

Engineers invent 'Smart Walkers' for elderly

June 25 2010



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(PhysOrg.com) -- Cornell biomedical engineering students working with a Weill Cornell Medical College-affiliated psychiatrist have designed an electronic braking system for walkers.

Rolling walkers -- which help senior citizens maintain mobility and an active lifestyle -- have just become safer and easier to use.

Cornell [biomedical engineering](#) students working with Weill Cornell

Medical College-affiliated psychiatrist Dr. Eli Einbinder have designed an electronic braking system for walkers, with buttons replacing bicycle-style squeeze brakes. Their walkers also have automatic braking that can prevent slips, slides and falls when a user grabs the handgrips.

For three years, a team of graduate students from the Department of Biomedical Engineering and undergraduate seniors from several departments in the College of Engineering worked with David Lipson, Cornell professor of engineering, as well as with Einbinder on a prickly problem: how to prevent elderly users with limited mobility from inadvertently falling when they use a braking walker.

The "Smart Walker" relies on handgrip sensors. The walker starts in the braked position, and low-strength users need only touch a button to electronically disengage the brake and begin moving. Once a user removes hands from the handlebar, the walker automatically resets to the braked position. The added stability and ease of operation for users with reduced hand strength promises to dramatically reduce accidental falls -- a significant source of injury among the elderly with limited mobility. It can further reduce injury among the elderly by encouraging a more active lifestyle.

The braking system the team devised has a single highly sensitive button. The button runs to a [microprocessor](#), which sends information to a linear actuator that in turn pulls on a mechanical brake to make the wheels come to a complete stop. That means this walker will brake safely for users with low strength or impairment in their hands.

This electrically assisted walker project stems from 16 years of work by Einbinder, who just received a patent for his solution. Einbinder was a tennis player and skier before 1993, when he injured his back.

"I'm sitting in my office looking for another hobby," Einbinder recalled,

"and I start noticing people with walkers -- how difficult they are, how not user-friendly. I'm also an inventor, so I decided to design a mechanical walker that works better. I soon realized that an electrical model with a button for braking is much simpler and easier for really anyone to use."

Einbinder has been a consultant to the project since its inception, working with Lipson's team at least weekly via conference calls and e-mail.

"The augmented walker appeared simple, but it also was a challenging design," Lipson said. "We had constraints on cost, weight, simplicity and several choices for which approach to use. This made it a terrific project because the students could look at many designs, with improvements in the subsequent years by a new team."

The U.S. Census Bureau reports that by the middle of the 21st century, about 80 million Americans will be 65 or older. According to the group's research, medical costs resulting from falls by the elderly are expected to approach \$32.4 billion by 2020.

Provided by Cornell University

Citation: Engineers invent 'Smart Walkers' for elderly (2010, June 25) retrieved 20 April 2024 from <https://phys.org/news/2010-06-smart-walkers-elderly.html>

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