

Sequential Material Deposition for Remineralization and Desensitization of Teeth

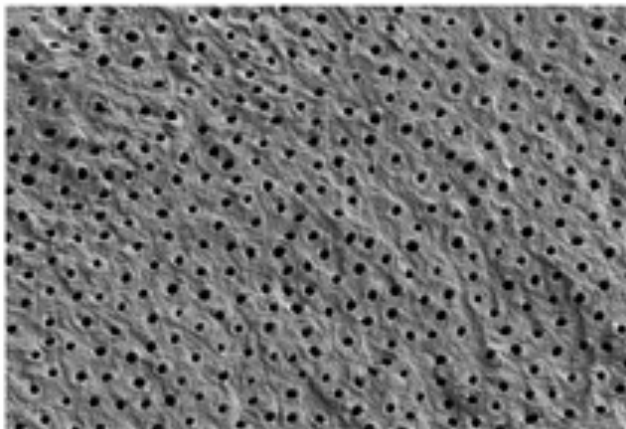
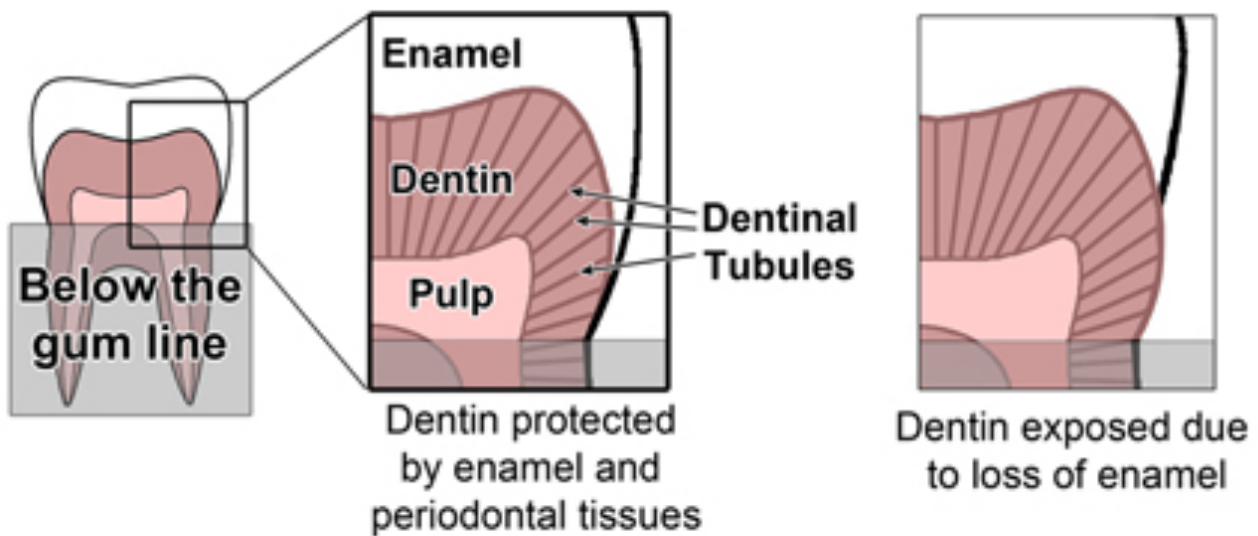
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Technology description

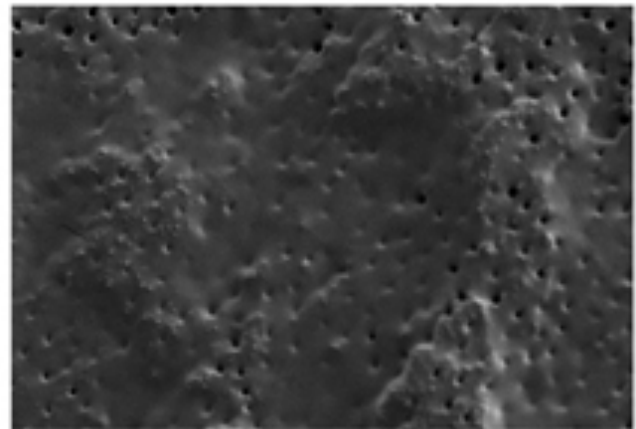
Demineralization of the teeth leads to hypersensitivity and dental caries, both significant public health concerns. This phenomenon is primarily caused by acids present in the mouth through the intake of acidic foods or beverages, the production of acids by bacteria present in the mouth, or the regurgitation of stomach acids. Demineralization exposes the dentinal tubules allowing access to dental nerves. It also weakens the hard surfaces of the teeth, increasing the incidence of dental caries. To combat this problem, Drs. Sereda and Brower have developed a technique that decreases dental sensitivity and builds a scaffold for further remineralization. This technology differs from what is presently available on the market because it results in a long-term solution rather than a temporary desensitization.

All existing dentifrices are based on the simultaneous application of active components to the tooth surface. The active components are often either non-natural materials (silica-based), or require the presence of parabene preservatives, unnecessarily exposing the consumer to potentially harmful chemicals. This innovation makes use of two sequentially applied components acting in a synergistic fashion and uses chemical and physical interactions to result in layer-by-layer deposition of components. This leads to a prolonged occlusion of the tubules that relieves sensitivity and serves as a scaffold for remineralization.

The non-toxic components can be supplied in foods, dentures, retainers, or mouth guards in addition to the classic dentifrices and mouthwashes commonly used for maintenance of dental hygiene. Since the deposited materials can be imparted with additional properties, the proposed technique is a significant improvement versus existing materials. In addition, the capability of multilayer films to deliver functional materials to the tooth surface in a time-controlled fashion is especially critical for the periods between meals when the natural saliva (stationary saliva) flow is lower, less alkaline, and minimally protective. The sequentially applied components can be supplied by different dentifrices (for example, one from a mouthwash and the second from a toothpaste), or by different domains of the same dentifrice (for example, different layers of a multilayered chewing gum, or microcapsules embedded in a chewing gum). The components are separated in the product or products before use but come into contact and act together in the process of product application.



Exposed dentinal tubules treated with a leading sensitivity toothpaste following sonication challenge



Exposed dentinal tubules treated with USD's new desensitization technology following sonication challenge

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