

ISSN: 2835-1568 CODEN: USA DOI: 10.51521



# WORLD JOURNAL OF CASE REPORTS & CLINICAL IMAGES

*Advancing in Cases*



<https://worldjournalofcasereports.org/>



## CASE STUDY

### Case Study: Minimizing Scarring in Wound Healing

Dr. Patricia Stevenson & Daniel Hawk

# NextScience

Received Date:  
18-09-2024  
Revised Date:  
21-10-2024  
Accepted Date:  
30-10-2024  
Published Date:  
15-11-2024

**Corresponding Author:** Patricia Stevenson

**Citation:** Patricia Stevenson & Daniel Hawk (2024) Case Study: Minimizing Scarring in Wound Healing. *World J Case Rep Clin Imag.* 2024 Oct; 3(2)01-04.

**Copyrights:** © 2024, Patricia Stevenson & Daniel Hawk. This article is licensed under the Creative Commons Attribution-NonCommercial-4.0-International-License-(CCBY-NC) (<https://worldjournalof-casereports.org/blogpage/copyright-policy>). Usage and distribution for commercial purposes require written permission.

#### ABSTRACT

Prolonged inflammation in wounds is positively correlated with increased scar formation. This case study explores the role of microbiome dysbiosis and biofilm in chronic wounds, emphasizing the need for targeted, biofilm-focused care to minimize scarring.

#### KEYWORDS:

Chronic wounds, Wound Healing, Scar Formation

#### INTRODUCTION

Inflammation is a critical phase of wound healing, but prolonged inflammation can lead to excessive scarring. Research confirms that microbiome dysbiosis and inflammatory levels of bioburden impedes wound healing and is a major contributor to scarring. These findings are especially noted when associated with two of the most common pathogens, *Staphylococcus aureus* and *Pseudomonas aeruginosa*. Pathogenic bacteria that express targeted virulence elements from deep within the wound bed tissue are found to facilitate bacterial adherence and subsurface tissue invasion. Published data suggests that, in the absence of any contact with microbiota, skin wound healing is accelerated and scarless, partially because of reduced accumulation of neutrophils, increased accumulation of alternatively activated healing macrophages, and better angiogenesis at wound sites. However, chronic wounds suffer from tissue invasion and abnormal levels of inflammation that slow wound healing and exacerbate scar formation.

Although some patients may not be able to heal from

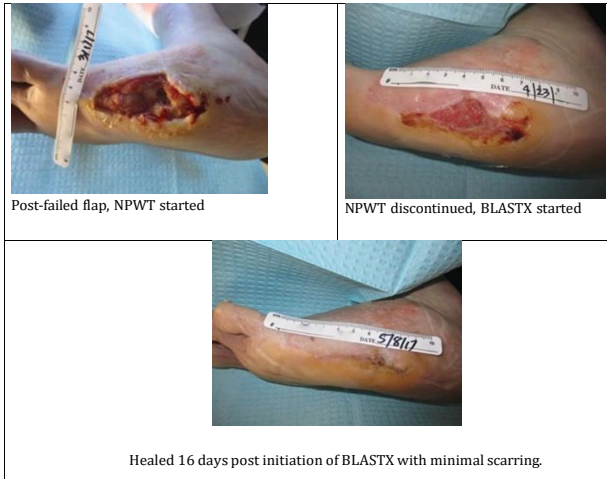
a chronic wound and receive palliative care, members of the Wound Healing Foundation (WHF) recommend an aggressive approach to achieve wound healing. This approach includes elements of the standard of care that incorporates addressing bioburden and biofilm beginning with the first visit. However, the Centers for Medicare & Medicaid Services (CMS) has determined that for all patients with wounds, one goal of wound care should be to prevent progression of the wound by minimizing the risk of infection and further progression of the wound from infection (CMS, <https://www.cms.gov/medicare-coverage-database/view/lcd.aspx?lcdid=38902>).

The aim of these cases is to highlight healing with minimal scarring through bioburden control and elimination of biofilm. While other factors can also affect scarring, bioburden and biofilm are strong influences on how wounds heal, and scars develop.

