A New Approach to Skin Health Assessment

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Introduction

• Prevention of occupational ill health due to dermal exposure
• Existing techniques detect clinical signs
• New techniques can detect sub-clinical damage
Cost of Compensation

- Administration
- Lost investment
- Lost skills
- Insurance premiums
- Retraining
- Lost production
Visual Assessment

• Visual and tactile examination of the skin
• Scoring system
• Comparison of images
Benefits and Disadvantages

- Quick
- Inexpensive
- Can be done ‘on-site’
- Valid for all visible skin conditions

- Subjective, no quantitative data
- Requires experience/training
- May not indicate sub-clinical damage
- Surface conditions do not always correlate with conditions in the skin
New Techniques

• Skin Bioengineering – skin condition measurement
• Uses scientific equipment to measure skin parameters
• Parameters give us information about the condition of the skin
Important parameters

- Transepidermal Water Loss (TEWL)
- Skin Hydration
- Barrier function
- General skin condition
TEWL

- Below 20 g/m²/h
- Arbitrary Units
- Measure of Barrier Function
- Assess skin function
TEWL Measurement

- Open chamber
- Closed chamber
- Closed chamber with condenser
- Closed vented chamber
Skin Hydration

• Hydration of outer layers
• Lose ability to bind water
• Damaged skin has fall in hydration
• Assess general skin condition
Skin Hydration

- Capacitance
- Conductance
- Impedance
Benefits and Disadvantages

😊

• Non-invasive
• Simple measurement methods
• Quantitative data
• May indicate sub-clinical damage
• Variety of parameters can be measured

😢

• Only valid for certain skin conditions
• Requires controlled conditions
Using Measurements

• Individual needs to acclimatise
• Room conditions need to be
  ➢ 40 – 60% Relative Humidity
  ➢ 20 – 23°C
Using TEWL Measurements

• Measurement between 10 seconds and several minutes
• Value or unit
• Assess barrier damage
• Take action to prevent further damage
  – Before a visible problem
  – Reduce risk of chemical penetration
Using Hydration Measurements

• Measurement takes couple of seconds
• Arbitrary units
• Assess skin condition
• Take action to prevent further damage
  – Help prevent irritant contact dermatitis
  – Help prevent penetration by chemicals
Where to measure

On skin where there is potential for a problem to occur
Interpretation: TEWL

• Low values = good barrier function

• High values = impaired barrier function
## Interpretation: TEWL

<table>
<thead>
<tr>
<th>Value g/m²/h</th>
<th>Unit</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-8</td>
<td>0-4</td>
<td>Very healthy barrier</td>
</tr>
<tr>
<td>8-14</td>
<td>5-9</td>
<td>Healthy barrier</td>
</tr>
<tr>
<td>14-20</td>
<td>10-12</td>
<td>Normal barrier</td>
</tr>
<tr>
<td>20-24</td>
<td>13-16</td>
<td>Strained barrier</td>
</tr>
<tr>
<td>25+</td>
<td>17-20</td>
<td>Indicates critical condition</td>
</tr>
</tbody>
</table>
Interpretation: Hydration

• Lower values = decline in skin condition

• Above certain level = normal skin condition
## Interpretation: Hydration

<table>
<thead>
<tr>
<th>Value</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Skin condition very poor</td>
</tr>
<tr>
<td>2</td>
<td>Skin condition poor</td>
</tr>
<tr>
<td>3</td>
<td>Skin condition not good</td>
</tr>
<tr>
<td>4</td>
<td>Skin condition borderline</td>
</tr>
<tr>
<td>5-8</td>
<td>Skin condition normal</td>
</tr>
<tr>
<td>9-12</td>
<td>Skin abnormally moist</td>
</tr>
</tbody>
</table>
Benefits

• Quantitative data
  – Reports
  – Support need for action
  – Show compliance
• Sub-clinical damage
  – Action before clinical disease
• Easier to identify problems
• Raise worker awareness
Conclusions

- Simple to use techniques
- Quantitative data
- Sub-clinical damage
- Raise awareness

Exciting new approach to skin health assessment
Thank you for listening!

Questions?