

# Letters to the Editor

## Changing concepts in cariology: forty years on (Dent Update 2013; 40: 277–286)

This letter is in response to the article 'Changing concepts in cariology: forty years on' published in *Dental Update* in May, 2013. Edwina Kidd and Ole Fejerskov are great names in the science of cariology and enamel defects related to fluoride. The dental community is bound to recognize their untiring efforts to increase our understanding of caries process, its control and prevention and the role played by fluoride.

There are some questions aroused by the statement 'The most important control measure (to prevent carious lesions formation) is to clean teeth regularly and thus disturb the biofilm mechanically, with a fluoride-containing toothpaste'. We know that carious lesions arise from numerous pH fluctuations in the biofilm on teeth. When biofilm is disturbed mechanically, it immediately starts reformation. So the questions are:

- How frequently we have to disturb the biofilm mechanically to prevent or control caries?
- What about the biofilm in the interdental areas near the contact points and in the deep pits and fissures?
- Is it less important to address something which causes fluctuations in pH in the biofilm?

The evidence linking sugar and caries is well documented. The question is not what is important and what is not but what is the most important? In Khyber Pakhtunkhwa, we have a large group of Persian speaking Afghans. These people are very keen on hygiene, especially oral hygiene. They maintain 'excellent' oral hygiene but, at the same time, they are very keen on taking sugar-containing foods frequently. In spite of maintaining excellent oral hygiene (most of them brushing their teeth three times a day with fluoride toothpaste), their caries index is so high that most of the dentists in Peshawar are making their bread and butter out of them.

The statement 'Unfortunately, there is less evidence that it is possible to alter diets and persuade people to eat differently' is quite true but the same may be true for oral hygiene measures, especially in the developing countries.

It may be as important to restore cavities (to reduce the burden of micro-organisms) as to give instructions to patients for primary prevention (to prevent new lesions). Prevention of new lesions may not be possible in the face of numerous unrestored cavities (restorations may be temporary before the caries are arrested).

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## Authors' reply

Thank you for your very pertinent questions which are highly relevant. The fact is that we do not know how often to disturb the biofilm. We do not know if it alone is sufficient to influence initiation of lesions. All we know is that, if you ensure that fluoride is available in the oral cavity (from fluoride toothpastes, water, etc) whenever there are pH fluctuations in the biofilm we can influence the de- and re-mineralization dynamics. However, regular (once or twice daily) oral hygiene removes excessive amounts of what we used to call dental plaque or disturbs the biofilm so that this facilitates fluoride ion access to the interface between enamel and biofilm.

When it comes to established cavities, we have since the days of Black and later Anderson, Massler and others, known that removal of the plaque/biofilm in the cavities is sufficient to arrest further lesion progression. Again, if the fluoride ion activity is slightly elevated in the oral fluids, it helps significantly. Example: occlusal cavities should be 'opened up' to facilitate keeping the cavity clean – eventually by mastication – and further lesion progression is inhibited. This is 'old' knowledge which has been largely

ignored since we had the high-speed drill entering the market almost 60 years ago. This is the case in both dentitions and, if appreciated, could prevent children from having a lot of drilling and filling.

What about interdental areas and deep fissures? If occlusal and ordinary approximal plaque removal is performed every day, there is no problem. Dental caries does not develop in the depth of the fissure, but at the entrance – and if the entrance is kept clean nothing happens in the deep microbiota, even when you apply 10% sucrose at the entrance twice daily and allow it to sieve to the bottom for 1–2 minutes – these experiments have been made in man.

Fluctuations in pH in biofilms always happen at random. However, the lower and longer a pH drop becomes, the more influence there is on the rate of lesion development. So any influence on pH drops in biofilm is likely to play a 'protective' role. It is interesting that pH measurements intra-orally show a distinct difference between lesions clinically characterized as active or inactive. In the inactive lesions the drop is much less and returns to normal physiological level much sooner after a controlled rinse with sucrose. But biofilms will always metabolize and even some of the sugar alcohols, when applied often enough in a 'clean mouth' at a tooth surface, can lead to a caries lesion development over time.

It would be interesting to examine the populations in Peshawar. We would question the level of oral hygiene, but your observation is correct, of course. If the caries load is high (and it is in some populations eating excessive amounts of sugar-containing snacks and food – also in Saudi Arabia and many other Muslim cultures) fluoride alone cannot dampen the caries attack. Here we must try to influence sugar habits.

Once more thank you for your engagement in an important issue.

*Dental Update* has our e mail addresses should you be interested.

**Ole Fejerskov and**  
**Edwina Kidd**