

## **THE SMILE OF AN ULTRARUNNER**

### **What's all that Sugar Doing to our Teeth?**

**By Sunny Blende, M.S., Sports Nutritionist, RDH (Registered Dental Hygienist)**

“There should have been a class action suit over the early Power Bars. I remember running at Leadville where the temperature was cold and it caused the bar to harden and have the texture of trying to gnaw on a steel-belted radial tire. I think I may have the record for ‘time exposure (of a sugared sports bar) in the mouth’ – trying to warm it up enough to chew it over the next 20 miles.” So says John Demorest, a retired dentist from Palm Springs, who has been running well-known ultras for over twenty-five years while still saving his smile☺

Before my hands gave out and I started my second career in nutrition, I was a dental hygienist for a few decades. My interest in nutrition grew out of conversations with my patients on their health in general and teeth in particular. I have been a long-distance runner since my twenties and it didn't take me long to figure out that if I subtracted the “running” from my healthy lifestyle, my diet would be terribly high in sugar! As a runner, I needed the calories and the quick nutrition while training, but as a hygienist, I knew all this fermentable carbohydrates, especially outside of a balanced meal, could significantly increase my caries (cavity) and gum disease risk.

Since most ultrarunners are generally health-conscious individuals, open to health-improving suggestions, I decided to combine my knowledge from dual careers and share some information of the process of dental decay and gum disease while making some preventive suggestions, (along with the contributions of Dr. Demorest and my hygienist, Lorna Smith RDH), to this high-risk population.

### **The Problem**

The strenuous efforts that any endurance runner expends in training and in races can tax even the strongest athlete. Energy outlay must be compensated with an equal amount of energy intake (calories) consumed by the athlete for ongoing training to be possible. For this reason, the diet of the endurance athlete consists mostly of carbohydrates (the muscles preferred fuel). During a race, the athlete must consume even a greater amount of carbohydrates with even greater frequency – and often for 20-30 hours at a time. Dental professionals know that a diet high in carbohydrates provides more nutrient-content in the mouth for *Streptococcus mutans* (the primary cavity-causing bacteria) to flourish. Research states that the biofilm (the thin layer of microscopic organisms that covers the surface of a tooth) formed in the presence of sucrose presents a situation ripe for demineralization of enamel by *lowering concentrations of calcium, phosphorus, and fluoride*, and that frequent eating or drinking sugary foods and drinks provides an *abundant food supply* for the caries-causing bacteria on tooth surfaces.

Taking a look at the sports nutrition products and supplements that are available on the market, we can see a source of potential problems. The assortments of bars, gels, chews and sports drinks all contain large amounts of sugar. And since studies show that *carbohydrate residues ... are still present in the mouth even 1 hour after ingestion*, we can see that the cavity-causing bacteria in the mouth can be nearly constant due to the amount and

frequency of fermentable carbohydrates consumed during training and races.

Another risk factor is dental erosion through xerostomia (dry mouth). As an athlete trains and races, the rate of breathing increases along with the level of intensity of the exercise. With increased respiration, the mouth tends to become drier due to the large amounts of air passing through it. Less saliva flow, and thus a lower concentration of neutralizing enzymes, becomes a catalyst for demineralization. The acidity of sports drinks is also a contributing factor. The front teeth are the ones most exposed to sports drinks and most likely to become dehydrated, and are often the first ones to show erosion and/or become sensitive. NSAIDS (anti-inflammatories) are another contributing factor of dry mouth.

Another factor is the acid content of the food and especially liquids we wash past our teeth. Anything below 5.5 on the pH scale is seen by experts to be deleterious. And guess what...sports drinks are pretty much the worst. According to John, it is even recommended that we **not** brush our teeth right away after an exposure to an acid drink below 5.5 until we can rinse with water or buffer the acid with our own saliva as the enamel is soft during the acid-assault on the teeth. (This buffering can be sped up with the use of fluoride or MI Paste™, which we will talk about later in this article.) Gatorade has a pH of 3.3, cola-type soft drinks range from 2.4 to 3.1, Red Bull™ 3.3, Power Bar Performance™ 3.7, and even coffee has a pH of 4.0!

