
- Económicos
- Aceptables por la comunidad
- Analizables

Y tienen requisitos para cumplir:

- Pertenencia con lo que se quiere estudiar
- Ser confiables, validez en el análisis estadístico y significación del fenómeno analizado

Los índices se utilizan para determinar la prevalencia de una enfermedad en una población estudiada.

El índice CAO es un índice epidemiológico publicado por Klein, Palmer y Knutson<sup>2</sup> en el 1940, desarrollado por la necesidad de tratamiento a los niños del Maryland en 1935; se refiere al número de dientes careados C, ausentes por caries A y obturados O, en ambas denticiones, respetivamente identificados por las letras mayúsculas para los permanentes y minúsculas para los temporales. Define una exposición de caries en el tiempo, presente y pasada, puesto que considera los dientes con lesiones de caries y tratamientos previos.

Está compuesto por el sumatorio de los dientes permanentes cariados, ausentes y obturados entre el número de individuos estudiados, por el cual es un

promedio. Descomponiendo sus partes, se consigue un mejor análisis e interpretación de los datos.

En los niños se utiliza el cod, para dientes temporales, es una adaptación del CAOD por la dentición primaria, propuesto por Gruebbel y es, como el anterior, una media de los dientes temporales cariados (c) y obturados (o).

La diferencia principal entre los dos es que, en el cod, no se calculan los dientes extraídos, solo los que están presentes en boca: sumatorio de cariados y obturados.

### **Índice Gingival y de Placa:**

La gingivitis, una reacción inespecífica provocada por el biofilm dental. Es una de las enfermedades orales más presentes en todo el mundo<sup>14</sup>. Esta enfermedad es ampliamente reversible, pero puede, en sujetos susceptibles, desarrollar una periodontitis. La periodontitis es caracterizada por una pérdida constante e irreversible del periodonto<sup>15</sup>. La periodontitis es bastante común en los adultos, aunque en los niños está considerada como una enfermedad rara, de todas formas, la manera más eficaz de mejorar la higiene oral y reducir la gingivitis, es probablemente una fuerte respuesta de prevención contra la periodontitis en los niños, como ya ha sido establecido en adultos.<sup>14</sup>

En general, se encuentra una baja prevalencia de gingivitis en preescolares, y notoriamente en la literatura científica no se suelen estudiar gingivitis y periodontitis en niños muy pequeños.

En un estudio conducido por Khaled A. Al-Haddad et al. En el 2013, con el objetivo de determinar el estado y la higiene oral entre los niños del Yemen resultó que 1292 niños con edad de 5 años fueron estudiados y resultó un rango

de Índice de placa de  $0.35 \pm 0.47$ . El índice gingival resultó ser en un rango de  $0.19 \pm 0.38$ . Fue además recogido y clasificado el nivel de inflamación gingival en estos niños objeto de estudio y los resultados extrapolados son representados en la Tabla 1.<sup>14</sup>

**Tabla 1:** nivel de inflamación gingival en niños de 5 años en el estudio propuesto por khaled a. al-haddad et al. del 2013<sup>14</sup>.

<b><i>N° participantes:</i></b>	<b><i>Ausente:</i></b>	<b><i>Bajo:</i></b>	<b><i>Moderado:</i></b>	<b><i>Alto:</i></b>
<i>Niños (n=646)</i>	455 (70.4%)	173 (26.8%)	18 (2.8%)	0 (0%)
<i>Niñas (n=646)</i>	485 (75.1%)	139 (22.5%)	22 (3.4%)	0 (0%)
<i>Total (n=1292)</i>	940 (72.8%)	312 (24.1%)	40 (3.1%)	0 (0%)

### **Traumatismos:**

El trauma dental es considerado un problema sanitario importante y serio en todo el mundo, tiene un gran impacto en la calidad de vida y un elevado coste de tratamiento.<sup>16</sup> Los dientes temporales de niños de edades comprendidas entre 1 y 3 años, y los dientes permanentes de niños y adolescentes entre 8-12, años son lo que resultan afectados con mayor frecuencia. Además, niños y adolescentes con una historia de múltiples trauma dentales, contribuyen a su alta prevalencia.<sup>16-17</sup> La mayoría de las lesiones en ambas denticiones involucran los dientes anteriores, y de manera especial, los incisivos centrales superiores.<sup>18</sup> Estudios afirman que traumatismos que involucran tejidos de soporte son más frecuentes en dentición primaria, mientras que traumatismos que involucran tejidos dentarios son más comúnmente asociados con traumatismos en dentición definitiva y dientes permanentes.<sup>19</sup> Ha sido reportado que los accidentes traumáticos dentales y sus consecuencias pueden derivar en caries y enfermedad periodontal en la población joven.<sup>20-21</sup>

En un estudio epidemiológico conducido por Stockwell AJ et al. sobre la incidencia de traumatismos dentales en Australia<sup>22</sup> resultó que la incidencia de trauma dental y en concreto el número de dientes con traumatismos era similar entre las varias franjas de edades. Se aprecian los resultados en la Tabla 2.

**Tabla 2:** Número de dientes con traumatismos en cada grupo de edad<sup>22</sup>.

<i>Edad:</i>	<i>Niños con traumatismo %</i>	<i>Niñas con traumatismos %</i>	<i>Total %</i>
6	0.15	0.10	0.12
7	0.74	0.85	0.79
8	1.78	1.35	1.56
9	2.60	1.85	2.22

### **Maloclusión:**

La definición de maloclusión siempre ha sido genérica, y fundamentalmente se refiere a aquellos casos que necesiten corrección ortodóncica; y por tanto no es considerada como una cualquiera desviación de la oclusión ideal<sup>2</sup>.

Angle, en 1899, estudió un sistema sencillo, rápido y funcional para todos, que hoy en día es aceptado en todo el mundo. Este sistema considera como base la posición de los primeros molares permanentes y distingue las relaciones mesio-distales entre los dientes y las arcadas dentarias.

Basándose en la “clase” consiguió agrupar y denominar las maloclusiones en tres grandes grupos; clase I, clase II y clase III.

- **Clase I:** Relación antero-posterior de los primeros molares permanentes normal, la cúspide mesio-vestibular del primer molar superior coincide con el surco vestibular del primer molar inferior. En estos casos las

maloclusiones consisten en malposiciones individuales en los dientes, o anomalías en las relaciones transversales, verticales y desviaciones de línea media.

- **Clase II:** Relación sagital anómala en los primeros molares; la cúspide mesio vestibular del primer molar permanente superior ocluye a mesial del surco vestibular del primer molar permanente inferior, por tanto, resulta que: o el maxilar superior se encuentra adelantada o la mandíbula retrasada respecto al maxilar superior.
- **Clase III:** En este tipo de arquitectura encontramos una arcada dentaria mandibular adelantada respecto al maxilar superior o bien, un maxilar superior retraído, con una relación incisiva generalmente invertida, típicamente los incisivos maxilares ocluyen lingualmente a los mandibulares.

La cúspide mesio-vestibular del primer molar permanente superior ocluye a distal del surco vestibular del primer molar inferior.

En Uruguay hay poca literatura científica respecto a las maloclusiones, los primeros datos publicados, revelaron una afectación del 65,7% en niños de 2-14 años<sup>23</sup>. Mientras que un otro estudio siempre conducido en Uruguay en niños de 5 a 13 años, de Montevideo, mostró un 38% de maloclusiones. Los últimos datos disponibles, precisamente tomados en 1999 y 2001, tienen una frecuencia del 70,7% en niños de 4 y 6 años, de Montevideo y Rivera<sup>24</sup>.

Con el fin de determinar la prevalencia, gravedad y necesidad de tratamiento ortodóntico, de una población de la Comunidad Autónoma de Madrid (CAM), en el 2009 Cristina Martin Cid et al. realizaron un estudio en una muestra de 203

sujetos de edades comprendidas entre 6-15 años. La prevalencia de las maloclusiones en la muestra estudiada fue de 58,31%<sup>9</sup>.

En la encuesta nacional de salud oral (SB Brasil 2010) realizado por José Mansano Bauman et al., participaron 6,855 niños de 5 años, de los cuales 4,332 (63.2%) niños preescolares, resultaron tener al menos un problema de maloclusión<sup>25</sup>.

En una revisión sistemática publicada en 2016 por Maryam Akbari et al. en 2016, donde se estudió la prevalencia de maloclusión en 28,693 niños iraníes, entre 3 y 18 años de edad, resultaron los datos útiles, expuestos en la siguiente tabla 3<sup>26</sup>.

**Tabla 3:** Prevalencia de maloclusión en estudios epidemiológicos, en las diferentes clases de Angle<sup>26-27-28-29-30-31</sup>.

<i>Autor:</i>	<i>Año Publicación:</i>	<i>Ciudad:</i>	<i>Edad:</i>	<i>Muestra:</i>	<i>Clase I</i>	<i>Clase II</i>	<i>Clase III</i>	<i>Ausente:</i>
<i>Danaie</i> <sup>27</sup>	2006	Shiraz	7-9	3584	50%	15.5%	2.2%	32.3%
<i>Moslem</i> <sup>28</sup>	2015	Yazd	3-5	390	84.1%	14.4%	1.5%	-
<i>Taleb</i> <sup>29</sup>	2013	Mashhad	3-5	68	77.1%	13.5%	4.2%	5.2%
<i>Sonbolestan</i> <sup>30</sup>	2005	Isfahán	9-12	607	58%	40%	2%	-
<i>Oshagh</i> <sup>31</sup>	2010	Shiraz	6-14	700	52%	33%	15.4	-
<i>Ghandhar</i> <sup>26</sup>	2001	Teherán	8-10	104	20.19%	67.3%	12.5%	-
<i>Haghgo</i> <sup>26</sup>	2004	Teherán	6-12	425	58.2%	31.5%	3.3%	7%
<i>Momen</i> <sup>26</sup>	2003	Shiraz	7-9	3776	47.4%	14.7%	2.1%	30.5%
<i>Basir</i> <sup>26</sup>	2013	Ahvaz	3-5	359	87.5%	3.3%	9.2%	-

### **Hipo-mineralización incisivo-molar (HIM):**

La definición de la Hipo-mineralización incisivo-molar (HIM) la dibuja como una lesión de origen sistémico dada por un hipo mineralización del esmalte, que suele afectar los molares permanentes y se presenta muy frecuentemente asociada

con lesiones a los incisivos definitivos. Estas lesiones características a menudo se manifiestan solo en los incisivos, esto suele indicar otro origen y por tanto estos casos no representan un HIM.

Es un defecto cualitativo del esmalte que se transduce en una alteración del aspecto normal del esmalte, con cambios que afectan la translucidez, y el color del esmalte sano, suele tener bordes y límites bien definidos y delimitados y sus lesiones son opacidades blancas, amarillentas o marrones, en algunos casos ocasiona hasta la ruptura del esmalte. Las lesiones ocasionadas por este trastorno identificado como HIM, pueden extenderse desde solo un molar permanente hasta abarcar los cuatro.<sup>32</sup>

El término de Hipo-mineralización Incisivo Molar (HIM), en inglés Molar Incisor Hypomineralization (MIH), fue descrito por primera vez por Weerheijm en el 2003, quien lo definió como “el defecto dental derivado del desarrollo, que implica la hipo-mineralización de 1 a 4 primeros molares permanentes, frecuentemente asociado con incisivos permanentes afectados de manera similar”<sup>33</sup>.

Aunque la causa principal todavía es un enigma para los investigadores, la presencia de diversos factores de riesgo en las últimas etapas del embarazo, hasta los primeros 2-3 años de vida del niño, se atribuyen como posibles causantes de esta patología. No obstante, la presencia de un componente genético, tampoco se descarta como factor de riesgo<sup>34</sup>.

Dicha enfermedad se debe a una alteración del esmalte durante el proceso de la amelogénesis, lo que genera una afectación en la calidad de este. Clínicamente, las lesiones se aprecian como opacidades asimétricas blanco tiza, amarillas o incluso marrones que varían según el grado de severidad<sup>35</sup> y que aparecen con

mayor frecuencia en las cúspides y/o bordes incisales de los dientes implicados, rara vez afectando el tercio cervical<sup>36</sup>.

Los reportes de prevalencia varían considerablemente según diversos estudios realizados a través del mundo<sup>37</sup>. De acuerdo con estudios realizados en el año 2017, en Europa, la prevalencia oscilaba entre 2.4-44%, mientras que, en España, la HIM tenía cifras que se situaban entre 12,4% y 21,80%<sup>38</sup>.

### **Definición oficial de 2003 y Criterios de clasificación de la EAPD:**

La Academia Europea de Odontología Pediátrica (EAPD), en el 2003, estableció y recomendó el uso de seis criterios, basados en la apariencia clínica de los dientes hipo mineralizados por HIM con el fin de facilitar el reconocimiento y posterior diagnóstico<sup>33</sup>.

- 1) **Primeros molares e incisivos permanentes:** Al menos uno de los cuatro primeros molares permanentes muestra hipo-mineralización; simultáneamente, los incisivos permanentes pueden verse afectados. Los defectos en ocasiones también se pueden ver en segundos molares temporales, incisivos y cúspides de los caninos. Cuantos más molares e incisivos estén afectados, más grave será el defecto<sup>33-38</sup>.
- 2) **Opacidades demarcadas:** Los dientes afectados muestran opacidades claramente demarcadas en las caras oclusales y vestibulares de la corona. Los defectos varían de color, de blanco cremoso o amarillo a parduzco, y en tamaño, pudiendo ser insignificante o llegar a comprender la mayor parte de la corona. Defectos menores a 1 mm, no se toman en consideración<sup>33-38</sup>.
- 3) **Desintegración del esmalte:** El grado de porosidad de las áreas opacas varía. El esmalte gravemente afectado sometido a fuerzas masticatorias

pronto se descompone, lo que lleva a una dentina desprotegida y un rápido desarrollo de caries<sup>33-38</sup>.

- 4) **Restauraciones atípicas:** Se consideran aquellas restauraciones atípicas en molares e incisivos permanentes con una extensión similar al defecto<sup>33-38</sup>.
- 5) **Sensibilidad dental:** Los dientes afectados se pueden informar con frecuencia como sensibles, desde una respuesta leve a estímulos externos hasta hipersensibilidad espontánea; Estos dientes suelen ser difíciles de anestésiar<sup>33-38</sup>.
- 6) **Dientes extraídos:** Se pueden diagnosticar dientes extraídos, únicamente en los casos donde existan otros molares hipos mineralizados. De lo contrario, no será posible diagnosticar<sup>33-38</sup>.

En definitiva, su etiología es aún desconocida, se supone ser un conglomerado de factores y no existe una causa claramente responsable.<sup>32</sup>

En el 2012, R. Condón et al. realizaron un estudio para evaluar, en 1500 pacientes pediátricos, en el rango de edad 0-15 años, la incidencia y prevalencia del HIM, en el reparto pediátrico dental de la Azienda Ospedaliera del Policlinico Tor Vergata de Roma, Italia, desde el 1996 hasta el 2011. Resultó que; de los 1500 pacientes, los afectados por el HIM fueron el 7.3% (110) entre 4 y 15 años de edad<sup>39</sup>. Se notó que la prevalencia de HIM era más alta en los molares permanentes. Respecto a la prevalencia de los molares deciduos solo 20 pacientes presentaron HIM en los segundos molares temporales. Desde el análisis de la literatura con los resultados obtenidos de este estudio emergió que, el HIM representa una condición bastante frecuente en la población pediátrica, específicamente la literatura demostró que tiene una frecuencia media del 12%<sup>39</sup>.

B. Jälevik et al. realizaron una revision sistematica de la literatura científica en Linköping, en Suecia sobre la prevalencia del HIM, después de haber reelaborado los datos, los resultados son reflejados en la Tabla 4.

**Tabla 4:** Prevalencia de HIM en estudios epidemiológicos<sup>40</sup>.

<i>Publicación:</i>	<i>País:</i>	<i>Edad:</i>	<i>Muestra:</i>	<i>Extensión:</i>	<i>Grado de Afectación:</i>	<i>Frecuencia:</i>
<i>Alaluusua et al. 1996</i>	Finlandia	6-7	102	≥ 2mm	3	17%
<i>Arrow 2008</i>	Australia	7	511	-	-	22%
<i>Calderara et al. 2005</i>	Italia	7-8	227	≥ 2mm	3	13.7%
<i>Dietrich et al. 2003</i>	Alemania	8	2,408	-	3	5.6%
<i>Fleita et al. 2006</i>	Libia	7-9	378	≥ 2mm	3	2.9%
<i>Jasulaityte et al. 2008</i>	Lituania	6.5-8.5	1,277	-	2	9.7%
<i>Jasulaityte et al. 2007</i>	Holanda	9	442	-	-	14.3%
<i>Jälevik et al. 2001</i>	Suecia	8	519	≥ 2mm	3	18.4%
<i>Kemoli 2008</i>	Kenia	6-8	3,591	-	1	13.70%
<i>Kuscu et al. 2008</i>	Turquía	7-9	147	-	2	14.9
<i>Wogelius et al. 2008</i>	Dinamarca	6-8	647	-	-	14.6%

Hernández M. et al., realizaron una revision sistemática en 2016, desde el departamento de odontología pediátrica de la Universidad de Barcelona, con el objetivo principal de analizar la variabilidad de las prevalencias de la HIM

descritas en la literatura científica<sup>41</sup>. Los datos más pertinentes son expuestos en las Tablas 5 y 6.

**Tabla 5:** Prevalencia de HIM en estudios epidemiológicos<sup>41</sup>:

<i>Región:</i>	<i>País:</i>	<i>Autor:</i>	<i>Año:</i>	<i>Muestra:</i>	<i>Edades:</i>	<i>Prevalencia:</i>
<i>Europa</i>	Suecia	Koch et al.	1987	2226	8-13	15.4 %
<i>Europa</i>	Finlandia	Alaluusua et al.	1996	102	6-7	17 %
<i>Europa</i>	Suecia	Jälevik et al.	2001	516	8	18.4 %
<i>Europa</i>	Reino Unido	Zagdwon et al.	2002	307	7	14.6 %
<i>Europa</i>	Italia	Calderara et al.	2005	227	7.3-8.3	13.7 %
<i>África</i>	Libia	Fteita et al.	2006	378	7-8.9	2.9 %
<i>Europa</i>	Lituania	Jasulaityte et al.	2007	1277	7-9	9.7 %
<i>Europa</i>	Noruega	Jasulaityte et al.	2008	442	9	14.3 %
<i>Oceanía</i>	Australia	Arrow	2008	511	7.1	22%
<i>África</i>	Kenia	Kemoli	2008	3591	6-8	13.71 %
<i>Europa</i>	Turquía	Kuscu et al.	2008	147	7-9	14.9 %
<i>Europa</i>	Dinamarca	Wogelius et al.	2008	647	6-8	37.5 %
<i>Oceanía</i>	N. Zelanda	Mahoney et al.	2009	522	8.2	14.9 %
<i>Asia</i>	Jordana	Zawaideh et al.	2011	3241	8.4	17.6 %
<i>Asia</i>	Iraq	Ghanim et al.	2011	823	7-9	21.5 %

<i>Oceanía</i>	N. Zelanda	Mahoney et al.	2011	756	8.2	15.7 %
<i>Europa</i>	Alemania	Petrou et al.	2014	2395	8-9	10.1 %
<i>Asia</i>	India	Mittal et al.	2014	1792	6-9	6.31%

**Tabla 6:** Estudios basados en criterios diagnósticos EAPD 2003<sup>41</sup>:

<b>Región:</b>	<b>País:</b>	<b>Autor:</b>	<b>Año:</b>	<b>Muestra:</b>	<b>Edad:</b>	<b>Prevalencia:</b>
<i>Europa</i>	Lituania	Jasulaityte et al.	2007	1277	7-9	9.7 %
<i>Europa</i>	Grecia	Lygidakis et al.	2008	3518	5.5-12	10.2 %
<i>Europa</i>	Turquía	Kuscu et al.	2008	147	7-9	14.9 %
<i>Europa</i>	Dinamarca	Wogelius et al.	2008	647	6-8	37.5 %
<i>Europa</i>	Turquía	Kuscu et al.	2009	153	7-10	9.1-9.2 %
<i>Asia</i>	Jordana	Zawaideh et al.	2011	3241	8.4	17.6 %
<i>Asia</i>	Iraq	Ghanim et al.	2011	823	7-9	21.5 %
<i>Europa</i>	Alemania	Petrou et al.	2014	2395	8-9	10.1 %
<i>Asia</i>	India	Mittal et al.	2014	1792	6-9	6.31%

## La Caries Dental:

En 2013, la ICCC (International Caries Consensus Cooperation), redactó el documento de consenso entre las comunidades científicas, justificándolo como: “una comunicación exitosa entre investigadores, clínicos y educadores necesita de un lenguaje consistente, sin términos ambiguos que conducen a una confusión”<sup>42</sup>

Se distingue el “**Proceso de caries**”, como la secuencia dinámica de los procesos diente-biofilm que ocurren en el tiempo, en una superficie dentaria. Es un proceso que puede ser detenido en cualquier momento.

Destaca la “**Lesión de caries**”, definida también como “lesión cariosa” dicha definición como tal es descrita como un cambio detectable en la pieza dentaria resultante de las interacciones diente-biofilm, o signos clínicos del proceso carioso.<sup>42</sup>

Está considerada actualmente, como una disbiosis azúcar dependiente y presenta graves repercusiones en la salud general de un niño; visitas de urgencia, dolor intenso, infecciones faciales y en muchos casos conlleva un retraso en su desarrollo físico y capacidad de aprendizaje<sup>43</sup>.

La caries es una enfermedad multifactorial fruto de la interacción de tres factores principales: huésped, microflora y el sustrato; este conjunto de factores origina la desmineralización del tejido duro del diente (el esmalte)<sup>44</sup>.

“La mayoría de los factores involucrados en la caries dental son modificables, permitiendo a los individuos y profesionales odontológicos tomar las acciones oportunas para prevenir o reducir la gravedad de la enfermedad”<sup>45</sup>.

Otros autores encontraron una asociación estadísticamente significativa entre la caries y la presencia de placa, el tiempo de cepillado, el uso del chupete con azúcar y el bruxismo<sup>44</sup>.

Se define como “diagnóstico de la enfermedad de caries” a la correlación de signos y síntomas para identificar su incidencia pasada y presente<sup>42</sup>.

Muchos estudios han encontrado relación entre la prevalencia de caries y la clase social, tanto en países en vías de desarrollo como en los industrializados. Los niños de menor nivel socioeconómico tienen mayor prevalencia y gravedad de caries<sup>44</sup>.

La caries dental, es una enfermedad con alta prevalencia y uno de los problemas más frecuentes a nivel de salud pública.

Resulta ser la enfermedad crónica más frecuente en la infancia, y con una elevada prevalencia en los preescolares españoles<sup>44</sup>.

Así mismo, en un futuro, un niño con caries en dentición primaria será un adulto con múltiples caries y restauraciones en la dentición definitiva.

### **Datos de Caries de la Encuesta de 2015:**

Según los datos de la encuesta de salud oral, en España, en 2015, en los niños de 6 años la caries afecta más a quienes provienen de niveles sociales bajos (38.3% frente a 15.6% en niveles altos) y aquellos nacidos fuera de España (índice de 2 frente a 1.3), con una diferencia también notable en el acceso a tratamientos<sup>44</sup>.

En la encuesta de salud oral en España realizado en 2015 con 661 escolares de edades comprendidas entre 5 y 6 años (23% de la muestra), se observó una prevalencia de los niños con caries del 31.5%, y, además, resultó una relación

estadísticamente significativa entre la caries; la nacionalidad y el nivel de estudios de los padres. La distribución de las maloclusiones, y del Hipo mineralización Incisivo-Molar, no fueron analizadas por esta cohorte de edad, solo fueron registrados aquellos niños con más de 12 años.

Respecto a los hábitos de alimentación, observaron una relación estadísticamente significativa entre el consumo de chicles, bollería, lácteos, medicación y aparición de caries<sup>44-4</sup>.

En cuanto a los Índices los resultados fueron: ir= 21,4; cod=1.11 CAOD=2,29.

### **Datos de Caries de la Encuesta de 2020:**

En la encuesta de salud oral española del 2020, fueron estudiados 768 niños de edad comprendida entre el rango 5-6 años, con edad media de 5.6 años, 358 niños y 410 niñas<sup>5</sup>. Fueron estudiados subdividiéndolos en grupos a través de diferentes variables, como: sexo, nivel social, país de nacimiento, y proveniencia geográfica. Los grupos más grandes fueron constituidos por los que presentaron un nivel social bajo (50%) y los que nacieron en España (86%)<sup>5</sup>.

La caries en dentición temporal, que es lo más relevante en el grupo de edad 5-6, se mantiene en unos niveles estables desde las últimas encuestas y también en los últimos años. Ha pasado del 38% de 1993 al 35.5% actual<sup>5</sup>.

No obstante, el porcentaje de niños que tiene caries activa (no tratada), componente “c” del cod, desciende del 35.1% de 1993 al 28.35 actual, pero con pocos cambios respecto de los datos de hace cinco y diez años. Es decir, la caries en dentición temporal no muestra cambios significativos.

En los niños del grupo de 5-6 años resultó un cod=1.28 con un índice de restauración ir=27.1, los resultados son reflejados en la tabla 7 y 8.

**Tabla 7:** Índices de restauración, y de caries (medias)<sup>41</sup>:

	<i>Muestra:</i>	<i>Ir/IR:</i>	<i>Cod/CAOD:</i>
<i>5-6 años temporal:</i>	768	27.1	1.28 ± 2.42
<i>5-6 años permanente:</i>	768	29.4	0.02 ± 0.21

**Tabla 8:** cod medio en dientes temporales dividido por número de niños <sup>41</sup>:

<i>Cod:</i>	<i>N° niños:</i>	<i>Porcentaje muestra:</i>
<i>5-6 años dientes temp.</i>	768	
<i>cod=0</i>	495	64.5 %
<i>cod=1</i>	80	10.4 %
<i>cod=2</i>	58	7.6 %
<i>cod=3</i>	29	3.8 %
<i>cod=4</i>	18	2.3 %
<i>cod=5-9</i>	78	10.2 %
<i>cod ≥10</i>	10	1.3 %

Analizando y comparando el porcentaje de individuos con caries de 5-6 años en las encuestas nacionales de 1993, 2000, 2005, 2010, 2015 y 2020 resulta que:

**Tabla 9:** Porcentaje de caries en dentición temporal (IC-95%) en encuestas nacionales españolas en el periodo 1993-2020<sup>4-5</sup>.

<i>cod/CAOD&gt;0</i>		<i>cariados &gt;0</i>	
<i>5-6 Temporal</i>	<i>% (IC-95%)</i>	<i>%</i>	<i>(IC-95%)</i>
1993	38,0 (33,5-42,4)	35,1	(30,7-39,5)
2000	33,3 (26,8-39,8)	30,0	(23,1-36,9)

2005	36,3 (30,1-42,5)	31,3	(25,2-37,4)
2010	36,7 (32,6-40,7)	26,7	(22,9-30,4)
2015	31,5 (25,9-37,0)	25,0	(19,6-30,3)
2020	33,5 (30,8-40,3)	28,3	(23,5-33,0)

**Tabla 10:** Porcentaje de caries en dentición definitiva (IC-95%) en encuestas nacionales españolas en el periodo 1993-2020<sup>4-5</sup>.

<i>Cod/CAOD&gt;0</i>	<i>cariados&gt;0</i>		
	<i>% (IC95%)</i>	<i>%</i>	<i>(IC-95%)</i>
<b>5-6 Permanente</b>			
1993	3,1 (1,7-5,1)	2,9	(1,5-4,9)
2000	3,7 (1,9-5,5)	3,0	(1,2-4,8)
2005	3,5 (2,0-5,0)	2,2	(1,1-3,3)
2010	3,7 (2,1-5,3)	3,5	(1,9-5,0)
2015	2,4 (1,3-3,6)	1,8	(0,7-2,9)
2020	1,3 (0,5-2,1)	1,0	(0,4-1,6)

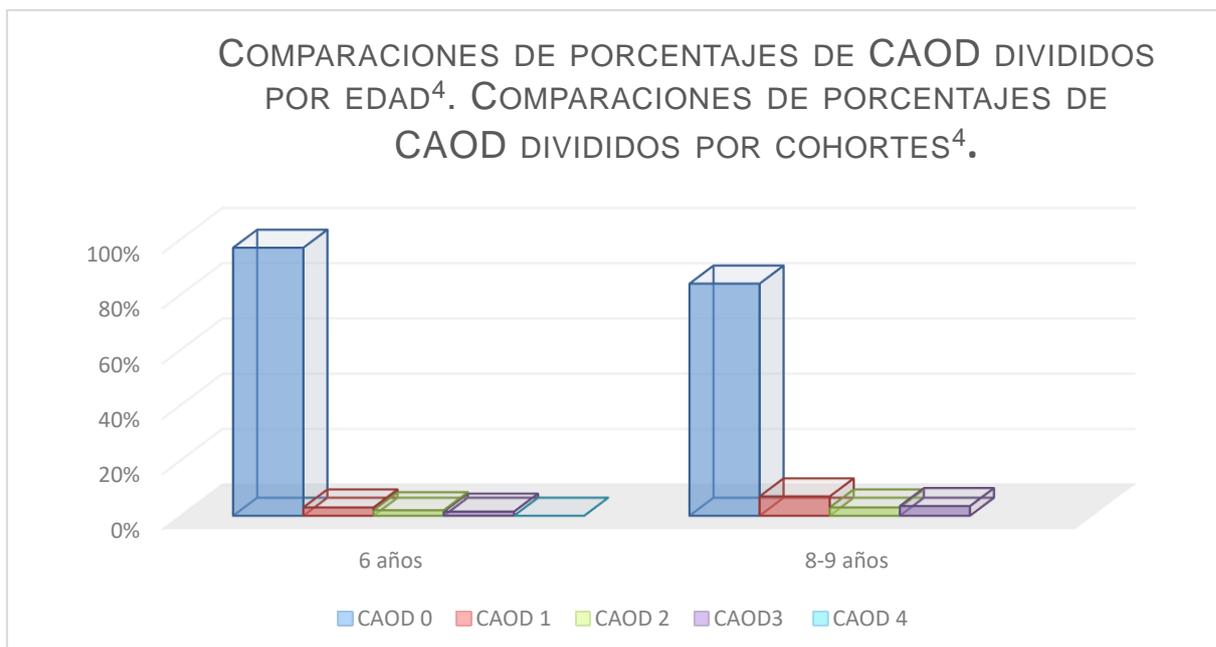
### Datos de Caries en España:

En la Tercera encuesta de salud oral de niños y adolescentes de Navarra, realizada en 2002 (se iniciaron en 1987)<sup>46</sup>. Resultan los siguientes datos:

**Tabla 11:** Porcentaje de caries en las dos denticiones<sup>46</sup> (IC-95%)

	<i>6 años:</i>	<i>8-9 Años:</i>
<i>cod:</i>	35,4	50,0
<i>CAOD:</i>	2,5	14,5

**Gráfico 1:** Comparaciones de porcentajes de CAOD divididos por cohortes<sup>46</sup>.



**Tabla 12:** Índices de Restauración (IC-95%)<sup>46</sup>:

	<b>6 años</b>	<b>8-9 años</b>
<i>ir:</i>	21,9 (17,4 - 29,4)	31,0 (25,3 - 36,4)
<i>IR:</i>	16,7 (0,0 - 50,16)	48,1 (31,8 - 56,1)

**Tabla 13:** Evolución del índice cod/CAOD en Navarra, en el periodo 1997-2002<sup>46</sup>.

<b>Edad:</b>	<b>6 años</b>		<b>9 años</b>	
<i>Publicaciones:</i>	<b>1997</b>	<b>2002</b>	<b>1997</b>	<b>2002</b>
<i>cod</i>	1,16	1,28	1,29	1,58
<i>CAOD</i>	0,04	0,04	0,35	0,27

En un estudio transversal conducido en la Comunidad Valenciana del año 2006, que proponía estudiar la evolución de la salud oral infantil unida a importantes cambios demográficos, asociados con la inmigración; fueron seleccionados al azar 509 niños de 6 años, 256 masculinos y 253 femeninos<sup>47</sup>.

**Tabla 14:** Prevalencia de caries por edad y sexo<sup>47</sup>:

		<b>6 años:</b>
<i>Dentición Temporal</i>	Masculino	37.1%
	<i>Interval de confianza 95%</i>	(31.1% - 43.3%)
	Femenino	27.3%
		(21.8% - 33.2%)
	Total	32.2%
		(28.1% - 36.4%)
<i>Dentición Permanente</i>	Masculino	3.5%
	<i>Intervalo de confianza 95%</i>	(1.6% - 6.5%)
	Femenino	4.0%
		(1.9% - 7.1%)
	Total	3.7%
		(2.2% - 5.7%)
<i>Ambas Denticiones</i>	Masculino	38.3%
	<i>Intervalo de confianza 95%</i>	(32.2% - 44.5%)
	Femenino	30.0%
		(24.4% - 36.1%)
	Total	34.2%
		(30.1% - 38.4%)

**Tabla 15:** Índice CAOD<sup>47</sup>

<i>Índice CAOD</i>	<i>Masculino</i>	0.046	1.00	1.83
		0.014-0.079	0.080-1.20	1.48-2.18
	<i>Femenino</i>	0.059	1,14	1.86
		0.019-0.099	0.92-1.36	1.53-2.18
	<i>Total</i>	0.053	1.07	1.84
		0.027-0.078	0.92-1.22	1.60-2.08

**Tabla 16:** Índices de caries de ambas denticiones por edades y nacionalidad.

\*= diferencia estadística significativa entre nacionalidades con  $p < 0.05^{47}$ .

**6 años:**

	<b>Espanoles</b>	<b>Extranjeros</b>
<i>Dentición Permanente</i>	4%	0%
<i>IC 95%</i>	2.4%-6.2%	0.0%-9%
<i>Dentición Temporal</i>	29.5%	64.1%
<i>IC 95%</i>	25,4% - 33.9%	47.1% - 78.7%
<i>Ambas Denticiones</i>	31.7%	64.1%
	27.5% - 36.1%	47.1% - 78.7%

**Tabla 17:** Índice Comunitario Periodontal por edad y sexo<sup>47</sup>.

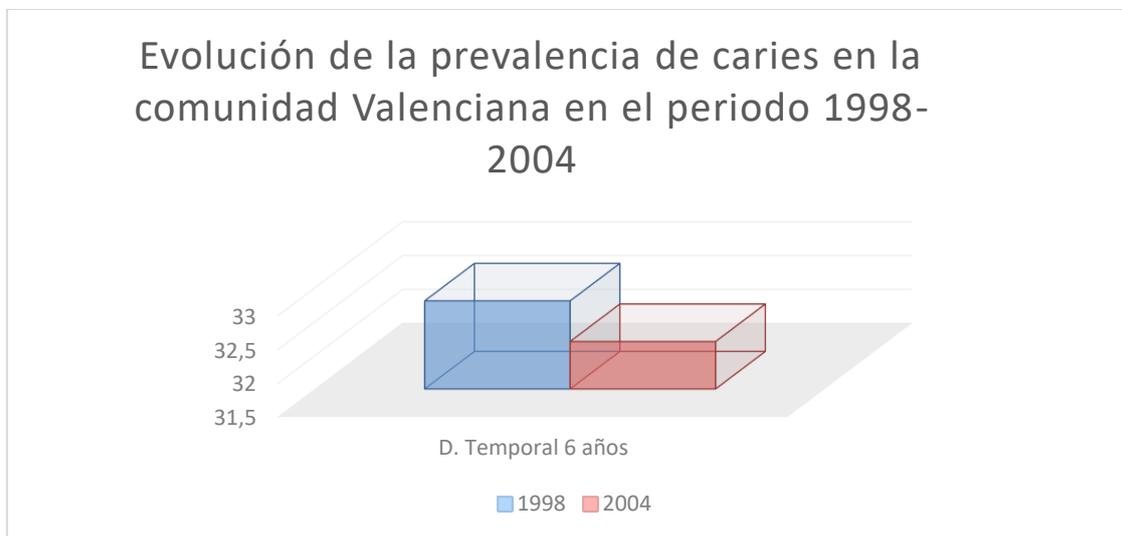
**6 años:**

<i>Sangrado Gingival</i>	<i>Masculino</i>	0.16
		0.04 - 0.27
<i>IC 95%</i>	<i>Femenino</i>	0.17
		0.05 - 0.28
	<i>Total</i>	0.16
		0.08 - 0.24
<i>Calculo Dental</i>	<i>Masculino</i>	0.09

IC 95%

	0.02 – 0.17
Femenino	0.2
	0.08-0.31
Total	0.15
	0.08 – 0.21

**Gráfico 2:** Evolución de la prevalencia de caries en la comunidad Valenciana en el periodo 1998-2004<sup>47</sup>.



Con este estudio se demuestra que la salud dental valenciana ha empeorado porque los dientes careados han aumentado y los obturados han disminuido, posicionando la región de Valencia en una posición desfavorable comparándola con otras regiones autónomas. Además, caries e inmigración están fuertemente relacionadas, los niños inmigrantes presentan muy altos niveles de caries y que requieren programas preventivos específicos<sup>47</sup>.

En el estudio epidemiológico conducido en Aragón, se estudiaron los escolares que frecuentaron las escuelas primarias en el curso 2004/05. Para la realización

de este estudio se utilizaron las recomendaciones que la OMS expone en Métodos básicos<sup>6</sup> y Criterios Mínimos de los Estudios Epidemiológicos de Salud Dental en Escolares<sup>48-49</sup>. De la muestra de este estudio 851 niños de 6 años, fueron analizados:

El índice de caries temporal (cod) a los 6 años fue de 0,61. La prevalencia de caries temporal, importante en su dentadura, que afectaban a 4 o más dientes fue de 5,7% en el grupo de 6 años. El índice CAOD resultó ser 0.02; considerando los índices por intervalos de edades, obtuvieron que, en la cohorte etaria de 5-9 años, tuvieron 16 niños y 14 niñas con respectivamente 3.7 y 3.3 de cod. Además, resultó poco común encontrar más de diez piezas afectadas por caries.

El Índice CAOM de caries del primer molar permanente fue 1,15% para los 6 años. (empieza a subir desde los 12 años) y es significativamente superior en niñas<sup>48</sup>. El porcentaje de individuos libres de caries resultó muy elevado para los niños con 6 años, 77.5 %.

El Índice de restauración aumentó al aumentar de la edad, resultando mayor en la dentición permanente, “20,9%” por la dentición temporal y “58,8%” por la dentición permanente en niños de 6 años.

El porcentaje global de caries en las dos denticiones, resultó ser del 22,79% a los 6 años, aunque fue similar entre ambos sexos, las niñas tenían índice de restauración más alto y acudían a la consulta más frecuentemente<sup>48</sup>. 72,3% - 61,3%. El porcentaje de caries activas no tratadas en la dentición primaria fue 20% a 6 años.

