NQ Surgical Dentistry

Keep Your Teeth healthy….

They say *"Prevention is better than cure;* Nowhere is it more relevant than when we apply it to dental decay and gum disease. These two dental diseases account for most of the dental work throughout the world. BOTH of these diseases are entirely preventable. In this article I aim to give a thorough overview of dental decay and its prevention. Information is available in other articles concerning gum disease.

Dental decay is a continuing problem….
I still find myself removing large numbers of decayed teeth from adults and children, often under general anaesthetic in a day surgery unit. This is often done in adults in preparation for the move from a natural dentition to wearing complete dentures while in children it is due to the ravages of dental decay resulting from dietary and cleaning issues. The fact that this sort of treatment is still required is proof that there are a number of problems that the dental team faces in reaching all members of the community and providing sound, early preventive advice about dental disease.

The problems of reaching patients….
There are many reasons why patients suffer extensive dental disease. One problem many Australians face is the inaccessibility of dental care in many rural locations. Many people live in remote areas with vast distances between them and dentists, therapists and dental hygienists. This means they are unlikely to receive much preventive dental advice.

There are still large numbers of Australians who are not aware of the underlying causes of dental decay and gum disease and unfortunately even larger numbers of people who are aware but have not received adequate preventive advice to cause them to change the things they do that contribute to dental decay or gum disease. This demonstrates the fundamental importance of preventive education of children right from the start of their education. Adults too need to hear the preventive messages about avoiding dental disease regularly to help them minimise their own dental disease and that of their children.

What are the causes of dental decay?
There are four factors (bacteria, sugars, tooth, and time) that have to be present for dental decay to occur:

- there must be dental plaque (bacteria) on the teeth,
- there must be sugars present to feed the bacteria (from the diet), and the resulting acid produced by the fermentation of these sugars must remain in contact with the tooth.
- the tooth surface enamel is strong but can be dissolved leading to dental decay while the dentine of the tooth root is far softer and more conducive to acid attack. If a patient has gum recession exposing the root surface to the mouth, root decay is a real danger.
- Acid must remain on the tooth for adequate time to attack and demineralise or dissolve the enamel or dentine leading to cavity formation.

To prevent decay, it is only necessary to block one of these factors.

Who is responsible for removing plaque?
Removal of dental plaque remains the responsibility of parents until a child is old enough to understand the need for detailed tooth cleaning and can take full responsibility for their dental care at home. This indicates there is a need for parents to be taught how to clean the teeth of their child.

Adults, however are clearly responsible for their own daily cleaning. To be effective people need to know exactly what they are aiming to achieve. Plaque is very sticky, and therefore not easy to disrupt and remove from the tooth surface. This is why an effective brushing technique is so important and due to the difficulty in achieving good cleaning, adequate time is needed too.

So while the responsibility for cleaning is the patient's, the dental team must first empower the patient by teaching them how to be effective and efficient in disrupting and removing dental plaque from all the areas of the mouth, including the tongue. Large numbers of bacteria live in the uneven surface of the tongue and this is the largest reservoir of bacteria hence the importance in reducing the overall numbers of bacteria that live there.

Fluoride toothpaste is important….
In young children the use of child fluoride toothpaste (*500 parts per million concentration*) can help reinforce the outer enamel of the teeth and make the teeth more resistant to decay. In adults normal fluoride toothpaste has 1000 parts Fluoride per million.

Because plaque is sticky, and does not come off the teeth easily, tooth brushing must be thorough and effective on all surfaces of teeth, including the inaccessible surfaces between teeth. Plaque removal is best done at least twice a day after breakfast and after their evening meal when the individual is not going to eat any more food.

Fluoride toothpaste protects the teeth from decay, but it can only do this if it is left on the teeth so that over night the fluoride can be adsorbed into the tooth enamel and thereby strengthen the tooth surface and repair any minor acid attack that has take place during the day. After tooth brushing with fluoride toothpaste, one should only spit out the excess toothpaste and NOT wash out the mouth with water. Leaving the fluoride on the teeth is most important to provide an environment suitable for the overnight repair of demineralisation.

High risk patients for tooth decay….
Anyone who has suffered from tooth decay should use a Fluoride toothpaste (*1000 parts per million concentration*) to provide additional protection. The additional use of Fluoride mouthwash has fairly limited benefits. The most effective measures that may be taken are to reduce the number of times sugar is put into the mouth every 24 hours.

Sugar and tooth decay….
Diet plays a major role in tooth decay. The modern diet sadly consists of significant quantities of refined carbohydrate. These can be considered fermentable sugars and suitable food for the near 500 species of bacteria that live in the human mouth. A lot of refined carbohydrates are hidden in foods as preservatives, especially in pre-packaged foods and tinned foods. Beware of this and read the labels for these hidden sugars.

One problem we face in modern living is the snacking that takes place throughout the day. Regular intake of sugar in tea, coffee, carbonated drinks, biscuits, candy, cakes, help to provide a continuous supply of sugar to feed the bacteria in the mouth. This allows the plaque to grow, and to ferment the sugars producing many chemicals including acids that attack the tooth surface causing initial demineralisation and later cavitation. Other chemicals are also produced that are toxic to the oral soft tissues, including hydrogen Sulphide, Sulphur compounds, organic acids, and even ammonia. These toxic chemicals cause an inflammatory reaction in the gum tissues and this them leads onto gingivitis and periodontitis (destructive gum disease).

