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**Literature search results**

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**Search details**

Inpatients at risk of pressure damage. Efficacy of turning airflow mattresses and/or aderma pads to relieve pressure. Recommendations for pressure off-loading in patients with pressure damage.

**Resources searched**

NHS Evidence; TRIP Database; Cochrane Library; BNI; CINAHL; EMBASE; MEDLINE; Google Scholar; Google Advanced Search

**Database search terms** : “pressure damage”; “pressure ulcer*”; PRESSURE ULCER; “pressure sore*”; “deep tissue damage”; “deep tissue injur*”; bedsore*; bed-sore*; “bed sore*”; pressure adj2 damage*; decubiti; “decubitis ulcer”; “airwave mattress”; exp BEDS AND MATTRESSES; mattress*; turn* adj2 mattress*; turn*; PATIENT POSITIONING; airwave adj2 mattress*; “air-flow mattress*”; “air flow mattress*”; “airflow mattress*”; air* adj2 mattress*; “aderma pad*” “aderma dermal pad*”; aderma adj2 pad; pad*; exp PRESSURE SORES; offload*; off-load*; “off load”

**Google search string** : (“pressure damage” OR “pressure ulcer” OR “deep tissue injury” OR bedsore OR “pressure sore”) ((mattress (turn OR turning)) OR pad) (relief OR relieved OR relieving OR offload OR offloading OR “off load” OR off-load) 2009..2011

**Summary**

There has not been a huge amount of research on the management of pressure damage published in the last three years, and even less on aderma pads and airwave mattresses. For this reason I have included information on the efficacy of pads and mattresses more generally. NICE has issued some guidance, but you’re probably aware of it. The Map of Medicine says ‘there is no evidence that any particular type of equipment is superior to another, though one study found that air fluidised beds increased the rate of ulcer healing compared with other pressure-relieving equipment’. See the following research for aderma pads: Report of a clinical evaluation: aderma dermal pads in prevention & reduction of pressure injuries in Evidence-based reviews and study 3. For airwave mattresses, see
Guidelines

Clinical Immediate Reference

Pressure Sores

Mobility and positioning

Patients at risk of pressure ulcer development should be positioned to minimise pressure, friction and shear, and the potential for further tissue damage. Patients who can move independently should be encouraged and enabled to do so.²

- All patients with pressure ulcers should actively mobilise, change their position or be repositioned frequently.
- Passive movements should be considered for patients with pressure ulcers who have compromised mobility.
- Avoid positioning individuals directly on pressure ulcers or bony prominences.

Pressure relief

- Current consensus recommends that:¹
  - All individuals assessed as having a Grade 1-2 pressure ulcer should be placed on a high specification foam mattress or cushion with pressure-reducing properties combined with close observation of skin changes and a documented positioning and repositioning regime.
  - If there is any perceived or actual deterioration of affected areas or further pressure ulcer development an alternating pressure mattress (replacement or overlay) or sophisticated continuous low pressure system (e.g. low air loss, air fluidised, air floatation, viscous fluid) should be used.
  - Depending on the location of an ulcer, individuals assessed as having Grade 3-4 pressure ulcer (including intact eschar where depth cannot be assessed) should be placed on an alternating pressure mattress or sophisticated continuous low pressure system.
  - If alternating pressure equipment is required, the first choice should usually be an overlay system.

European Pressure Ulcer Advisory Panel

Pressure Ulcer Prevention Quick Reference Guide 2010

An individual should be repositioned with greater frequency on a nonpressure-reducing mattress than on a viscoelastic foam mattress. The repositioning frequency should depend on the pressure-reducing qualities of the support surface.

See also section 2 Mattress and Bed Use in Pressure Ulcer Prevention

Map of Medicine

Pressure ulcer management 2010

All patients with pressure ulcers should [3]:

- actively mobilise
- change their position; or
- be re-positioned frequently

Patients with pressure ulcers should have access to appropriate pressure relieving support surfaces and strategies 24 hours a day, eg:

- mattresses [3] (not a standard NHS mattress or a basic divan) [5]
• cushions [3]
• repositioning [3]

All patients assessed as having a grade I/II pressure ulcer should [3]:
• be placed on:
  o high-specification foam mattress; or
  o cushion with pressure reducing properties
• be observed for skin changes
• have a documented position and repositioning regime

All patients assessed as having a grade III-IV pressure ulcer should [3]:
• be placed on one of the following:
  o an alternating pressure mattress (replacement or overlay):
    ▪ if alternating pressure is required, the first choice should be an overlay system [3]
    ▪ patients weight or patient safety may prevent overlay system, indicating the need for a replacement system [3]
    ▪ the decision to provide a specialist mattress should be taken as part of a comprehensive assessment [5]
  o sophisticated continuous low pressure (CLP) system, eg:
    ▪ air loss
    ▪ air fluidised
    ▪ viscous fluid

If there is any deterioration of affected areas or further ulcer development, an alternating pressure mattress or CLP system should be used [3].

**Pressure ulcers - prevention measures 2010**

There is no evidence that any particular type of equipment is superior to another, though one study found that air fluidised beds increased the rate of ulcer healing compared with other pressure-relieving equipment [10].

The following should not be used as pressure-redistributing devices [2,4]:
• synthetic sheepskin (natural sheepskin may be beneficial)
• doughnut-type devices
• water-filled gloves
• small-cell alternating-pressure air mattresses or overlays

**NICE**

**CG8 Multiple sclerosis 2009**

Both reviews found that higher specification foam mattresses were more effective than ordinary foam mattresses in reducing pressure ulcer incidence in patients at risk of pressure ulcer. The first review reported that the relative merits of higher-tech constant pressure and alternating pressure beds and mattresses were unclear.439 However, the second found that these were more effective than standard hospital mattresses in preventing pressure ulcer. This review also reported that some types of large-cell alternating pressure devices (cell diameter 10cm or greater) may be more effective than simple, low pressure mattresses, that low-air-loss beds are effective in preventing and treating pressure ulcer compared with foam mattresses and that there was no evidence to indicate the degree to which manual repositioning is effective, or what the optimum turning regime would be.437

The second review reported that air-fluidised supports and low-air-loss beds may improve
pressure sore healing rates and that seat cushions have not been adequately evaluated

**CG7 Pressure relieving devices 2007**

Although there is no research evidence that high-tech pressure-relieving mattresses and overlays are more effective than high-specification – low-tech – foam mattresses and overlays, professional consensus recommends that consideration should be given to the use of alternating pressure or other high-tech pressure relieving systems:

Support surface and positioning needs should be assessed and reviewed regularly and determined by the results of skin inspection, patient comfort, ability and general state. Thus repositioning should occur when individuals are on pressure-relieving devices. [D]

The management of a patient in a sitting position is also important. Even with appropriate pressure relief, it may be necessary to restrict sitting time to less than two hours until the condition of an individual with an elevated risk changes. [D]

**CG29 Pressure ulcer management 2007**

All individuals assessed as having a grade 1-2 pressure ulcer should, as a minimum provision, be placed on a high-specification foam mattress. If there is any perceived or actual deterioration of affected areas or further pressure ulcer development, an alternating pressure (AP) (replacement or overlay) or sophisticated continuous low pressure (CLP) system – for example low air loss, air fluidised, air flotation, viscous fluid – should be used.

If alternating pressure equipment is required, the first choice should be an overlay system, unless other circumstances such as patient weight or patient safety indicate the need for a replacement system.

**Occupational Therapy CATs**

Dynamic and static support mattresses and overlays decreased pressure ulcer incidence when compared to standard care in adult acute care settings

Dynamic and static support mattresses and overlays decreased pressure ulcer incidence when compared to standard care in adult acute care settings.

**Royal College of Nursing**

Clinical practice guideline: The use of pressure-relieving devices (beds, mattresses and overlays) for the prevention of pressure ulcers in primary and secondary care 2007

As per NICE pressure relieving devices guidance.

