

Dental Sealants Part 1: Prevention First

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ABSTRACT

Tooth decay is still one of the most common chronic childhood diseases in the world, even if during the last five decades measures to combat dental caries have been developed, tested and applied in many populations.

Preventive care and education programmes are essential to keeping children's mouths healthy. Within the prevention methods, dental sealants play an important role in preventing the onset and the development of dental cavities.

Keywords Caries prevalence; Caries prevention; Pit and fissure sealants; Primary health care.

Introduction

Tooth decay is still one of the most common chronic childhood diseases in developed countries (5 times more common than asthma and 7 times more common than hay fever) [Frencken, 2017]. Nevertheless, in the U.S., 1.75% of parents report that their kids sometimes or frequently forget to brush their teeth. Parents perceive their children's dental health as a low priority compared to other issues such as school safety, nutrition and the upcoming cold and flu season. One needs only think that children miss more than 51 million school hours each year due to dental-related illness [The Ad Council's survey, September 2014].

During the last five decades, measures to contrast dental caries and periodontitis have been developed, tested and applied in many populations around the world, so that millions of people have benefitted from it. Avoiding the development of a global burden of dental cavities is possible only through education and prevention programmes for children and parents at all socio-economic levels.

World caries epidemiology

Dental caries is strongly linked to individual hygiene and dietary factors, which are closely related to the socio-economic status of the subject (education level, employment, etc.). The prevalence data provided by the World Health Organization confirm this hypothesis, showing a lower dmft/DMFT in the high-income group, compared to the middle-income group (Tables 1 and 2).

Even if the prevalence and mean dmft/DMFT figures remarkably decreased over time in all countries, a recent review [Frencken, 2017] shows that the most prevalent health condition across the globe in 2010 remained the untreated cavitated dentine carious lesions in permanent teeth, affecting 2.4 billion people, and that untreated cavitated dentine carious lesions in deciduous teeth constituted the 10th most prevalent health condition, affecting 621 million children worldwide.

Europe caries epidemiology

Oral health problems and access to primary oral health care, reveal very high disparities across Europe. The European WHO section quotes dental cavities as one of the most frequent oral diseases.

In European countries, tooth decay among 6-year-old children varies from 20% to 90%, depending on socio-economic determinants (Fig. 1).

The "Europe/WHO 2020 goal" regarding dental cavities aims to obtain a caries-free value of 80% in both 4- and 12-year-olds, which is why the Organization focuses on prevention as a first community intervention. "Health 2020" is the policy framework adopted by the Member States as an overarching value- and evidence-based guide for health and wellbeing.

The latest data available (Fig. 2) show that the goal is a long way off, but WHO/Europe is already working with the Member States to develop, improve and promote government-approved policies dealing with oral health.

First of all, dentists and all oral health care providers must give priority to prevention and oral health promotion.

Country income	N	Prev %	Range %	N	dmft Median	Range %	N	d-comp %	Range %
Low	3	64.4	49.2–93.1	3	4.4	3.0–9.0	2	96.1	93.3–98.9
Lower-middle	12	83.4	64.0–88.6	16	4.1	1.4–8.0	9	96.4	91.3–100
Upper-middle	13	76.4	53.4–93.2	15	3.9	2.4–6.7	11	88.0	78.6–97.3
High	33	49.0	21.0–93.4	33	2.0	0.3–6.7	22	75.0	33.3–100

N number of countries

TABLE 1 Median prevalence of cavitated dentine carious lesions (Prev) in 5- and 6-years-olds, median of mean dmft scores and range interval, and median proportion of D-component and range interval by category of country income, using the WHO databank data from 2000 to 2015 [Frencken, 2017].

Country income	N	Prev %	Range %	N	DMFT Median	Range %	N	D-comp Median	Range %
Low	5	42.2	19.1–97.3	9	0.9	0.3–5.5	3	100	
Lower-middle	15	41.9	22.4–75.7	21	1.4	0.4–4.5	13	80.0	66.6–100
Upper-middle	20	69.4	37.0–87.0	27	2.1	1.1–4.9	16	79.0	36.4–94.1
High	36	46.6	22.3–84.0	44	1.3	0.4–4.8	27	45.5	0.0–92.9

N number of countries

TABLE 2 Median prevalence of cavitated dentine carious lesions (Prev) in 12-years-olds, median of mean DMFT scores and range interval, and median proportion of D-component and range interval by category of country income, using the WHO databank data from 2000 to 2015 [Frencken, 2017].

