**British Association for the Study of Community Dentistry**

Position statement on fluoride vehicles in the prevention of tooth decay

### We support the maximisation of the use of fluoride vehicles to reduce the prevalence and severity of tooth decay.

**Why BASCD has produced this position statement on fluorides?**

Despite improvements in UK oral health, tooth decay remains a public health problem. Almost a quarter of 5-year-olds in England (PHE 2017a), over a third (34.2%) of 5-year olds in Wales (2017) and just under a third (29%) of 5-year olds in Scotland (NDIP 2018) have experience of tooth decay. Although more Adults are keeping their teeth into old age than previous generations (Fuller et al 2011, White et al 2011), these will be susceptible to oral health problems (Bell et al., 2015), which can be detrimental to general health and personal and social well‐being (Steele et al, 2011). In addition, stark socio-economic gradients in dental health exist with some of the most vulnerable, disadvantaged and socially excluded facing significant oral health problems.

Oral health is an integral part of general health as it influences our general well-being and governs the quality of life of people allowing eating, speaking and socialising without active disease, disability, disfigurement or embarrassment. Poor oral health impacts on the individuals affected and those close to them and has far wider societal impacts at school or when a parent/guardian must take time off work to travel with a child for emergency dental treatment. In England dental decay is the most common cause of hospital admission for a general anaesthetic (GA) in children aged 6 to 10 years. In Scotland, during 2015-16, a total of 4,482 children of this age had a GA for tooth extractions (ISD 2018a). In Wales the total was 7,908 children of all ages having a dental GA during 2015-16.

Tooth decay has a significant financial impact; in England the cost to the NHS for dental care is estimated to be £3.4 billion annually, with an estimated £2.3 billion is spent on private dental care (NHS England, 2014). In England in 2015/16 a total of £50.5 million was spent on tooth extraction of all types, among under 19-year-olds. The 2015/16 total dental spend in Scotland was £522.75M (ISD 2018b). NHS General Dental Services spend in Wales in 2015/16 was £170.5m gross (Wales 2017), which includes patient charge income of £33.2m. This does not include dental spend on Community and Hospital Dental Services.

**What can be done?**

A major risk factor for development of tooth decay is consumption of dietary sugars. The BASCD position statement on dietary sugars covers this important issue (BASCD 2016).

Adequate use of fluorides has a strong protective effect in preventing tooth decay. Fluoride is a naturally occurring mineral naturally present in water in varying amounts (which is how the beneficial effects of fluoride were discovered), it is present in a number of foods and now in many dental and pharmaceutical products.

**International support for fluoride**

Prevention: The burden of oral diseases and other noncommunicable diseases (NCDs) can be reduced through public health interventions by addressing common risk factors.

These include: promoting a well-balanced diet: low in free sugars to prevent development of dental caries, premature tooth loss and other diet-related NCDs; with adequate fruit and vegetable intake, which may have a protective role in oral cancer prevention; reducing smoking, the use of smokeless tobacco including chewing of areca nuts, and alcohol consumption to reduce the risk of oral cancers, periodontal disease and tooth loss; and encouraging use of protective equipment when doing sports and travelling in motor vehicles to reduce the risk of facial injuries.

In addition to the NCDs’ common risk factors, inadequate exposure to fluoride and a number of social determinants of health should be addressed to prevent oral diseases and reduce oral health inequalities.

Dental caries can be largely prevented by maintaining a constant low level of fluoride in the oral cavity. Optimal fluoride can be obtained from different sources such as fluoridated drinking water, salt, milk and toothpaste. Twice-daily tooth brushing with fluoride-containing toothpaste (1000 to 1500 ppm) should be encouraged. Long-term exposure to an optimal level of fluoride results in substantially lower incidence and prevalence of tooth decay across all ages.

Oral health inequalities must be reduced by tacking the broader social determinants through a range of complementary downstream, midstream and integrated upstream policies such as: water fluoridation; regulation of the marketing and promotion of sugary foods to children and taxes on sugar-sweetened beverages. Moreover, promoting healthy settings such as healthy cities, healthy workplaces and health promoting schools is critical to building comprehensive supporting environments to promote oral health. (WHO 2019; WHO 2007).

**Governments**

BASCD members must advocate for policies/plans/approaches that result in increased use of fluoride vehicles (simply getting fluoride onto teeth) and for a reduction in sugar consumption.

Examples will include (but not exclusively) starting new community water fluoridation schemes/continuation of existing schemes, national level supervised toothbrushing programmes in early childhood settings, like Designed to Smile and Child Smile; reduced cost of toothpaste and toothbrush; regulatory and contractual changes to increase delivery of fluoride through service settings. Government sugar reduction drives and product reformulation work.

**Commissioners/Service Providers**

Innovative commissioning/service delivery models are required to increase fluoride delivery, commissioning/provision of oral health improvement programmes, such as community setting programmes e.g. supervised toothbrushing with fluoride toothpaste at school and nursery settings, fluoride varnish applications by trained dental nurses in nurseries and schools etc. Plus, integration of oral health and fluoride delivery into other services e.g. Health Visiting services and care homes. Local authorities have an important role in implementing new community water fluoridation schemes.

