

Tea and Oral Health Fact Sheet

Introduction

Dental disease remains a significant problem in the UK with the vast majority of the population suffering with the consequences of this disease at some stage in their lives. It can result in acute pain, aesthetic problems and can increase the risk of tooth loss, which may have long-term effects on food intake resulting in impaired nutritional status and subsequent overall well being.

Damage to or loss of teeth may result from:-

- o Dental caries
- o Acid erosion
- o Periodontal disease

Dental Caries

Caries is caused by bacterial acid production in tooth plaque, which can cause deep localized lesions if it remains too near the tooth for any length of time. If left the bacteria then may penetrate the tooth further and progress into the soft pulp tissue. Untreated dental caries can lead to incapacitating pain, potential tooth loss and loss of dental function. The development and progression of dental caries is due to a number of factors, specifically bacteria in the dental plaque (particularly *Streptococcus mutans* and lactobacilli) on susceptible tooth surfaces and the availability of fermentable carbohydrates.

The prevalence of dental decay in children in the UK has fallen significantly since the 1970's mainly as a result of the introduction of fluoridated toothpaste and fluoridation of water supplies¹. Nevertheless dental caries still remains a significant problem.¹

Acid Erosion

The damage to teeth from acid erosion is now thought to be a significant contributor to dental disease.² Erosion arises from acid derived from foods and drinks, or regurgitations from the stomach, which repeatedly wash over the teeth and result in shallower but more widespread lesions.

Periodontal Disease

Periodontal disease results from inflammation of the gum (gingivitis) that gradually causes destruction of the bone supporting the teeth. Gingivitis usually results from infection from debris that has accumulated at crevices at the base of the teeth.

Although the main reason for tooth extraction is as a result of dental caries, there appears to be an increasing trend for tooth loss in adulthood resulting from periodontal disease.³ The Adult Dental Survey⁴ found that about 95% of the UK population had some signs of gum disease.

Prevention of Dental Disease

- o Good oral hygiene practices – including proper cleaning of the teeth and gums to remove plaque build up and accumulation of debris at the base of the teeth

- o Fluoride Protection – fluoride is incorporated into tooth enamel making it harder and more resistant to acid attack. As well as fluoride containing toothpastes, the fluoride content of drinking water is also an important factor, and caries prevalence is lower where water is naturally or artificially high⁵. It is believed that water fluoridation is the most effective public health strategy for caries prevention. However, there are wide variations in the levels of fluoride naturally occurring in fresh water ranging from 0.01 to 100 ppm⁶ and only about 10% of the water in the UK is fluoridated at the ‘optimal’ level of 1ppm.
- o Dietary measures including:
 - o Reducing the frequency of consumption of sugar containing foods and drinks
 - o Consuming acidic drinks only at meal times. Between meal drinks should be non-acidic.

Tea and Dental Health

Epidemiological surveys have reported that some populations who drink tea on a regular basis have a reduced number of carious teeth⁷⁻⁹. Proposed mechanisms for tea’s oral health benefits include:-

1. Fluoride

The tea plant (*Camellia Sinensis*) extracts fluoride from the soil, which then accumulates in its leaves. For this reason tea is a very rich source of fluoride; dry tea leaves may contain 4-400ppm fluoride, the brewed tea 0.34-6ppm¹⁰⁻¹² resulting in one cup of tea containing between 0.3mg and 0.5mg of fluoride. In fact, in the UK the majority of fluoride comes from tea, providing 70% of our daily intake.¹³

Findings from a recent study that investigated the bio-availability of fluoride from tea in relation to its interaction with the tooth surface and oral tissues,¹⁴ demonstrated that after rinsing with tea, 34% of the fluoride was retained in the oral cavity and that some of this showed a strong binding ability to enamel particles on the tooth surface. For this reason the authors concluded that tea was an effective vehicle for delivering fluoride to the oral cavity where it may then become associated with the oral tissues potentially helping to prevent dental decay.

Some concern has been raised over excessive intakes of fluoride causing fluorosis in the enamel of the teeth while it is still forming in children. Early signs of fluorosis are mottling and discoloration of the teeth. Although appearance of the teeth is affected, the structure of the teeth will actually be stronger and less likely to get decay. In addition, the Dental profession is almost totally in favour of water fluoridation and any concerns have been carefully considered and discounted by the Public Health Alliance and the British Fluoridation Society (1995).

2. Tannins

Other components of tea may also contribute to the inhibition of caries. It has been reported that the tannins in tea can inhibit salivary amylase thereby reducing the cariogenic potential of starch-containing foods.¹⁵ A number of studies have also demonstrated that tannic acid inhibits the growth of *S.mutans* bacteria,¹⁶⁻²⁰ a major factor in the build-up of dental plaque.

3. Acid erosion

In addition to its beneficial effect on plaque, tannin, along with other components of tea such as catechin, caffeine and tocopherol have been shown to be effective in increasing the acid resistance of tooth enamel.²¹ Their effects increased dramatically when they were used in combination with fluoride.

The acid content of black tea and its influence on oral acidity during consumption has also been investigated.²² The pH of the tooth surface in ten healthy volunteers was examined after consuming black tea. The very small, short-lived, pH decrease that was observed led to the conclusion that tea can be recommended as an alternative drink to the more acidic versions, such as fizzy drinks, as part of preventive measures for dental erosion.

4. Flavonoids

Green tea and specific flavonoids, mainly catechins, have exhibited inhibitory effects on the growth of cariogenic bacteria by inhibiting the adherence and growth of plaque bacteria at the tooth surface.²³⁻²⁴

Tea and Oral Cancer

Preliminary results from trials determining the role of tea in the prevention of oral cancer look promising. One double-blind, randomised intervention trial suggested that treating patients with a mixture of black and green tea components could improve the clinical manifestations of their oral lesions.²⁵

In Summary...

There is a growing amount of in-vitro research identifying tea's potential oral health benefits. Although the scientific evidence for the mechanisms by which tea exerts its positive health effects is not yet conclusive it represents promising areas for future research in human trials. In the mean time it is reasonable to conclude that drinking tea, without the addition of sugar, is compatible with dietary advice to prevent dental decay, thereby helping to promote overall health and well being.

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