Prevention of Genu Recurvatum in Poststroke Patients Using a Hinged Soft Knee Orthosis


Products

- Genu Neurexa

Major Findings

- Prevention of hyperextension and higher knee flexion angle while walking.
- Significant improvement in all Functional Tests when using Genu Neurexa:
  - Berg Balance Scale (BBS): + 7.0%
  - 6-Minute Walk Test (6MWT): +16.5%
  - 10-Meter Walk Test (10MWT): + 6.9%
  - Timed Up and Go Test (TUG): +10.6%
- High user satisfaction with an OPUS-Satisfaction with Devices score of 13.8 ± 3.9 (9=very satisfied, 36=very dissatisfied)
  
  (Average score of the 9 questions is 1.5 ± 0.4, where 1 reflects very satisfied and 4 very dissatisfied)

Subjects:

- 31 (23 men, 8 women)
- Mean age: 59.9 ± 15.1 years
- Mean body mass: 76.1 ± 11.7 kg
- Time after stroke: 6.1 ± 6.7 years
- NIHSS: 7.5 ± 2.1

(National Institute of Health Stroke Scale) (Total range from 0 (normal function) to 42 (severe impairment))


Reference

Portnoy S, Frechtel A, Raveh E, Schwartz I.

Department of Physical Medicine and Rehabilitation, Hadassah Medical Center, Mount Scopus, Jerusalem 91240, Israel; Department of Occupational Therapy, Tel Aviv University.
Prevention of Genu Recurvatum in Poststroke Patients Using a Hinged Soft Knee Orthosis

Genu Neurexa

Interventional, single crossover with randomization:

### Study Design

<table>
<thead>
<tr>
<th>Functions and Activities</th>
<th>Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomechanics - Static measures</td>
<td>X-Ray</td>
</tr>
</tbody>
</table>

### Results

**Category**

- **Biomechanics - Gait analysis**

**Outcomes**

- Sagittal angle of paretic knee

**Results for Genu Neurexa**

The flexion angle of the paretic knee was significantly higher with Genu Neurexa compared to wearing no orthosis:

- **Minimum:**
  - The hyperextension was prevented with Genu Neurexa compared to wearing no orthosis.
- **Maximum:**
  - The maximum flexion angle increased by 23.9% with Genu Neurexa compared to wearing no orthosis.
  - At Preswing:
    - A significantly higher flexion angle (+156.7%) was recorded at Preswing with Genu Neurexa compared to wearing no orthosis.

**Spatiotemporal parameters and gait symmetry**

No significant differences for the recorded spatiotemporal and gait symmetry results were found.

**EMG**

- Activation time and Peak RMS (root mean square)

No differences for paretic and nonparetic leg were found when comparing Genu Neurexa to wearing no orthosis.

**Functional tests**

- Berg Balance Scale (BBS)
  - The BBS was significantly improved by 7% with orthosis compared to wearing no orthosis.
- 6-Minute Walk Test (6MWT) [m]
  - The covered distance within 6 minutes increased by 16.5% with Genu Neurexa compared to no orthosis.
- 10-Meter Walk Test (10MWT) [s]
  - The users were significantly faster by 6.9% with Genu Neurexa compared to wearing no orthosis.
- Timed Up and Go Test (TUG) [s]
  - The TUG was performed significantly faster by 10.6% with Genu Neurexa compared to wearing no orthosis.

**Satisfaction**

- OPUS-(Orthotics and Prosthetics User's Survey)—Satisfaction with Devices
  - The users rated to be very satisfied with the orthosis with an score of 13.8 ± 3.9, where 9 reflects great satisfaction and 36 great dissatisfaction. (Questionnaire included 9 questions about the orthosis, with an average score of 1.5 ± 0.4)

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

“Using a hinged soft knee orthosis to prevent genu recurvatum after stroke may be considered a viable option to prevent falls and fall-related injuries by restoring balance and confidence in the patient and increasing foot clearance” (Portnoy et al. 2015)