

Using your own stem cells to help your body heal osteoarthritis

31 July 2017



Credit: Emory University

The truth came crashing home last year—a perfect storm of faulty genetics, the unrelenting march of age, and every athletic mishap I've ever stumbled through.

After watching two kinds of arthritis stiffen my mother's joints—leaving her with fingers pinched into what she called her "flippers" and staggering knee pain—I suppose it shouldn't have been a shock to hear Emory rheumatologist Raluca Cozmuta gaze thoughtfully at my own X-rays and say the word I never wanted to hear.

Osteoarthritis.

The most common form of degenerative joint disease, affecting millions worldwide, osteoarthritis (OA) is both quite ordinary and, for many of us, somewhat inevitable. The cause is deceptively simple: Over the years, the slick rubbery cartilage

that pads and protects the ends of our bones simply wears down, eventually leaving bone rubbing painfully against bone.

Like a brake pad worn thin, this erosion can occur in almost any joint in the body, although it most commonly shows up in knees, hips, hands, and spines. There is no miracle cure; treatments to quell discomfort typically range from anti-inflammatory pain relievers, physical therapy, and cortisone injections to surgery.

But lately, a non-surgical alternative has been gaining attention—a treatment that relies upon the power of the human body to help heal itself.

About five years ago, physicians at Emory Orthopaedics and Spine Center were among the area's first health care providers to begin offering regenerative stem cell therapy, a treatment for osteoarthritis and related joint issues that harnesses the ability of a patient's own stem cells to repair damaged tissue, reduce pain, and promote healing.

It works like this: Stem cells are extracted from a patient with a needle—usually from abdominal fat (adipose tissue) or bone marrow within the hip—and placed into a centrifuge, where the sample is spun rapidly to isolate the stem cells and create a rich concentrate. Within a matter of minutes, those cells are injected back into the patient's damaged joint to help kick-start healing.

All told, the in-office procedure takes about an hour and a half, with little downtime, discomfort, or side effects for most patients. Harvesting the [adult stem cells](#) directly from patients reduces the risk of rejection; many report feeling marked improvement in their joint within one to three months.

For Ken Mautner, who practices sports medicine at Emory Orthopaedics and Spine Center, stem cell therapy represents a natural next step in

regenerative medicine.

Mautner is a leader in the field of orthobiologics, which uses cell-based therapies and biomaterials to enhance healing, empowering the body to help repair itself. About nine years ago, he began using platelet-rich plasma therapy to help patients with osteoarthritis and joint damage, expanding to stem cell therapy around 2012.

The power of the process lies within the cell. Stem cells are essentially the body's most fundamental raw material—specialized cells with the ability to make copies of themselves and the potential to differentiate into various types of cells for specific functions within the body. While there are several different types of stem cells, those thought to excel at promoting the healing of tendons, ligaments, and cartilage are [mesenchymal stem cells](#), multipotent stromal cells commonly found in bone marrow and adipose (fat) cells, says Mautner, an associate professor of physical medicine, rehabilitation, and orthopaedics at Emory and director of primary care sports medicine.

The body typically keeps a ready supply of these powerful mesenchymal cells on hand to help repair injured tissues. And while there is little evidence that introducing a concentration of the cells can actually replace lost cartilage within a joint, they do have the ability to function as "very powerful signaling cells," encouraging the body to send in proteins such as cytokines—molecular messengers that slow down cartilage degeneration and regulate pain—and interleukins, a type of cytokine that can also dial down inflammation.

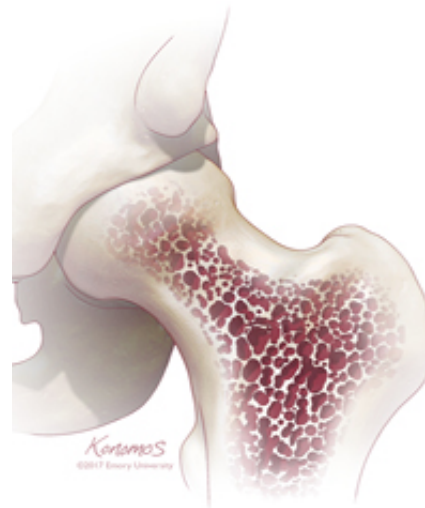
"Put them in a test tube, and you can get stem cells to grow into almost whatever you want," Mautner says. "Here, the goal is reducing pain and improving function, working to essentially turn off the death of your original cartilage cells."

Those cartilage cells could have been damaged from an old athletic injury, the wear-and-tear of everyday life, or by mechanical issues linked to the way you walk, exacerbated by obesity or simple genetics. The result is the same—pain, stiffness, and reduced range of motion.

