Applying Fluorescence Imaging in Routine Wound Assessment: Practical Lessons from Two Cases

Jose L. Ramirez-Garcialuna[1], Mario A. Martínez-Jiménez[2],Heba Tallah Mohammed[3], Samia Rahman[3],Basnama Ayaz[3,4], Robert D. J. Fraser[3,5]

[1] Scala Medical Technologies, QC,[2] Clienek SLPS, Mexico,[3] Swift Medical, Toronto,[4] University of Toronto [5] Arthur Labatt Family School of Nursing, Western University,

Introduction

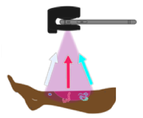
- Bacterial burden is common in chronic wounds and is a major factor in delayed healing, infections, and hospitalization. Traditional clinical assessment tools have low sensitivity (<20%) for detecting bacterial load.[1]
- Individual signs, including erythema, purulence and warmth, have low predictive value.[2] Further, asymptomatic bacterial colonization, diminishes the usefulness of these assessment tools.[3]
- Quantitative tissue biopsy culture is an objective tool, limited by its invasive and time-consuming methods limit its use.[4]
- Thus, there is a strong need for the development of point-of-care assessment tools that can objectively detect clinically relevant bacterial load in real-time.
- The Swift Ray™1device enables real-time wound autofluorescence at the point of care. Fluorescence (FL) imaging reveals bacterial signals not apparent on visual inspection, providing objective information to support timely treatment decisions when clinical signs are subtle or ambiguous.

Objective

- To demonstrate the clinical application of Swift Ray™1 fluorescence imaging as an adjunct to standard wound assessment in guiding treatment decisions for complex wounds.

Methodology

- **Study Design:** Prospective observational case series
- **Clinical Setting:** Ambulatory wound care clinic
- **Clinicians**: Trained wound care physicians performed all assessments and image interpretations following standardized device training protocol.
- **Assessment Protocol:**
  - Clinical evaluation using NERDS/STONEES criteria
  - Fluorescence imaging captured under standardized conditions (8-10 cm distance, perpendicular orientation)
  - Real-time image interpretation at point of care
- **Image Interpretation:** Clinicians documented fluorescence presence (positive/negative) and hue pattern (red, cyan, mixed, none).
- **Clinical Integration:** Fluorescence findings combined with clinical assessment to inform wound management decisions, including antimicrobial therapy adjustments and readiness for advanced wound care products.



Results

Case 1: Early Bacterial Detection Beyond Visual Signs

CASE DETAILS

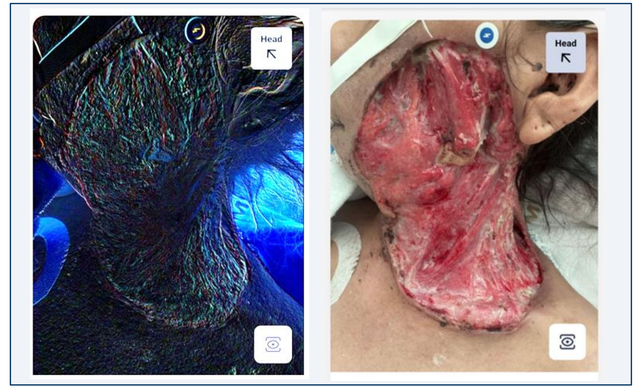
Patient Profile
- 61-year-old male
- Traumatic wound, anterior lower leg
- Wound size: 26.8 cm²
- Receiving parenteral antibiotic therapy

Clinical Assessment:
- Visual assessment suggested bacterial involvement, including exudate, friable granulation, and wound debris.
- Ongoing antibiotic therapy complicated interpretation, as bacterial burden may persist despite treatment.

Fluorescence Imaging Findings:
- FL Result: Positive
- Hue pattern: Red and cyan fluorescence Distribution: Both red and cyan signals visible throughout wound bed

Clinical Decision:
- Findings prompted early adjustment of antimicrobial therapy before considering skin substitute
- Local wound-care plan modified
- Enabled earlier intervention than visual assessment alone, reducing risk of complications

Case 2: Confirming Readiness for Repair



CASE DETAILS

Patient Profile
- 53-year-old female
- Medical history: Undergoing treatment for leukemia (immunocompromised)
- Surgical wound: Necrotizing fasciitis (post-debridement), anterior neck
- Wound size: 58.3 cm² extending to muscle and bone
- Treatment: 1 week systemic antibiotics post-surgery

Clinical Assessment:
- After 1 week of antibiotics, no overt signs of bacterial involvement

Fluorescence Imaging Findings:
- FL Result: Negative
- No red or cyan fluorescence signals detected
- Clean wound bed without bacterial autofluorescence

Clinical Decision:
- Low bioburden confirmation needed before skin substitute
- As no red or cyan signal by FL imaging , the findings supported timely use of a poly-lactic acid matrix without delay in a medically vulnerable patient.

Discussion

- Swift Ray™1 provided real-time bacterial burden information to guide clinical decisions. In Case 1, mixed bacterial activity was detected despite antibiotics, prompting treatment adjustment. In Case 2, low bacterial burden was confirmed, supporting timely advanced therapy in an immunocompromised patient.
- Fluorescence findings informed treatment sequencing. Positive signals supported antimicrobial optimization prior to skin substitute use, while negative findings enabled confident progression to matrix application without delay.
- These cases illustrate scenarios where bacterial assessment directly influenced care decisions, including incomplete antibiotic response and immunocompromised surgical wounds. Fluorescence imaging complemented clinical assessment to support individualized management.

References

1. Reddy, M., Gill, S. S., & Rochon, P. A. (2012). Does this patient have an infection of a chronic wound? JAMA, 307(6), 605–611.
2. Gardner, S. E., Frantz, R. A., & Doebbeling, B. N. (2001). The validity of the clinical signs and symptoms used to identify localized chronic wound infection. Wound Repair and Regeneration, 9(3), 178–186. https://doi.org/10.1046/j.1524-475x.2001.00178.x
3. International Wound Infection Institute (IWII). (2022). Wound infection in clinical practice: Principles and practice (2nd ed.). Wounds International. https://woundinfection-institute.com/wp-content/uploads/IWII-CD-2022-web-1.pdf
4. Bowler, P. G., Duerden, B. I., & Armstrong, D. G. (2001). Wound microbiology and associated approaches to wound management. Clinical Microbiology Reviews, 14(2), 244–269.