### Reference
Highsmith MJ, Kahle JT, Wernke MM, Carey, SL, Miro RM, Lura DJ, Sutton BS. School of Physical Therapy & Rehabilitation Sciences, University of South Florida, Tampa, FL, USA.

**Effects of the Genium knee system on functional level, stair ambulation, perceptive and economic outcomes in transfemoral amputees**

Technology and Innovation 2016; 18: 139-150

### Products
**Genium vs C-Leg**

### Major Findings
With Genium compared to C-Leg:

- The quality of stair ascent and descent improved significantly
- Mobility and functional level improved significantly
- Perceived function and safety in ADLs was as good as with C-Leg or significantly better
- 80% preferred Genium

### Population
Subjects: 20 unilateral, transfemoral amputees
Previous prosthesis: C-Leg
Amputation causes: 70% trauma, 20% malignancy, 10% vascular disease
Mean age: 46.5 ± 14.2 yrs
Mean time since amputation: 17.7 yrs ± 15.6 yrs
MFCL: K3

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![Preference for prosthetic knee joint](chart)

[Chart showing preference for Genium vs C-Leg]

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### Major Findings

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![Preference for prosthetic knee joint](chart)

[Chart showing preference for Genium vs C-Leg]
### Study Design

Interventional, randomized crossover design:

- **Randomization:**
- **Data collection:** 2 weeks – 3 months
- **Follow-up:**

### Results

<table>
<thead>
<tr>
<th>Category</th>
<th>Outcomes</th>
<th>Results for Genium</th>
<th>Sig.*</th>
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</thead>
<tbody>
<tr>
<td><strong>Functions and Activities</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Level walking</td>
<td>Stairs</td>
<td>SAI (Stair Assessment Index)</td>
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<td></td>
<td>Stairs</td>
<td><strong>SAI stair ascent</strong> score improved significantly from 6 to 11 points (median).</td>
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<tr>
<td></td>
<td>Stairs</td>
<td><strong>SAI stair descent</strong> median score was 11 for both knee joints. The mean score significantly improved by 9%.</td>
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<tr>
<td></td>
<td>Stairs</td>
<td>Stair ascent and descent completion time did not differ significantly.</td>
<td>0</td>
</tr>
<tr>
<td>Safety</td>
<td>Four Square Step Test</td>
<td><strong>Time to complete the test significantly decreased by 9%</strong>.</td>
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<tr>
<td>Activity, Mobility, Activities of Daily Living (ADLs)</td>
<td>AMP (Amputee mobility predictor)</td>
<td><strong>Mobility increased significantly by 5%</strong>.</td>
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<td></td>
<td>Step activity derived functional level</td>
<td><strong>The functional level significantly increased by 6%</strong>.</td>
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<td>ADL survey</td>
<td><strong>Perceived function and safety in three of five ADL domains improved significantly.</strong></td>
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<td></td>
<td>ADL survey</td>
<td>The other two domains showed no difference.</td>
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<tr>
<td>Preference, Satisfaction, Quality of Life (QoL)</td>
<td>Survey</td>
<td><strong>80% of the participants preferred Genium.</strong></td>
<td>++</td>
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<tr>
<td>Health Economics</td>
<td>ICER (Incremental cost-effectiveness ratio)</td>
<td>The ICER for reimbursing Genium ranges from $6,000 to $6,522 per unit of functional increase assuming a $30,000 intervention cost difference.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

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

### Author's Conclusion

“Accommodation and use of the Genium knee system compared with C-Leg improved stair walking performance, multi-directional stepping, functional level, and perceived function. Genium was also preferred compared to C-Leg in this group of high functioning community ambulators with unilateral transfemoral amputation. Finally, Genium is a more costly microprocessor knee system but, in this group of patients, is worth funding due to significant differences in functional performance with activities of daily living.” (Highsmith et al., 2016)