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Literature Review: Combining Interface Pressure Measurements with an Air Cushion to Prevent Pressure Ulcers

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Introduction: Pressure ulcers are wounds that result from tissue ischemia secondary to decreased perfusion when unrelieved pressure occurs on the skin and underlying tissue. Patients with pressure ulcers experience higher rates of morbidity and mortality. Pressure ulcers directly associate with longer and more costly hospital admissions. Patients with a spinal cord injury (SCI) have a higher risk to develop a pressure ulcer during a hospital stay. Higher sitting pressure measurements are associated with a higher incidence of pressure ulcers.

Methods: We conducted a systematic literature review to determine current practices to decrease pressure ulcers in SCI patients.

Results: The Braden Scale is the standard measurement tool used to assess risk factors for pressure ulcer development in patients. Current strategies to prevent pressure ulcers focus on recommendations based on the Braden Scale Score. These strategies include using a pressure reduction surface for sitting. The strategies for prevention of pressure ulcers for SCI patients include specific recommendations for seat cushions to prevent ischia and sacral pressure ulcers. Factors that need consideration for seat cushion fitting for SCI patients are the amount of time a patient spends in the wheelchair daily, whether or not the patient can independently change position, level of sensation over the ischia, muscle strength or atrophy, and any systemic co-morbidities that would affect circulation and healing. The standard of care includes proper fitting of the wheelchair to the patient and using computer modeling to determine interface pressure over the ischia. Alternating air-pressure seat cushions are superior to static foam seat cushions for pressure ulcer prevention. Real-time (RT) pressure mapping allows creating custom foam seat cushions, but our systematic review did not identify any studies testing whether combining RT pressure interface measurements with an alternating air-pressure seat cushion would decrease the development of pressure ulcers in SCI patients.

Conclusion: In our systematic review, no studies tested whether combining RT interface measurements with an alternating air-pressure seat cushion would decrease the development of sacral and ischia pressure ulcers in patients with spinal cord injuries. We postulate that combining RT pressure interface measurements with an alternating air-pressure seat cushion may be a feasible and superior option to decrease the development of pressure ulcers in SCI patients. Our next step will be to conduct a RCT testing our hypothesis.

Title:

Literature Review: Combining Interface Pressure Measurements with an Air Cushion to Prevent Pressure Ulcers

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alternating air cushion, pressure ulcer prevention and spinal cord injury

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Abstract Summary:

Patients with a spinal cord injury (SCI) have a higher risk to develop a pressure ulcer during a hospital stay. Combining real time pressure interface measurements with an alternating air-pressure seat cushion may be a feasible and superior option to decrease the development of pressure ulcers in SCI patients.

Content Outline:

Introduction

I. Magnitude of Problem

A. Prevalence of pressure ulcers

B. Population description

II. Impact of Problem

A. Morbidity and mortality

B. Financial impact

III. Pressure Ulcer Etiology

A. Mechanism of injury

B. Staging of pressure ulcers

IV. Factors related to pressure ulcer development

A. Braden Scale

1. Sensory perception

2. Moisture

3. Activity

4. Mobility

5. Nutrition

6. Friction and shear

V. Current strategies for pressure ulcer prevention

A. Interventions based on Braden Scale score

B. Interventions for Spinal Cord Injury patients

1. Custom seat cushion fitting

2. Cushion characteristics

a. Interface pressure measurements

b. Air cell cushions

i. Static air cell cushions

ii. Alternating air cell cushions

VI. Recommendations for further study

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