**Tabla 18:** Comparación de los porcentajes de caries en dentición temporal para niños de 6 y 7 años<sup>48</sup>.

**Prevalencia de caries en dentición temporal:**

<b>Estudio:</b>	<b>Año:</b>	<b>6 años:</b>	<b>7 años:</b>
<b>Aragón:</b>	2004	22,8	
<b>Castilla la Mancha:</b>	2004		43,0
<b>Navarra:</b>	2002	35,4	
<b>Extremadura:</b>	2001	35,9	
<b>Andalucía:</b>	2001		41
<b>Encuesta Nacional Salud Oral:</b>	2000	33,3	
<b>Canarias:</b>	1998		38,36
<b>Castilla y León:</b>	1998	31,29	
<b>Comunidad Valenciana:</b>	1998	32,8	
<b>País Vasco:</b>	1998		30,0

**Tabla 19:** Comparación del Índice de Restauración con más estudios<sup>48</sup>.

**Índice Restauración temporal (ir):**

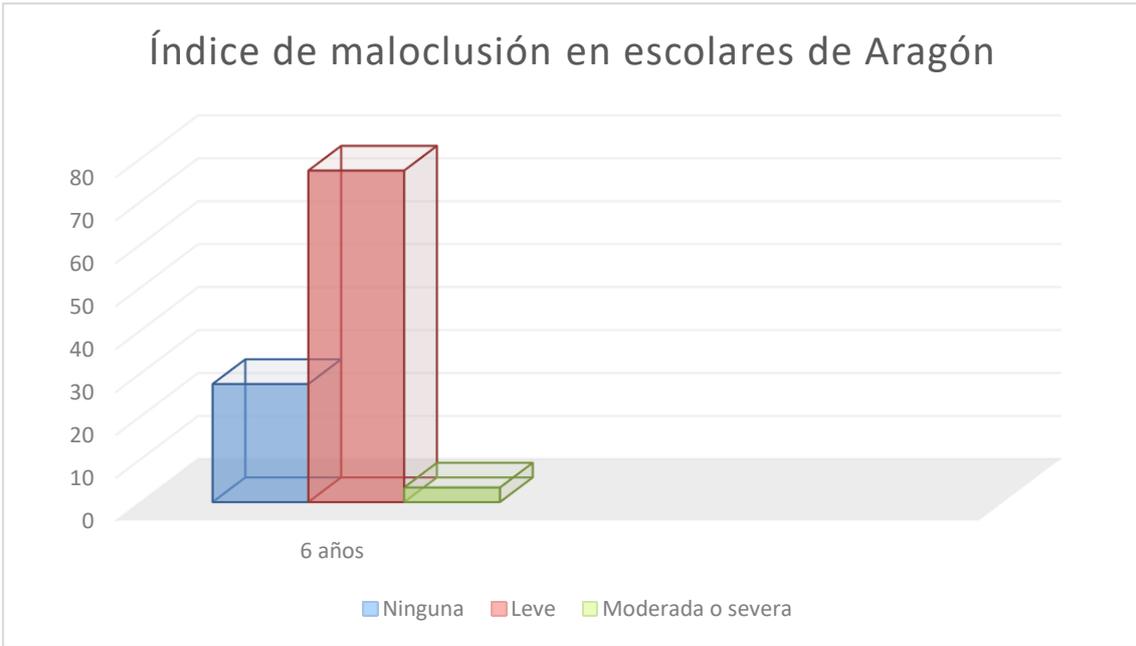
<b>Estudio:</b>	<b>Año:</b>	<b>6 años:</b>	<b>7 años:</b>
<b>Aragón</b>	2004	20,9%	

<b>Castilla la Mancha</b>	2004	21%
<b>Navarra</b>	2002	21,9%
<b>Extremadura</b>	2001	5,9%
<b>Andalucía</b>	2001	12,0%
<b>Encuesta Nacional Salud Oral</b>	2000	16,0%
<b>Comunidad Valenciana</b>	1998	12,0%

**Tabla 20:** Prevalencia de opacidades del esmalte, a 6 años divididos por sexo<sup>48</sup>.

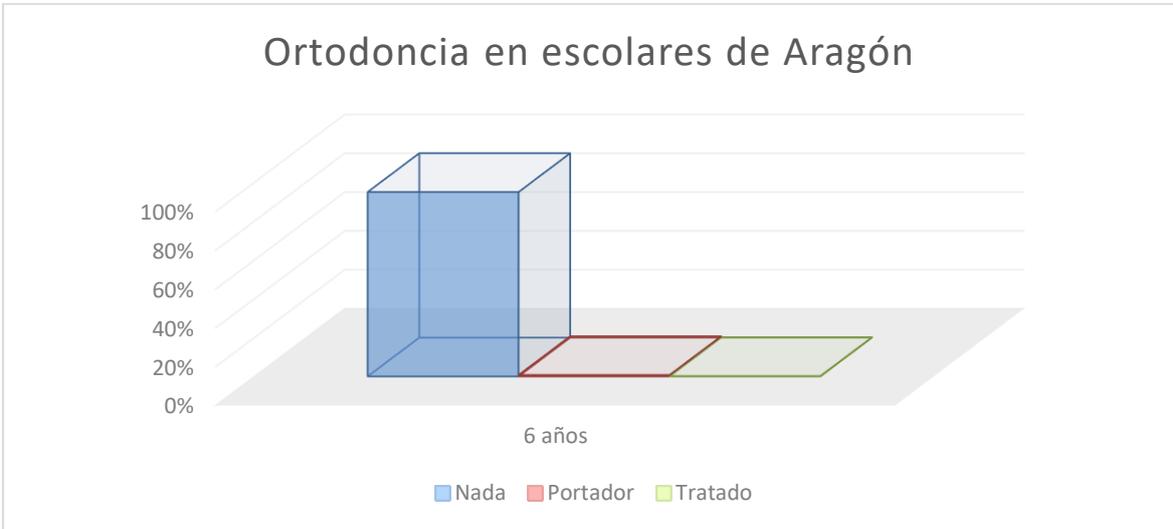
	<b>N° Hombre:</b>	<b>N° Mujer:</b>
<b>No registrado</b>	2	7
<b>No presentes</b>	380	363
<b>Lesión &lt; 2 mm</b>	26	30
<b>Lesión &gt; 2 mm</b>	11	12
<b>Áreas amarillas o marrones</b>	4	6
<b>Líneas blancas horizontales</b>	5	1
<b>Hipoplasia esmalte</b>	1	3

**Gráfico 3:** Índice de maloclusión en escolares de Aragón<sup>48</sup>:



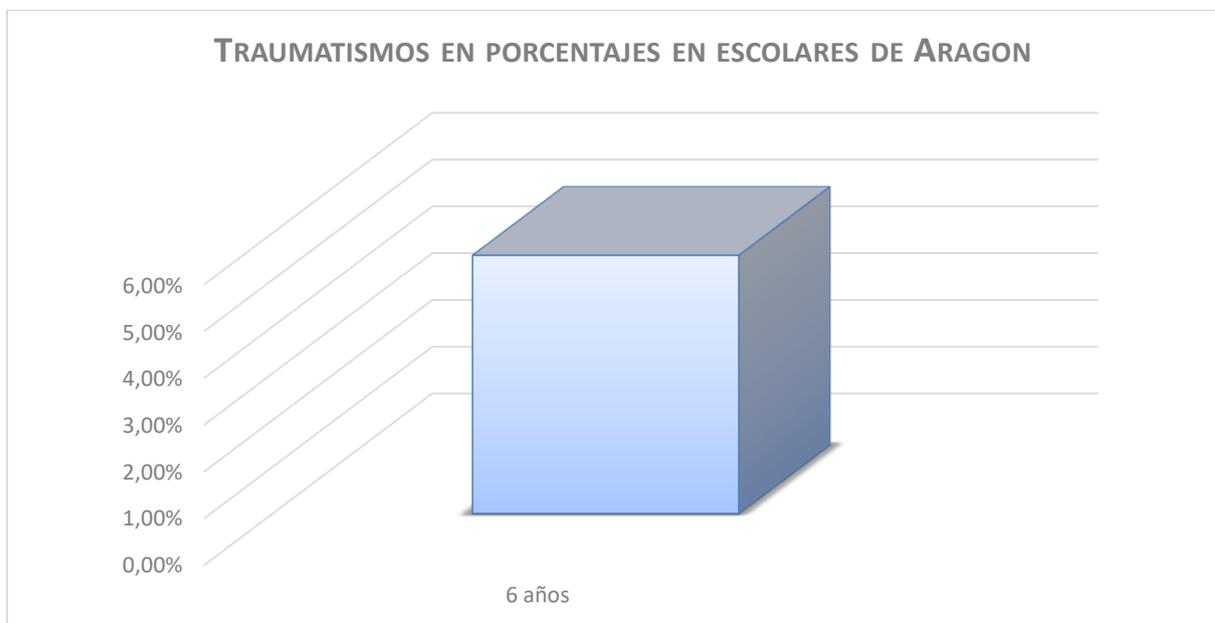
Como expuesto en el gráfico 3, el 77,2% de la muestra manifestaba una maloclusión ligera, mientras que el 3,4% de la población tuvo problemas en la oclusión moderados y el 27,5% de los escolares estudiados, no la presentaban sin apreciar diferencias por edad ni sexo. En el Gráfico 4 a los 6 años apenas había niños con aparatos ortodónticos, el 0,7% era portador de aparatos de ortodoncia.

**Gráfico 4:** Ortodoncia en escolares de Aragón<sup>48</sup>:



La prevalencia de traumatismos en los niños con seis años era mucho menor (3,52%) que en los otros rangos de edades.<sup>48</sup>

**Gráfico 5:** Traumatismos en porcentajes en escolares de Aragón<sup>48</sup>:



## Datos de Caries en Europa

En un estudio conducido en Albania en 2015 por la facultad de Medicina Dental Tirana sobre 2,039 niños, 976 niñas y 1063 niños de 5 años de edad obtuvieron los siguientes resultados<sup>50</sup>. Tablas 21 y 22.

**Tabla 21:** Características de la prevalencia de caries de la muestra del estudio<sup>50</sup>:

(P=0.001)

	<i>Niños (n=1,603, 47%)</i>	<i>Niñas (n=976, 52.1%)</i>	<i>Total (n=2,039)</i>
<b>Edad Media</b>	5.5	5.4	5.4
<b>Prevalencia de caries CAOD&gt;0</b>	84.3%	83.9%	84.1%
<b>Sin Caries CAOD=0</b>	15.7%	16.1%	15.9%

<b>Cod=0</b>	19.3%	20.9%	20.1%
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**Tabla 22:** Tipo de caries en la muestra de 5 años en Albania, total y por sexo<sup>50</sup>.

<b>Severidad:</b>	<b>Rango CAOD:</b>	<b>Niñas:</b>	<b>Niños:</b>	<b>Total:</b>
<b>Ausente:</b>	0	16.1%	15.7%	15.9%
<b>Muy Bajo:</b>	1	11%	9.4%	10.2%
<b>Bajo:</b>	2-3	25%	18.9%	21.8%
<b>Moderado:</b>	4-6	19%	18.7%	18.8%
<b>Alto:</b>	6+	28.9%	8.95%	33.3%

Los niños albaneses de 5 años involucrados en este estudio tuvieron una alta incidencia de caries, de las cuales muchas no tratadas en referencia a la dentición primaria, A tal propósito, los autores especifican directamente que existe la necesidad de introducir programas preventivos por parte del estado y en la mejoría del acceso a la atención odontológica por este grupo de edad.

Fue publicada una revision sistematica en 2018, por Kitty J. Chen et al. para averiguar la frecuencia de la caries temprana en niños de 5 años de edad a nivel mundial<sup>51</sup>. Los resultados útiles son expuestos en la tabla 23.

**Tabla 23:** Estudios de caries europeos con prevalencia de cod<sup>51</sup>.

<b>Autor y año:</b>	<b>Lugar de estudio:</b>	<b>Método de muestreo:</b>	<b>Criterio Diagnostico:</b>	<b>Prevalencia de cod:</b>	<b>(c) dientes temporales cariados:</b>
<i>Grund et al. 2015<sup>52</sup></i>	Ennepe-Ruhr, Alemania	Multietapa (n° 406)	cod (OMS)	26,2%	0.9±2.0
<i>Bissar et al.2015<sup>53</sup></i>	Heidelberg,	Multietapa	cod (OMS)	28,6%	-

	Alemania	(n° 385)			
<i>Monaghan et al. 2014</i> <sup>54</sup>	Wales, UK	Multietapa	cod (BASCD)	27,9%	1.6
		(n°7734)			
<i>Monaghan et al. 2014</i> <sup>54</sup>	Inglaterra, UK	Multietapa	cod (BASCD)	27,9%	0.9
		(n° 133 516)			
<i>Monaghan et al. 2014</i> <sup>54</sup>	Escocia, UK	Censo	cod (BASCD)	33,0%	1.4
		(n° 13 232)			
<i>Ferro et al. 2017</i> <sup>55</sup>	Véneto, Italia	Aleatorio	cod (BASCD)	35.2%	1.3±2.6
		(n° 728)			
<i>Nobile et al. 2014</i> <sup>56</sup>	Sur de Italia	Clúster de dos etapas	cod (OMS)	29,8%	0.9±1.8
		(n° 158)			
<i>Ferrazzano et al. 2016</i> <sup>57</sup>	Campania, Italia	Multietapa	cod (OMS)	43.4%	1.4±2.1
		(n° 387)			
<i>Tsanidou et al. 2015</i> <sup>58</sup>	Norte-este de Grecia	No reportado	cod (OMS)	64.2%	2.3±2.6
		(317)			

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### Datos de Caries en el Mundo:

Fue realizado un estudio sobre 338 escolares publicado en el 2000 por la Facultad de Odontología, Centro Integrado de Saúde, Universidade Federal de Juiz de Fora: (181 niños; 157 niñas) con edad comprendida en el rango de edad 2-6 años. La caries dental fue analizada mediante el índice cod. El objetivo de este estudio fue estudiar la prevalencia de caries en la dentición temporal con

sus variables asociadas, en los preescolares de las escuelas públicas infantiles en Juiz de Fora en Brasil<sup>59</sup>. Los resultados se aprecian en la Tabla 20.

**Tabla 24:** Prevalencia de Caries en relación a la edad en un grupo de 338 escolares – Juiz de Fora, Minas Gerais, Brasil<sup>59</sup>, 1987

<i>Edad:</i>	<i>Participantes:</i>	<i>Libres de Caries:</i>	<i>cod&gt;0:</i>
5	49	37	4.3
6	52	32	4.8

En un estudio realizado en el Instituto Mexicano se examinaron 1012 niños y 533 adolescentes, para un total de 1545 encuestados de uno u otro sexo. Se llevó a cabo la encuesta utilizando los índices avalados por la Organización Mundial de la Salud<sup>60</sup>.

**Tabla 25:** Índice CAOD por edad<sup>60</sup>.

<i>Edad:</i>	<i>Participantes:</i>	<i>C:</i>	<i>O:</i>	<i>A:</i>	<i>CAOD:</i>
5	326	0.01	0.0	0.0	0.01
6	558	0.19	0.39	0.01	0.59

En un estudio publicado por Ghada S. et al. En 2014, por el Institute of Public Health en la United Arab Emirates University, (UAE) fueron recogidos todos los datos epidemiológicos de caries, disponibles en la literatura publicada en niños con menos de 13 años. De este estudio resultó que el cod en niños de 5 años en Abu Dhabi varió mucho en la última década, respectivamente con un valor de 5.1 en 1991, 8.4 en el 1998 y, en el año siguiente, pasó a 5.8 para luego ser en el 2001 4.9. Mientras que el cod en Ajman resultó ser en el 2001 3.8, tres años

después 4.5, en el 2006 4.4 y finalmente en 2010 resultó un valor de 4<sup>61</sup>. De los once estudios analizados por esta publicación, los datos útiles extraídos son expuestos en la Tabla 26:

**Tabla 26:** Estudios conducidos en el Estado de los Emiratos Árabes Unidos (UAE) de caries dental<sup>61</sup>.

<b>Artículo:</b>	<b>Emirato:</b>	<b>Muestra:</b>	<b>Edad:</b>	<b>Criterio:</b>	<b>Prevalencia:</b>	<b>Cod:</b>	<b>Cos:</b>
<i>Al-Mughery (1991)</i> <sup>62</sup>	Abu Dhabi	1210	5 años	-	80-95%	5.1	-
<i>National Survey (2009)</i> <sup>63</sup>	Siete Emiratos	150 de cada Emirato	5 años	WHO	83%	5.1	-
<i>Hashim et al. (2009)</i> <sup>64</sup>	Ajman	1036	5-6 años	WHO	-	4.5	-
<i>Hashim et al. (2006)</i> <sup>65</sup>	Ajman	1297	5-6 años	WHO	76.1%	4.4	10.2
<i>Hashim et al. (2010)</i> <sup>66</sup>	Ajman	1297	5-6 años	WHO	(5 años) 72.9% (6 años) 80%	(5 años) 4 (6 años) 4.5	-

En la encuesta de R.A. Al-Banyan et al. del 2000, publicada por El *International Journal of Paediatric Dentistry*, sobre la salud oral de niños de edad comprendidas en 5-12 años, en Riyadh, Arabia Saudita<sup>67</sup>, figuraron los datos expuestos en la tabla 27.

**Tabla 27:** Índices de caries medios (± DS) según edades en niños árabes<sup>67</sup>.

<b>Edad:</b>	<b>Muestra:</b>	<b>cod:</b>	<b>cos:</b>	<b>CAOD:</b>	<b>CAOS:</b>
--------------	-----------------	-------------	-------------	--------------	--------------

5	49	4,5±3,8	30,4±20,2	0,2±0,7	0,2±0,8
6	49	4,3±3,2	25,5±15,4	0,9±1,3	1,1±1,6
7	31	4,2±4,0	30,1±14,6	1,5±1,6	2,1±3,0
8	49	4,1±2,8	21,1±9,6	2,6±1,5	3,7±3,2
9	44	3,5±2,7	16,8±10,2	2,8±1,6	4,5±3,3

Fue publicada una revision sistematica en 2018, por Kitty J. Chen et al. para averiguar la prevalencia de la caries temprana, en niños de 5 años de edad, a nivel mundial<sup>51</sup>.

Los resultados son expuestos en la tabla 28.

**Tabla 28:** Estudios de caries y prevalencia de cod a nivel mundial<sup>51</sup>.

**Autor y año:**      **Lugar de estudio:**      **Método de muestreo:**      **de Criterio Diagnostico :**      **Prevalencia de cod:**      **(c) dientes temporales cariados:**

<i>Blinkhorn et al.</i> 2015 <sup>68</sup>	New South Wales, Australia	Multietapa (n° 820)	cod (OMS)	44,4%	1.7
<i>Abanto et al.</i> 2014 <sup>69</sup>	Brasil, América Latina	Conveniencia (n° 335)	ceod (OMS)	64,8%	-
<i>Carvalho et al.</i> 2014 <sup>70</sup>	Distrito Federal, Brasil	Clúster (n° 602)	cod	53,6%	2.1±0.1
<i>Do Amaral et al.</i> 2014 <sup>71</sup>	Indaiatuba, Brasil	Sistematica probabilística (n°303)	cod (OMS)	41,6%	1.5

<i>Scarpelli et al.</i> 2014 <sup>72</sup>	Belo Horizonte, Brasil	Multietapa (n° 1635)	cod (OMS)	46,2%	-
<i>Lourenço et al.</i> 2013 <sup>73</sup>	Pacota, Brasil	Censo (n° 149)	cod	67.8%	-
<i>Corrêa-Faria et al.</i> 2013 <sup>74</sup>	Minas Gerais, Brasil	Sistemática, aleatória (n° 134)	cod (OMS)	62,7%	-
<i>Elidrissi et al.</i> 2016 <sup>75</sup>	Khartotum, Sudan	Sistemática (n° 196)	cod (OMS)	56,1%	2.8 ±4.0
<i>Chen et al.</i> 2017 <sup>76</sup>	Hong Kong, China	Multietapa (n° 501)	cod (OMS)	55%	2.7±3.7
<i>Peng et al.</i> 2013 <sup>77</sup>	Hong Kong, China	Multietapa (n° 390)	cod (OMS)	75.3%	4.2±4.6
<i>Bridges et al.</i> 2014 <sup>78</sup>	Hong Kong, China	Multietapa (n° 301)	cod (OMS)	75,4%	4.2±4.5
<i>Han et al.</i> 2014 <sup>79</sup>	Ulsan, Korea	Estratificada aleatória (n° 530)	cod (OMS)	60,9%	-
<i>Lin et al.</i> 2017 <sup>80</sup>	Kaohsiung, Taiwan	Cluster Estratificada (n° 232)	cod (OMS)	81,0%	-
<i>Yen et al.</i> 2013 <sup>81</sup>	Taichung, Taiwan	Multietapa (n° 146)	cod (OMS)	71,0%	4.8±4.2
<i>Li et al.</i> 2017 <sup>82</sup>	Xinjiang, China	Multietapa (n° 640)	cod (OMS)	84,5%	5.2±4.0

<i>Jiang et al.</i> 2017 <sup>83</sup>	Shandong, China	Estratificada aleatoria (n° 1080)	cod (OMS)	63,1%	2.6±2.5
<i>Chen et al.</i> 2014 <sup>84</sup>	Shanghai, China	Multietapa (n° 610)	cod (OMS)	64,8%	3.5±4.1
<i>Wulaerthan et al.</i> 2014 <sup>85</sup>	Kashgar, China	Estratificada tres etapas (n° 266)	cod (OMS)	82,0%	-
<i>Krisdapong et al.</i> 2014 <sup>86</sup>	Bangkok, Thailandia	Estratificada aleatoria (n° 503)	cod (OMS)	77,7%	6.2 ± 5.2
<i>Pattanaporn et al.</i> 2013 <sup>87</sup>	Chiang Mai, Thailandia	No reportada (n° 167)	cod (OMS)	78,0%	5.3±5.5
<i>Adiatman et al.</i> 2016 <sup>88</sup>	Jakarta, Indonesia	Cluster aleatoria (n° 390)	cod (OMS)	90,0%	7.5±5.5
<i>Kankur et al.</i> 2016 <sup>89</sup>	Bengaluru, India	Multietapa (n° 298)	ceod (OMS)	27,5%	5.1±3.6
<i>Sujlana et al.</i> 2015 <sup>90</sup>	Haryanam India	Multietapa (n° 400)	cod (OMS)	59.0%	2.8±3.2
<i>Gupta et al.</i> 2015 <sup>91</sup>	Moradabad, India	Simple aleatoria (n° 568)	cod (OMS)	47,5%	2.4±1.7
<i>Gopal et al.</i> 2016 <sup>92</sup>	Andhra Pradesh, India	Simple aleatoria (n° 170)	cod (OMS)	22,9%	-
<i>Sankeshwari</i>	Belgaum, India	Simple aleatoria (n° 302)	cod (OMS)	70,2%	3.0±3.6

*et al. 2014*<sup>93</sup>

*Thapa et al.*

*2015*<sup>94</sup>

Nawalparasi,	Sistematica aleatoria	cod	(no	64,4%	4.4±3.1
Nepal	(n° 357)	especificado)			

Criterio Diagnostico BASCD, (*British Association for the Study of Community Dentistry*);

### **Hipótesis:**

Los niños de 5-9 años, que acudieron en 2019, a la Policlínica Universitaria de la Universidad Europea de Madrid, presentan una salud oral, Índices de Caries, Índice Gingival, Índice de Placa, Traumatismos, Maloclusiones y HIM, compatible con la situación nacional española.

## **Objetivos:**

### **Objetivo primario:**

El objetivo primario de este estudio consiste en describir y comparar los índices de caries, índice gingival y de placa, traumatismos faciales y dentarios, maloclusiones, y HIM a través de los datos recogidos en las historias clínicas y exploraciones realizadas en la policlínica universitaria en el año 2019 a niños pertenecientes a la cohorte 5-7, y 7-9 años.

### **Objetivos secundarios:**

- I. Describir los datos de caries en ambas cohortes de edad y determinar el motivo de consulta más frecuente
- II. Establecer el porcentaje de niños con obturaciones y extracciones hechas
- III. La media del cepillado diario, la utilización de pasta dental, la frecuencia de enjuague diario/semanal y la aplicación de flúor por profesional.

## **Metodología:**

Es un estudio de tipo observacional, retrospectivo, transversal que fue diseñado para estudiar dos cohortes de niños con edad comprendida entre 5-7 y 7-9 años, utilizando como registros las historias clínicas y exploraciones realizadas en 2019 en la policlínica universitaria. Un examinador fue encargado de extraer los datos directamente del programa informático de la policlínica Universitaria de la Universidad Europea de Madrid, recogiendo una serie de variables y organizándolas en una tabla Excel para posteriormente ser analizadas por un estadístico.

El estudio está aprobado por el Comité de Ética de la Universidad Europea de Madrid (Anexo 1)

Las variables recogidas por un único examinador y recogidas en una tabla Excel fueron:

- Sexo
- Fecha de Nacimiento
- Motivo de Consulta
- Lactancia Materna expresada en meses
- Lactancia artificial expresada en meses
- Problemas en el embarazo
- Problemas neonatales
- Primera vez al dentista
- Obturaciones
- Extracciones
- Ortodoncia Previa
- Traumatismo en la cara
- Dolor Bucal
- Frecuencia cambio de cepillo expresada en meses
- Utilización pasta dental fluorada
- Enjuague diario/semanal y aplicación de flúor tópico
- Índices de Caries CAOD/CAOS/CAOM/cod/cos
- Índice de Placa y Índice Gingival
- Índices de Restauración de dientes permanentes y temporales
- Traumatismos en dientes
- Hipo-mineralización incisivo molar
- Maloclusiones

**Población de Estudio:**

Todos los pacientes de 5-7 años y 7-9 que acudieron a la Policlínica Universitaria de la Universidad Europea de Madrid entre los meses de enero y diciembre 2019.

**Criterios de inclusión:**

1. Historias Clínicas de pacientes entre los cortes de edad de 5-7 y 7-9 años.
2. Historias Clínicas con datos útiles a este estudio (variables)
3. Historias Clínicas realizadas en 2019 en la Policlínica
4. Pacientes con el Consentimiento Informado firmado por sus padres  
(Anexo1)

**Criterios de exclusión:**

1. Pacientes que no entran en las edades comprendidas entre el rango 5-7 y 7-9
2. Pacientes con variables incompletas o erróneas
3. Pacientes sin Consentimiento Informado

**Tamaño muestral y procedimiento de muestreo:**

El tamaño muestral de este estudio resultó ser 687 pacientes totales en el año 2019 después de una minuciosa selección 666 historias clínicas completas, y finalmente 131 niños que respetaban los rangos de edad en el data-base de la policlínica que cumplieron los criterios de inclusión/exclusión ya descritos. La inclusión se llevó a cabo de forma secuencial, en concomitancia con la aprobación del protocolo de extracción de datos desde la policlínica.

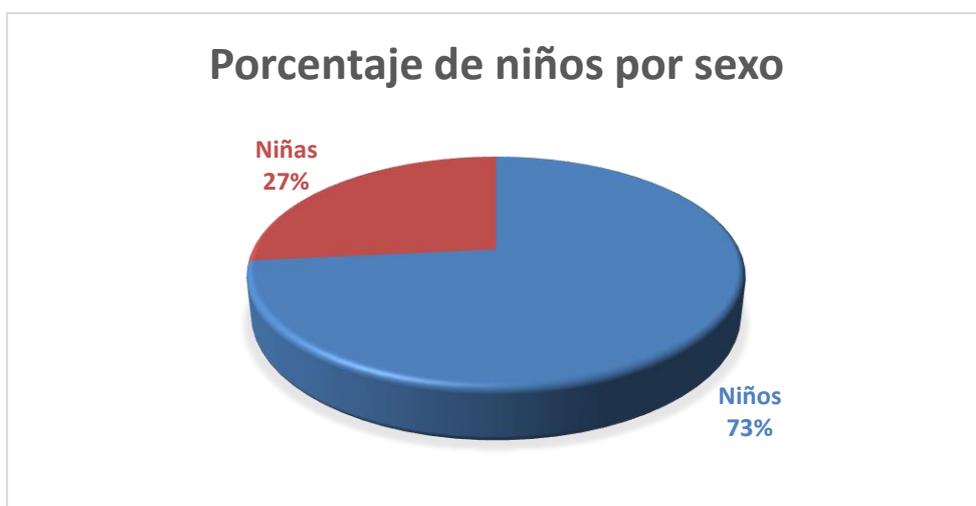
Las variables fueron recogidas mediante una hoja de recogida de datos en Excel. Todo el protocolo se cumplió de la manera establecida por la Policlínica Universitaria.

## Resultados:

### Datos de la Muestra:

Después de un riguroso análisis de los datos; figuraron 96 niños y 35 niñas en un total de 131 pacientes estudiados. El porcentaje de niños fue mayor 73,2% respecto a las niñas 26,8%.

### Gráfico 6: Porcentaje de niños por sexo.



### Datos de Índices de Caries:

Para los dientes permanentes de la muestra estudiada resultaron una media del CAOD de 2,07; mientras que la media CAOS resultó ser 2,30 y un CAOM de 1,86. Los datos sobre la dentición temporal obtenidos de las historias clínicas realizadas en el 2019 en la Policlínica Universitaria de la Universidad Europea de Madrid resultaron ser; una media cod de 4,58; y una media cos de 9,67.

Sexo	CAOD Medio	CAOD D.E.	CAOS Medio	CAOS D.E.	CAOM Medio	CAOM D.E.	cod Medio	cod D.E.	cos Medio	cos D.E.
Niños	1,97	2,24	2,28	4,49	1,72	1,70	4,70	3,19	10,08	9,25
Niñas	2,34	1,68	2,34	1,68	2,26	1,67	4,26	3,47	8,54	8,50
<b>Total, general</b>	<b>2,07</b>	<b>2,11</b>	<b>2,30</b>	<b>3,94</b>	<b>1,86</b>	<b>1,70</b>	<b>4,58</b>	<b>3,26</b>	<b>9,67</b>	<b>9,05</b>

CAOD=	Historias clínicas	Prevalencia
0	46	35,11%
1	15	11,45%
2	12	9,16%
3	15	11,45%
4	40	30,53%
5	1	0,76%
7	1	0,76%
15	1	0,76%
<b>Total, general</b>	<b>131</b>	<b>100,00%</b>

cod=	Historias clínicas	Prevalencia
0	22	16,79%
1	6	4,58%
2	15	11,45%
3	8	6,11%
4	11	8,40%
5	13	9,92%
6	19	14,50%
7	9	6,87%
8	13	9,92%
9	8	6,11%
10	4	3,05%
11	1	0,76%
13	1	0,76%
14	1	0,76%
<b>Total, general</b>	<b>131</b>	<b>100,00%</b>

### Datos de Índices Gingivales:

El índice gingival medio de estos niños resultó ser 11 %. El índice de Placa medio resultó 17%.

Sexo	IG Medio	IG D.E.	IP Medio	IP D.E.
Niños	0,10	0,17	0,15	0,23
Niñas	0,14	0,18	0,23	0,23
<b>Total, general</b>	<b>11,32%</b>	<b>0,17</b>	<b>17,21%</b>	<b>0,23</b>

### Datos de Índices de Restauración:

El Índice de restauración medio (IR) para dentición permanente resultó ser 37%

El Índice de restauración medio (ir) para dentición temporal resultó ser 38%

Sexo	IR Medio	IR D.E.	(ir) Medio	(ir) D.E.
Niños	41,44%	0,44	39,56%	0,38
Niñas	28,33%	0,37	35,00%	0,36
<b>Total, general</b>	<b>37,83%</b>	<b>0,42</b>	<b>38,28%</b>	<b>0,38</b>

### Datos de Traumatismos:

Traumatismos Cara	Niños	Prevalencia de Traumatismos en cara
NO	118	90,08%
SI	13	9,92%
<b>Total, general</b>	<b>131</b>	<b>100,00%</b>

Traumatismos dentarios	Historias clínicas	Prevalencia
NO	115	87,79%
si	16	12,21%
<b>Total, general</b>	<b>131</b>	<b>100,00%</b>

Durante el estudio de los traumatismos, figuraron un 10% de la muestra con al menos un traumatismo en la cara, y el 12% de la muestra tuvo un traumatismo en los dientes.

### Datos de Maloclusiones:

Maloclusiones	Niños	Prevalencia Maloclusiones
0	2	1,53%
NO	89	67,94%
SI	40	30,53%
<b>Total, general</b>	<b>131</b>	<b>100,00%</b>

El porcentaje de las maloclusiones presentes en la muestra, considerando cualquiera desviación de la oclusión normal en las tres clases de Angle, resultó ser el 30 %.

### Datos de Hipo-mineralización Incisivo Molar:

Hipo-mineralización Incisivo Molar	Historias clínicas	Prevalencia
NO	130	99,24%

si	1	0,76%
<b>Total, general</b>	<b>131</b>	<b>100,00%</b>

Resultó además un porcentaje de HIM de 0,76%.

### Otros Datos:

#### MOTIVO MÁS FRECUENTE DE CONSULTA:

Fue luego conducida un análisis sobre el motivo más frecuente, por el cual, los niños de la muestra acudieron a la consulta en la Policlínica, y figuró que el motivo más frecuente fue por Revisión Rutinaria, con el 38%. El 14% de ellos vinieron para Dolor, el 32% acudieron por Caries, el 6% para Continuación del tratamiento, un 3% por Revisión en el colegio, y por último resultó un 0% que no Sabe No Contesta.

Motivo de Consulta	Historias clínicas	Prevalencia
Caries	42	32,06%
Continuación del tratamiento	9	6,87%
DOLOR	22	16,79%
No sabe no contesta	2	1,53%
Revisión colegio	6	4,58%
Revisión rutinaria	50	38,17%
<b>Total, general</b>	<b>131</b>	<b>100,00%</b>

**Gráfico 7:** Motivos de consulta.



## OBTURACIONES/EXODONCIAS PREVIAS:

Obturaciones previas	Historias clínicas	Prevalencia
NO	32	24,42%
SI	99	75,57%
<b>Total, general</b>	<b>131</b>	<b>100,00%</b>

Exodoncias previas	Historias clínicas	Prevalencia
NO	93	70,99%
SI	38	29,01%
<b>Total, general</b>	<b>131</b>	<b>100,00%</b>

El porcentaje de niños con experiencia de obturaciones u obturaciones hechas fue el 75% de la muestra, mientras que el porcentaje de niños con exodoncias previas fue el 29%.

## CEPILLADO DIARIO Y EMPLEO DE COLUTORIOS:

Fecha de Nacimiento	Promedio de Frecuencia de cepillado diario	Desviación est. de Frecuencia de cepillado diario
<b>2012</b>	<b>2,13</b>	<b>0,82</b>
<b>2013</b>	<b>2</b>	<b>0,65</b>
<b>2014</b>	<b>1,75</b>	<b>0,96</b>
<b>Total, general</b>	<b>2,09</b>	<b>0,79</b>

Pasta dental	Historias clínicas	Prevalencia
NO	3	2,29%
SI	128	97,71%
<b>Total, general</b>	<b>131</b>	<b>100,00%</b>

Enjuague diario	Historias clínicas	Prevalencia
NO	109	83,21%
SI	22	16,79%
<b>Total, general</b>	<b>131</b>	<b>100,00%</b>

Enjuague semanal	Historias clínicas	Prevalencia
NO	120	91,60%
SI	11	8,40%
<b>Total, general</b>	<b>131</b>	<b>100,00%</b>

<b>Aplicación Flúor</b>	<b>Historias clínicas</b>	<b>Prevalencia</b>
NO	117	89,31%
SI	14	10,69%
<b>Total, general</b>	<b>131</b>	<b>100,00%</b>

Uno de los datos más importante que fue analizado resultó ser la media del cepillado diario de estos niños que, se cepillan los dientes 2 veces al día de media, y el 98% de ellos utiliza pasta dental para las sesiones de higiene oral. Además, el 17% de ellos suele utilizar un colutorio, de tipo diario para coadyuvar la limpieza diurna de los dientes, y un 8% utiliza un enjuague de tipo semanal. El 11% de los niños de la muestra tuvieron al menos una aplicación de flúor en cubeta por profesional.

#### LACTANCIA MATERNA Y LACTANCIA ARTIFICIAL:

<b>Fecha Nacimiento</b>	<b>Media de Lactancia Materna meses</b>	<b>Lactancia Materna meses D.E.</b>	<b>Media de Lactancia Artificial</b>	<b>Lactancia Artificial D.E.</b>
<b>2012</b>	<b>11,2</b>	<b>9,67</b>	<b>9,28</b>	<b>11,3</b>
<b>2013</b>	<b>10,3</b>	<b>9,42</b>	<b>8,92</b>	<b>10,4</b>
<b>2014</b>	<b>13</b>	<b>8,25</b>	<b>6</b>	<b>12,0</b>
<b>Total, general</b>	<b>11,1</b>	<b>9,53</b>	<b>9,11</b>	<b>11,1</b>

Fueron además recogidos datos sobre el tipo y tiempo de lactancia que estos niños tuvieron en sus primeros años de vida, resultando una media de 11 meses de lactancia materna, y 9 meses de lactancia artificial.

#### PROBLEMAS EN EL EMBARAZO Y PROBLEMAS NEONATALES:

<b>Problemas en el embarazo</b>	<b>Historias clínicas</b>	<b>Prevalencia</b>
NO	109	83,21%
SI	21	16,03%
0	1	0,76%
<b>Total, general</b>	<b>131</b>	<b>100,00%</b>

Problemas neonatales	Historias clínicas	Prevalencia
0	1	0,76%
NO	115	87,79%
SI	15	11,45%
<b>Total, general</b>	<b>131</b>	<b>100,00%</b>

La prevalencia de niños que tuvieron problemas durante la gestación fue el 16% de la muestra total. Mientras que resultaron el 11% con problemas neonatales de salud.

#### PRIMERA VEZ AL DENTISTA:

Primera vez dentista	Historias clínicas	Prevalencia
NO	83	63,36%
SI	48	36,64%
<b>Total, general</b>	<b>131</b>	<b>100,00%</b>

La prevalencia de niños que acudieron por primera vez al dentista resultó el 36% de la muestra total.

#### ORTODONCIA:

Ortodoncia	Historias clínicas	Prevalencia
NO	124	94,66%
Si	7	5,34%
<b>Total, general</b>	<b>131</b>	<b>100,00%</b>

El porcentaje de niños con aparato ortodóncico fue el 5% de la muestra.

#### DOLOR BUCAL:

Dolor Bucal	Historias clínicas	Prevalencia
NO	93	70,99%
SI	38	29,01%
<b>Total, general</b>	<b>131</b>	<b>100,00%</b>

Durante la anamnesis de los sujetos, resultó que el 30% de ellos acudieron a consulta con algún tipo de dolor en la cavidad bucal.

## **Discusión:**

En los últimos años se realizaron por parte de las Comunidades Autónomas diferentes estudios y encuestas, con la misma metodología, recomendada por la Organización Mundial de la Salud. Pero a pesar de basarse en un mismo método, presentan limitaciones para su comparación, tales como:

Edad a la que se realizan las encuestas, la cohorte que siempre incluyen todas las encuestas, son los 12 años, y tal vez se estudia el grupo etario de 5-6 años

Además, en el grupo de 15 años, en los estudios realizados antes de 2000 se suele utilizar también la edad de 14 años (límite de la enseñanza obligatoria en años anteriores).

Existen también diferencias, en los criterios de selección de las poblaciones escolares, algunos estudios consideran como unidad de muestreo las aulas y las escuelas, otros autores usan alumnos divididos por escuelas, y otros grupos etarios son agrupados por pueblos.

Respecto al método de muestreo, según edad; en algunos estudios se asume la edad del estudio exacta, otras veces se recogen juntos todos los niños de con diferente edad, por el hecho de estar matriculados en un determinado curso escolar.

En otros artículos se utilizan, niños matriculados en un curso escolar que correspondan con la edad exacta que define el estudio, excluyendo a niños de diferentes edades a la de la encuesta.

Sin embargo, a pesar de estas diferencias metodológicas, el intento es realizar comparaciones que proporcionen el conocimiento de la situación real de nuestra comunidad.

### **Análisis de datos de niños 5-7 años:**

En este estudio, después de haber dividido y organizado los datos obtenidos, por las dos cohortes de edad, se ha procedido al análisis, de manera que resulta:

- La mayoría son 28 individuos masculinos (80%) y 7 femeninos (5,34%)
- La media del CAOD=1,28
- La media del CAOS=1,28
- La media del CAOM=1,22
- La media del cod=5,65
- La media del cos=13
- La media del Índice Gingival es 5%
- La media del Índice de Placa es 15%
- La media del Índice de Restauración permanente (IR) es 26%
- La media del Índice de Restauración temporal (ir) es 21%

### **Análisis de datos de niños 7-9 años:**

En cuanto a los niños de la cohorte de edad de 7-9 años resulta que:

- La mayoría son 68 individuos masculinos (71%) y 28 femeninos (21%)
- La media CAOD=2,35
- La media CAOS=2,66
- La media del CAOM=2,09
- La media del cod=4,18
- La media del cos=8,45
- La media del Índice Gingival es 12%
- La media del Índice de Placa es 17%
- La media del Índice de Restauración permanente (IR) es 42%

- La media del Índice de Restauración temporal (ir) es 28%

### Análisis de datos de las cohortes de 5-7 y 7-9:

Fecha nacimiento	Prevalencia %	Numero de sujetos
<b>1</b>	<b>73,28%</b>	<b>96</b>
<b>2012</b>	<b>55,73%</b>	<b>73</b>
+ Trim.1	12,98%	17
+ Trim.2	11,45%	15
+ Trim.3	15,27%	20
- Trim.4	16,03%	21
ott	6,87%	9
nov	5,34%	7
dic	3,82%	5
+ 2013	15,27%	20
+ 2014	2,29%	3
<b>2</b>	<b>26,72%</b>	<b>35</b>
<b>2012</b>	<b>22,14%</b>	<b>29</b>
+ Trim.1	6,87%	9
+ Trim.2	6,87%	9
+ Trim.3	2,29%	3
- Trim.4	6,11%	8
ott	3,82%	5
nov	1,53%	2
dic	0,76%	1
+ 2013	3,82%	5
+ 2014	0,76%	1
<b>Total general</b>	<b>100,00%</b>	<b>131</b>

Analizando los datos totales obtenidos de las dos cohortes de edad, figura que:

- La mayoría son 96 individuos masculinos (73,28%)
- La media del CAOD=2,06
- La media del CAOS=2,3
- La media del CAOM=1,86
- La media del cod=4,58
- La media del cos=9,67
- La media del Índice Gingival es 11%
- La media del Índice de Placa es 16%

- La media del Índice de Restauración permanente (IR) es 37%
- La media del Índice de Restauración temporal (ir) es 38%
- La media del cepillado diario es 2 veces al día
- La media de la lactancia materna es 11 meses
- La media de la lactancia artificial es 9 meses
- El porcentaje de los traumatismos en la cara es 10%
- El porcentaje de maloclusión es el 30%
- El porcentaje del motivo de consulta más frecuente es por revision rutinaria 38%
- El porcentaje de obturaciones previas es 75%
- El porcentaje de exodoncias previas es 29%
- El porcentaje de utilizo de pasta dental es 98%
- El porcentaje de enjuague diario es 17%
- El porcentaje de enjuague semanal es 8%
- El porcentaje de aplicación previo de flúor por profesional es 11%
- El porcentaje de traumatismo en dientes es 12%
- El porcentaje de Hipo-mineralización Incisivo-Molar es 0,76%
- El porcentaje de problemas durante el embarazo es 15,2%
- El porcentaje de complicaciones neonatales es 11,5%
- El porcentaje de individuos con experiencia previa de tratamientos es el 63,4%
- El porcentaje de individuos sin experiencia previa de tratamientos es el 36,6%
- El porcentaje de individuos con aparatos ortodóncicos es 5,3%
- El porcentaje de individuos con dolor bucal es el 30%.

