

A SELECTION OF TEN READINGS ON TOPICS RELATED TO WOUND CARE

some available as free full-text and some requiring payment

Selection of readings made by A/Prof Goh Lee Gan

READING 1 – USING FRUITS TO STAGE PRESSURE ULCERS

Mackintosh R, Gwilliam A, Williams M. Teaching the fruits of pressure ulcer staging. J Wound Ostomy Continence Nurs. 2014 Jul-Aug;41(4):381-7. PubMed PMID: 24988517

URL: <http://ovidsp.tx.ovid.com./doi:10.1097/WON.0000000000000049>. – Free full text

Author information:

(1) Rebecca Mackintosh, APRN, FNP-C, CWCN, Intermountain Healthcare, Brigham Young University, Provo, Utah; Annette Gwilliam, RN, BSN, CWS, ACHRN, Intermountain Healthcare, Brigham Young University, Provo, Utah. Mary Williams, RN, PhD, Brigham Young University, Provo, Utah.

ABSTRACT

BACKGROUND: Accurate pressure ulcer staging is an important skill for nurses, physicians, physical therapists, and certified nursing assistants. Current education is based on the National Pressure Ulcer Advisory Panel's staging system. A review of the literature indicates variability in staging abilities of numerous healthcare providers. With this problem in mind, a new method of teaching pressure ulcer staging by visual analogy was developed.

METHODS: We used the current National Pressure Ulcer Advisory Panel definitions to create a training tool based on a visual analogy between the different pressure ulcer stages and common fruits and vegetables.

RESULTS: Initial feedback from a western states wound care conference indicates successful integration of teaching into nursing practice. A poster was also presented at the annual 2011 Wound, Ostomy and Continence Nurse's National Conference. Positive feedback was received from numerous Wound, Ostomy and Continence Nurse's members who requested an electronic copy of the poster.

CONCLUSIONS: Visual analogies can provide a method of teaching pressure ulcer staging across different disciplines with different levels of training involved in patient care.

READING 2 – NUTRITIONAL STRATEGIES TO REDUCE PRESSURE ULCERS

Posthauer ME, Collins N, Dorner B, Sloan C. Nutritional strategies for frail older adults. Adv Skin Wound Care. 2013 Mar;26(3):128-40; quiz 141-2. doi: 10.1097/01.ASW.0000427920.74379.8c. PubMed PMID: 23426414.

URL: <http://www.ncbi.nlm.nih.gov/pubmed?term=23426414&report=abstract&format=text> – free full text

Author information:

(1)MEP Healthcare Dietary Services, Inc, Evansville, Indiana, USA.

Comment in

Adv Skin Wound Care. 2013 Mar;26(3):102.

The objectives of this continuing education article are to analyze the aging process and its effect on the nutritional status of frail older adults; determine how sarcopenia, anorexia, malnutrition, and Alzheimer disease increase the risk for pressure ulcer development and impact the healing process; and to apply evidence-based nutrition guidelines and implement practical solutions for wound healing.

READING 3 – PRESSURE RISK MANAGEMENT GUIDELINES WORK

Kapp S. Successful implementation of clinical practice guidelines for pressure risk management in a home nursing setting. J Eval Clin Pract. 2013 Oct;19(5):895-901. doi: 10.1111/j.1365-2753.2012.01870.x. Epub 2012 Jun 5. PubMed PMID: 22672390.

URL: <http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2753.2012.01870.x/pdf> - Payment required

Author information:

Research Fellow, Registered Nurse, Royal District Nursing Service Helen Macpherson Smith Institute of Community Health, St Kilda, Victoria, Australia.

ABSTRACT

RATIONALE: This paper reports an initiative which promoted evidence-based practice in pressure risk assessment and management among home nursing clients in Melbourne, Australia.

AIM AND OBJECTIVES: The aim of this study was to evaluate the introduction and uptake of the Australian Wound Management Association Guidelines for the Prediction and Prevention of Pressure Ulcers.

