

Wounds digest

In this section, a brief synopsis is presented of a range of recently published articles that may be of interest to healthcare professionals working in the wound care setting. The aim of this round-up is to provide an overview, rather than a detailed summary and critique, of the research papers selected. Full references are provided should you wish to look at any of the papers in more detail.

1 Biomodulation induced by fluorescent light energy versus standard of care in venous leg ulcers: a retrospective study

Readability	✓	✓	✓	✓	
Relevance to daily practice	✓	✓	✓	✓	
Novelty factor	✓	✓	✓	✓	

- To complement the recently completed EUREKA study, which confirmed the efficacy and safety profile of fluorescent light energy (FLE) in treating hard-to-heal wounds, researchers selected one of the EUREKA clinical centres to conduct a retrospective analysis of data relating to 10 EUREKA subjects with venous leg ulcers (VLUs), compared to 46 patients with VLUs who had received standard wound care over a 5-year period. Healing rates were compared between the two groups.
- By comparison, the patients in the EUREKA group had wounds that were larger and significantly older wounds ($P < 0.05$), as well as significantly more risk factors ($P < 0.05$) than the matching wounds in the other group. In terms of outcomes, those in the EUREKA group saw 40% better outcomes, compared with the matching group, as well as 7% for full wound closure by 16 weeks.
- In terms of wound breakdown, non was observed at 16 weeks in the EUREKA group, compared with 25% in the matching group. There were no infections in the EUREKA group, compared with 37% in the other group. A mean relative wound area regression (RWAR) of 32% was found in the EUREKA group at week six and 50% at week 16, with the matching group having a RWAR of -3% at week six and -6% at week 16.
- The authors found that the FLE system was well-tolerated by patients and effective, offering better clinical outcomes compared with wounds treated with standard care alone.

Dini V, Janowska A, Davini G et al (2019) Biomodulation induced by fluorescent light energy versus standard of care in venous leg ulcers: a retrospective study. *J Wound Care* 28(11): 730–6

2 Communication with patients using negative wound pressure therapy and their adherence to treatment

Readability	✓	✓	✓	✓	
Relevance to daily practice	✓	✓	✓	✓	
Novelty factor	✓	✓	✓		

- The authors set out to explore the challenges that exist relating to patient/healthcare professional communication, as well as patient adherence to treatment for hard-to-heal wounds when negative wound pressure therapy (NPWT) is used.
- The 24 patients undergoing NPWT that took part in the study

were subject to face-to-face, semi-structured interviews with specific features of the NPWT device forming the main focus for discussion. It was found that patients required ongoing support to understand their treatment with NPWT, while a distinction was made between those who had decided not to adhere with therapy and those who did so unintentionally. In addition, patients stressed their difficulties in terms of their communication with healthcare professionals, as well as the difficulties faced in ensuring their needs were listened to and addressed.

- It was concluded that further research is needed in this area, to ascertain a better understanding of the distinction between intentional and unintentional adherence and, by extension, research is required to evaluate interventions that maintain adherence behaviours.

Moffatt CJ, Murray S, Aubeeluck A, Quere I (2019) Communication with patients using negative wound pressure therapy and their adherence to treatment. *J Wound Care* 28(11): 738–56

3 Effects of probiotics in the management of infected chronic wounds: from cell culture to human studies

Readability	✓	✓	✓		
Relevance to daily practice	✓	✓	✓		
Novelty factor	✓	✓	✓	✓	

- Polymicrobial biofilm infections are commonly attributed to chronic wounds and over the past few years, an extensive use of antibiotics has created several antibiotic-resistant variants. In a bid to avoid such situations, there have been a number of alternative natural treatments proposed, including microorganisms, such as probiotics.
- Current literature was reviewed by the authors relating to probiotic use in the treatment of infected chronic wounds. The Medline database was searched for relevant articles using the following keywords: “probiotics” and “wound” and “injuries”, “probiotics” and “wound” and “ulcer”, “biofilm” and “probiotics” and “wound”, “biofilm” and “ulcer” and “probiotics”, “biofilm” and “ulcer” and “probiotics”, “probiotics” and “wound”.
- A total of 253 relevant articles were found and after inclusion and exclusion criteria was applied, 19 research articles were included. The results made the articles somewhat difficult to compare due to the heterogeneity in methodology, laboratory techniques and applied clinical protocols. The most covered strain was found to be *Lactobacillus Plantarum*, which was highlighted as a positive application in burns and chronic wound infections.
- Although the authors highlighted the lack of large, long-term clinical trials, which are required, preliminary evidence does

support the use of specific strains of probiotics in certain clinical settings such as infected chronic wounds.