- El porcentaje de individuos con CAOD=0 fue el 35%

El porcentaje de individuos con cod=0 fue el 17%

### **Comparación de datos con España:**

Durante la búsqueda bibliográfica realizada en este estudio, han sido analizadas todas las encuestas de salud oral nacionales españolas, y considerando que, las últimas dos son la más representativas de la situación actual, la comparación a nivel nacional, con los datos obtenidos de nuestra policlínica, será llevada a cabo, sobre todo, con las encuestas nacionales de salud oral en España 2015<sup>4</sup> y 2020<sup>5</sup>. Además, es importante destacar que las últimas encuestas nacionales, 1993, 2000, 2005, 2010, 2015, y 2020 emplean la misma metodología, analizando 5 cohortes etarias, como recomienda la OMS, y por tanto la comparación con estas encuestas será meramente con la cohorte de edad de 5-6 años, una limitación de este hecho es que todos los datos relativos a maloclusiones, traumatismos, cepillado e incluso Índices de Placa y Gingival no vienen estudiadas por esta cohorte de edad.

Los resultados obtenidos en este estudio epidemiológico, por la cohorte de 5-7 años destacan Índices de caries muy altos respecto a los referidos en las últimas encuestas de salud oral de España del 2015<sup>4</sup> y 2020<sup>5</sup>.

Precisamente la muestra de la encuesta del 2015 tuvo un índice cod=1,11; mientras que en nuestra policlínica figuró un índice cod=5,65

Entonces podemos afirmar que; nuestros datos resultan mucho más altos, y no solo comparándolos con las últimas dos encuestas nacionales, sino también con otras encuestas nacionales más antiguas, no hemos obtenido datos similares, si consideramos que la media cod en la encuesta nacional del 1993 era 0,97.

En cuanto al Índice de Restauración (ir), apenas se modificó en las últimas décadas en España: pasando desde una media del 13,4 de 1993 hasta una media de 21,4 en 2015, sugiriendo un déficit de atención en cuanto a las restauraciones a nivel nacional en la dentición temporal<sup>4</sup>.

En comparación con la encuesta de salud oral del 2020, con una muestra poblacional de 768 niños con edad media de 5,6 años, es también evidente la diferencia, en cuanto los autores obtuvieron un índice cod=1.28 ± 2.42 y un ir=27,1; mientras que en la dentición permanente un IR=29,4 y un CAOD=0.02 ± 0.21 con un porcentaje de individuos libres de caries del 64,5%, mientras que nosotros hemos obtenido una media de índice CAOD=1,28 por esta cohorte de edad.

A nivel nacional desde el 1993 con un índice de CAOD=3,1 la tendencia ha sido muy positiva en España, con un pico máximo en la encuesta del 2010 con un CAOD=3.7, ha bajado considerablemente hasta un valor de CAOD=1,3 en la encuesta del 2020, por tanto, la situación de los niños con rango de edad de 5-7 años que acudieron en 2019 a consulta dental en la Policlínica Universitaria de la Universidad Europea de Madrid se sitúa muy debajo los estándares nacionales.

Respeto a la tercera encuesta de salud oral de niños y adolescentes de Navarra, del 2002<sup>46</sup>, resultan dos cohortes de edades útiles a este estudio, la primera de 6 años de edad y la segunda de 8-9 años. La cohorte de 6 años con unos índices cod=1,28 y CAOD=0,04 mientras que en la cohorte de 8-9 años, unos índices cod=1,58 y CAOD=0,27. También en este caso los resultados obtenidos en este estudio son mucho más superiores, a las medias de Navarra 2002, y efectivamente considerando la precedente encuesta del 1997, se aplica el mismo

principio, en cuanto resultan muy inferiores respecto a los niños de la policlínica. En cuanto a los Índices de restauración en Navarra 2002, resultaron: ir=21,9% e IR=16,7% a los 6 años e ir=31% e IR=48,1% a los 8-9 años, resultados muy parecidos a los obtenidos con este estudio, respectivamente; ir=21% e IR=26% para la cohorte de 5-7 e ir=28% e IR=42% para 7-9 años.

En un estudio conducido en la Comunidad Valenciana, del año 2006<sup>47</sup>, resulta una cohorte con 6 años de edad útil a este estudio, con un índice cod=1,07 y un CAOD=1,84; hay que destacar que esta muestra tuvo un porcentaje de extranjeros del 64,1% respecto al 31,7% de niños españoles, y efectivamente la hipótesis de este estudio fue comprobar la asociación entre caries e inmigración. Fue además estudiado el porcentaje de sangrado gingival en estos niños de 6 años, resultando un 16% de sangrado en la muestra total de 509 niños<sup>47</sup>.

Fue luego analizada la encuesta de salud bucodental en escolares de Aragón<sup>48</sup>, con una población útil a este estudio de 851 niños, con una edad media de 6 años.

Con unos índices medios totales mucho menores respecto a este estudio, respectivamente; cod=0,61 y CAOD=0,02; considerando los índices por intervalos de edades, obtuvieron; en el rango 5-9 años, en 30 niños, un cod=3,7. Un índice CAOM=1,15 muy similar al nuestro (CAOM=1,86) que aumentaba significativamente después de los 12 años. Con unos índices de restauración que aumentaban también con la edad, siendo mucho mayor en la dentición permanente, ir=58,8% e IR=20,9%, diferentes con los obtenidos por este estudio con este rango de edad ir=28% e IR=35%.

En cuanto a la prevalencia de caries en dentición temporal, resultó de la encuesta en Aragón 2002 que el 22% de los niños del estudio con 6 años tuvieron caries.

En el estudio conducido en Castilla la Mancha 2004, obtuvieron una prevalencia de caries del 43% en niños de 7 años.

En otro estudio, en Navarra en 2002, resultó una prevalencia de caries del 35,4% a los 6 años.

En una encuesta conducida en Extremadura en el 2001 resultó el 35% de prevalencia de caries en niños de 6 años.

En Andalucía en 2001 fue realizada una encuesta donde obtuvieron que el 41% de los niños con 7 años tenía caries.

En un estudio realizado en Canarias en 1998 resultó una prevalencia de caries del 38,36%.

En cuanto a los Índices de Restauración temporal en España, los datos son muy similares a los obtenidos en la policlínica universitaria, y efectivamente si consideramos estudios como: Aragón 2004 (ir=20,9%), Castilla la Mancha 2004 (ir=21%), Navarra 2002 (21,9%) son compatibles con el ir medio de nuestra población total (ir=21%), e incluso un poco mayores.

Comparados datos relativos a opacidades y MIH, figura que es una condición bastante rara, también en la literatura científica y efectivamente en el estudio conducido en Aragón 2004, solo un 12% de toda la muestra estudiada de 851 niños presenta opacidades y manchas asociadas con el MIH<sup>48</sup>.

En cuanto a la maloclusión, en la encuesta de salud bucodental en escolares de Aragón, el 77% presentaba una maloclusión leve o ligera, resultando solo lo 0,7% de pacientes con aparatos ortodóncicos, dato extremadamente menor respecto al obtenido en este estudio (5,3%).

Además, en nuestra policlínica resulta que, el 10% de la muestra tuvo al menos un traumatismo en la cara y el 12% al menos un traumatismo en los dientes, mientras que en la encuesta de salud bucodental en escolares de Aragón resulta el 3,52% de traumatismos en niños de 6 años, los autores subrayaron pero que este valor fue mucho menor respecto al resultado esperado.

En cuanto a prevalencia de maloclusión en 2009<sup>9</sup>, Cristina Martin Cid et al. realizaron un estudio en una muestra de 203 individuos de edad comprendida entre 6-15 años, donde figuró una prevalencia de maloclusión del 58,31%, mientras que en nuestra policlínica en 2019 el porcentaje de niños con maloclusión en la muestra total resultó solo el 30%.

### **Comparación de datos en Europa:**

En el 2015, en Albania fue conducido un estudio sobre 2,039 preescolares con 5 años de edad<sup>50</sup>, solo el 15,7% resultó tener un Índice CAOD=0, casi la mitad de lo obtenido con este estudio, (13%); y un cod=0 de 19,3% mayor a lo obtenido en la policlínica (cod=0 16,79%). El 33% de la muestra total presentaba caries de alta severidad.

En la revisión sistemática publicada por Kitty J. Chen et al. en 2018, en niños de 5 años de edad<sup>51</sup> de toda Europa, (Tabla 23); se puede apreciar la diferencia entre el norte, centro y sur Europa, así que los índices cod, de los estudios conducidos por Grund et al.<sup>52</sup>(Alemania); Bissar et al.<sup>53</sup>(Alemania); Monaghan et al.<sup>54</sup>(Wales); Monaghan et al.<sup>54</sup>(Inglaterra); Monaghan et al.<sup>54</sup>(Escocia); resultan significativamente más bajos respecto a los datos, recogidos en la policlínica universitaria (cod=5,65), mientras que, estudios conducidos en sur de Italia, o Norte-este de Grecia, presentan valores más similares a los de Índice cod, recogidos en este estudio.

En relación al HIM, en el 2012, R. Condón et al. realizaron un estudio en Roma, Italia para evaluar, en 1500 pacientes pediátricos la prevalencia de HIM, obteniendo un porcentaje de 7,3% (110), mientras que, en los niños de la policlínica en 2019, figuraron el 0,76% de niños con HIM, dato muy inferior, también en comparación con la frecuencia media (12%)<sup>60</sup> encontrada en la literatura científica. Efectivamente si comparamos nuestro porcentaje de HIM con los datos expuestos en la tabla 4, relaborada desde la revisión sistemática de B. Jälevik et al. se puede apreciar que:

En Finlandia, en el estudio de Alaluusua<sup>40</sup> et al. (1996) en una muestra con rango de edad 6-7 años, nuestros valores de HIM son muy inferiores, También comparado con el estudio de Calderara et al. en Italia, nuestros datos resultan mucho menores, en Alemania, Dietrich et al. 2003, aunque tengan unos de los porcentajes menores del estudio, presentan una frecuencia mucho mayor respecto a los niños de la policlínica en 2019 (0,76%). Lo mismo pasa en otras ciudades europeas como; Jasulaityte et al. 2007, Holanda; Jälevik et al. 200, Suecia; Wogelius et al. 2008, Dinamarca, con respectivamente el 14,3%; 18,4% y el 14,6%.

En la Tabla 5, se exponen varias prevalencias de HIM resultantes de diferentes estudios epidemiológicos, recogidos por la revisión sistemática de Hernández M. et al.<sup>41</sup> Hay que destacar que, de todos los estudios conducidos sobre prevalencia de HIM en Europa, ninguno representa o tiene similitud con los resultados obtenidos en este estudio, la mayoría de estos se sitúa en un rango de prevalencia entre el 10% y 17%.

## **Comparación de datos en otros Países:**

En el 2000 fue realizado un estudio en Brasil, para analizar el índice cod en niños de edad entre 2-6 años<sup>59</sup>. Los resultados útiles son expuestos en la Tabla 24. Se puede apreciar que el porcentaje de niños, en este estudio, libres de caries es muy alto contrariamente a los niños de la policlínica (cod=0 16,79%).

En un estudio realizado en México, utilizando los índices de caries, para estudiar una población de 1545 niños, fueron recogidos los datos expuestos en la Tabla 25. El índice CAOD medio resultó muy similar a los datos nacionales españoles, y al mismo tiempo mucho menores respecto a los niños encuestados en este estudio.

En otro estudio publicado por Ghada S. et al. en 2014<sup>61</sup>, fueron recogidos tramite una revision sistematica, todos los datos de la literatura científica disponible en los Emiratos, los resultados útiles son expuestos en la Tabla 26.

Claramente existe una similitud con los datos obtenidos en la policlínica universitaria, (cod=5,65; 5-7) también por la prevalencia muy alta, en estos artículos científicos.

En otro estudio publicado en 2000<sup>67</sup>, en Arabia Saudita, de R.A. Al-Banyan et al. figuran los resultados expuestos en la tabla 27, donde se aprecian, los índices cod, parecidos a los obtenidos en nuestras cohortes, pero aun menores, mientras que los índices cos son mucho mayores respecto a la población de nuestro estudio (cos=5,65; 5-7); (cos=8,45; 7-9); (cos=9,67 muestra total). En cuanto a los índices CAOD son muy parecidos respecto a ambas cohortes de edades de este estudio, respecto a los índices CAOS, los datos obtenidos de las historias clínicas de la policlínica son ligeramente más inferiores en la cohorte de 5-7 y en

la cohorte de 7-9, y resultan mucho menores respecto a los niños en Riyadh, Arabia Saudita<sup>67</sup>.

En la Tabla 28 se pueden apreciar los resultados útiles de la revisión sistemática publicada por Kitty J. Chen et al. en 2018, la mayor parte de estos estudios han sido elaborados utilizando los criterios de la OMS, y resalta mucho, la similitud entre los datos obtenidos de las historias clínicas de la policlínica universitaria de la Universidad Europea de Madrid y todos aquellos estudios realizados en países asiáticos, en cuanto a prevalencia de caries y a dientes temporales cariados, considerando que el índice COD obtenido de la cohorte de 5-7 años es COD=5.65, se puede apreciar que todos los países asiáticos, se encuentran el mismo rango de valores para el índice COD.

En cuanto a los índices de Placa y Gingival, en 2013, fue conducido por Khaled A. Al-Haddad et al. un estudio sobre la higiene oral de 1292 niños con edad de 5 años,<sup>14</sup> sus resultados fueron un Índice de placa de  $0.35 \pm 0.47$  y un índice gingival resultó en un rango de  $0.19 \pm 0.38$ . Los resultados de este estudio son expuestos en la Tabla 1. En comparación con los resultados obtenidos en la policlínica en el grupo etario 5-7 años (IG= 5%; IP=15%) podemos afirmar que, en cuanto a higiene oral, obtuvimos datos mejores respecto al estudio publicado por Khaled A. Al-Haddad et al.

Comparando nuestros resultados de traumatismos, con el estudio epidemiológico de Stockwell AJ et al.<sup>22</sup> hecho en Australia, Tabla 2, figura que: nuestra cohorte poblacional entera (5-7 7-9) tiene una menor incidencia de traumatismos respecto a los niños encuestados en dicho estudio.

En cuanto a las maloclusiones, nuestros resultados, respecto a estudios publicados en Uruguay<sup>23</sup> son muy positivos, puesto que nuestra población

muestral presenta un porcentaje de maloclusión del 30% mientras que los primeros datos publicados en Uruguay, revelaron una afectación del 65,7%, más del doble de la policlínica.

Otro estudio en Montevideo, Uruguay mostró un 38% de maloclusiones, mientras que los últimos datos disponibles del 1991 y 2001, revelan una frecuencia del 70,7% en niños de 4 y 6 años, de Montevideo y Rivera<sup>24</sup>.

En la encuesta nacional de salud oral (SB Brasil 2010),<sup>25</sup> el 63,2% resultó tener al menos un problema de maloclusión.

En la revisión sistemática de 2016, en 28,693 niños iraníes, (Tabla 3) resultaron porcentajes de maloclusión mucho mayores respecto a la encontrada en 2019 en nuestra policlínica.

Comparando los datos de prevalencia de HIM, obtenidos con la revisión sistemática de Hernández M. et al.<sup>41</sup> (Resultados en Tabla 5 y 6) es evidente, que ninguno de los estudios encontrados, en diferentes países de todo el mundo, tiene similitud con los datos obtenidos de nuestra policlínica en niños que acudieron en 2019.

## **Conclusiones:**

### **1. Conclusión Primaria:**

Los Índices en esta población tienen un valor alto, muy superior a los datos de las encuestas españolas nacionales, y a las encuestas realizadas en general en toda España y Europa, mientras que tienen ciertas similitudes y son bastante parecidos a los encontrados en países asiáticos. El porcentaje de traumatismos resultó ligeramente superior respecto a estudios realizados en España, pero mucho menor respecto a investigaciones conducidas a nivel mundial. El porcentaje de maloclusión figuró considerablemente más bajo en comparación a estudios realizados en Madrid y en el resto del mundo, también el porcentaje de sujetos con HIM fue extremadamente menor respecto a los datos nacionales y mundiales.

### **2. Conclusiones Secundarias:**

- I. Los datos de caries en la cohorte de edad de 5-7 años resultaron en general muy altos en comparación a estudios españoles, no obstante, resultaron muchas similitudes con los Índices de Restauración (ir) de estudios realizados en Comunidades Autónomas cuales: Navarra, Aragón, y Castilla la Mancha.

Los datos de caries en la cohorte de edad de 7-9 años resultaron ampliamente superiores en comparación a España y otros países de Europa, pero al mismo tiempo muy similares a los de Emiratos Árabes, y ligeramente inferiores a los encontrados en Arabia Saudita, resultando los Índices CAOS mucho menores en comparación con estos últimos.

El motivo de consulta más frecuente fue por revision rutinaria.

- II. El porcentaje de niños con obturaciones hechas fue medio-alto, en contra a la tendencia nacional española de las últimas décadas, que subestima la importancia de la restauradora. Una buena parte de la muestra tuvo exodoncias previamente hechas, no se ha podido establecer si representa un dato positivo o negativo, y si efectivamente las exodoncias fueron hechas por causas ortodóncicas o de caries.
- III. Resultó que la gran mayoría de estos niños, según los padres se cepilla frecuentemente los dientes cada día, y casi la totalidad de ellos coadyuva el cepillado con una pasta dental fluorada, además, una buena parte suele usar enjuagues diarios, y un pequeña parece usar colutorios semanales. Solo una mínima parte de ellos, fue tratada con aplicación de flúor en cubeta da parte de un profesional durante la consulta.

**Responsabilidad social:**

Es importante, la responsabilidad que tiene cualquier odontólogo en trabajos de investigación a nivel de salud oral, en estudios epidemiológicos y encuestas, para intentar proporcionar una alta calidad en los tratamientos de cada día y poder mejorar la calidad de vida de los pacientes.

**Sostenibilidad económica:**

Es importante destacar que la realización de estudios epidemiológicos y encuestas de salud oral representan un gran impacto económico a nivel individual y poblacional.

**Sostenibilidad social:**

El motivo principal por el cual se diseñan los estudios epidemiológicos y en particular este estudio de investigación es, poder cuantificar el estadio de salud actual de una muestra, y sobre todo las necesidades de tratamientos preventivos a implementar, necesarios para mejorar la salud bucodental de un conjunto de individuos.

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## ANEXOS:

### Anexo 1. Aprobación del Comité de ética.



*Comité de Ética de la Investigación de la  
Universidad Europea de Madrid*

D. Alberto Adanero Velasco  
Departamento de Odontología  
Universidad Europea de Madrid

Madrid, 22 de octubre de 2019

Estimado investigador:

En relación al Proyecto de Investigación titulado:

**"Estado de salud bucodental de escolares de la ciudad de Madrid entre 6 y 12 años e implementación de estrategias preventivas y de tratamiento en la Policlínica universitaria de odontología de la Universidad Europea de Madrid"**

este Comité de Investigación, en su reunión del día 24 de octubre de 2019, ha procedido a la revisión del mismo, y ha decidido que está en situación de:

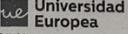
#### **APROBADO**

Al proyecto se le ha asignado el código interno **CIPI/19/128**. Se recuerda que este código es imprescindible para realizar todos los trámites asociados a su ejecución.

Atentamente,

Fdo.: Emma Cuenca Revuelta  
Secretaria del Comité de Ética de la Investigación

## Anexo 2. Hoja de Consentimiento informado que firman los padres a la primera visita.

 **Universidad Europea**

**CLINICA UNIVERSITARIA UNIVERSIDAD EUROPEA**

Este centro pertenece a la Universidad Europea.

Las actividades son realizadas por alumnos de Grado bajo supervisión de los Profesores de la Universidad Europea.

Dichas actividades les proporcionan un estudio diagnóstico y un plan de tratamiento global que usted conocerá en detalle y aceptará libremente.

De igual manera será informado/a de los mejores tratamientos previstos para el mantenimiento o recuperación de la salud en su caso particular.

Todos los documentos y registros, que se derivan de esta actividad, son propiedad de la Universidad que los podrá utilizar con fines docentes o científicos, cumpliendo siempre la Ley de Protección de Datos.

Si está usted de acuerdo en aceptar la mutua colaboración que le ofrece la Universidad Europea, le agradecemos firme el presente impreso.

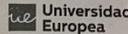
Nombre y Apellidos: ..... D.N.I./N.I.E./Nº Pasaporte.....

Tutor: ..... D.N.I./N.I.E./Nº Pasaporte.....

Firma: ..... Fecha: .....

**MUY IMPORTANTE: EL TUTOR NO PUEDE AUSENTARSE DE LA SALA**

UNIVERSIDAD EUROPEA DE MADRID, S.A.U., entidad del GRUPO EUROPA EDUCATION y titular de la Clínica Universitaria Odontológica y de la Policlínica Universitaria (individualmente, la "Institución"), actuará como responsable del tratamiento de los datos personales (incluyendo datos relativos a la salud, biométricos o cualquier otro que tenga la consideración de especialmente protegido) facilitados por usted a la correspondiente Institución con la finalidad de guardar registro de su historial médico, ofrecerle un servicio de diagnóstico y tratamiento médicos, así como remitirle cualquier información relativa a los servicios prestados y actividades de la Institución. La base para el tratamiento de los datos personales facilitados por Usted se encuentra en la prestación de los servicios sanitarios contratados por Usted, así como en el interés legítimo de la Institución como prestadora de dichos servicios. Los datos personales facilitados por Usted se incluirán en un fichero automatizado cuyo responsable es UNIVERSIDAD EUROPEA DE MADRID, S.A.U. Asimismo, de no manifestar fehacientemente lo contrario, usted consiente expresamente el tratamiento automatizado total o parcial de dichos datos por el tiempo que sea necesario para cumplir con los fines indicados. El titular de los datos tiene derecho a acceder, rectificar y suprimir los datos, limitar su tratamiento, oponerse al tratamiento y ejercer su derecho a la portabilidad de los datos de carácter personal, todo ello de forma gratuita, tal como se detalla en la Política de Privacidad de la Institución, en el enlace <https://universidad.europa.es/politica-de-privacidad>. Podrá efectuar cualquier consulta en relación con el tratamiento de sus datos personales, así como ejercer los derechos antes dichos, en la dirección [epo@universidad.europa.es](mailto:epo@universidad.europa.es).

 **Universidad Europea**

**CONSENTIMIENTO PARA ACCESO A LA HISTORIA CLÍNICA POR LOS ALUMNOS**

**DATOS DEL PACIENTE:**

Don/a: ..... De: ..... años, con

DNI/ PASAPORTE: .....

Con domicilio en: .....

**DATOS DEL TUTOR/REPRESENTANTE LEGAL:**

Don/a: ..... De: ..... años, con

DNI: .....

Con domicilio en: .....

En calidad de: .....

De conformidad a lo previsto en la Orden SSI/81/2017, de 19 de enero, por la que se publica el Acuerdo de la Comisión de Recursos Humanos del Sistema Nacional de Salud, por el que se aprueba el protocolo mediante el que se determinan pautas básicas destinadas a asegurar y proteger el derecho a la intimidad del paciente por los alumnos y residentes en Ciencias de la Salud, con el fin que los alumnos puedan atenderle y realizarle los tratamientos necesarios con la intervención de su tutor, usted presta su consentimiento expreso para que puedan acceder a sus datos contenidos en la historia clínica digital. Estos datos son confidenciales y únicamente serán usados para la finalidad prevista.

En Madrid, a \_\_\_\_ de \_\_\_\_ de \_\_\_\_

.....  
FIRMA PACIENTE

UNIVERSIDAD EUROPEA DE MADRID, S.A.U., entidad del GRUPO EUROPA EDUCATION y titular de la Clínica Universitaria Odontológica y de la Policlínica Universitaria (individualmente, la "Institución"), actuará como responsable del tratamiento de los datos personales (incluyendo datos relativos a la salud, biométricos o cualquier otro que tenga la consideración de especialmente protegido) facilitados por usted a la correspondiente Institución con la finalidad de guardar registro de su historial médico, ofrecerle un servicio de diagnóstico y tratamiento médicos, así como remitirle cualquier información relativa a los servicios prestados y actividades de la Institución. La base para el tratamiento de los datos personales facilitados por Usted se encuentra en la prestación de los servicios sanitarios contratados por Usted, así como en el interés legítimo de la Institución como prestadora de dichos servicios. Los datos personales facilitados por Usted se incluirán en un fichero automatizado cuyo responsable es UNIVERSIDAD EUROPEA DE MADRID, S.A.U. Asimismo, de no manifestar fehacientemente lo contrario, usted consiente expresamente el tratamiento automatizado total o parcial de dichos datos por el tiempo que sea necesario para cumplir con los fines indicados. El titular de los datos tiene derecho a acceder, rectificar y suprimir los datos, limitar su tratamiento, oponerse al tratamiento y ejercer su derecho a la portabilidad de los datos de carácter personal, todo ello de forma gratuita, tal como se detalla en la Política de Privacidad de la Institución, en el enlace <https://universidad.europa.es/politica-de-privacidad>. Podrá efectuar cualquier consulta en relación con el tratamiento de sus datos personales, así como ejercer los derechos antes dichos, en la dirección [epo@universidad.europa.es](mailto:epo@universidad.europa.es).

### Anexo 3. Hoja de Protección de datos para la recogida de datos.

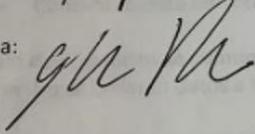
**Información Básica sobre Protección de Datos Pacientes**

<b>Responsable</b>	Universidad Europea de Madrid
<b>Finalidad (sencilla)</b>	Investigación Trabajo de fin de Grado
<b>Legitimación</b>	Consentimiento del interesado
<b>Destinatarios</b>	No se prevén cesiones de datos No se prevén transferencias internacionales
<b>Derechos</b>	Acceder, rectificar y suprimir los datos, así como otros derechos, explicados en la información adicional.
<b>Procedencia</b>	Del interesado
<b>Información adicional datos</b>	Puede consultar información adicional y detallada sobre protección de datos en la información adicional posterior

Por la presente, confirmo proteger los datos investigados mediante la grabación en un Pen Drive que custodiará el Coordinador de Odontología Infantil, quedando terminante prohibido realizar copias de los datos y sacar información externa de los pacientes.

Nombre Interesado: GIUSEPPE PELUSO.....DNI: AV 8519238.....

Fecha: 30/11/2020.....

Firma: 

## Encuesta de Salud Oral en España 2010

Llodra Calvo JC\*

### JUSTIFICACIÓN DEL PROYECTO

Las encuestas nacionales sobre salud bucodental tienen como función básica el proporcionar una idea de conjunto sobre salud y necesidades de tratamiento poblacional con el fin de vigilar la evolución de las tasas de morbilidad. Nos permiten conocer:

1. La medida en que los servicios odontológicos existentes responden a las necesidades de la población.
  2. La naturaleza y cuantía de los servicios de prevención y restauración necesarios.
  3. Los recursos necesarios para implantar, mantener, aumentar o reducir los programas de salud bucodental, estimando las necesidades cuantitativas y el tipo de personal requerido.
- En 1993 el Consejo General de Colegios de Odontólogos y Estomatólogos de España encargó la realización de una encuesta epidemiológica bucodental, siguiendo los criterios establecidos por la Organización Mundial de la Salud (OMS) para la ejecución de estudios transversales tipo *passifinder*. Ese estudio, publicado en 1995,<sup>1</sup> se realizó una década después del anterior, desarrollado en 1984 bajo supervisión de la OMS.<sup>2</sup> En el año 2000 el Consejo General volvió a encargar otro nuevo estudio epidemiológico. Finalmente, en 2005 se repitió el estudio epidemiológico bucodental. Con la vocación de garantizar un seguimiento de la salud bucodental de la población española, transcurridos 5 años desde entonces, se justifica plenamente este Proyecto.

### INTRODUCCIÓN

#### Estudios epidemiológicos sobre salud bucodental en España

A continuación pretendemos exponer la evolución de las dos enfermedades que presentan mayor trascendencia en salud oral, la caries dental y las enfermedades periodontales. El primer estudio sobre prevalencia

\*Director del proyecto.

Encuestadores: Brau Mañá I, Díaz Cano I, Rivera Romo C, Ruiz Díaz D, Talala Pastor H, López Jiménez E.

Información de datos: Carlos Hernández Rodríguez.

Correspondencia autor: Juan Carlos Llodra Calvo. Facultad de Odontología, Colegio Máximo s/n, Campus Universitario de Cartuja, E-18071-Guadalupe (España).

Correo electrónico: jllodra@comjodentistas.es

de enfermedades bucales realizado en nuestro país, y de ámbito geográfico nacional, fue el publicado por Gimeno de Sande en 1971, con trabajo de campo de 1969.<sup>3</sup> Su utilidad comparativa es limitada, pues los estudios posteriores han utilizado una metodología diagnóstica diferente.

En el año 1983 el Ministerio de Sanidad y Consumo encargó a la OMS un informe sobre la salud bucodental en nuestro país. El documento final de este informe se realizó sobre las bases de una encuesta epidemiológica de ámbito nacional, y los resultados del mismo, fueron publicados, parcialmente, por Cuenca.<sup>4</sup>

En 1990 se publicó el tercer estudio de ámbito nacional por Sicilia et al., y con trabajo de campo realizado en 1987.<sup>5,6</sup>

En 1995 se publicó el cuarto estudio epidemiológico con ámbito nacional por Nogueuel et al., con trabajo de campo realizado en 1993.<sup>7</sup>

En el 2002 se publica el quinto estudio epidemiológico de ámbito nacional.<sup>8</sup> Finalmente, en el 2006 se publica el último estudio de las distintas series transversales realizados en España.<sup>9</sup>

Desde el estudio de 1993, los criterios de diseño y tamaño muestral y la preparación de los exploradores son totalmente idénticos facilitando la comparación de los hallazgos obtenidos.

#### Caries dental

1. Grupo 12 años: A esta edad el índice CAOD registrado en 1983 fue de 4,2, para disminuir a 3,5 en 1987. En 1993 fue de 2,32, y se situó en 1,12 en la encuesta del 2000 y en 1,33 en el estudio del 2005. A pesar del valor de esta tendencia, reconocida por distintos autores,<sup>10-12</sup> es difícil, por algunas diferencias metodológicas poder afirmar de manera rotunda que esta tendencia es un fiel reflejo de la realidad. Hoy se acepta que quizás se sobreestimó el índice CAOD en el estudio de la OMS de 1983, ya que estudios contemporáneos de ámbito regional mostraron unas cifras muy inferiores; así en Cataluña se encontró en 1984 un CAOD de 2,98<sup>13</sup> en este grupo de edad, en

## UNIVERSIDAD COMPLUTENSE DE MADRID

FACULTAD DE ODONTOLOGÍA  
Departamento de Profilaxis, Odontopediatría y Ortodoncia



## ESTUDIO EPIDEMIOLÓGICO DE SALUD BUODENTAL EN UNA POBLACIÓN INFANTIL-ADOLESCENTE DE CASTILLA-LA MANCHA.

MEMORIA PARA OPTAR AL GRADO DE DOCTOR  
PRESENTADA POR

Isabel Navarro Montes

Bajo la dirección de los doctores

Rafael Ribobo García  
Ángel González Sanz

Madrid, 2010

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## Encuesta de Salud Oral en España 2005

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#### Agradecimientos:

El estudio ha sido financiado por el Consejo General de Colegios de Dentistas de España, y cuenta con el aval científico de la REDO (Red Española de Epidemiología y Salud Pública Oral).

BIBLI 1138-123X (2006)11:4, julio-agosto 381-496

Encuesta de Salud Oral en España 2005. RCOE 2006;11(4):409-456.

RCOE, 2006, Vol 11, Nº. 4, 409-456

— 102 —

## ESPECIAL RCOE

RCOE 2010; 21 (Supl 1): 8 - 48

## Encuesta de Salud Oral en España 2015

Bravo Pérez M, Almerich Silla JM, Asuna Márquez V, Avilés Gutiérrez P, Blanco González JM, Canoreo Díaz E, Casals Peiró E, Gómez Santos G, Hita Iglesias C, Llodra Calvo JC, Monge Tapiés M, Montiel Company JM, Palmer Vich PF, Sainz Ruiz C\*

### GLOSARIO DE ACRÓNIMOS DEL ESTADO ORAL

- **A:** Número de dientes permanentes ausentes.
- **ATR:** Articulación temporomandibular.
- **ICD:** Número de dientes temporales/permanentes cariados y obturados.
- **CAOD:** suma de dientes permanentes cariados, ausentes y obturados.
- **COB:** suma de dientes temporales cariados y obturados.
- **COO (IADR):** suma de dientes permanentes cuya raíz están cariadas u obturadas.
- **HSM:** Hipomeralización Incisivo-Molar.
- **IPCI:** Índice periodontal comunitario.
- **IR (IADR):** Índice de restauración = (dientes Obturados/CAOD) x 100.
- **MI:** Primeros molares permanentes.
- **MO:** Número de dientes temporales/permanentes obturados.
- **SC:** Significant Caries Index de Bhatnagar. Es el índice CAOD en el tercio con mayor CAOD. Para su cálculo se ordenan los sujetos de menor a mayor CAOD, se selecciona el tercio de sujetos con mayor CAOD y a ese tercio se le calcula el CAOD.

### JUSTIFICACIÓN DEL PROYECTO

Las encuestas nacionales sobre salud bucodental tienen como función básica proporcionar una idea de conjunto

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sobre salud y necesidades de tratamiento poblacional con el fin de vigilar la evolución de las tasas de morbilidad. Nos permiten conocer:

- La medida en que los servicios odontológicos existentes responden a las necesidades de la población.
  - La naturaleza y cuantía de los servicios de prevención y restauración necesarios.
  - Los recursos necesarios para implantar, mantener, aumentar o reducir los programas de salud bucodental, estimando las necesidades cuantitativas y el tipo de personal requerido.
- En 1993, el Consejo General de Colegios de Odontólogos y Estomatólogos de España (actualmente denominado Consejo General de Colegios de Dentistas de España) encargó la realización de una encuesta epidemiológica bucodental, siguiendo los criterios establecidos por la Organización Mundial de la Salud (OMS) para la ejecución de estudios transversales tipo *passifinder*. Ese estudio, publicado en 1995,<sup>1</sup> se realizó una década después del anterior, desarrollado en 1984 bajo supervisión de la OMS.<sup>2</sup> En los años 2000,<sup>3</sup> 2005<sup>4</sup> y 2010<sup>5</sup> se realizaron las correspondientes encuestas, siempre financiadas el Consejo General de Dentistas. Transcurridos 5 años desde entonces, la necesidad de monitorizar la situación oral de nuestra población es la principal justificación de este proyecto.

### INTRODUCCIÓN

#### Estudios epidemiológicos sobre salud bucodental en España

El primer estudio de ámbito estatal sobre prevalencia de enfermedades bucales realizado en España fue el publicado

RCOE, Vol. 21, Supl. 1, junio 2010



Prevalencia de maloclusiones en niños de la Comunidad Autónoma de Madrid según el índice estético dental

Cristina Martín Cid\*, Elena Barbería Leache\*, Ángel María González Sanz\*, Rafael Rioboo García\*



RESUMEN

Con el propósito de determinar la prevalencia, gravedad y necesidad de tratamiento ortodóncico de las maloclusiones presentes en niños y adolescentes de una población de la Comunidad Autónoma de Madrid (CAM), se ha realizado un estudio observacional, descriptivo, de corte transversal...

Prevalence of malocclusions in children in a population of Madrid (Spain) according to the dental aesthetics index

C. Martín Cid, E. Barbería Leache, A.M. González Sanz, R. Rioboo García

ABSTRACT

The purpose of this study was to determine the prevalence, severity and need of treatment of malocclusions in children and adolescents in a population of Madrid (Spain), an observational, descriptive and cross-sectional study has been made with a sample of 203 subjects (92 female and 111 male) aged 6-12 attending the Oral Health Program in three oral health centers located at the same number 4 of Health in Madrid...

Key words: Dental aesthetics index, Malocclusion, Oral epidemiology.

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Prevalencia de caries en una población escolar de doce años

Prevalence of caries in a school population of twelve year-old

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RESUMEN

El objetivo de este estudio es conocer la prevalencia de caries en una población escolar de 12 años y factores asociados a la misma. Se ha efectuado un estudio transversal en 452 escolares de 12 años de edad de Móstoles...

Palabras clave: Prevalencia, caries dental, SIC.

SUMMARY

The objective of study is to know the prevalence of dental caries in schoolchildren 12-year-old and associated factors. A cross sectional observational study has been carried out in 542 twelve year old schoolchildren in Móstoles...

Key words: Prevalence, dental caries, SIC.

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SALUD BUCODENTAL Y CALIDAD DE VIDA ORAL EN LOS MAYORES.

MEMORIA PARA OPTAR AL GRADO DE DOCTOR PRESENTADA POR

Edwin Járizton Meneses Gómez

Bajo la dirección de los doctores

María del Rosario Garcillán Izquierdo Eduardo Bratos Calvo Rafael Rioboo García

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Dental fear-related cognitive vulnerability perceptions, dental prevention beliefs, dental visiting, and caries: a cross-sectional study in Madrid (Spain)

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Carrillo-Díaz M, Crego A, Armfield JM, Romero M. Dental fear-related cognitive vulnerability perceptions, dental prevention beliefs, dental visiting, and caries: a cross-sectional study in Madrid (Spain). Community Dent Oral Epidemiol 2015; 43: 375-384. © 2015 John Wiley & Sons A/S. Published by John Wiley & Sons Ltd

Abstract - Objective: This study aimed to analyze the role that psychosocial elements may play concerning dental attendance and oral health in children. In particular, we explored the associations among dental fear-related cognitive vulnerability perceptions, dental prevention beliefs, the pattern of dental visits, and the number of decayed teeth. Methods: A cross-sectional design was used to collect data from 250 Spanish schoolchildren who completed a questionnaire. Oral health status was evaluated by pediatric dentists. Statistical analyses were mainly based on binary logistic regression and multiple linear regression, which allowed us to test possible associations among variables as well as interaction and mediation effects. Results: Children with more vulnerability-related cognitions (Adj. OR = 0.74 P < 0.05) and more unfavorable dental prevention beliefs (Adj. OR = 1.47 P < 0.01) were less likely to attend the dentist regularly. Moreover, the interaction between dental prevention beliefs and cognitive vulnerability perceptions was associated with more decayed teeth (β = -0.13 P < 0.05). The irregular pattern of dental visit, associated with fearful and unfavorable dental prevention cognitions, accounted for 29% of the effects of these variables on dental caries. Conclusions: The combination of greater cognitive vulnerability-related perceptions and low awareness of the benefits of dental prevention increased the risk of dental caries. Children with this profile also tended to demonstrate a more inadequate pattern of dental attendance. Preventive oral health programs would benefit from considering the role of children's cognitions on their oral health habits and dental health.

Key words: cognitions; cognitive vulnerability; dental caries; dental fear; dental prevention beliefs; dental visits; oral health Dr. Antonio Crego, Department of Psychology, Madrid Open University (UIMA), Campus de Getafe, 28 02400-Getafe, Villalba, Madrid, Spain Tel.: +34 915410000 email: antonio.crego@uimad.es Submitted 8 October 2013; accepted 27 March 2015

The prevention of oral health problems, and dental caries in particular, is a priority issue given the negative consequences on individuals and communities in terms of pain and suffering, functional impairments, and reduced quality of life (1). Preventive programs aimed at children and carried

out in community contexts are mainly based on learning adequate oral care habits. Schoolchildren are normally presented with information on the possible outcomes of neglecting oral health care, highlighting the hazards of excessive sugar consumption, eating between meals, irregular or

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# Epidemiology of periodontal disease in children and adolescents

WILLIAM M. M. JENKINS & PANOS N. PAPANAYAN

While the term "periodontal disease" may encompass all pathological conditions of the periodontal tissues, this review of the literature on epidemiology of gingivitis and periodontitis in child and adolescent populations up to 20 years of age will concentrate mainly on the two most prevalent forms of the disease: plaque-associated chronic gingivitis and periodontitis. The former, being an inflammatory lesion of the marginal gingiva, is recognized in epidemiological research by color change and/or by bleeding on gentle probing within the gingival sulcus or pocket orifice. If loss of support of the affected tooth, that is, destruction of the tooth-attached fibers and the bone into which they are inserted, is also present, the condition is characterized as periodontitis.