METHOD: In 2007 a pilot study was conducted. Nurse perspectives (n=21) were obtained via survey and a client profile (n=218) was generated. Audit of the uptake and continued use of the pressure risk screening tool, during the pilot study and later once implemented as standard practice organizational wide, was conducted.

RESULTS: Nurses at the pilot site successfully implemented the practice guidelines, pressure risk screening was adopted and supporting resources were well received. Most clients were at low risk of pressure ulcer development. The pilot site maintained and extended their pilot study success, ensuring more than 90% of clients were screened for pressure risk over the 18 months which followed. All other sites performed less well initially, however subsequently improved, meeting the pilot sites success after 18 months. Two years later, the organization continues to screen more than 90% of all clients for pressure risk.

CONCLUSION: Implementation of clinical practice guidelines was successful in the pilot project and pressure risk screening became a well-adopted practice. Success continued following organizational wide implementation. Pilot study findings suggest it may be prudent to monitor the pressure ulcer risk status of low risk clients so as to prevent increasing risk and pressure ulcer development among this group.

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READING 4 – REPOSITIONING FOR PRESSURE ULCER PREVENTION

Gillespie BM, Chaboyer WP, McInnes E, Kent B, Whitty JA, Thalib L. Repositioning for pressure ulcer prevention in adults. Cochrane Database Syst Rev. 2014 Apr 3;4:CD009958. doi: 10.1002/14651858.CD009958.pub2. PubMed PMID: 24700291.

URL: <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD009958.pub2/pdf> -- Payment required

Author information:

(1)NHMRC Centre of Research Excellence in Nursing, Griffith University, Brisbane, Queensland, Australia.

ABSTRACT

BACKGROUND: A pressure ulcer (PU), also referred to as a 'pressure injury', 'pressure sore', or 'bedsore' is defined as an area of localised tissue damage that is caused by unrelieved pressure, friction or shearing forces on any part of the body. PUs commonly occur in patients who are elderly and less mobile, and carry significant human and economic impacts. Immobility and physical inactivity are considered to be major risk factors for PU development and the manual repositioning of patients in hospital or long-term care is a common pressure ulcer prevention strategy.

OBJECTIVES: The objectives of this review were to:1) assess the effects of repositioning on the prevention of PUs in adults, regardless of risk or in-patient setting;2) ascertain the most effective repositioning schedules for preventing PUs in adults; and3) ascertain the incremental resource consequences and costs associated with implementing different repositioning regimens

compared with alternate schedules or standard practice.

SEARCH METHODS: We searched the following electronic databases to identify reports of the relevant randomised controlled trials: the Cochrane Wounds Group Specialised Register (searched 06 September 2013), the Cochrane Central Register of Controlled Trials (CENTRAL) (2013, Issue 8); Ovid MEDLINE (1948 to August, Week 4, 2013); Ovid EMBASE (1974 to 2013, Week 35); EBESCO CINAHL (1982 to 30 August 2013); and the reference sections of studies that were included in the review.

SELECTION CRITERIA: Randomised controlled trials (RCTs), published or unpublished, that assessed the effects of any repositioning schedule or different patient positions and measured PU incidence in adults in any setting.

