

# Genium vs C-Leg

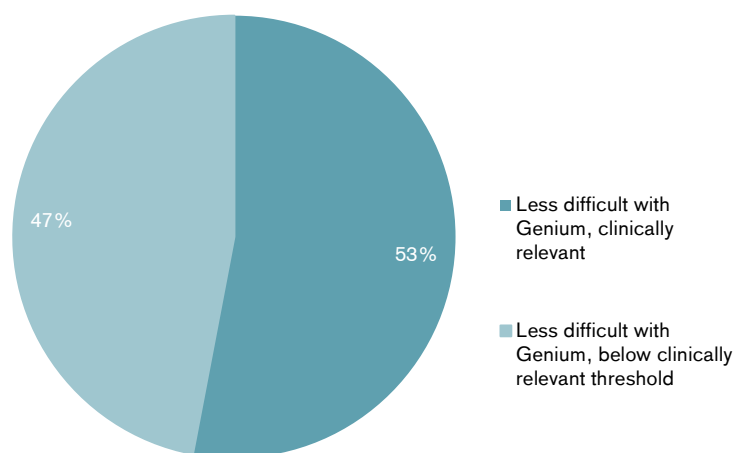
## Activity / Mobility / Activity of daily living (ADL)

### Major Findings

#### **With Genium compared to C-Leg:**

- **53% of the examined activities of daily living (ADLs) show a clinically relevant decrease in difficulty**
- **75% of ADLs in category 'Family and Social Life' show a clinically relevant decrease in difficulty**
- **58% of ADLs in category 'Mobility and Transportation' show a clinically relevant decrease in difficulty**
- **Mobility increased by 5%**
- **Physical functional performance scores significantly higher with Genium**

#### **Clinically relevant decrease in difficulty to perform activities of daily living with Genium**



Perceived difficulty was assessed for 45 activities (Kannenberg et al. 2013).

### Clinical Relevance

With an Activity of daily living (ADL) questionnaire, information is gathered about self-care activities such as functional mobility, dressing, eating and personal hygiene, as well as activities for living independently in a community, such as shopping, housework and transportation. The questionnaire is used as a tool to measure the general independence of patients.

### Summary

The results of an activity of daily living (ADL) questionnaire demonstrate that 53% of the examined ADLs were rated to show a clinically relevant decrease in perceived difficulty with Genium compared to C-Leg. The other 47% of examined ADLs showed a trend to be rated as less difficult. Especially in the categories, 'Family and Social Life' and 'Mobility and Transportation', the results were clearly in favour of Genium: 75% and 58% of the examined ADLs, respectively, were rated as less difficult to perform (Kannenberg et al. 2013). This improvement in the activities of daily living was confirmed by a study by Highsmith et al. (2016). The Perceived function and safety in three of five ADL domains improved significantly. The other two domains showed no difference. This study group also showed that the overall mobility increased by 5%, as measured with the Amputee Mobility Predictor.

In a case study, a bilateral transfemoral amputee was fitted with Genium with osseointegrated prosthesis fixation (OPF). Compared to the situation before OPF, the patient was able to perform four more activity categories of daily living listed in lower extremity functional scale (LEFS) (any of your usual work, housework, etc; usual hobbies, recreational or sporting; getting into or out the bath; walking between rooms) (Schalk et al. 2015).

Functional performance differences were assessed between Genium, C-Leg and intact knees by Highsmith et al. 2016 (b) using the Continuous-Scale Physical Functional Performance-10 (CS-PFP10). Subjects with Genium presented a significant ( $p < 0.05$ ) score improvement for upper-body flexibility, balance and endurance, compared to C-Leg users. Compared to non-amputees, Genium users presented a significantly lower score only for endurance domain.

In a retrospective, cross-sectional cohort analysis from Hahn et al. 2016, clinically important factors on performance using Genium were analysed based on 899 trial fittings. While none of the factors qualified as predictor for performance, toileting was found to be the most responsive indicator for subjects' perception. The complexity of the task may have been insufficiently considered so far.

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## References of summarized studies

Hahn, A., Lang, M., Stuckart, C. (2016). Analysis of clinically important factors on the performance of advanced hydraulic, microprocessor-controlled exo-prosthetic knee joints based on 899 trial fittings. *Medicine*, 95 (45):e5386.

Highsmith, M. J. Kahle, J. T., Miro, R. M. Cress, M. E., Lura, D. J., Quillen, W. S. Carey, S.L., Dubei, R. V., Mengelkoch, L. J. (2016)(b). Functional performance differences between the Genium and C-Leg prosthetic knees and intact knees. *J Rehabil Res Dev*. 2016;53(6):753–66.

\* Hahn A, Kannenberg A Zum Nutzen mikroprozessor-gesteuerten Prothesenkniegelenke bei eingeschränkten Außenbereichsgehern: eine aktualisierte systematische Literaturanalyse. *Orthopädie Technik* 2020 (05), S46 - 57.

Highsmith, M.J., Klenow, T.D., Kahle, J.T., Wernke, M.M., Carey, S.L., Miro, R.M., Lura, D.J. (2016). Effects of the Genium microprocessor knee system on knee moment symmetry during hill walking. *Technology & Innovation*, 18: 151-157.

\* Huppert L, Mileusnic M, Hahn A. Das Genium-Prothesenkniegelenk – ein Überblick über die wissenschaftliche Evidenz. *Orthopädie Technik* 2016. 4: 44-49.

Kannenberg, A., Zacharias, B., Mileusnic, M., Seyr, M. (2013). Activities of Daily Living: Genium Bionic Prosthetic Knee Compared With C-Leg. *JPO Journal of Prosthetics and Orthotics*, 25(3), 110–117. doi:10.1097/JPO.0b013e31829c221f

Schalk, S.A.F., Jonkergouw, N., van der Mer, F., Swaan, W.M., Aschoff, H.H., van der Wurff, P. (2015). The Evaluation of Daily Life Activities after Application of an Osseointegrated Prosthesis Fixation in a Bilateral Transfemoral Amputee: A Case Study. *Medicine (Baltimore)*, 94(36): e1416.

\* Mileusnic MP , Rettinger L , Highsmith MJ , Hahn A. Benefits of the Genium microprocessor controlled prosthetic knee on ambulation, mobility, activities of daily living and quality of life: a systematic literature review. *Disability and Rehabilitation: Assistive Technology*: 2021-Vol 16 – No 5, 453-464.

\* Systematic Reviews

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