Short extension outrigger splint to release Proximal Inter-phalangeal (PIP) joint contractures in clawed fingers in leprosy

The Leprosy Mission Trust India

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Problem

• **Claw finger** is the most common and visible deformity in leprosy

• When neglected, can lead to **PIP joint contractures** (skin, capsule or combination)

• **Muscle balance operations** in claw fingers often **fail** due to contracture

• This emphasizes the **importance of release of all the contracture** before surgery
Possible approaches

- Thermoplastics - expensive
- A serial cylinder cast (CS) — (Brand PW, 1952 & Bell Krotowski 1995)
  - short lever arm (Colditz JC, 1995)
  - demands considerable skill (Colditz JC, 2002)
  - time consuming (Colditz JC, 2002) and
  - risk of blisters
- Other commercial splints – may not be readily available in developing countries
Loss of sensation in leprosy is a challenge

• Poorly fitting splints may cause complications
• Therefore, an ideal splint would be the one
  – Easy to use,
  – Good lever arm and
  – Reduces risk of blisters
Objective

To compare the effectiveness of an aluminium short extension outrigger (SEO) splint to release PIP joint contracture as compared to serial cylinder cast (CS)
Setting

- The Leprosy Mission Hospital Naini, Allahabad, Uttar Pradesh, India.
- Over 2000 new untreated leprosy cases, each year
- 150 bedded
- Computerized medical records since 2008
- Over 250 tendon transfer for hand each year
Methodology

• Design: **Controlled clinical trial**
• November 2011 to August 2012
• The data was collected using surgical audit form and analyzed using SPSS
Inclusion criteria

- PIP joint contracture (skin and/or capsule) of less than 45°

Exclusion Criteria

- PIP joint contracture >45°
- Blister/wound in fingers
- Scar near volar aspect of PIP joint
- Fixed PIP contractures (ankylosis)
- Absorption of digit
47 fingers of 33 patients

Experimental (SEO)
23 fingers
- Wax bath, stretching exercise, massage
- SEO splint
- Continued till patient selected for surgery by surgeon

Control (CS)
24 fingers
- Wax bath, stretching exercise, massage
- Serial cylinder cast (CS) using POP
- Continued till patient selected for surgery by surgeon
Serial cylinder cast

Applied daily after therapy
Short extension outrigger

- Outrigger
- Dorsal block
- Dynamic assist
Short extension outrigger

4-6 session in a day, 20 mins each

Resting splint at night
Outcome measures

- **PIP joint Contracture angle** – finger goniometer
- **Time taken to release contracture** – in days
- **Incidence of blister** during therapy
- **Fingers require surgical release of contracture** – number of fingers
## Clinical profile

<table>
<thead>
<tr>
<th></th>
<th>Experimental (SEO) N=23</th>
<th>Control (CS) N=24</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean Duration of Deformity (SD) in years</strong></td>
<td>7.1 (5.4)</td>
<td>5 (3.6)</td>
</tr>
<tr>
<td><strong>Fingers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Index</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Middle</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Ring</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Little</td>
<td>15</td>
<td>19</td>
</tr>
<tr>
<td><strong>Ulnar paralysis</strong></td>
<td>10 patients</td>
<td>10 patients</td>
</tr>
<tr>
<td><strong>Ulnar &amp; Median paralysis</strong></td>
<td>6 patients</td>
<td>7 patients</td>
</tr>
</tbody>
</table>
PIP joint contracture before and after intervention (Mean)
Results cont...

<table>
<thead>
<tr>
<th>Outcome variables</th>
<th>Experimental (SEO) N=23</th>
<th>Control (CS) N=24</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of therapy – Mean (SD) in days</td>
<td>10.5 (5)</td>
<td>15.4 (9.7)</td>
<td>.036</td>
</tr>
<tr>
<td>Incidence of blister (in %)</td>
<td>3 (13%)</td>
<td>11 (43%)</td>
<td>.017</td>
</tr>
<tr>
<td>Surgical release - FTSG (in%)</td>
<td>6 (26%)</td>
<td>16 (66%)</td>
<td>.008</td>
</tr>
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</table>
## Conclusion

<table>
<thead>
<tr>
<th>Aluminium Short extension outrigger (SEO)</th>
<th>Serial cylinder cast (CS)</th>
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</thead>
<tbody>
<tr>
<td>Less demand of skill</td>
<td>Demands considerable skill</td>
</tr>
<tr>
<td>Less time to release contracture</td>
<td>More time to release contracture</td>
</tr>
<tr>
<td>Low incidence of blister</td>
<td>High incidence of blister</td>
</tr>
</tbody>
</table>

The aluminium SEO is superior to CS in PIP joint contracture release in clawed fingers.
Acknowledgment

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• Thank you to all the patients for their willingness to be part of this study.
Thank you
References


