MOBILE STRUCTURE SENSOR FOR REAL-TIME 3D WOUND ASSESSMENT: EX-VIVO VALIDATION USING WOUND PHANTOMS

Wu K, Amling J, Howell A, Kim PCW, Guler O.

Presented by: June Amling, MSN, RN, CNS, CWON, CCRN
Sheikh Zayed Institute for Surgical Innovation
Children’s National Health System

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Agenda

- Significance
- Methods
- Results
- Conclusion
Chronic Wound in the US

6.5 Million
Americans Affected (1)

$25 Billion
Dollars Spent on Treatment (1)

5%
Increase every year on spending (2)

0
Gold Standard for Wound Assessment


Up to 40% Measurement Errors (3)

20-30% Nursing time spent on documentation
Practical Alternative?

$17,000+

$8,000+

$18,000+
Innovation
Method

VATA Wound Model

<table>
<thead>
<tr>
<th>Wound</th>
<th>Circumference (cm)</th>
<th>Area (cm^2)</th>
<th>Depth (cm)</th>
<th>Volume (cm^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wound 1</td>
<td>34.3</td>
<td>69.4</td>
<td>2.6</td>
<td>90.0</td>
</tr>
<tr>
<td>Wound 2</td>
<td>17.0</td>
<td>21.2</td>
<td>1.5</td>
<td>19.5</td>
</tr>
<tr>
<td>Wound 3</td>
<td>16.6</td>
<td>19.5</td>
<td>0.5</td>
<td>4.7</td>
</tr>
<tr>
<td>Wound 4</td>
<td>11.8</td>
<td>8.1</td>
<td>0.1</td>
<td>0.5</td>
</tr>
</tbody>
</table>
Method:
Wound Model and 3D Reconstruction
## Result

<table>
<thead>
<tr>
<th>Wound</th>
<th>Sensor</th>
<th>CT</th>
<th>% error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wound 1</td>
<td><img src="image" alt="Image 36x558 to 756x576" /></td>
<td><img src="image" alt="Image 122x320 to 256x493" /></td>
<td><img src="image" alt="Image 119x98 to 259x271" /></td>
</tr>
<tr>
<td>Circumference (cm)</td>
<td>3.4%</td>
<td>2.0%</td>
<td>6.7%</td>
</tr>
<tr>
<td>Area (cm²)</td>
<td><img src="image" alt="Image 374x212" /></td>
<td><img src="image" alt="Image 463x228" /></td>
<td><img src="image" alt="Image 553x121" /></td>
</tr>
<tr>
<td>Depth (cm)</td>
<td><img src="image" alt="Image 374x212" /></td>
<td><img src="image" alt="Image 463x228" /></td>
<td><img src="image" alt="Image 553x121" /></td>
</tr>
<tr>
<td>Volume (cm³)</td>
<td><img src="image" alt="Image 374x212" /></td>
<td><img src="image" alt="Image 463x228" /></td>
<td><img src="image" alt="Image 553x121" /></td>
</tr>
</tbody>
</table>

| Wound 2 | ![Image 36x558 to 756x576](image) | ![Image 122x320 to 256x493](image) | ![Image 119x98 to 259x271](image) | ![Image 374x212](image) | ![Image 463x228](image) | ![Image 553x121](image) | ![Image 640x210](image) |
| Circumference (cm) | 3.8% | 4.2% | 4.2% | 12.7% |
| Area (cm²) | ![Image 374x212](image) | ![Image 463x228](image) | ![Image 553x121](image) | ![Image 640x210](image) |
| Depth (cm) | ![Image 374x212](image) | ![Image 463x228](image) | ![Image 553x121](image) | ![Image 640x210](image) |
| Volume (cm³) | ![Image 374x212](image) | ![Image 463x228](image) | ![Image 553x121](image) | ![Image 640x210](image) |

- Sensor
- CT
Result

Wound 3
- Circumference (cm): 4.3% error
- Area (cm²): 4.5% error
- Depth (cm): 13.2%

Wound 4
- Circumference (cm): 3.4% error
- Area (cm²): 3.2% error
- Depth (cm): 16.6%
Future Work
Questions?