

Cleaning and Antimicrobial Efficacy of Evacuation Line Solutions

Purpose: To investigate the cleaning capabilities of several enzymatic evacuation system cleaners in a clinical practice.

Methods and Materials:

Used evacuation lines were collected from 4 dental operatories in a busy practice and replaced with 4 new evacuation lines. The lumens of the used evacuation lines were exposed, photographed, and then tested for bacterial contamination. Each of the 4 new lines installed were assigned an experimental evacuation line preparation: a) Line 1 - *Microvac* (*Germiphene*); b) Line 2 - *Gobble* (*Germiphene*); c) Line 3 - *Leading Competitor A*; and d) Line 4 - *Leading Competitor B*. Active agents for each product are shown in Table 1. Clinical personnel were instructed to clean each line every workday for a 2-month period as per manufacturer's instructions. Visual and bacterial analysis of attached debris was performed at 1 and 2 months of the study.

Table 1. Active Cleaning Agents in Experimental Evacuation Line Products.

Product Name	Active Cleaning Agent(s)
Microvac	Multiple proteolytic enzymes
Gobble	Enzyme-eating bacteria
Leading Competitor A	Dual quaternary ammonium, ethanol, EDTA, sodium metasilicate
Leading Competitor B	Phosphoric acid, glycolic acid, isopropanol, surfactant

Results

Used evacuation lines that were replaced at the beginning of the study were found to contain large amounts of attached debris within the lumens of each sample (Figure 1). After 1 month of treatment with test cleaners, all line specimens showed small amounts of debris, with only minor differences noted. The most notable finding was observed with the evacuation line treated with *Microvac* (Line 1) (Figure 2). This line also continued to show lower debris levels after 2 months of treatment compared to observations of the other 3 test lines (Figure 3). All evacuation lines contained moderate presence of viable bacteria, however microbial colonization could not be quantified due to clumping of organic and inorganic debris on surfaces.

Figure 1a-d. Evacuation lines prior to the start of treatment: a) Line 1; b) Line 2; c) Line 3; and d) Line 4.

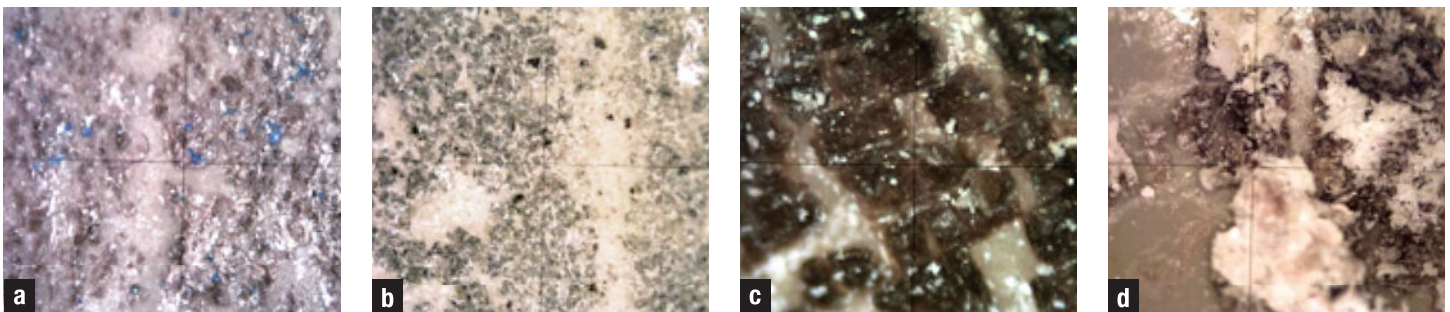


Figure 2a-d. New evacuation lines after 1 month of treatment: a) *Microvac* (1); b) *Gobble* (2); c) *Leading Competitor A* (3); and d) *Leading Competitor B* (4).

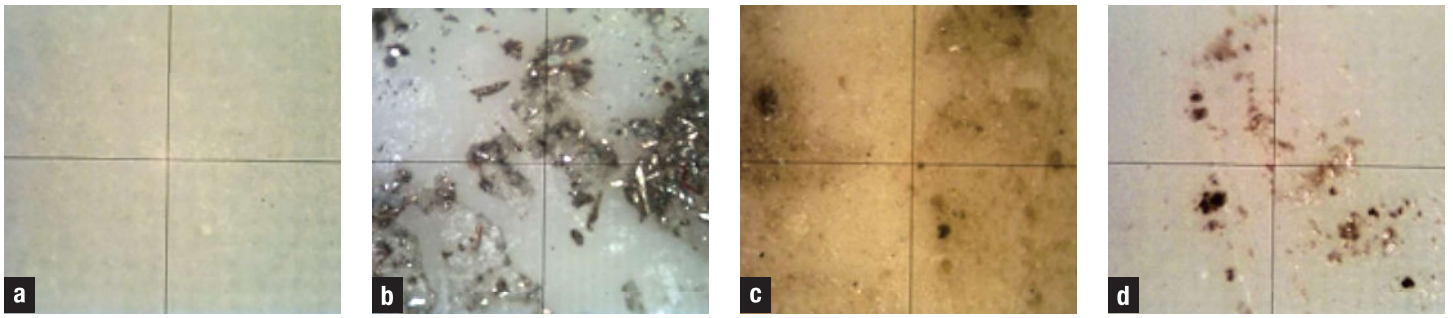
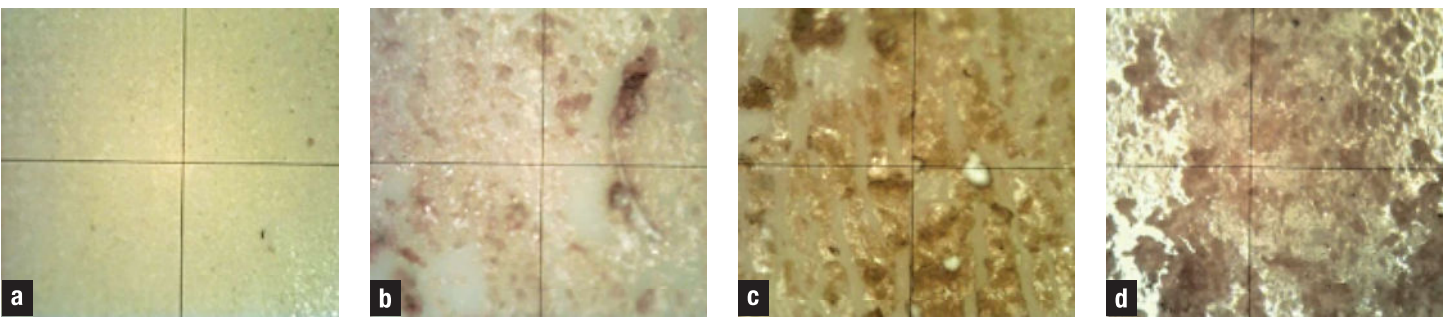


Figure 3a-d. New evacuation lines after 2 months of treatment: a) *Microvac* (1); b) *Gobble* (2); c) *Leading Competitor A* (3); and d) *Leading Competitor B* (4).



Summary

In this study new evacuation lines were installed and then treated using multiple cleaners for a period of 2 months. At the end of the investigation, each of the 4 cleaning products were shown to maintain clean and unobstructed lines. However, observation of the evacuation line treated with *Microvac* stood out, as little to no accumulated debris was detected on inner tubing walls when samples were processed.

Acknowledgment: This study was funded in part by Germiphene.