

# Oral Health

## More Important Than You Think!

### Did You Know?

An astonishing one fourth of US adults over 65 are completely toothless.

- The Centers for Disease Control and Prevention

58% of Americans 50 and over have fewer than 21 teeth (out of the usual 32).

- The National Institute of Dental and Craniofacial Research

Periodontal disease is a major healthcare issue. An estimated 80% of Americans have some form of gum disease.

- The US Surgeon General

Studies suggest that people who have gum disease are at higher risk for heart attack and other systemic diseases.

- The Centers for Disease Control and Prevention

### Care for Your Teeth

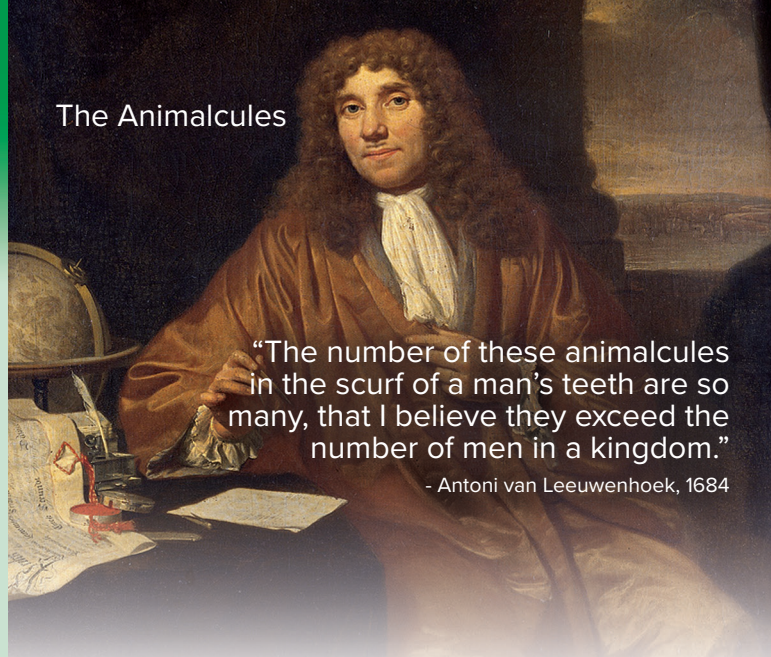
Start with a professional exam and cleaning. Follow through with good cleanings at home.

DioxiBrite Toothpaste with DioxiCare<sup>®</sup> makes the most of each brushing.



Look for this symbol to ensure you are getting the real power of **ACTIVE** Chlorine Dioxide!

### The Animalcules



"The number of these animalcules in the scurf of a man's teeth are so many, that I believe they exceed the number of men in a kingdom."

- Antoni van Leeuwenhoek, 1684

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(Peridex<sup>®</sup> - Zila, Inc., Hibiclens<sup>®</sup> - Mölnlycke Health Care, Crest<sup>®</sup> Pro-Health<sup>™</sup>- Procter & Gamble, Breath RX<sup>™</sup> - Discus Dental)



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# DioxiBrite<sup>™</sup>

## Toothpaste

with



### DioxiCare<sup>®</sup>

ACTIVE Chlorine Dioxide

### Unique Tooth Cleaner and Breath Freshener



With Fluoride

Fluoride Free

## The Way to Oral Health



# DioxiBrite™

## A New Level of Oral Hygiene

DioxiBrite™ contains DioxiCare® - the Active Chlorine Dioxide System

The only toothpaste with DioxiCare® –  
The Active Chlorine Dioxide System

### Why DioxiCare®?

DioxiCare® is Frontier's proprietary method of introducing chlorine dioxide into liquids and gels. This system maximizes antiseptic and oxidation properties<sup>1</sup> and is uniquely suited for oral use.

DioxiBrite™ Toothpaste incorporates DioxiCare® and other qualities never before found in a toothpaste:

- Removes Biofilm, Bacteria and Viruses
- Removes Bad Tastes & Odors (sulfur & non sulfur)
- Removes Stains, Whitens Teeth
- Prevents Cavities, Improves Enamel
- Helps Eliminate Plaque & Gingivitis
- Immediately Freshens Breath
- Soothes Irritations
- Helps Keep Toothbrush Clean & Germ-Free

### Why It Works?

Chlorine dioxide is a fast odor neutralizer, and not simply a masking agent. It removes off tastes and odors better than bleach or peroxide<sup>2</sup> --- at one time considered the standards of odor control. Chlorine dioxide is also one of the fastest deactivators of bacteria, viruses, yeast and spores. The practical result: **less germs, less odor.**

Chlorine dioxide is a small molecule, soluble in water, lipids, and saliva; as such, the compound easily penetrates small spaces. When brushing with DioxiBrite™, chlorine dioxide is immediately released, penetrating between teeth and under the gums, leaving mouth cleansed and invigorated. The fresh berry mint flavor is noticeable long after.

### Why Two Parts?

DioxiCare® is a two-part system which releases chlorine dioxide when the parts are mixed. A dual dispenser neatly places both parts onto the toothbrush which then mix while brushing. Once activated, chlorine dioxide dissipates in a short time. DioxiCare®'s inventive 2-part system enables the user to produce chlorine dioxide on demand, assuring freshness of the preparation.