**Evidence-based reviews**

**Cochrane Database of Systematic Reviews**

Support surfaces for pressure ulcer prevention 2011

People at high risk of developing pressure ulcers should use higher-specification foam mattresses rather than standard hospital foam mattresses. The relative merits of higher-specification constant low-pressure and alternating-pressure support surfaces for preventing pressure ulcers are unclear, but alternating-pressure mattresses may be more cost effective than alternating-pressure overlays in a UK context. Medical grade sheepskins are associated with a decrease in pressure ulcer development. Organisations might consider the use of some forms of pressure relief for high risk patients in the operating theatre.

**Tissue Viability Consultancy Services**

Report of a clinical evaluation: aderma dermal pads in prevention & reduction of pressure injuries 2010

Use of the Aderma Pads appeared to result in improvement in the tissue viability of the Subjects both visually, and via High Definition Ultrasound Scan.
Systematic reviews of wound care management: (5) beds; (6) compression; (7) laser therapy, therapeutic ultrasound, electrotherapy and electromagnetic therapy 2001

Foam alternatives to the standard hospital foam mattress can reduce the incidence of pressure sores in people at risk, as can pressure-relieving overlays on the operating table. One study suggests that air-fluidised therapy may increase pressure sore healing rates.

Published research

1. The influence of foot posture, support stiffness, heel pad loading and tissue mechanical properties on biomechanical factors associated with a risk of heel ulceration

Author(s): Sopher R., Nixon J., McGinnis E., Gefen A.

Citation: Journal of the Mechanical Behavior of Biomedical Materials, May 2011, vol./is. 4/4(572-582), 1751-6161 (May 2011)

Publication Date: May 2011

Abstract: Heel ulcers (HU) are the second most common type of pressure ulcers. In this work, we developed the first anatomically-realistic three-dimensional finite element model of the posterior heel for studying the risk for HU in bedridden patients. We specifically simulated a heel that is resting on supports with different stiffnesses at upright and inclined foot postures. Our objective was to examine the effects of foot posture and stiffness of the support on strains and stresses within the fat pad of the resting heel. We found that strains and stresses in the fat pad of the heel are considerably reduced when the foot is positioned so that its lateral aspect is at 90 degrees with respect to the horizon compared to an abducted (60 degrees) foot posture. The study therefore indicates that theoretically, an inclined foot posture puts a bedridden patient at a higher risk for HU with respect to an upright foot posture, which may be explained by the anatomy of the heel that faces a lower curvature and better cushioned region against the support when the foot is upright. 2011 Elsevier Ltd.

Source: EMBASE

2. Development and validity of a new model for assessing pressure redistribution properties of support surfaces

Author(s): Matsuo J., Sugama J., Sanada H., Okuwa M., Nakatani T., Konya C., Sakamoto J.

Citation: Journal of Tissue Viability, May 2011, vol./is. 20/2(55-66), 0965-206X (May 2011)

Publication Date: May 2011

Abstract: Pressure ulcers are a common problem, especially in older patients. In Japan, most institutionalized older people are malnourished and show extreme bony prominence (EBP). EBP is a significant factor in the development of pressure ulcers due to increased interface pressure concentrated at the skin surface over the EBP. The use of support surfaces is recommended for the prophylaxis of pressure ulcers. However, the present equivocal criteria for evaluating the pressure redistribution of support surfaces are inadequate. Since pressure redistribution is influenced by physique and posture, evaluations using human subjects are limited. For this reason, models that can substitute for humans are necessary. We developed a new EBP model based on the anthropometric measurements, including pelvic inclination, of 100 bedridden elderly people. A comparison between the pressure distribution charts of our model and bedridden elderly subjects demonstrated that maximum contact pressure values, buttock contact pressure values, and bone prominence rates corresponded closely. This indicates that the model provides a good approximation of the features of elderly people with EBP. We subsequently examined the validity of the model through quantitative assessment of pressure redistribution functions consisting of immersion, envelopment, and contact area change. The model was able to detect differences in the hardness of urethane foam, differences in the internal
pressure of an air mattress, and sequential changes during the pressure switching mode. These results demonstrate the validity of our new buttock model in evaluating pressure redistribution for a variety of surfaces. 2009 Tissue Viability Society. Published by Elsevier Ltd. All rights reserved.

Source: EMBASE

3. A cost-effective pressure damage prevention strategy.

Author(s): Large, Jenny

Citation: British Journal of Nursing (BJN), 15 April 2011, vol./is. 20/(0-), 09660461

Publication Date: 15 April 2011

Abstract: This article describes the development of a pressure ulcer prevention strategy, with the aim of establishing if the implementation of best practice would impact on the incidence of pressure ulcers in a healthcare setting. The strategy was piloted in a large 78-bedded nursing home. A full audit of the patients' notes and existing care pathways was conducted in order to inform the structure of the prevention plan. It was found that there were no protocols for the use of Cavilon barrier products and that it was not part of a standard care pathway. A prevention strategy was designed based on these findings and an education package delivered to all staff. Training in the appropriate use of Aderma™ Dermal Pads was also provided so that they could be put in place as an early preventative measure in patients at risk of pressure damage or those showing the symptoms. The results of the study showed that by establishing a best practice care pathway, the incidence of pressure ulcers could be reduced.

Source: CINAHL

Full Text:
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Available in print at Grantham Hospital Staff Library
Available in print at Lincoln County Hospital Professional Library
Available in print at Pilgrim Hospital Staff Library

4. A cost-effective pressure damage prevention strategy.

Author(s): Large J

Citation: British Journal of Nursing, March 2011, vol./is. 20/6(22-5), 0966-0461;0966-0461 (2011 Mar 22)

Publication Date: March 2011

Abstract: This article describes the development of a pressure ulcer prevention strategy, with the aim of establishing if the implementation of best practice would impact on the incidence of pressure ulcers in a healthcare setting. The strategy was piloted in a large 78-bedded nursing home. A full audit of the patients' notes and existing care pathways was conducted in order to inform the structure of the prevention plan. It was found that there were no protocols for the use of Cavilon barrier products and that it was not part of a standard care pathway. A prevention strategy was designed based on these findings and an education package delivered to all staff. Training in the appropriate use of Aderma™ Dermal Pads was also provided so that they could be put in place as an early preventative measure in patients at risk of pressure damage or those showing the symptoms. The results of the study showed that by establishing a best practice care pathway, the incidence of pressure ulcers could be reduced.

Source: MEDLINE

Full Text:
Available in fulltext at EBSCO Host
Available in print at Grantham Hospital Staff Library
Available in print at Lincoln County Hospital Professional Library
5. Practicing the prevention intention: Facilitating pressure ulcer prevention practice change in an orthopedic setting

Author(s): Rankine A.M., Teague L.M., Hon J., McLaren A., Lu S.

Citation: Wound Repair and Regeneration, March 2011, vol./is. 19/2(A45), 1067-1927 (March-April 2011)

Publication Date: March 2011

Abstract: This poster describes the process undertaken to change and sustain pressure ulcer (PU) prevention on a two unit orthopedic surgery service at a tertiary care hospital. A multi-pronged, interdisciplinary strategy was developed in response to an increase in reports of post discharge heel PUs and a rise in the corporate PU prevalence rate. Key practice processes included identifying pressure ulcer risk, implementing interventions, and preventing nosocomial skin ulceration for this vulnerable population. Collaboration with frontline staff identified existing gaps, barriers and opportunities to improve care. Statistical data from previous annual PU prevalence studies was reviewed. Change strategies included: PU prevention education to target specific risk factors, re-launching 'Project Heelboot' - a heel offloading postoperative protocol, implementation of a standardized policy for PU risk assessment, direct referral to a wound care team champion for skin issues, as well as chart auditing with feedback for skin and PU prevention documentation. Retrospective incidence data, number of patient complaints since beginning the project, and chart audit findings were recorded. Prior to beginning the project, pressure ulcer prevalence rates were 6.25% (n=16) on unit A, and 22% (n=18) on unit B. Two complaints had been received regarding post discharge pressure ulcers. Collection of nosocomial PU incidence was inconsistent. In the ensuing year, prevalence rates have dropped to 5.6% (n=18) on unit A, and 0% (n=10) on unit B. No complaints of post discharge PUs have been received. Estimated incidence (assuming that all patients with skin issues were referred consistently) of nosocomial PUs has been low (2/1,150 admissions on unit A, and 2/ 802 admissions on unit B from Jan. 2010-Oct. 2010). In conclusion, though sustainability remains a challenge, ongoing engagement and acknowledgement of staff in this process has supported the adoption of the ‘prevention intention’ and resulted in a decrease in PUs.

