World Sugar Research Organisation

Dietary Sugars & Dental Health

Dental Caries

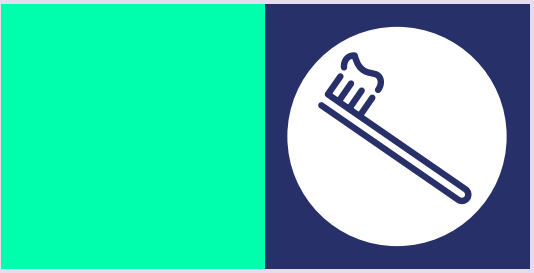
Dental caries (tooth decay) is a major global health issue, especially in low-income countries where protective factors such as access to fluoride (e.g., use of fluoride toothpaste) and dental treatment are less available[1,2]. Dental caries can develop over time when saliva interacts with easily digested carbohydrates (e.g., sugars and starches) and the bacteria living on dental plaque[3-5].

Dental caries can develop over time when saliva interacts with easily digested carbohydrates.

Dietary Sugars and Dental Caries

Caries development related to consumption of sugars and other easily fermentable carbohydrates (e.g., starches) does not only depend on how frequently these carbohydrates are consumed. It is also influenced by oral hygiene (e.g., toothbrushing), exposure to fluoride and various other factors[6-11].

A link has been found between sugars intake and dental caries risk. This evidence relies on observational studies which cannot fully account for all the factors which can influence the development of caries (e.g., use of fluoride, diet, toothbrushing)[11,12].



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Key Findings from Public Health Agency Reports

European Food Safety Authority (EFSA) 2022 – reported a relationship between total sugars intake and increase in dental caries incidence. The available data did not allow conclusions on what happens to the relationship when sugars intakes are gradually increased/decreased, for any age group. This report concluded that added/free sugars intake should be "as low as possible as part of a nutritionally adequate diet"[11].

World Health Organization (WHO) 2015 – found moderate evidence of an increase in dental caries occurrence when % energy from sugars in the diet was higher, versus lower, than 10% of dietary energy. The guidelines from this report were that population average free sugars intake should not exceed 10% of total energy intake. A further conditional recommendation to reduce free sugars intake to below 5% of total energy intake was based on three historic population studies with low fluoride exposure. This conditional recommendation was classified as very low-quality evidence[13]. The recent WHO Global Oral Health Status Report highlighted sugar consumption as the main cause of dental caries[14].

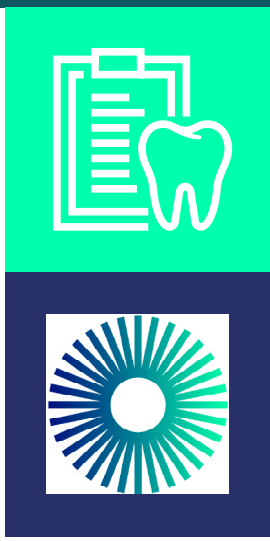
UK Scientific Advisory Committee on Nutrition 2015 & 2023 – found moderate evidence that higher free sugars intake is associated with increased development of dental caries in the population as a whole[4], with adequate (higher certainty) evidence in children[15]. The recommendation to reduce average intake of free sugars to 5% or less of total dietary energy intake in all age groups from 2 years upwards was not based on evidence on dental caries. However, the Committee noted that reducing consumption of free sugars would help to lower the risk of caries[4].

Prevention of Dental Caries

Both the prevention of dental caries, and its development, involve multiple factors. These range from early access to oral health professionals and early diagnosis, to fluoride application, health education and controlling risk factors. This includes limiting the consumption of foods and drinks containing free sugars[16].

The World Dental Federation suggest the following caries prevention strategies, from the highest level of evidence to the lowest[6]:

- Fluoride (highly effective in all forms, including in toothpaste and drinking water)
- Sealants (thin protective coating pasted onto teeth)
- Salivary stimulation (chewing gum)
- Diet modification (behavioural change, including limiting sugar intake)
- Antimicrobials (a type of oral treatment that is used to eliminate bacterial infections)
- Non-fluoride remineralisation strategies (e.g., xylitol, tooth varnishes).



References

1. GBD 2017 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet Lond Engl. 2018 Nov 10;392(10159):1789–858.
2. Lagerweij MD, van Loveren C. Declining Caries Trends: Are We Satisfied? Curr Oral Health Rep. 2015;2(4):212–7.
3. Abou Neel EA, Aljabo A, Strange A, Ibrahim S, Coathup M, Young AM, et al. Demineralization–remineralization dynamics in teeth and bone. Int J Nanomedicine. 2016 Sep 19;11:4743–63.
4. UK Scientific Advisory Committee on Nutrition. Carbohydrates and Health Report. London: TSO; 2015.
5. World Health Organisation. Sugars and dental caries. 2017. https://www.who.int/news-room/fact-sheets/detail/sugars-and-dental-caries
6. Pitts N, Zero D. Executive Summary White Paper on Dental Caries Prevention and Management. FDI World Dent Fed. 2017;
7. Masood M, Masood Y, Newton T. Impact of national income and inequality on sugar and caries relationship. Caries Res. 2012;46(6):581–8.
8. Singh A, Purohit BM. Malnutrition and Its Association with Dental Caries in the Primary and Permanent Dentition: A Systematic Review and Meta-Analysis. Pediatr Dent. 2020 Nov 15;42(6):418–26.
9. Schwendicke F, Dörfer CE, Schlattmann P, Page LF, Thomson WM, Paris S. Socioeconomic Inequality and Caries: A Systematic Review and Meta-Analysis. J Dent Res. 2015 Jan 1;94(1):10–8.
10. de Abreu MHNG, Cruz AJS, Borges-Oliveira AC, Martins R de C, Mattos F de F. Perspectives on Social and Environmental Determinants of Oral Health. Int J Environ Res Public Health. 2021 Dec 20;18(24):13429.
11. European Food Safety Authority Panel on Nutrition, Novel Foods and Food Allergens, Turck D, Bohn T, Castenmiller J, de Henauw S, Hirsch-Ernst KI, et al. Scientific Opinion on the Tolerable Upper Intake Level for Dietary Sugars. 2022 p. e07074.
12. Karjalainen S, Tolvanen M, Pienihäkkinen K, Söderling E, Lagström H, Simell O, et al. High sucrose intake at 3 years of age is associated with increased salivary counts of mutans streptococci and lactobacilli, and with increased caries rate from 3 to 16 years of age. Caries Res. 2015;49(2):125–32.
13. World Health Organization. Guideline: sugars intake for adults and children. Vol. WHO/NMH/NHD/15.2. 2015.
14. World Health Organization. Global oral health status report: towards universal health coverage for oral health by 2030. Geneva; 2022 Nov.
15. UK Scientific Advisory Committee on Nutrition. Feeding young children aged 1 to 5 years. London: TSO; 2023.
16. World Health Organization. Ending childhood dental caries: WHO implementation manual. Geneva; 2019.

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