Wound digest
This digest summarises recent key papers published in the areas of pressure ulcers, skin integrity, diabetic foot ulcers and venous leg ulcers.

SELECTED PAPERS OF INTEREST
1. Clinical judgement as effective as Waterlow and Ramstadius pressure ulcer assessment tools in preventing hospital-acquired PU
2. Attitudes towards PU correlate significantly with adequate prevention measures
3. Plain film X-ray can be diagnostic for osteomyelitis
4. Systematic development and validation of a leg ulcer adherence intervention is beneficial but time consuming
5. Hydrogel as effective as topical becaplermin gel in achieving hypertensive leg ulcer closure
6. Addition of weekly ultrasound treatment to standard wound care does not increase healing rates, affect quality of life or decrease leg ulcer recurrence rates
7. Link between new onset of leg ulcers and low climate temperature
8. Perianal pouch more effective than containment brief in delaying onset and reducing incidence of incontinence-associated dermatitis
9. English lower limb amputation rate static for 5 years
10. Repeated, prolonged therapies to salvage a diabetic limb
11. Validation of a wound impact schedule among people with DFUs

To compile the digest a Medline search was performed for the three months ending in April using the search terms ‘pressure ulcers’, ‘skin integrity’, ‘leg ulcers’ and ‘diabetic foot ulcers’. Papers have been chosen on the basis of their potential interest to practitioners involved in day-to-day wound care. The papers were rated according to readability, applicability to daily practice, and novelty factor.

Pressure Ulcers

1. Clinical judgement as effective as Waterlow and RamstADIUS pressure ulcer assessment tools in preventing hospital-acquired PU

- This single-blind, randomised controlled trial was designed to evaluate the effectiveness of the Waterlow and RamstADIUS pressure ulcer screening tools, compared to reliance on clinical judgement without use of risk screening instruments, in preventing pressure ulcers in internal medicine/oncology inpatients at the Royal Brisbane and Women’s Hospital, Australia
- This was the first randomised controlled trial to assess the Waterlow screening tool
- The study included 1,231 adult subjects (aged 18–100 years; mean age 62.6±19.3 years) with a minimum hospital stay of two days. N=410 were allocated to the clinical judgement group, and n=410 and n=411 to the Waterlow and RamstADIUS screening tool groups, respectively
- Patients were assessed for pressure ulcers as part of routine clinical care. Nurses on participating wards were offered in-service training about the study and use of the assessment tools, and had access to research staff for further support if necessary. Research nurses blinded to the screening tools and who had training in ulcer staging, assessed patients at baseline and then daily, using standardised assessment methods
- At baseline, 5.8% of patients had existing pressure ulcers (36.6% were stage 1, 39.4% stage 2, 8.5% stage 3 and 7.0% stage 4); 94.7% had one comorbidity and
71.6% had multiple comorbidities

- The incidence of new pressure ulcers was similar between groups: clinical judgement 28/410 (6.8%); Waterlow 31/411 (7.5%); Ramstadius 22/410 (5.4%), p=0.44
- Factors associated with the development of pressure ulcers following hospital admission included requirement for dietetic referral, admission from a location other than home and age over 65 years
- The authors concluded that the study provided no evidence for the superiority of two common pressure ulcer risk-assessment tools over clinical judgement in preventing pressure ulcer development following hospital admission, and that resources might be better employed in careful daily skin inspection and targeting of management based on specific risk factors.


2 Attitudes towards PU correlate significantly with adequate prevention measures

- This cross-sectional, multi-center study of Belgian nurses, recruited from 14 hospitals, aimed to explore knowledge of, attitudes to and use of treatment guidelines for pressure ulcer prevention, in order to identify barriers such as lack of knowledge or negative attitudes
- Previously-identified barriers to effective pressure ulcer prevention include lack of knowledge, lack of individual motivation, lack of interest and low prioritisation
- Ninety-four wards treating 2,105 patients (almost 70% of whom were aged at least 70 years) were subjected to clinical observation in order to assess the prevalence of pressure ulcers and the adequacy of PU prevention. Five hundred and thirty-three randomly-selected nurses took part (55% of whom had practised as nurses for over 10 years); at least five were included from each ward
- The Braden Scale was used to assess the pressure ulcer risk of each patient
- Nurses also completed validated knowledge and attitude instruments (the Pressure Ulcer Knowledge Assessment Tool and the Attitude toward Pressure Ulcer tool (APuP)
- Overall pressure ulcer prevalence (categories I-IV) was 13.5% (284/2105)
- Approximately 30% (625/2105) of patients were found to be at risk of PU (Braden score <17 and/or presence of pressure ulcer). However, only 13.9% (87/625) of these patients received fully adequate prevention whilst in bed and when seated. This improved among intensive care patients, of whom 30.9% received adequate prevention measures
- Mean knowledge and attitude scores were 49.7% and 71.3%, respectively
- The application of adequate prevention was significantly correlated with the attitudes of the nurses (OR=3.07, p=0.05). No independent correlation was found between knowledge and the application of adequate prevention (OR=0.75, p=0.71)
- The authors concluded that knowledge of pressure ulcer prevention is inadequate among Belgian nurses, and that attitudes towards PU correlate significantly with application of adequate prevention measures. Although poor knowledge did not correlate directly, the authors state that lack of knowledge undoubtedly contributes to poor prevention and suboptimal PU care.