Source: EMBASE

6. Pressure relief, cold foam or static air? A single center, prospective, controlled randomized clinical trial in a Dutch nursing home

Author(s): Van Leen M., Hovius S., Neyens J., Halfens R., Schols J.

Citation: Journal of Tissue Viability, February 2011, vol./is. 20/1(30-34), 0965-206X (February 2011)

Publication Date: February 2011

Abstract: Objective: At present, the evidence regarding the type of mattress that is the best for preventing pressure ulcers is not convincing. In a single center, prospective, controlled trial we compared a static air overlay mattress (no electric pump needed) on top of a cold foam mattress with a cold foam mattress alone on pressure ulcer incidence in nursing home residents. Methods: 83 Patients were included in the study with a score lower than 12 points on the Norton scale and no pressure ulcer at the start of the study. 42 Patients received a cold foam mattress and 41 patients received a static air overlay on top of that cold foam mattress. Out of bed we standardized the pressure reduction in sitting position by using a static air cushion in both groups. Patients were checked weekly in both groups for pressure ulcers. Only when there were signs of developing a pressure ulcer grade 2 or higher, repositioning by our nursing home pressure ulcer protocol (PU protocol) was put into practice. Results: Seven patients (17.1%) on a cold foam mattress and two (4.8%) on a static air mattress developed a pressure ulcer grade 2 or more. There was no difference regarding pressure ulcer incidence between patients with a high risk (Norton 5-8) and patients with a medium risk (Norton 9-12). In 5 out of 7 patients who developed a pressure ulcer on a foam mattress the ulcers showed no healing using our PU protocol. In the static air group all pressure ulcers healed by regular treatment according to our PU protocol. Conclusions: In this study, static air overlay mattresses provided a better prevention than cold foam mattresses alone (4.8% versus 17.1%). The Norton scores of
the patients in both groups did not change during the 6 month trial period. Our decision to use repositioning only when there were signs of a pressure ulcer seems to be acceptable when a static air overlay is in position. However, the score of 17.1% development (incidence) of pressure ulcers in the foam group may stress the need of repositioning when using only this type of mattress. 2010 Tissue Viability Society. Published by Elsevier Ltd. All rights reserved.

Source: EMBASE

7. Pressure relief, cold foam or static air? A single center, prospective, controlled randomized clinical trial in a Dutch nursing home.

Author(s): van Leen, M, Hovius, S, Neyens, J
Citation: J Tissue Viability, February 2011, vol./is. 20/1(30-4), 0965-206X (2011 Feb)
Publication Date: February 2011
Abstract: Research in the Netherlands examining the use of a static air overlay mattress on top of a cold foam mattress compared to a cold foam mattress alone on the incidence of pressure sores among residents in a nursing home. Participants were nursed either on the static air overlay mattress or the cold foam mattress and assessed using the Norton scale. 15 refs.
Source: BNI

8. Protecting fragile skin: nursing interventions to decrease development of pressure ulcers in pediatric intensive care.

Author(s): Schindler CA, Mikhailov TA, Kuhn EM, Christopher J, Conway P, Ridling D, Scott AM, Simpson VS
Citation: American Journal of Critical Care, 01 January 2011, vol./is. 20/1(26-35), 10623264
Publication Date: 01 January 2011
Abstract: Background: The reported incidence of pressure ulcers in critically ill infants and children is 18% to 27%. Patients at risk for pressure ulcers and nursing interventions to prevent the development of the ulcers have not been established. Objectives: To determine the incidence of pressure ulcers in critically ill children, to compare the characteristics of patients in whom pressure ulcers do and do not develop, and to identify prevention strategies associated with less frequent development of pressure ulcers. Methods: Characteristics of 5346 patients in pediatric intensive care units in whom pressure ulcers did and did not develop were compared. Multiple logistic regression was used to determine which prevention strategies were associated with less frequent development of pressure ulcers. Results: The overall incidence of pressure ulcers was 10.2%. Patients at greatest risk were those who were more than 2 years old; who were in the intensive care unit 4 days or longer; or who required mechanical ventilation, noninvasive ventilation, or extracorporeal membrane oxygenation. Strategies associated with less frequent development of pressure ulcers included use of specialty beds, egg crates, foam overlays, gel pads, dry-weave diapers, urinary catheters, disposable underpads, body lotion, nutrition consultations, change in body position every 2 to 4 hours, blanket rolls, foam wedges, pillows, and draw sheets. Conclusions: The overall incidence of pressure ulcers among critically ill infants and children is greater than 10%. Nursing interventions play an important role in the prevention of pressure ulcers.
Source: CINAHL
Full Text: Available in fulltext at EBSCO Host

Author(s): Reddy M
Citation: Clinical Evidence, 2011, vol./is. 2011/, 1462-3846;1752-8526 (2011)
Publication Date: 2011
Abstract: INTRODUCTION: Unrelieved pressure or friction of the skin, particularly over bony prominences, can lead to pressure ulcers in up to one third of people in hospitals or community care, and one fifth of nursing home residents. Pressure ulcers are more likely in people with reduced mobility and poor skin condition, such as older people or those with vascular disease. METHODS AND OUTCOMES: We conducted a systematic review and aimed to answer the following clinical questions: What are the effects of preventive interventions in people at risk of developing pressure ulcers? What are the effects of treatments in people with pressure ulcers? We searched: Medline, Embase, The Cochrane Library, and other important databases up to June 2010 (Clinical Evidence reviews are updated periodically, please check our website for the most up-to-date version of this review). We included harms alerts from relevant organisations such as the US Food and Drug Administration (FDA) and the UK Medicines and Healthcare products Regulatory Agency (MHRA). RESULTS: We found 64 systematic reviews, RCTs, or observational studies that met our inclusion criteria. We performed a GRADE evaluation of the quality of evidence for interventions. CONCLUSIONS: In this systematic review we present information relating to the effectiveness and safety of the following interventions: air-filled vinyl boots, air-fluidised supports, alternating-pressure surfaces (including mattresses), alternative foam mattresses, constant low-pressure supports, debridement, electric profiling beds, electrotherapy, hydrocellular heel supports, alternating-pressure surfaces (including mattresses), low-level laser therapy, low-tech constant-low-pressure supports, medical sheepskin overlays, nutritional supplements, orthopaedic wool padding, pressure-relieving overlays on operating tables, pressure-relieving surfaces, repositioning (regular "turning"), seat cushions, standard beds, standard care, standard foam mattresses, standard tables, surgery, therapeutic ultrasound, topical lotions and dressings, topical negative pressure, and topical phenytoin.

Source: MEDLINE

10. The biomechanics of heel ulcers.

Author(s): Gefen A

Citation: Journal of Tissue Viability, November 2010, vol./is. 19/4(124-31), 0965-206X:0965-206X (2010 Nov)

Publication Date: November 2010

Abstract: Heel ulcers are common, dangerous and costly, but their etiology is poorly understood and no biomechanical studies were conducted to explore it. This paper describes a biomechanical investigation of heel ulcers using a theoretical model that characterizes the internal mechanical loading at the soft tissues of a supported heel. The study is aimed first at identifying some heel-ulcer-specific risk factors pointed out by the biomechanical theory, and second, at demonstrating the kind of support that biomechanical theory and computer modeling can offer in the conduct of clinical studies in the pressure ulcer field. The modeling demonstrated that atypical foot anatomies characterized by heavy-weight foot, sharp posterior calcaneus and thin soft tissue padding are theoretically more prone to heel ulcers. Diabetes and edema at the feet were also predicted to impose risks for heel ulcers, which agrees very well with clinical observations. This paper therefore demonstrated that a biomechanical theory can be used to explain and interpret clinical and epidemiological findings related to heel ulcers. Copyright Copyright 2010 Tissue Viability Society. Published by Elsevier Ltd. All rights reserved.

