

Evaluation of Function, Performance, and Preference as Transfemoral Amputees Transition from Mechanical to Microprocessor Control of the Prosthetic Knee

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OBJECTIVE

To evaluate differences in function, performance, and preference between mechanical and microprocessor prosthetic knee control technologies. DESIGN: A-B-A-B reversal design.

SETTING

Home, community, and laboratory environments.

PARTICIPANTS

Twenty-one unilateral, transfemoral amputees.

INTERVENTION

Mechanical control prosthetic knee versus microprocessor control prosthetic knee (Otto Bock C-Leg).

MAIN OUTCOME MEASURES

Stair rating, hill rating and time, obstacle course time, divided attention task accuracy and time, Amputee Mobility Predictor score, step activity, Prosthesis Evaluation Questionnaire score, Medical Outcomes Study 36-Item Short-Form Health Survey score, self-reported frequency of stumbles and falls, and self-reported concentration required for ambulation.

RESULTS

Stair descent score, hill descent time, and hill sound-side step length showed significant ($P < .01$) improvement with the C-Leg. Users reported a significant ($P < .05$) decrease in frequency of stumbles and falls, frustration with falling, and difficulty in multitasking while using the microprocessor knee. Subject satisfaction with the C-Leg was significantly ($P < .001$) greater than the mechanical control prosthesis.

CONCLUSIONS

The study population showed improved performance when negotiating stairs and hills, reduced frequency of stumbling and falling, and a preference for the microprocessor control C-Leg as compared with the mechanical control prosthetic knee.

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