



Everything Michigan

## Van Andel Institute researcher discovers more durable cement for joint replacements

By Monica Scott The Grand Rapids Press

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Rex Larsen | The Grand Rapids Press

Van Andel Institute investigator Jim Mason holds a model human femur bone and two stainless steel joints he uses to demonstrate how a new high-fatigue cement he invented holds joint replacements in place longer. Mason owns Ortho X, a Granger Indiana-based company that recently won an award for the product.

GRAND RAPIDS -- Obesity and aging baby boomers are driving demand for hip and knee replacements, and a discovery by a Grand Rapids-based researcher could provide relief for pain sufferers and economic promise for the region.

Jim Mason, a researcher at Van Andel Institute in Grand Rapids, is seeking Food and Drug Administration approval for a fiber-reinforced cement that he says is stronger and more durable than the cement currently used for securing joint implants.

"It has a longer fatigue life," said Mason, who also is a mechanical engineer. "I want to make it possible for people not to need a second replacement.

The number of joint replacements has increased steadily, with knee and hip procedures accounting for most. Nearly 814,000 total hip and knee replacements were performed in 2007, according to the most recent data available from the American Academy of Orthopaedic Surgeons. That's up from 726,000 in 2006.

### BY THE NUMBERS

Hip and knee replacements have been on the rise nationwide, primarily due to

The demand is expected to double over the next decade. Locally, Spectrum Health, Saint Mary's Health Care and Metro Health performed 3,931 joint replacements in fiscal year 2009 -- 3,726 for hips and knees. Mercy Health Partners in Muskegon has performed 862 hip and knee replacements.

"Aging baby boomers demand a more active lifestyle," Mason said. "They're not just content to walk but snow ski and run marathons, and obesity increases stress on joints."

His company, OrthoX, based in Granger, Ind., recently won the Innovation of the Year award given by TechPoint, an Indiana economic development initiative.

"We were looking for something that could be revolutionary, game-changing," said Jim Jay, CEO of TechPoint, who described his group as focused on technology and entrepreneurship that leads to work force development. "I think the heart of our economy is entrepreneurship. (Mason's) FDA approval is imminent, and then he's off to the races."

Jerry Callahan, Van Andel Institute's vice president of business development, said that is the hope. The institute aims to improve human health in multiple ways and, with that, provide an economic boost to the region, he said.

"We are looking for commercial outlets and licensing opportunities, joint ventures and to create spin-off and start-up companies," said Callahan. "Commercialization around research is not a bad thing. If you ever want to have an impact on health, someone has to believe to believe in the technology."

Mason, who joined the institute in August, plans to start a second company based on his research there. His cement already is having an impact locally. Kalamazoo-based Keystone Solutions Group began manufacturing it in a suburban Grand Rapids facility last month.

Company co-owner Mike Zamora said that resulted in some new equipment purchases and contributed to two more assembly jobs.

"This is a very good relationship for us," said Zamora, who talked about the potential for growth once FDA approval is secured.

The cement cannot be marketed in the U.S. without that approval, Mason said.

Joint replacement surgery can be done with or without cement. With cementless joints, the components that fit inside the bone are made of a porous material that allow the natural bone to grow into it.

Gregory Golladay, a surgeon with Grand Rapids' Orthopaedic Associates of Michigan, said most replacements done in the U.S. are cementless. However, when cement is used, he said it is typically for knee replacements, where it has been the most effective.

"Over 90 percent of hip or knee replacements done will still be functional 10 to 15 years from now or 20 to 30 years," Golladay said about advances in devices, materials and techniques. "Cement strength is not the predominant reason implants fail.

"Two-thirds of revisions done in knees, for example, are due to infection, stiffness or other problems in the first couple of years."

obesity and aging baby boomers. Below are figures for joint replacements done at area hospitals and national figures.

#### **Total joint replacements locally in 2009**

##### **Butterworth/Blodgett**

**Hospitals:** 2,813

**Mercy Health Partners:** 862

**Saint Mary's Health Care:** 850

**Metro Health:** 268

#### **Nationwide replacements in 2007**

**Hip:** 262,680

**Knee:** 551,259

Source: American Academy of Orthopaedic Surgeons and local hospitals.

Dr. Martin Pallante, a Muskegon orthopaedic surgeon who has been doing hip and knee replacements for 18 years, said a better cement would be useful but the long-term solution for getting replacement surgeries to last longer is to get rid of cement altogether.

"Improved cement would be most helpful in total knees where it is used most often," he said. "Eventually, I think we will largely eliminate the need for bone cement by improving the ingrowth of bone into these prostheses."

Of all health care interventions, Golladay said, hip and knee replacements are among the most significant in terms of the impact on "quality of life and functional independence."

But Mason said "cement failure and implant loosening" over time can lead to the need for a second surgery, particularly if the replacement is done at a younger age.

Muskegon County, with 13 percent of the population over age 65, has had its share of hip and knee replacements. The county also beats the national and state averages with a 23 percent obesity rate, while 40 percent of residents are overweight.

The average age for those seeking hip and knee replacements is the mid-60s, but surgeons say younger people have become more comfortable with the surgery. By 2011, projections are more than 50 percent of patients requiring hip replacements will be younger than 65.

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