DATA COLLECTION AND ANALYSIS: Two review authors independently performed study selection, risk of bias assessment and data extraction. **MAIN RESULTS:** We included three RCTs and one economic study representing a total of 502 randomised participants from acute and long-term care settings. Two trials compared the 30° and 90° tilt positions using similar repositioning frequencies (there was a small difference in frequency of overnight repositioning in the 90° tilt groups between the trials). The third RCT compared alternative repositioning frequencies. All three studies reported the proportion of patients developing PU of any grade, stage or category. None of the trials reported on pain, or quality of life, and only one reported on cost. All three trials were at high risk of bias. The two trials of 30° tilt vs. 90° were pooled using a random effects model ($I^2 = 69\%$) (252 participants). The risk ratio for developing a PU in the 30° tilt and the standard 90° position was very imprecise (pooled RR 0.62, 95% CI 0.10 to 3.97, $P=0.62$, very low quality evidence). This comparison is underpowered and at risk of a Type 2 error (only 21 events). In the third study, a cluster randomised trial, participants were randomised between 2-hourly and 3-hourly repositioning on standard hospital mattresses and 4 hourly and 6 hourly repositioning on viscoelastic foam mattresses. This study was also underpowered and at high risk of bias. The risk ratio for pressure ulcers (any category) with 2-hourly repositioning compared with 3-hourly repositioning on a standard mattress was imprecise (RR 0.90, 95% CI 0.69 to 1.16, very low quality evidence). The risk ratio for pressure ulcers (any category) was compatible with a large reduction and no difference between 4-hourly repositioning and 6-hourly repositioning on viscoelastic foam (RR 0.73, 95% CI 0.53 to 1.02, very low quality evidence). A cost-effectiveness analysis based on data derived from one of the included parallel RCTs compared 3-hourly repositioning using the 30° tilt overnight with standard care consisting of 6-hourly repositioning using the 90° lateral rotation overnight. In this evaluation the only included cost was nursing time. The intervention was reported to be cost saving compared with standard care (nurse time cost per patient €206.6 vs €253.1, incremental difference €-46.5; 95%CI: €-1.25 to €-74.60).

AUTHORS' CONCLUSIONS: Repositioning is an integral component of pressure ulcer prevention and treatment; it has a sound theoretical rationale, and is widely recommended and used in practice. The lack of robust evaluations of repositioning frequency and position for pressure ulcer prevention mean that great uncertainty remains but it does not mean these interventions are ineffective since all comparisons are grossly underpowered. Current evidence is small in volume and at risk of bias and there is currently no strong evidence of a reduction in pressure ulcers with the 30° tilt compared with the standard 90° position or good evidence of an effect of repositioning frequency. There is a clear need for high-quality, adequately-powered trials to assess the effects of position and optimal frequency of repositioning on pressure ulcer incidence. The limited data derived from one economic evaluation means it remains unclear whether repositioning every 3 hours using the 30° tilt is less costly in terms of nursing time and more effective than standard care involving repositioning every 6 hours using a 90° tilt.

READING 5 – COMPARING PRESSURE ULCER TREATMENT STRATEGIES

Smith ME, Totten A, Hickam DH, Fu R, Wasson N, Rahman B, Motu'apuaka M, Saha S. Pressure ulcer treatment strategies: a systematic comparative effectiveness review. *Ann Intern Med.* 2013 Jul 2;159(1):39-50. doi: 10.7326/0003-4819-159-1-201307020-00007. Review. PubMed PMID: 23817703.

URL: <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0057472> – Free full text

Author information: (1) Oregon Evidence-based Practice Center, Oregon Health & Science University, Portland, OR 97239-3098, USA. smithbet@ohsu.edu

ABSTRACT

BACKGROUND: Pressure ulcers affect as many as 3 million Americans and are major sources of morbidity, mortality, and health care costs.

PURPOSE: To summarize evidence comparing the effectiveness and safety of treatment strategies for adults with pressure ulcers.

DATA SOURCES: MEDLINE, EMBASE, CINAHL, Evidence-Based Medicine Reviews, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects, and Health Technology Assessment Database for English- or foreign-language studies; reference lists; gray literature; and individual product packets from manufacturers (January 1985 to October 2012).

STUDY SELECTION: Randomized trials and comparative observational studies of treatments for pressure ulcers in adults and noncomparative intervention series ($n > 50$) for surgical interventions and evaluation of harms.

DATA EXTRACTION: Data were extracted and evaluated for accuracy of the extraction, quality of included studies, and strength of evidence.