## **The Solution**

The least effective dental health strategy for ultrarunners is to forgo energy sources high in simple carbohydrates (meaning carbohydrates such as glucose, fructose and sucrose that are acidic, having a low pH). The better strategy is to use them, along with neutralization and remineralization. Neutralization occurs when the salivary buffer is restored, or the low-pH environment is counteracted with, surprisingly, water, or the stimulation of salivary flow via gum chewing. Remineralization comes in the form of "liquid calcium" – bio-available calcium found in a number of toothpastes or oral rinses.

### **Neutralization**

The many benefits of saliva include acid buffering, acting as a solvent for carbohydrates and also performing as a mouth lubricant. Stimulating saliva is one preventative measure we can take as ultrarunners. Studies with xylitol-containing chewing gum found it to inhibit *Streptococcus mutans* and also provided relief from dryness in 55% of the study subjects by increasing salivary output. Products such as these can be used between workouts and meals to attempt to generate remineralization, as well as *during* races to stimulate saliva flow. Sports drinks companies are starting to use xylitol for a sweetener. This can help prevent tooth problems, although it can cause stomach distress in some athletes. Carrying a bottle of water while racing and working out to rinse the mouth after consumption of gels, drinks and bars can help with neutralization as well as help relieve dry mouth.

## **Remineralization**

Chewy, sticky supplements stay in the mouth longer than liquid forms, but both can erode or etch tooth enamel, mostly by changing the pH in the mouth. The “pH clock” starts as soon as the food substance is ingested and stops when the last morsel clears the mouth, so demineralization can occur for long periods of time if food is continually consumed over many hours without brushing. In addition, some people are more prone to weaker (more porous) enamel than others. If demineralization has already occurred, the best option someone has is to try to return minerals to the molecular structure of the tooth itself in a process known as *remineralization*. The minerals come from ions dissolved in the saliva. Fluoride therapy is one method used to promote remineralization and there are a few new products on the market to aid in this procedure.

## **Ultra Dentist JOHN DEMOREST's Recommendations**

“As a general rule, the faster you can get whatever sugary concoction by your teeth and down the hatch, the better. Therefore, gummy, or chewy bar things that stick in between teeth, and/or roll around our mouths are probably more likely make the deleterious ‘bugs’ to our enamel and gums happier and cause more damage than the liquids that slip by quickly. However, the downside of the sugar liquids has the drawback that their exposure is usually constant over the entire run. It all boils down to the time exposure and the type of sugar on your teeth and that regard. Sucrose is the absolutely the most favored sugar by bacteria to eat. Other more simple sugars like fructose or glucose are not quite as damaging.”

So here are some of his ideas to lower the dental impact of our energy replacements:

1. “Have at least one water bottle with **just** water for swishing your mouth when you can remember. Although this may be impractical for each gulp or mastication of a solid sugar intake, rinsing once and awhile with just water is great idea.
2. On a long race over 50 miles, I liked to brush (and occasionally floss) my teeth at the half way point to get the most of the fuzzy crap off my teeth. Not only is it good dentally, it is oddly very refreshing.
3. Get the sugar past your teeth as quickly as you can. Don't let things slowly dissolve like my Leadville Power Bar.
4. Avoid bars or whatever else that is hard or becomes hard in cold weather.
5. The gummy things that sick between your teeth easily isn't great, but chose that over the hard candies or bars...just rinse with water after you chew it up.
6. Getting your teeth cleaned on a four month recall is a good idea (minimum of 6 months) and obviously brushing and flossing on a regular daily basis is more important to us runners than those eating a diet with less sugars.”

