

Clinical Literature Review

<p>Title</p>	<p>Evaluation of detergents and contact time on biofilm removal from flexible endoscopes</p>
<p>Authors</p>	<p>Wei Ren MD, Xiaoyan Sheng MD, Xi Huang MD, Fachao Zhi PhD, Wenzhi Cai PhD</p>
<p>Journal</p>	<p>AJIC – American Journal of Infection Control (September 2013)</p>
<p>Article Abstract</p>	<p>Background: The formation of endoscopic biofilm reduces the results of cleaning and disinfection and may increase nosocomial infection. This study aims to evaluate the effects of various detergents and different contact time on the removal of biofilm on flexible endoscopes based on an artificial biofilm model.</p> <p>Methods: The endoscopic biofilm model was established and treated for 3, 5, and 7 minutes with various detergents: (1) Rapid Multi-Enzyme detergent from 3M; (2) Scopezime enzymatic detergent from Ruhof; (3) INTERCEPT™ Non-Enzymatic Detergent from Cantel/Medivators. Viable counts of <i>Escherichia coli</i> (<i>E. coli</i>) and biofilm changes were measured by colony counting and electron microscopy scanning, respectively.</p> <p>Results: Statistical differences were observed between various detergents and the control group ($P < .001$), but not among the different contact time groups (3, 5, and 7 minutes, $P > .05$). Multiple comparisons showed that statistical differences in residual biofilm bacteria were observed between the detergents and the control ($P < .001$), whereas no significant difference was observed between the two enzymatic detergents ($P > .05$). No crossover effect was observed between various detergent groups, contact time, and the control group ($P > .05$).</p> <p>Conclusions: Significantly more biofilm bacteria and biofilms were found in the enzymatic detergent groups compared with the non-enzymatic detergent group, whereas no significant difference was observed among the 3, 5, and 7 minutes groups.</p>
<p>Methods</p>	<p><u>The purpose of the study was to compare the efficacy of various detergents against biofilm on lumens.</u></p> <p>Biofilm composed of <i>E. coli</i> were grown on the inside of Teflon™ tubing (meant to simulate the internal lumens of an endoscope).</p> <p>Randomized sections of the tubing were cleaned with the following detergents:</p> <ul style="list-style-type: none"> • Rapid Multi-Enzyme detergent from 3M • Scopezime enzymatic detergent from Ruhof • INTERCEPT Non-Enzymatic Detergent from Cantel/Medivators • Sterilized water (control) <p>The tubing sections were submerged in the diluted detergents at room temperature for 3-, 5-, and 7-minute time frames.</p>

Clinical Literature Review

	<p>After soaking, the cleaned tubes were evaluated for the following:</p> <ul style="list-style-type: none"> • Residual biofilm bacteria colony counts • Microscopic imaging of remaining bioburden (bacteria and biodebris)
Results	<p>Bacteria Studies</p> <ul style="list-style-type: none"> • No difference was observed between the different contact times for each detergent (3, 5, and 7 minutes showed statistically similar results) • All detergents showed a removal effect on biofilm bacteria, while the non-enzymatic detergent showed a greater removal effect on biofilm bacteria. • The two enzymatic detergents reduced the bacteria by ~1 log • Almost all bacteria was removed by INTERCEPT Detergent (4 logs) <p>Scanning Electron Microscope (SEM) Imaging Studies</p> <ul style="list-style-type: none"> • Imaging studies confirmed that following different contact time and exposure to the non-enzymatic detergent (INTERCEPT Detergent) produced the highest biofilm removal • No significant difference in the biofilm residue was observed with the same detergent and contact time of 3, 5, and 7 minutes
Discussion/Conclusions	<ul style="list-style-type: none"> • Increasing contact times for the individual detergents did not improve their results, suggesting that the peak cleaning efficiency was reached at ≤ 3 minutes for all the detergents tested • INTERCEPT Detergent removed more bacterial biofilm (by counts) as well as more biodebris (by visualization) than the enzymatic competitors • Non-enzymatic detergent (INTERCEPT Detergent) was shown to be better at removing bacterial biofilm under the conditions tested • The author notes that occupational health and safety of the cleaning operators are also improved by removing enzymatic detergents from the process
Messaging	<ul style="list-style-type: none"> • Using INTERCEPT Detergent provides a better first line defense against biofilm and the related bacteria than enzymatic competitors
Potential Objections	<ul style="list-style-type: none"> • Only bacterial survival was measured for cleaning efficacy. The study would be more robust if they had included residual protein, carbohydrate, or total organic carbon (TOC) measurements to bolster the conclusions of the study. • <i>E. coli</i> bacteria was used for the biofilm, but <i>Pseudomonas aeruginosa</i> is a more commonly used bacteria for modeling biofilms in endoscopy (and may be more representative) • INTERCEPT Detergent is known to be even more effective under conditions of flow (this study was isolated to static soaking)

INTERCEPT™ is a trademark of Medivators Inc.

© 2019 Cantel Medical Corp.