SOFT DRINKS & DENTAL HEALTH

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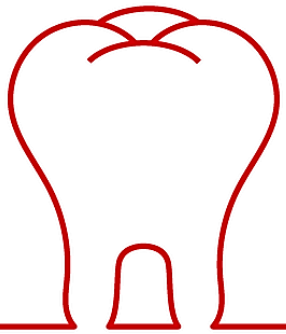


It is easy to think in this day and age that sugar is the cause of all evil, and of course it does contribute to a number of health conditions such as obesity, type 2 diabetes and dental caries. But what about diet drinks?

Of course they don't contain sugar but what exactly are they made from and are there any health implications for consumers? In an earlier briefing we discussed sweeteners and their effect on health – see *gulp!* briefing on Artificial Sweeteners

The media would have you believe that sweeteners are toxic and carcinogenic, however studies show that when consumed at current levels they are non-toxic and are safe for consumption.

However, recent questions have been asked about the impact that sweetness and sweet flavours have on the body. Does consuming an artificially sweetened drink make you crave more sweetness? Do people over-compensate when choosing sugar free varieties? Researchers are currently searching for answers and the jury is still out – though early findings suggest there may be a connection.

What is clear, is the damage **'diet'** or low sugar drinks can do to teeth.

Dental Decay – Sugar

When it comes to teeth, evidence suggests that it isn't how much sugar is consumed, but rather how long it has been in contact with teeth [1].

There are naturally occurring bacteria in everyone's mouths, and these bacteria feed on sugar, producing acids as by-product that can harm teeth. Some drinks can contain in excess of 12 teaspoons of sugar per serving. Such large amounts of sugar consumed regularly not only contributes to excess weight, but also increases the likelihood of damage to teeth.

Risk of dental caries is particularly high in early childhood and adolescence. Many factors contribute to the initiation and progression of dental caries, but high sugar consumption and especially consumption from products that coat the teeth are particularly harmful.

Tooth Erosion – Acid

Unlike dental cares (decay), dental erosion is not a disease and it's not caused by bacteria [3]. It occurs when acid dissolves the hard tissues of the tooth. In its early stages, it strips away the surface layers of tooth enamel. In advanced stages, it can expose the softer dentine that underlies tooth enamel, or even the central pulp of the tooth.

In addition to the acids formed by bacteria in the mouth when they feed on sugar, most soft drinks contain a combination of phosphoric acid, citric acid and / or carbonic acid, and with a pH level of below 5.5 these drinks are comparatively acidic.

Manufacturers add some of these acids while others occur naturally in the beverages. They are added to carbonated drinks to give the beverages freshness and tartness specific to the drink.

Phosphoric acid is mainly found in colas, while citric or citrate appears in lemon and lime-flavoured drinks.

These acids are present in full sugar, "diet" and reduced sugar drinks and fruit juice. Additionally, non-carbonated fruit-flavoured drinks contain considerable amounts of acids which, in vitro, induce erosions in teeth similar to those induced by carbonated soft drinks [4].

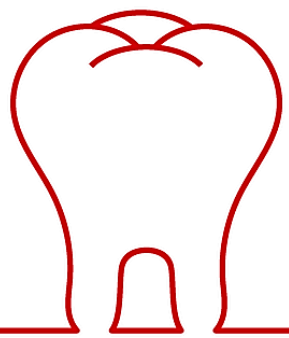
Any of these acids can erode tooth enamel. Dental erosion by acidic soft drinks appears to be a growing problem and has been the subject of numerous studies in vitro and in situ [5].

But it's not simply a matter of pH levels. It's the mix of chemicals in a drink that also determines whether or

not it is harmful to teeth. Some chemical are chelators, which means they bind or trap other chemicals, and they cause tooth erosion by chelating calcium and effectively removing it from teeth, including the acids mentioned above.

Calcium in saliva works to re-mineralise teeth after exposure to small amounts of eroding acid, but with the increased consumption of soft drinks, it's not enough. People often consume soft drinks over the course of a day, which means acid floods into the mouth every time you take a sip of the drink, causing an "acid attack", these attacks can last approximately 20 minutes and this process begins again each time a sip is taken. Therefore drinking a soft drink over a period of time could subject your teeth to hours of acid attacks.

Sugar-free varieties of soft drinks – marketed as "zero" or diet versions - are promoted as healthier alternatives.



But although sugar is off the list of their ingredients, the acidic additives remain the same. Research shows sugared and sugar-free soft drinks cause similarly significant levels of tooth erosion [6].

Young, immature enamel is porous and is more easily dissolved by acids until the surface enamel has matured. Ions in the saliva progressively harden the enamel, however this takes time and therefore children are at greater risk of dental erosion if acid attacks are frequent.

Reduced Calcium Intake

The body needs calcium for many processes, including building strong bones and teeth, but carbonated beverages, especially soft drinks, often replace calcium-rich drinks in the diet. Milk consumption by teens has decreased at the same time their consumption of soft drinks has risen. Women build most of their bone mass by the age of 18, so replacing calcium-rich drinks with soft drinks during teen years leaves women at risk of osteoporosis later in life. Pregnant women who choose soft drinks over calcium-rich drinks are not only affecting their own health, but also the health of their unborn children. Tooth decay later can be one of the many ill effects of poor nutrition in the womb.

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WHAT CAN I DO TO AVOID DENTAL EROSION?

The best way to avoid dental erosion from drinks is to opt for water or milk. However, whilst diet drinks can have an adverse effect on dental health, they are a better choice than full sugar varieties. If you must drink them there are a number of things you can do:

- Have acidic food and drinks just at mealtimes. This will reduce the number of acid attacks on your teeth.
- Drink quickly, without holding the drink in your mouth or 'swishing' it around your mouth. Or use a straw to help drinks go to the back of your mouth and avoid long contact with your teeth.
- Follow the drink with cheese or milk as this will help cancel out the acid.
- Chew sugar-free gum after eating. This will help produce more saliva to help cancel out the acids which form in your mouth after eating.
- Wait for at least one hour after eating or drinking anything acidic before brushing your teeth. This gives your teeth time to build up their mineral content again.
- Brush your teeth last thing at night and at least one other time during the day, with fluoride toothpaste. Use a small-headed brush with medium to soft bristles.

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