Preliminary study on plantar skin resilience and plantar padding in the anaesthetic foot in leprosy
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Hypothesis

To establish that plantar skin resilience and plantar padding are significantly altered in the anaesthetic foot in leprosy and may have a role in the genesis of plantar ulceration
Basis of study

**Skin resilience**

Because of loss of sweating and resultant dryness, the plantar skin loses its resilience leading to cracks and fissures and renders the plantar skin vulnerable for breaching.
Basis of study

**Plantar padding**

Paralysis of intrinsic muscles in the foot results in wasting and thinning of plantar soft tissue pad leading to altered loss of absorption and dissipation of pressure in the sole of the foot
Measurement of plantar skin resilience

Plantar skin resilience is measured by an instrument called durometer which tests hardness. This hardness is expressed in units of “shore”

The durometer used for assessing soft tissue hardness is used.
Measurement of Plantar padding

• Plantar soft tissue padding is measured using a standard lateral radiograph of the foot.
• On the radiograph soft tissue shadow of skin outline is marked at standard points - the heel, mid foot and 5th metatarsal head. The distance between the skin outline and the bone outline is measured at those points.
Patients - Controls

Inclusion criteria
22 feet in patients which had complete loss of sensation as tested by SW filaments attending the outpatient department of our institution were included in the study.

Exclusion criteria
Those with diabetes and alcoholism excluded.

Controls – 32 controls were recruited.
# Results – Plantar Padding

<table>
<thead>
<tr>
<th>Site</th>
<th>Normal (cms)</th>
<th>Patients (cms)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heel</td>
<td>1.9 (0.37)</td>
<td>2.01 (0.15)</td>
<td>0.14</td>
</tr>
<tr>
<td>Cuboid</td>
<td>2.5 (0.38)</td>
<td>3.03 (0.19)</td>
<td>0.00</td>
</tr>
<tr>
<td>5th MTH</td>
<td>1.4 (0.24)</td>
<td>1.68 (0.16)</td>
<td>0.00</td>
</tr>
</tbody>
</table>
## Results – Plantar skin resilience

<table>
<thead>
<tr>
<th>Site</th>
<th>Normal</th>
<th>Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heel</td>
<td>15 (4.1)</td>
<td>16.64 (12.5) p=0.60</td>
</tr>
<tr>
<td>Lateral Border</td>
<td>11 (3.2)</td>
<td>15.21 (7.7) p=0.06</td>
</tr>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; MTH</td>
<td>8 (4.1)</td>
<td>14.30 (7.2) p=0.02</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; MTH</td>
<td>7 (5.2)</td>
<td>11.80 (17.4) p=0.40</td>
</tr>
<tr>
<td>5&lt;sup&gt;th&lt;/sup&gt; MTH</td>
<td>8 (3.2)</td>
<td>14.16 (15.4) p=0.18</td>
</tr>
</tbody>
</table>
Observations

• Results for plantar padding show that there is no decrease in padding at the heel, cuboid and 5\textsuperscript{th} metatarsal head

• Results for plantar skin resilience over heel, lateral border, 3\textsuperscript{rd} and 5\textsuperscript{th} MTH showed that even though the resilience marginally decreased these were not statistically significant

• However, plantar skin resilience at 1\textsuperscript{st} metatarsal heads showed significant decrease
Conclusions

• Plantar padding at all the sites studied does not seem to have a bearing on the genesis of plantar ulcers
• The intrinsic muscle bellies in the foot are not present at the heel and metatarsal heads and therefore may not contribute to plantar padding
• In case of mid foot region most muscle bellies lie between the metatarsals and are deep and may not contribute to the plantar padding
Conclusions

• Plantar skin resilience in the heel and lateral border did not show any difference - may be because even among normal feet the skin is always thick giving it the hardness

• Plantar skin resilience under the 1st metatarsal head has increased significantly making the skin vulnerable for breakdown
Conclusions

• It would need a larger study before one can recommend plantar skin resilience measurement as a predictor for genesis of plantar ulcer.

• Plantar skin resilience measurement may be an additional predictor for plantar ulcers to other ulcer predictors such as loss of protective sensation over the plantar skin and clawing of toes leading to high pressures under the metatarsal heads.