

Quattro rated easier to perform functional tasks

Review of an IRB-approved study: Quattro Microprocessor Knee Allows Users to Complete Functional Tasks with Less Difficulty Than Typically Worn Microprocessor Knee

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Background



People with transfemoral amputation using **passive mechanical prosthetic knees** typically have a lower quality of life due to being more sedentary, a slower preferred walking speed, higher metabolic cost compared to using a **microprocessor knee (MPK)**.^{1,2,3}

Microprocessor knees have been shown to:



Increase quality of life



Increase ambulation speed and magnitude



Decrease metabolic cost²

Hypothesis



After 30 days of at-home use of the Freedom Quattro Microprocessor Knee by PROTEOR, people with a transfemoral amputation would be able to complete functional tasks with comparable or reduced difficulty with the Quattro compared to using their typically worn prosthesis.

Findings



After 30 days of at-home use, subjects identified **five functional tasks as easier to complete with the Quattro MPK compared to their typical MPK.**

Compared to using their typical MPK, on average, subjects rated the following complex tasks statistically significantly easier with the Quattro:



Walking backwards

p=0.038



Walking sideways

p=0.047



Walking over an obstacle of six inches in height

p=0.035



Kneeling on their prosthetic knee and standing

p=0.008



Swinging a golf club

p=0.038

STUDY DETAILS:

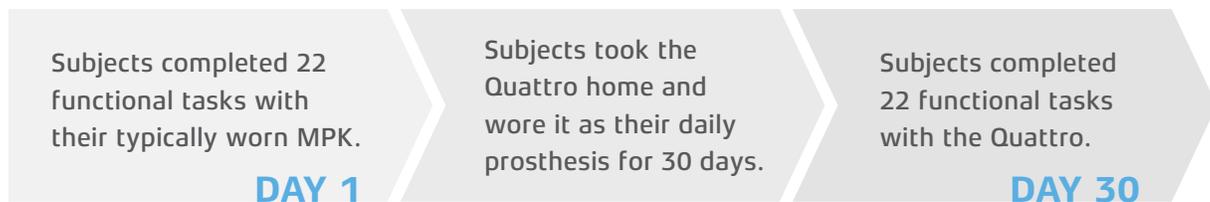
Method



The protocol was approved by an independent IRB prior to commencement of any study activities (Advarra IRB Protocol # Pro00048820).

10 subjects with unilateral or bilateral transfemoral amputations participated in study; 7 subjects completed the full protocol without deviation and were included in analysis.

At two timepoints, participants were given **22 functional tasks** to perform and assess functional task difficulty on a **scale of 1-9** with 1 representing the greatest difficulty and 9 the greatest ease.



Discussion



Subjects completed and assessed 22 functional tasks as part of the study:

Level-ground walking, 10m	Stand facing down a ramp	Walk over an obstacle of 6 inches	Mount a bicycle, cycle, dismount, and walk
Stand, bend, extend knee then walk	Walk up stairs	Perform 5 stand-to-sit-to-stand tasks	Perform a golf swing
Lean against wall, bend, extend knee then walk	Walk down stairs	Perform 3 Timed Up and Go tests	Enter and exit car on driver's side
Walk up a ramp	Walk backwards	Kneel on the prosthetic knee then stand	Enter and exit car on passenger's side
Walk down a ramp	Walk sideways	Start walking then increase speed to a jog	
Stand facing up a ramp	Complete figure-of-eight on level ground	Start jogging then increase speed to a run	

Change in score (mean and standard deviation) was calculated from subjects' typical MPK to the second office visit with the Quattro MPK after 30 days of at-home use.

Paired, independent, two-tailed t-tests were performed on the functional task difficulty ratings. Significance was defined as a critical alpha of 0.10

Summary



People with a transfemoral amputation place high importance on being able to complete functional tasks and activities of daily living.

Quattro was rated comparable or easier to use to perform functional tasks compared to other commercially available MPKs.

The Quattro MPK has the potential to improve the quality of life for people with a transfemoral amputation by reducing the difficulty of daily tasks.

¹Hagberg, K., and R. Brånemark. Prosthetics & Orthotics International, vol. 25, no. 3, 2001, pp. 186–194.

²Seymour, Ron, et al. Prosthetics & Orthotics International, vol. 31, no. 1, 2007, pp. 51–61.

³Jayaraman, Arun, et al. Physical Therapy, vol. 94, no. 3, 2014, pp. 401–410