



Use of a bacterial fluorescence imaging device: wound measurement, bacterial detection and targeted debridement



Raizman R et al. *Journal of Wound Care* (2019)*

This study demonstrates the reliability and accuracy of the MolecuLight *i:X*[®] fluorescence imaging device to measure and document wound area, length and width, detect pathogenic bacteria (red or cyan fluorescence), target sampling to regions of high bacterial burden, and facilitate debridement to a more appropriate level.

Study reports the following:

>95%	89%	85%
Measurement accuracy of MolecuLight <i>i:X</i> device for wound area, length and width	% of wounds with red or cyan fluorescence in the periwound, a region rarely sampled	% of DFUs where additional debridement was performed based on fluorescence guidance

Study Design

- Benchtop wound models and clinical images were used to verify the accuracy and repeatability of the digital wound measurement application of the MolecuLight *i:X* imaging device. 51 wound measurements from 5 clinicians were used to determine intra/inter-user coefficients of variation.
- 50 wounds (36 DFUs, 4 VLU, 3 arterial venous ulcers, 7 other) were included in a clinical trial to assess digital wound measurement and the use of fluorescence images to detect presence of moderate-to-heavy bacteria loads.
- In a separate series of wounds, digital wound measurement and fluorescence imaging were incorporated into routine wound assessments of 22 diabetic foot ulcers (DFUs). Fluorescence imaging was used to assess standard of care debridement and target additional debridement, when needed.

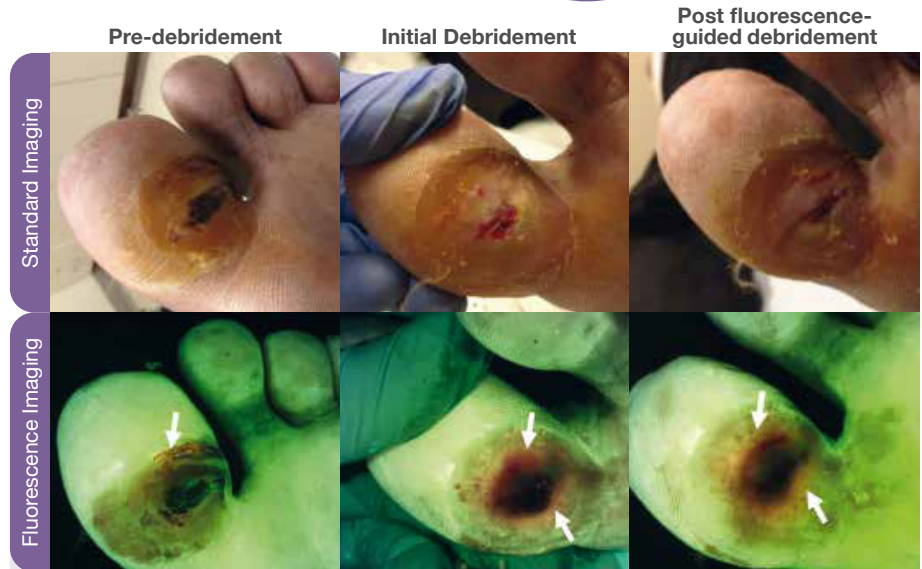
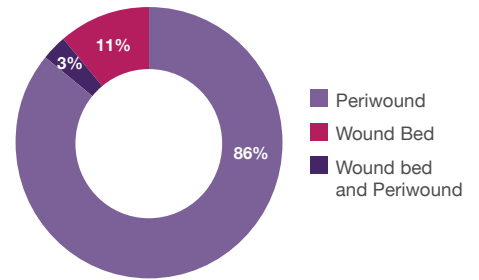




Key Results

- Using the benchtop wound models, the measurement accuracy for wound length and width of the MolecuLight device was $\geq 96\%$. Measurement accuracy for wound area was $\geq 95\%$.
- Compared to digital wound measurement, conventional ruler-based measurement methods overestimated wound size by, on average 31% (and up to 52%).
- In 89% of fluorescence-positive wounds in the 50-patient clinical trial, bacterial (red and cyan) fluorescence emanated from periwound tissue; only 11% of wounds had bacterial fluorescence exclusively in the wound bed.
- Standard of care debridement left behind red fluorescence indicative of bacterial loads $>10^4$ CFU/g in 100% of debrided wounds (20/20); bacterial fluorescence lessened, and was sometimes eliminated, with additional, fluorescence-targeted debridement.

Bacterial fluorescence signal



Fluorescence-guided diabetic foot ulcer (DFU) debridement. Bacterial fluorescence (red, arrows) was observed pre- and post- standard of care debridement. After fluorescence-guided debridement, bacterial fluorescence persisted. Fluorescence information led to more frequent debridement and addition of antimicrobial dressings.

Conclusion

These results demonstrate the accuracy and repeatability of the MolecuLight *i:X* imaging device in capturing digital wound measurements in real-time. These findings also highlight the potential for fluorescence imaging of bacteria to improve current debridement practices by enabling evidence-based, tailored decision making on location and degree of debridement needed to optimize healing.

Impact on Practice

Digital wound measurement using the *i:X* enables more accurate assessment and documentation of wound care. Objective detection of bacterial load and location with fluorescence imaging provides evidence to guide appropriate debridement and deployment of antimicrobials.

Study Citation

[Raizman R, Dunham D, Lindvere-Teene L, Jones LM, Tapang K, Linden R, Rennie MY. Use of a bacterial fluorescence imaging device: wound measurement, bacterial detection and targeted debridement. J Wound Care 28 \(12\) 2019](#)

