

Rawa Alammari -Research agenda statement

In a national survey by the American Dental Association, the smile ranked the highest on a list of the most attractive physical features [1]. Tooth whitening is a commonly utilized procedure to improve a smile because it is conservative, cost effective, and often achieves successful results [2]. Today, tooth whitening is an 11-billion-dollar industry with products ranging from those that are prescribed by the dentist to kits that you can buy at the drug store [3]. All these products work the same way, they use hydrogen peroxide that breaks down the stain molecules, so that the tooth would appear lighter [4]. However, some studies demonstrated that some tooth whitening products can lead to negative surface changes of the tooth, which may weaken the tooth and make it more prone to cracks, wear and dental caries [5]. Erosive like lesions have been observed after the use of some whitening agents [6]. These changes can negatively affect the physical and mechanical properties of dental hard tissues [5]. With the rising concern of over use of tooth whitening products, it is important to find ways to minimize any potential side effects with a procedure that we as dentists recommend so often [4]. There is a need to understand the effect of tooth whitening agents on dental hard tissues, and to find possible preventive and/or treatment modalities to potential adverse effects, in order to ensure longevity and integrity of dental hard tissues [7, 8].

My research focuses on the effects of different formulations of tooth whitening products on the integrity of dental hard tissues such as enamel and dentin. Our research team evaluated the effect of multiple tooth whitening products on tooth surface using a specialized microscope that can quantify minerals. We confirmed that some tooth whitening products can lead to demineralization of the tooth. This is a process by which calcium and phosphate dissolve. These minerals are considered the main building blocks of the tooth. The use of topical remineralizing agents such as Sodium fluoride (NaF), and Casein phosphopeptide-amorphous calcium phosphate (ACP) [9,10] has been suggested to overcome some of these effects. Fluoride binds to the minerals of the tooth making them less susceptible to dissolution [11]. The Casein phosphopeptide-amorphous calcium phosphate paste provides a reservoir of minerals to compensate for those lost [12].

To date there is no established protocol for the use of these remineralizing agents with the tooth whitening procedure. My current focus is to compare the preventive effect of Fluoride and calcium phosphate paste to reduce demineralization when used in conjunction with different tooth whitening products. In addition, we want to compare different application times and protocols to determine which of these will provide the most protection. This understanding will help set the foundation for updating standards and clinical guidelines for using preventative treatments in conjunction with tooth whitening to reduce the adverse effects so that our patients can safely utilize such a cost-effective cosmetic procedure.

We want to determine the best protective protocol, which can be used not only for tooth whitening-potentially-induced erosion, but can also be utilized for the treatment and prevention of dental erosion in general. Based on results from our preliminary studies, we expect that the tooth whitening without remineralizing agents will show a degree of enamel and dentin surface loss. We also expect that the remineralizing agents will reduce the potential surface loss. We anticipate seeing a difference in the effect of the two remineralizing agents.

Results from our research will verify the potential effects of tooth whitening agents on enamel. In addition, we will have a better understanding of the possible difference in the effect of NaF and ACP. Furthermore, the results will provide more knowledge about how the application protocol influences the effects of the remineralization agents. In other words, what application protocol would provide the most protection against potential erosion. This can lead to establishing a simple and cost-effective protective protocol the utilizes remineralizing agents in conjunction with the tooth whitening procedure. Additionally, this research can help provide a blueprint for future studies that can confirm the findings, and evaluate the effect of different whitening and remineralizing agents. Furthermore, this model can be used to investigate the same variables when tooth whitening is overused, which is a rising concern in the field due to the increasing availability of these products for consumers without the dentist supervision.

References:

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