

Wounds digest

In this section, we present brief synopses 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 Factors affecting the incidence and prevalence of pressure ulcers in COVID-19 patients admitted with a Braden scale below 14 in the intensive care unit: Retrospective cohort study

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

- The long length of hospitalisation for COVID-19 patients in intensive care units (ICUs) leads to the development of pressure ulcers (PUs). This study aimed to evaluate the incidence and prevalence of PUs and the contributing factors in COVID-19 patients admitted to ICUs.
- This cohort retrospective study used registry data from Imam Reza Hospital, Iran, from 20 March 2020 to 30 December 2020. The study included 445 patients, >20 years old, hospitalised in COVID-19 ICUs, with a Braden score <14. There were 183 (41.12%) men and the mean age of patients was 63 (SD = ±9.78) years.
- A total of 1,152 PUs occurred, with the highest prevalence in the sacrum (234), followed by non-invasive ventilation ulcers (176). The prevalence of PU was 79.7%. The highest prevalence was found in people >80 years (90.67%) and the highest number of new cases was in people with diabetes (60.96%). Age, Braden score, BMI, comorbidity, diabetes, stool incontinence, Glasgow coma scale, vasopressor, and length of hospital stay were significantly associated with PUs (p<0.05).
- The authors concluded that the length of hospitalisation and Braden score were the most important factors in the development of PUs. They emphasised the use of appropriate measures to prevent PUs in COVID-19 patients.

Amini M, Mansouri F, Vafaei K et al (2022). Factors affecting the incidence and prevalence of pressure ulcers in COVID-19 patients admitted with a Braden scale below 14 in the intensive care unit: Retrospective cohort study. *Int Wound J* 19(8): 2039–54.

2 Ultrasound patterns of venous disease in patients with venous leg ulcers and morbid obesity

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

- Obesity affects more than two-thirds of the Australian population and is associated with increased risk of venous leg ulcers (VLU). Surgical treatment of superficial venous incompetence in patients with VLU reduces ulcer healing time and recurrence, but this has not yet been investigated in patients with obesity. The authors aimed to determine if their ultrasound pattern of superficial

venous incompetence in patients with VLU and morbid obesity was the same as patients without morbid obesity.

- Consecutive patients attending a outpatient leg ulcer clinic were eligible for inclusion if they had an active or healed VLU. Demographics and VLU information was collected from the electronic medical record and assessed against findings of venous duplex ultrasound. The primary outcome was the proportion of patients with morbid obesity with superficial venous incompetence. Secondary outcomes included the proportion of patients with morbid obesity who were investigated with a duplex ultrasound, and presence of deep venous incompetence.
- There were 156 eligible patients; of these, 103 patients had full data and were used for the primary outcome analysis. Twenty-nine patients (28.2%) had morbid obesity, and they were younger than those without morbid obesity (69.0 versus 73.0 years, p=0.026), with no difference in sex, active or healed ulcer classification or ulcer sidedness.
- On ultrasound, there was no difference in the proportion of patients with morbid obesity with superficial venous incompetence on ultrasound (72.4% versus 79.7%, p=0.423). Patients with morbid obesity were equally as likely to undergo ultrasound investigation (73.2% versus 75.8%, p=0.748).
- In patients with VLU there was no difference in the proportion of patients with morbid obesity with superficial venous incompetence.
- The authors noted that directed studies are needed to determine the effectiveness of intervention in this patient population.

Moss JL, Pugliese M, Richards T (2022) Ultrasound patterns of venous disease in patients with venous leg ulcers and morbid obesity. *Phlebology* 37(10): 732–38

3 Iliac vein recanalisation and stenting accelerate healing of venous leg ulcers associated with severe venous outflow obstruction

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

- Obstruction involving the iliac veins and/or inferior vena cava is highly comorbid in patients with chronic venous leg ulcers (VLU) and is a barrier to healing. Venous stenting is recommended to promote wound healing; however, there is limited data on the effects of venous outflow restoration on healing.
- The authors retrospectively identified patients with VLUs and comorbid venous outflow obstruction. They collected data on wound size, degree of obstruction, interventions, wound healing and recurrence were collected. Intervention was performed where

possible. Patients were grouped based on whether the venous outflow was successfully reopened and maintained for at least 1 year. Outcomes included time to wound healing, wound recurrence, stent patency and ulcer-free time.

