

## 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)**.<sup>1,2,3</sup>

Microprocessor knees have been shown to:



Increase quality of life



Increase ambulation speed and magnitude



Decrease metabolic cost<sup>2</sup>

### 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:

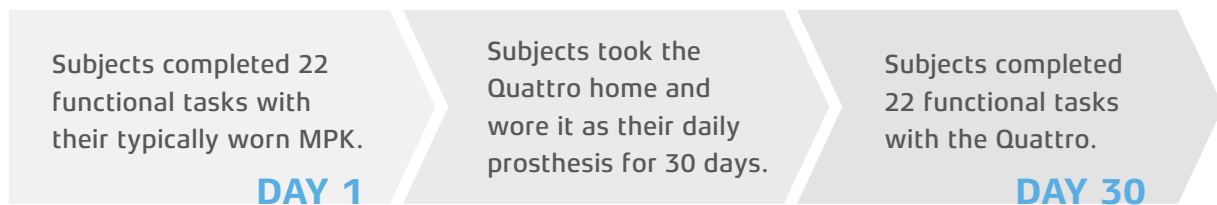
## Method



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.**

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

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

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