**Dental Professionals and Use of fluoride at home**

There are well proven, effective fluoride vehicles, these include fluoride toothpaste, community water fluoridation and fluoride varnish. Some require input by dental professionals (fluoride varnish), some require compliance by the individual (toothbrushing with fluoride toothpaste). BASCD members can follow evidence-based advice on fluoride use as provided in “Delivering Better Oral Health.”

**Evidence for effectiveness of various fluoride vehicles**

Toothbrushing with fluoride toothpaste is the most commonly used vehicle for prevention of tooth decay in the world and BASCD believes that it has been the main reason for improvements in the number of people affected by tooth decay over the last forty years (Ten Cate 2013). For best effects, toothbrushing with fluoride toothpaste needs to be undertaken twice daily, once at bedtime and on at least one other occasion (PHE 2017b). However, in the most recent survey of national adult dental health, although 75% of adults reported brushing twice a day, 23% reported only brushing once a day (Chadwick et al 2011). Simply achieving an increase in the number of people brushing twice daily with fluoridated toothpastes could lead to major improvements in population levels of tooth decay.

Due to the mode of action of fluorideoptimal benefit occurs when low levels of fluoride are present in the mouth for long time periods. Water fluoridation is perhaps the best way to achieve this (PHE 2014a). Additional Simple steps can be taken to increase the amount of fluoride retained and so increase caries prevention, for example, by spitting after brushing rather than rinsing with water; brushing twice a day rather than once a day, by using other fluoride-containing vehicles in addition to toothpaste, e.g. rinses and varnishes (Marinho et al 2004).A combined approach of fluoride toothpastes and fluoride varnishes is used in the ChildSmile programme in Scotland which is thought to have led to the benefits seen for child oral health.

Application of fluoride varnish is another option for increasing the availability of fluoride on teeth. Fluoride varnish has to be applied by a trained member of the dental team. A Cochrane review concluded that fluoride varnish had a substantial caries-inhibiting effect in both permanent and primary teeth, however the quality of the evidence was assessed as only moderate (Marinho et al, 2013).

Water fluoridation is a fluoride vehicle that is very cheap and does not require behaviour change/compliance by the individual. All water supplies contain small amounts of naturally occurring fluoride. To reduce tooth decay requires the fluoride in the water to be at a concentration of one part per million (1mg fluoride per litre of water [1mg/l]). Where the naturally occurring fluoride in water is at level that is too low to provide benefits, a community water fluoridation scheme can raise the fluoride level to one part per million.

Every country that has introduced water fluoridation also uses fluoride toothpaste and their dental teams use fluoride varnish. Therefore, water fluoridation is complementary to other vehicles to ensure maximising fluoride contact onto teeth.

There have been effective water fluoridation schemes worldwide for over 70 years. Some 370 million people worldwide, including six million in England and 200 million (70% of the population) in the United States have an artificially fluoridated water supply (PHE 2016). Research of the potential health effects of fluoridated drinking water by various expert groups including PHE (2014, 2018) and reviews of the evidence (e.g. NHMRC 2017, CADTH 2019) have not identified any non-dental health effects at a target level of 1 milligram per litre (1 mg/L).

Fluoride mouth rinses are another way of increasing fluoride availability in the mouth. These are used for children aged eight years and above. The fluoride mouth rinses should be used in addition to twice daily brushing with fluoride toothpaste, but at a different time. Effectiveness evidence shows that regular use of fluoride mouthrinse under supervision results in a reduction in tooth decay in children's permanent teeth (Marinho et al 2016).

Fluoride tablets and drops (supplements) can be prescribed for the prevention of dental caries in children. It is recognised that the use of fluoride tablets and drops requires ongoing compliance by families and can result in under and over-use. The evidence shows that the uses of fluoride supplements are associated with a reduction in caries increment when compared with no fluoride supplement in permanent teeth, but the effect on primary teeth is less clear as is whether there is benefit over and above use of topical fluorides (Tubert-Jeannin et al 2011).

There are school milk schemes in England in which parents can opt for their child to have fluoridated milk. They are provided in areas which water is not fluoridated and where levels of caries are high. There is low quality evidence to suggest fluoridated milk may be beneficial in reducing tooth decay (Yeung et al 2015). Additional high-quality research is needed before definitive conclusions about the benefits of milk fluoridation can be made.

**Are there any risks to fluorides?**

When fluoride vehicles are considered for the control of tooth decay, the only risk to health is an increase in mild dental fluorosis which may be of cosmetic impact where it affects front permanent teeth. This only occurs if young children receive excess levels of fluoride whilst these adult teeth are developing. Dental fluorosis can vary in appearance from white flecks to white lines to white patches which may be of aesthetic concern. Dental fluorosis is one of a number of different conditions that can affect teeth in this way.

**BASCD support for a broad programme of measures**

There is no single fluoride delivery system that is wholly effective in isolation, therefore policy makers should be asked to consider a range of interventions to increase the use of fluorides and reduce the consumption of sugars (BASCD 2016) based on local need. When planning programmes, it is important for policy makers and commissioners to seek specialist advice and support from dental public health teams UK Public Health organisations have produced guidance for health service planners and commissioners relating to children and vulnerable older people to help with this (e.g. PHE 2014; PHE 2018).

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