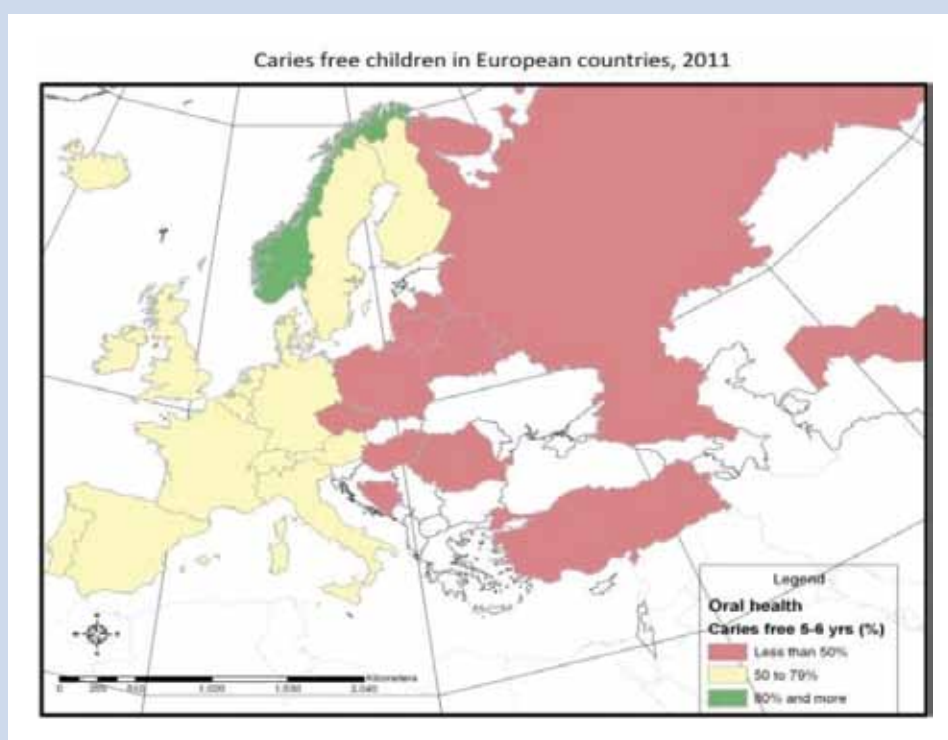


FIG. 1 DMFT index of children in European countries, 2011 (WHO, 21th Congress of the European Association of Dental Public Health, October 2016).

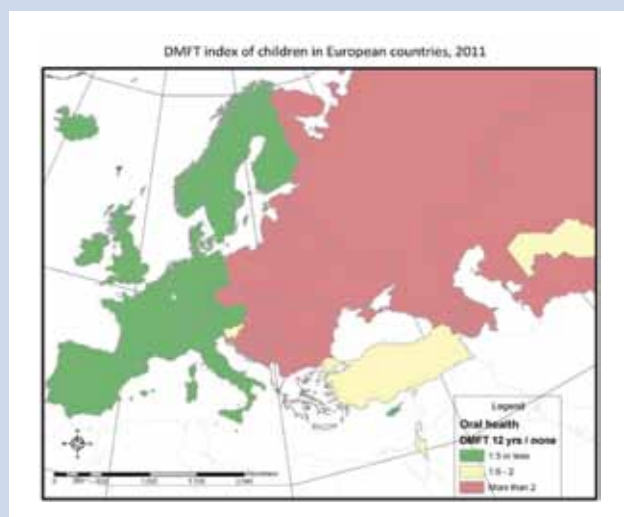


FIG. 2 Caries free children in European countries, 2011 (WHO, 21th Congress of the European Association of Dental Public Health, October 2016).

Sealants as part of preventive dentistry

Dental caries can be prevented and defeated in many ways. Approaches include primary prevention, defined as interventions to prevent caries onset, for example by encouraging less consumption of sugar, and secondary prevention, defined as early disease detection and interventions to hinder the progression of early caries to cavitation.

Occlusal surfaces of posterior teeth are the most susceptible sites for the development of caries because of their deep and narrow anatomy of pits and fissures which can host bacteria coming from plaque, unreachable during brushing [Beuchamp J, 2008].

Sealants act as a primary prevention barrier against plaque and acids, by forming a hard shield that prevents food and bacteria from getting into these vulnerable areas on the chewing surface of the tooth and causing decay.

Current evidence indicates that sealants are also an effective secondary preventive approach when placed on early non-cavitated carious lesions, by inhibiting caries progression [Holmgren, 2014].

Wright reported that the risk of developing new carious lesions in primary or permanent molars decreased by 76% in children or adolescents who receive sealants in sound occlusal surfaces or non-cavitated pit and fissure carious lesions, compared with

an unsealed control group after two years of follow up. Even after 7 or more years of follow-up, the caries incidence is about 29% in the experimental group, compared to a caries incidence of 74% in the control group [Wright JT, 2016].

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