Bacteria cause tooth decay….
A particular group of bacteria are closely linked with tooth decay. These bacteria ferment the sugars in the mouth producing acids that can then demineralise the enamel. Over a period of time, this area of demineralisation spreads deeper into the enamel towards the dentine. Finally the level of mineral content in the enamel and superficial dentine is so low that the hard tooth structure involved collapses and creates a cavity, a process called cavitation.

The longer acids remain undisturbed against the enamel surface of the tooth, the more damage occurs to that enamel and the more quickly the decay becomes established. This is another reason why regular effective plaque removal by tooth brushing must be carried out. One area where dental decay often starts in many people is between the teeth. This is the reason why so many dentists advocate the use of dental floss.

Floss is pulled tight, and carefully passed through the contact point between the teeth. The contact point is that tiny area of the tooth where it toughed the tooth next to it. Often plaque builds up around the contact point, especially just underneath it and hence this area is especially prone to the development of dental decay.

Once the floss is through the contact point, it is then passed just below the gum margin and then the floss is pulled tight against the tooth surface to be cleaned. Once tight against the tooth, the floss is moved up the tooth surface and back through the contact point. This action allows the floss to "skim" off the plaque from the tooth surface. This flossing should be done for all the tooth surfaces between the teeth because most dental decay begins just under the contact point, particularly in adolescents and young adults.

What about using a mouthwash….
There are many mouthwashes available in the supermarkets and pharmacies. Unfortunately it is very difficult to scientifically evaluate each one and compare one with another in any useful way. In terms of effectiveness, it depends on what you want from a mouthwash.

In many cases it is assumed by patients that by using a mouthwash the plaque will be killed and that it assists in controlling plaque. This is not entirely true. The majority of the cleaning and bacterial disruption is due only to the mechanical cleaning action of the filaments of a toothbrush used in an effective manner for sufficient time.

Plaque is a jelly-like, protein matrix and this will protect the bacteria within from the chemical effects of a mouthwash that rests on the outside of the plaque during mouth-washing. The studies that manufacturers use to claim effective antibacterial effect of their mouthwash are studies where the mouthwash was used in a bacterial culture dish in a laboratory where the bacteria are not covered by a protein matrix. This does not represent the situation in the mouth and hence many mouthwashes have very limited antibacterial effect when used in the mouth.

The use of a mouthwash containing an antibacterial agent called *Chlorhexidine*, will have a very significant antibacterial effect, even in the mouth, and will slow the growth of bacterial plaque significantly. Such mouthwashes include Savacol and Curasept. Unfortunately this chemical leads to staining of the teeth and tongue if it is used for more than 2 weeks. This disadvantage has been

overcome by the manufacturers of Curasept, that contains an anti-discolouration system allowing the mouthwash to be used for longer periods without staining. Listerine is a very commonly used mouthwash containing essential oils that have some antibacterial effect but again, the effect on a mature plaque in the mouth environment is of very little benefit when compared to the effect of correct brushing for adequate time.

Other mouthwashes contain Fluoride to assist in protecting teeth against decay. This may be useful for children, whose teeth are more susceptible to the decay process, and in the elderly where the root surfaces of teeth are exposed to the mouth with the danger of root surface decay. These mouthwashes are useful for certain people but are not required for most because there is Fluoride in the majority of toothpastes bought today.

While a number of the available mouthwashes do have some antibacterial effect, they are not generally an effective means of improving plaque control. It is the brush and how it is used that matters most. Some mouthwashes may have a taste that appeals to some people and therefore it may help focus their attention on the care and cleaning of the teeth. This is beneficial as they are more likely to brush more thoroughly if they are more focused on their oral and dental health.

Dietary sugar control is a must….
Refined carbohydrate literally means sugar. Sugar is the most important contributing factor in dental decay. Sadly sugar is used as a preservative in just about all the processed and packaged foods we buy. Look at the labels and you will see this is a fact.

Tooth decay is best avoided by limiting the number of sugar intakes per day. In other words, avoid "drip-feeding" sugar into the mouth with all those small snacks and drinks. The best drink is water, pure and simple!

It is best to try to limit the sugar supply to the bacteria in the plaque to no more than three mealtimes each day. Once a meal is over, it is best to neutralise the acid produced by the bacteria in the mouth before brushing the teeth by chewing a little cheese, which is alkaline and neutralises the acid. Chewing cheese and sugar-free chewing gum is also effective at removing sugars by stimulating the flow of saliva that washes away food debris and sugar residues so that they are swallowed.

The healing power of saliva….
The saliva also delivers minerals that start to repair the demineralised areas of the teeth that have suffered the acid attack during the day. The natural mineral content of the saliva results in the demineralised zone of the enamel taking up calcium and phosphate and a process of remineralisation then takes place resulting in repair of the early dental decay lesion.

