Methodology to Measure the Adjustability of Skin Protection Features of Wheelchair Cushions

Maureen Linden, MSBME
Stephen Sprigle, PH.D., MSPT
Adjustable Skin Protection Cushion (SADMERC)

• Meets skin protection requirement

• Adjustable by the addition or removal of air, liquid, gel, or other fluid medium in physiologically appropriate areas of the cushion to promote pressure reduction.
Constructs of Pressure Relief

- Magnitude
- Immersion
- Pressure Redistribution
  - Envelopment
  - Off-Loading
# Test Matrix

<table>
<thead>
<tr>
<th></th>
<th>Model A</th>
<th>Model B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Load</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Load</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Protocol

• Cohort includes skin protection and adjustable skin protection cushions.
• 3 trials per condition in test matrix.
• Cushion is compared to reference foam
# Metrics

<table>
<thead>
<tr>
<th>Metric</th>
<th>Description</th>
<th>COR/Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Magnitude</strong></td>
<td>Sum of the 3 most medial sensors</td>
<td>14 %</td>
</tr>
<tr>
<td>Total: -5 to 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Envelopment</strong></td>
<td>Indicates equality between IT and lateral 5 sensor</td>
<td>12 %</td>
</tr>
<tr>
<td>Parity 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Off-Loading</strong></td>
<td>Indicates equality between IT and trochanteric sensor.</td>
<td>7 %</td>
</tr>
<tr>
<td>Parity 40</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Immersion</strong></td>
<td>How far the model has been immersed into the cushion.</td>
<td>1 %</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Magnitude

- 56 kg, 22.0
- 56 kg, 25.5
- 84 kg, 22.0
- 84 kg, 25.5

adj | non
---|---
adj | non

Tot: -5 to 5

Cush type
Envelopment
Panel variables: mass, model
Adjustability Delineation

• At least one adjustment must meet criteria on all 3 constructs

• Extreme loading conditions only
Discussion

- Protocol determines adjustability based on body masses and body types
- Cushion adjustments may not be as suitable for model as for a person
- Inter & Intra lab validation is necessary
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