Despite the fact that correct diagnosis of periodontitis requires the concurrence of bleeding on probing and loss of periodontal support, assessments in large epidemiological surveys have focused only upon the accumulated destructive effect of the disease revealed by clinical measurements of loss of attachment or radiographic measurements of loss of marginal bone. Unfortunately, by reporting periodontal conditions in these terms, no assumptions can be made either about the presence of an inflammatory lesion or, indeed, about the nature of the destructive process that has taken place. Thus, although periodontitis is the most likely explanation for proximal surface attachment loss, toothbrush trauma, manifested as gingival recession, may be a more frequent cause of attachment loss on facial tooth surfaces in individuals of young age.

Another commonly observed sign of periodontal disease recorded in epidemiological surveys is an increased pocket depth. This may occur due to conditions other than periodontitis, such as delayed passive eruption and inflammatory or fibrous gingival enlargement. Deep pockets, therefore, may not be specific for either gingivitis or periodontitis. Indeed, periodontitis may develop and progress with-

out significant increase in pocket depth if gingival recession occurs.

In selecting publications for inclusion in this chapter, consideration has been given to certain features of study design and sample size and also to whether the sample could be considered to be representative of the general population. Thus, studies that did not adequately describe the diagnostic criteria used or used non-standard and non-validated methods have not been included. To describe the occurrence and distribution of periodontitis, preference has been given to the publications that have reported data on radiographic marginal bone levels or proximal probing attachment loss. Surveys that have relied on pocket depth as the main descriptor have generally not been included for reasons mentioned previously. However, because of its widespread adoption, some Community Periodontal Index of Treatment Needs (CPITN) data are presented, along with the authors' reservations about this method.

The first and major part of the review describes the findings of cross-sectional studies of chronic periodontal disease: gingivitis is described in children of all ages; periodontitis, as represented by loss of periodontal support, is described first in the deciduous dentition, then in the permanent dentition, and finally in the distinctive form of early-onset periodontitis; and a brief overview of CPITN studies describes the occurrence and distribution of bleeding, calculus and pockets. This is followed by a review of longitudinal studies of disease progression. Time-trend studies, in which cross-sectional surveys are repeated after a long interval to identify trends in the occurrence of disease, conclude this section on chronic periodontal disease. The chapter continues with a consideration of necrotizing periodontal disease, which may be limited to the marginal gingiva or spread quickly to involve the supporting tissues and occasionally the adjacent soft tissues.

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## Clinical Study Assessment of Gingival Health Status among 5- and 12-Year-Old Children in Yemen: A Cross-Sectional Study

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**Purpose:** There are limited data about the gingival health status in Yemeni children. The aim, therefore, was to assess oral hygiene status and prevalence and severity of gingivitis among Yemeni preschool and school children. **Material and Methods:** A total of 1396 children were included from 5 representative Yemeni governorates: Sana'a, Hajjah, Hodeida, Hadramout, and Taiz. Five-year olds (12%) were recruited from private kindergartens while 12-year olds (40%) were selected from public primary schools. Gingival health status was assessed using the plaque index (PI), calculus index (CAI), and gingival index (GI) on the 6 Ramford teeth. The latter index was used to categorize gingivitis severity at the subject level. Data were analyzed using simple hypothesis testing, as well as ordinal regression. **Results:** The 12-year old children had significantly much higher mean PI, CAI, and GI ( $P < 0.001$ ) with 78.6% presenting with gingivitis and 47.8% with moderate gingivitis. In contrast, the figures were 27.2% and 17% in the younger group ( $P < 0.001$ ). There were significant variations according to gender, area of residence, and governorate. Regression analysis revealed that mean PI (OR = 35), mean CAI (OR = 7.7), male gender (OR = 1.4), living in rural areas (OR = 1.4), and being from Hajjah or Sana'a were independent risk factors of gingivitis severity in the older group. For the 5-year olds, the determinants were mean PI (OR = 122), male gender (OR = 1.4), and living in Sana'a or Taiz. **Conclusions:** Bad oral hygiene and moderate gingivitis are highly prevalent among Yemeni preschool and school children. Geographical location appeared an important independent risk factors of gingival inflammation.

### 1. Introduction

Chronic gingivitis, a nonspecific inflammatory reaction to dental biofilm bacterial plaque, is the most common oral health problem worldwide in both adults and children. While the disease is largely reversible in nature, it can develop into susceptible hosts into periodontitis, which is characterized by irreversible loss of periodontal attachment [1]. Periodontitis is common in adults, but it still occurs in children either as a rare but severely destructive form called aggressive periodontitis or a more common milder form called chronic periodontitis. In fact, high prevalence of these types of periodontitis in children has been reported from some parts of the world [2]. Therefore, early intervention to improve oral hygiene

and reduce gingivitis is probably an important approach to prevent periodontitis in children, as is the case with adults [3].

Epidemiological data on gingivitis in children are important for understanding the natural course of the disease, identifying its risk factors, and predicting its time trends [1, 4]. They are also of paramount importance for developing and, later, assessing community preventive programs. However, while overwhelming amount of such data is available for children in developed countries [2, 5], little is known about children in developing countries, although sporadic reports suggest that poor oral hygiene and gingival inflammation are highly prevalent [6–13]. Therefore, the need for national oral health surveys to provide baseline as well as follow up data in the developing cannot be overemphasized.

### Profiles of Trauma in Primary and Permanent Teeth of Children and Adolescents

## Profiles of Trauma in Primary and Permanent Teeth of Children and Adolescents

Jackeline Nogueira de Paula Barros <sup>\*)</sup> Thyssa Augusto Assis de Araújo <sup>\*\*)</sup>  
Thais Rodrigues Campos Soares <sup>\*\*\*)</sup> Michele Machado Lenzi <sup>\*\*\*\*)</sup> Patricia de Andrade Risso <sup>\*\*\*\*\*)</sup>  
Tatiana Kelly da Silva Fidalgo <sup>\*\*\*\*\*)</sup> Lucianne Cople Maia <sup>\*\*\*\*\*)</sup>

This retrospective study aimed to evaluate the dental trauma profile in primary and permanent teeth from patients between 0 and 15 years old who attended the Faculty of Dentistry of the Federal University of Rio de Janeiro. Data regarding gender, age, trauma classification, tooth type, and affected tissues were obtained from dental records. The data were analyzed descriptively and by the  $\chi^2$  test ( $p < 0.05$ ). Data associated with 333 traumatized teeth (70% primary and 30% permanent teeth) were included. The mean ages of children with affected primary and permanent teeth were  $3.35 \pm 2.02$  and  $9.09 \pm 2.43$  years, respectively. Males presented more permanent teeth with trauma (64.4%) than primary ones (55.6%;  $p = 0.085$ ). The upper central incisors, both primary (68.9%) and permanent (69.4%), were the teeth most commonly affected. Primary teeth showed a higher frequency ( $p < 0.001$ ) of supportive tissue trauma (73.3%) and lower frequency ( $p = 0.001$ ) of hard tissue trauma (40.7%) than those in permanent ones (51.5% and 60.6%, respectively). The most frequent trauma in the supportive tissue was subluxation (27.2%) and permanent lateral luxation (42.0%). In the hard tissues, permanent teeth presented a higher prevalence of trauma than primary ones ( $p = 0.001$ ), however this difference was not statistically significant when each type of fracture injury was evaluated individually ( $p = 0.05$ ). With affected primary teeth, there was a greater frequency of trauma in the gingival mucosa (51.0%;  $p = 0.022$ ); in the permanent ones, traumatic lesions in the chin region were the most prevalent (20.8%;  $p = 0.009$ ). Trauma was recurrent in 26.3% of primary teeth and in 20.2% permanent teeth. Therefore, primary and permanent teeth showed distinct trauma profiles, suggesting that distinct preventive and therapeutic approaches are needed for these two groups.

**Keywords:** Children, Dental trauma, Primary teeth, Permanent teeth

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### INTRODUCTION

Dental trauma is considered a highly prevalent dental emergency and a serious public health problem worldwide that has a great impact on quality of life and a high cost for treatment [1]. Primary teeth of children between 1 and 3 years old and permanent teeth of children and adolescents aged from 8 to 12 years are most frequently affected [2]. In addition, gender and children and adolescents with a history of multiple episodes of dental trauma contribute disproportionately to this high prevalence.

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## Risk evaluation and type of treatment of multiple dental trauma episodes to permanent teeth

Glender U, Kouček B, Halling A. Risk evaluation and type of treatment of multiple dental trauma episodes to permanent teeth. *Endodont Dent Traumatol* 2006; 16: 205-210. © Munksgaard, 2009.

**Abstract** – Studies have shown that some children and adolescents are affected only once with a dental trauma, while others seem to be accident-prone and suffer from multiple dental trauma episodes (MDTE). Studies have also shown that dental traumas mostly affect upper permanent and medial incisors. Less is known about treatment consequences related to teeth with repeated dental trauma episodes. The aim was therefore to evaluate the risk of MDTE to permanent teeth among children and adolescents by age and gender and to compare types of dental treatment modalities used for patients with one episode and those with MDTE and with single and repeated traumatized teeth. The study was based on a random sample of 83 Danish 6–10-year-old children and adolescents born in 1970 who suffered from dental trauma episodes. All patients were followed during a 12-year period (1976–1988). Forty-one of the patients were registered with MDTE with a range of 2–7 episodes and a mean of 2.9 episodes (patient SD=1.1). The mean age at single and MDTE was 11.4 years (SD=3.6) and 8.6 years (SD=2.1), respectively. No significant differences were found between age at first episode and the number of MDTE per patient. The number of patients with MDTE was significantly higher among those who suffered their first trauma episode in the age interval 6–10 years than in the age interval 11–18 years ( $P<0.001$ ). A survival analysis showed that the risk of sustaining another trauma episode increased by 14.9–30.3% when the first trauma occurred before the age of 11, compared to 0–7.4% after the age of 10. The risk of sustaining multiple injuries was 8.4 times higher when the first trauma episode occurred at 9 years of age, compared with those occurring at age 12. The survival analysis also showed that for every new trauma episode, the interval between them became closer. Forty-five per cent of the MDTE affected teeth had already sustained an injury. With an increased number of trauma episodes per patient followed an increase in the number of follow-ups, filling therapy, information and prosthetics, whereas the rates of endodontics, surgery, and consultations were unchanged or even decreased.

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**Key words:** adolescent; child; dental trauma; permanent dentition; risk  
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Accepted January 21, 2006

## ORIGINAL RESEARCH Pediatric Dentistry

## Influence of clinical and socioeconomic indicators on dental trauma in preschool children

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**Abstract** The aim of the present study was to determine the prevalence of traumatic dental injury (TDI) in the primary dentition and investigate associations with clinical and socioeconomic indicators. A population-based, cross-sectional study was carried out with a randomly selected sample of 301 children aged one to five years. Data were collected through clinical oral examinations and interviews with parents/guardians during immunization campaigns. Statistical analysis involved Pearson's Chi-squared test and Poisson regression with robust variance. The prevalence of TDI was 33.9%. TDI was more prevalent in children with overjet > 3 mm ( $p < 0.001$ ) and those with inadequate lip coverage ( $p < 0.001$ ). A statistically significant association was also found between TDI and household income ( $p = 0.024$ ). According to the adjusted Poisson regression model, greater prevalence rates of TDI were found for children from families with a monthly income 2–twice the Brazilian minimum monthly wage (PR: 1.52; 95%CI: 1.10–2.12), those with accentuated overjet (PR: 1.53; 95%CI: 1.05–2.22) and those with inadequate lip coverage (PR: 2.00; 95%CI: 1.41–2.84). The prevalence of TDI was high in the present study and was associated with a higher family income, accentuated overjet and inadequate lip coverage.

**Descriptors:** Tooth Injuries; Child, Preschool; Socioeconomic Factors.

**Declaration of interests:** The authors certify that they have no commercial or associative interest that represents a conflict of interest in connection with the manuscript.

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## Dental Traumatology

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## A retrospective study of pediatric traumatic dental injuries in Xi'an, China

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**Key words:** pediatric dentistry; traumatic dental injuries; primary and permanent teeth; children

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Traumatic dental injury (TDI) has become a worldwide dental health problem. Although the oral region comprises only 1% of the whole body area, trauma to the oral region comprises 5% of all injuries (1, 2). The prevalence of TDI in both the primary and permanent dentition is high throughout the world. Previous studies have reported frequencies of TDI varying from 10.2% to 69.2%, based on various samples and classifications (3–7).

Young children are more likely to suffer from TDIs than young adults, and these injuries may impact the growth and development of the permanent dentition. Psychologically, TDI can make children feel embarrassed because of their absence of teeth, which will consequently result in a decrease in the quality of life (QoL) of both the children and their parents (8, 9). Furthermore, treatment of pediatric TDI is always complicated and costly because it can directly affect growth and development. TDI treatment often requires the participation of specialists of different disciplines and could be needed for the rest of a child's life.

According to statistics from the National Bureau of Statistics of China, the population of 0- to 14-year-olds

**Abstract** – **Background/Aim:** Pediatric traumatic dental injury is an important public health problem because of its high prevalence, severe physical or psychological impacts, and high prevention and treatment costs. This study aimed to determine the distributive features of pediatric traumatic dental injury in a university dental hospital in Xi'an, China. **Materials and methods:** Children (aged 1 to 15 years) visiting the hospital from February 2011 to May 2012 as a result of dental trauma were investigated. Trauma-related information was recorded and analyzed. **Results:** Most of the traumas occurred in children aged 7 to 12 years and affected the maxillary incisors. Of all the children involved, 17.2% had overjet. Concussion, enamel-dentin-pulp fracture, avulsion, and lateral luxation occurred more in the primary dentition (20.0%, 16.5%, 14.3%, and 13.2%, respectively). However, most trauma to the permanent dentition were enamel-dentin-pulp fractures and enamel-dentin fractures (53.7% and 29.1%, respectively). Most traumas were luxations ( $n = 156$ ) in the 1- to 6-year-old group, while fractures were more common in the 7- to 12- and >13-year-old groups ( $n = 549$ , 84,  $P < 0.001$ ). In total, 357 urban children had access to immediate medical care, whereas only 12 rural children were able to access a clinic within 24 h after injury ( $P < 0.001$ ). **Conclusion:** Based on the information presented in this survey, the government should focus on medical development in rural settings and should attempt to balance the distribution of medical resources between urban and rural areas. Educational and preventive programs should also be promoted to enhance the guardians' awareness regarding pediatric traumatic dental injuries.

in China was approximately 222 million in 2010, and the population of 0- to 6-year-olds was approximately 180 million in 2012. These amounts are approximately equivalent to 20% of the global population in the same age groups. It is thus of great importance to evaluate the distribution of pediatric TDIs in China. Despite its importance, few studies have been published regarding this issue in China (10, 11). It is therefore necessary to gradually collect related data that could be used to determine global TDI epidemiology.

The aim of this retrospective survey was to reveal the age-dependent distributive features of pediatric TDI in Xi'an, China. We intend to perform further research regarding the prevention of dental trauma.

### Materials and methods

Our study was performed in children (aged 1 to 15 years) who visited the Department of Pediatric Dentistry in the Stomatology Hospital of the Fourth Military Medical University from February 2011 to May 2012 as a result of pediatric TDI. The clinical

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## Epidemiology and outcomes of traumatic dental injuries: a review of the literature

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### ABSTRACT

Dental trauma is a significant public health problem because of its frequency, impact on economic productivity and quality of life. It is not a disease and no individual is ever at zero risk of sustaining these potentially life-changing injuries. The aim of this article was to review the literature on the prevalence, incidence, aetiology, prognosis and outcomes of dental trauma. The importance of standardized reporting, oral health policy, adjunctive research methods, prevention and education will also be discussed. A search for relevant articles appearing in databases such as Medline, Cochrane and SCISearch formed the basis of this review. Epidemiological studies indicate the annual incidence of dental trauma globally is at about 4.5%. Approximately one-third of children and toddlers (primary teeth) and one-fifth of adolescents and adults (permanent teeth) sustained a traumatic dental injury. The majority involved the maxillary central incisors, mainly from falls in toddlers at home and contact sport in adolescents. Despite these trends, there is considerable variation between studies within and across jurisdictions. There is a need to standardize research with a consistent approach to reporting, classification and methodology. This will improve research and form a greater basis for predicting prognosis. This research basis will assist in consent and clinical management.

**Keywords:** Aetiology, dental trauma, epidemiology, prevalence, outcomes.

**Abbreviations and acronyms:** SCI = Social Citation Index; SH = structured histories; WHO = World Health Organization.

### INTRODUCTION

Dental trauma (traumatic dental injury) is an impact injury to the teeth and/or other hard and soft tissues within and around the vicinity of the mouth and oral cavity. It is usually sudden, circumstantial, unexpected, accidental and often requires emergency attention. It is not a disease but a consequence of several unavoidable risk factors in life. Although these injuries are more common in certain groups, no individual is ever at zero risk through their activities of daily living. These injuries may render an individual with meticulous oral hygiene and a life experience of only the standard check-up and clean with life-changing dentistry. Costs to the injured person and the community throughout the world have been substantial.<sup>1-3</sup>

Dental trauma is often more time consuming and costly compared with many other accidental injuries presenting to emergency clinics and hospitals.<sup>4</sup> Trauma to the body, inclusive of the oral cavity, is a significant public health problem worldwide. In certain groups, dental trauma is almost as high as one-fifth of all bodily injuries.<sup>4</sup> Bodily injuries have been

reported to be the leading cause of death among young people aged between 12 to 24 years of age.<sup>5</sup> In some western countries, the direct (treatment) and indirect (lost productivity and wages, transport cost and quality of life) cost of trauma has been estimated to be around 4–5% of gross domestic product.<sup>6</sup> In the United States alone, the lifetime cost of bodily injuries has been estimated to be US\$406 billion.<sup>6</sup> It has been reported that traumatic dental injuries and their consequences may exceed the burden of caries and periodontal disease in the young population.<sup>7,8</sup> These consequences are not only physical or economic but also an unquantifiable psychosocial burden on the individual.

Managing dental trauma is never the same and presents a challenge to carers. Emergency management should be considered to begin at the time of injury rather than the time the patient first sees the dentist as this impacts recovery. This highlights the importance of first aid and the need to educate the public. Even with timely presentation, management of dental trauma is not an ordinary situation in daily dental practice. It is a procedure where the initial appointment

## The caries decline: a review of reviews

Peterson HG, Brattahlid D. The caries decline: a review of reviews. *Eur J Oral Sci* 1996; 104: 436-441. © Munksgaard, 1996.

The aim of this paper is to review publications discussing the declining prevalence of dental caries in the industrialized countries during the past decades, focusing on some main conferences addressing this issue. Has there been a real decline in the prevalence of dental caries? Several excellent papers and reviews have been published, and there is a general agreement that a marked reduction in caries prevalence has occurred among children in most of the developed countries in recent decades. This fact has stimulated much debate and attempts to identify the most likely explanations for this change. The conclusion made from this review is that the various authors believe that the use of fluoride in various forms has contributed most significantly to the decline in dental caries prevalence. A number of other factors must, however, also be taken into consideration, and such factors have been extensively discussed in the various publications.

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Has there been a real decline in the prevalence of dental caries? Several excellent reviews have been published during recent years and there is a general agreement that a marked reduction in caries prevalence has occurred among children in most of the industrialized countries. This is true for countries using water fluoridation as a preventive measure, as well as for countries without such programs.

Water fluoridation was introduced in 1945 in the USA. In the 1950-60s, a number of organized preventive programs started in several industrialized countries. In addition, fluoride toothpastes were introduced onto the market during the 1960s, and their use expanded significantly during the 1970s. The availability of dental resources increased, and a more preventive approach to oral health services was established.

The decline in caries occurred to an extent which did not seem to have been foreseen. It occurred in countries far apart from each other and with different oral health care systems and services. It was reflected in reports to the *Global Oral Data Bank* (GOODB) kept at the WHO. Graphs and figures showing down-going trends became abundant. We have decided to illustrate the decline in dental caries prevalence by using just one figure (Fig. 1), showing

the % of proximal caries-free children in a city, situated in the south of Sweden. Similar figures could have been obtained from many countries and areas.

Although several local reports on the caries decline were thus available at an early stage, it was not until 1982 that an International Conference was held to review the issue on a broader scale. After that, the scientific community as well as oral health workers have found it important to evaluate the degree of the decline more closely, the reasons for the changes observed, as well as its impact on the society. A number of conferences has been held during the past decade. The aim of this paper was to review some of the major conferences discussing the declining prevalence of dental caries in the industrialized countries, focusing on the major conclusions drawn.

### 1st International Conference on the Declining Prevalence of Dental Caries, Boston 1982

The 1st International Conference on the Declining Prevalence of Dental Caries was held at the Forsyth Dental Center, Boston 1982. 8 industrialized countries were represented at the conference: Denmark, England, Ireland, New Zealand, Norway, Scotland, Sweden and USA. The papers of the Symposium

## Incidence of dental trauma in the Western Australian School Dental Service

Stockwell AJ. Incidence of dental trauma in the Western Australian School Dental Service. *Community Dent Oral Epidemiol* 1988; 16: 294-8.

**Abstract** - A prospective study was undertaken to determine the annual incidence of trauma to the anterior permanent teeth of children enrolled in the Western Australian School Dental Service. The population comprised 66 500 6-12-year-old children. 1.66 children and 2.05 teeth per 100 children received trauma. Of the children incurring trauma the incidence per 100 erupted teeth was 11.7. 80.5% of children traumatized one tooth only per incident, but 35% of all teeth that were traumatized involved trauma to two or more teeth. 88% of all traumatized teeth were central incisors. Girls received proportionately more trauma to the maxillary dental arch than did boys. Fracture involving both the enamel and the dentine was the most commonly recorded class of trauma (42.7% of cases). There was no obvious pattern to the overall distribution of trauma through the week or the year. Approximately one-third of all trauma occurred at school, one-third at home, and the remainder elsewhere. Trauma to the maxillary dental arch occurred most frequently at home, while trauma to more than one tooth (multiple trauma) occurred most commonly at school. Trauma incidence resulting from falling or being pushed was almost twice as high among girls as among boys. Bicycle accidents caused a higher than average rate of multiple trauma and of pulp exposure.

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The School Dental Service of Western Australia provides preventively oriented dental care for enrolled school students, the majority of whom are aged 6-12 yr. This is effected in dental therapy centres, by dental therapists working under the control of dentists. The majority of dental therapy centres are situated in the larger primary schools which are designated as "fixed" in distinction to "mobile" centres, which visit smaller schools. Emergency treatment outside business hours is obtainable from other dental services. At the time of this study, the prevention of dental trauma had not received significant attention within the School Dental Service, due, principally, to the lack of relevant epidemiological data (1).

Over the last two to three decades the majority of studies of trauma to children's teeth have been retrospective prevalence studies (2-5). The variables measured have generally been limited to those of: oral location of trauma, and

set and age of child, while a few recent studies have also considered the place of occurrence (6), and the aetiology of trauma (7-9). Incidence studies are potentially capable of providing more information than prevalence studies, such as accurate temporal distributions of occurrence and the number of erupted teeth at the time of trauma. A number of incidence studies has been published over the last decade or so (10-14), but only one such study is known to have been published in Australia (15). This was a retrospective incidence study which covered both children and adults who had presented to specialist endodontic practices; children between the ages of 6 and 12 yr were grouped into a single age category.

In view of the paucity of local information and concern being expressed at that time at the number of accidents to children riding BMX bicycles, it was decided to conduct a prospective incidence study within the School Dental Service in which would be included as many relevant variables as it would be reasonably practicable to record.

### Material and methods

The study population was that of all enrolled students aged 6-12 years in all "fixed" dental therapy centres in the capital, Perth, it comprised 66 500 children of whom 51.1% were boys. Dental therapists (approximately 80 in number) were asked to record all cases of trauma to permanent incisors and canines which presented during a period of 12 calendar months commencing December 1983. Those cases which caused the patient to seek immediate treatment from the School Dental Service were recorded at that time, other cases which either were initially treated by other dental services or did not receive any immediate treatment were recorded when the child was next examined by the School Dental Service.

The variables which were recorded for

## Prevalencia de maloclusiones en adolescentes y adultos jóvenes del interior del Uruguay. Relevamiento nacional de salud bucal 2010-2011

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### Resumen

**Objetivo:** Determinar la prevalencia de maloclusiones, su severidad y necesidad de tratamiento en adolescentes y adultos jóvenes entre 15 y 24 años del interior del Uruguay, así como su asociación con variables sociodemográficas, de calidad de vida e indicadores de riesgo. **Método:** Se realizó un estudio transversal utilizando datos originados del "Primer Relevamiento Nacional de Salud Bucal en población joven y adulta uruguayana", realizado entre 2010 y 2012. **Análisis estadístico:** Las diferencias de prevalencia entre categorías de covariables fueron testadas con test chi-cuadrado para heterogeneidad con linealización de Taylor. **Resultados:** La prevalencia de maloclusiones en la población de estudio fue de 33,8% en el período 2010-2012. Las maloclusiones presentaron asociación con la calidad de vida. **Conclusiones:** Estos resultados son los primeros con una muestra representativa en esta población, siendo de interés para gestores de salud pública y útiles para otros investigadores del área en futuros estudios.

**Palabras clave:** prevalencia, maloclusiones, adultos jóvenes, adolescentes

### Abstract

**Objetivos:** Determinar la prevalencia de maloclusión, su severidad y necesidad de tratamiento en adolescentes y adultos jóvenes entre 15 y 24 años de edad, así como su asociación con variables sociodemográficas y de calidad de vida variables, and risk indicators. **Método:** A cross sectional study was performed using data from the "First National Survey of Oral Health in young and adult Uruguayan population" conducted between 2010 and 2012. **Statistical analysis:** The differences in prevalence of malocclusion among categories of covariates were tested with the chi-square test for heterogeneity with Taylor linearization. **Resultados:** The prevalence of malocclusion was 33.8% in the period 2010-2012. Malocclusions showed association with quality of life. **Conclusiones:** The results of this study are the first ones conducted with a representative sample in this population and therefore of interest for public health managers and other researchers in the field.

**Key words:** prevalence, malocclusions, young adults, adolescents



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## ¿Son las maloclusiones un problema de salud pública en el Uruguay?

Malocclusions: are a public health issue in Uruguay?

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### Resumen

Este trabajo es un estudio descriptivo transversal (de tipo transversal). La muestra considerada abarcó 542 niños seleccionados de los departamentos de Montevideo y Rivera. Se observaron niños de ambos sexos, de escuelas públicas y privadas, en grupos de preescolares y escolares de 1er. Año con el objetivo de cuantificar las maloclusiones presentadas en este grupo etario, su prevalencia y determinar si son un problema de Salud Pública. En esta tarea se utilizó una ficha de relevamiento epidemiológico generalizada con los puntos de la OMS, reducida y reestructurada específicamente para acortar el tiempo de inspección. El trabajo se realizó con operadores previamente calificados. El relevamiento fue realizado durante una jornada de 8 horas en cada institución. Se comparó el estudio del año 1999 en Rivera con el relevamiento del 2001 de niños de la capital del mismo grupo etario. La prevalencia de maloclusiones en este grupo etario ascendió al 70,7%, reflejando un elevado índice de maloclusiones. Según como resulta decisivo más significativo, la existencia de hábitos orales como la deglución atípica y la respiración bucal, la falta de espacio (apilamientos) y la presencia de frenillos anómalos (labiales superior e inferior).

**Palabras clave:** maloclusión, salud pública, deglución atípica, respiración bucal, frenillos.

### Abstract

This study is a descriptive transversal type. The population observed was 542 children selected among Montevideo and Rivera Uruguayan provinces. Both sexes, public and private schools students, integrating preschoolers, and first degree were observed. The goal was to quantify the presented malocclusions in this group, its prevalence and to determine if it is a Public health issue. The age range used to quantify the malocclusions was this to determine if it is a public issue in Public health. In this task, a form was designed to consider the OMS parameters, written and restructured. Operators were calibrated for this job, which was done in this research institution. This analysis was compared in Rivera 1999 to the one done in the capital city in 2001, considering this age range. The result was the prevalence of the malocclusions in this age range in 70,7%, what reflects a high index of malocclusions. The relevant findings were oral health habits like atypical deglutition, oral breath, as well as frenum (upper and lingual).

**Key words:** malocclusion, public health, atypic deglutition, oral breath, frenum.

**Epidemiological pattern of malocclusion in Brazilian preschoolers**

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 João Gabriel Silva Souza<sup>2</sup>  
 Claudiana Donato Ruzman<sup>3</sup>  
 Flávia Maria Florio<sup>4</sup>

**Abstract** This study aimed to evaluate the prevalence and distribution profile of malocclusion in Brazilian preschoolers and its association with macro-region, housing, gender, and self-reported race. In total, 6,855 children aged five years participating in the National Oral Health Survey (called SB Brasil 2010) were analyzed. Malocclusion was diagnosed according to the Foster and Hamilton index. We conducted descriptive, bivariate and multiple regression analyses (P<0.05). We identified that 63.2% of children had at least one of the occlusal problems evaluated: anterior key (22.9%), overjet (32.9%), overbite (34.6%), and posterior crossbite (18.7%) and, thus, were considered with malocclusion. Higher probability of the presence of malocclusion was identified among the residents of the Midwest (1.08/95%CI 1.01-1.15), Northeast (1.21/95%CI 1.14-1.28), Southeast (1.27/95%CI 1.20-1.34) and South (1.34/95%CI 1.26-1.42) regions when compared to residents in the North. It was also higher among female children (1.06/95%CI 1.02-1.09). No associations were identified concerning race and location of the municipality (optimalis capital). A high prevalence of malocclusion was identified in Brazilian preschoolers, and it was associated with gender and the macro-region. These findings may contribute to expand public policies and greater access to treatment for this population.

**Keywords:** Malocclusion, Child, Prevalence, Oral health, Prevalence

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**Dental Research Journal**

**Review Article**

**Prevalence of malocclusion among Iranian children: A systematic review and meta-analysis**

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**ABSTRACT**

**Background:** The high prevalence of malocclusion is a public health problem in the world and the third priority in oral care. Numerous primary studies have presented reports on the prevalence of malocclusion among Iranian children. In combination, the results of these studies using meta-analysis are highly valuable for health policy-making. Similarly, this study aimed at determining the prevalence of different types of malocclusion among Iranian children.

**Materials and Methods:** Using relevant keywords, national and international databases were explored. After narrowing down the search strategy and leaving out the duplicates, the remaining articles were screened based on titles and abstracts. To increase search sensitivity, reference lists of the papers were examined. To identify unpublished articles and documentations, a set of negotiations were done with the people involved and research centers. Finally, the heterogeneity index between the studies was determined using Cochran (C) and I<sup>2</sup> tests. According to the results of heterogeneity, the random effects model was used to estimate the prevalence of malocclusion in Iran.

**Results:** In total, 25 articles were included in the meta-analysis process. The prevalence of dental malocclusion was estimated in 28,693 Iranian children aged 3-18 years. The total prevalence of Class I, II, and III malocclusion was 54.6% (46.5-62.7), 24.7% (20.8-28.7), and 6.01% (4.7-7), respectively. The prevalence of Class I, II, and III malocclusion was 44.4% (32.9-56.2), 21.5% (18.01-25.1), and 4.5% (3.2-5.9) in boys and 48.8% (36.8-60.8), 21.5% (16.9-25.1), and 5.5% (3.9-7.1) in girls, respectively.

**Conclusion:** This study showed a high prevalence of malocclusion among Iranian children. Also, the results indicated that the prevalence is higher in girls.

**Key Words:** Children, malocclusion, meta-analysis as topic, review

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**INTRODUCTION**

The high prevalence of malocclusion has made it a public health problem in the world; it is now considered as the third highest oral health priority<sup>(1)</sup>. "A malocclusion is defined as an irregularity of the teeth or a relationship between the dental arches

beyond the range of what is accepted as normal."<sup>(2)</sup> Malocclusion is one of the most common dental problems as well as dental caries, periodontal disease, and dental fluorosis.<sup>(3)</sup> In addition, maloccluded dentition can cause disturbances in oral function



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**Short communication**

**Distribution of malocclusion types in 7-9-year-old Iranian children**

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توزیع انحطاط سوء الإطباق الأسنان بين الأطفال الإيرانيين من الفئة العمرية 7-9 سنوات  
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**الخلاصة:** تم في إطار هذه الدراسة تقييم أنماط سوء الإطباق وانحطاص الأسنان السنية، ومدى الحاجة إلى الفلج الشائع للأسنان، في عينة عشوائية من الأطفال من الفئة العمرية 7-9 سنوات في مدينة شيراز الإيرانية. وقد أظهرت الدراسة أن 30,6% من عينة الأطفال البالغ عددهم 3776 طفلاً لديهم إطباق عادي، و 47,4% لديهم سوء إطباق من الدرجة الأولى، و 13,7% لديهم سوء إطباق من الدرجة الثانية والقسم الأول (نسبة الذكور إلى الإناث 3 : 2)، و 1% لديهم سوء إطباق من الدرجة الثانية والقسم الثاني (نسبة الذكور إلى الإناث 3 : 1)، و 2,1% لديهم سوء إطباق من الدرجة الثالثة. كما تبين أن 47,9% من الأطفال الذين تم فحصهم يعانون من مشكلات ارتصاصية في الأسنان، وأن 14,7% منهم لديهم سوء إطباق من الدرجة الأولى، وكانت نسبة الإناث أعلى من الذكور (17,3% مقابل 12,1%). ولم يلاحظ أي ارتباط بين أنماط سوء الإطباق وبين حجم الأسرة، أو مهنة الوالدين، أو مستوى التعليم.

**ABSTRACT** This study assessed the malocclusion types, very severe crowding and need for serial extraction among a random sample of 7-9-year-old children in Shiraz, Islamic Republic of Iran. Of the 3776 children 30.6% had normal occlusion, 47.4% class I malocclusion, 13.7% class II division 1 malocclusion (male:female ratio 3:2), 1.0% class II division 2 malocclusion (male:female ratio 3:1) and 2.1% class III malocclusion. Among the children examined, 47.9% had crowding problems and 14.7% of them had class I malocclusion with very severe crowding—more girls (17.3%) than boys (12.1%). No correlation was observed between the types of malocclusion and family size, parents' occupation or level of education.

**Distribution des types de malocclusions chez des enfants iraniens âgés de 7 à 9 ans**  
**RÉSUMÉ** La présente étude a évalué les types de malocclusions, l'encombrement très sévère et le besoin d'extraction en série dans un échantillon aléatoire d'enfants âgés de 7 à 9 ans à Chiraz (République islamique d'Iran). Sur les 3776 enfants, 30,6 % présentaient une occlusion normale, 47,4 % une malocclusion de classe I, 13,7 % une malocclusion de classe II division 1 (rapport des sexes masculin/féminin de 3:1) et 2,1 % une malocclusion de classe III. Parmi les enfants examinés, 47,9 % avaient des problèmes d'encombrement et 14,7 % présentaient une malocclusion de classe I associée à un encombrement très sévère — davantage chez les filles (17,3 %) que chez les garçons (12,1 %). Aucune corrélation n'a été observée entre les types de malocclusions et la taille de la famille, la profession des parents ou le niveau d'instruction.

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**RESEARCH ARTICLE**

**EVALUATION OF DENTAL OCCLUSION IN 3-5 YEAR-OLD CHILDREN**

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**ABSTRACT:** Background and Objectives: At present, due to the increased awareness of parents regarding oral health and dental esthetics, the number of dental visits has increased. Dentofacial disorders that can cause esthetic and functional problems for the child and affect dental growth and development to be detected during routine dental visits. This study sought to assess the occlusion of the primary dentition in 3-5 year-olds. **Materials and Methods:** This study was conducted on 390 children aged 3-5 years selected from Yari kindergartens using systematic cluster sampling. Occlusal relations namely the relationship of primary second molars, the relationship of canines, overjet, overbite, cross bites, spaces, crowding and the dental midline were evaluated. The children were examined using a ruler, wooden tongue depressor and brass wire under sunlight. **Results:** The flush terminal plane relationship (FTP) was seen in 71.3% of the children. Mesial step (MS) relationship had higher frequency among females. The distal step (DS) and mesial step relationships increased with age. Canine relationship was Class II in 84% of children; while Class III relationship was seen in 1.5% of children and was more prevalent among boys. Overbite had a significant correlation with age; 64.6% of boys and 59% of girls had normal overbite. Reverse overjet was not observed in any girl but was seen in 3 boys. Anterior crossbite was observed in 13.1% of children. No case of posterior openbite was found and 2.3% had posterior crossbite; which was more prevalent among girls. Primary maxillary spaces were present in 76.9% of children; 8.7% and 2.6% had mandibular and maxillary crowding, respectively. Twin teeth were present in two children and 13.1% had dental midline deviation. **Conclusion:** Comparison of our results with previous studies showed that occlusal relationships have variable frequencies in different populations. Attention must be paid to dental occlusion of children because timely diagnosis and treatment may prevent future problems.

**INTRODUCTION:** Primary teeth start to erupt at 6 months of age and complete their eruption at the age of 3 years (1). Eruption time of primary teeth is affected by several factors (2). Occlusion means

interlocking of upper and lower teeth when the jaws are not moving (3). Proper occlusion of teeth plays an important role in mastication, deglutition, speech and respiration. Thus, it is extremely important to have adequate knowledge about the normal occlusion of primary teeth.



Normal occlusion of primary teeth has the following characteristics: presence of space between the incisors, primate spaces at the mesial of maxillary canines and distal of mandibular canines, placement of 2<sup>nd</sup> primary molar tooth in



Review Article

**Molar-Incisor Hypomineralization: Review of its Prevalence, Etiology, Clinical Appearance and Management**  
Shubha AB, Sapna Hegde

**Abstract**  
Molar-incisor Hypomineralization (MIH) is defined as hypomineralization of systemic origin of one to four permanent first molars frequently associated with affected incisors. Affected molars may present major clinical problems in terms of extensive tooth structure loss, hypersensitivity and difficulty in restoration and retention. The prevalence of MIH ranges from 2.5–40% and seems to differ in certain regions and birth cohorts. Several factors are associated with etiology of MIH. The general dental practitioners should be aware that MIH is common and should be able to diagnose and manage at the early and appropriately.

**Keywords:** Developmental Enamel Defects; MIH; Molar-Incisor Hypomineralization; Post-Eruptive Enamel Breakdown.

Shubha AB, Sapna Hegde. Molar-Incisor Hypomineralization: Review of its Prevalence, Etiology, Clinical Appearance and Management. *International Journal of Oral & Maxillofacial Pathology*, 2013, 4(1):26-33. *International Journal of Oral and Maxillofacial Pathology*. Published by Publishing Division, Celega Software Private Limited. All Rights Reserved.

