



A BRIEF BACKGROUND ON TOOTH WHITENING

Tooth whitening is not a new concept in dentistry. In fact, the incidence of tooth bleaching has been well documented for over a century. In 1947, Ames introduced a technique for treating mottled enamel using hydrogen peroxide. In 1989, Heywood and Hyman published the first clinical study of tooth whitening using carbamide peroxide and vacuum-formed custom trays to aid in application. Since its introduction in 1989, the use of carbamide peroxide containing bleaching gels for doctors administered at-home use, has become increasingly popular, particularly due to convenience of application, efficiency, and fast, effective results. The benefits of tooth whitening are also well established. Tooth whitening has been known to contribute to an increase in patient self-esteem in addition to other positive aesthetic effects. Dentists have also reported that getting patients involved with at home bleaching has stimulated other therapeutic procedures previously on hold, including anterior restorations, orthodontics and the replacement of missing teeth.

The Stark White professional bleaching gel is a dentist-controlled tooth whitening system containing carbamide peroxide as an active ingredient to penetrate the enamel and dentin to oxidize the stains within the tooth. In addition, Stark White contains potassium nitrate and fluoride to prevent sensitivity, calcium for remineralization of tooth structure, and a mint flavoring to promote patient comfort.

THE ACTIVE BLEACHING AGENT

As an oxidizing element, carbamide peroxide reacts with moisture yielding free peroxide radicals or nascent oxygen to change the color of the enamel and dentin, thus producing the whitening effect. Carbamide peroxide, the active bleaching element, is found in Stark White bleaching gel at 16 and 22 percent concentrations.

Kihn and colleagues (2000) clinically evaluated 10 percent versus 15 percent carbamide peroxide concentration tooth whitening agents. Results showed that higher concentrations of carbamide peroxide do lighten teeth more significantly than lower concentrations over the recommended period of use, providing patients with results more quickly than with the 10 percent agent. The investigators found no significant difference in average tooth sensitivity between the groups treated with 10 percent carbamide peroxide and the group treated with 15 percent carbamide peroxide. The clinically relevant findings suggest that at home whitening is an effective treatment whether 10 percent or 15 percent carbamide peroxide containing bleaching gel is used.

Combating Sensitivity = Potassium Nitrate and Fluoride

The issue of sensitivity associated with tooth bleaching, particularly at-home bleaching, is well known among those in the dental community. A mechanism for sensitivity can be attributed to penetration of hydrogen peroxide into the pulp chamber of the tooth [Tam + refs]. Risk factors may include the patient's inherent sensitivity, the pH of the whitening solution, concentration of the active bleaching agent (i.e. carbamide peroxide) and the excessive frequency of application of the bleaching product [Tam + refs]. It is hypothesized that by reducing the concentration of the bleaching agent or the duration of application, tooth sensitivity would decrease as a result. However, it is suspected that reduction of these elements may also lead to a reduction in the effectiveness in the tooth whitening as well [Tam + refs]. Therefore, the introduction of desensitizing elements such as potassium nitrate and fluoride may aid in the reduction of tooth sensitivity.

Potassium nitrate, often found in toothpaste, is a soluble salt used for reducing tactile and thermal sensitivity and is typically used in conjunction with fluoride. Potassium nitrate works by preventing nerve repolarization after initial depolarization and hence reduces pulpal or dentinal sensory nerve activity [Tam + refs]. Sodium fluoride is an anticarcinogenic, desensitizing agent that is commonly found in mouthwashes. Fluoride works via the mechanism of occlusion of dentinal tubules by fluoride precipitates [Tam + refs].

Microhardening was evaluated. The results show that the bleached and unfluoridated specimens had a significantly higher loss of hardness compared to the fluoridated specimens. The investigators concluded that fluoride aids in the remineralization of enamel.

Similarly, in a study by Tam [2001], the effects of fluoride and potassium nitrate in association with carbamide peroxide bleaching was assessed. Seventeen maxillary and four mandibular arches were treated with 10% carbamide peroxide gel containing both potassium nitrate and fluoride. The clinically relevant results indicate that the 10% carbamide peroxide including potassium nitrate and fluoride produced less tooth sensitivity as reported by patients than the control bleaching gel. In addition, the investigators concluded that there was no difference in the degree of perceived whitening between the bleaching gel with the potassium nitrate and fluoride and that without.

Therefore, the addition of the potassium nitrate and fluoride does not compromise the efficacy of the carbamide peroxide agent, but rather provides an effective way to significantly reduce tooth sensitivity and thus contributes to improved patient compliance and comfort during treatment. It is also noted that the increase in the concentration of carbamide peroxide did not add to sensitivity as long as the duration of wear time is reduced.

Attin and colleagues [1977] studied the effect of fluoride treatment on the remineralization of bleached enamel. Sixty bovine enamel specimens were subjected to treatment with a bleaching agent followed by remineralization in artificial saliva. Half of the specimens were treated with either a fluoride varnish or were submerged in a fluoride solution prior to remineralization. The other specimens were not treated with fluoride and the control group was stored in distilled water instead of bleaching agent.

Aloe Vera

Used both internally and externally since 400 B.C., aloe vera gel, extracted from the aloe vera plant, is a healing herb commonly used for burned or irritated tissues. Aloe vera functions as an anti-inflammatory, relieving burning, irritation and inflammation; as a tissue moisturizer and as a tissue anesthetic [Hayes].

Because of these healing capabilities, aloe vera is highly beneficial in dentistry. The aloe can be effective in reducing discomfort, pain, swelling, inflammation and bleeding associated with certain dental procedures, including operative procedures, to facilitate a faster healing response.

Hayes (1999) discussed the beneficial effects of aloe vera treatment in a case study of a patient diagnosed with Lichen Planus. Lichen Planus is a disease that is brought about by emotional distress and that caused lace-like lesions in the oral cavity and on the skin. The patient was successfully treated with a regimen of aloe vera. In this case, the aloe was ingested in a liquid form and was also applied to the oral lesions. The aloe relieved the burning and itching sensations and also caused the striations and lesions of the mouth and hands to dissipate.

The inclusion of aloe vera is unique to the Stark White Bleaching Gel. The benefits are numerous and include helping to prevent the occurrence of sensitivity.

References:

1. Kihn, P.W., et al. A clinical evaluation of 10 percent vs. 15 percent carbamide peroxide tooth-whitening agents. JADA 2000; 131:1478-84.
2. Ames, J. W., Removing stains from mottled enamel. JADA and Dent Cosmos 1937; 24: 1674-7

3. Haywood, V. B. and Heymann, H. O., Night guard vital bleaching. Quintessence Int. 1989; 20: 173-6
4. Christensen, G. J., to bleach or not to bleach. JADA 1991; 122: 64-65
5. Tam, L. Effect of potassium nitrate and fluoride on carbamide peroxide bleaching. Esthetic Dentistry 2001; 32: 766-70
6. Hayes, S. M., Lichen Planus- Report of successful treatment with aloe vera. General Dentistry 1999; 47 (3) 268-72

Tru-Tain Orthodontic and Dental Supplies

Toll Free 1-800-843-0904

Fax 1-507-288-9385

[www. tru-tain.com](http://www.tru-tain.com)