Why Theodent's toothpastes are so revolutionary and unique: Bye-Bye Fluoride!

The dietary habits of various foods and drinks in our daily lives have an important implication on our own health. The mouth (oral cavity) is the beginning of the digestive tract and its health represents the health of the whole person.

In today’s society, the daily consumption of large quantities of soft drinks, fruit juices and wine result in erosion (the leaching out of tooth mineral as a result of exposure to acid- also known to "caries or cavities"). Most of these drinks are acidic. This erosion of enamel is one of the reasons for increased tooth sensitivity.

In the normal mouth, exchange between tooth surface and saliva, which contain calcium and phosphate, provides the tooth surface with building blocks to remineralize the enamel. Teeth are formed from calcium phosphate in the form of mineral hydroxyapatite (HAP).

Erosion of enamel surfaces becomes a pathological situation when the repair process cannot keep pace with the rate of erosion. This eventually leads to thinning of the enamel surfaces and cavity formation. You can think of this as a delicate balancing act.

Correlations are reported between chewing and activities of daily living and nutritional status for the elderly (Neurosci Biobehav Rev. 2011; 35: p.483). For instance, chewing gum is associated with greater alertness and a more positive mood (Nutr Neurosci. 2010; 13: p.7). Chewing may also stimulate memory (Neurosci Lett. 2008; 436: p.189), suggesting that chewing properly could become an important contribution to mental alertness. Recently, it was reported (Wall Street J, 8/12/2014, D1) that greater chewing during eating leads to reduced calorie consumption, which could eventually control weight.


These examples indicate how healthy oral conditions and/or function are critical to maintain our general health. The purpose of Theodent, a revolutionary toothpaste, is to play an important role in promoting the “Healthy Tooth” and overall health.

Studies On Xanthines

Almost 30 years ago, we discovered that caffeine ingestion resulted in increased dissolution of the enamel surfaces. This was later found to be due to the formation of reduced enamel crystal size because of exposure to caffeine (Arch Oral Biol 1993; 38: p.441). Caffeine belongs to a group of naturally occurring compounds known as xanthines.

These phenomena are explained by a simple example. If a gallon of water is poured into two jars and one container has one pound of solid ice, and another container has crushed ice. The container with the crushed ice will dissolve quicker because of the smaller size (greater surface area).

Dental caries and cavity formation are partly caused, from the acid produced by bacteria in the mouth, which dissolves the hard surface (enamel) of the teeth. Therefore, one can reasonably assume that the smaller crystal size will increase cavities in caffeine-exposed teeth compared to non-exposed teeth. This hypothesis turned out to be true (Arch Oral Biol 1993; 38; p.919). Babies’ teeth from pregnant or lactating women, who are heavy coffee drinkers, (coffee contains caffeine), could inadvertently be affected i.e., the teeth of the offspring might become vulnerable to future dental caries.
While studying caffeine’s effects on enamel, a serendipitous discovery was made. We assumed that all the xanthines would have the same effect on enamel as caffeine, but this turned out to be a false assumption. Another member of xanthine family, theobromine, had the opposite property of caffeine; that is, theobromine increases crystal size. Large crystallite size is correlated with resistance to dissolution and dental caries (JADA 1975; 91: p.594). So in the ice example above, the crystals that are larger like the block of ice have a smaller surface area, and therefore will dissolve or melt at a slower rate than the crushed ice.

Theobromine is the only known substances that increase the crystal size of hydroxylapatite in tooth surfaces. This may explain why feeding cacao prevents dental caries (Arch Oral Biol 1966; 11: p.149). It was also shown that theobromine is 71 times more effective for remineralization than fluoride (Caries Res 2013; 47: p.399).

Theobromine is the main component of cacao. Our proprietary ingredient, “Rennou™“ is a culmination of many years' of intensive study and has been developed based upon this discovery.

**Effects Of Fluoride**

Fluoride based toothpastes have been the standard for many years. In the presence of fluoride, fluoro-hydroxyapatite crystals are formed. Partially fluoridated crystallites have lower solubility in acid produced by bacteria in the mouth than non-fluoridated HAP and thus protects against tooth decay. Another of fluoride’s roles is to stimulate remineralization of teeth at the early stages of decay (Brit Dent J 2013; 214: p.161). These are the mechanisms of fluoride’s protection against dental caries.