After having allowed time for neutralisation of the acid and clearance of the acid by salivary flow, then is the best time to brush the teeth with a fluoride toothpaste. Brushing too soon after consuming sugars means you are brushing tooth surface that has been microscopically softened on the surface (due to demineralisation) allowing the mechanical abrasion of the brush to remove a very small (microscopic) quantity of enamel from the tooth. This act of brushing softened enamel, repeated many hundreds of times, can damage the teeth leading to enamel wear and sensitivity of the tooth to cold foods and drinks can develop.

The "demon" fizzy drinks….

One of the most damaging constituents of our diets is carbonated or fizzy drinks. They have two problems; first they are full of sugar and secondly they are highly acidic. There is no doubt that the best drink for all of us, and certainly for children, is water! Fizzy drinks should be a treat and not a regular dietary component. They not only contribute to decay but the acidity causes severe destruction to the teeth by dissolving the enamel; a process called erosion.

Dehydration makes tooth decay worse….
People, who work outside in the heat or in jobs where the work environment is very hot, may sweat profusely becoming thirsty. Sadly many people then drink fizzy drinks like Coke rather than water. Such drinks contain Caffeine and this has a diuretic effect promoting the production of urine making dehydration even worse. As a consequence, the body tries to preserve its fluid in other ways and closes down many of the body's secretions, including saliva. This results in the mouth becoming dry. With reduced saliva formation the mouth is unprotected by the natural moistening and enzymatic effects of natural saliva. Consequently the acid drinks destroy the enamel of the teeth by dissolving the surface layers. This is often seen both at the back of the upper front teeth and on the surface of the back teeth (molars) leading to sensitivity of the teeth and may also cause a change in the way in which the teeth meet when chewing due to a reduction in the size of the teeth as they are dissolved.

The protection of saliva….
Salivary flow is an important protective factor keeping the entire mouth healthy. Without saliva the mouth feels dry (called *Xerostomia*) and this can make swallowing difficult and can cause difficulty speaking. Both these effects arise due to the dryness of the soft tissues. However, the lack of saliva may also contribute to gum disease.

The antibacterial effect of saliva's natural enzyme systems helps in the control of the bacteria that live in the mouth. Without this control, the bacterial plaque is able to accumulate leading to the formation of tartar (also known as calculus) on the tooth and root surfaces. This calculus assists in the development of gum disease.

Practical advice on preventing dental decay….
So what can be done to keep the mouth healthy?

- Be effective in brushing your teeth. Learn the right way to achieve plaque control in all areas of the mouth. Spend some time with your dental hygienist and then make effective cleaning part of your daily routine to remove as much plaque as you can. It takes time to clean well; so don't cut corners.
- Be aware of where the hidden sugars are in your food. Consider changing the foods you choose to eat and serve your family and read labels when shopping.
- Try to reduce the number of times each day when you put sugars into your mouth. Reducing the number of times you consume sugar will reduce the time your teeth spend in an acid environment.
- Reduce the number of times you drink fizzy drinks. This reduces the number of times the bacteria are fed and produce acid to demineralise your teeth causing tooth decay. It also reduces the direct acid attack of the acid drink itself leading to dissolution of the tooth surfaces and the development of painful tooth sensitivity.
- Drink water more often and try to make sure you drink 2-3 litres a day; more if you sweat or work in a hot environment. If you go to the gym or play sport you will sweat far more. Remember to increase the intake of water significantly to cover the additional fluid loss.

- We should also try to minimise the amount of caffeine we ingest in tea and coffee and of course drink a minimal amount of alcohol. All these lead to greater fluid loss through the kidneys. Reducing the intake of these diuretic drinks will help to ensure you produce an adequate quantity or good quality saliva to protect your mouth keeping the tissues healthy and the teeth intact.
- Use a fluoride-containing tooth paste to brush your teeth with and don't wash out the mouth when you finish brushing. Just spit out the excess toothpaste mixed with your saliva. Leaving the fluoride on the teeth will help the teeth to repair after acid attack.
- Make sure you have dental checks with a dentist. The dentist should check for decay and gum disease if you are an adult. A gum check requires gentle gum probing of all areas of the mouth to find any areas of gum inflammation that can indicate a destructive gum disease resulting in the loss of the bone supporting the teeth.

Finally protecting your teeth during sports….
Decay and gum disease lead to tooth loss but so do contact sports. Many sporting bodies in Australia insist that players wear mouth guards. These come in many different types. There are those off the shelf varieties that you place in hot water and then mould them around the teeth and gums and they then fit to a degree but they are not close fitting and are not truly protective.

The reason players should wear mouth protectors, also called mouthguards, is to protect the teeth from fracture or displacement of the teeth during collision with other players or hard objects.

A poorly fitting mouthguard is little better than wearing no mouthguard. It is therefore best to visit a dentist, have impressions taken and then have a properly made thick mouthguard constructed on models of mouth. The cost of a high quality and effective mouthguard is far less than the costs faced to put right a dental injury and possibly have to replace missing teeth.

Some sports are known as contact sports and others are not, however, when playing sports where contact is not part of the sport, unintended falls or contact can still take place. Netball is an ideal example. It is advised that players of most sports should wear mouthguards.