ottobock.

Kenevo.
Main clinical takeaways.

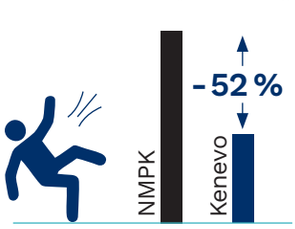
Information for professionals

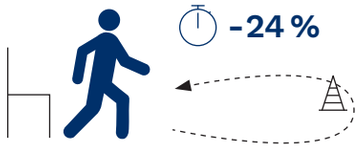
Main clinical takeaways.

More than 140 patients were included in clinical studies investigating the ***Kenevo*** microprocessor controlled prosthetic knee. Compared with non-microporcessor controlled knee joints (NMPKs), faster and easier walking and improvements in safety were shown. The following paragraphs outline the clinical proven outcomes for ***Kenevo*** use compared to NMPKs.

Safety.

Safety among ***Kenevo*** users is impressively improved, with fewer falls, stumbles as well as less risk and fear of falling compared to NMPKs.

Mobility needs or deficient of the patient	**Evidence for benefits of the *Kenevo* compared to NMPKs**
Patient stumbles repeatedly	• **Reduced frequency of stumbles** [2]  Frequecy of stumbles: **Up to 50 % of subjects never stumble with *Kenevo*** (improvement by 42 % from 8% to 50% from previous prosthesis)
Patient falls repeatedly	• **Reduction in falls** [2–4]  Number of falls: **Up to 80 % reduction in falls with MPKs** (including ***Kenevo***) [2–4]
	• Reduced falls after one year of usage [1]  Falls in one year use: **Up to 52 % fewer falls in 12-month use** [1]
	• **Higher percentage of subjects who never fall** [2]  Frequecy of falls: **Up to 72 % never fall with *Kenevo*** (improvement by 27 % from previous prosthesis)

Mobility needs or deficient of the patient	**Evidence for benefits of the *Kenevo* compared to NMPKs**
Patients stumbles and falls repeatedly and has fear of falling	• **Significant reduction in risk of falling** [3] presented by improvements in Timed for Up and Go Test (TUG) [1, 4] and the Activity Balance Scale (ABC) [3, 5].  Risk of falls: **Up to 24 % reduction in completion time for the TUG**
	• **Significant reduction in fear of falling** [1]  Fear of falling: **Up to 21 % reduction in Fear of Falling Related Avoidance Behaviour (FFABQ)**
	• **Increased patient-perceived safety** [3]  Patient-perceived safety: **Up to 83 % of subjects reported increased perceived safety with MPKs (including *Kenevo*)**

Functions and activities – level walking, stairs and ramps.

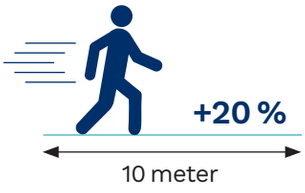
Kenevo users walk up to 20 % faster in the 10 m walking test than their NMPK counterparts after one year of use. Most users (64 %) also report better walking quality on uneven surfaces as well as a better quality in ascending and descending stairs and ramps.

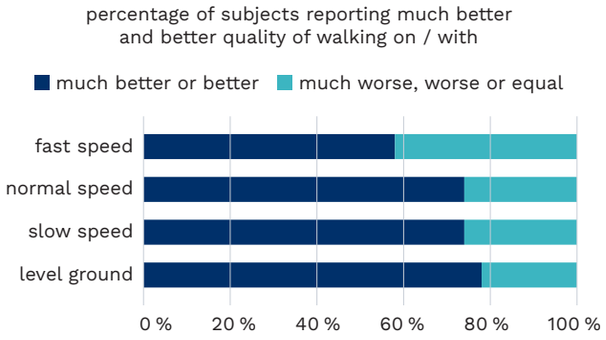
Level walking

Mobility needs or deficient of the patient	**Evidence for benefits of the *Kenevo* compared to NMPKs**
Patient has limited mobility	• **Improved walking speed** [1] • **Higher quality of walking on level ground, walking with slow, normal, and fast speed** [2]
Patient has difficulties negotiating obstacles	• **Higher quality of walking on uneven ground in 64 % of subjects** [2]

Walking speed: [1]

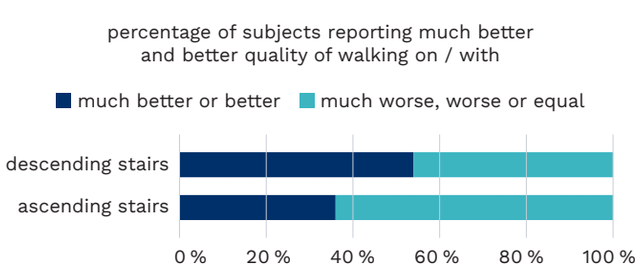
Up to 20 % improved walking speed in 10 meter walking test





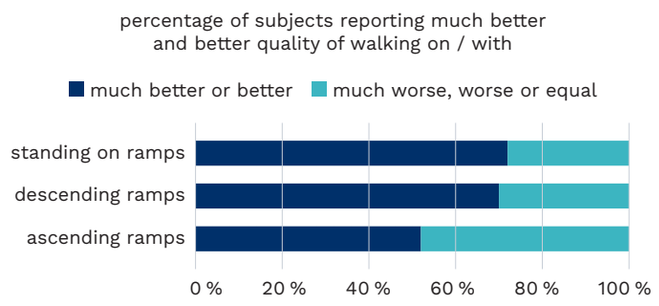
Stairs

Mobility needs or deficient of the patient	**Evidence for benefits of the *Kenevo* compared to NMPKs**
Patient has difficulties negotiating stairs	• **Higher quality walking on stairs** (ascending and descending) [2, 3]



Ramps

Mobility needs or deficient of the patient	Evidence for benefits of the *Kenevo* compared to NMPKs
Patient has difficulties negotiating slopes/hills	• **Higher quality of walking on ramps** (ascending, descending and standing) [2]



Functions and activities – cognitive demand and energy.