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**Introduction**

The Permanent first molars (PFMs) are considered the most caries-susceptible teeth in the permanent dentition because of their early eruption.<sup>1</sup> A very common factor predisposing these teeth to caries which is also the most frequently unrecognized or overlooked is a developmental defect in the enamel referred to as Molar-Incisor Hypomineralization (MIH). First recognized in the late 1970s by Swedish dentists working within the public dental services, it may have existed long before it was identified.<sup>2</sup> However, when caries prevalence is high, the developmental defect responsible for initiation of the cavity is probably masked.<sup>3</sup>

The dental literature contains an abundance of terms that have been used to refer to hypomineralized molars including 'non-fluoride enamel opacities', 'internal enamel hypoplasia', 'non-endemic mottling of enamel', 'opaque spots', 'idiopathic enamel opacities', 'cheese molars', 'hypomineralized PFMs', 'idiopathic enamel hypomineralization' and 'hypomineralized PFMs'.<sup>4,5</sup> It was in 2001 that Weerheijm et al<sup>6</sup> coined the term Molar-Incisor Hypomineralization and laterally MIH as 'a hypomineralization of systemic origin of 1–4 permanent first molars, frequently associated with affected incisors'. For a patient to be diagnosed as suffering from MIH, at least one permanent first molar must be affected with or without involvement of

the incisors.<sup>7</sup> The term 'Molar Hypomineralization (MH) has been used, sometimes, to distinguish children in whom the incisors are not affected.<sup>8</sup>

**Prevalence of MIH**  
After initial presentation and establishment of diagnostic criteria<sup>6</sup> for MIH many prevalence studies for MIH were carried out in various countries and large variations found in the prevalence rates, ranging from 2.5–40.2%. This wide range could be because of difference in recording methods, indices used and different age or population investigated.<sup>9,10</sup> In some countries, caries levels may mask the true prevalence of MIH.<sup>4,11</sup> No much difference in prevalence has been reported so far between the male and female genders.<sup>12,13</sup>

**Characteristic features of MIH-affected teeth**

**A. Clinical presentations**  
Molars and incisors affected by MIH exhibit demarcated opacities, which are whitish-yellow or yellowish-brown in color.<sup>14,15</sup> The affected PFM may undergo post-eruptive enamel breakdown because of occlusal loading, whereas incisors rarely exhibit post-eruptive enamel breakdown.<sup>16</sup> Clinically, MIH should not be mistaken for enamel hypoplasia, which is a quantitative developmental defect resulting from deficient enamel matrix formation.<sup>17</sup> Clinically, in cases of hypoplasia, the margins are smooth, while in MIH the borders are

**Treatment modalities in children with teeth affected by molar-incisor enamel hypomineralisation (MIH): A systematic review**

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**Abstract**

**AIM:** This was to review the literature concerning the treatment of permanent teeth with molar-incisor hypomineralised enamel (MIH), comment about possible shortcomings and propose areas of future research. **METHODS:** A search of Medline, Scopus, ResearchGate, Ista and Google Scholar databases was conducted using all terms relevant to the subject. Relevant papers published in English were identified after a review of their titles, abstracts or full reading of the papers. **RESULTS:** Of 189 references initially found, 66 papers were included; 34 directly relevant to the subject. From the latter, only 14 concerned laboratory or clinical studies dealing with treatment for MIH. Since 2000 11 reviews evaluated, to a certain extent, treatment options for affected teeth. Analysis of the proposed treatment modalities, indicated options for prevention, restorations, and adhesion to hypomineralised enamel, full coronal coverage and extraction followed by orthodontics. Based on these findings, a treatment decision plan is proposed. **CONCLUSIONS:** Although treatment approaches for MIH have started to be clearer, long-term clinical trials, supported by laboratory studies, should be conducted to further facilitate the clinical management of this dental defect.

Following the establishment of the presently used diagnostic criteria for MIH (Weerheijm et al., 2003), a number of well-documented studies have reported on the prevalence of the disorder and were reviewed by Jälevik [2010]. Previous studies recorded a prevalence of 5.9–14.3% in Europe, while there are few studies concerning America and other parts of the world [Jäla et al., 2008; Willmott et al., 2008]. Additionally MIH prevalence has a strong positive correlation with the overall prevalence of developmental defects of enamel. Muratbegovic et al. [2008] showed that prevalence of DOE fell after exclusion of MIH patients from 32.8% to 21.4%.

Accordingly it is clear that MIH is an important clinical problem often concerning both general dentists and specialist paediatric dentists. As caries rates have declined in western countries, paediatric dental defects have become more apparent, requiring more complex and long-term treatment. As a result over the last few years a limited number of papers have appeared dealing with the treatment of MIH. The aim of this paper was to review the literature concerning the treatment of MIH, comment about possible shortcomings and propose areas of future research.

**Methodology**

A broad search of Medline, Scopus, ResearchGate, Ista and Google Scholar databases was conducted for the years 1980 until 2009, using as index terms 'treatment or management or therapy or clinical approach' AND 'dental enamel defects', 'developmental enamel defects', 'chronological enamel defects', 'molar-incisor-hypomineralisation', 'non fluoride hypomineralisation of permanent teeth', 'idiopathic hypomineralisation of permanent teeth', 'cheese molars', 'hypomineralised permanent molars' and 'hypomineralised permanent incisors'. Papers other than in English were excluded. All abstracts were read and the full text of relevant ones were then read. The reference list of each of these papers was additionally examined in order to locate any further references that may not have been found in the search engines previously mentioned.

Of the 189 initial references, 93 were selected based on their abstracts, the remaining papers dealing with inherited enamel defects. After a reading of each paper, 66 papers were chosen for inclusion, 32 supportive to the review and 34 relevant to the subject. From these 66, those dealing exclusively with

**Key words:** molar, incisor, enamel hypomineralisation, MIH, treatment, review.  
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**Molar incisor hypomineralisation (MIH) – an overview**

Z. Almuallim<sup>1</sup>\* and A. Busuttil-Naud<sup>2</sup>

**Key points**

Highlights different aspects related to molar-incisor hypomineralisation. Provides some up-to-date information about molar-incisor hypomineralisation. Discusses management and treatment options.

Recent data indicates that molar-incisor hypomineralisation (MIH) is a frequently encountered dental condition worldwide. The condition could be associated with dental complications that might affect patients' quality of life as well as create treatment challenges to dentists. The affected teeth are more prone to caries and post-eruptive enamel breakdown, therefore, it is believed that this condition might be responsible for a substantial proportion of childhood caries since the condition has high prevalence. MIH is common, and as such it should be diagnosed and managed in primary care wherever possible. Early diagnosis can lead to more effective and conservative management. This article aims to highlight different aspects related to MIH, from its prevalence to treatment options in young patients.

**Introduction**

The term molar incisor hypomineralization (MIH) was first introduced in 2001 by Weerheijm et al. and it was defined as 'hypomineralization of systemic origin, presenting as demarcated, qualitative defects of enamel of one to four first permanent molars (PFMs) frequently associated with affected incisors'. Earlier nomenclature included non-fluoride enamel opacities, internal enamel hypoplasia, non-endemic mottling of enamel, idiopathic enamel opacities and cheese molars.<sup>1</sup> In 2003, MIH was further described as a developmental, qualitative enamel defect caused by reduced mineralization and inorganic cement components which leads to enamel discoloration and fractures of the affected teeth.<sup>2</sup> Initially the condition was described as affecting the PFMs and incisors but more recently it has been noted that these defects could affect any primary permanent tooth.<sup>3</sup> In MIH, the PFM show

rapid caries progression starting shortly after eruption in the majority of cases, which causes serious problems to patients as well as treatment challenges to dentists.<sup>4</sup> Although this condition is frequently encountered in dental clinics,<sup>5,6</sup> recent studies<sup>7,8</sup> have shown that dentists experience significant difficulties in diagnosis and management. Therefore, the aim of this article is to highlight the most important aspects of MIH from its prevalence to treatment options in young patients.

**Prevalence**

Epidemiological studies from different parts of the world show a wide variation in the prevalence of MIH which can range between 2.8 to 40.2%,<sup>9</sup> however, this variation may be due to a lack of standardized tools to record MIH leading to underestimation of the prevalence.<sup>10</sup> In response to this finding Chant et al.<sup>11</sup> have introduced a standardized scoring system based on the European Academy of Paediatric Dentistry (EAPD) evaluation criteria. A manual has also been recently published<sup>12</sup> to facilitate and standardize its use in future epidemiological studies. Eirik et al.<sup>13</sup> suggest that at least 300 subjects should be involved in such studies. Currently, it is estimated that this condition affects one in six children worldwide.<sup>14</sup>

**Aetiology**

The causative mechanism of MIH is still unclear,<sup>15</sup> but the clinical presentation of localized and asymmetrical lesions suggests a systemic origin with the disruption in the amelogenesis process most probably occurring in the early maturation stage or even earlier at the late secretory phase.<sup>16</sup> In general, the condition seems to be multifactorial and systemic factors such as acute or chronic illnesses or exposure to environmental pollutants during the late gestational trimester and first three years of life have been suggested as causative or contributing factors.<sup>17,18</sup> The number of affected teeth was associated with the time when the potential systemic disturbance occurred, children with prenatal, perinatal and postnatal problems showing more affected teeth in increasing order.<sup>19</sup> Multiple possible causes have been suggested in the literature, for instance, respiratory tract infections, perinatal complications, toxemia, oxygen starvation, low birth weight, calcium and phosphate metabolic disorders, frequent childhood diseases, use of antibiotics and prolonged breast feeding.<sup>20</sup> In addition, some studies<sup>21,22</sup> raise the possibility of a genetic role in the aetiology of MIH, indicating that a genetic variation may interact with systemic factors leading to MIH.

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REVIEW ARTICLE

**Essentiality of Early Diagnosis of Molar Incisor Hypomineralization in Children and Review of its Clinical Presentation, Etiology and Management**

Nishita Garg, Abhay Kumar Jain, Sonali Saha, Jaspal Singh

**ABSTRACT**

Molar incisor hypomineralization (MIH) is a common developmental condition resulting in enamel defects in first permanent molars and permanent incisors. In case of eruption of these teeth. One to four molars, and often also the incisors, could be affected. Since first recognized, the condition has been puzzling and interpreted as a distinct phenomenon unlike other enamel disturbances. Early diagnosis is essential since, rapid breakdown of tooth structure may occur, giving rise to acute symptoms and complicated treatment. The purpose of this article is to review MIH and illustrate its diagnosis and clinical management in young children.

**Keywords:** Hypomineralization, First permanent molars, Post-eruption breakdown.

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**INTRODUCTION**

Enamel defects are known to occur due to depressed activity of the enamel-forming ameloblasts which result in the formation of linearly distributed pits or grooves. These alterations can be found in two different stages: Enamel matrix formation (secretion phase) and enamel mineralization (maturation phase). If an imbalance occurs during the secretion phase, the enamel defect is called hypoplasia. If it occurs during the maturation phase, it is called hypomineralization. Once formed, enamel is not remodelled during life and every individual's enamel is a record of the first 8 or 9 years of their life when the crowns are formed.<sup>1</sup> In hypoplasia only the tooth surface is involved that can be considered as an external defect associated to the smallest thickness of the affected enamel. It can be present as shallow or deep fossae with horizontal or vertical grooves and with partial or total absence of enamel. Hypomineralization on the other hand presents as an anomaly in the tissue translucency. A white or yellowish/brownish area can be seen and there is no thickness variation. Recently one enamel alteration of great clinical significance affecting the first permanent molars (PFM) was described in four presentations at the European Academy of Pediatric Dentistry Congress in 2000. These reports called the condition hypomineralized PFM,<sup>2</sup> idiopathic enamel hypomineralization in PFM,<sup>3</sup>

nonfluoride hypomineralization in PFM<sup>4</sup> and cheese molars.<sup>5</sup> It was defined as a single clinical entity and termed molar incisor hypomineralization (MIH). It is defined as hypomineralization of systemic origin affecting one, two, three or all first permanent molars and the permanent incisors.<sup>6</sup> Due to the lack of an agreed definition, prior to 2001, the literature regarding MIH is confusing and it is difficult to be sure that different researchers are referring to the same thing. The severity of MIH may vary greatly. It ranges from mild opacities to post-eruptive breakdown. It may be asymmetrical but should an PFM be severely affected the contralateral molar is more likely to be affected. In affected incisors, the severity of hypomineralization is usually less than that of the affected molars.<sup>7</sup> Literature is scanty on this highly variable ectodermal disorder, supra added by its manifold clinical features this leads to many undiagnosed cases which lead to an array of clinical errors. Solving this problem and possible consequences can be a great challenge for professionals as treatment can be complex. The purpose of this review is to describe the diagnosis, clinical features, prevalence, putative etiologic factors of MIH and to describe sequential treatment options all of which may lead to existing literature on the topic and update pedodontists role in management of such clinical disorders.

**MIH DIAGNOSIS**

Any examination for MIH should be undertaken on clean wet teeth and the age of 8 years is optimum, as at this age all permanent first molars and most of the incisors are erupted. In addition, the permanent first molar teeth will be in a relatively good condition without excessive post-eruptive breakdown. Judgments related to individual teeth (all PFM and incisors) should be recorded, helping in the correct diagnosis of the condition.<sup>8</sup> Diagnostic criteria for hypomineralization of PFMs currently available are the modified defect of dental enamel (DDE) index given by federation dentaire international (Table 1) and the criteria of Weerheijm et al<sup>6</sup> (Table 2).

**DIFFERENTIAL DIAGNOSIS**

Teeth with developmental defects of enamel may present similarly, regardless of etiology, and the development defects of enamel hypoplasia may be confused with MIH. Enamel hypoplasia is a quantitative defect associated with reduced localized thickness of enamel whereas hypomineralization is a qualitative defect affecting enamel translucency.<sup>7</sup>

## Abordaje Terapéutico de la Hipomineralización Molar - Incisal. Revisión Narrativa

Peripheral Odontogenic Fibroma: Case Report

Daniela Alvarez Ochoa<sup>1</sup>; Isabel Robles Contreras<sup>2</sup>; Jaime Diaz Meléndez<sup>3</sup> & Paulo Sandoval Vidal<sup>4</sup>

ALVAREZ, O. D.; ROBLES, C. I.; DÍAZ, M. J. & SANDOVAL, V. P. Abordaje terapéutico de la hipomineralización molar - incisal. Revisión narrativa. *Int. J. Odontostomat.*, 11(3):247-251, 2017.

**RESUMEN:** Hipomineralización Molar-Incisal (MIH) es un trastorno del desarrollo dentario asociado a factores sistémicos, producido por una incompleta mineralización y maduración del esmalte. La prevalencia en niños, a nivel mundial, varía en la literatura entre el 2,4 % y el 40,2 %. Este trastorno que implica al menos un primer molar permanente, pudiendo también verse afectados los molares, dependiendo del momento, la duración, la susceptibilidad del individuo y la gravedad de la injuria prenatal, perinatal o postnatal. El esmalte presenta un grado variable de alteración en la translucidez, siendo éste de un espesor normal y de color blanco, o café-amarillo. Si bien se encuentra intacto en el momento de la erupción, puede sufrir fracturas post erupción debido a las fuerzas de la masticación, dejando límites definidos. Por lo general, los molares gravemente afectados son extremadamente hipersensibles, propensos a lesiones de caries de rápida progresión, y pueden ser difíciles de tratar en pacientes jóvenes. La atención debe abordar el comportamiento y la ansiedad del niño, con el objetivo de proporcionar restauraciones duraderas en condiciones libres de dolor. La ejecución de medidas preventivas individuales puede posponer el inicio del tratamiento restaurador y reducir la incomodidad del paciente a largo plazo. El diagnóstico precoz permitirá el seguimiento y la instauración de dichas medidas preventivas tan pronto las superficies afectadas sean accesibles. Pese a que los enfoques de tratamiento para MIH han comenzado a ser más claros y los avances en los materiales dentales han proporcionado soluciones clínicas en los casos que se consideraban sin posibilidad de restauración en el pasado, deben llevarse a cabo ensayos clínicos a largo plazo para facilitar aún más el manejo clínico de este cuadro.

**PALABRAS CLAVE:** hipomineralización molar-incisal, defectos estructurales del esmalte, medidas preventivas.

### INTRODUCCIÓN

Durante la formación del esmalte, los ameloblastos son susceptibles a alteraciones locales y/o sistémicas, las cuales pueden verse reflejadas al momento de la erupción del diente como defectos en el esmalte, pudiendo clasificarse en alteraciones de la translucidez y alteraciones de la estructura (Muthumuju & Wright, 2006; Bianchi, et al., 2010; Alaluusua, 2012; Seow, 2014). Si éstas interrumpen la función ameloblástica en la fase de calcificación o maduración pueden producir un esmalte morfológicamente normal, pero cualitativo o estructuralmente defectuoso, conocido como

hipomineralización o hipocalcificación. El término de "hipomineralización Molar-Incisal" fue descrito como tal en el año 2001 por Weerheijm et al., para definir una patología de etiología desconocida hasta la fecha, sin embargo, no fue hasta el año 2003 cuando fue aceptado como entidad patológica en la Reunión de la Academia Europea de Odontopediatría (Alaluusua).

Esta alteración se describe como "hipomineralización de origen sistémico que abarca de uno a todos los primeros molares permanentes, fre-

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Facultat de Medicina i Odontologia



## LA HIPOMINERALIZACIÓN INCISIVO MOLAR

### Y LA CARIES DENTAL

#### TESIS DOCTORAL

PRESENTADA POR:

ADELA NEGRE BARBER

DIRIGIDA POR:

DR. JOSÉ MANUEL ALMERICH SILLA

DR. JOSÉ MARÍA MONTIEL COMPANYY

DRA. MONTSERRAT CATALÀ PIZARRO

VALENCIA, 2017

## MIH: EPIDEMIOLOGIC CLINIC STUDY IN PAEDIATRIC PATIENT

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research article

### SUMMARY

The Molar Incisor Hypomineralization (MIH) is a qualitative and quantitative defect of the enamel structure of the first permanent molars, which may vary from 1 to 4 with involvement of maxillary and jaw permanent incisors. Aim: Aim of this study is that to evaluate, among 1500 paediatric patients chosen at random aged between 0 and 14 years, affected by the Paediatric Dentistry of the Azienda Ospedaliera Policlinica Tor Vergata of Rome from 1996 to 2011, the incidence and the prevalence of the MIH distribution, and furthermore to ascertain the possible relationship with the data described in the literature. Results and discussion: From the sample of 1500 paediatric patients, the number of those affections from MIH has turned out to be pairs to 110 (7.3%) aged between 4 and 15 years, and an average age equal to 9.7. The incidence of the hypoplastic defects is greater in the elements of the permanent series in which the functional class mainly interested is that of the first molars, with a percentage of 39.8%. Regarding the elements of the deciduous series affections from hypoplasia, they turn out to be in all in number of 20 represented in 80% of the cases from the second molars while in the remaining 20% of the cases the items involved are the central incisors. About the percentage of elements involved in the MIH: the molars, involved with a frequency of 56%, turn out to be more hit regarding incisors (44%). As reported in the literature, it can be asserted that the MIH can hit in equal measure both the male sex that feminine one. Conclusions: MIH represents a condition quite frequent in the paediatric population. In managing this anomaly takes an essential role in the early diagnosis and in the differential one. The study done underlined the importance of a correct application of the therapeutic protocol which, starting from a careful diagnosis and articulating themselves in the execution of preventive treatments and in severe cases restorative and prosthetic, has the aim to certify the functionality and the aesthetic of the dental elements affected by MIH.

Key words: MIH, paediatric patient, epidemiology.

### Introduction

The Molar Incisor Hypomineralization (MIH) is a qualitative and quantitative defect of the dental enamel, to idiopathic aetiology characterized by the progressive and simultaneous hypomineralization and/or hypoplasia of the enamel structure of the first permanent molars, which may vary from 1 to 4 with involvement of maxillary and jaw permanent incisors. In the past many Authors described clinically such a peculiar and specific pathological condition making reference to it, any time with different terms and even contradictory. It was only in the 2000 that the European Academy

of Paediatric Dentistry recognizes the necessity to identify it in an univocal and unequivocal way with the terms of Molar Incisors Hypomineralization (MIH) not to confuse with the Molar Hypomineralization (MH) that does not affect at all the incisors. Therefore, the lack of appropriate definition made it, for many years, that the related literature often confused and however insufficient to the extent that even today it is difficult to establishing if some of the studies made actually refer to said pathology. Aim of this study is that to evaluate, among 1500 paediatric patients chosen at random aged between 0 and 14 years, affected by the Paediatric Dentistry of the Azienda Ospedaliera Policlinica Tor Vergata of Rome from 1996 to 2011, the incidence and the

## Prevalence and Diagnosis of Molar-Incisor-Hypomineralisation (MIH): A systematic review

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### Abstract

**Aim:** This was to review the literature published, to point out shortcomings and to suggest areas in need of improvement concerning the diagnosis and prevalence of MIH. **METHODS:** A broad search of the PubMed database was conducted. Relevant papers published in English were identified after a review of their titles, abstracts or full reading of the papers. Papers were selected if the number of children with at least one first permanent molar affected by demarcated opacities could be determined. Targeted publications were critically assessed by the author concerning examination criteria, selection and character of the study groups, examiners' calibration and result presentation. **RESULTS:** The initial search revealed 414 papers of which 24 met the inclusion criteria. A wide variation in defect prevalence (2.4 - 62.2 %) was reported. Close comparison of the results of the various studies were difficult because of use of different indices and criteria, examination variability, methods of recording and different age groups. **CONCLUSIONS:** Further standardization of study design and methods is needed to make the results comparable.

### Introduction

Since the late 1970s, first permanent molars (FPM) with orange-white to yellow-brown enamel opacities, in severe cases in combination with disintegration, have been observed frequently (Koch et al., 1987). One to four molars, and often also the incisors, could be affected. Since first recognised, the condition has been puzzling and interpreted as a distinct phenomenon unlike other enamel disturbances e.g. amelogenesis imperfecta, fluorosis or chronological hypoplastic disturbances. Diagnostic terms. Historically, a wide variety of terms and definitions have been used to describe various developmental defects of the enamel (DDE). Some are simply descriptive terms while others are linked to the causative agent e.g. fluoride. To remedy this confusion a FDI working group was established, and in 1982 the DDE index was published. This original index turned out to be too complicated to use in practice and a modified DDE index (mDDE) was presented in by FDI (1992).

Briefly, DDE are classified as demarcated opacities, diffuse opacities and hypoplasia. Opacity is defined as a qualitative defect of the enamel, whereas hypoplasia is defined as a quantitative defect of the enamel. Tooth surfaces are inspected visually, and defective areas tactfully explored with a probe. Natural or artificial light is used during examination, defects less than 1mm are not recorded, the teeth are not dried but large debris should be removed with help of a cotton roll. When the results are reported, the number of subjects with one or more teeth affected, the mean number of teeth per child affected by any defect, and by different types of defects are the standard data.

Koch et al. (1987) published a prevalence study in 1987 concerning malformed FPM. They did not use the DDE index but described the enamel defects in terms of colour and surface changes. The condition was named 'enamel hypomineralization in FPM'. Alaluusua and coworkers (1991a, b) published two studies concerning mineralisation defects in FPM with prevalence figures. They registered enamel defects in FPM and excluded hypoplasia, fluorosis, and defects related to major disturbances in general health. The degree of severity and size of the defects were also registered as: severe (loss of enamel with need for restoration, physical restoration), moderate (loss of enamel), mild (colour change). Size was recorded as: large (≥4.5 mm), moderate (3-5mm), small (<3mm).

In 2001 three studies were published reporting the prevalence of FPM with enamel defects. Leppäniemi et al. (2001) used the 'Alaluusua criteria'. Weerheijm et al. (2001c) and Jillevik et al. (2001) used the mDDE index further adapted to be able to point out the phenomenon 'hypomineralized permanent first molars'. The authors of those papers met at the EAPD congress in Bergen 2000, and concluded that they described the same phenomenon and agreed on a definition and the nomenclature molar-incisor-hypomineralization (MIH) (Weerheijm et al., 2001a).

The subsequent EAPD seminar in Athens 2003 strove to establish the judgment criteria for MIH in epidemiological studies. The mDDE index was considered to be too time consuming and not adequate for MIH studies. Post-eruptive breakdown (PEB) is prominent feature in MIH and the mDDE index does not clearly differentiate PEB from hypoplasia.

Key words: prevalence, diagnosis, MIH, review  
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## Conceptos actualizados en cariológia

### Updated concepts in cariology

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#### Resumen

La ICCC (International Caries Consensus Cooperation) –constituida por expertos de doce países de América del Norte y del Sur, Europa y Australia– se ha reunido en grupos de trabajo para producir documentos referidos a las definiciones y las terminologías de la caries dental, así como las abordajes actuales de su tratamiento. Recientemente, sus publicaciones fueron incluidas en un libro titulado *Excavación de las caries*.

La ICCC (International Caries Consensus Cooperation) –constituida por expertos de doce países de América del Norte y del Sur, Europa y Australia– se ha reunido en grupos de trabajo para producir documentos referidos a las definiciones y las terminologías de la caries dental, así como las abordajes actuales de su tratamiento. Recientemente, sus publicaciones fueron incluidas en un libro titulado *Excavación de las caries*.

El presente trabajo tiene por objeto planear y revisar los conceptos surgidos de esas publicaciones.

**Palabras clave:** Caries dental, diente decíduo, remineralización, remoción de la caries, tratamiento restaurativo traumático dental.

#### Abstract

Experts in cariology research from twelve countries covering North and South America, Europe and Australia met at the International Caries Consensus Collaboration (ICCC), and published a series of papers related to modern caries definitions, terminology and current approaches for treating carious lesions. A book entitled *Caries excavation*.

Evolution of treating cavitated caries lesions was recently published by this authors.

The objective of this paper is to communicate and review the concepts exposed in the mentioned documents.

**Key words:** Deciduous tooth, dental traumatic restorative treatment, dental caries, tooth remineralization.

## Do We Really Know the Prevalence of MIH?

### Do We Really Know the Prevalence of MIH?

Hernandez M\* / Boj JR\*\* / Espasa E\*\*\*

**Aim:** To analyze the existing variability on molar incisor hypomineralization prevalence in the literature; to distinguish the various molar incisor hypomineralization prevalence rates in different countries, areas, and regions of the world, and to know the valid diagnostic criteria used for the correct identification of molar incisor hypomineralization prevalence. **Study design:** A literature review from Medline® and Cochran Library® online databases was performed using five terms individually or in combination. Articles not reporting diagnostic criteria employed and articles not written in English were excluded. The results were analyzed by country, region, year of study, sample size, range of age, and prevalence rate. **Results:** A total of 37 articles in English were selected from 1987 to 2014 and from those only 14 employed the EAPD's 2003 diagnostic criteria. The reported age range varied from 5.5 to 17 years; the most frequently range used was 7 to 9 years. A wide prevalence range from 2.8% to 44% was found and 82.61% of the articles reported calibrated examiners. **Conclusions:** Comparison among the results of the studies is difficult due to the use of different indices and diagnostic criteria, the analysis variability, selection methods, and different age groups. In reality, we are probably far from knowing the real MIH prevalence.

**Key words:** Molar incisor hypomineralization, prevalence.

#### INTRODUCTION

The molar incisor hypomineralization (MIH) is a condition previously recognized and named with multiple terms, which could lead to confusion. Recently MIH has been defined as "Hypomineralization of systemic origin from one to four first permanent molars frequently associated with affected incisors".

The hypomineralized enamel defect has its origin in the different stages of amelogenesis, with an ameloblast disturbance in the transitional or early maturation stage, resulting in a reduced mineral deposit; thus being a qualitative defect.<sup>1-3</sup>

The MIH etiological factors have not yet been well defined, although theories of combination of factors and its action in syndromes have been proposed. A questionnaire sent to pediatric dentists throughout Europe in 2003 showed that this condition can be found all over Europe, but the prevalence rates are not entirely comparable.<sup>4</sup>

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Previous studies have used different criteria to define this dental disorder, which has complicated the comparison of the resulting prevalence. Only one third of the investigations have been performed in all age cohorts or children randomly selected from the target population.<sup>5</sup> Concerning MIH, in the sixth congress of the European Academy of Pediatric Dentistry (EAPD) it was concluded that there was a limited number of studies about MIH prevalence and thus it was necessary to modify the diagnostic criteria.<sup>6</sup>

Worhejcin, et al.<sup>7</sup> indicates that the MIH examination should be conducted on cleaned and moistened teeth (all clearly visible opacities should be recorded, regardless of their size) at the optimal age of 8 years old, since at this age all permanent molars and incisors have erupted. Currently the MIH prevalence rate varies from 2.8% to 44%. This condition is relatively frequent and can lead to serious problems for the affected children and their families by the consequences of pain, postoperative breakdowns, chewing and rating problems, esthetics, and treatment difficulties; for those reasons there is a growing concern for this entity, especially in Europe where it seems to be increasing.

In 2003 the EAPD<sup>6</sup> defined the MIH characteristics and stated that permanent first molars and incisors should be examined (12 index teeth); this examination for MIH should be performed on wet teeth after cleaning and having established five criteria to be considered in epidemiological studies, based on 8-year-old population. Each tooth should be recorded for absence or presence of demarcated opacities (white, yellow, or brown in color), postoperative enamel breakdown (loss of initially formed enamel surface after tooth eruption, typically related to a pre-existent opacity), atypical resourcations, extrusion due to MIH and failure of eruption of a molar or incisor.<sup>6</sup>

#### Introducción

Los avances en el campo de la etiología y la patogénesis de la caries dental han producido nuevas concepciones que alcanzan diversos aspectos del diagnóstico, el control y el tratamiento de esta enfermedad. Hoy sus terapéuticas deben estar guiadas por las recomendaciones basadas en la evidencia,<sup>8</sup> y mientras el número de estudios crece permanentemente, no siempre hay consonancia en la interpretación y la comprensión de los datos que estos ofrecen.<sup>9</sup>

La cariológia moderna brinda nuevos paradigmas sustentados en datos procedentes de la investigación científica, pero ello no siempre se ha trasladado a la clínica, donde –a pesar de la fuerte evidencia del fracaso de las estrategias tradicionales en el tratamiento de la caries dental– un considerable segmento profesional mantiene prácticas que hoy se consideran

obsoletas. Son diversos los factores responsables de esta brecha, donde no están apenas las políticas nacionales de salud ni el sistema de remuneración.

Con el objeto de esclarecer y aclarar conceptos actualizados en cariológia, la ICCC (International Caries Consensus Cooperation) –constituida por expertos de doce países de América del Norte y del Sur, Europa y Australia– se ha reunido en grupos de trabajo y producido, desde 2013, documentos destinados a la búsqueda de consenso entre las comunidades científicas.<sup>10</sup>

Recientemente, sus publicaciones fueron incluidas en un libro bajo el título de *Excavación de las caries. Evolución en el tratamiento de las lesiones de caries cavitadas*, con el propósito que allí expresan de que lleguen a estudiantes y graduados de

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## Protocolo de diagnóstico, pronóstico y prevención de la caries de la primera infancia.

### INTRODUCCIÓN

La Organización Mundial de la Salud (OMS) establece que las enfermedades bucodentales comparten factores de riesgo con 4 enfermedades crónicas importantes: las enfermedades cardiovasculares, el cáncer, las enfermedades respiratorias crónicas y la diabetes, porque se ven favorecidas por las dietas no saludables, el tabaco y el consumo nocivo de alcohol; otro factor es una higiene bucodental deficiente.

La caries dental es actualmente la enfermedad crónica más frecuente en la infancia con una elevada prevalencia en preescolares españoles.

Esta enfermedad infecciosa está considerada, actualmente, como una disbiosis causada por el consumo de azúcares; es decir, se considera que es una enfermedad azúcar-dependiente. La enfermedad de la caries dental presenta graves repercusiones en la salud general del niño, tales como: dolor intenso, infecciones faciales, hospitalizaciones y visitas de urgencia, disminución en su desarrollo físico y en la capacidad de aprendizaje, dificultad en el manejo ambulatorio y un elevado costo de tratamiento. Asimismo, un niño con caries en los dientes primarios, será probablemente un adulto con múltiples caries y restauraciones en la dentición permanente.

Entre los factores de riesgo que intervienen en la aparición de la caries de la primera infancia (CPI) se encuentran: insuficiente higiene oral, biberón o lactancia materna a demanda y/o nocturna, consumo frecuente de carbohidratos fermentables, colonización oral bacteriana precoz, presencia de placa bacteriana visible, historia anterior de caries, niveles elevados de *Streptococcus mutans* (SM), flujo o función salival reducidos, bajo nivel socio-económico de los padres y/o pocos conocimientos sobre salud oral.

Siendo la caries una enfermedad potencialmente controlable, llama la atención que nuestra práctica diaria se relacione casi por completo con esta enfermedad. Por otro lado, debemos ser conscientes que los enfoques restauradores tradicionales han fracasado en el intento de disminuir la caries durante las últimas décadas. Es por ello que, debemos replantearnos esta situación y dedicar cada vez más esfuerzos preventivos y educativos para ofrecer a nuestros pacientes la posibilidad de vivir sin enfermedades orales.

La educación basada en el control de los factores de riesgo debe ofrecerse no solo a los padres y familiares, sino que también debe estar presente en todos los ambientes que



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#### Resumen

Introducción: la caries dental es una enfermedad crónica, con elevada prevalencia en preescolares españoles. La falta de higiene, la alimentación inadecuada y las altas densidades son problemas de salud frecuentes en nuestra zona básica de salud según los resultados del análisis de situación de salud. El objetivo de este trabajo es estudiar la prevalencia de caries dental en niños de tres a cinco años en nuestra zona básica de salud mediante un estudio descriptivo transversal.

**Materiales y métodos:** se realiza la inspección bucodental por dentista y la recogida de datos por higienista dental en escolares de primer, segundo y tercer curso de Educación Infantil. La variable principal estudiada es la presencia de caries. Los datos son registrados en fichas individuales y cargados en una base de datos elaborada en el programa SPSS, donde se realiza el análisis descriptivo de los mismos.

**Resultados:** de 150 niños escolarizados en educación infantil en la zona, se revisan 121 que acuden a clase el día que se realiza la revisión (80,7%). En primer curso un 46% de los niños presentan caries, en segundo un 40,5% y en tercero encontramos un 77,3% de niños con caries en dientes temporales y un 20,8% en definitivos.

**Conclusiones:** las cifras de caries en nuestra zona básica de salud son altas, muy superiores a las de las zonas de menor nivel social como la nuestra.

#### Palabras clave:

- Caries dental
- Diente definitivo
- Diente temporal
- Higiene bucal

## Original

### Prevalencia de caries dental en escolares de educación infantil de una zona de salud con nivel socioeconómico bajo

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#### Resumen

Introducción: la caries dental es una enfermedad crónica, con elevada prevalencia en preescolares españoles. La falta de higiene, la alimentación inadecuada y las altas densidades son problemas de salud frecuentes en nuestra zona básica de salud según los resultados del análisis de situación de salud. El objetivo de este trabajo es estudiar la prevalencia de caries dental en niños de tres a cinco años en nuestra zona básica de salud mediante un estudio descriptivo transversal.

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**Conclusiones:** las cifras de caries en nuestra zona básica de salud son altas, muy superiores a las de las zonas de menor nivel social como la nuestra.

#### Palabras clave:

- Caries dental
- Diente definitivo
- Diente temporal
- Higiene bucal

#### Prevalence of dental caries in preschool age children from a low socioeconomic status area

**Introduction:** dental caries is a frequent chronic disease throughout childhood. Poor hygiene, inadequate nutrition and dental problems are frequent health problems in our basic health area according to the results of our health situation analysis. Objective: To study the prevalence of dental caries in children attending to 1st, 2nd and 3rd year of pre-school education in the schools located in our basic health area.

**Material and methods:** cross-sectional descriptive study. A dentist and a dental hygienist carried out an oral inspection of children enrolled in first, second and third year in preschool education. The main variable studied was the presence of caries. Information was registered in individual cards and processed with SPSS program by a descriptive analysis.

**Results:** out of a total of 150 children enrolled in early childhood education in the three schools researched, 121 who attended to class (80.7%) were studied. Caries were present in 46% of children in 1st year and in 40.5% of children in 2nd year. In 3rd year 77.3% of children had caries in deciduous tooth and 20.8% had caries in permanent tooth.

**Conclusions:** caries prevalence is high in comparison with national studies. The current child oral health program seems to be insufficient. It is necessary to increase preventive actions in early childhood, specially in lower social status areas such as ours.

#### Key words:

- Deciduous tooth
- Dental caries
- Oral hygiene
- Permanent tooth

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## Solving the etiology of dental caries

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For decades, the sugar-fermenting, acidogenic species *Streptococcus mutans* has been considered the main causative agent of dental caries and most diagnostic and therapeutic strategies have been targeted toward this microorganism. However, recent DNA- and RNA-based studies from carious lesions have uncovered an extraordinarily diverse ecosystem where *S. mutans* accounts only a tiny fraction of the bacterial community. This supports the concept that consortia formed by multiple microorganisms act collectively, probably synergistically, to initiate and expand the cavity. Thus, antimicrobial therapies are not expected to be effective in the treatment of caries and other polymicrobial diseases that do not follow classical Koch's postulates.

## Microbiology of dental caries

Classical Koch's postulates contend that a specific microorganism can be found to be responsible for an infectious disease when it invades a host, a principle that has been assumed to be correct for most microbial infections. Although the identification of asymptomatic carriers readily showed that the postulates have important limitations and the original formulation has been modified with the introduction of genetic techniques [1], the principles proposed by Koch have remained a cornerstone in microbiology. Probably due to this, when the sugar-fermenting, acidogenic species *S. mutans* was isolated in the 1920s from carious lesions, it was considered to be the etiological agent of dental caries [2]. Dental caries is considered the most prevalent human disease, affecting 80–90% of the world population [3]. In children, it appears to have a fivefold higher prevalence than asthma, the second most prevalent disease. For decades, *mutans streptococci* have been considered the main causative agent of the disease [4] and most diagnostic, preventive, and therapeutic strategies have been targeted toward this microorganism (see, for example, [5–7]). However, other microbial species were also isolated from carious lesions and have been related to the process of tooth decay, including lactobacilli [8] and bifidobacteria [9]. The introduction of molecular approaches to study the human microbiome revealed that the oral ecosystem is inhabited by hundreds of bacterial species [10], most of which are considered commensals, and that species regarded as pathogens are frequently found in healthy individuals, although at lower levels than in

diseased subjects [11]. An important hurdle in determining the etiology of tooth decay is that many samples were not taken from the disease site itself but from other, noninvasive samples such as saliva, which does not represent the cariogenic microbiota (Box 1). However, in a seminal work, Aas and collaborators obtained over 1200 clones of the 16S rDNA gene from dental plaques and carious lesions at different stages of the disease [12]. This work showed that *S. mutans* could not be PCR amplified in a significant proportion of samples and other bacteria such as *Atopobium*, *Prevotella*, and *Propionibacterium* appeared to be associated with the disease. Recent work added *Scardovia* organisms as a new etiological agent of severe early childhood caries [13]. In recent years, the use of second-generation sequencing and metagenomic techniques has uncovered an extraordinarily diverse ecosystem where *S. mutans* accounts only for 0.1% of the bacterial community in dental plaque and 0.7–1.6% in carious lesions [14,15]. When the DNA of samples from dentin caries was directly sequenced, obviating cloning or PCR techniques, *Vulnificoccus* appeared as the most common genus [16], underlining the varying nature of microbial composition in caries. However, these DNA-based studies may quantify dead, transient, or inactive microorganisms that do not contribute to the disease, inferring estimates of diversity and introducing noise in the analysis [17]. Thus, the application of high-throughput sequencing to the RNA extracted from oral samples finally provides an opportunity to identify the metatranscriptome; that is, the active microbial composition and expressed genetic repertoire underlying disease initiation and progression.

The first of these RNA-based studies on the surface of teeth [18] studied the active microbial communities in oral biofilms before and after a meal, identifying the bacteria that increase their activity and respond to the premise that these organisms may be involved in sugar fermentation and acid formation. Metatranscriptomic data indicate that the active microbiota is a subset of the total microbial composition in oral biofilms [19] but is still extraordinarily diverse. In addition, the RNA-based estimates of diversity indicate that different microbial consortia are formed in the dental plaque of different individuals. Thus, determining the active microbiota in carious lesions may finally unravel the elusive etiology of the disease, paving the way for diagnostic and preventive tools.

## The active microbiota of caries

The first RNA-based estimates of bacterial diversity in caries are shown in Figure 1, pictorially representing the microbial consortia that are actively contributing to the disease. This approach shows an average of eight active

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Clinical dentistry

Oral health survey in the Valencia Region

## Oral health survey of the child population in the Valencia Region of Spain (2004)

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## ABSTRACT

**Introduction (basis and objectives):** The objectives of this study were to study the evolution of child oral health in the Valencia Region and establish a six-year interval for these surveys, at a time of major demographic changes associated with immigration into the region.

**Materials and Methods:** A cross sectional study was conducted in a random sample of 509 children aged 6 years, 478 aged 12 years and 401 aged 15-16 years. The clinical examinations were performed by calibrated dentists (Kappa > 0.85).

**Results:** Caries prevalence was 32% at 6 years of age (dft=1.08) in primary dentition and 42.5% at 12 years (DMFT=1.07) and 55.9% at 15-16 years (DMFT=1.84) in permanent dentition. Caries levels in immigrant children were significantly high. The mean numbers of sextants with bleeding were 0.16, 1.58 and 1.10 while the scores for sextants with calculus were 0.15, 0.76 and 0.88, respectively.

**Conclusions:** Caries levels in both primary and permanent dentition have remained stable at 6 and 12 years of age and have continued to fall in the 15-16-year-old age group. Immigrant children have high caries levels and are a population group in serious need of treatment and prevention plans.

**Key words:** Dental epidemiology, dental caries, caries indices, periodontal status, immigration, social class.

## RESUMEN

**Introducción (fundamento y objetivos):** La finalidad de establecer una periodicidad sexual para estudiar la evolución de salud oral infantil unido a importantes cambios demográficos asociados con la inmigración en la Comunidad Valenciana han motivado este trabajo.

**Material y método:** Con una muestra seleccionada al azar de 509 niños de 6 años, 478 de 12 años y 401 de 15-16 años se ha realizado un estudio de corte transversal. Los exploraciones clínicas fueron realizadas por odontólogos calibrados (Kappa > 0.85).

