

Summary of Scientific Papers

Aseptium  October 2021

The aim of the study was to compare and evaluate the cleaning efficacy of the PullThru wipes against alternative cleaning devices (single-headed brush and double-headed brush) through using VeriTest Blue protein detection reagent and ProReveal protein quantification technology.

Summary:

This study aimed to determine the most effective cleaning device among three different types of brush. The results indicate that the PullThru device is the most effective of the three at removing contamination from the internal channels of endoscopes, demonstrating a 93% greater efficacy than the Single Headed Brush and a 79% greater efficacy than the Double Headed Brush.

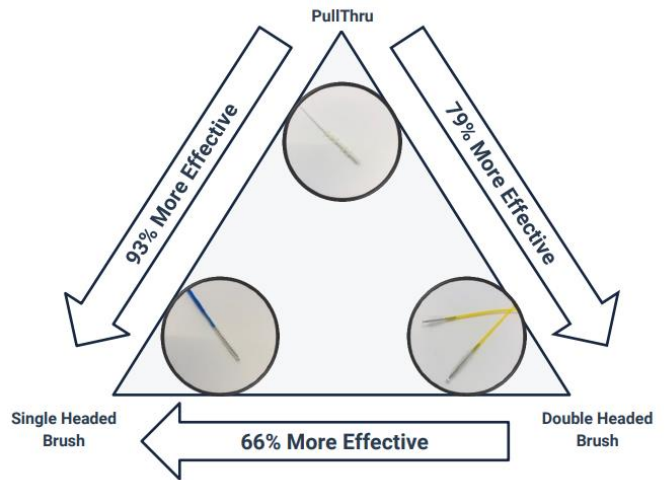


Figure 9. Comparison of Cleaning Efficacy between groups.

Rescope  September 2021

The purpose of these tests was to investigate whether:

- The PULL THRU™ Cleaning Brush damages the biopsy channel during manual brushing.
- If there is existing damage, such as a kink in the channel, what impact does this have on the cleaning performance of the PULL THRU™ Cleaning Brush.

Conclusions:

No damage was observed in the biopsy channel when using the PULL THRU™ Cleaning Brush. The PULL THRU™ Cleaning Brush is more effective than the regular bristle in cleaning the channel around a kink in the channel.

The conclusion is that the PULL THRU Cleaning Brush is more effective than the regular brush both in undamaged biopsy channels and channels with a kink.



The PULL THRU™ Cleaning Brush in the biopsy channel



A regular bristle brush in the biopsy channel

Summary of Scientific Papers

University Hospitals Birmingham  (2012 03)
NHS Foundation Trust

The Birmingham study compared the performance of a PULL THRU™ Cleaning Brush after one pass through a pre-contaminated channel, with a bristle brush after five passes. Performance was assessed using a Ninhydrin test to measure detectable protein, and a visual inspection was made to detect soil.

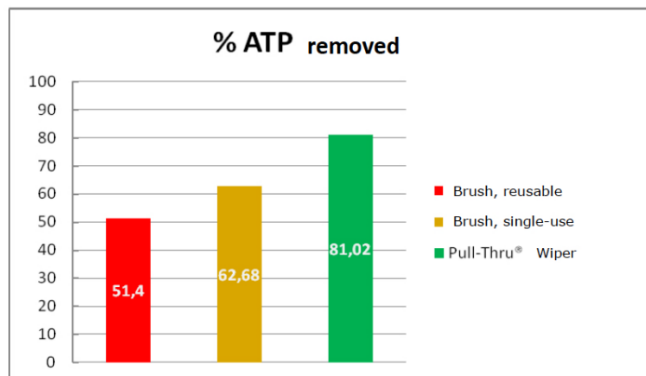
The results indicate that a single pass of the PULL THRU™ product is as effective as five passes of the bristle brush, even after the soil was left to dry for 30 minutes.

Test	Pull Thru Device			Cleaning Brush		
	Number of passes	Visual Inspection	Ninhydrin test	Number of passes	Visual Inspection	Ninhydrin test
1	1	No soil	Negative	>5	Scanty soil	Negative
2	1	No soil	Negative	>5	Scanty soil	Negative
3	1	No soil	Negative	>5	Scanty soil	Negative
4	1	No soil	Negative	>5	Scanty soil	Negative
5	1	No soil	Negative	>5	Scanty soil	Negative
6	1	No soil	Negative	>5	Scanty soil	Negative
7	1	No soil	Negative	>5	Scanty soil	Negative
8	1	No soil	Negative	>5	Scanty soil	Negative
9	1	No soil	Negative	>5	Scanty soil	Negative
10	1	No soil	Negative	>5	Scanty soil	Negative

 Deventer Study (2011 11)

The Deventer study compared protein removal in the channel of a range of colonoscopes after brushing with a reusable bristle brush, a single use bristle brush and a PULL THRU Cleaning Brush.