With ***Kenevo*** most users (79 %) experience reduced concentration needed and 84 % of users experience less exertion during walking.

Cognitive demand

Mobility needs or deficient of the patient	Evidence for benefits of the *Kenevo* compared to NMPKs
Patient has difficulties to concentrate during walking	• **Lower level of concentration during walking** [2]

Concentration during walking:

Up to 79 % of subjects experience less/much less concentration during walking

Energy

Mobility needs or deficient of the patient	Evidence for benefits of the *Kenevo* compared to NMPKs
Patient has limitations at work	• **Less exertion during walking** [2]

Exertion during walking:

Up to 84 % of subjects experience less/much less exertion during walking

Functions and activities – activity, mobility and ADLs.

50 % of MPK users have the chance to improve their mobility grade from MG2 to MG3, and up to 50 % of ***Kenevo*** users reported a reduced dependency on a wheelchair. Users also demontrated an improved ability to manage everyday challenges – like opening heavy doors, walking backwards or on uneven ground.

Mobility needs or deficient of the patient	**Evidence for benefits of the *Kenevo* compared to NMPKs**
Patient has limited mobility	• **Mobility increased** presented by significant in-creased LCI global mean [2, 4] and significant increases PLUS-M and ABC scale in early rehabilitation [5] • **Improved mobility grade (MG)** [3]  Mobility grade: **50 % improved to MG 3 from MG2 with MPKs**
Uses wheelchair and walking aids	• Wheelchair dependency decreased by up to **50 %** of subjects [2]
Difficulties with performing activities of daily living	• **Improved ability to perform complex movements** (opening heavy door, walking backwards, walking on uneven terrain) [3, 4]

Preference and satisfaction.

Nearly 90 % of patients prefer ***Kenevo*** over their previous NMPK.
Further users report a significant increase in satisfaction and quality of life.

Mobility needs or deficient of the patient	**Evidence for benefits of the *Kenevo* compared to NMPKs**
Patient has limitations at work	• **Preference for *Kenevo*** [2]  Preference: **Up to 89 % of subjects prefer *Kenevo* over previous NMPKs** • **Satisfaction and domains of QoL significantly increased** presented by improvements in SF-36 and QUEST 2.0 scores [4]

References

1. Wurdeman SR, Hafner BJ, Sawers A, England DL, Lundstrom R, Kannenberg A. ASsessing Clinical outcomes with microprocEssor kNee uTilization in a K2 population (ASCENT K2): randomized controlled trial results for above-knee prosthesis users over age 65. Disabil Rehabil 2025 Jul 21:1-18. doi: 10.1080/09638288.2025.2530172. Online ahead of print.
2. Mileusnic MP, Hahn A, Reiter S. Effects of a novel microprocessor-controlled knee, Kenevo, on the safety, mobility, and satisfaction of lower-activity patients with transfemoral amputation. J Prosthet Orthot 2017;29(4):198-205.
3. Hahn A, Buesches S, Prager M, Kannenberg A. The effect of microprocessor controlled exo-prosthetic knees on limited community ambulators: systematic review and meta-analysis. Disabil Rehabil 2022;44(24):7349-7367. doi: 10.1080/09638288.2021.1989504. Epub 2021 Oct 25.
4. Lansade C, Vicaut E, Paysant J, Ménager D, Cristina MC, Braatz F, Domayer S, Pérennou D, Chiesa G. Mobility and satisfaction with a microprocessor-controlled knee in moderately active amputees: a multi-centric randomized crossover trial. Ann Phys Rehabil Med 2018;61(5):278-285. https://doi.org/10.1016/j.rehab.2018.04.003
5. Morgan SJ, Friedly JL, Nelson IK, Rosen RE, Humbert AT, Hafner BJ. The effects of microprocessor prosthetic knee use in early rehabilitation: a pilot randomized controlled trial. PM R 2025; 17(4):371-383. doi: 10.1002/pmrj.13321. Epub 2025 Feb 2.
6. Kuhlmann A, Hagberg K, Kamrad I, Ramstrand N, Seidinger S, Berg H. The Kenevo microprocessor-controlled prosthetic knee compared with non-microprocessor controlled prosthetic knees in individuals older than 65 years in Sweden: accost-effectiveness and budget impact study. Prosthet Orthot Int 2022 Oct 1;46(5):414-424. doi: 10.1097/PXR.0000000000000138. Epub 2022 May 3.
7. Dobson A, Beins M, DaVanzo J, Kim S, McMahon P, Haught R, Hasselbrink R, Gonzalez S, Kannenberg A, Seidinger S. Retrospective cohort study of the economic value of providing microprocessor knees to the population of Medicare fee-for-service K2 beneficiaries with knee disarticulation/above knee amputation. Prosthet Orthot Int 2024 Dec 11. doi: 10.1097/PXR.0000000000000374. Online ahead of print.
8. Davie-Smith F, Carse B. Comparison of patient-reported and functional outcomes following transition from mechanical to microprocessor knee in the low-activity user with a unilateral transfemoral amputation. Prosthet Orthot Int 2021;45(3):198-204. doi: 10.1097/PXR.0000000000000017.

More details can be found in the study summaries