

	Water fluoridation	Fluoridated toothpaste
<b>Who benefits</b>	Everyone benefits from water fluoridation, irrespective of social class, education or financial status. Low SES and young age groups receive the most benefit.	People who use toothpaste with fluoride will benefit.
<b>Usage</b>	Everyone, in areas where available.	It is a financial burden for some to buy toothpaste; only people who are able (or want) to buy and then use toothpaste with fluoride benefit.
<b>Physiology of use</b>	As water is ingested in small amounts through the day, the fluoride level in saliva (although small) remains relatively constant.	The fluoride level is usually high soon after brushing and drops off quickly. Peak level and frequency of fluoride peaks in saliva vary depending on frequency of brushing, the amount swallowed, and the contents of the stomach.
<b>Mode of action</b>	Pre- and post-eruptive with pre-eruptive being very important for caries prevention (Singh et al. 2003)	Essentially post-eruptive.
<b>Level of exposure</b>	Constant, low-level exposure.	Varies and depends on a range of behavioural factors.
<b>Cost</b>	No direct cost to consumers.	Cost to the individual; the amount spent depends on the brand used and the pattern of usage.

Table 1 Comparison between water fluoridation and toothpaste.

**Restoring early decayed lesions and the traditional 'drill and fill' approach to dental treatment are no longer appropriate.**

Treatment of a carious lesion involves far more than placing a restoration. Restorative treatments deal only with one consequence of the disease (lost tooth structure) and not the causes.

**Successful treatment requires first identifying and controlling the causes, remineralising both initial and root lesions and then attending to the loss of tooth structure.**

Restorative treatment will not be long-lasting unless the disease causes are recognised and the patient is equipped to be able to successfully manage future decay challenges. It is therefore important to develop a prevention-oriented management plan for individual patients. Because patients differ in their behaviour, diet, fluoride use and general health, each requires a different approach. This part of dental treatment is probably the most demanding in terms of the practitioner's time and communication skills. Some practitioners find patient pamphlets to be of some assistance,

particularly if used in the surgery as an educational tool to assist in explaining a dental problem to a patient. The same pamphlet can then be given to the patient to read again at home and for future reference. Having pamphlets in the surgery is useful but it is even better to use them as a 'communication link' between practitioner and client.

### Risk assessment and risk reduction

Due to the nature of the disease process, we recognise that everyone is at risk of dental caries, but at differing levels. The levels vary among individuals due to differences in diet and fluoride use, or varied general health or social circumstances. Caries risk can be categorised into three levels: low, moderate and high (Colgate Caries Control Program, Practice Information Sheet 2). Assignment of risk involves

- Fluoride history
- Dental history
- Medical history
- Thorough examination
- Consideration of all factors to make a diagnosis.

Some groups of people may be at increased risk of caries e.g. preschoolers, older adults in residential care.

### Low risk patients

Low caries risk patients are characterised by:

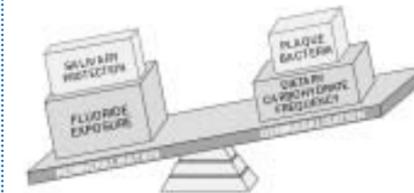


- no active carious lesions
- low-cariogenic diet
- fluoride exposure sufficient to counteract cariogenic dietary factors
- not taking medication that contains sugar or suppresses saliva production.

Patients in this category are successful in dealing with caries risk factors. Their combined population level (water fluoridation) and individual at-home prevention efforts are therefore sufficient. There are two groups of patients included in the low caries risk category: one has remineralisation and demineralisation patterns that balance each other, and the second has the balance tipped towards remineralisation

Although individuals at low risk of caries do not need additional

preventive measures, they still need to have their fluoride use and diet investigated as part of the dental examination. This information is needed to understand where the re-/de-mineralisation balance is for that patient.



**Low risk patients still need education on caries prevention as well as encouragement to continue with their established level of preventive measures.**

It is not advisable to lower the use of fluoride for individuals in the low caries risk group. Any change to the de-/re-mineralisation balance may put some patients at an increased caries risk.

### Moderate risk patients

Moderate caries risk patients are characterised by:

- one cavitated or a number of precavitated lesions
- low fluoride exposure
- cariogenic diet
- patient with or without carious lesions, but on regular medication that contains sugar or decreases saliva production
- patient with or without carious lesions, but approaching change in socioeconomic environment or with history of recent change or stressful life events that could negatively influence diet or brushing habits.



Moderate caries risk patients suffer from a de-/re-mineralisation imbalance with more demineralisation than remineralisation factors.

That imbalance may have its origins in excessive exposure to demineralisation factors, lack of or low exposure to remineralisation factors, or a combination of both.

