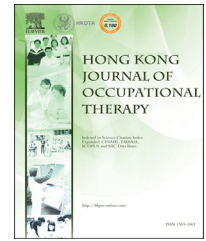




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REVIEW ARTICLE

Systematic Review: Is Prescription of Pressure-relieving Air Cushions Justified in Acute and Subacute Settings?



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Summary *Background/Objective:* Pressure injuries are a common yet largely preventable complication of hospitalisation. Whilst occupational therapists commonly prescribe pressure-relieving devices to reduce these risks, evidence to support clinical decision-making is limited. The purpose of this study was thus to examine research literature as to the efficacy of pneumatic cushions for general acute/subacute patient populations.

Methods: A systematic search of various databases was conducted, and the literature was then appraised using standardised inclusion/exclusion parameters.

Results: Three randomised controlled trials were identified that met search criteria.

Conclusion: Whilst there is currently preliminary evidence to support the effectiveness of pneumatic pressure-relieving cushions as compared to standard foam, specific recommendations as to a preferred make/model of cushion for use within general hospital settings are not supported at this time.

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Introduction

Pressure injuries are a common yet largely preventable consequence of hospitalisation, often resulting in significant patient morbidity and mortality (Carlson, Emmons, Falone, & Preston, 2011). They are formally defined as 'localized injury to the skin and/or underlying tissue usually over a bony prominence as a result of pressure, or

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pressure in combination with shear and/or friction (NPUAP & EPUAP, 2009, p. 12)', with prevalence within the Australian context estimated to be between 11.0% and 17.6%, consistent with the rates reported in other international studies (CEHSEU, 2006).

The treatment of pressure injuries requires specialised and coordinated medical, surgical and therapeutic interventions to promote optimal wound healing and reduce the risk of further deterioration or recurrence (Carlson et al., 2011; Graves, Birrell, & Whitby, 2005). Invariably, treatments of this nature are costly and resource-intensive. Together with the economic impacts of increased hospital length of stay and risk of secondary complications (including sepsis, cellulitis, bone/joint infection and abscess), these costs place further burden on an already stretched health-care system (Dealey, Posnett, & Walker, 2012; Graves et al.). A 2005 Australian study by Graves et al. estimated that the opportunity cost of lost bed days associated with pressure injury incidence is approximately AU\$285 million per annum, a figure that is only expected to increase with an ageing population and increased demand for health services.

Occupational therapists are commonly involved in the prescription of pressure-relieving seating surfaces (including cushions, seat pads, back-rests and mattresses) for pressure injury prevention and intervention. These pressure-relieving devices are generally used in addition to other wound management and risk-reduction strategies, such as skin care, dressings, repositioning and patient transfer techniques (McInnes, Jammali-Blasi, Cullum, Bell-Syer, & Dumville, 2013). Although there are multiple types of pressure-relieving seating surfaces on the market, there is a clear lack of reliable evidence to support the relative benefits of these expensive equipment items (Russell & Reynolds, 2000). As a result, clinicians often utilise the same pressure-care products regardless of the patient's clinical presentation, and have varying levels of understanding of the evidence base supporting their use. Similarly, consideration of other important prescriptive factors, such as appropriate equipment set-up, use and monitoring, staff training, infection control requirements and financial cost, are often neglected or incorrectly applied.

Given the high prevalence of pressure injuries within hospital settings, and the associated clinical and financial implications of their management, a clear need exists for evidence-based practice guidelines for optimal prescription of pressure-relieving seating products by occupational therapists. The release of the *Pan Pacific Clinical Practice Guideline for the Prevention and Management of Pressure Injury* (AWMA, 2012) and the *National Safety and Quality Health Service Standards* (ACSQHC, 2012) also provide further impetus for evidence-based research to underpin the delivery of high-quality pressure injury interventions within inpatient settings.

This paper thus presents the findings of a systematic review of current research in pressure-relieving seating for general acute/subacute inpatient populations, with a specific focus on determining the effectiveness of pneumatic (air-filled) cushions, and identification of specific types of pressure-relieving cushions for optimal pressure injury prevention and management. Analysis of the clinical transferability of research results for occupational therapy practice and recommendations for future study in this area are also discussed.

Methods

Search strategy and search terms

Between July and October 2013, a comprehensive search of the literature was conducted using Medline Complete, Cinahl Plus, Embase, the Cochrane Library and OT Seeker databases. PICO (population, intervention, comparison, outcome) search terms were tailored to each individual database, using both individual key words and multiple 'Boolean' search strategies (i.e., using 'and' and 'or') (refer to Appendix 1). Articles obtained were then initially screened by title to ensure basic applicability, and then further reviewed by abstract to determine specific relevance to the research question.

Reference lists obtained from key literature were also reviewed to reduce the likelihood of any missed studies, as well as the use of citation tracking and key author searches.

Inclusion and exclusion criteria

Strict inclusion criteria were applied to this systematic review as follows:

- Comparative research involving any type of pneumatic pressure-relieving cushion
- Studies examining pressure-relieving cushions used in conjunction with standard seating or wheelchairs in any environmental setting
- Studies involving participants aged 18 years and over and with any grade of pressure area
- Articles published in English between 1990 and present

Studies were excluded from review if they focused on paediatric populations, neurological/spinal cord diagnoses, pressure care mattresses and/or the management of heel pressure ulcers. These exclusions were made on the basis that all research studies obtained needed to be representative of a general, aged patient population.

Quality assessment and risk of bias

The titles and abstracts of the search results were assessed for eligibility and relevance by two independent reviewers (AF & AB). Full copies of potentially relevant studies were then obtained, and again double-reviewed against the study inclusion criteria.

The methodological quality of the articles selected was evaluated using the PEDro rating scale (CEBP, 2010). Inter-rater agreement for the two reviewers was recorded, and any disagreements were resolved via direct discussion (refer to Appendix 2).

Data extraction

A standardised form was developed to ensure that uniform review criteria were applied to each study, including participant characteristics, patient population, study setting, recruitment procedures, intervention type/duration, outcome measures, results and adverse events. This process

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