DATA SYNTHESIS: 174 studies met inclusion criteria and 92 evaluated complete wound healing. In comparison with standard care, placebo, or sham interventions, moderate-strength evidence showed that air-fluidized beds (5 studies [$n = 908$]; high consistency), protein-containing nutritional supplements (12 studies [$n = 562$]; high consistency), radiant heat dressings (4 studies [$n = 160$]; moderate consistency), and electrical stimulation (9 studies [$n = 397$]; moderate consistency) improved healing of pressure ulcers. Low-strength evidence showed that alternating-pressure surfaces, hydrocolloid dressings, platelet-derived growth factor, and light therapy improved healing of pressure ulcers. The evidence about harms was limited.

LIMITATION: Applicability of results is limited by study quality, heterogeneity in methods and outcomes, and inadequate duration to assess complete wound healing.

CONCLUSION: Moderate-strength evidence shows that healing of pressure ulcers in adults is improved with the use of air-fluidized beds, protein supplementation, radiant heat dressings, and electrical stimulation.

READING 6 – ENZYMATIC SUPERIOR TO AUTOLYTIC DEBRIDEMENT

Waycaster C, Milne CT. Clinical and economic benefit of enzymatic debridement of pressure ulcers compared to autolytic debridement with a hydrogel dressing. J Med Econ. 2013 Jul;16(7):976-86. doi: 10.3111/13696998.2013.807268. Epub 2013 Jun 7. PubMed PMID: 23701261.

URL: <http://informahealthcare.com./doi/pdf/10.3111/13696998.2013.807268> – Free full text

Author information:

(1)Healthpoint Biotherapeutics, Fort Worth, TX 76107, USA. curtis.waycaster@healthpoint.com

ABSTRACT

OBJECTIVE: The purpose of this study was to determine the cost-effectiveness of enzymatic debridement using collagenase relative to autolytic debridement with a hydrogel dressing for the treatment of pressure ulcers.

METHODS: A 3-stage Markov model was used to determine the expected costs and outcomes of wound care for collagenase and hydrogel dressings. Outcome data used in the analysis were taken from a randomized clinical trial that directly compared collagenase and hydrogel dressings. The primary outcome in the clinical trial was the proportion of patients achieving a closed epithelialized wound. Transition probabilities for the Markov states were estimated from the clinical trial. A 1-year time horizon was used to determine the expected number of closed wound days and the expected costs for the two alternative debridement therapies. Resource utilization was based on the wound care treatment regimen used in the clinical trial. Resource costs were derived from standard cost references and medical supply wholesalers. The economic perspective taken was that of the long-term care facility. No cost discounting was performed due to the short time horizon of the analysis. A deterministic sensitivity analysis was conducted to analyze economic uncertainty.

RESULTS: The number of expected wound days for the collagenase and hydrogel cohorts are estimated at 48 and 147, respectively. The expected direct cost per patient for pressure ulcer care was \$2003 for collagenase and \$5480 for hydrogel debridement. The number of closed wound days was 1.5-times higher for collagenase (317 vs 218 days) than with the hydrogel. The estimated cost/closed wound day was 4-times higher for the hydrogel (\$25) vs collagenase (\$6).

CONCLUSIONS: In this Markov model based on a randomized trial of pressure ulcer care in a long-term care setting collagenase debridement was economically dominant over autolytic debridement, yielding better outcomes at a lower total cost. Since it was a single institution study with a small sample size, the results should be interpreted with caution. Specifically, the findings may not necessarily be generalized to other hydrogel dressings, healthcare settings, age groups, or to wounds of other etiologies.

READING 7 – DIABETIC FOOT INFECTIONS

Gemechu FW, Seemant F, Curley CA. Diabetic foot infections. Am Fam Physician. 2013 Aug 1;88(3):177-84. PubMed PMID: 23939696.