Source: MEDLINE

11. Strategies to improve the prevention of pressure ulcers.

Author(s): Elliott, J

Citation: Nursing Older People, November 2010, vol./is. 22/9(31-6), 1472-0795 (2010 Nov)

Publication Date: November 2010

Abstract: How 3 interventions were introduced to prevent pressure ulcers in hospital patients. The evaluation of the effectiveness of a trust-wide pressure ulcer campaign which focused on risk assessment and appropriate support surfaces, positioning and repositioning and heel offloading is described, and the role of tissue viability support workers in the campaign is highlighted. 31 refs.
12. Facility dramatically reduces pressure ulcers.

Citation: Healthcare Benchmarks & Quality Improvement, 01 November 2010, vol./is. 17/11(123-124), 15411052

Publication Date: 01 November 2010

Source: CINAHL

Full Text: Available in fulltext at EBSCO Host

13. Strategies to improve the prevention of pressure ulcers.

Author(s): Elliott J

Citation: Nursing Older People, 01 November 2010, vol./is. 22/9(31-36), 14720795

Publication Date: 01 November 2010

Abstract: This article outlines the actions taken by one acute trust to implement evidence-based, best practice recommendations for pressure ulcer prevention. Initially, an exploratory study identified specific areas for practice development, particularly improving early risk assessment, intervention and focus on heel ulcers. Further actions included recruiting tissue viability support workers to promote a pressure ulcer campaign. Prevalence audit results demonstrated improved prevention and reduced prevalence of hospital-acquired pressure ulcers by 6 per cent and heel ulcers by 4.9 per cent. Further work is required to ensure prevention strategies are consistent and documented.

Source: CINAHL

Full Text: Available in fulltext at EBSCO Host


Author(s): Peterson MJ, Schwab W, van Oostrom JH, Gravenstein N, Caruso LJ

Citation: Journal of Advanced Nursing, 01 July 2010, vol./is. 66/7(1556-1564), 03092402

Publication Date: 01 July 2010

Abstract: Aim. This paper is a report of a study of the effects of lateral turning on skin-bed interface pressures in the sacral, trochanteric and buttock regions, and its effectiveness in unloading at-risk tissue. Background. Minimizing skin-support surface interface pressure is important in pressure ulcer prevention, but the effect of standard patient repositioning on skin interface pressure has not been objectively established. Methods. Data were collected from 15 healthy adults from a university-affiliated hospital. Mapped 24-inch x 24-inch (2304 half-inch sensors) interface pressure profiles were obtained in the supine position, followed by lateral turning with pillow or wedge support and subsequent head-of-bed elevation to 30DG. Results. Raising the head-of-bed to 30DG in the lateral position statistically significantly increased peak interface pressures and total area >=32 mmHg. Comparing areas >=32 mmHg from all positions, 93% of participants had skin areas with interface pressures >=32 mmHg throughout all positions (60 - 54 cm²), termed 'triple jeopardy areas'. The triple jeopardy area increased statistically significantly with wedges as compared to pillows (153 - 99 cm² vs. 48 - 47 cm², P < 0DT05). Conclusion. Standard turning by experienced intensive care unit nurses does not reliably unload all areas of high skin-bed interface pressures. These areas remain at risk for skin breakdown, and help to explain why pressure ulcers occur despite the implementation of standard preventive measures. Support materials for maintaining lateral turned positions can also influence tissue unloading and triple jeopardy areas.

Source: CINAHL

Author(s): Thomas DR

Citation: Journal of the American Medical Directors Association, 01 July 2010, vol./is. 11/6(397-405), 15258610

Publication Date: 01 July 2010

Abstract: Pressure ulcers remain problematic across health care settings, with prevalence and incidence changing little over the past 2 decades. Because external pressure is viewed as the chief factor in the development of pressure ulcers, considerable research has focused on pressure relief. Because relief of external pressure is possible, and would hypothetically eliminate all pressure ulcers, the development of a pressure ulcer is often regarded as a failure of the care system. This logic conveys the notion that sustained pressure is the only factor in the development of pressure ulcers and disregards additional factors in the pathogenesis of pressure ulcers intrinsic to the patient. Patient-specific factors leading to derangement in tissue perfusion may account for an observed development of a pressure ulcer, despite the provision of common prevention measures that include pressure reduction. A more comprehensive understanding of unique individual intrinsic factors may lead to more effective interventions.

Source: CINAHL

16. Effectiveness of instituting a specific bed protocol in reducing complications associated with bed rest

Author(s): Schweinberger M.H., Roukis T.S.

Citation: Journal of Foot and Ankle Surgery, July 2010, vol./is. 49/4(340-347), 1067-2516 (July 2010)

Publication Date: July 2010

Abstract: Pressure ulceration, deep venous thromboembolism, and hospital-acquired pneumonia are well-known complications of bed rest. This retrospective, single-center, observational cohort study evaluated the effectiveness of instituting bed rest protocol that included specific positioning, continuous heel off-loading, recumbent upper and lower body bed exercises, scheduled incentive spirometry, frequent position changes, and thromboprophylaxis (chemical, mechanical, or both), in reducing the incidence of pressure ulceration, deep venous thromboembolism, and hospital-acquired pneumonia in consecutive patients admitted for at least 7 days. A total of 29 patients (24 males, 5 females) were included in this study, with a mean age of 62.5 (median 63, range 17 to 84) years. The mean length of bed rest was 13.1 (median 10, range 7 to 31) days; and, the mean length of hospital stay was 21.1 (median 17, range 8 to 72) days. During hospitalization, 2 (6.9%) patients developed one or more of the complications measured, with 1 developing a posterior heel pressure ulcer that resolved with local care and another who developed deep venous thrombosis without pulmonary embolism, managed with therapeutic anticoagulation, and hospital-acquired pneumonia treated with antibiotic therapy. The results of this analysis were favorable in comparison with previously reported incidence rates for pressure ulcer, deep venous thrombosis, and hospital-acquired pneumonia in patients with similar risk factors, and suggested that a prescribed bed protocol reduces complications associated with bed rest. 2010 American College of Foot and Ankle Surgeons.

Source: EMBASE

17. Nimbus range of pressure-redistributing mattresses

Author(s): Phillips L.

Citation: Wounds UK, June 2010, vol./is. 6/2(116-122), 1746-6814 (June 2010)

Publication Date: June 2010

Abstract: Healthcare providers face unprecedented challenges with higher-acuity patients, budget cuts, public demand for better health care and a growing recognition that some
healthcare-acquired injuries, such as pressure ulcers, could be avoided. Given that pressure is a primary causative factor in pressure ulcer development, the latest guidelines (EPUAP-NPUAP, 2009) provide recommendations for patient repositioning, the allocation of either an Active or Reactive pressure-redistributing support surface and, for some, complete and permanent off-loading of the tissue.

**Source:** EMBASE

18. **Tips for protecting critically ill patients from pressure ulcers.**

**Author(s):** Jankowski IM

**Citation:** Critical Care Nurse, 02 April 2010, vol./is. 30/2(0-), 02795442

**Publication Date:** 02 April 2010

**Source:** CINAHL

**Full Text:**
Available in fulltext at [Highwire Press](#)
Available in fulltext at [EBSCO Host](#)

19. **Preventing pressure ulcers: new lessons from Minnesota.**

**Citation:** OR Manager, 01 April 2010, vol./is. 26/4(1-5), 87568047

**Publication Date:** 01 April 2010

**Source:** CINAHL

**Full Text:**
Available in fulltext at [EBSCO Host](#)

20. **Transitional off-loading: an evidence-based approach to pressure redistribution in the diabetic foot**

**Author(s):** McGuire J.

**Citation:** Advances in skin & wound care, April 2010, vol./is. 23/4(175-188; quiz 189-190), 1538-8654 (Apr 2010)

**Publication Date:** April 2010

**Abstract:** PURPOSE: To enhance the learner’s competence in providing pressure redistribution therapy for the diabetic foot. TARGET AUDIENCE: This continuing education activity is intended for physicians and nurses with an interest in skin and wound care. OBJECTIVES: After participating in this educational activity, the participant should be better able to: 1. Relate diabetic foot problems to the need for using off-loading devices. 2. Distinguish between the various types of dressings and off-loading devices used for diabetic foot wounds. 3. Apply the "transitional approach" to off-loading the diabetic foot.

