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**Reference**

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

## Effects of the Genium microprocessor knee system on knee moment symmetry during hill walking.

Technology and Innovation 2016; 18: 151-157.

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

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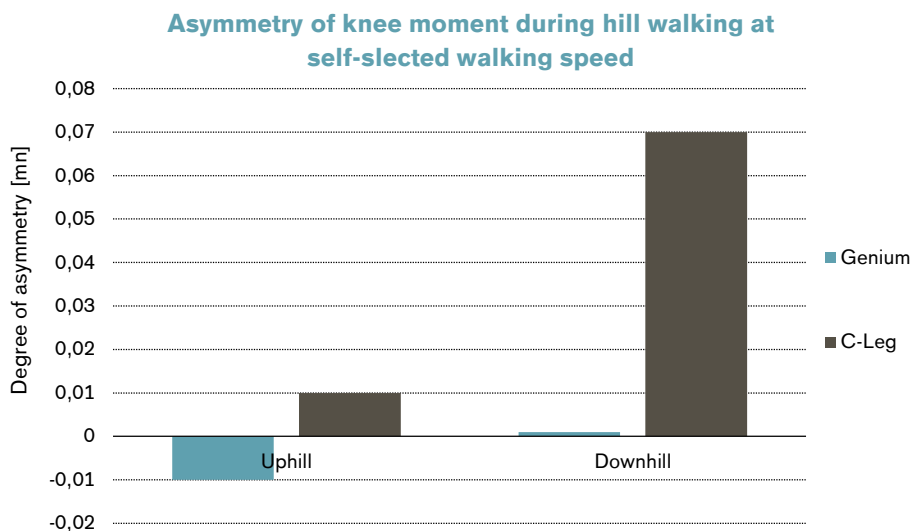
**Major Findings**

With Genium compared to C-Leg:

→ **The degree of asymmetry for knee moment during hill walking is lower with Genium**

Uphill: significantly lower at slow and fast walking speed

Downhill: significantly lower at slow and self-selected walking speed



A positive value indicates a greater knee moment on the sound side when ascending ramps, a negative value a greater knee moment on the prosthetic side and a value of zero perfect symmetry.

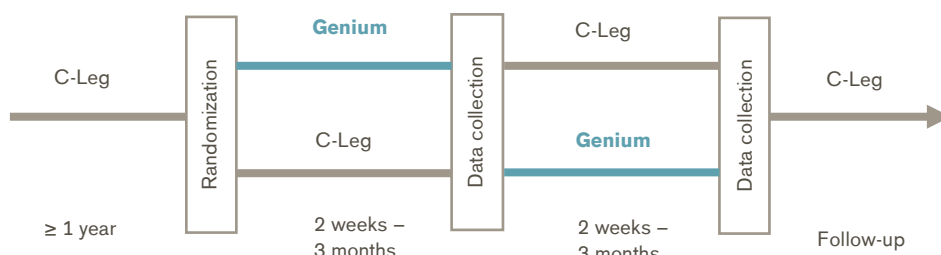
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**Population**

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 ± 15.6 yrs
MFCL:	K3

## Study Design

Interventional, randomized crossover design:



## Results

Functions and Activities						Participation			Environment
Level walking	Stairs	Ramps, Hills	Uneven ground, Obstacles	Cognitive demand	Energy	Safety	Activity, Mobility, ADLs	Preference, Satisfaction, QoL	Health Economics

Category	Outcomes	Results for Genium	Sig.*
Ramps, Hills	Motion analysis Ramp ascent	<b>The degree of asymmetry for knee moment was significantly lower at slow and fast walking speed</b> and not significantly different at self-selected walking speed.	--
	Motion analysis Ramp descent	<b>The degree of asymmetry for knee moment was significantly lower at slow and self-selected walking speed</b> and not significantly different at fast walking speed.	--

\* 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 knee moment symmetry in slow speed walking up and down a five degree ramp. Additionally, the Genium improved knee moment symmetry when walking downhill at comfortable speed. At fast walking speed, variance in knee moment symmetry was lower when using Genium. These results were found in a sample of high functioning persons with unilateral transfemoral amputation; however, the results likely have application in other patients who could benefit from more consistent knee function, such as older patients and others who have slower walking speeds." (Highsmith et al., 2016)

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