URL: <http://www.aafp.org/afp/2013/0801/p177.pdf> -- Free full text

Author information: (1) MetroHealth Medical Center, Cleveland, OH, USA. fgemechu@metrohealth.org

ABSTRACT

Diabetic foot infection, defined as soft tissue or bone infection below the malleoli, is the most common complication of diabetes mellitus leading to hospitalization and the most frequent cause of nontraumatic lower extremity amputation. Diabetic foot infections are diagnosed clinically based on the presence of at least two classic findings of inflammation or purulence. Infections are classified as mild, moderate, or severe. Most diabetic foot infections are polymicrobial. The most common pathogens are aerobic gram-positive cocci, mainly *Staphylococcus* species. Osteomyelitis is a serious complication of diabetic foot infection that increases the likelihood of surgical intervention. Treatment is based on the extent and severity of the infection and comorbid conditions. Mild infections are treated with oral antibiotics, wound care, and pressure off-loading in the outpatient setting. Selected patients with moderate infections and all patients with severe infections should be hospitalized, given intravenous antibiotics, and evaluated for possible surgical intervention. Peripheral arterial disease is present in up to 40% of patients with diabetic foot infections, making evaluation of the vascular supply critical. All patients with diabetes should undergo a systematic foot examination at least once a year, and more frequently if risk factors for diabetic foot ulcers exist. Preventive measures include patient education on proper foot care, glycemic and blood pressure control, smoking cessation, use of prescription footwear, intensive care from a podiatrist, and evaluation for surgical interventions as indicated.

READING 8 – DIABETIC FOOT ULCER ORGANISMS

Gardner SE, Hillis SL, Heilmann K, Segre JA, Grice EA. The neuropathic diabetic foot ulcer microbiome is associated with clinical factors. Diabetes. 2013 Mar;62(3):923-30. doi: 10.2337/db12-0771. Epub 2012 Nov 8. PubMed PMID: 23139351; PubMed Central PMCID: PMC3581190.

URL: <http://diabetes.diabetesjournals.org./content/62/3/923.full.pdf+html> – Full free text

Author information:

(1)University of Iowa, College of Nursing, Iowa City, Iowa, USA. sue-gardner@uiowa.edu

Comment in Diabetes. 2013 Mar;62(3):679-81.

ABSTRACT

Nonhealing diabetic foot ulcers (DFUs) are a common and costly complication of diabetes. Microbial burden, or "bioburden," is believed to underlie delayed healing, although little is known of those clinical factors that may influence microbial load, diversity, and/or pathogenicity. We profiled the microbiomes of neuropathic nonischemic DFUs without clinical evidence of infection in 52 individuals using high-throughput sequencing of the bacterial 16S ribosomal RNA gene. Comparatively, wound cultures, the standard diagnostic in the clinic, vastly underrepresent microbial load, microbial diversity, and the presence of potential pathogens. DFU microbiomes were heterogeneous, even in our tightly restricted study population, but partitioned into three clusters distinguished primarily by dominant bacteria and diversity. Ulcer depth was associated with ulcer cluster,

positively correlated with abundance of anaerobic bacteria, and negatively correlated with abundance of *Staphylococcus*. Ulcer duration was positively correlated with bacterial diversity, species richness, and relative abundance of Proteobacteria, but was negatively correlated with relative abundance of *Staphylococcus*. Finally, poor glycemic control was associated with ulcer cluster, with poorest median glycemic control concentrating to *Staphylococcus*-rich and *Streptococcus*-rich ulcer clusters. Analyses of microbial community membership and structure may provide the most useful metrics in prospective studies to delineate problematic bioburden from benign colonization that can then be used to drive clinical treatment.

READING 9 – PRESSURE ULCERS PREVALENCE IN SWEDEN

Gunningberg L, Hommel A, Bååth C, Idvall E. The first national pressure ulcer prevalence survey in county council and municipality settings in Sweden. *J Eval Clin Pract*. 2013 Oct;19(5):862-7. doi: 10.1111/j.1365-2753.2012.01865.x. Epub 2012 May 29. PubMed PMID: 22640165.

URL: <http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2753.2012.01865.x/pdf> – Payment required

Author information:

(1)Associate Professor, Department of Public Health and Caring Sciences, Uppsala University and Uppsala University Hospital, Uppsala, Sweden and Adjunct Assistant Professor, School of Nursing, University of California, San Francisco, CA, USA Assistant Professor, Lund University and Skåne University Hospital, Lund, Sweden Assistant Professor, Karlstad University and County Council of Värmland, Karlstad, Sweden Professor, Faculty of Health and Society, Malmö University and Skåne University Hospital, Malmö, Sweden.