**Source:** EMBASE

21. **Taking steps to prevent pressure ulcers.**

**Author(s):** Blaney WD

**Citation:** Nursing, 01 March 2010, vol./is. 40/3(44-47), 03604039

**Publication Date:** 01 March 2010

**Abstract:** Here’s how one hospital is putting evidence-based practices to work to keep patients' skin intact.

**Source:** CINAHL

22. **Laboratory measurement of the interface pressures applied by active therapy support surfaces: a consensus document.**

**Author(s):** Tissue Viability Society
A key element in pressure ulcer prevention and management is the selection of appropriate pressure redistributing (PR) patient support surfaces for use while seated and in bed. However, little explicit guidance exists allowing standardised quantitative comparison of different PR surfaces based upon their ability to redistribute pressure from anatomical landmarks such as the heels and sacrum. In 2008, a working group was established in Europe through the US National Pressure Ulcer Advisory Panel (NPUAP) support surface standardisation initiative (S3I) and under the aegis of the European Pressure Ulcer Advisory Panel with the specific remit of developing test methods for the evaluation of active therapy support surfaces (alternating pressure air mattresses). This report describes a consensus development process to agree test methods appropriate to compare active therapy surfaces based upon their ability to redistribute pressure from the sacrum and the heels. Copyright 2009 Tissue Viability Society. Published by Elsevier Ltd. All rights reserved.

Source: MEDLINE

23. Laboratory measurement of the interface pressures applied by active therapy support surfaces: A consensus document

A key element in pressure ulcer prevention and management is the selection of appropriate pressure redistributing (PR) patient support surfaces for use while seated and in bed. However, little explicit guidance exists allowing standardised quantitative comparison of different PR surfaces based upon their ability to redistribute pressure from anatomical landmarks such as the heels and sacrum. In 2008, a working group was established in Europe through the US National Pressure Ulcer Advisory Panel (NPUAP) support surface standardisation initiative (S3I) and under the aegis of the European Pressure Ulcer Advisory Panel with the specific remit of developing test methods for the evaluation of active therapy support surfaces (alternating pressure air mattresses). This report describes a consensus development process to agree test methods appropriate to compare active therapy surfaces based upon their ability to redistribute pressure from the sacrum and the heels. Copyright 2009 Tissue Viability Society. Published by Elsevier Ltd. All rights reserved.

Source: EMBASE

24. Use of alternatives to air-fluidized support surfaces in the care of complex wounds in postflap and postgraft patients

Author(s): Fleck C.A., Rappl L.M., Simman R., Titterington V., Conwill J., Koerner C., Locke P., Bechtold D., Papantonio C., Gray D.P., Lawrence K.

Air-fluidized support surface therapy has many drawbacks, such as dehydration, in an already difficult recovery for those wound patients who have undergone flap and graft surgery. In addition, patient care and handling are also problematic. Patients complain of discomfort, and the instability of the surface interferes with patient stability in side lying and semi-Fowler's positions. Alternative support surfaces can be considered for postflap or postgraft patients. Such technologies as alternating pressure, low-air-loss, and therapeutic nonpowered, advanced, and lateral rotation surfaces are widely used for pressure management in high-risk patients and those with existing pressure ulcers. These surfaces must be used within a total pressure ulcer management program that includes frequent turning and repositioning, skin and ulcer care according to evidence-based protocols, patient and caregiver instruction, nutrition, and offloading and positioning. The proposed recommendations require more research on the relative effectiveness of less expensive and more user-friendly support surfaces such as low-air-loss and nonpowered advanced
support surfaces and is necessary in order to conclusively recommend one type of surface over another. However, at this time the available clinical studies and opinions remain positive. 2010 Elsevier Inc. All rights reserved.

Source: EMBASE

25. Pressure ulcer prevention in the OR: recommendations and guidance.

Citation: World Council of Enterostomal Therapists Journal, 01 January 2010, vol./is. 30/1(28-29), 08194610
Publication Date: 01 January 2010
Source: CINAHL

26. Patient-specific analyses of deep tissue loads post transtibial amputation in residual limbs of multiple prosthetic users

Author(s): Portnoy S., Siev-Ner I., Shabshin N., Kristal A., Yizhar Z., Gefen A.
Citation: Journal of Biomechanics, December 2009, vol./is. 42/16(2686-2693), 0021-9290 (11 Dec 2009)
Publication Date: December 2009

Abstract: Active transtibial amputation (TTA) patients are at risk for developing pressure ulcers (PU) and deep tissue injury (DTI) while using their prosthesis. It is therefore important to obtain knowledge of the mechanical state in the internal soft tissues of the residuum, as well as knowledge of the mechanical state upon its surface. Our aim was to apply patient-specific MRI-based non-linear finite element (FE) models to quantify internal strains in TTA prosthetic users (n=5) during load-bearing. By further employing a strain injury threshold for skeletal muscle, we identified patients susceptible to DTI. The geometrical characteristics of the residuum of the TTA participants varied substantially between patients, e.g. the residuum lengths were 7.6, 8.1, 9.2, 11.5 and 13.3 cm. We generally found that internal strains were higher in the bone proximity than in the muscle flap periphery. The highest strains, which in some patients exceeded 50% (engineering strain) for compressive, tensile and shear strains, were found in the shortest residual limbs, i.e. the 7.6 and 8.1 cm-long limbs. Correspondingly, the lowest strains were found in the 13.3 cm-long residuum, which had the bulkiest muscle flap. Yet, even in the case of a long residuum, about a third of the soft tissue volume at the distal tibial proximity area was occupied by large (>5%) internal compressive, tensile and shear strains. For both patients with shorter residual limbs, the internal principal compressive strains above 5% occupied almost the entire distal tibial proximity area. For a patient whose distal tibial end was flat (non-beveled), internal strains were more uniformly distributed, compared to the strain distributions in the other models, where focal elevated strains accumulated in the bone proximity. We found no muscle strains above the immediate injury threshold, indicating that all patients were not at immediate risk for DTI. Two patients whose residuum fat padding was minimal to none, were the only ones identified as theoretically prone to DTI at long (>3 h) continuous weight-bearing periods. We conclude that there is a wide variability in internal mechanical conditions between residual limbs across subjects, which necessitates patient-specific quantitative analyses of internal mechanical states in TTA patients, to assess the mechanical performance of the reconstructed limb and in particular, the individual risk for deep PU or DTI. 2009 Elsevier Ltd. All rights reserved.

Source: EMBASE

27. Evaluating the pressure-reducing capabilities of the gel pad in supine
[corrected] [published erratum appears in AM J OCCUP THER 2010 Mar-
Apr;64(2):210].

Author(s): Thorne S, Sauve K, Yacoub C, Guitard P
Citation: American Journal of Occupational Therapy, 01 November 2009, vol./is. 63/6(744-750), 02729490
Publication Date: 01 November 2009

Abstract: OBJECTIVE. Gel pads are commonly used by occupational therapists in acute care settings to reduce pressure on the coccyx and sacrum in supine. The purpose of this
A study was conducted to determine the pressure-reducing capabilities of gel pads used in supine and the resultant potential impact on pressure ulcer management. **METHOD.** A pressure-mapping system was used to measure interface pressures between the participant's buttocks and the mattress, with and without the gel pad. **RESULTS.** The gel pad did not have a significant effect on interface pressure for most participants. No obvious clinical indicators were identified. **CONCLUSION.** Use of the gel pad is not recommended to decrease pressure in supine. Because potential adverse effects may result from using the gel pad in supine and no clinical indicators were identified to direct practice, use of the gel pad in supine is not recommended as an intervention for decreasing interface pressure.

