

Plaque Biofilm Disruption

in vitro study

Effect of the Sonicare FlexCare power toothbrush on fluoride delivery through *Streptococcus mutans* biofilms

Stoodley P, Nguyen D, Longwell M, Nistico L, von Ohle Ch, Milanovich N, de Jager M. Effect of the Sonicare FlexCare power toothbrush on fluoride delivery through *Streptococcus mutans* biofilms. *Compend Contin Educ Dent*. 2007;28 (suppl 1):15-22

Objective	Evaluate the ability of two power toothbrushes, the Sonicare FlexCare and the Oral-B Triumph®, to enhance the diffusion of fluoride through a biofilm by fluid dynamic action in vitro.
Methodology	Fluoride diffusion was established by an experimental system that measured the rate of fluoride diffusion through a membrane colonized with a <i>Streptococcus mutans</i> biofilm. In a fluid-filled container, the biofilm colonized membrane was contained in a water tight partition that separated the “brushing” chamber from the “measurement” chamber. Brushes were positioned perpendicular to the biofilm at 10 mm distance, then fluoride (1100 ppm NaF) was added to the brushing chamber and the brush activated to enhance fluoride penetration to the measurement chamber through fluid dynamic activity. Penetration of fluoride through the biofilm and membrane was measured with a fluoride electrode over a four minute period, and expressed as the “mass transfer coefficient.”
Results	The mass transfer coefficient (a measure of the rate of delivery of fluoride through the biofilm-colonized membrane) of fluoride generated by powered brushing was significantly greater ($p < 0.05$) than that from passive diffusion alone (no brushing): Sonicare FlexCare increased diffusion by 129% over no brushing. Sonicare FlexCare resulted in a significantly greater ($p < 0.05$) mass transfer coefficient than the Oral-B Triumph by 29%.
Conclusion	This study demonstrated that the fluid dynamic action of Sonicare FlexCare enhances the penetration of fluoride through biofilm which may, in turn, help increase the bioavailability of fluoride in residual dental plaque.