3 Plain film X ray can be diagnostic for osteomyelitis

- US federal reimbursement via Medicaid for hospital-acquired stage III and IV pressure ulcers has been restricted since 2008, on the basis that such ulcers should never develop whilst a patient is under hospital care
- This decision has renewed focus on the adequate diagnosis, treatment and prevention of PU
- Although methods used in PU have improved in general, there is no definitive way to diagnose osteomyelitis in PU patients other than open biopsy of the involved bone
- This retrospective study of 44 patients with stage IV pressure ulcers reviewed preoperative radiologic studies and bone biopsy results to determine which radiologic studies might be diagnostic for osteomyelitis
- Patients having surgical debridement of their ulcers with open bone biopsy after prior radiographic imaging (plain films, ultrasound, computed tomography [CT], magnetic resonance imaging [MRI], and/or nuclear bone scans) were included in the study
Images were interpreted by a single musculoskeletal radiologist blinded to information from the medical record, following standard radiologic criteria for diagnosis of osteomyelitis.

Of patients with biopsy-proven osteomyelitis, 50% were identified with the condition via CT scan, and 88% using plain film only. Among those without osteomyelitis, this was confirmed in 85% of patients by CT scan, and in 32% using plain film.

The authors concluded that detection of osteomyelitis to aid diagnosis via radiologic means in stage IV pressure ulcer patients was “less than definitive” but that, of the imaging modalities examined, plain film appears to be sufficient, although even routine use of this may be problematic in today’s cost-containment environment.

They also emphasise that bone biopsy should still be performed in patients with suspected osteomyelitis, not least to inform choice of antibiotic therapy.


Leg Ulcers

4 Systematic development and validation of a leg ulcer adherence intervention is beneficial but time consuming

The aim of this study was to describe and assess the added value of systematic development and validation of an adherence-promoting nursing intervention devised for patients with leg ulcers.

The intervention, developed originally in 2008, consists of information and counselling sessions carried out by tissue viability nurses (TVNs), and focuses on the use of compression hosiery, leg elevation, physical activity and leg exercises.

The intervention is based on a model consisting of four phases: Phase 1 - literature review (of lifestyle advice and adherence, patient problems, quality of life and information needs), problem and needs analysis (via explorative, qualitative research via interviews with 15 patients), and current practice analysis (involving focus group research with community nursing teams); Phase 2 – intervention design; Phase 3 – validation of the nursing intervention (via use of anonymous Delphi procedure involving 17 experts) and Phase 4 – intervention validation (via qualitative field study and cyclical testing, re-testing and evaluation).

The systematic development process examined an analysis of patients’ experiences and professionals’ views on care, and employed a cyclical process of trying out, evaluating, revising and reassessing the adapted intervention in patients.

This process demonstrated that the intervention was more likely to be feasible and appropriate to patients’ needs when patient and nurse perspectives were explored during intervention development.

Patient issues included lack of awareness of causes of leg ulcers and how the individual might contribute to healing; lack of awareness of how lifestyle advice impacts on healing or recurrence; and concerns about pain, wound healing and skin care.

Nursing issues included concerns about patient adherence with lifestyle advice (and sympathy with non-adherence); poor exploration of problems and obstacles experienced by patients; and limited knowledge of lifestyle advice.

Validation via use in nursing care was useful in refining the intervention via clarification of the processes underlying effectiveness, and in linking techniques most successful in effecting behavioural change to theoretical constructs.

During the validation phase, key issues included trust in the TVN in achieving patient adherence; much higher self-efficacy for performance of leg exercises than leg elevation and physical activity; and doubts expressed by patients about the likely benefits of lifestyle changes.