**Source:** CINAHL

**Full Text:**

Available in fulltext at Ovid

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28. **Seating and pressure ulcers: clinical practice guideline.**

**Author(s):** Stockton L, Gebhardt KS, Clark M

**Citation:** Journal of Tissue Viability, 01 November 2009, vol./is. 18/4(98-108), 0965206X

**Publication Date:** 01 November 2009

**Abstract:** Pressure ulcers (bedsores) often develop following prolonged sitting especially where people are immobile or are unable to feel discomfort due to injury or disease. This guideline provides health professionals with specific recommendations intended to minimise any risk of developing pressure ulcers when their clients are seated. The guideline covers sitting when people are acutely ill in hospital and, more commonly, where people have a long-term need for prolonged sitting for example after spinal injury. Particular focus is placed upon the need to make sure the physical size and shape of the seat is appropriate for the seated individual. Guidance is provided upon areas where seated individuals require information to help them minimise pressure ulcer development. The advantages and disadvantages of different cushion materials are described.

**Source:** CINAHL

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29. **Mechanism leading to the development of pressure ulcers based on shear force and pressures during a bed operation: Influence of body types, body positions, and knee positions.**

**Author(s):** Mimura M, Ohura T, Takahashi M, Kajiwara R, Ohura N Jr.

**Citation:** Wound Repair & Regeneration, 01 November 2009, vol./is. 17/6(789-796), 10671927

**Publication Date:** 01 November 2009

**Abstract:** Surface pressures and shear forces were measured in order to clarify the mechanism leading to the development of a pressure ulcer at five sites on the body during the operation of a bed (bed) using a device for simultaneously measuring pressure and shear force. Changes of shear force and pressure when three body types adopted different supine positions, with or without raising/bending the knees (raising the knees), were investigated and analyzed. The results are as follows: a slender body type tends to have the highest shear force at the coccygeal bone site and also has a higher surface pressure at the coccygeal and at the lateral sacral bone sites than an obese body type. On the other hand, an obese body type has a higher surface pressure at the other sites than the slender type. Shear forces at the sacrum and coccygeal bone sites can be reduced during a bed operation by raising the knees. Furthermore, shear forces can be reduced during a bed operation in a supine position by matching the body's bending points with those of the bed or by shifting the subjects 10 cm toward the head of the bed. These new findings are clinically useful in the treatment and the prevention of the onset of pressure ulcers.

**Source:** CINAHL

**Full Text:**

Available in fulltext at EBSCO Host

Available in fulltext at EBSCO Host
30. Evaluating the pressure-reducing capabilities of the gel pad in supine
Author(s): Thorne S., Sauve K., Yacoub C., Guitard P.
Citation: American Journal of Occupational Therapy, November 2009, vol./is. 63/6(744-750), 0272-9490 (November-December 2009)
Publication Date: November 2009
Abstract: OBJECTIVE. Gel pads are commonly used by occupational therapists in acute care settings to reduce pressure on the coccyx and sacrum in supine. The purpose of this study was to determine the pressure-reducing capabilities of gel pads used in supine and the resultant potential impact on pressure ulcer management. METHOD. A pressure-mapping system was used to measure interface pressures between the participant's buttocks and the mattress, with and without the gel pad. RESULTS. The gel pad did not have a significant effect on interface pressure for most participants. No obvious clinical indicators were identified. CONCLUSION. Use of the gel pad is not recommended to decrease pressure in supine. Because potential adverse effects may result from using the gel pad in supine and no clinical indicators were identified to direct practice, use of the gel pad in supine is not recommended as an intervention for decreasing interface pressure.
Source: EMBASE
Full Text: Available in fulltext at Ovid

31. ROHO Dry floatation technology: implications for clinical practice.
Author(s): Stephen-Jaynes J
Citation: British Journal of Community Nursing, 02 September 2009, vol./is. 14/9(0-), 14624753
Publication Date: 02 September 2009
Abstract: This article discusses the aetiology of pressure ulcers, the clinical and financial cost of pressure ulcer prevention and the need for pressure reducing equipment. The role of Dry floatation in pressure ulcer prevention and management is explored. How Dry floatation technology works is discussed and its use within clinical practice is highlighted. The evidence to support Dry floatation is presented.
Source: CINAHL
Full Text: Available in fulltext at EBSCO Host

32. Correct positioning: reducing the risk of pressure damage.
Author(s): Swann J
Citation: Nursing & Residential Care, 01 August 2009, vol./is. 11/8(415-417), 14659301
Publication Date: 01 August 2009
Abstract: Ensuring that residents find a good position when sitting or lying can play an important role in minimizing pressure damage. Julie Swann discusses the risks of bad positioning, the avoidance of pressure ulcers and management of care after a stroke.
Source: CINAHL
Full Text: Available in fulltext at EBSCO Host

33. Review: Alternative-foam mattresses and some operating-table overlays reduce pressure ulcers more than standard surfaces.
Author(s): Wallace M
Citation: Evidence Based Nursing, 01 July 2009, vol./is. 12/3(81-81), 13676539

Author(s): Watson JC, Sugama J

Citation: Journal of Gerontological Nursing, 01 June 2009, vol./is. 35/6(8-9), 00989134

35. The heel: Anatomy, blood supply, and the pathophysiology of pressure ulcers

Author(s): Cichowitz A., Pan W.R., Ashton M.

Citation: Annals of Plastic Surgery, April 2009, vol./is. 62/4(423-429), 0148-7043 (April 2009)

Abstract: There remains much confusion regarding the pathophysiology of pressure ulcers. Data indicate that the prevalence of pressure ulcers is increasing. The heel is unique in structure and well adapted to the task of shock absorption. However, it is often subject to prolonged pressure, which predisposes it to tissue breakdown, with attempts at reconstruction prone to failure. Four dissections were carried out of the heel region, which included removing each heel pad en bloc for histology. Seventeen arterial injection studies, 12 venous studies, and a combined arterial and venous study of the foot were performed. The results were correlated with clinical cases and previous research. The heel was found to be richly vascularized by a subdermal plexus and periosteal plexus with vessels traveling between the 2 within fibrous septa that connect the reticular dermis and periosteum of the calcaneus. These septa effectively create isolated compartments containing relatively avascular fat. A layer of panniculus carnosus muscle was observed in the subcutaneous tissue. It is likely that the metabolically active panniculus carnosus muscle is involved early in the course of pressure ulcers. Extensive pressure damage can be concealed by intact skin. Friction and shear are additional factors important in skin breakdown. Copyright 2009 by Lippincott Williams & Wilkins.

Source: EMBASE

36. Preventing never events: pressure ulcers.

Citation: Joint Commission Perspectives on Patient Safety, 01 April 2009, vol./is. 9/4(5-7), 15345181

Publication Date: 01 April 2009

Source: CINAHL


Author(s): Shahin ES, Dassen T, Halfens RJ

Citation: International Journal of Nursing Studies, April 2009, vol./is. 46/4(413-21), 0020-
Abstract: BACKGROUND: Pressure ulcers are common in acute and long-term care. However, critically ill patients usually have multiple risk factors for pressure ulcers. OBJECTIVES: The study was conducted to assess pressure ulcer incidence in intensive care patients, the factors related to pressure ulcer incidence and the course of pressure ulcers after the admission to an intensive care unit. DESIGN: A longitudinal design. SETTING: This study was carried out in cardiological and surgical intensive care of a general hospital and in a nephrological intensive care of a university hospital. PARTICIPANTS: All patients admitted to intensive care wards during the period from April until October 2006 were invited to take part in the study. One hundred and twenty-one patients were involved in the study. The inclusion criteria were adult intensive care patients, males and females, all diagnosis were included. The exclusion criterion was patients whose age less than 18 years. METHOD: Each patient was assessed twice; first, upon admission and second upon discharge or death, or after 2 weeks if the patient was still in intensive care. The assessed data included pressure ulcer preventive measures, risk factors using Braden score, pressure ulcer characteristics and treatment. Additionally, incontinence supplies (urine/bowel) if used and the severity of illness using Acute Physiology and Chronic Health Evaluation (APACHE II score) were assessed. RESULTS: This study revealed a total incidence of 3.3% (4.5% in nephrological patients and 2.9% in surgical patients). Sixteen patients with a total of 21 pressure ulcers were admitted to the intensive care units. During the patients' stay at the intensive care units six pressure ulcers developed newly and five pressure ulcers healed. The mean of the APACHE II score of patients with new pressure ulcers (16.6) were higher than in patients without new pressure ulcers (11.5). CONCLUSION: Pressure ulcer incidence is low in this study compared to other studies. Pressure ulcers can be healed in intensive care patients. Using some preventive measures such as foam and alternating air pressure mattresses may help to decrease pressure ulcer development. Hydrocolloid dressing may help to increase the healing rate of pressure ulcers.

