INTRODUCTION

- Damage to skin and soft tissue via traumatic burn wounds allows for opportunistic pathogens to complicate and impede the normal course of healing and repair
- The diagnosis of microbial infection in a wound, based on common clinical signs and symptoms is difficult, as there is no gold standard to predict bacterial activity in tissue and bacteria are invisible to the unaided eye
- Fluorescence imaging has recently been used to visualize clinically significant levels of pathogenic bacteria in real-time at the bedside using a non-contact handheld device
- We aimed to assess the effectiveness of this device in the detection and management of bacterial load in burn patients

METHODS

Bacterial Fluorescence Imaging
- When excited by 405 nm violet light, tissues fluoresce green while bacteria fluoresce red (porphyrin producers) or cyan (porphyrin-producing Pseudomonas aeruginosa)
- This enables real-time, point-of-care detection and localization of bioburden (≥ 10^4 CFU/g) within and around wounds

RESULTS

- Fluorescence imaging targets swabbing to region of bioburden
- Fluorescence imaging allows for confidence when skin grafting
- Bacterial Fluorescence Guides Antimicrobial Decision Making and Monitors Treatment Effectiveness

- Fluorescence Detection of Pseudomonas aeruginosa

CONCLUSIONS

- Using the bacterial fluorescence imaging device is similar to using any smart, touchscreen technology
- By detecting bacteria at the point of care, we may be able to prevent bacterial levels from reaching critical colonisation, infection, and sepsis
- Thus, this research has significant implications for improving overall healing
- Early intervention could reduce the likelihood of graft failure, while fluorescence guided swabs to determine precise bacterial species present will enable targeted antibiotic therapy, with the goal of preventing antibiotic resistance
- In summary, bacterial fluorescence imaging provides guidance for clinicians in regards to:
  - Immediate information on bacterial presence or absence
  - Identifying the type of bacteria to be treated (specific detection of P. aeruginosa)
  - Pinpointing the location of bacterial presence for more accurate swabbing
  - Antimicrobial and antibiotic decision making and monitoring of treatment effectiveness

REFERENCES

5. Bower PW et al. Point-of-care fluorescence imaging positively predicts the presence of pathogenic bacteria in wounds infected ≥ 10^5 CFU/g, a clinical study. Wound Care (published)