The study authors concluded that, although systematic development of the nursing intervention was time consuming, it was worthwhile.


5 Hydrogel as effective as topical becaplermin gel in achieving hypertensive leg ulcer closure

This randomised, double-blind, parallel assignment, controlled study in 64 patients with one or more hypertensive leg ulcers was designed to assess the healing effect of topical becaplermin gel (human recombinant platelet-derived growth factor-BB, 0.1%, in hydrogel) versus hydrogel dressing.

Eligible consecutive ambulatory and hospitalised adult patients from 17 French dermatology departments were randomised to receive either topical becaplermin
rates, affect quality of life or decrease leg ulcer


6 Addition of weekly ultrasound treatment to standard wound care does not increase healing rates, affect quality of life or decrease leg ulcer recurrence rates

- This multicentre, two-arm randomised controlled trial was designed to assess the efficacy of adding weekly low-dose, high frequency ultrasound treatment to standard wound care in the management of hard-to-heal leg ulcers
- Subjects (n=337) were recruited from both community-based wound care services and hospital outpatient leg ulcer clinics in 12 settings (11 in the UK and one in the Republic of Ireland). To be eligible, patients had at least one venous leg ulcer of at least a six-month duration, or with surface area greater than 5cm² and ankle brachial pressure index of at least 0.8
- Participants were randomised to receive standard care, or standard care plus weekly administration of ultrasound therapy (0.5 W/cm², 1 MHz, pulsed pattern of 1:4) for up to 12 weeks. Participating nurses were trained in the administration of the ultrasound therapy
- Primary outcome was time to healing of the largest eligible leg ulcer; secondary outcomes were proportion of patients healed by 12 months, percentage and absolute change in ulcer size, proportion of time participants were ulcer-free, health-related quality of life and adverse events
- The study demonstrated that there was no difference between the two groups in time to leg ulcer healing, even after adjustment for baseline ulcer area, use of compression bandaging and study centre (hazard ratio 0.99 [95% confidence interval 0.70 to 1.40], P=0.97). Median time to healing of the reference leg ulcer was inestimable
- There was no significant difference between groups in the proportion with all ulcers healed by 12 months (72/168 in ultrasound group versus 78/169 in standard care group, P=0.39 for Fisher’s exact test) nor in the change in ulcer size at four weeks by treatment group (model estimate 0.05 [95% CI −0.09 to 0.19]). There was no difference in time to complete healing of all ulcers (log rank test, P=0.61), with median time to healing of 328 days (95% CI 235 to inestimable) with standard care and 365 days (224 days to inestimable) with ultrasound
- There was no evidence of a difference in rates of recurrence of healed ulcers (17/31 with ultrasound v 14/31 with standard care, P=0.68 for Fisher’s exact test). There was no difference between the two groups in health-related quality of life, both for the physical component score (model estimate 0.69 [-1.79 to 3.08]) and the mental component score (model estimate −0.93 [-3.30 to 1.44]), but there were significantly more adverse events in the ultrasound group (model estimate 0.30 [0.01 to 0.60])
- Larger and older ulcers took longer to heal; centres with high recruitment rates had the highest healing rates
- Previous trials in which ultrasound was reported to be beneficial in venous leg ulcers were described by the authors of the present study as having been methodologically weak, heterogeneous, prone to bias and with wide variation in ultrasound application regimens.
Seasonal variations in leg ulcer onset are widely reported, but the reasons for the fluctuations in incidence are not well understood. This retrospective analysis of data from 193 patients with chronic leg ulcers aimed to discover any correlation between climatic factors and seasonal onset of leg ulcer formation due to chronic venous insufficiency or mixed arterial and venous disorders.

Data were examined from the records of 183 patients with chronic leg ulcers (defined as lack of healing within three months despite appropriate treatment) treated in the dermatology wound care centre at the University School of Medicine Essen-Duisberg between January 2004 and December 2009.

Onset of ulcers each month and by season were documented, and climatic factors including temperature and relative humidity for the same time periods were identified.

The analysis revealed that the onset of chronic leg ulcers showed striking seasonal variations. There were two peaks in incidence: the first in autumn (September, October and November), and the second in winter (December, January and February).

Maximum incidence occurred in January (33 patients; 17.5%), and minimum in July and August (12 patients; 6.3%).

There was a statistically significant negative correlation between temperature and new ulcer onset; ie the colder the temperature, the higher the onset (correlation coefficient 0.613, P = 0.034).