Source: MEDLINE

38. Prevention of pressure ulcers in the surgical patient.

Author(s): Walton-Geer PS

Citation: AORN Journal, 01 March 2009, vol./is. 89/3(538-552), 00012092

Publication Date: 01 March 2009

Abstract: Pressure ulcers (PUs) are a serious health care problem, and it is crucial to assess how patients acquire pressure ulcers after admission to a health care facility. In the OR, factors related to positioning, anesthesia, and the duration of surgery, in addition to patient-related factors, all can affect PU development. This article reviews current practices, including AORN recommended practices, regarding pressure ulcer prevention efforts for surgical patients. All surgical patients should be considered at-risk for pressure ulcer development; therefore, perioperative departments should develop and implement strategic plans for pressure ulcer prevention. AORN J 89 (March 2009) 538-548. (c) AORN, Inc, 2009.

Source: CINAHL

39. Wound & skin care. Take steps to prevent pressure ulcers.

Author(s): Hess CT

Citation: Nursing, 01 January 2009, vol./is. 39/1(61-61), 03604039

Publication Date: 01 January 2009

Source: CINAHL

40. Evaluation of comfort in bedridden older adults using an air-cell mattress with an automated turning function: measurement of parasympathetic activity during night sleep.
This study objectively evaluated the degree of comfort in bedridden older adults using an air-cell mattress with an automated turning mechanism. The sample included 10 bedridden women with verbal communication difficulties. The high frequency (HF) components of heart rate variability, which reflect parasympathetic nervous activity, were compared for the manual and automated turning periods. No significant differences in the HF component were observed in 5 of the participants. Significant increases in the HF component associated with automated turning were observed in 3 participants; however, the two participants with the lowest body mass index values exhibited a significant reduction in the HF component during the automated turning period. The results revealed that comfort might not be disturbed during the automated turning period.
43. **Practice recommendations for preventing heel pressure ulcers.**

**Author(s):** Fowler E, Scott-Williams S, McGuire JB

**Citation:** Ostomy Wound Management, 01 October 2008, vol./is. 54/10(42-55), 08895899

**Publication Date:** 01 October 2008

**Abstract:** Heels are the second most common anatomical location for pressure ulcers. A combination of risk factors, including pressure, may cause ulceration. Heel pressure ulcers are a particular concern for surgical patients. A review of the literature, including poster presentations, shows that controlled clinical studies to assess the effectiveness and cost-effectiveness of available interventions are not available. Case series (with or without historical controls) as well as pressure ulcer guideline recommendations suggest the most important aspect of heel ulcer prevention is pressure relief (offloading). It also has been documented that the incidence of heel ulcers can be reduced using a total-patient care approach and heel offloading devices. Guidelines, observational studies, and expert opinion intimate that reducing heel ulceration rates can be expected to improve patient outcomes, decrease costs associated with their care, and avoid costs related to hospital-acquired pressure ulcers. The heel pressure ulcer prevention strategies reviewed should be implemented until the results of prospective, randomized controlled studies to compare the effectiveness and cost-effectiveness of these strategies are available.

**Source:** CINAHL

44. **Examining the Carital Optima air-float mattress through patient experience and pressure mapping.**

**Author(s):** Thompson, G, Bevins, J, Hutchcox, S

**Citation:** Wounds UK, September 2008, vol./is. 4/3(72-82), 1746-6814 (2008 Sep)

**Publication Date:** September 2008

**Abstract:** 3 case reports outlining the use, effectiveness and comfort of the Carital Optima low air pressure system mattress for patients with pressure ulcers. Performance assessment of the mattress using dynamic interface pressure measurements is described and its other features are discussed. 26 refs.

**Source:** BNI

45. **Examining the Carital Optima air-float mattress through patient experience and pressure mapping**

**Author(s):** Thompson G., Bevins J., Hutchcox S., White R.

**Citation:** Wounds UK, September 2008, vol./is. 4/3(72-82), 1746-6814 (September 2008)

**Publication Date:** September 2008

**Abstract:** Pressure ulcers can be very painful and distressing for patients and present a significant management problem for healthcare professionals. Over the past few years, a wide variety of mattresses have become available for at-risk patients that aim to provide a pressure-reducing support surface. One of these products, the Carital Optima mattress, has been designed for a wide range of dependent patients who are being nursed with or without existing pressure area damage. This article details a pressure mapping exercise and looks at three patient case studies to assess the efficacy of the Carital Optima mattress.

**Source:** EMBASE

46. **Alternating pressure air mattresses as prevention for pressure ulcers: A literature review**

**Author(s):** Vanderwee K., Grypdonck M., Defloor T.

**Citation:** International Journal of Nursing Studies, May 2008, vol./is. 45/5(784-801), 0020-7489 (May 2008)
Abstract: Objectives: The purpose of this paper is to examine and synthesise the literature on alternating pressure air mattresses (APAMs) as a preventive measure for pressure ulcers. Design: Literature review. Data sources: PubMed, CINAHL, Central, Embase, and Medline databases were searched to identify original and relevant articles. Additional publications were retrieved from the references cited in the publications identified during the electronic database search. Results: Thirty-five studies were included. Effectiveness and comfort of APAMs were the main focuses of the studies evaluating APAMs. Pressure ulcer incidence, contact interface pressure, and blood perfusion were the most frequently used outcome measures to evaluate the effectiveness of APAMs. Fifteen randomised controlled trials (RCTs) analysed the pressure ulcer incidence. One RCT compared a standard hospital mattress with an APAM and found that the APAM was a more effective preventive measure. RCTs comparing APAMs with constant-low-air mattresses resulted in conflicting evidence. There was also no clear evidence as to which type of APAM performed better. All RCTs had methodological flaws. The use of contact interface pressure and blood perfusion measurements to evaluate the effectiveness of APAMs is questionable. Comfort of APAMs was the primary outcome measure in only four studies. Different methods for assessment were used and different types of APAMs were evaluated. Better measures for comfort are needed. A few studies discussed technical problems associated with APAMs. Educating nurses in the correct use of APAMs is advisable. Conclusion: Taking into account the methodological issues, we can conclude that APAMs are likely to be more effective than standard hospital mattresses. Contact interface pressure and blood perfusion give only a hypothetical conclusion about APAMs' effectiveness. Additional large, high-quality RCTs are needed. No conclusions can be drawn regarding the comfort of APAMs. A number of technical problems associated with APAMs are related to nurses' improper use of the devices. 2007 Elsevier Ltd. All rights reserved.

Source: EMBASE

47. Alternating pressure air mattresses as prevention for pressure ulcers: a literature review.

Author(s): Vanderwee, K, Grypdonck, M, Defloor, T

Citation: Int J Nursing Studies, May 2008, vol./is. 45/5(784-801), 0020-7489 (2008 May)

Abstract: Literature review on the effectiveness and comfort of alternating pressure air mattresses (APAMs) as a preventative measure for pressure ulcers. Contact interface pressure and blood perfusion were frequently used outcome measures to examine the effectiveness of APAMs. The benefits of APAMs over standard hospital mattresses are examined and mechanical reliability, user errors and costs are discussed. 62 refs.

