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**File: ■ Aloe Vera (*Aloe vera*, Xanthorrhoeaceae)**

■ Chlorine Dioxide

■ Gingivitis

■ Plaque Formation

**HC 041621-544**

**Date: May 13, 2016**

**RE: Aloe Vera and Chlorine Dioxide Mouth Rinses Reduce Plaque and Gingivitis in Patients with Fixed Orthodontics**

Yeturu SK, Acharya S, Urala AS, Pentapati KC. Effect of aloe vera, chlorine dioxide, and chlorhexidine mouth rinses on plaque and gingivitis: a randomized controlled trial. *J Oral Biol Craniofac Res.* January-April 2016;6(1):54-58.

Dental plaque formation is caused by the presence of bacterial colonies on the teeth and can lead to gingivitis, periodontal disease, and dental caries. Bacteria and plaque can be removed with both mechanical (brushing, flossing, and dental instruments) and chemical (mouthwash) means. However, mechanical cleaning can be particularly difficult in patients with fixed orthodontic hardware and some mouth rinses, while effective, have unwanted side effects, including allergic reactions, mouth lesions, and a disturbance in the sensation of taste. Aloe vera (*Aloe vera*, Xanthorrhoeaceae) and chlorine dioxide mouth rinses may provide better alternatives to conventional mouth rinses. The mucilaginous gel within the aloe vera leaf has been shown to have antibacterial, antioxidant, and anti-inflammatory properties. Chlorine dioxide is an antibacterial agent and is often used to disinfect the mouth during dental procedures and to treat halitosis and gingivitis. The goal of this randomized, controlled, single-blind study was to measure the efficacy of aloe vera and chlorine dioxide mouth rinses in reducing plaque and gingivitis in dental patients with fixed orthodontic hardware.

The study was conducted at the Department of Orthodontics, Manipal College of Dental Sciences, Manipal University in Manipal, Karnataka, India. Patients were included if they were > 18 years old, had visible plaque and gingivitis associated with > 30% of the teeth examined, and had fixed orthodontics for more than 3 months. Patients were excluded from the study if they had multiple dental restorations or gross dental caries, had used antibiotics during the last 2 weeks, were tobacco (*Nicotiana* spp., Solanaceae) users, regularly used mouth rinses or antimicrobials, or had removable dental appliances. The extent of plaque and gingivitis was measured with the Silness and Löe Plaque Index and Gingival Index before and after the treatment. Ninety patients were randomly divided into 3 treatment groups—an aloe vera group, a chlorine dioxide group, and a chlorhexidine group. Chlorhexidine was used as the positive control. The sources of the mouth rinses

were not provided. Patients were instructed to rinse with 10 ml of mouthwash for 1 minute 2 times per day for a total of 15 days. Data were analyzed with paired t-tests and analysis of variance with post hoc Dunnett's tests.

Five patients were lost from the chlorhexidine group due to non-compliance with the protocol. Plaque and gingivitis were significantly reduced in all of the treatment groups ( $P < 0.001$  for all). There was a significant treatment effect on plaque and gingivitis reduction ( $P = 0.03$  and  $0.04$ , respectively). The percent mean reduction of plaque for aloe vera, chlorine dioxide, and chlorhexidine was 20.38, 30.29, and 31.59, respectively; a similar trend was seen in percent mean reduction of gingivitis of 9.88, 12.22, and 16.30, respectively.

Aloe vera and chlorine dioxide mouth rinses both significantly reduced plaque and gingivitis in dental patients with fixed orthodontics. Chlorine dioxide was nearly as effective as chlorhexidine in reducing plaque and gingivitis. Aloe vera was not as effective as chlorhexidine or chlorine dioxide in reducing plaque and gingivitis, but still resulted in a significant decrease in these measures. The study may have been limited by the small sample size. In addition, the concentrations and sources of the mouth rinses were not given, making it difficult to understand the phytochemical composition of the aloe vera used and to compare these results with results from similar studies.

—*Cheryl McCutchan, PhD*

The American Botanical Council has chosen not to include the original article.

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