Incidence and Risk factor of reamputation according to foot amputation level

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Jun-Young Choi, Kyung Ah Chun, Hyeong Tak Ko,
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My disclosure is in the Final AOFAS Mobile App.
I have no potential conflicts with this presentation.
Introduction and Purpose

• Approximately 75% of foot amputation are performed on patients with DM
• Many paper had been published about Reamputation risk factor in DM patients
• Few paper had been published about location of amputation & Reamputation
• Alteration foot Pressure After foot partial amputation
• After great toe amputation, Pressure distribution of the foot is significantly altered
• Compare Re-Amputation rate according to the location of foot amputation
• Incidence & Risk factor of re-amputation according to location of foot amputation
Materials & Method

- From 2002.3 To 2012.9
- 231 cases low extremity amputation
- Amputation below ankle, 86 cases (> f/u 12 months)
- F/U; Average 50.4 month (12~96 month)

- 86 cases
  DM foot : 69 cases
  ASO/Bugér’s Dz : 11 cases
  Traumatic sequellae : 4 cases
  Gouty arthritis: 1 case
  Malignant melanoma: 1 case

![Pie chart showing distribution of cases]

- DM foot
- ASO/Buger dz
- Traumatic
- Others
Materials & Method

• Definition of Re-amputation
  : Proximally amputation than first amputation

• Location of amputation
  Ray, Phalanx & metatarsal

• Cause of amputation
  ✓ Mechanical failure
  (chr. ulcer → infection → necrosis)
  ✓ Vasculopathy
  ✓ Chronic Pain & deformity
Materials & Method

- Location of amputation (Ray)
  - Single ray 73
  - Multi ray 13

Single Ray Amputation (73)
- 1st ray  24
- 2nd ray 14
- 3rd ray  5
- 4th ray  6
- 5th ray  24

Multi Ray Amputation (13)
- 1,2,3,4,5 Ray Amputation : 4 cases
- 4,5 Ray Amputation : 4 cases
- 1,2,3,4 Ray Amputation: 1 case
- 2,3,4 Ray Amputation: 1 case
- 1,2 Ray Amputation: 1 case
- 2,3 Ray Amputation: 1 case
- 3,5 Ray Amputation: 1 case
Materials & Method

- Location of amputation (MT or Phalanx)
  - Phalanx Amputation: 29 toes
  - Metatarsal Amputation: 87 toes
- M: 73 cases, F: 13 cases
- Re-amputation rate: 53.5% (46/86)
- Cause of Re-amputation
  - Mechanical failure
    - chr. ulceration → infection → necrosis
      58.7% (27/46)
  - Vasculopathy
    34.8% (16/46)
  - Pain & Deformity
    6.5% (3/46)
## Result

<table>
<thead>
<tr>
<th></th>
<th>Amputation Group (A)</th>
<th>Re-amputation group (RA)</th>
<th>Amputation Group (A)</th>
<th>Re-Amputation group (RA)</th>
<th>Re-Amputation rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>68.7</td>
<td>68.7</td>
<td>11</td>
<td>18</td>
<td>62.1%</td>
</tr>
<tr>
<td><strong>Sex (M/F)</strong></td>
<td>36/4</td>
<td>37/9</td>
<td>16</td>
<td>22</td>
<td>57.9%</td>
</tr>
<tr>
<td><strong>Metatarsal Amputation</strong></td>
<td>33</td>
<td>54</td>
<td>26</td>
<td>23</td>
<td>46.9%</td>
</tr>
<tr>
<td><strong>Phalanx Amputation</strong></td>
<td>20</td>
<td>9</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td><strong>Multi-Ray Amputation</strong></td>
<td>6</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Single-Ray Amputation</strong></td>
<td>34</td>
<td>39</td>
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</tbody>
</table>

P=0.003  P=0.916

P=0.372
## Result

<table>
<thead>
<tr>
<th>Amputation Group (A)</th>
<th>Re-amputation group (RA)</th>
<th>Re-Amputation rate</th>
<th>Cause of Re-Amputation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st &amp; 2nd &amp; 3rd Ray Amputation</td>
<td>26</td>
<td>41</td>
<td>61.2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Vasculopathy 22.2% (4/18)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pain &amp; Deformity 5.6% (1/18)</td>
</tr>
<tr>
<td>4th &amp; 5th Ray Amputation</td>
<td>27</td>
<td>22</td>
<td>44.9%</td>
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<tr>
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<td></td>
<td>Vasculopathy 26.7% (4/15)</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Pain &amp; Deformity 13.3% (2/15)</td>
</tr>
<tr>
<td>1st Ray Amputation (18)</td>
<td></td>
<td>62.1%</td>
<td>Mechanical failure 62.5% (5/8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Vasculopathy 12.5% (1/8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pain &amp; Deformity 25% (2/8)</td>
</tr>
<tr>
<td>2nd Ray Amputation (15)</td>
<td></td>
<td>60%</td>
<td>Mechanical failure 50% (4/8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Vasculopathy 37.5% (3/8)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Pain &amp; Deformity 12.5% (1/8)</td>
</tr>
<tr>
<td>3rd Ray Amputation (13)</td>
<td></td>
<td>61.5%</td>
<td>Mechanical failure 64.3% (9/14)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Vasculopathy 35.7% (5/14)</td>
</tr>
</tbody>
</table>
### Result

<table>
<thead>
<tr>
<th>Ray amputation</th>
<th>TM amputation</th>
<th>BK amputation</th>
<th>AK amputation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; Ray</td>
<td>12</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Ray</td>
<td>7</td>
<td>1</td>
<td>3</td>
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<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; Ray</td>
<td>5</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt; Ray</td>
<td>3</td>
<td>0</td>
<td>6</td>
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<tr>
<td>5&lt;sup&gt;th&lt;/sup&gt; Ray</td>
<td>8</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

| 57.4% | 8.2%  | 32.8% | 1.6% |

P=0.360
Conclusion

• **Re-Amputation after foot partial amputation**
  - Relative common
  - 53.5%

• **Re-Amputation rate**
  - Level: Metatarsal > Phalangeal
  - Ray: 1,2,3 > 4,5

• **Most common Cause of Re-amputate**
  - Mechanical failure
Reference


