

Fallout from nuclear testing shows that the Achilles tendon can't heal itself

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Notorious among athletes and trainers as career killers, Achilles tendon injuries are among the most devastating. Now, by carbon testing tissues exposed to nuclear fallout in post WWII tests, scientists have learned why: Like our teeth and the lenses in our eyes, the Achilles tendon is a tissue that does not repair itself. This discovery was published online in *The FASEB Journal*.

"[Tendon injury](#) is a very common disease, which hinders many people from enjoying the numerous benefits of sports and recreational activities," said Katja Heinemeier, Ph.D., a researcher involved in the work from the Institute of [Sport Medicine](#) and Center for Healthy Aging at the University of Copenhagen in Denmark. "We hope that these new results will provide the essential knowledge necessary for the development of effective treatments of tendon diseases."

Heinemeier and colleagues made this discovery by taking advantage of carbon-14 spikes resulting from post WWII nuclear bomb tests. Because of these tests, there was there was a large release of the [radioactive carbon](#)-14 (radiocarbon) to the atmosphere between 1955 and 1963. This sudden rise in carbon-14 – called the "bomb pulse" – reached a maximum of twice the natural atmospheric level in 1963, and then gradually dropped to the lower levels over time. This variation is reflected in all human tissue, because humans eat plants (and animals fed on plants) that take up carbon-14 from the atmosphere. Researchers studied the Achilles tendons from people who had lived during the carbon-14 bomb pulse peak, and found that the high carbon-14 levels of

this period had remained in the tendon tissue for decades after. This persistence of radiocarbon can only be explained by the fact that the rate of tissue renewal is extremely slow in the tendon, if it exists at all. In fact, the results showed that the [Achilles tendon](#) stays the same after growing ends. In comparison, muscle tissue from the same persons had been constantly renewed and contained no "memory" of the radiocarbon.

"While the nation waits to see if another Olympic skier or NFL rookie recovers from serious tendon or ligament damage, this report serves as a cautionary tale to temper expectations," said Gerald Weissmann, M.D., Editor-in-Chief of *The FASEB Journal*. "When it comes to our tendons, what we have may be all we have. Like our teeth, it's far better and less painful in the long term to protect them throughout your lifetime than it is to count on a successful recovery."

More information: *FASEB J* [doi:10.1096/fj.12-225599](https://doi.org/10.1096/fj.12-225599)

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