**From Sunny's Dental Hygienist, LORNA SMITH, RDH – Some Products and Procedures**

## **PRODUCTS**

### **Stimulation of Saliva – Remineralization**

- Chewing Gums with Xylitol - Xylitol causes bacteria to lose the ability to adhere to the tooth, stunting the cavity causing process, as well as stimulating saliva production. Results of recent studies also indicate that xylitol can induce remineralization of deeper layers of demineralized enamel. There are many xylitol-containing sugar-free gums on the market, both in health food stores and mainstream markets. (Spry™, Trident™, Epic™) Check the label for amount of time to chew, although *any* chewing will help with saliva production.
- Biotene® Products – Oral rinses, toothpaste, chewing gum that stimulates salivary flow, replaces natural salivary enzymes and helps prevent dry mouth.

### **Prevention of Demineralization – Remineralization**

- Fluorides – No matter what your position is on ingesting fluoridated water, many studies have proven the ability of fluoride to prevent decay when applied topically. This is an area you may want to embrace as an ultrarunner. The use of appropriate topical fluorides in fluoridated toothpastes and rinses, as well as professionally applied fluoride treatments by your dentist or dental hygienist, can both prevent demineralization and help with remineralizing if erosion has already occurred. Although many products are sold over-the-counter, prescription fluorides have a higher concentration and are more pro-active. They are not expensive and your dentist can prescribe an appropriate strength for you.
- ProNamel® (Glaxo) – Toothpaste that promotes remineralization through a low abrasion, neutral pH and also has potassium nitrate to reduce tooth sensitivity. It is sold over-the-counter
- MI Paste™ (Recaldent) – A paste that is smeared on the teeth and gums that promotes remineralization through its “CPP-ACP” (containing calcium and phosphate ions). This substance adheres easily to the soft tissues of the mouth, enamel and even dental plaque. When acid is produced in response to the break down of carbohydrates, this paste neutralizes the acid and releases calcium and phosphate required for remineralization to take place. (*A study was done in Australia where CPP-ACP was added to a sports drink, Powerade™, and compared with the drink with nothing added. The results showed that adding CPP-ACP “significantly reduced the beverage’s erosivity without affecting the product’s taste”.*) The paste also protects against tooth sensitivity and helps with dry mouth. (Can not be used with milk allergies and must be obtained from your dentist or online.)

## **PROCEDURES**

- **Pit and Fissure Sealants** - Pit and fissure sealants have been used successfully for many years to prevent caries. The sealants are resin-based materials that harden when cured either chemically or by light. Sealants also may contain fluoride that is released over time.

- **Proper Home Care** – Brushing well and flossing regularly are the best defense against decay.
- **Regular Dental Check-Ups** – Seeing your dentist and dental hygienist regularly to maintain a state of oral health is your best insurance at catching any potential problems while they can still be treated with minimal invasiveness and the best possible outcome.

## **Summary**

So, for your dental hygienist and your *ultra* teeth, add a toothbrush to your finish line drop bag. And now you have two things to do right after you finish your long training run or ultra race – don't miss your 30-Minute Window to refuel and be sure to brush and floss your teeth. And in the words of John Demorest, DDS, "Be true to your teeth or they will be false to you". 😊

<b>TYPE OF PRODUCT</b>	<b>GRAMS OF SUGAR (approx.)</b>
<i>Sports Drinks (Heed, Cytomax, GU Brew, Gatorade)</i>	<i>2 – 22 grams (Carb grams are similar, sugar grams are NOT)</i>
<i>Soda Drink (Pepsi, Coke, Mountain Dew)</i>	<i>30 - 39 grams</i>
<i>Gels and Chews (Hammer Gel, GU, Clif Shot, Sharkies, Chomps, Bloks, Power Bar Gel Blasts)</i>	<i>2 – 35 grams (Most are 2 – 12)</i>
<i>Sports Bars (LUNA, Clif, Met Rx, Power Bar)</i>	<i>12 – 25 grams</i>
<i>Liquid Diet Supplements (Boost, Ensure)</i>	<i>20 - 23 grams</i>
<i>Protein (Justin’s Nut Butters, LUNA Protein)</i>	<i>2 – 13 grams</i>
<i>Protein (Power Bar Bites, Clif Shot Roks)</i>	<i>16 – 26 grams</i>

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