Through [stem cell therapies](#), Mautner sees an opportunity to fill a critical treatment gap for OA patients, providing an alternative between pain relievers and total joint replacement surgery.

Though some still consider the treatment experimental—the FDA is now considering how to regulate a number of stem cell therapies, which most insurance doesn't yet cover—Mautner and his colleagues are monitoring outcomes for 150-200 patients a year. And they're encouraged by what they've seen.

Mautner's average patient is mid-50s, but he works with patients from their 20s into their 80s. Patients in good overall health with no underlying complicating conditions will see an improvement 75%-80% of the time, he says.



Weight-bearing joints like the hip (above), knee, and spine are most likely to be affected by osteoarthritis. Credit: Michael Konomos, Visual Medical Education, Emory School of Medicine

While stem cell therapy may not be for everyone, "we're definitely seeing success with the right people under the right conditions," he says. "I'm seeing folks who were once candidates for knee replacement now five years out from stem cell treatment and doing very well."

As physical conditions vary, so do outcomes. "I've

treated folks who went from being very inactive to doing Ironman triathalons and those who are happy to just be able to take a walk again," he says. "The goal is less pain in their day-to-day lives, the ability to get up and moving."

For John Bourke, a former college basketball player who punished his joints on the hardwoods well into his 50s, stem cell therapy has proven to be a game changer.

The 62-year-old Suwanee businessman struggled with OA for years, a veteran of multiple courses of treatment. By the time he began meeting with Oluseun Olufade, a [sports medicine](#) physician at the Emory Orthopaedics, Sports & Spine at Johns Creek and assistant professor of orthopaedics, he had undergone two knee replacements and had severe hip pain.

A cortisone shot had brought temporary relief, but the ever-present ache of OA—it felt like being stabbed with a hot knitting needle— returned with a vengeance. In fact, pain was a near-constant companion. "On my worst days, to drive to work, park my car, get out, and walk 30 steps into the building and 15 more to my desk was very, very painful," he says.

Last year, Olufade raised the possibility of stem cell therapy. "He went to great pains to say that this is not a guaranteed fix—there was a possibility that it wouldn't help much at all," says Bourke, who would cover the \$3,000 treatment himself.

"But the more I heard about it, the more I liked the science of it," says Bourke, an electrical engineer by training. "It's not rebuilding cartilage, it's using your own cells to affect improvement in your joint, so there's not the rejection issue."

Having twice before endured joint replacement, followed by long weeks of rehabilitation, he liked the idea of avoiding—or at least delaying—the intrusion of surgery. In his mind, stem cell therapy offered a welcome compromise.

Compared with previous knee replacements, the procedure was simple and relatively painless. On January 11, Bourke reported to Emory

Orthopaedics, Sports, and Spine at Johns Creek, where stem [cells](#) were removed from adipose tissue in his abdomen. With a local anesthetic, it was only mildly uncomfortable, he recalls.

Once extracted, his [stem cells](#) were spun, isolated and reintroduced into his hip joint—probably the least comfortable part. He compares it to receiving a cortisone shot.

After about 10 minutes, Bourke was allowed to leave, with orders to stay off his legs for a few days. Within several weeks, he began to feel improvement. Now more than two months out, having completed a dedicated course of physical therapy, he's thrilled with the results.

"My hip has improved a ton. I'm doing the best I've done in a long time," he says. "I own a couple of acres, and I've been able to get out and walk on my property and return to the gym, working on getting my weight down again."

If the treatment had to be repeated in a few years, he says, he would gladly do it again.

It may sound like a modest victory, but in the lives of his patients, Olufade recognizes that conquering daily pain is a huge achievement.

"The goal from my perspective is to keep people enjoying what they enjoy. High school student, professional athlete, middle-aged person—it's really just about helping them function the way they want," he says.

Beyond OA, Olufade has also used stem cell therapy to help with tendon and rotator cuff injuries. "The goal is to help address pain," he says.

His patients come to him with a myriad of conditions and hopes for relief. A 30-year-old man desperate to avoid a knee replacement. A middle-aged woman who yearns to ride horses again. An executive looking to recapture his golf game. An 85-year-old man who simply isn't a strong candidate for hip replacement surgery.

"Stem cell therapy is an option for athletes," says Olufade, "but also for the guy who just wants to live

a normal life and play soccer with his grandkids."

Provided by Emory University

APA citation: Using your own stem cells to help your body heal osteoarthritis (2017, July 31) retrieved 3 March 2021 from <https://medicalxpress.com/news/2017-07-stem-cells-body-osteoarthritis.html>

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