#### CASE REPORTS

##### Case 1: 65-Year-Old Diabetic with Flap Necrosis

- **Condition:** Post-surgical removal of exostosis from the base of the 5th metatarsal (MT) with flap failure.
- **Intervention:** Post-debridement, negative pressure wound therapy (NPWT) was initiated until granulation reached the surface level (requiring discontinuance of NPWT treatment), followed by the application of SURGX.
- **Outcome:** Wound healed within 16 days with a minimal fine scar.



## Case 2: 61-Year-Old Female with Infected Dog Bite

- **Condition:** Infection developed after a dog bite to the left foot, complicated by a previous surgical scar, history of HIV, drug abuse, and other comorbidities.
- **Intervention:** Surgical debridement was followed by the application of SURGX (sterile version of BLASTX developed for incision management/application in the OR).
- **Outcome:** Wound healed 10 weeks post-intervention; even over a previous site of injury, the scar was fine without hypertrophic characteristics.



8/10/20 (10 days post surg debridement)



BLASTX started on 8/28/20

Healed 10/22/20 with minimal scarring



## Case 3: 63-Year-Old Male with Necrotizing Cellulitis

- **Condition:** Diabetes mellitus and peripheral artery disease led to the development of a non-healing wound that exacerbated with necrotizing cellulitis and a deep forefoot abscess.
- **Intervention:** Post-debridement care included advanced wound management and biofilm-targeted therapy.
- **Outcome:** Wound healed with a thin scar, demonstrating effective biofilm/bioburden control.

## CONCLUSION

The cases presented highlight the critical role of bioburden control and products specifically designed to solubilize the biofilm structure allowing access to bacteria and fungi within the EPS. Using biofilm management in wound healing in conjunction with Standard of Care modalities such as debridement helps to protect companion modalities, minimize scarring and enhance healing outcomes, especially in chronic wounds.

**Conflict of Interest:** None

**Acknowledgements:** None

**Ethical Consideration:** None

## References

1. Yu, J., et al. (2023). Microbiome dysbiosis occurred in hypertrophic scars is dominated by *S. aureus* colonization. *Frontiers in Immunology*, 14, 1227024. <https://doi.org/10.3389/fimmu.2023.1227024>
2. Canesso, M. C., et al. (2014). Skin wound healing is accelerated and scarless in the absence of commensal microbiota. *Journal of Immunology*, 193(10), 5171-5180. doi:10.4049/jimmunol.1400625
3. Zielińska, M., et al. (2023). Wound Microbiota and Its Impact on Wound Healing. *International Journal of Molecular Sciences*, 24(24), 17318. doi:10.3390/ijms242417318
4. Zhao, G., et al. (2013). Biofilms and Inflammation in Chronic Wounds. *Advances in Wound Care*, 2(7), 389-399. doi:10.1089/wound.2012.0381
5. Maheswary, T., et al. (2021). The Insights of Microbes' Roles in Wound Healing: A Comprehensive Review. *Pharmaceutics*, 13(7), 981. doi:10.3390/pharmaceutics13070981



6. Zhou, S., et al. (2023). New insights into balancing wound healing and scarless skin repair. *Journal of Tissue Engineering*, 14. doi:10.1177/20417314231185848
7. Uberoi, A., McCreedy-Vangi, A. & Grice, E.A. The wound microbiota: microbial mechanisms of impaired wound healing and infection. *Nat Rev Microbiol* 22, 507–521 (2024). <https://doi.org/10.1038/s41579-024-01035-z>
8. Eriksson E, Liu PY, Schultz GS, et al. Chronic wounds: Treatment consensus [published correction appears in *Wound Repair Regen*. 2022 Jul;30(4):536. doi: 10.1111/wrr.13035]. *Wound Repair Regen*. 2022;30(2):156-171. doi:10.1111/wrr.12994.

Submit your manuscript to the

World Journal of Case Reports and Clinical Images  
(ISSN: 2835-1568); CODEN: USA

And benefit from:

- Convenient online submission
- Rigorous peer review
- Immediate publication on acceptance
- Open access: articles freely available online
- High visibility within the field
- Retaining the copyright to your article

*Submit your manuscript at*

<https://worldjournalofcasereports.org/>

&

[wjcasereports@gmail.com](mailto:wjcasereports@gmail.com);

[submission@worldjournalofcasereports.org](mailto:submission@worldjournalofcasereports.org)

