

A previous article in this journal (Vol 5 No 1, 1987) described research findings on toothbrushing and dental care habits in children, and discussed the efficacy of toothbrushing as a means of preventing dental disease.

This article follows up with information about dental floss and considers the value of regular flossing as an adjunct to the use of a toothbrush in maintaining dental health.

Brushing the teeth with an ordinary toothbrush will not properly clean between the teeth. Effective toothbrushing will remove food debris and the harmful bacterial plaque which accumulates at the neck of the tooth, but only from easily-accessible tooth surfaces. However good the toothbrushing, it always leaves bacteria adhering to the more inaccessible surfaces of the teeth (Lovedal *et al*, 1958).

### Undisturbed

The sites between the teeth where bacteria can build up undisturbed are precisely the sites where dental decay (caries) and gum (periodontal) diseases begin. This is because both

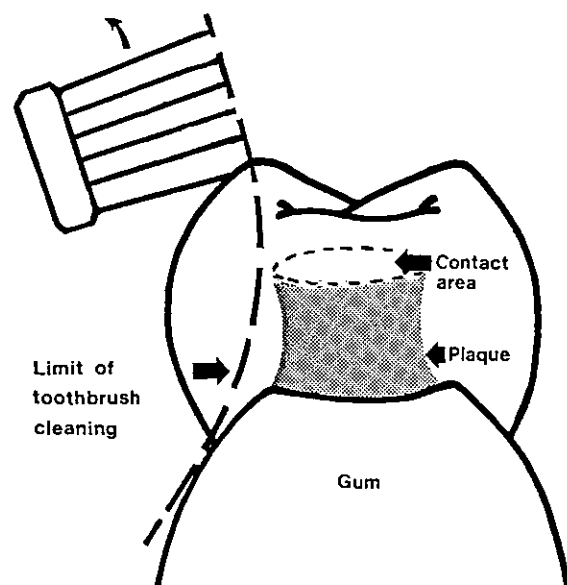


Diagram of the interdental surfaces of a tooth, showing how plaque (shaded area) collects between the tooth contact area and the gum. This interdental plaque is inaccessible to the toothbrush.

# IAN MACGREGOR

## Flossing: how to do it, what it does

caries and periodontal diseases are caused by mouth bacteria.

These micro-organisms have the special ability to stick to teeth, rather like limpets, in spite of the fact that the teeth are continually washed by saliva. Rinsing the mouth will not dislodge them; they can only be removed by physically wiping the tooth surface.

The diagram illustrates the interdental surface of the tooth and its relation to the gum which supports it: that is, the tooth is seen as viewed from its neighbour with which it is in contact.

### Protected

Because the tooth surface is convex, the actual area of tooth-to-tooth contact is quite small. Between the contact area and the gum there is a small area (shaded) of tooth surface exposed to the mouth. The shaded area is a relatively protected environment. Bacteria can grow without being wiped away by food being chewed or by toothbrush bristles, however vigorously the toothbrush may be employed.

The shaded area on the diagram indicates the site

where decay commonly begins, and the adjacent area of gum where periodontal disease begins. Hence this aspect of the tooth surface is the one that is the most important to wipe clean, and the one that is hardest to reach.

### Gum disease

With respect to gum disease, it seems that only the mature bacterial plaques, which have been growing on the tooth for four or more days, are able to initiate the inflammatory process which characterises gum disorders.

These well-established plaques show a consistent and identifiable framework containing millions of micro-organisms, which occur in an enormous variety. Contrary to popular opinion there is very little food debris or dietary remains in plaque: 70% is made up of micro-organisms and the remainder consists of constituents derived from the saliva. Over 150 different species of micro-organisms have so far been identified in these plaques, but it has not yet been possible to identify them all.

### Aggressive

Whether it is a certain combination of micro-organisms, or particular species of aggressive microbes, which are responsible for the common gum diseases found in man is

now known, although some species are now suspected of causing particular forms of periodontal disease.

Dental caries is less of a mystery. It is caused by bacterial production of acid from dietary sugar solution which has penetrated the plaque on the tooth surface.

In simple terms, the acid dissolves the tooth enamel underneath the plaque. Dental enamel, which covers the crown of the tooth, is almost entirely composed of inorganic mineral crystals. Until recently it was thought that once the enamel crystals had been dissolved, natural healing was impossible and a hole in the tooth was inevitable.

### Fluoride

However, research has shown that when the tooth becomes coated with fluoride, from whatever source, in the early stages the enamel surface can re-mineralise. Moreover, the newly-formed enamel crystals appear to have an enhanced natural resistance to decay.

The rest of the story is by now common knowledge. Everyone has heard of fluoride, and how it has dramatically reduced dental decay.

### Dental floss

Some form of adjunctive device therefore needs to be used to wipe the

### School policies

We recently received a letter from Mrs Margaret Selfridge, HEO (Health Education Centre, 48 Osborne Road, Jesmond, Newcastle upon Tyne NE2 2AL — 091 281 6311).