Source: BNI

48. Physiological response of the heel tissue on pressure relief between three alternating pressure air mattresses.

Author(s): Goossens, R, Rithalia, S

Citation: J Tissue Viability, February 2008, vol./is. 17/1(10-4), 0965-206X (2008 Feb)

Abstract: Research to compare the performance of 3 alternating pressure air mattresses on the development of pressure ulcers on heels, using pressure relief index and blood perfusion measurements. Maximum and minimum interface pressures, peak air pressures, interface pressure durations, peak perfusion and area under the perfusion curve were measured for each mattress, using healthy volunteers. 20 refs.

Source: BNI

49. Comparing the effectiveness of a specialized alternating air pressure mattress replacement system and an air-fluidized integrated bed in the management...
of post-operative flap patients: a randomized controlled pilot study.

Author(s): Finnegan, M, Gazzerro, L, Finnegan, J
Citation: J Tissue Viability, February 2008, vol./is. 17/1(2-9), 0965-206X (2008 Feb)
Publication Date: February 2008
Abstract: Research in the USA comparing outcomes for post-operative patients cared for on alternating air pressure support surfaces and an air-fluidised system. Participants with significant long-term paralysis who were admitted for reconstructive surgery to repair a full-thickness pressure ulcer were randomised to either therapy. Length of stay, cost of device provision and feedback from patients and nursing staff were compared. 27 refs.
Source: BNI

50. Physiological response of the heel tissue on pressure relief between three alternating pressure air mattresses

Author(s): Goossens R.H.M., Rithalia S.V.S.
Citation: Journal of Tissue Viability, February 2008, vol./is. 17/1(10-14), 0965-206X (Feb 2008)
Publication Date: February 2008
Abstract: Heels have substantially higher tissue interface pressures and are prone to ulceration compared to other bony prominences. Although many different types of alternating pressure air mattresses (APAMs) are used for the prevention and treatment of pressure ulcers, a few high-quality randomised controlled trials (RCTs) are available on which to base purchasing decisions. Faced with this situation, physiological measurements are increasingly being used as a surrogate. A time-based technique, which calculates pressure relief index (PRI), has been previously reported for analysing the ability of such systems. This technique has demonstrated that different designs produce variable results in this regard. The aim of the present study is to investigate the performance of three APAMs using PRI and blood perfusion measurements. Eleven able-bodied adult volunteers (6 males and 5 females) participated in the study. Their age, weight, height and body mass index (BMI) were (mean +/- s.d.) 23.9 +/- 2.1 years, 65.6 +/- 12.4 kg, 1.76 +/- 0.84 m and 21.0 +/- 2.4 kg/m², respectively. There was no statistically significant difference in maximum interface pressure for the three mattresses. However, the AUTOlogic produced a statistically significant lower minimum interface pressure (Duo Care Plus, p < 0.0001 and higher pressure relief index below 30 mmHg than either the Duo Care Plus, p = 0.002 or Proficare, p < 0.0001. The AUTOlogic also gave a statistically significant enhanced perfusion per cycle when compared to other two mattresses (Duo Care Plus, p = 0.03 or Proficare, p = 0.01). 2007 Tissue Viability Society.
Source: EMBASE

51. Comparing the effectiveness of a specialized alternating air pressure mattress replacement system and an air-fluidized integrated bed in the management of post-operative flap patients: A randomized controlled pilot study

Author(s): Finnegan M.J., Gazzerro L., Finnegan J.O., Lo P.
Citation: Journal of Tissue Viability, February 2008, vol./is. 17/1(2-9), 0965-206X (Feb 2008)
Publication Date: February 2008
Source: EMBASE

52. Pressure ulcers.

Author(s): Cullum N, Petherick E
Citation: Clinical Evidence, 2008, vol./is. 2008/, 1462-3846;1752-8526 (2008)
Publication Date: 2008
Abstract: INTRODUCTION: Unrelieved pressure or friction of the skin, particularly over bony prominences, can lead to pressure ulcers in up to a third of people in hospitals or
community care, and a fifth of nursing home residents. Pressure ulcers are more likely in people with reduced mobility and poor skin condition, such as older people or those with vascular disease. METHODS AND OUTCOMES: We conducted a systematic review and aimed to answer the following clinical questions: What are the effects of preventive interventions in people at risk of developing pressure ulcers? What are the effects of treatments in people with pressure ulcers? We searched: Medline, Embase, The Cochrane Library and other important databases up to February 2007 (Clinical Evidence reviews are updated periodically, please check our website for the most up-to-date version of this review). We included harms alerts from relevant organisations such as the US Food and Drug Administration (FDA) and the UK Medicines and Healthcare products Regulatory Agency (MHRA). RESULTS: We found 60 systematic reviews, RCTs, or observational studies that met our inclusion criteria. We performed a GRADE evaluation of the quality of evidence for interventions. CONCLUSIONS: In this systematic review we present information relating to the effectiveness and safety of the following interventions: air-filled vinyl boots, air-fluidised supports, alternating pressure surfaces (including mattresses), alternative foam mattresses, constant low-pressure supports, debridement, electric profiling beds, electrotherapy, hydrocellular heel supports, low-air-loss beds (including hydrotherapy beds), low-level laser therapy, low-tech constant low-pressure supports, medical sheepskin overlays, nutritional supplements, orthopaedic wool padding, pressure-relieving overlays on operating tables, pressure-relieving surfaces, repositioning (regular "turning"), seat cushions, standard beds, standard care, standard foam mattresses, standard tables, surgery, therapeutic ultrasound, topical lotions and dressings, topical negative pressure, and topical phenytoin.

Source: MEDLINE

Full Text: Available in fulltext at National Library of Medicine

☐ 53. Strategies for preventing pressure ulcers.

Citation: Joint Commission Perspectives on Patient Safety, 01 January 2008, vol./is. 8/1(5-7), 15345181

Publication Date: 01 January 2008

Source: CINAHL

☐ 54. Review: support surfaces, nutritional supplements, and topical agents help prevent pressure ulcers.

Author(s): Dealey C

Citation: Evidence Based Nursing, 01 April 2007, vol./is. 10/2(54-54), 13676539

Publication Date: 01 April 2007

Abstract: What is the quality of evidence for various pressure ulcer prevention interventions?

Source: CINAHL

Full Text: Available in fulltext at Highwire Press

☐ 55. Effectiveness of turning with unequal time intervals on the incidence of pressure ulcer lesions.

Author(s): Vanderwee K, Grypdonck MHF, De Bacquier D, DeBacquor T

Citation: Journal of Advanced Nursing, 01 January 2007, vol./is. 57/1(59-68), 03092402

Publication Date: 01 January 2007

Abstract: Aim. This paper reports a study investigating whether repositioning patients lying on a pressure-reducing mattress alternately for 2 hours in a lateral position and 4 hours in a supine position reduces the incidence of pressure ulcers in comparison with repositioning every 4 hours. Background. Repositioning is commonly recognized as an effective preventive measure. Almost no research has been carried out so far on the necessary
turning frequencies to prevent pressure ulcer lesions. The pressure is higher in a lateral than in a supine position. Method. A two-arm randomized controlled trial was conducted in 16 Belgian elder care nursing homes. Patients with non-blanchable erythema were randomly assigned to either an experimental or a control group. In the experimental group (n = 122), patients were repositioned alternately 2 hours in a lateral position and 4 hours in a supine position. In the control group (n = 113), patients were repositioned every 4 hours. The sitting protocol was identical in both groups. Pressure areas were observed daily and classified according to the four grades of the European Pressure Ulcer Advisory Panel.

Results. In the experimental group, 16.4% patients developed a pressure ulcer lesion (grade 2-4), while 21.2% did so in the control group. The incidence was not statistically significantly different between the two groups (P = 0.40). The severity (P = 0.65) and location (P = 0.19) of pressure ulcer lesions, and the time to developing them (P = 0.29) were also similar in both groups. No patient developed a pressure ulcer at the hips. A considerable number of patients changed from a lateral to a supine position between the turning intervals. Conclusion. More frequent repositioning on a pressure-reducing mattress does not necessarily lead to fewer pressure ulcer lesions and consequently cannot be considered as a more effective preventive measure.

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