**The prime objective for clinicians is to diagnose causes of the imbalance for the individual patient, as this will determine treatment planning and long-term outcome.**

**"For patients in the moderate risk group, water fluoridation alone, although very beneficial, is not enough. Dietary patterns are difficult to alter and changes usually take time. Therefore, the use of additional fluoride is essential."**

The level and form of additional fluoride use depends on factors such as the severity of the re-/de-mineralisation imbalance and the patient's capacity to follow dental advice. In some instances where reduction in sugar intake cannot be achieved, additional fluoride products may have to be used for prolonged periods of time.

**Additional fluoride is also needed in cases where patients' habitual fluoride use is low. Patients in this category are usually those who:**

- live in non-fluoridated areas
- drink water that contains little or no fluoride, e.g. tank water, most bottled waters or some filtered water
- brush irregularly or not frequently enough
- do not use toothpaste with fluoride for brushing (e.g. use herbal toothpastes).

It is very important to ascertain the area of fluoride deficiency, as that will determine what form of additional fluoride is best for the patient. If a patient is from a low-fluoride area but brushes regularly, compliance with using additional fluoride products (e.g. rinses) is likely to be much higher than if he/she forgets to brush.

No fluoride vehicle should be prescribed without comprehensive patient education on the role of fluoride in dental health and its importance to the patient's current situation.

**The better the practitioner-patient communication, the higher the chances of compliance with the prescribed treatment and a successful outcome.**

### High risk patients

High caries risk patients are characterised by:



- active carious lesions
- precavitated lesions
- low fluoride exposure
- highly cariogenic diet.

They also need extensive dental health education on the causes of their problem and ways to overcome it, as well as on the role and value of fluoride. Extensive use of fluoride for these patients is necessary. Fluoride is needed not only to return the patient's mouth balance to remineralisation and to prevent further decay, but also to remineralise (repair) those precavitated enamel lesions and caries on root surfaces, to remineralise (harden) cavitated lesions to protect the pulp, and to facilitate successful restorative treatment.

**High risk patients have severe dietary and dental behaviour problems. They have urgent need of dental education, and extensive use of fluoride is essential.**

Management of high caries risk patients will usually take longer than for those of moderate risk, and will consume more time and resources. Often, it will also involve placing restorations that release fluoride, as well as protective fissure sealants where necessary.

# Caries

## STRATEGIES FOR CARIES MANAGEMENT IN GENERAL DENTAL PRACTICE

### Treatment planning and risk level

*"Restorative management does not stimulate a patient to change their risk behaviour, and needs, therefore, to be performed in conjunction with dental education and other preventive strategies."*

The patient should be advised that long term retention of fillings and sealants is an achievable goal, but that without attention to fluoride and dietary recommendations, a pattern of replacements of fillings and new decay is likely to continue.

### Fluoride use

The first and basic requirement of fluoride use is to use fluoridated toothpaste on a regular basis. There is no use trying to introduce other fluoride products if there is a lack of compliance from the patient. All reasons (e.g. being anti-fluoride, forgetting or lack of motivation) for not using fluoridated toothpaste need to be addressed at the beginning of the treatment with in-depth patient education on the benefits of fluoride.

Patients who forget to brush regularly are not very likely to remember to use other dental products regularly. The habit of toothbrushing with fluoridated toothpaste needs to be firmly established before any other recommendations are given. To increase exposure to fluoride through brushing, a simple recommendation of 'spit, no rinse' is useful. That advice builds up patients' habits and is therefore more likely to be followed. Additional recommendations that are not associated with patients' habits need to be well explained and possibly linked with other activities.

In some cases, a change from regular- to high- fluoride toothpaste may be a better option than the use of additional products.

### Fissure sealants

Where tooth morphology is determined to be a risk factor, or where cooperation with dietary, plaque control and topical fluoride measures is considered unreliable, use of sealants may assist in providing protection against caries development. Uses of sealants include protection of pit and fissures, sealing restorations, protection against erosion, and protection of cervical surfaces. Pitts (1991) also proposed fissure sealant use on proximal surfaces; however, their placement may be difficult.

### Restorative treatment.

Simple restorative care aimed at 'filling a hole' does not treat decay; nevertheless the majority of restorative procedures and materials do just that. However, some materials (such as glass ionomer cements) release fluoride and promote remineralisation. Use of this type of material is recommended where appropriate, e.g. at the base of a cavity, or as a temporary restorative material to stabilise carious lesions.

