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Activities of Daily Living: Genium Bionic Prosthetic Knee Compared with C-Leg


Products
Genium vs C-Leg

Major Findings
With Genium compared to C-Leg:

- 60% of Activities of Daily Living (ADLs) show a clinically relevant gain in safety.
- 53% of ADLs show a clinically relevant decrease in difficulty.
- Ease of ascending and descending stairs is improved by 34% and 10%.
- Ease of ascending and descending ramps is improved by 24% and 17%.
- Ease of walking backwards is improved by 26%.

Safety was assessed for 45 activities.

Population
Subjects: 10 unilateral, transfemoral amputees
Previous prosthesis: C-Leg
Amputation causes: trauma
Mean age: 36.7 yrs (±10.2 yrs)
Mean time since amputation: 12.5 yrs (±9.6 yrs)
MFCL: 40% K3, 60% K4

Study Design
Interventional, pre- to post-test design:

Data collection

C-Leg

5.4 ± 2 years

Genium

90 days

Data collection
**Results**

<table>
<thead>
<tr>
<th>Category</th>
<th>Outcomes</th>
<th>Results for Genium compared to C-Leg</th>
<th>Sig.*</th>
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</thead>
<tbody>
<tr>
<td>Level Walking</td>
<td>ADL Questionnaire, separate for each MPCK</td>
<td>Difficulty of walking backwards was decreased by 26%. Walking at varying speeds tends to be rated as less difficult.</td>
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<tr>
<td>Stairs</td>
<td>ADL Questionnaire, separate for each MPCK</td>
<td>Difficulty of ascending and descending stairs was decreased by 34% and 10%.</td>
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<tr>
<td>Ramps, Hills</td>
<td>ADL Questionnaire, separate for each MPCK</td>
<td>Difficulty of ascending and descending slopes was decreased by 24% and 17%.</td>
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<td>Uneven Ground, Obstacle Course</td>
<td>ADL Questionnaire, separate for each MPCK</td>
<td>Walking on uneven and unfamiliar ground tends to be rated as less difficult.</td>
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<td>Safety</td>
<td>ADL Questionnaire, comparative</td>
<td>60% of ADLs showed a clinically relevant gain in safety.</td>
<td>n.a.</td>
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<td>40% of ADLs showed a trend toward a clinically relevant gain in safety.</td>
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<td><strong>In the category ‘Family and Social Life’ 83% of ADLs showed a clinically relevant gain in safety.</strong></td>
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<td><strong>In the category ‘Mobility and Transportation’ 63% of ADLs showed a clinically relevant gain in safety.</strong></td>
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<tr>
<td>Activity Mobility, Activities of daily living (ADLs)</td>
<td>ADL Questionnaire, comparative</td>
<td>53% of ADLs showed a clinically relevant decrease in perceived difficulty.</td>
<td>n.a.</td>
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<td>47% of ADLs showed a trend towards a clinically relevant decrease in perceived difficulty.</td>
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<td><strong>In the category ‘Family and Social Life’ 75% of ADLs showed a clinically relevant decrease in perceived difficulty.</strong></td>
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<td><strong>In the category ‘Mobility and Transportation’ 58% of ADLs showed a clinically relevant decrease in perceived difficulty.</strong></td>
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</table>

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

**Author’s Conclusion**

“This study showed that the new technological functions of the Genium Bionic Prosthetic Knee for transfemoral amputees of MFCL 3 and 4 lead not only to clear biomechanical benefits compared with the C-Leg but also to a further improvement in the subjective perception of safety and perceived difficulty of many ADLs.” (Kanennenberg et al., 2013)