Lymphedema with associated arm swelling following surgical and/or radiation therapy for breast cancer is a major complication experienced by about 25-30% of women breast cancer survivors (1, 2). Incidence however does vary on a variety of co-factors and the nature of the primary treatment, with incidence rates of 15% (2) to over 40% reported for radical mastectomies combined with radiortherapy(3). About 75% of women who will go on to experience lymphedema complications do so within three years of treatment but new cases develop beyond this at about 1% per year (5).

**Background**

### Postmastectomy Arm Lymphedema

About 25-30% of women breast cancer survivors (1, 2). Incidence does vary on a variety of co-factors and the nature of the primary treatment, with incidence rates of 15% (2) to over 40% reported for radical mastectomies combined with radiortherapy(3). About 75% of women who will go on to experience lymphedema complications do so within three years of treatment but new cases develop beyond this at about 1% per year (5).

**Methodology**

Relative arm skin tissue water (RTW) was determined based on the measured dielectric constant (0-80) at 300 MHz in edematous and contralateral normal forearms of 10 women using the Delfin MoistureMeter-D. Measurements were made before the start of treatment at a standardized site on the volar forearm located seven cm distal to the antecubital crease. Different skin depths were assessed in triplicate using four probe sizes that targeted depths of about 0.5, 1.5, 2.5 and 5 mm. Volumes (VOL) and edema of a four cm segment encompassing the RTW measurement site were determined by arm girth measures and calculations based on an elliptical frustum model. Edema percentage was calculated as 100/(VOL – VOL_N)/VOL_N.

### Results

**Segmental Volume Measurements**

<table>
<thead>
<tr>
<th>Probe</th>
<th>Depth</th>
<th>Arm</th>
<th>Lymphedema</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>L50</td>
<td>0.5</td>
<td>1.6</td>
<td>47.6±8.3</td>
<td>41.1±6.8</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>2.5</td>
<td>41.1±6.8</td>
<td>31.9±6.7</td>
</tr>
<tr>
<td></td>
<td>2.5</td>
<td>41.1±6.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Volume (VOL) and edema of a four cm segment encompassing the RTW measurement site were determined by arm girth measures and calculations based on an elliptical frustum model. Edema percentage was calculated as 100/(VOL – VOL_N)/VOL_N.**

**Conclusion:**

These initial findings suggest that this new method may serve as a rapid quantitative assessment procedure for documenting lymphedema and possibly for early detection of incipient lymphedema that is not yet clinically observable.

**References**