In it, she says:

*At the moment I am working with LEA Advisers and Health Education Co-ordinators in Health Education and am trying to collect various different policies for sex, drugs, alcohol and smoking from schools around the country.*

*Any help would be most appreciated.*

Readers are invited to contact Mrs Selfridge. We would also like to hear of such policies ourselves, for possible presentation to readers of *Education and Health*.

interdental tooth surface clean. In the healthy mouth this can be accomplished by the use of dental floss or dental tape. Dental tape is effectively extra-wide floss, but a little easier to handle.

Using floss does require a certain degree of manual dexterity and it does take a little time, but like everything else it becomes easier and quicker with practice. The advantage of floss is that it can clean just under the margin of the gum, where harmful bacteria reside. Without causing damage, it has been shown that the floss can be brought two to three millimetres below the tip of the gum (Waehaug, 1981). However, if used incorrectly it can of course cause damage, just as a toothbrush can.

### Assortment

Dental floss is essentially a simple white nylon cord, but there is now quite an assortment produced by different manufacturers. It comes supplied in handy little containers that allow the thread to be broken off at the desired length. Flosses either have a wax coating or are unwaxed.

The waxed variety are available plain, or with a mint flavour, or perhaps more importantly incorporate fluoride. Floss with fluoride is the most recent development and has the object of applying fluoride to the tooth surfaces which are most in need of it. This would seem to be a good idea, but to date there have been no controlled trials to test its effectiveness.

Oral B Laboratories (Aylesbury, Bucks.) market Super-Floss, which comes already cut into lengths of about 60 cm. Its particular feature is a thickened section about 15 cm long, which has a brush-like texture. This acts as a thin flexible brush — ideal for cleaning around crowns and fixed bridgework.

### Sticks

Other types of interdental cleaning aid are available for use where the gum, for one reason or another, has

receded and left a gap between the teeth.

Pre-formed dental wood sticks or wood points have a triangular section so that they fit the space between the teeth. They are not toothpicks: they should be used with a gentle sawing motion, rubbing them against the interdental tooth surfaces where space allows.

The first wood sticks were made of soft balsawood. They are still available, but the harder double-ended pinewood sticks are preferred by most users. Again, these are packaged in neat little plastic containers. Cone-shaped spiral-tufted brushes, with replaceable heads, have been designed for cleaning larger spaces and those that are difficult to reach.

All of these tooth-cleaning aids require professional instruction in their use to maximise their effectiveness, and to avoid unnecessary damage to the teeth or gums.

### Does flossing work?

There are only two reports of controlled studies examining the effect of flossing on dental caries.

One was conducted in the United States (Wright, 1979) where 88 primary-school children had their teeth flossed daily by dental research workers over a period of 20 months. This resulted in a 50% reduction in decay rate on flossed tooth surfaces compared with unflossed surfaces.

The other study was carried out in Sweden (Granath *et al*, 1979), where 140 12–13 year old children flossed their own teeth on one side of the mouth, but not on the other. Selected teeth were flossed with waxed floss once a day, supervised by trained assistants, for a period of two years. This investigation failed to find any difference in decay rates as a result of flossing.

However, the flossing technique was possibly over-simplified to make it acceptable to the extent that it had no preventive effect. It would be interesting to see the results of a similar type of study using floss incorporating fluoride.

### *Wrong reason*

People tend to use floss for the wrong reason. It is important to appreciate that the purpose of flossing is to remove the thin film of plaque from interdental tooth surfaces, and not as a means of removing food which has become lodged between the teeth after a meal. To be of any real benefit, floss should be used on a regular daily basis rather than spasmodically.

Floss holders have been marketed with the intention of making it easier to use, but none are very satisfactory. The best way to use floss is to take a piece about 45 cm long and wind the ends around the middle fingers. Then use the thumb and forefingers to ease the floss between the teeth. The floss should be curved gently around the tooth surface to be cleaned and moved gently up and down with a rubbing action, taking it just below — but only just below — the tip of the gums. Care should be taken to avoid using a sawing action, as it is possible to saw through a tooth with time — as well as damage the gums.

### *References*

Granath, L.-E. *et al*, 'Intra-individual effect of daily supervised flossing on caries in schoolchildren'. *Community dentistry and oral epidemiology*, 7, 147-150, 1979.

Lovdal, A. *et al*, 'Incidence of clinical manifestations of periodontal disease in the light of oral hygiene and calculus formation'. *Journal of the American Dental Association*, 56, 21-23, 1958.

Wearhaug, J., 'Healing of the dento-epithelial junction following the use of dental floss'. *Journal of clinical periodontology*, 8, 144-150, 1981.

Wright, G. Z. *et al*, 'The Dorchester dental flossing study: final report'. *Clinical preventive dentistry*, 1, 23-26, 1979.