Brogna L, Salmaso L, Mazzotti A et al (2019) Effects of probiotics in the management of infected chronic wounds: from cell culture to human studies. *Curr Clin Pharmacol* doi: 10.2174/157488471466619111130630. [Epub ahead of print]

4 The microbiome, malignant fungating wounds, and palliative care

Readability	✓	✓	✓	✓	
Relevance to daily practice	✓	✓	✓		
Novelty factor	✓	✓	✓		

- In advanced cancer patients in the US, malignant fungating wounds are present in 5–14% in this patient group. The presentation of such wounds usually happens in the last 6 months of life, often representing a move towards impending death for patients and their families alike.
- Patients with these wounds require palliative care until end of life, in order to limit the suffering that they experience. Common symptoms encountered by these chronic wounds include, but are not limited to, necrosis, malodour, exudate and pain. Despite the fact that there is currently limited data available on the use of culture-based techniques that have been conducted on malignant fungating wounds, links have been made between the cutaneous microbiome of these wounds and severity of symptoms. Due to this lack of relevant data, an optimal approach to treating these wounds has yet to be established.
- Severe odour and exudate have been associated with the presence of at least one strain of obligate anaerobic, while a concentration of over 10⁵/g bacteria has been linked with an increase in exudate and pain. Bacterial metabolites, such as dimethyl trisulfide and putrescine, are linked with malignant fungating wound odour, as well as the degradation of the periwound skin.
- In order to discover potential therapeutic targets within the microbiome to improve the current methods of treatment used in the palliative care approach, further research has been suggested in terms of using 16S rRNA gene sequencing to build on the associations that have been made between the malignant fungating wound microbiome and severity of symptoms.

Vardhan M, Flaminio Z, Sapru S et al (2019) The microbiome, malignant fungating wounds, and palliative care. *Front Cell Infect Microbiol* 9: 373

5 Itch in chronic wounds: pathophysiology, impact, and management

Readability	✓	✓	✓	✓	
Relevance to daily practice	✓	✓	✓	✓	
Novelty factor	✓	✓	✓	✓	✓

- The authors set out to conduct a literature review relating to the characteristics and pathophysiological mechanisms of itch attributed to chronic wounds, in order to analyse the impact on quality of life and delayed-healing. The aim of the review

was to determine how best to establish optimum strategies of prevention and treatment.

- Eleven articles were selected that met the criteria after a search of MEDLINE, PubMed, Embase, Scopus, ScienceDirect and the Cochrane Library. The review found a link between itch in chronic wounds and xerosis, larger wound areas, necrotic tissue, exudate levels, peripheral tissue oedema and sclerosis, among other things.
- At present, the authors found that there was no validated prevention or management strategy regarding itch in chronic wounds. Further studies are required to clarify the association and pathophysiology of itch in chronic wounds, which will enable an evaluation of safety and efficacy of topical treatments on perilesional skin aimed at reducing itch, as well as to distinguish multidimensional sensations of itch in this wound type. The overarching aim should eventually be to create Best Practice guidelines.

Iannone M, Janowska A, Dini V et al (2019) Itch in chronic wounds: pathophysiology, impact, and management. *Medicines (Basel)* 6(4): pii: E112. doi: 10.3390/medicines6040112.

6 Does debridement improve clinical outcomes in people with diabetic foot ulcers treated with continuous diffusion of oxygen?

Readability	✓	✓	✓	✓	
Relevance to daily practice	✓	✓	✓		
Novelty factor	✓	✓	✓		

- The authors conducted a *post-hoc* analysis aimed at evaluating the association between the frequency of diabetic foot ulcer (DFU) debridement and the quantity of ulcers that healed over a 12-week period after treatment with active continuous diffusion of oxygen (CDO).
- A total of 146 patients with DFUs entered into a double-blind, placebo-controlled, randomised study, with one group treated with either active CDO or a fully operational placebo device. The average age of participants was 56.3 ± 12.4 years and 77% were male. All participants received identical offloading, dressings, and follow-up and all were followed for 12 weeks or until wound closure.
- In the CDO group, 204% more ulcers healed than in the placebo group (46.2% vs. 22.6%, respectively; *P*=0.016). In addition, CDO's relative performance became greater when compared to placebo when frequent debridement was used (51.2% vs. 21.3%, respectively; *P*=0.006).
- The authors concluded that hypertension is associated with impaired nerve conduction in individuals with Type One diabetes. The study supports previous small trials that showed ACE inhibitors improving nerve conduction.
- It was concluded that the relative performance of CDO seems to increase when used with frequent debridement, advocating its potential use in the future. A case was made for the use of active CDO therapy with standard wound care.

Lavery LA, Niederauer MQ, Papas KK, Armstrong DG (2019) Does debridement improve clinical outcomes in people with diabetic foot ulcers treated with continuous diffusion of oxygen? *Wounds* pii: WNDS20190731-1. [Epub ahead of print]