**Resultados:** La prevalencia de caries en dentición temporal a los 6 años es del 32% (dft=1.08) y en dentición permanente es de 42.5% a los 12 años (ICAO=1.07) y del 55.9% a los 15-16 años (ICAO=1.84). Los niveles de caries en los niños inmigrantes son significativamente altos. La media de sextantes con sangrado fue de 0.16, de 1.58 y de 1.10, mientras que con cálculo fue de 0.15, 0.76 y 0.88 respectivamente.

**Conclusión:** Los niveles de caries tanto en dentición temporal como permanente a los 6 y 12 años se mantienen estables, mientras que a los 15-16 años siguen descendiendo.

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## Prevalencia de caries y estado periodontal de los niños y adolescentes de Navarra (2002)



Cortés-Martínorena, Fco. Javier

## Caries prevalence and periodontal status of children and adolescents in Navarra (2002)

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**Resumen.** Introducción (fundamento y objetivo): En Navarra se realizó un seguimiento epidemiológico de la caries dental y su tratamiento desde el año 1987, antes de la puesta en marcha del programa ISBIO en 1991. El objetivo de este trabajo ha sido conocer el estado de salud dental y periodontal de la población infantil y adolescente de Navarra en 2002. Método: Encuesta epidemiológica sobre una muestra al azar de escolares de 1º, 2º y 6º de Enseñanza Primaria y 2º, 3º, de 15-16 años. Los exámenes clínicos fueron realizados por examinadores calibrados (Kappa > 0.85) en los colegios utilizando equipamiento por radi. El estudio estadístico se realizó con una base de datos Microsoft Access, con el paquete estadístico SPSS versión 10 para Windows. Resultados: La prevalencia de caries en dentición temporal a los 6 años fue de 35.4% (dft 1.28) y en permanente a los 14 años 50.7%. La media ICAD en los cuatro grupos de edad fue 0.16, 0.27, 0.75 y 1.36 respectivamente. Los índices de mutación (M) 16.7%, 48.1%, 77.2% y 76.7%. El estado periodontal, antes (6 años) 9.1%, sangrado 86.2%, cálculo 17.2%. Conclusión: La prevalencia de caries sigue siendo alta pero la media de dientes afectados bajo la tendencia respecto de 1997 es a aumentar en dentición temporal y a disminuir en permanente.

**Palabras Clave:** Caries dental, Estado periodontal, Epidemiología dental, Tratamiento dental, Seladores de fluoros, Captación, Inmigrantes.

**Abstract.** Background: Survey of caries prevalence and dental treatment have been conducted in Navarra since 1987, before ISBIO was implemented (1991). Objectives: Investigate the dental and periodontal health status of children and adolescents of Navarra in 2002. Methods: Epidemiological survey of a representative sample (n 1,566) of 1º, 2º, 6º EP and 2º, 3º (15-16 years old) schoolchildren. Clinical examinations were conducted by calibrated examiners (Kappa > 0.85) in the school centres. Data were processed using Microsoft Access and SPSS 10 for Windows. Results: Caries prevalence in deciduous dentition at 6 years of age was 35.4% (dft 1.28), and in permanent dentition at 14 years of age 50.7%. Mean DMFT in the four groups were 0.16, 0.27, 0.75, 1.36. Caries indices were 16.7%, 48.1%, 77.2%, 76.7% respectively. Periodontal status, healthy (6 years) 9.1%, bleeding 86.2%, calculus 17.2%. Conclusions: Caries prevalence is still high but mean number of affected teeth is low. Trends of caries level since 1997 demonstrate an increase in deciduous dentition, and a decrease in permanent dentition.

**Key Words:** Dental caries, Periodontal status, Dental epidemiology, Dental treatment, Fluoride sealants, Captation, Immigrant.

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— 38 —

## Encuesta de Salud Bucodental en Escolares en ARAGÓN 04



COLABORACIÓN ESPECIAL

CRITERIOS MÍNIMOS DE LOS ESTUDIOS EPIDEMIOLOGICOS DE SALUD DENTAL EN ESCOLARES

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RESUMEN

Los estudios epidemiológicos de salud bucodental en escolares constituyen un instrumento básico en la planificación de los programas de prevención y de asistencia dental. En este trabajo se proponen unos elementos mínimos: consenso en el diseño, realización y análisis de estos estudios, se señala un método para la calibración de los equipos examinadores, el índice de caries, criterios diagnósticos, clasificación de las maloclusiones dentales, e indicadores para el análisis de los resultados.

**Palabras clave:** Estudios epidemiológicos. Maloclusiones. Calibración de examinadores. Diagnóstico de caries. Maloclusiones dentales.

ABSTRACT

Minimum Criteria for Epidemiological Dental Health Studies in School Children

Epidemiological studies of oral health in schools constitute a basic instrument for planning prevention and dental health programs. This paper sets forth some minimum common elements to the design, execution, and analysis of such studies, and presents a method for the adjustment of examining teams, index age, diagnostic criteria, classification of dental malocclusions, and indicators for analysis of results.

**Key words:** Oral epidemiological studies. Calibration of examiners. Diagnosis of caries. Dental malocclusions.

INTRODUCCIÓN

En mayo de 1994, la Dirección General de Salud Pública del Ministerio de Sanidad y Consumo, convocó la primera reunión de coordinación de técnicos responsables de salud bucodental de las Comunidades Autónomas y de la Administración Central del Estado.

En dicha reunión se pusieron de manifiesto discrepancias metodológicas en las encuestas de salud bucodental que se habían realizado hasta la fecha, discrepancias que dificultaban la comparabilidad de los resultados.

Una de las propuestas de actuación fue la creación de una Comisión Técnica con el objetivo de elaborar un documento en el que se fijaran unos criterios mínimos y comunes para la realización de estos estudios, que permitieran asegurar la validez de los mismos y

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Dental caries experience among Albanian pre-school children: a national survey

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**Objective:** To determine the dental caries experience and treatment needs among 5-year-olds in Albania. **Research Design:** This cross-sectional study was conducted in 2015 by using a cluster sampling technique. The dmft was used to assess dental caries experience and caries prevalence as percentages of children with dmft=0. Caries treatment needs were assessed with dmft=1 x 100, missing teeth with dmft=1 x 100 and 0 dmft x 100 as the Care Index. **Participants:** 2,039 five-year-olds, from 17 districts of Albania were selected. Children's residency was divided into 3 main regions (South, West, Central and North). **Method:** WHO 2013 diagnostic criteria were used and dental caries was recorded at cavity level 03. **Results:** The mean age was 5.4 (SD 0.5) years. The caries prevalence (dmft=0) was 84.1%. The prevalence of children without cavitated lesions (dfo) was 20.1%. The mean dmft index was 4.41 (SD 3.83). The caries treatment needs were 84% (SD 20%). **Conclusions:** The Albanian 5-year-olds assessed in this survey had a high dental caries experience and untreated cavities in the primary dentition. The national health authorities should introduce preventive programs and improved dental care access for this age group.

**Key words:** 5-year-old children, dmft, dmft index, caries prevalence, treatment need, Albania, national survey

Introduction

Dental caries is the most common chronic disease among children and adolescents (Filstrup et al., 2003). The evidence indicates that childhood caries is strongly related to their quality of life causing pain, premature tooth loss, malnutrition and affecting growth and development (Sheiham, 2006). It has been recently stated that caries onset early in life is associated with an increased risk of future caries (Alm et al., 2007). There is evidence of declining prevalence of dental caries among 5-year-olds in developed countries (Pitts et al., 2005). In contrast, the situation is completely different in developing countries, where there is still a high burden of caries among 5-year-olds (Vee and Sheiham, 2002). There are limited data regarding dental caries among Albanian 5-year-olds. Prior to 1990, generations of children had received restorative treatment rather than prevention. This was a period of isolation when most Nordic countries had established data collection to monitor the level of dental caries and proceed with prophylactic measures. European Union candidate Albania has changed dramatically in the last two decades. There is a general perception from its dental community and some local data indicating that dental caries of 5-year-olds is a serious problem. The main challenges are related to poor access to dental services, firstly as the dentists are not evenly distributed through the country (most are in the capital, Tirana) and secondly, because of poverty and lack of a national oral health insurance plan. Albanian drinking water is not currently artificially fluoridated (F-level=0.3 ppm). The only national study

of dental caries experience of 6-year-olds in 2005, had a questionable methodology representing only the main districts of the country and has not been published. Those data indicated that the national mean decayed filled teeth (dft) index for the deciduous dentition was 2.9. However, for the last decade no scientific reports are available from Albania where there is a young society emerging. The aim of the present study was therefore to determine the dental caries experience and treatment needs among Albanian 5-year-olds.

Methods

This cross-sectional study was conducted in the beginning of 2015 by the Faculty of Dental Medicine, Tirana. Permission was received from the Local School Authorities who took responsibility for obtaining individual parental consent for their 5-year-olds' participation. The total number of 5-year-olds anticipated in 2015 was 34,061, comprising 18,063 boys and 15,998 girls (ratio 1:13) (INSTAT, 2014).

Sample selection took into account the population density in different districts of the country, their geographical distribution, social economic status and accessibility to examination sites. In Albania, the main economic activities are located in the west and central region followed by southern and northern regions (INSTAT 2014). Of the country's 36 local districts, 17 were randomly selected. Children's residency was divided into three main regions as South (nine districts: Fier, Gjirokastra, Kavaje, Librazhd, Peqin, Perretjan, Pogorece, Sarande, Vlora);

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REVIEW ARTICLE  
Paedodontics

WILEY

Prevalence of early childhood caries among 5-year-old children: A systematic review

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Abstract

The aim of the present review was to describe the updated prevalence of early childhood caries (ECC) among 5-year-old children globally. Two independent reviewers performed a systematic literature search to identify English publications from January 2013 to December 2017 using MEDLINE, ISI Web of Science, and Scopus. Search MeSH key words were 'dental caries' and 'child, preschool'. The inclusion criteria were epidemiological surveys reporting the caries status of 5-year-old children with the decayed, missing, and filled primary teeth (dmft) index. The quality of the publications was evaluated with the modified Newcastle-Ottawa Scale. Among the 2410 identified publications, 37 articles of moderate or good quality were included. Twenty of the included studies were conducted in Asia (China, India, Indonesia, Korea, Nepal, and Thailand), seven in Europe (Greece, Germany, Great Britain, and Italy), six in South America (Brazil), two in the Middle East (Saudi Arabia and Turkey), one in Oceania (Australia), and one in Africa (Sudan). The prevalence of ECC ranged from 23% to 90%, and most of them (26/37) were higher than 50%. The mean dmft score varied from 0.9 to 7.5. Based on the included studies published in the recent 5 years, there is a wide variation of ECC prevalence across countries, and ECC remains prevalent in most countries worldwide.

KEYWORDS

early childhood caries, epidemiology, oral health, preschool children, tooth

1 | INTRODUCTION

According to the American Academy of Pediatric Dentistry (AAPD), early childhood caries (ECC) is defined as the presence of one or more decayed (non-cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child at 571 months of age.<sup>1</sup> ECC is considered as one of the most prevalent diseases in childhood, affecting many children globally. The American Dental Association identifies that ECC is a significant public health problem in deprived communities, and is also found throughout the general child population.<sup>2</sup> When compared with other common childhood diseases, ECC is five times as frequent in adults and seven times as

common as hay fever.<sup>3</sup> Therefore, the American Dental Association urges the public and health professionals to recognize that a child's teeth are susceptible to decay as soon as they begin to erupt.

Early childhood caries is an infectious disease. Baby bottle tooth decay is recognized as one of the severe clinical manifestations of ECC. The term 'ECC' was suggested at the workshop sponsored by the Centers for Disease Control and Prevention in 1994. The aim of this nomenclature was to focus attention on the multiple factors (i.e. socioeconomic, behavioral, and psychosocial) contributing to caries at such early ages, rather than attributing sole causation to supragingival feeding methods. Four main aetiological factors are well-documented: susceptible host, cariogenic bacteria, fermentable

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RESEARCH ARTICLE

Open Access



Clinical consequences of untreated dental caries in German 5- and 8-year-olds

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Abstract

**Background:** About half of all carious lesions in primary teeth of German 6- to 7-year-old children remain untreated, but no data regarding the clinical consequences of untreated dental caries are available. Therefore, this cross-sectional observational study aimed to assess the prevalence and experience of caries and odontogenic infections in the primary dentition of 5- and 8-year-old German children.

**Methods:** Dental examinations were performed in 5-year-old pre-school children (n = 496) and 8-year-old primary school children (n = 608) living in the Westphalian Ennepe-Ruhr district. Schools and preschools were selected by sociodemographic criteria including size, area, ownership, socio-economic status. Caries was recorded according to WHO criteria (1997). The Lorentz curves were used to display the polarization of dental caries. Caries pattern in 5-year-olds was categorized by Wines's (1997) definition of early childhood caries (ECC). Odontogenic infections as clinical consequence of untreated dental caries were assessed by the pufa index. The 'untreated caries-pufa ratio' was calculated, and the Spearman's rank correlation coefficient (ρ) was used for evaluating the correlation between dmft and pufa scores. Categorical data were compared between groups using the chi-square test and continuous data were analysed by t-test.

**Results:** Caries prevalence and experience in the primary dentition was 26.2%/0.9 ± 2.0 dmft in 5-year-olds and 48.8%/2.1 ± 2.8 dmft in 8-year-olds. ECC type I (2/3) was the prevalent caries pattern in 5-year-olds. About 30% of the tooth decay was treated (5y: 29.7%/8y: 39.3%). The Lorentz curves showed a strong caries polarization on 20% of the children. Pufa prevalence and experience was 4.4%/0.1 ± 0.3 pufa in 5-year-olds and 16.6%/0.3 ± 0.9 pufa in 8-year-olds. In 5-year-olds 14.2% and in 8-year-olds 34.2% of the d-component had progressed mainly to the pulp. A significant correlation between dmft and pufa scores exists in both age groups (5y: ρ = 0.399; 8y: ρ = 0.499). First deciduous molars were most frequently affected by odontogenic infections, presenting virtually all pufa scores (>95%).

**Conclusions:** Prevalence and experience of odontogenic infections and the untreated caries-pufa ratio were increasing from the younger to the older children. Dmft and pufa scores in primary teeth predict a higher caries risk in permanent teeth. The pufa index highlights relevant information for decision makers to develop effective oral health care programs for children at high risk for caries.

**Keywords:** Children, Odontogenic infections, Primary dentition, pufa index, Untreated dental caries

Background

Dental caries continues to be one of the most widespread diseases in the world [1]. In particular, children are predisposed to the development of carious lesions, and their treatment is not just a problem in low- and middle-income countries [2, 3]. Even in economically developed countries such as the United Kingdom, France, Germany, and the

United States, the treatment of decayed primary teeth remains an on-going public health challenge [4–7]. Severely decayed teeth have an important impact on children's general health, nutrition, growth and body weight [8–10] by causing discomfort, pain, sleeping problems, learning disorders and absence from school [11–13]. Furthermore, odontogenic infections as a consequence of untreated dental caries are a most frequent reason for the hospitalisation of young children

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## Factors contributing to severe early childhood caries in south-west Germany

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### Abstract

**Objectives** The purpose of this study is to investigate the contribution of selected variables to the occurrence of severe early childhood caries (S-ECC) in 3- to 5-year-old kindergarten children.

**Methods** A cross-sectional study was conducted in 2010 in 30 randomly selected kindergartens in the German Rhein-Neckar district. After informed consent, parents were asked to complete a questionnaire. The oral examinations took place in the selected kindergartens and the WHO methods as well as the criteria proposed by the American Academy of Pediatric Dentistry were followed. Logistic regression was applied to explore the main factors contributing to S-ECC in a multivariate model.

**Results** In all, 1,007 children aged 3 to 5 years with an average age of 4.1 (SD=0.8) years were examined. Five variables were associated significantly with the occurrence of S-ECC: breastfeeding for more than 12 months (OR=3.27), use of the nursing bottle in bed (OR=3.08), start of tooth brushing after the first anniversary (OR=2.42), regular visits at the dentists (OR=0.14) and mother with immigration background (OR=4.05). Prevalence rate of S-ECC was 5.5%. The mean dmf-DMF

values were 5.69 (S-ECC group) and 0.23 (non-S-ECC group).

**Conclusion** These results show that occurrence of S-ECC is a complex interaction between socioeconomic, psychological and behavioural factors of parents. New and specific ways to provide preventive dental care for toddlers and infants of caries risk groups have to be developed.

**Clinical relevance** Parents of newborn children have to receive information about timely start of tooth brushing and adequate use of nursing bottles.

**Keywords** Severe early childhood caries · Caries prevalence · Risk factors · Kindergarten children · Germany

### Introduction

Many factors contribute to the development of dental caries in young children. In a systematic review, more than 80 different risk indicators for the presence of dental caries in deciduous teeth of children aged 6 years or under were identified [1]. In this review, no distinction between low and high caries severity was made to allow the inclusion of studies exploring factors for caries in general as well as studies exploring nursing caries. For many years, very different terms have been used to describe presence and severity of caries in deciduous teeth of children six years old or under. Especially rampant caries in young children had been named in different ways like baby bottle tooth decay, nursing caries, early childhood caries, etc. [1]. As a result of a consensus conference on caries in young children the terms “early childhood caries (ECC)” and “severe early childhood caries (S-ECC)” were proposed and defined [2]. These recommendations were the basis for the definitions of early childhood caries and severe early childhood caries presented by the American Academy of Pediatric Dentistry [3] according to which ECC includes not only

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## The caries experience of 5-year-old children in Scotland, Wales and England in 2011–2012: Reports of cross-sectional surveys using BASCD criteria

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**Objective:** This paper collates differences in methods and trends in caries prevalence in surveys of the oral health of young children undertaken in Scotland, Wales and England in 2011–12. For Wales and England this was the second survey carried out since changes were required in consent arrangements. **Method:** In compliance with BASCD criteria representative samples were drawn within the geographies of primary care organisations across the UK, and within Local Authorities across England and Wales. Consent was sought in two ways; via opt-in parental consent in England and Wales and opt-out parental consent in Scotland. Children aged five were examined in England and those aged 5 to 6 were examined in Wales and Scotland. Examinations were conducted in schools by trained and calibrated examiners and caries was diagnosed at the dental threshold using visual criteria. **Results:** In Scotland there is a continuing decline in caries prevalence in young school children. Comparison with the previous survey using positive consent in England and Wales shows a decline in caries in both England and Wales although decay levels remain higher in more deprived areas. **Conclusion:** International comparisons assist in interpreting data and trends even if there are some differences in approach. A trend line is more useful than a single data point for monitoring of oral health. This second survey using positive parental consent in England and Wales has enabled trend analysis for the first time since the consent arrangements changed.

**Key words:** epidemiology, dental caries, dmf index, Great Britain, parental consent

### Introduction

This paper reports on the data from surveys of the oral health of children at the start of formal education carried out in Scotland, Wales and England during the school year 2011–2012. Fieldwork for these was carried out by National Health Service clinical teams using training, calibration, sampling and criteria to measure caries experience established by the British Association for the Study of Community Dentistry (BASCD) (Pine *et al.*, 1997a, 1997b; Pitts *et al.*, 1997). United Kingdom (UK) level national training was provided by BASCD for regional coordinators, trainers and standard examiners using criteria consistent with previous surveys and the BASCD criteria.

The United Kingdom consists of Great Britain (England, Scotland and Wales) plus Northern Ireland and health matters are a matter for the national parliamentary bodies in each of these countries. Northern Ireland chose not to collect caries data through a survey in 2011/2012. In the remaining three countries examinations were carried out in state-funded primary schools using standardised portable equipment, techniques and conventions. In the UK formal education commences at age 5 and only 6% of children in the UK are in private schools and therefore not included in the survey. Dental caries was diagnosed at the dental and dentine (d) level using a visual method only. No use was made of radiography, transillumination or compressed air.

The introduction of a requirement for positive parental (opt-in) consent in England and Wales in 2006 limited direct comparison of results with Scotland (Davies *et al.*, 2011, 2014). This requirement was not introduced in Scotland, where a form of passive parental (opt-out) consent underpins their National Dental Inspection Programme. Scotland can undertake retrospective comparison with data collected prior to 2006, whereas England and Wales cannot. England and Wales have had to set new baselines because of the change in consent arrangements and have only collected data using the revised approach since then. The collection of data in 2011–12 provides a second data point and the monitoring of decay trends over the last four years in England and Wales. This paper provides an overview of the results and signposts the complete results.

### Scotland

#### Method

Following UK calibration of benchmark examiners in June 2011, training and calibration of 47 fieldwork teams was carried out in Edinburgh in November 2011. Training involved an introductory session, followed by revision of the survey procedures, tooth/surface codes and diagnostic criteria based on the BASCD Trainers' Pack. Clinical training sessions were then undertaken on school children, and

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## Survey of Caries Experience in 3- to 5-year-old Children in Northeast Italy in 2011 and Its Trend 1984–2011

Roberto Ferro<sup>a</sup> / Alberto Besozzi<sup>b</sup> / Armando Oliveri<sup>c</sup>

**Purpose:** To describe dental caries experience by age and gender among preschool children in a health district in northeast Italy and to plot a trend of primary-dentition dental caries prevalence and severity over a 27-year time span (1984–2011).

**Materials and Methods:** In a cross-sectional survey, 27 out of 88 kindergartens were randomly selected with a sample of 2003 preschoolers drawn from a population of 8329 3-, 4- and 5-year-old children. Dental caries (EC) experience according to the criteria of the British Association for the Study of Community Dentistry was evaluated by two calibrated examiners at schools in 1980 (75.3%), 3- to 5-year-old children from October 2010 to May 2011. Three previous surveys performed in the same area, applying the criteria of the World Health Organization, were used to plot a trend over a 27-year period. Comparisons between groups were made using Pearson's chi-squared test, and caries occurrence was established by logistic regression analysis to assess the influence of sex and age (independent variables) on caries experience (dependent variable).

**Results:** Prevalence (%) and severity (mean dmft ± SD) increased with age (17% and 0.5 ± 1.7 at age 3; 24% and 0.8 ± 2.2 at age 4; 35% and 1.3 ± 2.6 at age 5). The level of untreated caries was 85.8%. No statistically significant difference was found for gender. From 1984 to 2004, the prevalence and severity of caries declined at all examined ages, but were unchanged from 2004 to 2011.

**Conclusion:** The current caries scores in preschoolers are low and similar to those reported in other western European countries. Nevertheless, as very early childhood is a key opportunity to intervene, an effort must be made to provide clear oral health guidance and increase the cooperation among all health professionals.

**Key words:** caries, epidemiology, preschoolers, trend of caries experience.

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Beginning in the 1970s, a significant reduction in caries occurrence was reported by several epidemiological surveys in the industrialised countries.<sup>1,2,4,25,26</sup> This phenomenon can be attributed to water fluoridation, the widespread use of fluoridated toothpastes, the improvement of living conditions and the increased awareness about personal oral health.<sup>25</sup>

Nevertheless, early childhood caries (ECC)<sup>7</sup> – defined as caries affecting the primary dentition of children under 71 months of age – remains the most common chronic childhood disease<sup>18</sup> and the most important risk factor for caries occurrence also in permanent dentition.<sup>15</sup>

It should be recognised that the prevalence and experience of tooth decay (dental caries) across a population is still seen as a key measure both of assessing oral health and the prospects for future oral health.<sup>28</sup> Thus, in Health District 15 in the Veneto region, recurrent surveys on preschoolers have been carried out for the last three decades and the resulting data were compared to plot a trend from 1984 to 2005.<sup>12–15</sup>

With the aim of increasing and maintaining the awareness of oral health prevention and care in early childhood in our area, a coordinated oral health prevention project was established in 1984 and implemented every year since then. The programme, conducted by two dental hygienists, includes: 1) an original nursery tale in a big picture-book (‘the gentle giant and the smiley 1’); 2) using a model and an oversized toothbrush to demonstrate proper daily oral health behaviours, after which every child is invited to brush

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### RESEARCH ARTICLE



Open Access

## Pattern and severity of early childhood caries in Southern Italy: a preschool-based cross-sectional study

Carmelo GA Noble, Leonzo Fortunato, Aida Bianco, Claudia Pileggi and Maria Pavia\*

### Abstract

**Background:** This survey was intended to investigate prevalence and severity of early childhood caries (ECC) in a sample of children in Southern Italy and to identify factors that may be related to this condition.

**Methods:** The study was designed as a cross-sectional survey. The study population (children aged 36–71 months) attending thirteen kindergartens was randomly selected through a two-stage cluster sampling procedure. Parents/guardians of all eligible children were invited to participate filling out a structured self-administered questionnaire, and after having returned the informed consent form an oral examination of the child was performed at school. The questionnaire included information on socio-demographics about parents/guardians and child, pregnancy and newborn characteristics, oral hygiene habits of child, eating habits particularly on consumption of sweets, access to dental services, and infant feeding practices. The WHO caries diagnostic criteria for deciduous decayed, missing and filled teeth (dmft) and surfaces (dmfs) were used to record ECC and severe ECC (S-ECC). Univariate and multiple logistic regression analyses were conducted to evaluate statistical associations of social demographics, infant feeding practices, oral hygiene habits, and access to dental services to ECC, S-ECC, dmft and dmfs.

**Results:** 515 children participated in the study, 19% had experienced ECC, and 2.7% severe-ECC (S-ECC), with a mean dmft and dmfs scores of 0.51 and 0.99, respectively. Mean dmft was 2.68 in ECC subjects, and 6.86 in S-ECC subjects. Statistical analysis showed that prevalence of ECC significantly increased with age (OR = 1.95; 95% CI = 1.3–2.91) and duration of breastfeeding (OR = 1.26; 95% CI = 1.01–1.57), whereas it was significantly lower in children of more educated mothers (OR = 0.64; 95% CI = 0.42–0.96), and higher in those who had been visited by a dentist in the previous year (OR = 3.29; 95% CI = 1.72–6.33).

**Conclusions:** Results of our study demonstrate that even in Western countries ECC and S-ECC represent a significant burden in preschool children, particularly in those disadvantaged, and that most of the known modifiable associated factors regarding feeding practices and oral hygiene are still very spread in the population.

**Keywords:** Early childhood caries, Public health, Feeding habits, Children, Prevention

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**Purpose:** The aims of this study were to: 1) determine the oral health status of Campanian (Italy) 5- and 12-year-old schoolchildren; 2) establish an oral health baseline prior to introducing promotion and prevention strategies and appropriate healthcare for specific groups; 3) provide the starting point for monitoring changes over time according to the World Health Organization 2020 global goals for oral health.

**Materials and Methods:** A cross-sectional observational study was performed on schoolchildren from public schools. 828 children were clinically evaluated, recording DMFT, dmft and SIC (Significant Caries Index). A questionnaire investigating demographic and oral health behaviour was completed by parents.

**Results:** 56.6% of the 5-year-old children were caries free (deciduous dentition) and the mean dmft value was 1.44 ± 2.13. In 12-year-old children, caries prevalence was 35.8%. The mean DMFT value was 1.17 ± 1.56, while the SIC was 3.42 ± 1.97. There were significant relationships between dmft/DMFT (caries experience) and family income level ( $p < 0.001$ ), mother's educational level ( $p < 0.001$ ) and history of recent dental visits ( $p < 0.01$ ).

**Conclusion:** Information drawn from this study can be helpful to describe future and specific dental prevention programmes in order to reduce caries incidence and promote better oral health in the Campania region of Italy.

**Key words:** caries prevalence, oral health, socio-behavioural factors

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Recent epidemiological surveys indicate a reduction in the prevalence of caries in Italy, which is in line with the trend observed in industrialised countries in the last decades.<sup>1</sup> Many factors could play a key role in this decrease, but the use of fluoride in toothpaste is the main reason.<sup>2,4</sup> Preventive programmes and advancement in the restorative dental

treatment approach are also considered important factors.<sup>5,6,15</sup> However, the real contribution of health services to the improvement of oral health remains unclear. A possible contribution of the dental services to the caries decrease is the advancement in diagnostic and treatment criteria.<sup>6</sup> Improved oral hygiene may also explain the decrease. Additional factors such as overall nutrition, number of meals and snacks per day, use of non-carbogenic sweeteners and socioeconomic status should also be considered.<sup>16</sup> Despite this reduction, a polarised distribution of the disease has recently been observed.<sup>8</sup>

Furthermore, there are only a few Italian reports about children's caries experience: in northern Italian areas, the mean DMFT ranged from 1.21 to 1.83,<sup>7</sup> in Milan it was 1.52,<sup>20</sup> in Venice 2.2,<sup>21</sup> and in Rome 2.81, Sassari 0.86 and Crotona 2.6.<sup>17</sup> In some countries, this positive trend could deteriorate to further improve oral health or sustain achievements. It might also lead to the belief that caries is no longer a problem, at least in the developed countries, resulting in the limited resources

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Caries prevalence and manganese and iron levels of drinking water in school children living in a rural/semi-urban region of North-Eastern Greece

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**Abstract**  
**Objective:** The aim of this study was to correlate different combinations of manganese (Mn) and iron (Fe) concentration in drinking water with prevalence of dental caries in both primary and permanent dentition, among school children with similar socio-demographic characteristics. **Methods:** Evros region, in North-Eastern Greece, was divided into four areas, according to combinations of levels of Mn and Fe in drinking water (High Mn-high Fe; High Mn-low Fe; Low Mn-high Fe; Low Mn-low Fe). Children of similar socio-economic background, attending either first or sixth grade (primary or permanent dentition, respectively) of elementary schools, were clinically assessed for caries by three dentists. Caries was defined by the use of dmft/DMFT index. A questionnaire answered by the parents was also analysed. **Results:** 573 children were included. Caries prevalence was high in both age groups (64.2% with mean dmft 3.3 ± 3.6 in primary and 60.7% with mean DMFT 2.3 ± 2.5 in permanent dentition, respectively). Residence in a high Mn-low Fe area was associated with a significant

OR for caries in both age groups (OR (95% CI) for primary and permanent dentition was, respectively, 3.75 (1.68–8.37),  $p = 0.001$  and 3.09 (1.48–6.44),  $p = 0.003$ ), independently of factors like sugar consumption or brushing frequency. **Conclusion:** Prevalence of caries was high in general, and was associated with the combination of high Mn/low Fe levels in drinking water, independently of various socio-demographic factors.

**Keywords:** Trace elements · Manganese · Iron · Drinking water · Dental caries

**Abbreviations**

dmft Decayed, missing, filled teeth (for deciduous teeth)  
 DMFT Decayed, missing, filled teeth (for permanent teeth)  
 Fe Iron  
 Mn Manganese

**Introduction**

Dental caries is a common disorder, which negatively affects the quality of life, causing pain, chronic infections, eating disorders and sleep disturbances that may result in diminished growth. Despite the advances in oral health, dental caries is the most prevalent chronic condition among school children and is high elevated even in developed countries consisting a major public health issue [1].

The exact etiological agent of caries is multifactorial, resulting from metabolic activities of bacteria that form a

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APORTACIONES ORIGINALES

Encuesta de prevalencia de caries dental en niños y adolescentes

Dental caries in the primary dentition in public nursery school children in Juiz de Fora, Minas Gerais, Brazil

Cárie dentária na dentição decídua de crianças assistidas em algumas creches públicas em Juiz de Fora, Minas Gerais, Brasil

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**Abstract** The aim of this study was to assess the prevalence of dental caries in the primary dentition and associated variables in low socioeconomic preschool children enrolled in public nursery schools in Juiz de Fora, Minas Gerais, Brazil. Four public institutions were selected by geographic criteria (two in the central region and two in the peripheral region). The study population comprised 238 children (181 boys, 157 girls) aged 2–8 years old. Dental caries was recorded using the decayed, missing, and filled teeth (dmft/d) index. Among the examined children, 50.8% were caries free. The mean dmft/d index was 2.03. It was higher in the peripheral nursery schools ( $p < 0.01$ ). A trend towards a difference between sexes ( $p = 0.06$ ) was observed. Logistic regression analysis selected a previous child's visit to dentist ( $p < 0.001$ ), geographic location of the public nursery school ( $p < 0.01$ ), and age ( $p < 0.01$ ) as predictive variables for the dmft/d index. The study showed the need for an oral health program for this population, including both curative and preventive measures in order to achieve the WHO/DI goals for the year 2000, namely 50% of children free of caries at age 3–6 years.

**Key words:** Dental Caries, Primary Dentition, Prevalence, Epidemiology

**Resumo** O objetivo deste estudo foi avaliar a prevalência de cárie dentária em dentição decídua e variáveis a ela associadas em pré-escolares de baixo nível socio-econômico, assistidos em creches públicas da cidade de Juiz de Fora, Minas Gerais, Brasil. Quatro instituições públicas foram selecionadas por critérios geográficos (duas na região central e duas na região periférica). A população do estudo compreendeu 238 crianças (181 meninos, 157 meninas) com idade de dois a seis anos. A cárie dentária foi registrada usando o índice dmft/d. Dentre as crianças examinadas, 50,8% estavam livres de cárie. A média do índice dmft/d foi 2,03, que foi maior nas creches periféricas ( $p < 0,01$ ), e uma tendência de diferença entre sexos foi observada ( $p = 0,06$ ). A análise de regressão logística selecionou as variáveis visita prévia da criança ao dentista ( $p < 0,001$ ), localização geográfica da creche pública ( $p < 0,01$ ) e idade ( $p < 0,01$ ) como preditoras do índice dmft/d. O estudo mostrou a necessidade de um programa de saúde bucal para essa população, incluindo medidas tanto curativas, quanto preventivas, com o objetivo de alcançar as metas da OMS/DI para o ano 2000 (50% de crianças livres de cárie na faixa etária de cinco a seis anos). **Palavras-chave** Cárie Dentária, Dentição Primária, Prevalência, Epidemiologia

RESUMEN

Objetivo: determinar la prevalencia de caries dental en los niños y adolescentes desahortados del Instituto Mexicano del Seguro Social.

Métodos: se llevó a cabo la encuesta utilizando los niños asistidos por la Organización Mundial de la Salud. A través de muestreo aleatorio estratificado se seleccionó a niños de tres, cinco y seis años, y a los adolescentes de 12 años de edad.

Resultados: se examinaron 1012 niños y 533 adolescentes, para un total de 1545 encuestados de uno a diez años. La prevalencia de caries dental fue de 66.9 %, las cifras fueron más elevadas en dentición temporal que en permanente ( $p < 3.07$ ). El promedio del índice de caries decedidas, perdidas y obturadas (CPDQ) en dentición primaria a los seis años de edad fue de 3.57 ± 2.8. En los adolescentes de 12 años de edad, el CPDQ fue de 1.97 ± 1.4. En la dentición primaria como en la permanente, el principal componente del índice fue la caries, con 2.49 y 1.56, respectivamente.

Conclusiones: los resultados del presente estudio evidencian poco cambios en la prevalencia y alto índice de caries de los niños durante el periodo estudiado.

SUMMARY

Objective: to identify the prevalence of caries in affiliated children and teenagers at Instituto Mexicano del Seguro Social (IMSS).

Methods: the survey was carried out according to the World Health Organization indexes. The studied was carried out in 1545 boys and girls aged three, five, six, and twelve years and selected by stratified random sampling in seven places of Mexico Republic (Quintana Roo, East and West Estado de México, Northwest 1, Northwest 2, Southwest 3, and Southwest 4 DF).

Results: the prevalence of caries was 66.9 %. Rates were higher in temporary dentition than in permanent teeth ( $p < 3.07$ ). The mean of caries index per tooth in primary dentition in children of six years of age was 3.57 ± 2.8. In the 12 years of age group the average per tooth was 1.97 ± 1.4. The main component in both primary and permanent dentition was caries with 2.49 and 1.56 respectively.

Conclusions: the results of this survey showed slight changes in prevalence and high levels of caries in children.

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**Palabras clave**  
 caries dental  
 dieta cariogena  
 higiene bucal  
 salud bucal  
 niño  
 adolescente

**Key words**  
 dental caries  
 diet, cariogenic  
 oral hygiene  
 child  
 adolescent

Introducción

Las enfermedades bucales afectan entre 60 y 90 % de la población en el mundo y la caries dental es considerada la pandemia del siglo XXI y principal patología responsable de daño en la boca, afecta a población de cualquier edad, sexo, condición social y lugar de residencia.<sup>1,2</sup>

México está considerado por la Organización Mundial de la Salud como un país con alta prevalencia de caries dental,<sup>3</sup> la cual representa un serio

problema de salud pública para nuestro país y un reto para las instituciones de salud.

La caries dental es una enfermedad infecciosa y transmisible que inicia con la desmineralización de los tejidos duros del dente. Es la afectación de la cavidad bucal de mayor morbilidad, originada por la acción del *Streptococcus mutans* presente en la placa dental.<sup>1,2</sup>

El impacto que se genera en la salud bucal de una población lleva mucho tiempo en ser observado, ya que las enfermedades bucales dependen de múltiples

## Epidemiology of dental caries in children in the United Arab Emirates

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Dental caries has a significant impact on the general health and development of children. Understanding caries epidemiology is an essential task for the United Arab Emirates (UAE) policymakers to evaluate preventive programmes and to improve oral health. The purpose of this review is to collect and summarise all data available in the published literature on the epidemiology of dental caries in the UAE in children aged under 13 years. This will provide dental health planners with a comprehensive data summary, which will help in the planning for and evaluation of dental caries prevention programmes. Data were collected from the various published studies in PubMed, Academic Search Complete, Google, and the reference lists in relevant articles. Four keywords were used in the search: 'dental caries', 'epidemiology', 'prevalence', and 'UAE'. All studies conducted in the UAE in general or any single emirate that sheds light on the prevalence of dental caries of children under 13 years were included in this literature review. Studies on early childhood caries and factors associated with dental caries were also included. The review comprises 11 published surveys of childhood caries in UAE. The earliest study was published in 1991 and the most recent was published in 2011. The range of decayed, missing and filled primary teeth (dmft) in UAE children (age between 4 years and 6 years) was 5.1-8.4. For the 12-year-old group the decayed missing and filled permanent teeth (DMFT) ranged from 1.6 to 3.24. Baseline data on oral health and a good understanding of dental caries determinants are necessary for setting appropriate goals and planning for preventive oral health programmes. The current data available on the dmft and DMFT indicate that childhood dental caries is still a serious dental public health problem in the UAE that warrants immediate attention by the government and policy makers.

**Key words:** Dental caries, caries epidemiology, children, time trends, United Arab Emirates

## INTRODUCTION

## The importance of oral health

It is now well established that oral health is an essential component in defining overall health and quality of life.<sup>1</sup> It is also well established that the most common oral disease is dental caries (cavities). Milk or primary teeth are as important to young children as the permanent teeth are to both children and adults. These teeth serve in chewing, speaking and reserving space for future permanent teeth in addition to their importance to the child's aesthetic and self-esteem.<sup>2</sup> In addition to causing pain and discomfort, dental caries can affect children's ability to communicate and learn. Moreover, several studies have shown that children with caries in their primary teeth are more likely to have caries in their permanent teeth.<sup>3-5</sup> A recent study estimates that more than 30 million school hours are lost annually because of oral health

problems in both developing and developed countries.<sup>6</sup>

## Indices used for dental caries assessment

Dental caries is a multifactorial microbial disease. It affects both genders, all races, all ages and all socioeconomic groups. It affects the hard tissue of the teeth by causing softening and cavity formation. There are two sets of main indices chosen by the World Health Organisation (WHO) as the most appropriate indices for the assessment of dental caries in public health surveys. The first is for permanent teeth, namely, DMFT (average number of decayed, missing, filled teeth per person) and DMFS (average number of decayed, missing, filled surfaces per person). The second is for primary teeth, and is written in lowercase letters, namely, dmft (average number of decayed, missing, filled teeth person) and dmfs (average number of decayed, missing, filled surfaces per

## Dental health of 5-year-old children in Abu Dhabi, United Arab Emirates

Al Mughery AS, Attwood D, Blakemore AS. Dental health of 5-year-old children in Abu Dhabi, United Arab Emirates. Community Dent Oral Epidemiol 1991; 19: 308-9.

The United Arab Emirates has a well-developed dental service which has been built up on the Western clinical model. As the Ministry of Health has little epidemiological data, the dental services have been expanded without reference to the population's oral health. Further development of dental services and rational forward planning is impossible without adequate information. Thus it seemed an opportune time to demonstrate that the dental health of a defined population could be measured with the minimum of equipment and local personnel.

## Method

The sample selected was all 5-year-old children attending city and rural schools within the Abu Dhabi administrative area. Three private schools were also examined in order to allow a comparison with the private sector. The schools in the city and rural areas catered mostly for nationals of Abu Dhabi. The private schools selected had a mixture of nationals and other Arabs, who were life-time residents of the area. The children were examined in a mobile dental clinic in a supine position using a standard dental light. A visual caries diagnostic examination technique was used (i.e. a CPTN).

