Wounds UK salutes the sterling work being done in the world of wounds

Building on the success of the inaugural *Wounds UK* Awards for Excellence at the *Wounds UK* 2012 conference in Harrogate, we were inundated with entries for the 2013 exhibition. A total of 225 posters were displayed at the 2013 conference, covering a wide range of subjects: case studies, health economics, debridement, education, research, pressure ulcers and dressings.

The theme of the *Wounds UK* 2013 conference was "Integrated strategies for quality outcomes" and, as ever, we were delighted by the high standard of abstract entries we received. Each year we aim to celebrate the innovation and breadth of practice shown in tissue viability and the winning free paper proved to be an exceptional example of this. Short presentations of those abstracts shortlisted were given in the main auditorium at the Harrogate International Centre. These were Cornelia Wiegand and Richard White's *Regulation of wound healing by micromechanical forces – an introduction* (read the abstract on the next page); Natalie Cavanagh and Nuala O'Brien's *The developing role of the pressure area care equipment coordinators in a large NHS acute trust*; Jacqui Stringer's *The management of malodour in fungating malignant wounds using NEOC cream*; Samantha Holloway's *Validation of a new classification system for skin tears;* and John Stephenson's *Preparing to meet the challengeof promoting skin integrity in an ageing population – results of a five-trust wound care survey.*

At the glittering black tie gala dinner at Harrogate, winners Cornelia Wiegand and Richard White received their award from Woundcare4Heroes Directors Keith Harding and Claire Stephens, as well as armed forces veteran Karen Burrows, who has benefitted from the charity's great work and who shared her remarkable story of life on the frontline.

We would like to take this opportunity to thank all the clinicians who submitted their work and we eagerly await your submissions for the *Wounds UK* 2014 conference.

We look forward to seeing you again on November 10–12 at the UK's biggest and best wound care event!

Free paper presentations

From left to right: Keith Harding, Cornelia Wiegand, Richard White, Karen Burrows and Claire Stephens.

WINNER

Cornelia Wiegand and Richard White *Regulation of wound healing by micromechanical forces – an introduction*

HIGHLY COMMENDED

Natalie Cavanagh and Nuala O'Brien *The developing role of the pressure area care equipment coordinators in a large NHS acute trust*

Jacqui Stringer, Graeme Donald and Peter Warn *The management of malodour in fungating malignant wounds using NEOC cream*

Samantha Holloway and Kimberly LeBlanc *Validation of a new classification system for skin tears*

John Stephenson, Karen Ousey and Simon Barrett *Preparing to meet the challenge of promoting skin integrity in an ageing population – results of a five-trust wound care survey*

The *Wounds UK* Award for Excellence 2013 winning entry:

Regulation of wound healing by micromechanical forces – an introduction

Authors: Cornelia Wiegand and Richard White

Introduction

Mechanical forces influence cellular organization and behavior. Without mechanical stimuli cells stop to proliferate, discontinue migration, go into cell-cycle arrest and eventually die. Hence, mechanical cues will have fundamental effects on wound healing. Reports on application of micromechanical forces to wounds elucidate the roles of cell stretch, substrate stiffness and tissue deformation during cell proliferation and differentiation. This raises questions relevant to all working in the field: What is the significance of mirodeformations for wound healing? Does 'dead space' impede propagation of mechanical cues? How can microdeformations induce cell proliferation? What role do fibroblasts, myofibroblasts and mesenchymal stem cells play in chronic wounds with regard to micromechanical forces?

Objective

To find and summarize all relevant research on microdeformation with respect to all tissues, and to relate findings to the wound healing situation as well as to identify, if possible, areas of potential research.

Methods

A literature review was conducted to find publications on these subjects. The following electronic databases were searched: CINHAL, the Cochrane Central Register of Controlled Trials, the Cochrane Database of Systematic Reviews, and the Database of Abstracts of Reviews of Effects, Health Technology Assessments and National Health Service Economic Evaluation, Embase, Ovid Medline, and PubMed. The findings have been summarised.

Results

Mechanical stimuli are processed by mechanotransduction pathways that are coupled to the cytoskeleton which can 'sense' microdeformations of the cells. This initiates signaling cascades that regulate tissue organization and homeostasis. Hence, it is not surprising that mechanical signals have a profound effect on wound healing as they promote cell proliferation and migration as well as increase the expression of extracellular (ECM) components, contractile elements and growth factors. Moreover, as tangible structural requisites for physiological cell functions are lacking in chronic wounds, the loss of stimulatory micromechanical forces impedes cell proliferation and cell migration. The formation of a 'dead space' should be avoided as it hampers healing. Cells such as fibroblasts, myofibroblasts and mesenchymal stem cells play a crucial role in wound healing, e.g. fibroblasts synthesize connective tissue and restore its mechanical strength. However, aged fibroblasts display a decreased proliferation and migration rate. Moreover, in the absence of mechanical stimuli, due to diminished mechanical properties of the ECM in chronic wounds, myofiboblasts are not able to contract and remodel the ECM.

Discussion

It is clear from published literature, mostly on non-wound tissues, that micromechanical forces can have a significant influence on tissue growth and function. Applied to wound healing, these forces alter cell proliferation and differentiation, as well as affect cytokine release and matrix protein secretion. In contrast to healing wounds, the structural requisites for the transduction of mechanical cues are lacking in chronic wounds. The absence of ECM and the accumulation of wound fluid can lead to the formation of 'dead space' across which mechanical stimuli cannot be transferred. In addition, neutrophils and macrophages cannot invade this area and therefore, microbial contamination may proceed to wound infection.

Conclusions

There is a clinical requirement for wound-related research in this area. In simple practical terms, closely-adhering dressings that maintain an intimate contact with the wound bed may help to avoid the creation of dead space. What is more, it can be assumed that application of micromechanical forces to chronic wounds in vivo, either by negative pressure wound therapy (NPWT) or specially designed dressings, will promote wound healing by induction of appropriate microdeformations.