Effect of different orthotic concepts as first line treatment of plantar fasciitis

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Disclosure

Effect of different orthotic concepts as first line treatment of plantar fasciitis
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My disclosure is in the Final AOFAS Program Book.

I have a potential conflict with this presentation due to:

Our research is supported by
German Association of Foot and Ankle Surgery (GFFC)
Bauerfeind AG
Schoen Klinik Muenchen Harlaching
Axomed Inc.
Geistlich Inc.
Marquardt Inc.
Adidas AG
Risk factors for plantar fasciitis

- high sports activity
- forefoot pronation
- high pressure under the forefoot,
- shortening of the heel cord
- increased body mass index (BMI)
- pes planovalgus and/or pes cavus

2. Irving DB, Cook JL, Young MA, Menz HB. Obesity and pronated foot type may increase the risk of chronic plantar heel pain: a matched case-control study. BMC Musculoskelet Disord 8: 41, 2007.
Treatment concepts

Mechanical concepts of orthotics
● hindfoot cushioning
● hind foot stabilization
● medial midfoot support

The purpose of this study was to compare three of the most common mechanical orthotic concepts in a prospective, randomized, controlled, head-to-head study.

Material and Methods

- 30 consecutive patients (21 women, 9 men)
- Diagnosis of plantar fasciitis (clinical + MRI)
- Registered at the German Register for Clinical Trials (DRKS00000742)
- Orthotics as single treatment for 3 weeks
- Exclusion criteria included:
  - Previous surgery in the area of the heel
  - Injection treatments within the last six months
  - Inflammatory joint diseases
  - Neurological diseases
  - Metabolic disorders
  - Foot deformities that required earlier treatment
- Three branches with different orthotics
- Patients randomly assigned to one of the three branches of therapy

Three weeks daily documentation of
- Maximal pain (Visual Analogue Scale)
- Average pain (Visual Analogue Scale)
- Duration of pain
- Hours of usage of the orthotics
- Type of shoes used
- Daily walking distance

Statistics
- Levene’s test, an inferential statistic used to assess the equality of variances
- Analysis of Variance (ANOVA) to compare the means of the groups
- The post hoc analysis was used to identify significant differences between the groups
- T-test for dependent samples and Wilcoxon signed-rank test were to analyze therapeutic effects over time.
Demographics of the three groups

<table>
<thead>
<tr>
<th></th>
<th>age (ø ± SD)</th>
<th>Male/female</th>
<th>BMI (ø ± SD)</th>
<th>Pain in weeks (ø ± SD)</th>
<th>Usage time of the orthotics [h/day] (ø ± SD)</th>
<th>Shoes used</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 1</strong></td>
<td>51,6 ±12,5</td>
<td>2/8</td>
<td>27,4 ±2,9</td>
<td>8,6 ±4,9</td>
<td>8,8 ±3,9</td>
<td>6 Business shoe</td>
</tr>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>2 Comfort shoe</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 Safety shoe</td>
</tr>
<tr>
<td><strong>Group 2</strong></td>
<td>53,8 ±13,2</td>
<td>3/7</td>
<td>27,4 ±3,9</td>
<td>10,7 ±7,5</td>
<td>9,1 ±2,9</td>
<td>7 Business shoe</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>2 Comfort shoe</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 Safety shoe</td>
</tr>
<tr>
<td><strong>Group 3</strong></td>
<td>53,9 ±14,9</td>
<td>4/6</td>
<td>28,7 ±5,0</td>
<td>9,7 ±4,5</td>
<td>8,7 ±3,4</td>
<td>7 Business shoe</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 Comfort shoe</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>2 Safety shoe</td>
</tr>
</tbody>
</table>

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## Material and Methods

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Thin, prefabricated, over-the-counter (OTC) orthotic&lt;br&gt;Insert base is made of polyethylene (PE)&lt;br&gt;Cushion under the heel and forefoot are made of thin polyurethane (PU)&lt;br&gt;Besides trimming for sizing purposes, no further adjustments are possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 2</td>
<td>Soft foam insert&lt;br&gt;Padded heel&lt;br&gt;Voluminous basis made of EVA (Ethylene Vinyl Acetate)&lt;br&gt;Layered, recessed polyurethane cushion zone.&lt;br&gt;Individualization possible by an orthopedic technician</td>
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<td>Group 3</td>
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</tr>
</tbody>
</table>
## Results

<table>
<thead>
<tr>
<th></th>
<th>Prior to treatment</th>
<th>After 1st week of treatment</th>
<th>Wilcoxon Test Chance to baseline value after 1 week of treatment</th>
<th>After 2nd week of treatment</th>
<th>Wilcoxon Test Chance to baseline value after 2nd week</th>
<th>After 3rd week of treatment</th>
<th>Wilcoxon Test Chance to baseline value after 3rd week of treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>71,7 ± 14,4</td>
<td>47,1 ± 13,6</td>
<td>p=0,683</td>
<td>63,2 ± 31,0</td>
<td>p=0,415</td>
<td>56,2 ± 35,3</td>
<td>p=0,173</td>
</tr>
<tr>
<td>Group 2</td>
<td>67,3 ± 25,3</td>
<td>35,8 ± 14,8</td>
<td>p=0,407</td>
<td>54,7 ± 30,4</td>
<td>p=0,059</td>
<td>44,1 ± 29,1</td>
<td>p=0,009</td>
</tr>
<tr>
<td>Group 3</td>
<td>63,7 ± 24,4</td>
<td>43,7 ± 16,2</td>
<td>p=0,008</td>
<td>25,9 ± 16,7</td>
<td>p=0,005</td>
<td>20,2 ± 15,6</td>
<td>p=0,005</td>
</tr>
</tbody>
</table>
Results

- A significant (p<0.05) reduction in the average pain level was observed in group 2 and 3.
- The effect in group 3 is already significant after 1 week of
Results

- Thin PU-orthotics provide a significant (p<0.05) lower comfort than thick polyethylene orthotics or cantilever core orthotics.
Conclusion

- All orthotics investigated caused a reduction in the maximum and average pain level – however the pain reduction was not significant for the thin PU-orthotic.
- The additional mechanical approach implemented by the cantilever core orthotics seems to accelerate the onset of pain reduction.
- Thin PU-orthotics provide a significant (p<0.05) lower comfort than thick polyethylene orthotics or cantilever core orthotics.

- Thin PU-orthotics are inferior in the first line treatment of plantar fasciitis regarding pain reduction and patient comfort, compared to thick polyethylene orthotics or cantilever core orthotics.
References