

FeelClean™ Technology Cell Culture Study Outcomes

A comparative study conducted at Queen's University Belfast to understand the effect catheterisation has on the cells of the urethral lining



...causes less uroepithelium cell damage or microtrauma than PVP-coated hydrophilic catheters in the biomimetic urethral model¹

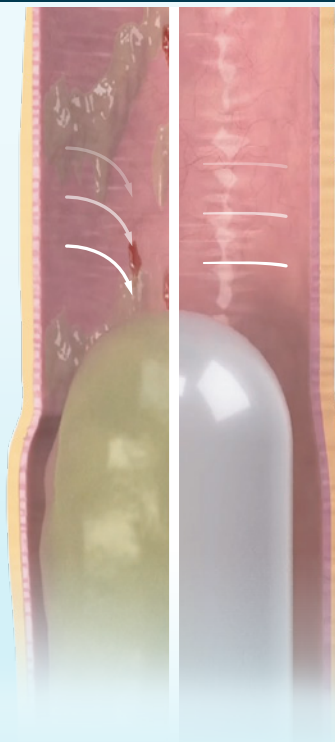
Study rationale

A **known issue** with traditional **PVP-coated hydrophilic** catheters is that the coating becomes **adhesive as it dries**, potentially **sticking** to patients' urethral mucosa during use.¹

FeelClean™ Technology has been designed to avoid such stickiness by **removing the need for the PVP-coating** and integrating the lubricious properties within the core of the catheter.

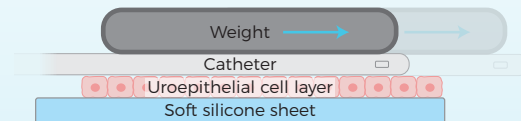
Catheters investigated

Catheter	Technology
Self-Cath	Uncoated control
GentleCath™ Glide	FeelClean™ Technology
Vapro Pocket™	Hydrophilic PVP-coated
SpeediCath® Flex	
LoFric® Origo	



The biomimetic model

Human uroepithelial cells fixed to a silicone base mimicked the properties of the urethra. Catheters were hydrated to manufacturers' IFUs and pulled across the cell layer at a speed of 15 cm/min for 5 cm.



The tests



Insertion

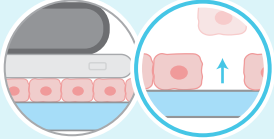
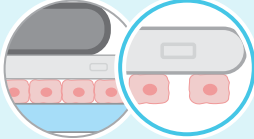
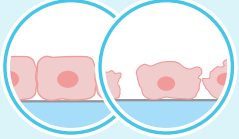



Catheters were still fully hydrated after 0 min of contact with cells.



Withdrawal

Hydration levels dropped after 2 mins of contact with cells.

To explore the potential effect of different catheters on urethral health, two tests were conducted to mimic the catheter insertion & withdrawal at 0 mins and 2 mins. The scientists assessed three factors after the catheter was pulled across the cell layer.

TESTS	 <p>Cell detachment Percentage area of cells remaining on the silicone base</p>	 <p>Cell adhesion Percentage area of the catheter covered in cells</p>	 <p>Cell health How damaged were the cells left on the silicone base?</p>
INSERTION 	All hydrophilic catheters performed equally well, causing <20% cell layer disruption.	All hydrophilic catheters performed equally well with few cells attached to their surface.	Damage to cell health ranged from none for LoFric® Origo to moderate for VaPro Pocket™.
WITHDRAWAL 	Significant cells detachment with VaPro Pocket™ and SpeediCath® Flex vs GentleCath™ Glide and LoFric® Origo.	VaPro Pocket™ had 5x more cells attached than others. Surprisingly, SpeediCath® Flex had few cells attached.	All hydrophilic catheters caused moderate to severe damage. GentleCath™ Glide caused only mild.
SUMMARY 	GentleCath™ with FeelClean™ Technology showed superior performance compared to VaPro Pocket™ and SpeediCath® Flex at 2 minutes.	Preliminary investigations suggest that SpeediCath® Flex's coating sheds onto the cell layer while the adhesive drying properties of PVP could cause damage.	GentleCath™ with FeelClean™ Technology was the only hydrophilic catheter to not cause moderate-to-severe damage.

Presented at BAUN 2022



REFERENCES: 1. Humphreys O, Pickering M, O'Gearbhaill ED, Flanagan TC. A biomimetic urethral model to evaluate urinary catheter lubricity and epithelial micro-trauma. J Mech Behav Biomed Mater. 2020;108:103792. doi:10.1016/j.jmbbm.2020.103792. *In vitro* data on file.