ABSTRACT

AIM: To report data from the first national pressure ulcer prevalence survey in Sweden on prevalence, pressure ulcer categories, locations and preventive interventions for persons at risk for developing pressure ulcers.

METHODS: A cross-sectional research design was used in a total sample of 35,058 persons in hospitals and nursing homes. The methodology used was that recommended by the European Pressure Ulcer Advisory Panel.

RESULTS: The prevalence of pressure ulcers was 16.6% in hospitals and 14.5% in nursing homes. Many persons at risk for developing pressure ulcers did not receive a pressure-reducing mattress (23.3-27.9%) or planned repositioning in bed (50.2-57.5%).

CONCLUSIONS: Despite great effort on the national level to encourage the prevention of pressure ulcers, the prevalence is high. Public reporting and benchmarking are now available, evidence-based guidelines have been disseminated and national goals have been set. Strategies for implementing practices outlined in the guidelines, meeting goals and changing attitudes must be further developed.

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READING 10 – PRESSURE ULCERS IN GERMANY & NETHERLANDS

Meesterberends E, Halfens RJ, Spreeuwenberg MD, Ambergen TA, Lohrmann C, Neyens JC, Schols JM. Do patients in Dutch nursing homes have more pressure ulcers than patients in German nursing homes? A prospective multicenter cohort study. *J Am Med Dir Assoc*. 2013 Aug;14(8):605-10. doi: 10.1016/j.jamda.2013.03.005. Epub 2013 Apr 28. PubMed PMID: 23628407

URL: <http://ac.els-cdn.com/doi/10.1016/j.jamda.2013.03.005>. – Payment required

Author information: (1)Department of Health Services Research, School for Public Health and Primary Care (CAPHRI), Maastricht University, Maastricht, The Netherlands. e.meesterberends@maastrichtuniversity.nl

ABSTRACT

OBJECTIVES: To investigate whether the incidence of pressure ulcers in nursing homes in the Netherlands and Germany differs and, if so, to identify resident-related risk factors, nursing-related interventions, and structural factors associated with pressure ulcer development in nursing home residents.

DESIGN: A prospective multicenter cohort study. **SETTING:** Ten nursing homes in the Netherlands and 11 nursing homes in Germany (around Berlin and Brandenburg).

PARTICIPANTS: A total of 547 newly admitted nursing home residents, of which 240 were Dutch and 307 were German. Residents had an expected length of stay of 12 weeks or longer.

MEASUREMENTS: Data were collected for each resident over a 12-week period and included resident characteristics (eg, demographics, medical history, Braden scale scores, nutritional factors), pressure ulcer prevention and treatment characteristics, staffing ratios and other structural nursing home characteristics, and outcome (pressure ulcer development during the study). Data were obtained by trained research assistants.

RESULTS: A significantly higher pressure ulcer incidence rate was found for the Dutch nursing homes (33.3%) compared with the German nursing homes (14.3%). Six factors that explain the difference in pressure ulcer incidence rates were identified: dementia, analgesics use, the use of transfer aids, repositioning the residents, the availability of a tissue viability nurse on the ward, and regular internal quality controls in the nursing home.

CONCLUSION: The pressure ulcer incidence was significantly higher in Dutch nursing homes than in German nursing homes. Factors related to residents, nursing care and structure explain this difference in incidence rates. Continuous attention to pressure ulcer care is important for all health care settings and countries, but Dutch nursing homes especially should pay more attention to repositioning residents, the necessity and correct use of transfer aids, the necessity of analgesics use, the tasks of the tissue viability nurse, and the performance of regular internal quality controls. Copyright © 2013 American Medical Directors Association, Inc. Published by Elsevier Inc. All rights reserved.