- Patients who maintained a patent venous outflow tract had higher rates of wound healing (79.3%) versus those with persistent outflow obstruction (22.6%) at 12 months ($p < 0.001$). Ulcer-free time for the first year was greater with patent venous outflow (7.6 ± 4.4 months versus 1.8 ± 3.0 months, $p < 0.0025$).
- Patients with severe obstruction of the venous outflow tract experience poor healing of VLU despite appropriate wound care. This study demonstrated that healing time is improved and ulcer-free time increased after venous stenting.

Ruiz CS, Hamrick MF, McGinagle KL, Marston WA (2023) Iliac vein recanalisation and stenting accelerate healing of venous leg ulcers associated with severe venous outflow obstruction. *Wound Repair Regen* [Online ahead of print]

4 Analysis of the clinical features and risk factors of device-related pressure injuries in the operating room

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

- The authors aimed to describe the clinical features and risk factors of device-related pressure injuries in the operating room (OR).
- The clinical features of the device-related pressure injuries experienced by patients undergoing elective surgery in a tertiary hospital were investigated through prospective data collection. A patient questionnaire was designed.
- The incidence of OR device-related pressure injuries was 0.56%, and these were mainly stage I injuries (73.53%). Non-bone protuberances, such as the upper arms and thighs, were common injury sites. The patients' BMI, mean arterial pressure and instrument action time were independent risk factors for the OR device-related pressure injuries.
- The authors concluded that in order to reduce the incidence of OR device-related pressure injuries, it is of great clinical significance to focus on the characteristics of the surgical patients and the types of surgery-related devices used and to take personalised preventive measures based on the relevant risk factors.

Ma LY, Chen HL, Gu HY et al (2023) Analysis of the clinical features and risk factors of device-related pressure injuries in the operating room. *Int Wound J* 20(3): 706–15

5 Macronutrient and micronutrient intake of individuals with diabetic foot ulceration

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

- The authors' aim was to describe the dietary intake of adults with diabetic foot ulcers (DFU) in an Australian setting. A lack of nutrients, such as protein, zinc, vitamin C and vitamin D, have all been associated with poor wound healing.
- In this cross-sectional study, the researchers recruited 115 people with diabetes, a mean BMI of 36 and current foot ulceration from

across New South Wales. Dietary intake was assessed using the Australian Eating Survey, a self-reported validated food frequency questionnaire.

- The mean (SD) reported energy intake was $9.57 (\pm SD 4.43)$ MJ/day. The mean protein intake was below the level recommended for wound healing. The mean carbohydrate intake was within recommended ranges; however, the mean total fat intake was above recommendations. Micronutrient intake was adequate, apart from folate, which was below the recommended level, and sodium, vitamin C, vitamin A and selenium, which were higher than recommended.
- The authors concluded that a lack of adequate folate may have a negative impact on healing. Management of individuals with DFU should include a regular assessment of dietary intake to recognise and address deficiencies in macro- and micronutrients to optimise healing.

Collins R, Burrows T, Donnelly H, Tehan PE (2022) Macronutrient and micronutrient intake of individuals with diabetic foot ulceration: A short report. *J Hum Nutr Diet* 35(5): 786–90

6 Association of vitamin D status with all-cause mortality and outcomes among Chinese individuals with diabetic foot ulcers

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

- The aim of this study was to examine the correlation between serum vitamin D and prognosis among Chinese individuals with diabetic foot ulcers (DFUs).
- The authors retrospectively recruited 275 patients with DFUs from a Chinese hospital. They compared serum vitamin D concentrations among DFU patients with different prognostic status.
- The authors found that 31.6% of patients had vitamin D deficiency (< 30 nmol/l) and 42.2% had insufficient vitamin D (< 50 nmol/l). During a median follow-up of 52 months, 65 patients died (all-cause mortality 23.64%). Vitamin D deficiency was independently linked to increased all-cause mortality after multivariable adjustments. Patients who had undergone amputations had a tendency to have lower vitamin D concentrations.
- The authors found that vitamin D deficiency was significantly associated with increased all-cause mortality in DFUs. They suggest that vitamin D supplementation may be a potential therapy for DFUs to prevent premature death and improve outcomes.

Tang W, Chen L, Ma W et al (2023) Association of vitamin D status with all-cause mortality and outcomes among Chinese individuals with diabetic foot ulcers. *J Diabetes Investig* 14(1): 122–31.