Die Nutzung von Unterschenkelorthesen im Rahmen der konservativen Behandlung der Gonarthrose

The application of orthoses for the lower leg in conservative treatment of gonarthrosis

MOT: Medizinisch Orthopädische Technik 2011; 5: 68-78.

Products

Agilium Freestep (Prototype)

Major Findings

With Agilium Freestep

→ Knee pain could be reduced by 51% (p ≤ 0.01)
→ Compliance could be increased

→ Static: the vertical component of the ground reaction force (GRF) shifts significantly towards lateral direction (frontal plane)

→ Dynamic: the knee adduction moment could be reduced significantly

Mean maximum knee adduction moment during walking

Population

Subjects: 12 Patients
Mean age: 64.3 ± 11.8 years
Gender: 7 male, 5 female
Inclusion criteria: Medial knee osteoarthritis
OA classification: OA grade 2 and 3 (1x grade 4)

Control-Group: 10 healthy subjects
Mean age: 32.3 ± 7.5 years
## Study Design

Comparative, randomized:

### Subjects

![Diagram showing study design and outcomes](image)

### Patients

![Diagram showing study design and outcomes](image)

## Results

<table>
<thead>
<tr>
<th>Functions and Activities</th>
<th>Participation</th>
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</thead>
<tbody>
<tr>
<td>Biomechanics – Static measures</td>
<td>Biomechanics – Gait analysis</td>
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<thead>
<tr>
<th>Category</th>
<th>Outcomes</th>
<th>Results for Agilium Freestep compared to no orthosis</th>
<th>Sig.*</th>
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<tbody>
<tr>
<td>Biomechanics – Static measure</td>
<td>Knee lever arm in the frontal plane</td>
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<tr>
<td>Subjects</td>
<td>Lateral shift of 11mm (from 15±12 to 26±11 mm)</td>
<td>++</td>
<td></td>
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<tr>
<td>Patients</td>
<td>Lateral shift of 13mm (from -7±15 to 6±14 mm)</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Biomechanics – Gait analysis</td>
<td>Knee adduction moment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjects</td>
<td>reduced by 22% (from 0.58 to 0.45 Nm/kg)</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Patients</td>
<td>reduced by 14% (from 0.73 to 0.63 Nm/kg)</td>
<td>++</td>
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The application of orthoses for the lower leg in conservative treatment of gonarthrosis

### Functions and Activities

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<td>Biomechanics – Static measures</td>
<td>X-Ray</td>
<td>EMG</td>
<td>Functional tests</td>
</tr>
<tr>
<td><strong>Clinical effect</strong></td>
<td>NAS (0= no pain ... 10= extreme pain), mean value during gait</td>
<td><strong>Patients</strong></td>
<td>reduced by 51% (from 7.7±1.8 to 3.8±1.8 points)</td>
</tr>
<tr>
<td><strong>Satisfaction</strong></td>
<td>Compliance</td>
<td><strong>Patients</strong></td>
<td>Could be increased</td>
</tr>
</tbody>
</table>

* no difference (0), positive trend (+), negative trend (−), significant (++/−−), not applicable (n.a.)

### Author’s Conclusion

“The treatment of patients with osteoarthritis of the knee with the new AFO seems to be an alternative to the conventional orthoses for gonarthrosis. The clinical outcomes and biomechanical effects are equivalent to those measured with conventional orthoses, but the compliance is probably increased.” (Schmalz et al. 2011)

“"In der Versorgung von Gonarthrose-Patienten mit der vorgestellten Unterschenkel-Orthese ist eine alternative orthetische Versorgungsmöglichkeit zu den bisher bekannten Gonarthrose-Orthesen zu sehen. Die klinischen Resultate und der biomechanische Effekt hinsichtlich der Belastungsreduktion sind knieübergreifenden Orthesen mindestens gleichwertig, die Akzeptanz durch den Patienten ist jedoch mit hoher Wahrscheinlichkeit erhöht.” (Schmalz et al. 2011)