There was no statistically significant correlation between relative humidity and the amount of ulcer onset (P > 0.05).

The authors concluded that climatic factors play an important role in leg ulcer development. They recommend routine application of moisturisers to aged, dry and damaged skin resulting from chronic venous insufficiency or mixed arterial and venous disease, especially in cold, dry weather, in order to help prevent the skin scaling and pruritis, as these may predispose to the development of chronic leg ulcers.

As many as two-thirds of acute hospitalised patients and 60% of nursing home residents may suffer from incontinence-associated dermatitis (IAD).

This randomised controlled trial compared the effects of two devices used to contain faecal incontinence on the incidence of IAD in patients hospitalised in the neurology and neurosurgery wards of a large university hospital in Turkey.

The devices tested were a perianal pouch and containment brief. Thirty bedridden patients were randomised to use one or the other (n=15 in each group). Patients all had indwelling urinary catheters and were faecally incontinent.

Routine skin hygiene was carried out daily and repeated when required because of faecal soiling. Skin care consisted of washing the area with a 1% antiseptic solution containing 15% cetrimide, 1.5% chlorhexidine gluconate, ethanol, and water.

Perineal skin integrity was evaluated daily during skin care. Data was collected using a Patient Identification Form, a Patient Observation Form and a Perineal Skin Integrity Assessment Form.

The mean number of perianal pouches required daily was 5.80 versus 5.46 for the containment brief.

IAD occurred in 66.7% of perianal pouch users, and in 100% of subjects managed by containment brief. This difference was statistically significant (X² = 6.0, P = 0.04).

Onset of IAD was later in subjects using a perianal pouch than in those using adult containment briefs (U = 30.500, P = 0.011).

IAD involved an average of 1.8 areas among patients managed with a perianal pouch, compared to 2.3 areas in patients managed with adult containment briefs (P= NS).

The authors concluded that, using the devices in this study, both incidence and time to onset of IAD was reduced using the perianal pouch. They, therefore, recommend the use of the perianal pouch in bedridden patients with faecal incontinence.
Diabetic foot ulcers

9 English lower limb amputation rate static for five years

- Data on lower-extremity amputations in England were extracted from the Hospital Episodes Statistic database for 2003–2008. Risk adjustment and linear regression were used for analysis
- The major amputation rate was static for the period (1.5/100 000)
- Of those who underwent major amputation, >39% had diabetes
- Amputation and post-amputation mortality rates varied significantly between regions (P<0.001).


10 Repeated, prolonged therapies to salvage a diabetic limb

- The authors describe a case of limb salvage in a 52-year-old man with type 2 diabetes in the USA as a typical case of this nature at their institution and go on to question whether the repeated, prolonged therapies undertaken were the best clinical course
- Presenting with a left foot ulcer that appeared spontaneously four weeks prior, the man (type 2 diabetes duration, 10 years; a range of comorbidities) was treated with antibiotics as an outpatient
- The man’s health quickly deteriorated and he was admitted to hospital with systemic infection and congestive heart failure
- An orthopaedic consultation was obtained, the recommendation being for a below-knee amputation to which the patient agreed. However, following further discussion with the attending physicians, continued limb salvage attempts were undertaken
- One hundred and eight days following presentation, after eight surgical interventions, including superficial femoral artery angioplasty and stenting, development of a secondary heel ulcer, synthetic skin therapy and transmetatarsal amputation, the man was given leave to begin ambulating in a custom boot
- The authors question whether a single high-level amputation might have been more appropriate in this case and stress that frequent re-evaluation must be undertaken along the therapeutic path, by people with diabetic foot disease, their families and treating healthcare professionals.


11 Validation of a wound impact schedule among people with DFUs

- The authors sought to evaluate and validate the Cardiff Wound Impact Schedule (CWIS) in a Canadian population with active diabetic foot ulceration (DFU) at enrolment
- The CWIS assesses health-related quality-of-life measures among people with chronic lower-limbs wounds
- Participants (n=30; mean age 59±11 years; active DFU) were recruited from an outpatient clinic
- The CWIS social life, well-being and general health measures correlated well with the World Health Organization’s wound impact scale (SF-36v2; all P<0.01)
- Participants with more severe wounds as measured by the University of Texas wound classification system did not have significantly worse scores on the CWIS
- Although the CWIS is reliable and valid, the authors concluded that more research is required to determine the relationship between CWIS score and wound severity.