The first fluoridated toothpastes were introduced in 1955 (Scientific American 2008; p.74). Although fluoride has been considered the gold standard in oral care, the toothpastes containing fluoride have the warning “Keep out of reach of children under 6 yrs. of age. If more than used for brushing is accidentally swallowed, get medical help or contact a Poison Control Center right away". A report from Poison Control Centers showed 21,513 calls in 2011 concerning fluoridated toothpaste ingestion (Clinical Toxicol 2012; 50: p.911)

In view of this warning, one wonders what adverse, accumulative, effects there may be on the general health of adult and elderly populations that might be exposed daily, or swallow even very small amounts of fluoride throughout their lives? Ingestion of excessive fluoride has been associated with an increased risk of permanent discoloration in developing teeth, and about ninety percent of toothpaste in the US is fluoridated (Environ Health Perspect 2005; 113: p.111). Furthermore, an increased risk of bone fracture due to excessive fluoride (Pediatrics 1986; 77: p.876) and a possible increased incidence of osteosarcoma (Cancer Causes and Control, 2006; 17: p. 421) have been reported.
Dentists in the US are seeing young children with as many as 10 cavities. The American Dental Association (ADA) recommends using only a pea-sized amount of fluoride toothpaste for brushing, beginning at 2 years of age. (JADA 2014; 145(2): p.190). However, unfortunately, it has been shown that 1-3 year old children ingest 30-75% of toothpaste (BMC Oral Health 2006; 6(Suppl 1):S9 p.1). It is difficult to train a two-year-old to spit out toothpaste, particularly if it tastes great.

The discoloration of teeth is only one aspect of the problems from fluoride. A recent report from China demonstrated an association between fluoride intake and significantly worse IQ scores for children (Fluoride 2003; 36: p.84). A review from Harvard university suggested further in-depth studies be undertaken on this aspect of fluoride (Lancet 2006; 368: p.2167). On the other hand, a more recent report from New Zealand disputes the finding of a relationship between fluoride exposure and IQ (Am J Public Health 2014; e1-e5. doi:10.2105/AJPH.2013.301857).

It appears that fluoride readily accumulates in the human pineal gland (a small gland present the brain), and a positive correlation between fluoride and calcium content in this gland has been shown (Caries Res 2001; 35: p.125). The pineal gland produces melatonin, a hormone related to setting the rhythms and duration of sleep. The degree of calcification has been associated with a decreased secretion of melatonin (Neuropsychopharm 1999; 21: p.765). Thus, this could result in the disturbance of circadian rhythms and sleep patterns (Psychiatry Res 1998; 82: p.187).

A possible relationship between fluoride intake and thyroid gland disease has been reported (Fluoride 2005; 38: p.98). There are many pros and con arguments as to fluoride’s cavity fighting benefits. In light of the evidence presented above concerning possible adverse effects, it is understandable that strong opposition has developed against daily fluoride use in consumer products.

**One clear benefit to Theodent toothpastes is that it is safe to swallow.** This non-toxic formula is an advantage for concerned parents. Theodent Kids toothpaste has the FDA’s highest clearance for food additives, which is the GRAS (Generally Regarded As Safe) status.
Theodent’s Effect On Hypersensitivity

As stated above, erosion of tooth surfaces can result from consumption of various soft drinks, fruit juices and wine. Hypersensitivity from this source is one of the problems often encountered by practicing dentists. It has been estimated that 15-57% of adults suffer from hypersensitivity (J Clin Dent 2009; 20: p.1), and the incidence appears to be increasing (US Pharm 2011; 36: p.12).

Theodent sponsored an 80 person clinical study (Clin Oral Invest 2014; DOI 10.1007/s00784-014-1226-1). The below electron microscope images show the results. The first picture shows an eroded tooth surface before brushing. Note the small tube openings exposed in the mouth. It has been found that the more open tubes exposed, the more pain one will feel with cold or hot drinks. One of the treatments for sensitivity is to occlude (close) these tubes. Results after brushing one week with a regular commercially available fluoride toothpaste (twice a day, morning and evening) is shown in the middle picture. Very little occlusion of the tubes can be seen and most remain open, indicating that the toothpaste is not effective in reducing sensitivity. The third picture shows the results after using Theodent in the same way as with the fluoride toothpaste. Here, all tubes are fully occluded. Those interested in greater detail can read the original article (Clin Oral Invest 2014; DOI 10. 1007/s00784-014-1226-1).

Whether Theodent is more effective than fluoride containing toothpastes to prevent dental caries is currently planned for future studies.

Theodent’s Mission

In science, absolute truth is difficult to come by. The introduction of Theodent became controversial as soon as the new technology was presented. However, we have every reason to believe that our results and expectations will stand up to any challenges in the future.

The philosophy of Theodent is to make superb products that will lead to consumer satisfaction and good oral health. By maintaining a healthy oral function, eventually it will lead to a healthy life style that can be maintained for years to come. If one considers
the potential adverse effects described by many scientists for fluoride, why take a chance?

We do not advertise our products, but people tell others when they are happy with them. This is how a revolution in oral care started in New Orleans.

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