

# Long Run to Preserve Cartilage Continues at CU

By Todd Neff

Let's get right at the apparent paradox. [Cecilia Pascual-Garrido](#), MD, is a CU Sports Medicine orthopedic surgeon who has spent years studying the wear, tear and repair of joint cartilage. Pascual-Garrido is also a competitive marathoner who runs 50 to 60 miles a week during the six months of the year she isn't training for the Boston Marathon.

When she's training for the big race, she does 80-mile weeks. However you do the math (she runs six days a week with her Boulder Track Club teammates, with both morning and evening runs on Tuesdays and Saturdays), that's some serious pounding. What gives?



*Cecilia Pascual-Garrido, MD, the latest addition to the CU Sports Medicine team.*

Cartilage gives, it turns out. Pascual-Garrido, 38, knows as much about the cartilage that pads and smooths the operations of our joints as anyone. Lots of running doesn't necessarily translate to cartilage loss, she said. She points to a study of Boston Marathon

participants with healthy knees. The study found the runners' cartilage to have indeed thinned down during the race. But the cartilage rebounded within a week or so. The reason: The running squeezed water from cartilage, but the cartilage quickly reabsorbed it.

"If your knees are good, it's actually good for your body," she said.

**World traveler.** Not-so-good joints are Pascual-Garrido's professional interest. Since joining CU Sports Medicine as an assistant professor this fall, her surgical focus has been in hip repair. Her academic interest is in the preservation and repair of all sorts of articular cartilage – the shiny white surface, just a few millimeters thick, that protects the ends of bones and helps joints glide smoothly.

She got interested in cartilage during her surgical residency at Hospital Italiano de Buenos Aires in her native Argentina. She was seeing, as orthopedic specialists everywhere do, many patients for whom a knee or hip replacement was the only good option.

"I was always interested in why the cartilage couldn't regenerate," she said. Nine years ago, Pascual-Garrido embarked on a quest to find out why.

Her first stop was at Freiburg University in Germany, where she spent a year studying cartilage regeneration. She moved on to the Center for Cartilage Restoration at Rush University in Chicago. She spent two-and-a-half years at Rush as a fellow under the guidance of Brian Cole, MD. Her work there included experimenting with induced pluripotent stem cells (iPSCs) – reprogrammed stem cells that can be used to replace any type of adult cell – growth-factor proteins, and platelet-rich plasmas (PRPs) to try to heal post-injury cartilage damage, slow the decline of those with osteoarthritis, and spur cartilage regrowth.

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**Three more.** In 2009, Pascual-Garrido decided on pursuing a clinical career in the United States. Her international status dictated that she do three additional fellowships. The first one was in orthopedic sports medicine at Lake Tahoe Sports Medicine in 2011. It mainly involved fixing damaged skiers. In 2012, she became the first-ever international applicant selected for the orthopedic sports fellowship at the Hospital for Special Surgery in New York, a top orthopedic hospital. She did both clinical and laboratory work, the effort in the lab focusing on the impact of low vitamin D in animal models. (She found that vitamin D deficiency hastened cartilage degeneration). That fellowship also involved being a team physician for the New York Knicks and the New York Mets, in addition to serving on the medical staff during the U.S. Open tennis tournament.



*Pascual-Garrido during the 2013 Boston Marathon, which she finished in 3:14:11, or an average mile pace of 7:25.*

She came to Colorado for her third and final fellowship in 2013, working with [Michael Dayton](#), MD and [Omer Mei-Dan](#), MD. She focused on knee replacements with Dayton and hip preservation with Mei-Dan, who [arrived](#) at UCH in 2011 and now runs the Hip Preservation Service. In her spare time, she ran about 4,000 miles that year and finished the Boston Marathon in 3:14:11.

Pascual-Garrido focuses her research efforts with Karin Payne, PhD, who leads the CU School of Medicine's [Regenerative Orthopedics Lab](#), and Stephanie Bryant, PhD, whose [CU-Boulder Biomaterials and Functional Tissue Engineering Laboratory](#) builds cellular scaffolds to guide cartilage regeneration.

The work includes developing a rabbit model of femoroacetabular impingement ([FAI](#)), a problem caused by ill-fitting bones in the hip rubbing together and damaging the joint. FAI has been hard to reproduce in animals, which has hampered efforts at developing treatments. A new project reaches out of the lab and into the stable: In collaboration with Colorado State University researchers, the work involves studying how injections of stem cells, PRPs, and hyaluronic acid – a naturally occurring joint lubricant – affect aging racehorses with osteoarthritis.

The basic question that sparked Pascual-Garrido's quest nine years ago – why can't cartilage regenerate? – remains open. While growth stimulating treatments can help damaged articular cartilage heal and slow the decline of young patients (30 to 50 years old) in early stages of osteoarthritis, these treatments can't spur the body to reinvigorate a chondral landscape already swept bare.

She and colleagues aren't giving up yet. In the meantime, slowing the decline of young patients is a worthy endeavor, Pascual-Garrido said.

"This is the bridge we need," she said. "For these patients, it's too early for hip or knee replacement but they can't continue a normal life."