**Table 1** Abu Dhabi 5-year-olds: caries prevalence (dmft) according to school type, and the total sample

	City		Rural		Private		Total	
	n	dmft	n	dmft	n	dmft	n	dmft
dm	443	3.98	429	3.91	217*	2.97	338	3.86
ms	0.46	1.14	0.42	1.23	0.24*	0.76	0.40	1.11
fs	0.25	0.67	0.37	0.99	0.65*	1.50	0.36	1.10
dmfs	5.14	4.43	5.02	4.39	3.06**	3.16	4.63	4.33

dmfs: \*  $P < 0.05$  for city v rural; \*\*  $P < 0.05$  for private v city and rural.

## Short Communications

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Key words: Abu Dhabi; dental caries; 5-year-olds

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groups. Children from rural schools had a higher filled teeth score than did their city counterparts, but subjects from private schools had the highest mean *f* score.

Results from this survey show that, despite considerable expenditure on dental health care, only 20% of 5-year-old Abu Dhabi children are caries free. Clearly there will have to be a reallocation of resources to preventive dental care if the WHO goal of 50% of 5-year-olds caries free by the year 2000 is to be achieved (3). One possible way to facilitate such a caries reduction fairly rapidly would be to introduce water fluoridation (4). This is a feasible option as there is only one major water source in Abu Dhabi, based on a large desalination plant. The reasons for the differences in caries rates between rural, city, and private schools, are not clear. The high untreated levels of dental caries (dm) in the rural and city schools is surprising since both of these schools are regularly visited by a dental team specialising in the dental care of children. A recent study from Saudi Arabia (5) has also noted that the type of school which children attend had a direct bearing on caries risk status. Hence there would also appear to be scope for the Ministries of Health and Education in Abu Dhabi to develop dental health education programmes, particularly for city and rural schools.

## Results and Discussion

The total sample included 1210 5-year-old children, 640 males and 569 females (mean age = 5 yr 5 months). A total of 501 city school children were enrolled, of whom 490 were examined (98%). In four schools in remote rural areas 451 children were examined out of 462 (98.5%). In private schools 267 children were examined out of a possible 273 (97.8%). Table 1 illustrates the caries prevalence (dmft) of the three groups and the total school sample. No significant differences were noted in dmft scores for the males and females, and 20% were caries free while 31% had no untreated caries. Children from private schools had a significantly lower dmft score than both the other

groups. Children from rural schools had a higher filled teeth score than did their city counterparts, but subjects from private schools had the highest mean *f* score.

Results from this survey show that, despite considerable expenditure on dental health care, only 20% of 5-year-old Abu Dhabi children are caries free. Clearly there will have to be a reallocation of resources to preventive dental care if the WHO goal of 50% of 5-year-olds caries free by the year 2000 is to be achieved (3). One possible way to facilitate such a caries reduction fairly rapidly would be to introduce water fluoridation (4). This is a feasible option as there is only one major water source in Abu Dhabi, based on a large desalination plant. The reasons for the differences in caries rates between rural, city, and private schools, are not clear. The high untreated levels of dental caries (dm) in the rural and city schools is surprising since both of these schools are regularly visited by a dental team specialising in the dental care of children. A recent study from Saudi Arabia (5) has also noted that the type of school which children attend had a direct bearing on caries risk status. Hence there would also appear to be scope for the Ministries of Health and Education in Abu Dhabi to develop dental health education programmes, particularly for city and rural schools.

dmfs: \*  $P < 0.05$  for city v rural; \*\*  $P < 0.05$  for private v city and rural.

dmfs: \*  $P < 0.05$  for city v rural; \*\*  $P < 0.05$  for private v city and rural.

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## National survey of the oral health of 12- and 15-year-old schoolchildren in the United Arab Emirates

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المسح الوطني لصحة الفم لأطفال المدارس بأعمار 12 و15 عاماً في الإمارات العربية المتحدة  
م. القبيص، عيسى الحوسني، هبة حساب، إبراهيم بن عرب

**المقدمة:** يهدف الباحثون في هذه البوابة المسح الوطني الأول لصحة الفم في الإمارات العربية المتحدة، مستخدمين معايير منظمة الصحة العالمية، وقد سجلوا تسوس الأسنان والتسحم بالفلورايد لدى 2651 طفل المدارس بأعمار 12-15 عاماً، ومرض دوام السن لن هم من 15 عاماً. وقد بلغ معدل انتشار تسوس الأسنان الدائمة لن هم في عمر 12 عاماً 7.54، أما وسطى عدد الأسنان الدائمة الصلبة بالتسوس أو القلقة أو الخدعة فبلغ 1.6 لكل طفل. وبلغ معدل انتشار التسوس بين من هم في عمر 15 عاماً 7.65، ووسطى عدد الأسنان الصلبة بالتسوس أو القلقة أو الخدعة 2.5 لكل طفل. في عمل الإمارات العربية المتحدة فإن 70% من أطفال المدارس بعمر 12 عاماً ليس لديهم تسحم بالفلورايد في الأسنان 37% من هم في عمر 15 عاماً لديهم تسحم دوام الأسنان 12 تتسحم بالصدفة.

**ABSTRACT:** This paper describes the first national survey of oral health in the United Arab Emirates (UAE). Using WHO criteria, dental caries and fluorosis were recorded in 2651 schoolchildren aged 12 and 15 years, and periodontal disease in those aged 15 years. The prevalence of dental caries in the permanent teeth of 12-year-olds was 54%, the mean DMFT (number of decayed, missing or filled permanent teeth) per child was 1.6. The prevalence of dental caries in 15-year-olds was 65%, and the mean DMFT was 2.5. For the UAE as a whole, 70% of 12-year-old schoolchildren had no dental fluorosis and 37% of 15-year-olds had healthy periodontal tissues.

**Étude nationale sur la santé bucco-dentaire des enfants de 12 et 15 ans scolarisés aux Émirats arabes unis**

**RÉSUMÉ:** Cet article est consacré à la première enquête nationale sur la santé bucco-dentaire aux Émirats arabes unis (EAU). En se basant sur les critères de l'OMS, on a enregistré les caries dentaires et la fluorose chez 2 651 enfants scolarisés âgés de 12 et 15 ans, et les parodontopathies chez ceux âgés de 15 ans. La prévalence des caries sur les dents définitives chez les enfants âgés de 12 ans était de 54 %, l'indice CAO (nombre de dents définitives cariées, absentes ou obturées) moyen par enfant était de 1,6. La prévalence des caries dentaires chez les adolescents âgés de 15 ans était de 65 %, et l'indice CAO moyen de 2,5. Dans l'ensemble des EAU, 70 % des écoliers de 12 ans ne présentent pas de fluorose dentaire et 37 % de ceux âgés de 15 ans avaient des tissus parodontaux sains.

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## Diet and caries experience among preschool children in Ajman, United Arab Emirates

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The study investigated the association between food and drink consumption and the caries experience among young children in Ajman, United Arab Emirates. A one-stage cluster sample was used to select children who were 5 or 6 yr of age. Clinical examinations for caries were conducted. Parents completed questionnaires seeking information on dietary habits. Principal components analysis was used to derive a summary score for the dietary variables (designated 'snack consumption level') and thus overcome the multicollinearity problems associated with using multiple dietary variables. Dental examination and questionnaire data were obtained for 1,036 children (79.9% participation rate). The overall mean number of decayed, missing or filled teeth (dmft) was 4.5. Snacking three or more times per day was associated with a dmft score that was almost one-third higher than the dmft score for children who snacked only once daily. One-third of children had a low overall snack consumption level (4% moderate and 25% high). There was a consistent dmft gradient across these categories. The severity of Early Childhood Caries (ECC) in young Ajman children is high, with dietary habits being important determinants. Carcinogenic snack consumption can be represented using a summary exposure variable that appears to be valid. Young children in Ajman would benefit from health-promotion strategies directed towards appropriate dietary practices. This is First column

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Key words: child; dental caries; diet; UAE (United Arab Emirates)  
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The Emirate of Ajman is part of a larger collection of Emirates known collectively as the United Arab Emirates. The Emirate of Ajman is situated on the coast of the Arabian Gulf, extending over a distance of 16 km between the Emirates of Umm Al-Qaiwain and Sharjah. The most recent estimate of the Ajman population is 189,000 (1).

The cariogenic potential of sugar and other fermentable carbohydrates has been extensively reviewed (2-4). Manufactured sugar-containing products represent a major source of sugar intake by children, and perhaps by those in other age groups, both developing and developed societies (5-7). Such snacks may therefore have a direct impact on dental caries experience.

Studies of preschool children show wide variation in the prevalence and severity of dental caries, both between and within countries (8). In the Gulf States, a study of caries experience in preschool children in Riyadh, Saudi Arabia (9) reported the mean number of decayed, missing or filled teeth (dmft) among 4-6-year-old children to be 6.9, and noted that children as young as 17 months of age had started to eat cariogenic snacks (such as chocolates, sweets, dates, bakery products, and ice cream) at least twice a day. Another example from Saudi Arabia showed that around half of

a group of 446 preschool children consumed sweets at least twice daily (10). In Jordan, confectionery was reported to be eaten regularly by 70% of 4-5-year-old children (11). Consumption of a high level of sugary foods in childhood seems to be common in the Arab world (12). In each study, consumption of a high level of sugary food was associated with a higher prevalence of caries.

One of the problems encountered when investigating the role of dietary factors in dental caries occurrence by using a food-frequency questionnaire is the difficulty of using the resultant variables, as they tend to be highly correlated (leading to problems with multicollinearity). Testing for associations in such a situation carries the risk of Type I error. To date, this problem has not been resolved satisfactorily, but there may be merit in using an approach that summarizes the information captured by the food frequency variables.

The aim of the current study was to investigate the association between foods and drink consumption and the severity of dental caries in young children in the Emirate of Ajman, in the United Arab Emirates. A secondary aim was to identify a more efficient method of dealing with food-frequency questionnaire data obtained from such studies.

## Dental caries experience and use of dental services among preschool children in Ajman, UAE

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**Summary.** Objective. The aim of this study was to estimate the prevalence and severity of dental caries in the primary dentition of young children in Ajman, UAE, and investigate its association with sociodemographic characteristics and use of dental services.

**Methods.** A cluster-sampling approach was used to randomly select children aged 5 or 6 years who were enrolled in public or private schools. Clinical examinations for caries were conducted by a single examiner using World Health Organization criteria. Parents completed questionnaires seeking information on socioeconomic background and dental service utilization. Zero-inflated negative binomial (ZINB) regression modelling was used to identify risk markers and risk indicators for caries experience.

**Results.** The prevalence of dental caries in the sample was high 76.1%. The average dmfs score 10.2. Caries severity was greater among older children and among male children of less educated mothers. Emirati (local) children had higher caries severity than others. Children who had higher level of caries visited the dentist more frequently than other children whose visits were for check-up only.

**Conclusions.** Dental caries prevalence and severity in young children in Ajman are high, and socioeconomic characteristics and dental utilization are important determinants of their dental caries experience. There is an urgent need for oral health programmes targeted at the treatment and underlying causes of dental caries in these children.

### Introduction

The United Arab Emirates (UAE) lies on the eastern side of Arabia. It is bordered by the Arabian Gulf, the Gulf of Oman, and Sultanate of Oman, Qatar and Saudi Arabia. In 1995, the population of the UAE was officially estimated at 2.378 million residents [1]. The Emirati population represents some 25-30% of this number, with the remainder being expatriates who are living in the UAE for variable lengths of time. Children between 0 and 14 years (33.9%) and women in the childbearing age group of 15-45 years (20.6%) represent 54.5% of the total population, which emphasizes the importance of maternal and child health services. In general, dental services are spread throughout the UAE. The dental care system is well-developed and comprehensive, and has a predominantly curative emphasis. About half a million people sought dental care in 1995 [2]. On average, there is one dentist for every 13 000 people.

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## Caries prevalence and intra-oral pattern among young children in Ajman.

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**Objective:** To describe the prevalence and intra-oral pattern of caries among young children in Ajman, UAE. **Methods:** A one-stage cluster sampling was used to randomly select children aged 5 or 6 years old who were enrolled in public or private schools in Ajman. Clinical examinations for dental caries were conducted by a single examiner using WHO criteria. **Results:** The total number of children sampled was 1297, of whom 1036 (79.9%) were dentally examined. The prevalence of caries (defined as dmft = 0) in 5- and 6-year-olds was 72.9% (95% CI, 61.5, 81.9) and 80.9% (95% CI, 70.0, 84.4) respectively, with mean dmft scores of 4.0 (sd, 4.1) and 4.9 (sd, 4.3) respectively (P=0.05). The teeth most frequently affected by caries were mandibular second molars (18.6% of those on the left, and 36.9% of those on the right) and the least affected were mandibular central incisors (2.1% and 2.0% respectively). The prevalence of bilateral molar caries (that is, contralateral teeth both affected) was relatively high, being 29.7% for mandibular second molars and 28.3% for mandibular first molars. **Conclusions:** Dental caries prevalence and severity in 5- and 6-year-olds in Ajman were high, with the lower molars and upper central incisors most commonly affected by caries. There is an urgent need for oral health programs targeted at the treatment and prevention of dental caries in these children.

### Introduction

The Emirate of Ajman is part of a larger collection of Emirates known collectively as the United Arab Emirates (UAE). The Emirate of Ajman was selected for this study because, at the time this study was conducted, no information on the oral health of preschool children in the Emirate was available. In fact, only three studies of child oral health had previously been conducted in the Emirates: that by Al-Mughery et al. (1991) in the Emirate of Abu Dhabi; that by Al-Hosani and Rugg-Gunn (1998), who looked at Abu Dhabi, Al-Ain and the Western Region; and that by Naqvi et al. (1999), who focused on the Al-Ain region only. These three studies all reported caries estimates which were relatively high by international standards.

In the literature, there is no universal definition for Early Childhood Caries (ECC). This disease has been variously referred to as "early childhood tooth decay", "nursing caries", "nursing caries", "baby bottle tooth decay", "nursing bottle tooth decay", "caries of the incisors", "maxillary anterior caries", and "severe early childhood caries". These terms all refer to the condition that focuses on decay specifically in the primary maxillary anterior teeth. However, many studies on pre-school children have reported on dental caries in any tooth (Shackelford and Hohn, 1995; Thabodeo and O'Sullivan, 1995; Dini et al., 2000). The aim of this study was to describe the prevalence and intra-oral pattern of caries among young children in Ajman, UAE.

### Methods

The study was officially approved by the UAE Ministry of Health and the ethics committee of the University of Otago. Before the dental examination, informed consent forms (which had been sent to the parents of selected children) were signed by parents.

Primary schools (kindergartens) were the primary sampling unit. There were a total of 22 schools (16 private and six government) in the Emirate. Half of these schools were selected randomly for inclusion in this study, using a computer program for generation of random numbers, and lists obtained from the Ministry of Education, for Ajman Educational District. A total of 11 primary schools were selected (eight private and three government); all eligible children at each selected school were sampled (one-stage cluster sampling), and were identified according to their date of birth. All schools participated in the study (all of the eligible children in each sampled school were selected). Children whose parents did not consent (and those who were absent at the day of dental examination) were not replaced by substitutes.

The clinical examination involved a systematic, tooth-by-tooth (and surface-by-surface) examination and recording of dental caries status. The dental examinations were carried out using disposable mouth mirrors. The children were examined while sitting on an ordinary chair at the school health clinic. Natural daylight was used for illumination. No radiographs were taken, and no treatment was provided. As recommended by WHO (1997), caries was diagnosed at the cavitation stage only. The rule adopted for missing teeth was that any missing

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## Oral health survey of 5-12-year-old children of National Guard employees in Riyadh, Saudi Arabia

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**Summary.** Objectives. To assess the oral health status, preventive practices and mutans streptococci (MS) levels among the children of National Guard personnel living in Riyadh, Saudi Arabia.

**Design.** Cross-sectional study of schoolchildren.

**Setting.** Dental Clinic of the National Guard Hospital in Riyadh, Saudi Arabia. **Sample and methods.** A sample of 2725-12-year-old children, 154 males and 118 females (95% Bedouin), were selected from approximately 35 National Guard schools in the Riyadh area. An examination was performed in the dental clinic in the National Guard Hospital. Oral hygiene was assessed using the Simplified Debris Index (SDI), Gingival Index (GI) was used to measure gingival health, dental fluorosis was recorded according to the criteria of Dean. Dental caries (dmft, dmfs, DMFT and DMFS) was recorded according to the recommendations of Haugjeorden. Concentration of MS in saliva rinse samples was assessed by routine laboratory methods and expressed as colony forming units (CFU) per ml (log<sub>10</sub>).

**Results.** There was a high level of dental caries (mean dmft = 3.8 ± 3.2; mean dmfs = 21.5 ± 15.7; mean DMFT = 2.0 ± 1.9; mean DMFS = 3.1 ± 3.7). Only 0.7% of the children had no caries experience (dmft = DMFT). MS levels ranged from 0 to 7.5 × 10<sup>7</sup> CFU per ml (mean MS = 4.10 ± 0.90 log<sub>10</sub> CFU per ml). A significant relationship between MS and caries experience was observed (P = 0.003). Mild fluorosis was observed in 14% of the children. Oral hygiene scores indicated that most of the examined tooth surfaces had detectable plaque (mean D1.5 = 1.78). Gingivitis was present in 100% of the children and was considered moderate to severe in 14% (mean GI = 1.68).

**Conclusions.** The study revealed a high level of oral diseases and poor oral hygiene in the study population and a need for therapeutic and preventive measures.

### Introduction

During past years, many epidemiological studies were carried out comparing caries prevalence and oral hygiene levels in children and adolescents. However, few studies have been conducted on the oral health of children in Saudi Arabia and no

studies have been performed on dental caries and mutans streptococci (MS) levels on children of National Guard employees, who are mostly of Bedouin origin. The modern state of Saudi Arabia was established in 1932 with the unification of Bedouin tribes of the Arabian peninsula desert by King Abdulaziz Al-Saud. Initially, this desert Kingdom focused on establishing the stability of the country. Development into a modern state was not started until the discovery of oil in the area in the 1930s. Major changes have taken place since then as

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### RESEARCH ARTICLE

### Open Access

## The Dental Health of primary school children living in fluoridated, pre-fluoridated and non-fluoridated communities in New South Wales, Australia

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### Abstract

**Background:** The Local Government Area of Gosford implemented a water fluoridation scheme in 2008. Therefore the opportunity was taken to record the dental health of primary school children aged 5-7 years prior to the fluoridation and compare the results with other communities in NSW with different access to fluoridated water. The aim was to compare the oral health of New South Wales (Australia) 5-7 year olds living in fluoridated, and non-fluoridated communities. One of the areas was due to implement water fluoridation and is termed the pre-fluoridation site.

**Methods:** Pupils in the first year of Public and Catholic Schools in three areas of NSW were recruited. Class lists were used to draw a sample of approximately 3000 per area. This number allowed for a non-response rate of up to 30 per cent and would give a sample sufficient numbers to allow statistical inferences to be drawn. Children whose parents consented received a dental examination and the clinical data was collected on mark sense cards.

**Results:** In the 3 areas the proportion of children who received a dental examination varied; 77.5% (n = 825) for the fluoridated area, 80.1% (n = 781) for the pre-fluoridated area and 55.3% (n = 523) for the non-fluoridated area. The mean dmft was 1.40 for the fluoridated area, 2.02 for the pre-fluoridated area and 2.09 for the non-fluoridated area. These differences were statistically significant (p < 0.01). Differences were also noted in the proportion of children who were caries free, 62.6% fluoridated area, 50.8% for the pre-fluoridated area and 48.6% for the non-fluoridated location.

**Conclusion:** The children living in the well-established fluoridated area had less dental caries and a higher proportion free from disease when compared with the other two areas which were not fluoridated. Fluoridation demonstrated a clear benefit in terms of better oral health for young children.

**Keywords:** Water fluoridation, Dental caries, Children, Australia

### Background

The State of New South Wales in Australia has a long history of water fluoridation in common with many other countries throughout the world [1,2]. In the 1950s levels of dental caries in NSW children were amongst the highest in the world. The mean Decayed, Missing and Filled Teeth score (DMFT) for 12 year olds at that time was 9.0; a huge burden of disease and treatment need [3] In an

effort to improve the oral health of people living in NSW fluoridation of public water supplies was given a high priority. The first water fluoridation scheme in NSW was opened in Yass in 1956 followed by Tamworth in 1963 and the City of Sydney. By June 2010 approximately ninety four per cent of the NSW population had access to fluoridated water [4,5] and epidemiological surveys have charted a dramatic decline in the prevalence of dental caries in NSW over the last 50 years [6-8]. However the addition of new communities having fluoridated water has slowed. In an effort to offer all NSW residents access to fluoridated water the NSW Department of Health agreed

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## Impact of dental caries and trauma on quality of life among 5- to 6-year-old children: perceptions of parents and children

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**Abstract** – Objective: To assess the impact of dental caries and traumatic dental injuries (TDI) on the oral health-related quality of life (OHRQoL) of 5- to 6-year-olds according to both self- and parental reports. **Methods:** A total of 335 pairs of parents and children who sought dental screening at the Dental School, University of São Paulo, completed the Scale of Oral Health Outcomes for 5-year-old children (SOHO-5), which consists of a child self-report and a parental proxy-report version. Three calibrated examiners assessed the experience of caries according to primary teeth that were decayed, indicated for extraction due to caries, or filled (def-0). TDI were classified into uncomplicated and complicated injuries. Poisson regression models were used to associate the different clinical and sociodemographic factors to the outcome. **Results:** Overall, 74.6% of children reported an oral impact, and the corresponding estimate for parental reports was 70.5%. The mean (standard deviation) SOHO-5 scores in child self-report and parental versions were 3.5(3.2) and 5.1(8.26), respectively. In both versions, caries was associated with worse children's OHRQoL, for the total score and all SOHO-5 items ( $P < 0.001$ ). In contrast, TDI did not have a negative impact on children's OHRQoL, with the exception of two items of the parental version and one item of the child self-report version. In the final multivariate adjusted models, there was a gradient in the association between caries experience and children's OHRQoL, with worse SOHO-5 score at each consecutive level with more severe caries experience, for both child and parental perceptions [RR (CI 95%) = 6.37 (4.71, 8.62) and 10.81 (7.05, 15.27), respectively]. A greater family income had a positive impact on the children's OHRQoL, for child and parental versions [RR (CI 95%) = 0.68 (0.49, 0.94) and 0.70 (0.54, 0.90), respectively]. **Conclusions:** Dental caries, but not TDI, is associated with worse OHRQoL of 5- to 6-year-old children in terms of children's perceptions of both children and their parents. Families with higher income report better OHRQoL at this age, independent of the presence of oral diseases.

**Key words:** oral health; pediatric dentistry; quality of life  
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Dental caries and traumatic dental injuries (TDI) are the most common dental health problems affecting young children populations in both developed and developing countries around the

world (1, 2). Caries and complicated TDI during childhood may have a negative impact on oral health-related quality of life (OHRQoL) of young children and their parents (3–6). Caries is very

## Carries Research

### Oral Health Determinants and Caries Outcome among Non-Privileged Children

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#### Key Words

Caries diagnosis; Caries prevention; Clinical outcomes; Determinants; Eating behaviour; Epidemiology; Oral health; Paediatric dentistry

#### Abstract

The study aimed at identifying oral health determinants that are present in early childhood, are amenable to change and for which there is evidence of their modulation of the rate of caries progression in a sample of non-privileged children. The null hypothesis was that determinants associated with the child's nutritional environment as evidenced by nursery policies significantly influenced the child's oral health. The sample was formed by 2,511 Brazilian 1.5-year-olds. Caries severity and activity were recorded. Parents were interviewed and nurses answered a questionnaire. According to the case status of 495, the final multilevel model (generalized linear mixed model) identified significant associations with determinants such as bottle-feeding the child during the night on demand, not assisting the child in tooth-brushing, ensuring visit to the dentist in case of troubles with teeth only ( $p < 0.0001$ ) and intake of sugary products 2–4 times daily at nursery ( $p = 0.026$ ). The likelihood of caries out-

comes was associated with determinants related to nursery policies, not promoting preventive oral health care for children of mothers with 4 years of education (OR = 2.14;  $p < 0.0015$ ) and <4 years of education (OR = 2.6;  $p = 0.0010$ ), as well as consumption of sugary products 2–4 times daily for children of mothers with 4 years of education (OR = 3.35;  $p = 0.0010$ ) and <4 years of education (OR = 4.07;  $p = 0.0003$ ). In conclusion, determinants related to parental negative practices and to nursery policies significantly influenced children's oral health. Of particular interest was the identification of determinants considered amenable to change in connection with nursery policies towards oral health.

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Non-privileged children are more likely to have poorer oral health than privileged ones and to experience early onset of caries (Carvalho et al., 2004; Watt, 2007; Reisine et al., 2008; Carvalho et al., 2009). Early onset of caries in turn has been associated with further caries development in both primary and permanent dentitions [Alm et al., 2007]. The importance of identifying determinants of oral health that might change the paradigm of non-privileged children having poor oral health is acknowledged. Of par-

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## Original Article

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## Dental caries trends among preschool children in Indaiatuba, SP, Brazil

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#### Abstract

**Aim:** To evaluate caries experience and associated factors in 5-year-old preschool children in the city of Indaiatuba, SP, Brazil. **Methods:** This was a cross-sectional, representative study, conducted from an epidemiological oral health survey (2010) with 303 children. The sample was established by the systematic probabilistic method, in public and private schools, in accordance with WHO criteria. The sample was checked for caries experience (dmft) by four trained and calibrated dentists, reaching acceptable levels of agreement for data collection. Parents or guardians answered questions related to their education and monthly income, and the children answered questions related to dental care and pain. Descriptive and bivariate analyses of independent variables were performed. Variables with  $p < 0.20$  were included in the model (Poisson regression analysis). **Results:** The sample consisted of 151 boys and 152 girls, with a mean dmft of 1.46. The reasons for visiting a dentist due to pain or need for treatment were associated with dmft  $> 0$  (PR=3.76, 95%CI=2.06-6.84) after adjustment of the regression model. **Conclusions:** Among the preschool children of this study, pain or need for treatment due to caries disease in the primary dentition and the reason to visit the dentist due to pain emphasizing the importance of the professional not only in curative actions, but also as a health promoter at the first contact with the child.

**Keywords:** oral health; epidemiology; dental caries; preschool.

#### Introduction

Several publications have shown declining trends in caries experience, thus many researchers studied the factors associated with this decline.<sup>1–4</sup> Among the studied factors are family income and mother's education level.<sup>1–4</sup>

According to the SB Brazil 2010 data, there was a 17% reduction in the 'decay' component of dmft index in 5-year-old children, with a decrease in the mean dmft value from 2.8 in 2003 to 2.3 in 2010.<sup>5</sup> Nevertheless, Brazil did not show a significant decline according to the WHO (2000) goals for primary dentition (5 years), which established a minimum proportion of 50% of caries-free teeth,<sup>6</sup> and is far from fulfilling the WHO goal for 2010 of 90% of 5- and 6-year-old children free of caries.<sup>7</sup>

The city of Indaiatuba, SP, Brazil, presents a 0.79 Human Development Index (HDI), which is above the Brazilian national average. This HDI denotes a situation not usually observed in other Brazilian cities regarding health indicators. Dental caries is a multifactorial disease caused by oral bacteria mediated by dietary carbohydrates, but income and education, which are both considered on HDI determination, might have an influence on caries etiological factors.

## Oral health-related quality of life among Brazilian preschool children

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**Abstract** – Objective: The purpose of this study was to evaluate the impact of oral health conditions on oral health-related quality of life (OHRQoL) in population-based sample of Brazilian preschool children. A further aim was to identify the influence of socio-demographic profile and perceptions regarding general health and oral health status on OHRQoL. **Methods:** An epidemiological survey was carried out at public and private preschools in the city of Belo Horizonte, Brazil. The sample consisted of 1632 5-year-old male and female preschoolers randomly selected using a multi-stage sampling technique and their parents/caregivers. Oral examinations of the children were performed by a single, previously calibrated examiner for the assessment of dental caries experience, malocclusion, traumatic dental injury and developmental defects of enamel. Caregivers were asked to complete the Brazilian Early Childhood Oral Health Impact Scale (B-ECHHS), and a form on socio-demographic data. Descriptive, bivariate and adjusted Poisson regression model analyses were carried out. **Results:** In the child section of the B-ECHHS, OHRQoL was negatively impacted by decayed, missing and filled teeth (prevalence ratios (PR) = 2.18, 95% CI, 1.88–2.52), position of the child among siblings in the family (PR = 1.20, 95% CI, 1.04–1.39), type of preschool (PR = 1.36, 95% CI, 1.10–1.69), age of parents/caregivers (PR = 1.18, 95% CI, 1.04–1.34), monthly household income (PR = 1.48, 95% CI, 1.18–1.85) and perception of the child's general health status (PR = 1.26, 95% CI, 1.06–1.51). In the family section, the adjusted results demonstrated a negative impact on OHRQoL, associated with dental caries experience (PR = 3.40, 95% CI, 2.83–4.08), age of parents/caregivers (PR = 1.16, 95% CI, 1.01–1.33) and monthly household income (PR = 1.41, 95% CI, 1.16–1.72). **Conclusions:** Dental caries experience was the only normative criteria with a negative impact on OHRQoL. Families with low income and younger parents reported a greater impact on quality of life. According to parents' perceptions, a poor general health status rating was related to poorer quality of life among the children.

**Key words:** oral health; pediatric dentistry; quality of life

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Oral disorders can have a negative impact on the functional, social and psychological well-being of young children and their families (1). Oral health and dental treatment may have an impact on speaking, eating and appearance, thereby affecting quality of life, which is a multidimensional concept (2). Thus, there has been a greater clinical focus on the assessment of quality of life as a complement to the measurement

of oral health needs, the prioritization of care and the evaluation of the outcomes of treatment strategies (3).

Oral health-related quality of life (OHRQoL) instruments have been designed and tested on different populations, especially adults and the elderly (4). In the last years, however, there has been a focus on children (5, 6), although the number of studies on this age group remains small in comparison with the vast

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## Factors associated with the development of early childhood caries among Brazilian preschoolers

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RESEARCH ARTICLE

Open Access

### Child, neglect and oral health

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**Abstract** Background: Despite advancements in oral health policies, dental caries still is a problem. The lack of parents'/caregivers' care regarding child's oral health, which characterizes neglect, may lead to a high prevalence of caries. Therefore, the objective of this study was to analyze the relation between dental caries and neglect in five-year-old children.

**Methods:** Quantitative study performed in two different moments. First, the children underwent oral examinations and physical inspection. Then, a semi-structured interview was performed with parents of children with high and low caries rate.

**Results:** In all, 149 physical inspections and oral exams were performed. The number of decayed, missing and filled teeth - dmft - was 2.75 (SD 2.83). 16 children had extremely high values (dmft ≥ 27), 85 intermediate values (1 < dmft < 26) and 48 extremely low (dmft = 0). Nearly all caregivers were female (96.7%; n = 29), mostly mothers (93.3%; n = 28). Associations were found between caries experience and reason of the last consultation (p = 0.011), decayed teeth and child's oral health perception (p = 0.001). There was a trend towards a significant association between general health and decayed teeth (p = 0.079), general hygiene and caries experience (p = 0.083), and caries experience and number of times the child brushes the teeth (p = 0.086).

**Conclusion:** There is a relation between caries experience and children's oral health perception by caregivers, as well as between caries experience and children's access to dental care. There is a trend towards association between caries experience and risk factors suggestive of neglect.

**Keywords:** Neglect, Oral health, Maternal behavior

#### Background

The United Nations Convention on the Rights of the Child declares, in article 27th, that "States Parties recognize the right of every child to a standard of living adequate for the child's physical, mental, spiritual, moral and social development". It also states that "The parents, or others responsible for the child, have the primary responsibility to secure, within their abilities and financial capacities, the conditions of living necessary for the child's development" [1].

However, despite the great advancements in oral health policies, caries disease is still a severe problem that hinders such development [2]. Among the factors associated with the high prevalence of caries in infants is the lack of caregivers' care concerning child's oral health [2,3], which characterizes a neglect act [4]. Neglect is a

type of maltreatment that refers to the failure by the caregiver to provide needed, age-appropriate care although financially able to do so or offered financial or other means to do so [5]. Neglect can be subdivided, being dental neglect, a form of physical neglect. According to the American Academy of Pediatric Dentistry, dental neglect is willful failure of parent or guardian to seek and follow through with treatment necessary to ensure a level of oral health essential for adequate function and freedom from pain and infection [6].

Yet, despite the potential association between the presence of dental caries and neglect, little is known about the relation between them, which is the main objective of this research.

Caries disease is probably the most prevalent of all child diseases, and, if left untreated, it may cause many problems such as pain, suffering, productivity loss - for instance, at school - and development of severe functional and social limitations in the individuals affected by it [7]. Children are considerably dependent on their

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### SCIENTIFIC RESEARCH REPORT

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## Prevalence of dental caries and toothbrushing habits among preschool children in Khartoum State, Sudan

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**Background:** Dental caries in preschool children remains a major dental public health problem and affects significant numbers of children in developed and developing countries. The incidence is increasing in developing countries, such as Sudan, because of lifestyle changes, absence of oral health-preventive services and inadequate access to oral health care. **Objective:** This study assessed the prevalence of dental caries and toothbrushing habits among 3- to 5-year-old preschool children in Khartoum State, Sudan, and described the correlation between the mean decayed, missing and filled tooth (dmft) score for primary teeth with toothbrushing and sugar consumption. **Materials and Methods:** The subjects were 553 preschool children with their mothers/guardians, selected by random sampling from the kindergartens of the seven localities of Khartoum State, Sudan. Data were obtained through clinical examination using a modified World Health Organization (WHO) examination data capture sheet and through structured administered interviews with mothers/guardians. **Results:** The prevalence of dental caries was 52.4%, with a mean dmft score of 2.3. There was an increase in the dmft scores with increasing age. The frequency of children who brushed their teeth regularly at least once a day was high (83.4%), lower dmft scores were associated with starting toothbrushing earlier in life and with increased frequency of brushing per day. Eating sugar-containing food was significantly associated with dmft score. **Conclusions:** The prevalence of dental caries was found to be high among 3- to 5-year-old preschool children, and caries experience increased with age. This was mostly associated with sugar consumption and therefore calls for educational interventions to control sugar intake. The toothbrushing habit is well established in Khartoum State, Sudan, as a large number of children were found to be brushing their teeth regularly. No significant association was found between feeding habits and dmft score.

**Key words:** Dental caries, preschool children, dmft, toothbrushing

#### INTRODUCTION

Dental caries in preschool children remains a major oral health problem because it affects significant numbers of preschool children worldwide<sup>1</sup>. There has been a decline in the prevalence of dental caries in children and adolescents in developed countries over the last 20 years, whereas in developing countries the prevalence of dental caries is increasing<sup>2</sup>. Globally, the highest prevalence of dental caries in primary teeth is found in children in Africa and South-East Asia<sup>3</sup>.

In 2003, the prevalence of dental caries in 4- to 5-year-old children in Khartoum State, Sudan, was 55%, with a mean decayed, missing and filled tooth (dmft) score for primary teeth of 1.68<sup>4</sup>. Ten years later, in a study among 3- to 5-year-old children, a prevalence of dental caries of 65.5% with a mean

dmft score of 3.53 and increased prevalence with increasing age was reported<sup>5</sup>.

Dietary factors found to be a significant risk factor for caries are related to the amount, frequency and time of sugar consumption<sup>6</sup>. Studies on 1- to 5-year-old preschool children have found that the daily consumption of sugar-containing drinks (especially at night) and daily sugar intake were independent risk factors for the development of early childhood caries (ECC)<sup>7,8</sup>. ECC or rampant tooth decay is associated with breastfeeding when this is prolonged and on demand<sup>9,10</sup>. Mothers should be educated to stop night breastfeeding after their children reach 1 year of age, to encourage their children to use a cup by 10 months of age and to start cleaning their child's mouth and teeth regularly once the first primary tooth is erupted<sup>11</sup>. In addition, it has been established that bottle feeding,

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BMC Oral Health

### RESEARCH ARTICLE

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## Dental caries status and its associated factors among 5-year-old Hong Kong children: a cross-sectional study

Kitty Jiyei Chen, Shery Shiqian Gao, Duangporn Duangthip, Samantha Kar Yan Li, Edward Chin Man Lo and Chun Hung Chu

#### Abstract

**Background:** This study investigated dental caries status and its associated factors among 5-year-old children in Hong Kong.

**Method:** This cross-sectional survey was conducted in 2016. It comprised a questionnaire survey and a clinical examination. Kindergarten children aged 5 were recruited using a multistage sampling method. Parents of the participating children were asked about their children's demographic information, sugary snacking behaviour, and oral health-related behaviours and about their own oral health knowledge. One trained dentist performed oral examinations on the children. Caries experience was measured using the dmft index. The relationships between the dmft scores and background information, sugary snacking behaviour, oral health-related behaviours and parental dental knowledge were studied using a zero-inflated negative binomial (ZINB) regression analysis.

**Results:** A total of 570 children were invited to participate, and 501 completed the oral examination (response rate: 88%). The prevalence of dental caries was 55%, and the mean dmft score was 2.7 ± 3.7. Decayed teeth (dt) constituted 93% of caries experience. ZINB analysis found that children who visited a dentist, who were taken care of primarily by grandparents and whose parental dental knowledge levels were moderate had higher dmft scores. Children who ate sugary snacks more than twice daily, had irregular dental attendance and lived in low-income families had a significantly higher chance of having dental caries.

**Conclusions:** Dental caries was prevalent among 5-year-old Hong Kong children, and most of the decayed teeth were untreated. The caries prevalence of the children was related to their frequency of sugary snack intake, dental attendance and socio-economic background.

**Keywords:** Caries, Oral health, Children

#### Background

Dental caries is a common oral disease affecting preschool children around the world [1]. The development of this multifactorial disease is affected not only by cariogenic plaque, fermentable carbohydrates, susceptible host (tooth) and time, but also by environmental factors such as saliva and availability of fluoride [2]. A literature review reported that the prevalence of dental caries has increased in both developed and developing countries in the past decade [3]. Dental caries causes pain as well as local and

systemic infection. It will progress into tooth pulp and a dental abscess will form if untreated. Moreover, it affects children's nutrition, growth and development, general health and quality of life [4].

The water supply in Hong Kong has been fluoridated since 1961, and is currently maintained at 0.5 ppm fluoride [5]. Apart from water fluoridation, the Department of Health has set up an Oral Health Education Unit and implemented preventive programs to reduce dental caries among preschool children. An oral health education program for kindergarten children has been carried out since 1993. The program promotes good oral health-related behaviours among kindergarten children.

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## Is dental caries experience associated with adiposity status in preschool children?

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**Background.** To date, research on the relationship between dental caries experience and adiposity status is debated.

**Aim.** To determine associations between dental caries experience and adiposity status among a community sample of preschool children in Hong Kong.

**Design.** Among a random sample of 5-year-old children, clinical assessment for dental caries was conducted using WHO criteria. Anthropometric measurements for body weight, body height, waist circumference (WC), hip circumference, and triceps skinfold thickness (TRFSK) were performed to assess general adiposity, central adiposity, and peripheral adiposity. Associations between

adiposity status and caries were examined in regression analyses.

**Results.** The response rate was 83.1% (324/390). Regression analyses (adjusted for tooth brushing habits, snacking habits, and socio-demographic factors) identified that weight/height ratio z-score was associated with caries experience: prevalence of dental caries experience (dmft > 0), OR 1.41 (95% CI 1.04, 1.91), and 'very high' caries experience (dmft ≥ 5) OR 1.62 (95% CI 1.05, 2.50). In addition, WC z-score was associated with 'very high' caries experience (dmft ≥ 5) OR 1.72 (95% CI 1.06, 2.81).

**Conclusion.** In a Hong Kong community sample of preschool children, dental caries experience was associated with general adiposity (as assessed by weight/height ratio) and central adiposity (as assessed by WC).

### Introduction

Dental caries remains one of the most common early childhood diseases, with estimates of dental caries experience exceeding 50% among preschool children in many countries<sup>1</sup>. Moreover, most of the dental caries experience remains untreated. The untreated dental caries may lead to pain and adversely affect the quality of life, nutritional status, and development of young children<sup>2</sup>, which is of public health concern. Another public health concern is the growing prevalence of adiposity among young children, which has long been described in industrialized countries and increasingly recognized as a global concern<sup>3,4</sup>.

There has been a growing interest in the relationship between dental caries and adiposity status, not least because they are both of public health concern among children, but because they are likely to share a similar aetiology<sup>5</sup>. It has long been accepted that diet, namely non-milk extrinsic sugars, is of key aetiological concern in the development of dental caries<sup>6-8</sup>. Likewise, it is accepted that diet is a major aetiological factor of adiposity, and it is acknowledged that sugar intake accounts for a considerable amount of the caloric intake among children<sup>9</sup>.