### Monitoring of non-cavitated lesions.

#### Record keeping

Why do we need records? Dental records fulfil a number of roles, including assisting practitioners in providing comprehensive patient care. The practitioner who is aware of changes in a patient's medical and social history may be more prepared in terms of potential changes in his/her caries risk status, and may be able to assist in an early response.

Dental decay is usually a prolonged process that takes years to manifest as a loss of tooth structure. An adequate record of fluoride use and dietary changes helps early diagnosis and intervention so that a cavity may be avoided. A practitioner needs to keep in mind that the patient's current diet and fluoride use have a significant impact on treatment and future prognosis. However, the causes of the decay occurred some time previously and the patient needs to be aware of this issue as well. Decay is not about what the patient does now, but about what he/she has done in the past.

Clinical records that include areas of early decalcification recorded as 'watch' may be easily followed for longer periods. Inadequate records of early lesions may lead to the wrong diagnosis, the incorrect use of fluoride or even the provision of unnecessary restorations.

### Dental team.

The patient is the most important member of the dental team. He or she usually needs good communication with the dental practitioner, as well as dental education, in order to be able to fully participate in the necessary teamwork. If cooperation and involvement of the patient are not achieved, the effort of other members of the team is not likely to be successful. It is the patient, first and foremost, who will control caries not the dentist.

*Although dental disease is as old as the human race, dental decay has not always been prevalent. As civilisation has progressed, so have dietary differences between wealthy and poor people. Those with affluence started to consume a diet high in sugar, and caries became a frequently observed disease among aristocrats. As sugar became more accessible and less expensive, however, its consumption increased among people in the broader community, causing them to experience the same level of caries as more wealthy groups. Currently, lower caries rates are observed in higher socioeconomic status (SES) groups than lower SES groups.*

*Higher SES groups are usually more educated, and more successful in adopting dietary advice and in using caries prevention strategies. This has caused a widening in the oral health discrepancies observed between high and low SES groups.*

*In developed countries most caries occurs among low SES groups. However, it would be false to assume that dental disease does not affect higher SES groups. Everyone is at risk of dental caries and inadequate prevention will result in disease developing. It is important for dental clinicians to set up some strategies to identify, and to provide care for patients at various levels of caries risk.*

### Principles of modern caries management focus on:

- prevention
- risk assessment
- risk reduction
- treatment planning that is appropriate for the risk level and follows principles of minimal intervention dentistry.
- monitoring of non-cavitated carious lesions.

Another important issue that needs more attention is the need to consider family relationships and the role of carers who may play a greater part in the future in dental management of the youngest and the oldest in our population.

### Prevention

There are three levels of prevention: primary, secondary and tertiary. The aim of the primary level is to prevent dental disease from happening. The secondary level aims to treat the disease which is present and prevent the process from recurring. The third level is to rehabilitate the mouth and enable function.

#### Primary prevention:

Primary prevention may be achieved on two levels: population and individual. In dentistry the widely recommended and accepted population approach to caries prevention is water fluoridation. In developed countries brushing with fluoride toothpaste has also become common practice, so that the use of fluoridated toothpaste could also be considered as a population approach to caries prevention.

There are a number of fundamental differences between the two fluoride vehicles that need to be recognised, (Table 1.)

**Fluoridated toothpaste and water fluoridation should be used to complement rather than replace each other.**

The mode of action of fluoride is an interesting topic, and over the years the understanding of how fluoride works has changed. During the era in which water fluoridation was introduced (1960s–1970s), fluoride action was perceived as being mostly pre-eruptive. That understanding changed to mostly post-eruptive during the progression of use of fluoride in various oral care products in the 1980s and 1990s. Recently, a study (Singh et al. 2003) on the relative effects of pre- and post-eruption water fluoride on caries experience confirmed previous work by Backer Dirks et al. (1961) that pre-eruptive, as compared to post-eruptive, exposure had more significant effect on caries experience of permanent first molars.

**Water fluoridation remains the most effective and socially equitable means of providing the caries preventative effect of fluoride to the community**

#### Secondary prevention

Secondary prevention applies to cases where coronal or root surface decay has developed. Assessment should be made of the possibility of remineralisation of tooth structure with fluoride and/or the need for replacement of lost tooth structure.

### References

Backer Dirks O, Houwink B, Kwant GW 1961. Some special features of the caries-preventive effect of water fluoridation. Archives of Oral Biology;61:175–9.

Pitts NB 1991. The diagnosis of dental caries; 2. The detection of approximal, root surface and recurrent lesions. Dental Update;18(10):436–8, 440–2.

Singh KA, Spencer AJ, Armfield JM 2003. Relative effects of pre- and post-eruption water fluoride on caries experience of permanent first molars. Journal of Public Health Dentistry;63(1):11–19.

### Further information

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