

Arthritis simulation gloves aid companies in designing easy-to-use products

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GTRI principal research scientist Brad Fain displays the arthritis simulation gloves, which help those responsible for consumer products better understand how arthritis affects a person's ability to open or use their products. Credit: Georgia Tech Photo: Gary Meek

As the U.S. population ages, manufacturers of consumer goods are realizing that many customers may not be as nimble-fingered or sharp-sighted as they once were. To help product designers and engineers address those changing requirements, researchers at the Georgia Tech Research Institute (GTRI) have been developing evaluation methods and design techniques to identify and address the needs of all consumers,

including those with functional limitations.

GTRI's latest product is a pair of arthritis simulation [gloves](#), which reproduce the reduction in functional capacity experienced by persons with arthritis. The gloves help those responsible for consumer products better understand how arthritis affects a person's ability to grasp, pinch, turn, lift and twist objects.

"A product manager or designer can put these gloves on and attempt to open their company's products or packaging," explained GTRI principal research scientist Brad Fain. "If they are unable to open a product or package, then chances are high that people with moderate to severe symptoms of arthritis will also have difficulty opening it."

The gloves can be used with a variety of consumer products, including medicine bottles, beverage containers, office supplies, medical devices, vehicles, cell phones and many other consumer products. They can also be used with many different types of packaging, including clamshell packages, cardboard boxes, cereal containers and foil packages.

Three companies, including Kraft Foods, are currently using the gloves in-house.



While wearing the arthritis simulation gloves, which reproduce the reduction in

functional capacity experienced by persons with arthritis, GTRI principal research scientist Brad Fain tries to open a medicine bottle. Georgia Tech Photo: Gary Meek

"Maxwell House always keeps our consumers' needs in mind when designing packaging," said Linda Roman, senior group leader for packaging strategic research at Kraft Foods. "For example, we used the gloves created by the Georgia Tech Research Institute to verify that the lid on our new instant coffee jar is accessible for those who have difficulty opening jars with regular caps. The gloves helped us evaluate the EZ Grip lid to be sure that our lid is, in fact, easy for our consumers to use."

The gloves were designed to reduce a wearer's functional ability to grasp something and either pull or rotate it by 33-50 percent. They also stiffen an individual's finger joints and restrict the range of motion of his or her fingers. To create the finger stiffness and reduced finger strength experienced by individuals with arthritis, the gloves were designed with metal wires between layers of neoprene and other fabrics.

In addition to identifying ease of use issues with products, the gloves are also intended to raise awareness about issues faced by people with disabilities and to support programs focused on ease of use in design. Currently, the Arthritis Foundation in the United States and Arthritis Australia are using the gloves for such educational purposes.

The gloves can be purchased alone, or as part of GTRI's disability awareness kit, which also includes a low-vision simulation kit, a finger strength simulation kit and a CD training program. The finger strength simulation kit consists of finger exercises that are calibrated to certain amounts of force recommended for packaging and the training program

teaches individuals how to use the gloves.

The low-vision simulation kit contains a pair of glasses that simulate common visual disabilities, including various degrees of cataracts, visual acuity problems, contrast sensitivity issues and age-related macular degeneration.

"A product manager can put the glasses on and observe products to see if he or she can read important things written in small print, like instructions or an expiration date," added Fain.



Kraft Foods used GTRI's arthritis simulation gloves to verify that the Maxwell House instant coffee EZ Grip lid was accessible by consumers who have difficulty opening jars with regular caps. Credit: Georgia Tech Photo: Renita Folds

In the future, many baby boomers will likely demand the same access to products that they currently have -- even as their functional abilities decline.

"These older individuals will attribute any inability to open or use a product with deficiencies in the product itself," added Fain. "That

message or perception can be detrimental to companies because they want to avoid being associated with a product that's difficult to use. The [arthritis](#) simulation gloves and the rest of the items in the disability awareness kit can help companies avoid these design mistakes."

More information: www.gtri.gatech.edu/facilities/aef

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