

## **Does Having a Computerized Prosthetic Knee Influence Cognitive Performance During Amputee Walking?**

Williams RM, Turner AP, Orendurff M, Segal AD, Klute GK, Pecoraro J, Czerniecki J: *Archives of Physical Medicine and Rehabilitation*, 2006; 87:989-994.

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### **OBJECTIVE**

To compare objective cognitive performance and perception of cognitive burden during walking tasks using 2 different prosthetic knees: a computerized hydraulic knee (Otto Bock C-leg) and a noncomputerized hydraulic knee (Ossur Mauch SNS).

### **DESIGN**

Two-group crossover trial, with participants randomly assigned to order of prosthesis. Participants completed assessments under 2 conditions, a self-selected speed walk and a controlled speed walk, on 2 separate occasions (precrossover, postcrossover).

### **SETTING**

Veterans Health Administration hospital.

### **PARTICIPANTS**

Eight transfemoral amputees.

### **INTERVENTION**

Computerized versus noncomputerized prosthetic knee.

### **MAIN OUTCOME MEASURES**

Objective cognitive performance measures included verbal fluency (Controlled Oral Word Association Test, Category Test), attention and working memory (serial subtraction), and walking speed during cognitive tasks. Measures of perceived cognitive burden included subjective attentional requirements of walking and cognitive tasks and subjective general cognitive burden of prosthesis.

### **RESULTS**

There were no significant differences in objective cognitive performance on any task between prostheses, nor did walking speed vary by prosthesis during the free-speed walk. Participants reported that walking required less attention while wearing the C-leg and that the C-leg was less of a cognitive burden than the noncomputerized prosthesis.

### **CONCLUSIONS**

In nondemanding walking conditions with experienced amputees, participants reported that the more costly C-leg required less cognitive attention than the noncomputerized knee. However, this subjective experience did not translate to improved performance on neuropsychologic screening instruments or on walking speed. Noncomputerized prostheses may be adequate for a majority of amputees, and further research is needed to identify particular groups of amputees (ie, new amputees, amputees with complex physical or cognitive demands) who may benefit from computerized prostheses.

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