Each brush was passed down the channel of the colonoscope once when the scope was manually cleaned. The protein loading in the channels was measured prior to and after cleaning-



Charlton Study, Australian Infection Control 2007; 12(3); 81-90 (2007).

The Charlton study measured the weight of pre-loaded soil removed after a single pass of the PULL THRU Cleaning Brush versus six passes of the bristle brushes used in the comparison. The PULL THRU Cleaning Brush removed at least 96% of debris every time, whereas the bristle brushes removed between 29% and 90% of debris.

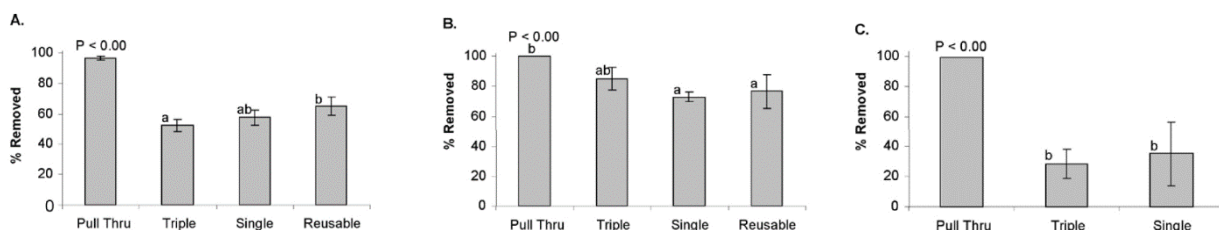


Figure 3. Percent of soil removed (Mean ± SD) from the lumen after passage of the lumen-cleaning device.: A. 2.8 mm (new) lumen, B. 2.8 mm (old) lumen, C. 5.0 mm (old) lumen.

Summary of Scientific Papers

Alfa, Michelle & M. Ribeiro, Maira & da Costa Luciano, Cristiana & França, Rodrigo & Olson, Nancy & Degagne, Pat & Singh, Harminder. (2017). A novel polytetrafluoroethylene-channel model, which simulates low levels of culturable bacteria in build-up biofilm after repeated endoscope reprocessing. *Gastrointestinal Endoscopy*. 86. 10.1016/j.gie.2017.05.014.

In this study, the authors reprocessed endoscopes each day for five days, storing them wet overnight to facilitate biofilm growth. Two types of detergents and cleaning brushes were used to see which would give the best results in the manual cleaning process. For both detergents used, the PULL THRU Cleaning Brush gave better results overall in each category, apart from the mean ATP when used with an enzymatic.

The Authors note on page 1289:

“Our data also support the role of friction in the cleaning process because the use of the pull-through channel cleaner left less organic debris than the bristle brush, when evaluated by SEM. The flexible “discs” of the pull-through device would have better surface contact with the inner surface of the PTFE channel compared to the bristles of the traditional bristle brush used for cleaning. This may explain why the SEM images showed far less residual debris and bacterial forms when the pull-through device was used, regardless of the detergent.”

Alfa, Michelle & Singh, Harminder & Nugent, Zoann & Duerksen, Donald & Schultz, Gale & Reidy, Carol & DeGagne, Patricia & Olson, Nancy. (2017). Sterile Reverse Osmosis Water Combined with Friction Are Optimal for Channel and Lever Cavity Sample Collection of Flexible Duodenoscopes. *Frontiers in Medicine*. 4. 10.3389/fmed.2017.00191.

This study investigated the sampling of duodenoscope channels. Though not directly related to the cleaning capabilities of the PULL THRU Cleaning Brush, the study provided some interesting findings.

On page four of the study it states

“The pull-through channel cleaner was the most effective at removing fixed residuals in the borescope examination.”

And on page seven

“In addition, the borescope assessment supports the initial data reported by Alfa and Olson (13) confirming that the use of friction (i.e., bristle brush or pull-through device) for sample collection of the channel is critical to ensure optimal removal of fixed residuals --regardless of what fluid is used or sample extraction”.

Cattoir, Lien & Vanzieleghem, Thomas & Florin, Lisa & Helleputte, Tania & de vos, martine & Verhasselt, Bruno & Boelens, Jerina & Leroux-Roels, Isabel. (2017). Surveillance of Endoscopes: Comparison of Different Sampling Techniques. *Infection Control & Hospital Epidemiology*. 38. 1-8. 10.1017/ice.2017.115.

This study also explored sampling techniques.

On page four, the study notes,

“Based on our findings, it could be argued to replace standard cleaning brushes with PULL THRU Brushes for manual endoscope cleaning. Because current evidence is limited, future research on the efficacies of different brush types for manual cleaning of flexible endoscopes is warranted.”