



# HerbClip™

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**File: ■ Aloe Vera (*Aloe vera*, Xanthorrhoeaceae)  
■ Propolis  
■ Dental Cavities**

**HC 051522-531**

**Date: October 30, 2015**

**RE: Disinfection of Dental Cavities with Aloe Vera or Propolis Extract Significantly Reduces the Number of Bacteria within the Cavities**

Prabhakar AR, Karuna YM, Yavagal C, Deepak BM. Cavity disinfection in minimally invasive dentistry - comparative evaluation of *Aloe vera* and propolis: a randomized clinical trial. *Contemp Clin Dent*. March 2015;6(Suppl 1):S24-S31.

Atraumatic restorative treatment (ART) in dentistry is becoming an increasingly popular treatment regime in developing countries, for children and for dental patients with extreme fear of the dentist. ART uses the least invasive techniques for treatment, including hand tools to remove demineralized portions of the tooth. If the demineralized material is not completely removed or the cavity is not properly disinfected, formation of a secondary cavity can occur. Chlorhexidine is commonly used to disinfect dental caries, but there is evidence that chlorhexidine can weaken tooth structure. Several natural disinfectants have been proposed for ART and include aloe vera (*Aloe vera*, Xanthorrhoeaceae) and propolis, a resinous compound collected by honeybees (*Apis mellifera*). Both have been found to have antimicrobial properties. The goal of this open, controlled, randomized, split-mouth study was to measure the antimicrobial properties of aloe vera and propolis in adolescent patients.

Ten patients between the ages of 5 and 12 years old were recruited from the Department of Pedodontics and Preventive Dentistry, Bapuji Dental College and Hospital in Davangere, Karnataka, India. Patients were included if they had dental caries in a minimum of 3 teeth. Patients were excluded if there was pulpal involvement, pain or swelling, 1 or more teeth had abscesses, or the patient had a systemic illness. Patients received ART on each cavity and then cavities were treated with distilled water, aloe vera extract, or propolis extract for 60 seconds. The aloe vera extract was prepared from the mucilage produced in the leaves. The mucilage was dried, extracted with ethanol, filtered, and then dried to produce the extract. Propolis was extracted with ethanol, filtered, and dried to produce a sticky, brown substance. Three samples, which included a sample of the demineralized tooth (baseline), a sample after ART, and a sample after disinfection, were extracted from each cavity and measured for the total count of bacteria-forming colonies. Data were analyzed with repeated measures analysis of variance.

There was a significant reduction in bacteria-forming colonies after removal of demineralized tooth material and after disinfection in all treatments when compared to baseline ( $P < 0.001$ ). The bacterial count decreased from  $128.20 \pm 47.35$  at baseline to  $47.20 \pm 26.61$  after

disinfection in the distilled water treatment, from  $142.50 \pm 82.23$  to  $3.90 \pm 5.60$  in the aloe vera treatment, and from  $131.90 \pm 51.73$  to  $4.50 \pm 5.23$  in the propolis treatment. The final bacterial counts were significantly lower in the cavities treated with aloe vera or propolis than in the cavities treated with distilled water ( $P < 0.01$ ).

Treatment of cavities with ART significantly reduced the number of bacteria within the cavities, but large numbers of bacteria were still found within the cavities. Additional treatment with aloe vera extract or propolis extract significantly reduced the bacterial count within the cavities when compared to distilled water. Aloe vera and propolis were nearly equivalent in their ability to reduce bacterial infection within the cavities. Both aloe vera and propolis have been found to have antimicrobial characteristics. Aloe vera contains a wide range of anthraquinones that have been shown to be both antibacterial and antiviral. Propolis contains flavonoids, cinnamic acid, and other compounds that have been shown to inhibit bacterial growth. This study was limited by the small sample size.

—Cheryl McCutchan, PhD

**Peer Reviewer Comments:**

The review does not address the supposition that the aloe vera extract is not likely to contain constituents found only in the latex.

Note the procedure used to prepare the extract:

"The leaves of the plant were washed with distilled water, cut opened, and fresh pulp was collected. The gel was dried in an oven at  $800^{\circ}\text{C}$  for 48 h and then powdered. An ethanolic extract was obtained by dissolving 20 g of the powder in 200 ml of ethanol. The contents were then filtered using Whatman<sup>®</sup> filter paper no. 1, and the filtrate was evaporated for dryness."

The paragraph on the mechanism of action states that "aloin and aloe emodin are the major anthraquinones [*sic*] in aloe plants ... ." and implies that these constituents are in the extract. However, they are contained in the discarded rind and are not found in the pulp/gel. So, either other constituents are responsible for the activity or the pulp/gel was contaminated with latex during processing. Since no chemical analysis is presented, the actual case cannot be determined. At least an actual extract was made, an extract of the inner leaf pulp/gel that should be free of those constituents.

Although the herbal preparation is described, which should not be unusual but often is, their supposition of active materials is theoretically incorrect. Authors and reviewers need to address the requirements for describing botanical materials used in clinical studies, such as the herbal Consolidated Standards of Reporting Trials (CONSORT) (<http://www.ncbi.nlm.nih.gov/pubmed/21208777>) or the National Center for Complementary and Integrative Health (NCCIH) policy on natural product integrity (<https://nccih.nih.gov/research/policies/naturalproduct.htm>).

Referenced article can be accessed at <http://www.contempclindent.org/article.asp?issn=0976-237X;year=2015;volume=6;issue=5;spage=24;epage=31;aualast=Prabhakar>.

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