Pressure and Nutrition Factors on the Development of Pressure Injuries for Individuals with a Spinal Cord Injury

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Spinal Cord Injury Population

- US Prevalence: 243,000-347,000 individuals living with SCI
- Approx. 17,000 new cases
- Average age: 42 years

National SCI Statistical Center, 2016
Pressure Injury Background

- Primary cause of hospitalization in 50K patients annually
- Treated in 500K hospitalized patients annually in US
- Stays totaled $11 billion in medical costs
- Wheeled mobility utilization
  - Estimated 5 M using Wheeled Mobility in US
  - Estimated 20 M using Wheeled Mobility Worldwide
  - Estimated 70 M actually need Wheeled Mobility


Prevention and Treatment of Pressure Ulcers by Rappl LM, Sprigie SH, Lane RT in Wound Healing: Evidence-Based Management
Pressure Injury Risk

- 24% of individuals with SCI experience a pressure ulcer during a rehabilitation hospital stay
- 15% experience a pressure ulcer within the first year
- 50%–85% patients with spinal cord injury will get pressure ulcer in lifetime
  - ~100% get a second pressure ulcer

Research article

The application of implementation science for pressure ulcer prevention best practices in an inpatient spinal cord injury rehabilitation program

Carol Y. Scovil1,2, Heather M. Flett1,3, Lan T. McMillan4, Jude J. Delparte1, Diane J. Leber1, Jacque Brown4, Anthony S. Burns4,5; on behalf of the Spinal Cord Injury Knowledge Mobilization Network (SCI KMN)

National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel, Pan Pacific Pressure Injury Alliance. 2014
Project Goals

- For individuals with SCI, explore factors that allow for the exploration of the relationship between
  - pressure relieving activities and technologies
  - risk for malnutrition
  - pressure ulcer risk
- The data collected for this exploratory study may lead to the identification of predictors for the development of pressure ulcers.
- The prevention of pressure ulcer development could have a significant impact on health care cost and overall quality of life for the SCI patient.
- The long-term goals include describing the nutritional status of individuals with a SCI, the risk of pressure ulcer development, and the pressure relieving and temperature characteristics of an individual’s seat cushion.
Methodology

- Recruitment from Assistive Technology Center: sample of convenience
- Single visit:
  - Health questionnaire: hx of PU, injury history
  - Nutrition focused physical exam
  - Braden Score, ASIA Score
  - Online Food Frequency Questionnaire (FFQ)
  - 2-item food insecurity screener
  - Current wheelchair assessment
  - Pressure and Temperature Mapping
- Focus of current discussion
  - Dispersion Index
  - Key nutrients from FFQ
Methodology
Pelvic Landmarks

- ASIS
- PSIS
- Sacrum
- Ischial Tuberosity
Seat Cushions

Air

Foam

Gel

Honeycomb
Pressure: Dispersion Index

Vista Medical, Boditrak Pressure Measurement System. Winnipeg, Manitoba, CA; www.pressuremapping.com

Area circumscribing the ischial tuberosities and the sacrum. The largest box (pink) is used to define the numerator of the dispersion index.
Cushion #1 - Foam

PPI Left IT – 122mmHg
PPI Right IT – 149mmHg
PPI Sacrum – 74mmHg
Dispersion Index – 37%
Current Cushion

PPI Left IT – 105 mmHg
PPI Right IT – 92 mmHg
PPI Sacrum – 100 mmHg
Dispersion Index – 35%
Methodology

- VioScreen

VioScreen Diet Assessment

Graphical Food Frequency Questionnaire (FFQ)
Results

- Demographics
- Pressure Injury History
- Nutrition and Pressure
<table>
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<th></th>
<th>Age (yrs)</th>
<th>Post Injury (yrs)</th>
<th>Height (cm)</th>
<th>Weight (kg)</th>
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<tr>
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<td>0.7</td>
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<td>59.7</td>
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<td>Max</td>
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<td>45.5</td>
<td>188.0</td>
<td>102.1</td>
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## History of Pressure Injuries on Buttocks

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Nutrition and Pressure

High Risk in the upper Left Quadrant
Nutrition and Pressure

High Risk in the upper Left Quadrant
Nutrition and Pressure

High Risk in the upper Left Quadrant
Discussion

- Pressure - Dispersion Index
- Nutrition – Vioscreen
- Reference Standards for SCI Population
- Pressure & Nutrition
- Future Direction
Thank You and Acknowledgements

- School of Health and Rehabilitation Science - Seed funding
- Michele Basso – Grant Officer & Mentor
- Matt Yankie – PT and Pressure Mapping
- Hannah Oakley - Dietetics Grad Student – Data Collection
- Kim Pierpont – Dietetics Grad Student – Data Collection
- Julie Faieta – OT PhD Student – Temperature Analysis
- Matt Brockman – ME Grad Student – Pressure & Temperature Analysis
- Chris Taylor – Healthy Eating Index & SPSS
- Susan White – Statistics
- Sandra Metzler – Mechanics of Materials