The complexities of wound healing

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Introduction
The development of a pressure ulcer immediately following spinal cord injury can have detrimental consequences on an individual's psychological and physical rehabilitation. Enforced bed rest, isolation and frustration can lead to poor adaptation to the acceptance of the diagnosis, with the resultant scar tissue exacerbating the potential for further breakdown in the future.

The patient is 64 year old lady with a spinal fracture to her cervical and thoracic vertebrae (C7/T1) and a neurological diagnosis of complete tetraplegia at C5. She had a non-healing sacral pressure ulcer, which despite the use of negative pressure wound therapy, larvae therapy, surgical closure, a dynamic replacement mattress and three hourly turns, reverted to a deep bed of offensive smelling, necrotic tissue. She also suffered unexplained fevers and anaemia which, after extensive investigation proved to be consistent with Myelodysplasia – a rare bone marrow disorder which requires supportive management of platelet levels. The platelet plays an instrumental role within the inflammatory phase of the healing cascade, and a reduction in the levels could be associated with delayed healing. The patient's platelet levels were monitored and transfusions were administered as necessary. The wound was treated with Activon Tube® (Advancis Medical) which consists of 100% Medical Grade Manuka honey to reduce the bacterial burden and odour, whilst its high osmotic pressure promoted autolytic debridement of the necrotic tissue. Once the wound was debrided, it was decided to continue with the honey dressings as the wound was progressing rapidly.

Discussion
Holistic assessment was used to identify possible underlying factors as to why the patient's wound had become recalcitrant, these needed to be addressed in order to allow the wound to heal.

Wound healing in the spinal cord injured patient is frequently slow and has a tendency to become recalcitrant. Research has identified that all aspects of the wound healing cascade are impaired by the physiological deficits within the tissue below the level of injury. This is potentially related to the differences in denervated skin, including decreased blood flow and pressure, resultant reduction in oxygen perfusion, and a decrease in fibronectin (necessary for fibroblast activity) and enzymes required for biosynthesis. Honey contains hydrogen peroxide which in turn stimulates fibroblast activity and has the ability to function within the wound without the need for oxygen, yet stimulates angiogenesis, (production of new blood vessels) providing oxygen and nutrients to the tissue. Off-loading of the wound reduced compression of the blood vessels to the tissue.

This case study emphasises the importance of continually pursuing the possible underlying pathology in any patient with a wound that does not respond to conventional therapy. Once these factors are addressed, the wound made rapid progress towards healing by relatively simple and inexpensive measures.

Method
A full holistic assessment of the patient was conducted by the Medical and Tissue Viability Team. The patient's platelet levels were monitored and transfusions were administered as necessary. The wound was treated with Activon Tube® (Advancis Medical) which consists of 100% Medical Grade Manuka honey to reduce the bacterial burden and odour, whilst its high osmotic pressure promoted autolytic debridement of the necrotic tissue. Once the wound was debrided, it was decided to continue with the honey dressings as the wound was progressing rapidly.

Complete and continuous pressure off-loading was achieved by the permanent deflation of a cell using the unique VentValve Technology within a pressure redistributing mattress (Nimbus 3 Professional system, ArjoHuntleigh).

Weekly wound photography and measurements were taken to objectively assess progress.

Results
Granulation tissue was evident within the wound bed by day 11, with signs of contraction and re-epithelialisation being present by day 25. The wound had healed by day 122, demonstrating the rapid progression once the underlying pathology had been established, the wound had been off-loaded and the bio-burden had been addressed with the honey dressing.

Conclusion
This case study highlights the importance of continually pursuing the possible underlying pathology in any patient with a wound that does not respond to conventional therapy. Once these factors are addressed, the wound made rapid progress towards healing by relatively simple and inexpensive measures.