### The Biofilm Connection

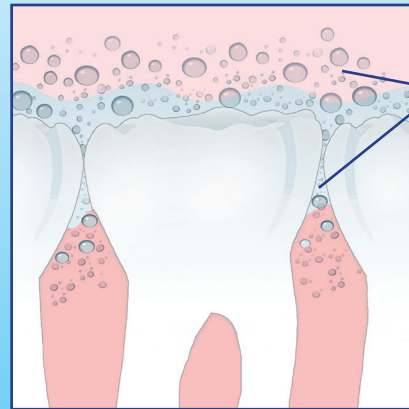
Let's talk about "biofilm" --- and what's bad about it.

Biofilm is a sticky organic coating that naturally forms in the mouth. The coating always recurs after removal by tooth brushing or a dental procedure. The same kind of film is common in many water systems, and often develops, for example, on rocks in a fast moving stream, making the rocks slippery. Understanding

### HOW DOES IT WORK?

#### It's a gas!

- ✓ While brushing, 2 parts mix to form chlorine dioxide (ClO<sub>2</sub>)
- ✓ Because it is a small molecule as well as a gas, ClO<sub>2</sub> penetrates sockets and spaces between teeth
- ✓ ClO<sub>2</sub> begins immediately to neutralize odors and bacteria, oxidize stains and whiten teeth



As you brush, ClO<sub>2</sub> gas permeates throughout the mouth. Bad breath and germs are eliminated in hard to reach places.

that biofilm is packed with bacteria is important in the fight against gum disease. Plaque, tartar, and the coating in back of the tongue, are biofilms --- harboring 500 different kinds of microorganisms, and odor too. Orthodontic appliances and removable dentures are also coated with bacteria, further increasing the risk of gum disease and odor.

Gingivitis, the most common form of gum disease, is caused by the body's response to bacteria. Our immune system actually attacks the gum tissue, producing the familiar redness and swelling. As plaque thickens on the teeth and gums, bacteria and their toxic by-products are constantly discharged in the area, initiating gingival inflammation. Between gums and teeth there is an enormous load of bacteria, higher than the concentration in an infected wound, and much higher than normally used for laboratory testing. It may be predictable that in our population, gum infection and bad oral odors are ubiquitous.

The most serious form of gum disease, periodontitis, causes tooth and bone loss, and often constant pain. Further, research now strongly implicates systemic disease and general health as being affected by the health of the gums.

### Common Antiseptics --- Questionable?

Disinfection is hundreds of times more difficult when microbes are encased in a tough coating such as plaque<sup>3</sup>. The oral antiseptic, chlorhexidine (Peridex®, Hibiclens®), often prescribed by dentists for infection, is ineffective for treating or removing biofilm in the mouth<sup>4,5</sup>, and in fact, increases tartar buildup on the teeth<sup>6,7</sup>. Cetylpyridinium chloride (Crest Pro-Health®, Breath RX®), another common antiseptic, prevents plaque from forming if used ahead of time, but had no effect on plaque when the film is already established<sup>8,9</sup>. A third disinfectant, Triclosan (Colgate Total®), found in toothpaste, mouthwash and soap, likewise provides little or no removal of biofilm<sup>10,11</sup>.

Chlorhexidine, for 30 years considered the best available mouth antiseptic, has poor efficacy against many gram negative bacteria, and has little or no effect on yeast, viruses or spores. Also of interest, although all common oral antiseptics reduce odor by killing mouth bacteria, none will additionally remove the *existing* odor already produced by bacteria. Most odors must be neutralized by an oxidizing agent. DioxiBrite™ Toothpaste **both deactivates and oxidizes.**

### DioxiBrite™ Does It With Ease

Chlorine dioxide removes biofilm by penetrating the polysaccharide outer coating that bacteria produce for attachment to surfaces.<sup>2</sup> Most other disinfectants can't do this. An ADA report showed 100% removal of bacteria using a DioxiCare® solution to clear dental waterlines.<sup>12</sup> A double blind clinical study confirmed that DioxiBrite™ Toothpaste was significantly better than Colgate's Total in removing plaque<sup>13</sup>. Further, independent labs found DioxiBrite™ killed all mouth bacteria tested in one minute. One such study was presented at the American Society of Microbiology Annual Meeting<sup>14</sup>.

Biofilm is likely lining our throat and sinuses too, and the oral cavity is susceptible to the unique cleaning action of chlorine dioxide<sup>15</sup>. Before availability of DioxiBrite™ Toothpaste, and companion, DioxiRinse™ Mouthwash, there were no oral treatments ideal for ever present biofilms and the infections they harbor. Neither systemic or local delivery of antimicrobial agents, nor our own immune response, are effective against biofilm. They merely kill off the sensitive free floating bacteria<sup>3</sup>

All of us suffer from gum disease and bad mouth odor at some point. Given the completeness of germ kill, especially on gram negative bacteria, routine use of DioxiBrite™ Toothpaste can minimize both.

We focus so much attention on our physical health by exercising and going to the gym. Of equal importance is maintaining oral health. DioxiBrite™ Toothpaste and DioxiRinse™ Mouthwash should be part of your oral workout.