To date, evidence of the relationship between adiposity and dental caries is equivocal, and even when an association between them has been observed this association can be conflicting with some reports suggesting a positive association and others a negative association<sup>10</sup>. Such confusion and conflicting results may have arisen because of how adiposity and dental caries are assessed. For

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### COMMUNITY DENTISTRY AND ORAL EPIDEMIOLOGY

## Regular dental checkup and snack-soda drink consumption of preschool children are associated with early childhood caries in Korean caregiver/preschool children dyads

Han D, Kim D, Kim M, Kim J, Jung-Choi K, Bae K. Regular dental checkup and snack-soda drink consumption of preschool children are associated with early childhood caries in Korean caregiver/preschool children dyads. Community Dent Oral Epidemiol 2014; 42: 70-78. © 2013 John Wiley & Sons AS. Published by John Wiley & Sons Ltd

**Abstract** - Objectives: Early childhood caries (ECC) is a common oral disease among young Korean children. The purpose of this study was to examine the relationship of ECC with preschool children's oral health behavior and caregivers' oral health in Ulsan, Korea. Methods: In 2006, cross-sectional survey of 1214 children under 6 years old and their care givers were surveyed. Two dentists examined according to the WHO criteria. Outcome variables were ECC, and explanatory variables were preschool children's oral health behavior and caregivers' oral health. The chi-square test and multiple log-binomial regression models were performed. Results: The prevalence of simple ECC was 47.5% and that of severe ECC was 34.8%. In bivariate analysis, ECC prevalence was increased according to children's age, caregiver's age, and type of housing. In multiple log-binomial regression models, preschool children's irregular oral checkup (prevalence ratio (PR): 1.7 for simple ECC and 1.8 for severe ECC) and frequent snack and soda drinking (PR: 1.2 for simple ECC, and 1.6 for severe ECC) were significant factors. Conclusions: This study demonstrates that the prevalence of ECC was high among Korean children. Early intervention programs for preschool children's oral health behavior should be developed based on the risk factors identified in this study.

Early childhood caries (ECC) is a preventable form of dental caries that affects very young children. In its simplest form, ECC refers to any dental caries in the primary dentition. Severe ECC is an aggressive form of dental caries in the primary dentition associated with specific patterns of dietary intake in young children (1). ECC can rapidly destroy the primary dentition of toddlers and small children, and, left untreated, can lead to pain, acute infection,

nutritional insufficiencies, and learning and speech problems. In its earliest stages, ECC is characterized by smooth-surface lesions of the primary maxillary teeth (2). ECC caries patterns have been proposed previously (3). Such patterns may reflect (i) a spectrum of risk factors, (ii) the effect of timing of exposure to risk factors and (iii) the effect of duration of exposure to these risk factors. Four distinct patterns of ECC (i) any maxillary incisor

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Key words: caries, dental health promotion, early childhood caries prevention

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### Health Literacy

## The relationship between caregiver functional oral health literacy and child oral health status

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### ABSTRACT

**Objective:** To describe the relationship between caregivers' oral health literacy (OHL) and the oral health status of their children in an Asian population.  
**Methods:** A random sample of 301 child/caregiver dyads was recruited from kindergartens in Hong Kong. Two locally-developed and validated OHL assessment tasks were administered to caregivers with Hong Kong Rapid Estimate of Adult Literacy in Dentistry-30 (HKREAD-30), assessing word recognition and Hong Kong Oral Health Literacy Assessment Task for Paediatric Dentistry (HKOHAT-P) assessing comprehension. Their children's oral health status was assessed (dental caries experience - decayed, missing, filled teeth index - dmft) and oral hygiene status - Visible Plaque Index (VPI).  
**Results:** Caregivers' literacy was associated with children's oral health status. The HKOHAT-P had a stronger association with children's oral health than HKREAD-30. HKOHAT-P and HKREAD-30 remained associated with dmft in the adjusted negative binomial regression models (accounting for socio-demographics), Incidence Rate Ratio (IRR) 0.97, *p* = 0.02, and 0.96, *p* = 0.03, respectively. In the adjusted model, HKOHAT-P was associated with VPI (IRR 0.90, *p* < 0.05), but no association between HKREAD-30 and VPI was evident.

**Conclusion:** The main conclusion of this study was that caregiver oral health literacy was associated with their child's oral health status. A comprehension instrument had a more robust association with children's oral health status than a word recognition instrument.  
**Practice implications:** This study has implications for general public health education for designing community-level interventions.

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### 1. Introduction

Debates regarding the conceptualization and definition of health literacy (HL) [1-3] and, more recently, oral health literacy (OHL) [4,5] indicate that the fields continue to be of considerable interest. Nabeau's (6) notions of health literacy as an outcome of health promotion and as a 'clinical risk' or 'personal asset' provide a useful conceptual framing. His earlier work [3],

making the important 3-way distinction between: (i) basic functional literacy; (ii) communicative/interactive literacy; and (iii) critical health literacy articulated some of the aspects of health literacy that are distinguishing the field from mainstream literacy research [8]. The initial and, to date, dominant focus on functional levels of (oral) health literacy is reflected in the definitions in Table 1a.

OHL studies adopting a functional focus have yielded fruitful results regarding the readability of health materials [9] and the assessment of patient reading skills, including word recognition [10,11] and comprehension [12]. As a more recent evolution from the HL agenda, particularly in the USA [13-16], OHL is proving to be developing as a distinct field. These distinctions are driven by differences in healthcare contexts which are not only disciplinary in nature (see Table 1a) but also encompasses unique, topic-specific communicative events and epidemiological concerns.

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## Significant caries and the interactive effects of maternal-related oral hygiene factors in urban preschool children

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### Keywords

dental caries; primary dentition; preschool children; significant caries (SC); maternal oral hygiene; dental checkups; sugar-sweetened beverages (SSBs)

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### Abstract

**Objectives:** This study examined significant caries (SC) and the interactive effects of maternal-related oral hygiene factors in urban preschool children.

**Methods:** A cross-sectional study was designed to collect data from a cluster of randomly selected samples in 2011. A total of 495 child-mother pairs from the Sun-Ming District of Kaohsiung City, Taiwan, participated in the study. Children aged 4-6 years received dental examinations, and their mothers completed a self-administered questionnaire. The SC Index indicated the highest caries values in participants. The association between 3 groups - dmft (decayed, missing, and filled teeth)-free, non-SC, and SC - and the mothers' and their children's factors were examined using polytomous logistic regression analysis.

**Results:** Among the SC children, caries experience was most frequent in the mandibular molars (64.5-84.9 percent), and almost 50 percent of these children had dental factor caries. The significant factors associated with the SC children were lower maternal self-efficacy in oral hygiene [adjusted odds ratio (aOR) = 2.04], child's intake of sugar-sweetened beverages (SSBs) more than once per day (aOR = 2.07), and irregular child dental checkups (aOR = 2.32). Significant interaction effects were detected among children who received irregular dental checkups and whose SSBs intake was more than once per day and whose mothers had lower self-efficacy in oral hygiene (P for interaction term = 0.034 and 0.004, respectively).

**Conclusions:** Caries prevention programs should prioritize enhancing maternal self-efficacy in oral hygiene and emphasize childhood SSBs intake management and regular dental checkups to mothers to prevent severe caries in preschool-aged children.

### Introduction

Dental caries affects the general health and quality of life of preschool children (1). The 2011 national survey of oral health status in Taiwan showed that the mean number of decayed, missing, and filled teeth (dmft) in preschool children was 6.3 and the caries prevalence was 79.3 percent (2). The caries prevalence of Taiwanese preschool children was a higher than that of other countries such as Hong Kong (49

percent) (3) and Singapore (40 percent) (4). In Taiwan, rural children display a significantly higher prevalence of primary teeth caries compared with urban children (5). However, in recent years, the declining trend in dental caries among children with primary dentition in urban areas has stopped or even reversed (2). This might be related to urbanization with a resulting cariogenic diet (6).

The consumption of Taiwanese preschool children was a risk indicator for dental caries among preschool children (7).

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## Association between dental caries and obesity in preschool children

### ABSTRACT

**Aim** The purpose of this study was to investigate the association between dental caries and obesity in preschool children.

**Materials and methods** A total of 329 preschool children were recruited from nine day care centers. A qualified dentist examined the oral health of each child and a caries score was recorded. Anthropometric measurements included body weight, height, triceps skinfold thickness, and body fat. Body mass index and weight-for-height index were calculated. Parents or guardians answered a questionnaire regarding their children's dietary patterns, oral hygiene habits, and medical history, as well as parental practices and attitudes towards their children's oral health.

**Results** The prevalence of dental caries was 73% in this study. Fourteen percent of the children were overweight or obese. The caries scores were not significantly different according to weight-for-height index categories. After taking into account important factors in the multiple regression models, body mass index and weight-for-height index, respectively, were not significantly associated with dental caries.

**Conclusion** This study showed that obesity was not significantly associated with dental caries in preschool children.

**Keywords** Body Mass Index; Dental caries; Obesity; Preschool children; Weight-for-height index.

### Introduction

Dental caries is one of the common public health problems among preschool children worldwide. Dental caries can lead to pain, chewing difficulty, general health disorders, and can affect growth and development [Shehmar, 2005]. In Taiwan, caries is a serious public health problem. A study reported that the prevalence of dental caries was as high as 88% in preschool children [Tsai et al., 2000]. Yet, a national diet and nutrition survey showed that the prevalence of dental caries was 37% in 4-6 years old in the United Kingdom [Walker et al., 2000]. Forty percent of preschool children presented dental caries in Brazil [Ferreira et al., 2007]. In Mexico, the prevalence of dental caries was 18% in preschool children [Vázquez-Nava et al., 2010].

Obesity is currently one of the most common health problems in numerous countries. A cross-sectional study showed that the obesity prevalence among 4-year-old US children was 18% [Anderson & Whitaker, 2009]. According to one survey, the prevalence of obesity varied from 4% to 17% in Taiwanese children aged 3-19 years [Chen, 1997]. Obese children are more likely to become obese adults [Freedman et al., 2001].

There has been a growing interest in the relationship between dental caries and childhood obesity. The studies have found a positive association between these two conditions and have suggested that obese children are at an increased risk for dental caries [Willebrand et al., 2004; Willebrand et al., 2007] or, on the contrary, preschool children with a low body mass index (BMI) have significantly higher dental caries [Norberg et al., 2012]. Yet, other studies have shown no association between dental caries and childhood obesity [Granville-Garcia et al., 2008; Chen et al., 1998]. Some studies have found that children with early childhood caries have lower weight [Ajahan et al., 1996; Acs et al., 1999]. In a recent systematic review, dental caries was reported to be associated with both high and low BMI in children [Hooley et al., 2012a]. Previous studies have demonstrated inconsistent results because the association between dental caries and obesity is complicated. Both conditions are complex with multiple contributing factors, including biological, genetic, socioeconomic, cultural, dietary, environmental, and lifestyle factors [Granville-Garcia et al., 2008; Hong et al., 2008]. Nevertheless, childhood caries and obesity may share some common risk factors. Energy-dense and highly refined foods (i.e. soda, cake, candy) have been identified as potential contributors to obesity [Nicklas et al., 2001]. Also, these foods are considered highly cariogenic; the increased consumption of sugars leads to an increased risk of caries [Marshall et al., 2005]. The relationship between dental caries and obesity in preschool children has not been thoroughly investigated, and the results are inconsistent. The purpose of this study was to examine the relationship between dental caries and obesity among preschool children.

### RESEARCH ARTICLE

### Open Access

## Prevalence of severe early childhood caries and associated socioeconomic and behavioral factors in Xinjiang, China: a cross-sectional study

Yan Li<sup>1</sup>, Jibieke Wulaerhan<sup>2</sup>, Yuan Liu<sup>3</sup>, Ayinur Abudureyimu<sup>2</sup> and Jin Zhao<sup>1\*</sup>

### Abstract

**Background** This study assessed the prevalence and severity of early childhood caries (ECC) and identified socioeconomic and behavioral correlates of the disease in preschool children living in Xinjiang.

**Methods** For this cross-sectional survey, 1727 children aged 3-5 years in Xinjiang were randomly recruited using a three-stage cluster sampling procedure. The "dmft" index according to the WHO 1997 criteria was used to assess ECC and severe ECC (S-ECC). A questionnaire was completed by caregivers. Variables included sociodemographic characteristics, dietary and oral hygiene behaviors, and access to dental services. The statistical associations of variables with ECC, S-ECC, and dmft were evaluated by univariate and multiple logistic regression analyses.

**Results** The prevalence of ECC was 78.2% and that of S-ECC was 41.2%; mean dmft scores were 5.61 ± 3.36 and 8.17 ± 2.94, respectively. The prevalence of ECC was significantly higher in children from Ining (OR 2.747; 95% CI 2.033-3.713), those whose caregivers had caries (OR 1.78; 95% CI 1.245-2.547), those with a dental visit in the past (OR 2.023; 95% CI 1.429-2.865), and those whose parents had received instructions on oral health care (OR 2.171; 95% CI 1.444-3.272), and increased significantly at age 4 years (OR 2.039; 95% CI 1.506-2.901) and 5 years (OR 2.666; 95% CI 1.855-3.853) and in children who started tooth brushing at a young age (OR 1.363; 95% CI 1.171-1.587), and decreased significantly in children with a more educated mother (OR 0.817; 95% CI 0.688-1), those from high-income families (OR 0.667; 95% CI 0.582-0.765), those with low consumption of sweets (OR 0.66; 95% CI 0.57-0.763), and those who seldom ate before sleep (OR 0.557; 95% CI 0.437-0.712).

**Conclusions** ECC and S-ECC remain a serious problem among preschool children in Xinjiang. Caries rates were associated with sociodemographic and behavioral factors, which could be modified by public health strategies, including protection of primary dentition, extension of insurance to cover oral preventive services, improvement of the oral health care system, and public health education.

**Keywords** Early childhood caries; Related factors; Children, Xinjiang

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## Prevalence of Early Childhood Caries Among 2- to 5-year-old Preschoolers in Kindergartens of WEIFANG City, China: A Cross-sectional Study

Ying-Ying Jiang\*

**Purpose:** To assess the prevalence of early childhood caries (ECC) in 2- to 5-year-old preschool children in WEIFANG City, China, and to investigate the factors related to this condition.

**Materials and Methods:** A cross-sectional study was carried out among 2829 children (2-5 years old, including 1601 boys and 1228 girls) in twenty kindergartens in WEIFANG City, China, in 2014. These children were selected via cluster sampling. First, the percentages of ECC and severe ECC (S-ECC) as well as the mean dmft were compared between different genders and ages, and the tooth distribution pattern of ECC was analyzed. Meanwhile, the information regarding feeding and oral hygiene practices was collected by a questionnaire with 14 questions to evaluate their relationships with the percentages of ECC and S-ECC as well as the mean dmft. The chi-squared test, t-test and one-way ANOVA were conducted to evaluate the significant differences.

**Results:** The ECC prevalence of the preschoolers was 53.3%, and the mean dmft was 2.12 ± 2.56. 71.4% of the 1509 children with ECC were identified as SECC. Not only the percentages of ECC and S-ECC but also the mean dmft differed statistically significantly according to gender and age ( $p < 0.05$ ). Furthermore, caries was most common in primary maxillary central incisors. Feeding and oral hygiene practices were shown to be the significant determining factors for caries.

**Conclusions:** The oral health status of children living in WEIFANG is very poor. Appropriate strategies must be implemented to promote oral health early on by improving feeding and oral hygiene practices.

**Key words:** China, dmft, early childhood caries, feeding and oral hygiene, prevalence

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Early Childhood Caries (ECC) is a social, behavioural, political, medical, economic, psychosocial and dental problem which affects babies and preschool children worldwide [2,29-32]. ECC is defined as any caries experience in primary dentition of child younger than 72 months of age. 7 children all over the world are affected by ECC, and to more aggressive form, Severe Early Childhood Caries (SECC), occurs disproportionately in certain populations. 30 Although ECC is not a life-threatening disease, it causes pain and bacteremia, sometimes leading to toxic overdose of analgesics (acetaminophen). It also compromises chewing ability early in life, and even leads to malocclusion in permanent dentition, as well as low self-esteem, phobic problems and failure to thrive if ECC goes untreated [3,31]

Currently, an increasing number of studies are being conducted to determine the prevalence of ECC in order to evaluate the oral health of children in different regions and countries [3,31,37]. The prevalence of ECC differs between populations, and even within the same population at different times, owing to several established as well as controversial associated factors [29]. According to these studies, the prevalence of ECC is 1% to 17% among preschool children in developed countries, but up to about 70% among preschool children in developing countries [3]. In China, although the caries rate of preschoolers has decreased in recent decades, it is still very high and cannot be ignored. 38 Identifying the related factors is important for the prevention of ECC. Parental sociodemographic factors, educational level and living conditions are reported to be associated with the occurrence and development of caries in children. 1,3-39 In addition, child feeding practices play a critical role early on in establishing dietary behaviours and ECC development. 39 Meanwhile, some studies have identified both breastfeeding and bottle feeding as ECC risk factors. 38 The age at which toothbrushing is started, bedtime brushing, frequency of brushing and time spent brushing were also found to be as-

Chi Chai Invest  
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ORIGINAL ARTICLE

## Factors associated with black tooth stain in Chinese preschool children

Xi Chen · Jing-Yu Zhan · Hai-Xia Lu · Wei-Ye · Wei Zhang · Wen-He Yang · Xu-Xiao Feng

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**Abstract**

**Objective** The objective of this study was to investigate the prevalence of black tooth stain and associated factors in primary dentition in Shanghai, China.

**Materials and methods** Through a cross-sectional design, preschool children were randomly recruited from 12 kindergartens. Children's dental caries were assessed on the number of decayed, missing, and filled teeth (dmft) and surfaces (dmtfs). The presence of black tooth stain was examined, and the visible plaque index was calculated. Questionnaires were completed by the children's parents or guardians. Negative binomial regression was used to investigate the associated factors.

**Results** A total of 2023 children were invited, and 1,397 examined participants with questionnaire data were included in final analysis. The rate of black tooth stain was 9.9% with mean age of 4.55 years. Compared to children without black stain, children with black stain had a significant lower prevalence and experience of dental caries ( $P < 0.001$ ). Factors for black stain were age, born in Shanghai, parents' higher education level, lower visible plaque index and mean dmft, loss of nursing bottle, food with more soy sauce, and history of pneumonia.

**Conclusions** Preschool children with black tooth stain had fewer dental caries. Further studies are warranted to explore the microbiological risk factors for black tooth stain and to

evaluate the causal-effect factors using prospective study design.

**Clinical relevance** In clinics, dentists should pay more attention to the aesthetic problem for the relative high prevalence of black tooth stain in primary dentition. Also, the related factors can be explained to parents for the prevention of black tooth stain in children.

**Keywords** Black tooth stain · Dental caries · Primary dentition · Food habits · Age · Risk factor

### Introduction

Tooth discoloration is a common dental finding and associated with clinical and aesthetic problems [1]. Black tooth stain is an extrinsic discoloration which can occur in both primary and permanent dentition. Its clinical diagnosis is based on the presence of pigmented dark lines parallel to the gingival margin or an incomplete coalescence of dark dots rarely extending beyond the cervical third of the crown [2, 3]. The attraction of materials to the tooth surface is crucial to the formation of extrinsic dental stain. These attractive forces include electrostatic, van der Waals, hydration forces, hydrophobic interactions, and hydrogen bonds. However, the mechanisms that determine the strength of adhesion are not clearly understood [4].

Black stain has been considered a form of dental plaque differentiated from other types by insoluble iron salt and high calcium and phosphate content [1, 5, 6]. The black material is a ferric compound, most likely a ferric sulfide, which arises from the interaction of hydrogen sulfide (produced by bacteria in the periodontal environment) and iron in the saliva or gingival fluid [3]. An association between black tooth stains and the bacteria *Actinomyces* has been reported [7, 8].

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## Risk determinants associated with early childhood caries in Uyghur children: a preschool-based cross-sectional study

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**Abstract**  
**Background:** The prevalence of early childhood caries (ECC) varies with geographical region and population. The Uyghur people, one of 55 officially recognized ethnic minorities in China, have a population of 10,693,346. We performed a preschool-based cross-sectional study of 670 Uyghur children from the southern region of Xinjiang, China to investigate the prevalence and severity of ECC and to identify factors related to the dental health condition of this population.  
**Methods:** The study population of children ranging in age from 3 to 5 years was invited using a three-stage stratified sampling in Kashgar, the westernmost city in China. The "dmft" index was used to assess dental caries. The diagnosis of ECC or severe ECC was based on the oral health diagnostic criteria defined by the American Academy of Pediatric Dentistry. A questionnaire was completed by the children's caregivers. The survey included questions concerning the children's sociodemographic background; feeding and eating habits, particularly frequency of sweet beverage and food consumption; dental hygiene-related behaviors; the general oral health knowledge of caregivers; and the dental healthcare experience of caregivers and their children.  
**Results:** A total of 670 Uyghur children underwent complete dental caries examination. Most of the children (74.2%) had ECC, with a mean dmft ± SD of 3.95 ± 3.64. The prevalence of severe ECC was 40.1% (N = 269), with a mean dmft of 7.72 ± 3.14. More than 99% of caries were untreated. Statistically significant correlations were found between higher ECC prevalence and increased age and lower socioeconomic background, while greater dental health knowledge of the caregiver and positive oral hygiene behaviors were found to be protective. Our findings confirm the multifactorial etiology of ECC.  
**Conclusions:** The prevalence of ECC among preschool-aged Uyghur children in Kashgar was high, particularly among those from lower socioeconomic backgrounds. Caries prevalence was associated with oral hygiene behaviors of children and the general oral health knowledge of caregivers. These factors could be modified through public health strategies, including effective publicity concerning general dental health and practical health advice.  
**Keywords:** Early childhood caries, Risk indicators, Uyghur ethnic minority

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## Mode of delivery, mutans streptococci colonization, and early childhood caries in three- to five-year-old Thai children

Pattanasorn K, Sarathpong P, Khongkuntian S, Aiksejjanimee J, Laohapansang P, Chhuan N, Chen Z, Li Y. Mode of delivery, mutans streptococci colonization, and early childhood caries in three- to five-year-old Thai children. Community Dent Oral Epidemiol 2013; 41: 212-223. © 2012 John Wiley & Sons A/S. Published by John Wiley & Sons Ltd

**Abstract** – Objective: To investigate whether mode of delivery is associated with mutans streptococci (MS) colonization and early childhood caries (ECC) in preschool Thai children. **Methods:** Three hundred and fifty mothers and their 3- to 5-year-old children (184 born vaginally and 166 born by Caesarean section) participated in the study. Data included a dental examination, MS colonization assessed by the Dentocult<sup>®</sup> SM Strip Mutans method, and a questionnaire survey of family socio-demographic information, as well as children's birth history, dietary habits, and oral health practices. **Results:** Overall, ECC prevalence was 56% in 3-year-old and 78% in 5-year-old Thai children. Compared to children delivered by C-section, vaginally born children experienced increased ECC prevalence (73.8% versus 59.6%;  $P = 0.009$ ) and were more likely to have higher MS scores (OR = 1.8, 95% CI = 1.1–2.9), adjusting for mother's gestational age, MS score, feeding practice habits, child's age and tooth brushing habits. Children's MS scores were highly correlated with their mothers' MS scores ( $P < 0.001$ ). Additionally, children's age, MS colonization, and mothers' preweaning feeding habits were the most significant risk indicators for ECC in Thai children. **Conclusion:** Our findings suggest that mode of delivery is significantly correlated with MS colonization and caries outcomes in young Thai children. Future studies are needed to further understand the possible biological mechanisms linking mode of child delivery to the colonization of cariogenic microflora and development of ECC.

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**Key words:** early childhood caries; maternal factors; mode of delivery; mutans streptococci colonization; preschool children; Thailand

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Early childhood caries (ECC) is etiologically associated with bacterial colonization in deciduous dentition, and it significantly affects the oral health-related quality of life of preschool children (1–3). Since the 1980s in Thailand, the development and implementation of a community-based preventive program has been aimed at decreasing dental caries among Thai school children (4). However, the prevalence of ECC remains high among preschool children (5, 6). Caries in primary teeth has become one of the most prevalent chronic

childhood diseases impacting the overall health of Thai children (6–8).

Mutans streptococci (MS), especially *Streptococcus mutans* and *S. sobrinus*, have been associated with dental caries based on well-defined cariogenicity (9–12). Consistently, *S. mutans* and *S. sobrinus* have been commonly isolated from the saliva and dental plaque of caries-active individuals, including children with ECC. The natural history of *S. mutans* colonization from newborns through childhood has been previously studied (13–16).

## Disparities in Early Childhood Caries and Its Impact on Oral Health-Related Quality of Life of Preschool Children

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### Abstract

This study aimed to investigate the caries experience and its impact on preschool children's quality of life and the associations between these outcomes and underlying determinants. A survey was conducted on 5- to 6-year-old children (503 in all) in Bangkok who were orally examined and interviewed on their oral health-related quality of life (OHRQoL). In addition, behavioral questionnaires were sent to parents. Associations between determinants and oral health outcomes were tested through logistic regression. It was found that 28% of children experienced high-level impacts on quality of life, mostly dental pain (58.3%) and eating difficulties (45.9%). Children of low socioeconomic status were more likely to have a high level of dental caries and subsequent OHRQoL impact. Oral status was related to oral behaviors and OHRQoL. Social disparities in preschool children's OHRQoL were identified.

### Keywords

early childhood caries, oral health-related quality of life, preschool children, disparity, oral health behaviors

### Introduction

Early childhood caries (ECC) in preschool children is an important dental public health problem in Thailand, with the level of dental caries in primary teeth increasing during the past 20 years.<sup>1–5</sup> Meanwhile, oral health services provided in Thailand's health care system have been primarily targeted at primary school children. Several national oral health programs have been implemented in primary schools, such as the incremental dental service, the oral health surveillance,

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## Dental and Gingival Status of 5 and 12-Year-Old Children in Jakarta and Its Satellite Cities

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## Exploring the Multitude of Risk Factors Associated with Early Childhood Caries

### Abstract

**Context:** Despite efforts in restorative therapy, children who experience Early Childhood Caries (ECC) continue to be at a higher risk for new lesions in both the primary and the permanent dentition. Early interventions which disrupt the pathobiology of caries need identification of all the causative or risk factors. **Aims and Objectives:** This study dealt with the prevalence and associated risk factors of ECC among preschool children aged 3 to 5 years in Bengaluru city. **Materials and Methods:** Information regarding risk factors was obtained through a structured questionnaire in a random sample of 152 children. Clinical examination was performed by a trained dental professional using the modified WHO oral health survey format. **Statistical Analysis:** Chi-square, one-way ANOVA, correlation, multiple linear regression analysis. **Results:** The prevalence of ECC among preschool children was 24.39% ( $P < 0.05$ ), whereas the mean dmft was  $5.80 \pm 8.90$ . The prevalence of ECC among males and females was 24.92% and 23.81%, respectively. 42.7% of children with ECC showed a history of prolonged breastfeeding beyond 2.5 years ( $P < 0.05$ ). 50.18% of children had a history of using medications during bedtime/night. History of low birth weight was reported among 23.84% of ECC children. Only 13.22% of mothers claimed of getting a prenatal oral health counselling ( $P < 0.05$ ). **Conclusion:** The prevalence of ECC was seen in almost a quarter of the population with a high dmft. A significant relation was associated only with the feeding duration and lack of prenatal oral health counselling provided to parents.

**Keywords:** Dietary practices, Early Childhood Caries, pediatric medications, prevalence

### Introduction

Caries in infants and young children has been described as "Les dents noires de tout-petits" which means "black teeth of the very young."<sup>1,2</sup> Despite efforts in restorative therapy, children who experience Early Childhood Caries (ECC) continue to be at a higher risk for new lesions in both the primary and the permanent dentition.<sup>3</sup> Hence, this study was undertaken to determine the prevalence of ECC and to investigate associated risk factors in 3-5-year-old children attending preschools, highlighting the fact that such information may provide a valuable base to setup the effective preventive program in future.

### Materials and Methods

The present cross-sectional study involved 1152 preschool children selected using the multiphase sampling method. The sample size, i.e., 1152 was calculated with a

confidence level of 95% and a confidence interval of 5% with a relative precision of 10% and anticipated ECC population proportion of 25%.

The preschool children considered in the study were aged 3-5 year old attending preschools maintained by private and government sectors in Bengaluru city. Children with systemic diseases, chronic use of medications, and with any type of enamel hypoplasia were excluded from the study.

This study was approved by the Institutional Ethical Committee. The procedures, possible discomforts, and risks were fully explained to the children and their parent/primary caregivers, and informed consent was obtained before the investigation. Mothers/primary caregivers of the subjects were invited to enter the program voluntarily.

A structured questionnaire was adopted and modified from the WHO II International Collaborative Study of Oral

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## Original Article

### Family related factors associated with caries prevalence in the primary dentition of five-year-old children

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### ABSTRACT

**Background:** Habits formed in childhood dictate life-long choices made as adults. These encompass both oral hygiene and dietary habits which in turn affect dental caries status. Children largely acquire these habits from modeling/observing parents and other family members. **Aim:** The purpose of this study was to assess the caries status of 5-year-olds, and evaluate associations between dental caries and family-related factors. **Materials and Methods:** A cohort of 400 children were examined for dental caries using the WHO criteria. Parents were interviewed using a self-structured questionnaire to collect data with regard to variables under evaluation. **Statistical analysis:** Collected data was subjected to descriptive analysis using the SPSS 21.0 version. Risk factor association with dental caries was investigated using logistic regression analysis with  $P$ -values  $< 0.05$  considered significant. **Results:** Fifty nine percent of children suffered from dental caries. Statistically significant risk indicators for a child having dmft  $> 0$  were: Mother with low basic education ( $OR = 1.3$ ), higher number of siblings ( $OR = 1.4$ ), high snacking frequency ( $OR = 2.0$ ), parental inability to control sugar consumption ( $OR = 1.0$ ) parental laxness about the child's tooth brushing ( $OR = 1.5$ ), parents brushing their own teeth less than twice daily ( $OR = 2.0$ ) and unsanitized feeding by the child ( $OR = 1.4$ ). **Conclusion:** It is thus mandatory to focus on parents' education level, attitudes and family structure when planning preventive programs for young children.

**KEYWORDS:** Dental caries, family, prevalence

### Introduction

Habits children acquire early in life continue to shape attitude and lifestyle choices they make as adults. Thus, good oral hygiene and dietary habits adopted at an early age ensure optimal oral health later in life.

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In accordance with the Social Learning theory these habits are largely acquired through observational learning. For child development, parents are these are primarily, the parents and immediate family members.<sup>1</sup>

Parents inculcate good habits in their children based on their own attitudes and beliefs. Various intergenerational processes connect parental oral health status with that of their offspring.<sup>2</sup> At the age of 5 years, a child's dietary choices and oral hygiene behavior, and consequently their dental health is predominantly dictated by their care givers. The choices parents make are influenced by a variety of factors which include their oral health attitudes, behavior as well as various socio-demographic factors.

Thus all these factors may collectively have the potential to affect oral health outcomes. Previously conducted studies have established that family related factors definitely impact dental caries experience in the primary dentition. A study conducted by Mealla *et al.*, concluded that focusing on parents to improve oral health outcomes of their children is an indispensable *quid pro quo*.<sup>3</sup> Furthermore studies have proposed that the family structure possibly influence dental caries in children.<sup>4,5</sup>

Thus the present study was conducted to examine the prevalence of dental caries in 5-year old children

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## Original Article

### Dental Caries and Their Treatment Needs in 3-5 Year Old Preschool Children in a Rural District of India

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### Abstract

**Background:** Dental problems in the preschool children are neglected by their parents as the deciduous teeth are going to shed off, and hence considered to be of no importance and more of a cosmetic benefit if attended to them. **Aim:** This study was to determine the caries prevalence in preschool children (3-5 year old) of rural Moradabad district, to analyze the specific pattern of dental caries experience in this population and to assess the treatment needs among them. **Material and Methods:** Children within the age group of 3-5 years attending Anganwadi centers of rural Moradabad district were included in the study. Caries diagnosis was based on decayed, extracted, filled surface (def) and the treatment needs were recorded using World Health Organization (WHO) oral health assessment form 1997. **Results:** Out of 1,500 children examined, 48.7% males and 52.0% females did not require any treatment. The mean decayed, extracted, filled tooth (def) value was found to be significantly high in 5-year-old participants when compared to 3-year-old participants ( $P < 0.001$ ). Majority of the children required one surface filling followed by two surface fillings, caries arresting sealant car, extraction, crown bridge element, pulp care, and space maintenance. **Conclusion:** The most common primary caries (pit and fissure), then maxillary anterior pattern, posterior proximal pattern, and posterior buccal lingual smooth surface pattern. The mean def value was higher in males as compared to females. There is a greater need for oral health education among parents and teachers.

**Keywords:** Dental caries, preschool children, treatment needs, rural India, Unlabeled

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### Introduction

Health is a common theme in most cultures. With the adoption of health as an integral part of socioeconomic development by the United Nations, it has become

a major instrument of overall socioeconomic development and the creation of a new social order.<sup>1</sup> Poor oral health has a detrimental effect on children's performance in school and their success in later life.<sup>2</sup>

The two most common oral diseases are dental caries and periodontal disease.<sup>3</sup> There is no universally accepted opinion of the etiology of dental caries and is considered multifactorial in nature.<sup>4</sup>

Due to its high global prevalence, dental caries among children has been described as a "pandemic" disease.<sup>5-6</sup> The World Health Organization (WHO) has ranked it

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### Prevalence and Predictors of Early Childhood Caries in 3- to 6-year-old South Indian Children - A Cross-sectional Descriptive Study

**Satya Gopal<sup>1</sup>, Vinay Chandrapa<sup>2</sup>, Uloopi Kadidal<sup>3</sup>, Chandrasekhar Rayala<sup>4</sup>, Madhuri Vegesna<sup>5</sup>**

**Purpose:** To determine the prevalence and potential risk factors of ECC in 3- to 6-year-old preschool children.

**Materials and Methods:** A sample of 477 preschool children aged 3 to 6 years was randomly selected from the schools in the area of study. Caries was recorded according to the WHO criteria from 1997. Information regarding demographic data, socioeconomic status, feeding habits, oral hygiene practices, bedtime/night and the children's visits to the dentist was obtained through a structured questionnaire. The data were analysed using Student's  $t$ -test, the chi-square test and Pearson's correlation analysis.

**Results:** The prevalence of early childhood caries in 3- to 6-year-old preschool children was found to be 27.3% with a mean dmft of 2.38. ECC increased significantly with age and is more predominant in girls. The maxillary arch was more affected than mandibular arch and children belonging to the low socioeconomic group showed higher caries prevalence. ECC is more prevalent in children accustomed to on-demand breast feeding, bottle feeding at night, between meal snacking and sweetened pacifier use. Factors such as increased frequency of toothbrushing, use of toothbrush and fluoridated dentifrice were found to be the protective factors against the risk of ECC.

**Conclusion:** A strong correlation between the risk factors studied and ECC was found. Health education, proper guidelines on feeding and oral hygiene practices and access to early oral health care can substantially reduce the risk and prevalence of ECC.

**Key words:** early childhood caries, feeding practices, oral hygiene practices, preschool children, socioeconomic status

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Early Childhood Caries (ECC) remains a significant public health problem in both developing and industrialized countries. Despite understanding the factors responsible for the development of caries, ECC remains the most prevalent unmet health need among children. ECC was previously known by several names, but a more precise terminology that uses age-defined criteria was recommended by American Academy of Pediatric Dentistry. The disease ECC is the presence of one or more decayed (noncavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child under the age of six.<sup>1</sup>

ECC is a chronic, infectious disease with a complex and multifactorial aetiology. It has detrimental consequences on children's quality of life by inflicting pain, premature tooth loss, malnutrition ultimately influencing overall growth and development.

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## Association of socio-economic status and dietary habits with early childhood caries among 3- to 5-year-old children of Belgauam city

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### Abstract

**Aim** To ascertain if there were any association of socio-demographic factors and dietary habits with early childhood caries (ECC).

**Methods** A cross-sectional study was conducted on 1,250 children 3–5 years of age. A self-designed validated questionnaire was prepared comprising two parts, one pertaining to socio-demographic data and the other related to a 3-day diet diary. Socio-economic stratification was based on Kuppuswamy's classification. Diet history was obtained via a 3-day diet diary completed by the parents. A calibrated examiner conducted the oral examinations of the preschool children. Dental caries was assessed by using WHO criteria. Chi-square test and logistic regressions described the strength of the associations.

**Results** The prevalence rate of ECC was 63.17 %. Significant associations were obtained between ECC and age of the child, number of siblings in the family, mother's education, sucrose exposure in between meals, sucrose exposure at meals, total frequency of sucrose exposure, and total sweet score. However, non-significant association of ECC was observed with socio-economic status.

**Conclusion** Many of the socio-demographic and dietary factors were significantly associated with ECC. It would be appropriate to plan health education strategies for parents and care takers by inculcating socio-demographic factors

with emphasis on reduced sucrose intake. ECC should be regarded as a serious public health problem.

**Keywords** Diet history · Early childhood caries · Preschool children · Socio-economic status · Sucrose intake

### Introduction

Dental caries is the most common chronic childhood disease. Oral diseases represent "what amounts to a silent epidemic affecting our most vulnerable citizens—poor children." Early childhood caries (ECC) is one such form of dental caries which affects teeth of infants as soon as they erupt (Ferre et al. 2010). ECC has been defined as a decayed, missing or filled tooth in the primary dentition under 71 months of age and severe ECC (SECC) as any smooth surface caries in children under 3 years of age (AAPD 2003). The outstanding improvement in oral health that started in the early 1970s across the industrialised countries did not involve children from disadvantaged communities who have been continuing to experience higher disease levels (Reisine and Walter 2001). The developing countries are the most numerous and poorest countries of the world. They also account for the majority of the population on Earth. With a larger population and lesser income, the Gross National Product of these countries is less than the funds available for the health sector. The funds spent on oral health care have been infinitesimal (Pine 1997). In conjunction with economical factors there are many social and cultural factors which act as important barriers to accessing and accepting oral health care.

Income, socio-economic factors and diet are probably the major determinants of ECC. Social class most likely has an indirect effect on caries-risk, because it may

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## Oral Health Condition of School Children in Nawalparasi District, Nepal

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### ABSTRACT

**Background:** Oral disease and feeding habits are inextricably linked. Significance of assessing oral health conditions among the school children therefore exists. The current study investigated the oral health condition among 5–6 years and 12–13 years children in Nawalparasi district, Nepal.

**Methods:** Recruiting 1,000 school children aged (5–6) and (12–13) years in Nawalparasi district, a cross-sectional study was carried out from November to December, 2014. Data assembled from standard instrument was entered in Epi-Data 3.1, cleaned in SPSS version 16.0, and analyzed in Epi-Info 3.5.4.

**Results:** Of 12–13 years children, those out of ten (32.0%, 95% CI: 27.8–36.4) suffered from occasional dental discomfort and pain, and 8.1% (95% CI: 5.9–11.0) often experienced dental discomfort and pain during the last 12 months. It was 73.67% (95% CI: 69.3–77.4) who brushed teeth at least once a day, while another 20.7% (95% CI: 17.2–24.7) brushed twice a day. Among all children, 80.1% (95% CI: 82.6–85.1) used toothpaste to brush the teeth. A three-fourth (73.8%, 95% CI: 69.5–77.7) drank tea with sugar daily. Dental caries was visible on 42.2% (95% CI: 37.7–46.8) (mean DMFT score 2.1 ± 1.5). Likewise, a quarter (24.1%, 95% CI: 20.3–28.3) had gingival bleeding, 19.9% (95% CI: 18.3–14.1) questionable enamel fluorosis, 4.5% (95% CI: 2.9–6.9) dental trauma, and 1.7% (95% CI: 0.8–3.3) oral mucosal lesion. Referral for preventive/restorative treatment was observed in 40.5% (95% CI: 36.1–45.1).

Among 5–6 years old children, a remarkable proportion of dental caries (64.4%, 95% CI: 59.2–69.4) and mean DMFT score 4.4 ± 3.0) was noted. Statistics of enamel fluorosis, dental trauma, and oral mucosal lesions in this age group were: 5.1% (95% CI: 3.6–6.6), 1.2% (95% CI: 0.7–1.8), and 1.1% (95% CI: 0.4–1.9) respectively. About 80.1% (95% CI: 75.0–85.4) were referred for preventive treatment, and the rest for restorative treatment.

**Conclusions:** Oral health of the children was poor, chiefly dental caries remained widespread. Dental hygiene programmes should be promoted in schools in active coordination and collaboration with education authorities.

**Keywords:** Dental caries, nepal, oral health, school children, 5–6 years, 12–13 years.

### INTRODUCTION

Oral diseases stand as one of the widely prevalent public health problems in the developing world, though underreported. Dental caries is the major one

affecting 60–90% of world's school-aged children.<sup>1</sup>

Dental caries touched six out of ten 5–6 years old Nepalese school children in the year 2004.<sup>2</sup> Counting on National Oral Health Policy 2070,<sup>1</sup>

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