

Osteoporosis drug improves healing after rotator cuff surgery

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Tears in the shoulder's rotator cuff, a common sports injury, are painful and restricting. Surgery to repair the damage is successful for pain management, but in many patients it does not result in full recovery of function due to poor healing. New research shows an approved therapy for osteoporosis, Forteo, may speed healing and improve patient outcomes. The preliminary study from Hospital for Special Surgery in New York is being presented at the American Academy of Orthopaedic Surgeons (AAOS) meeting in New Orleans March 9-13.

"According to a previous study, only 69 percent of rotator cuff repairs were completely healed when evaluated two years after the surgery," said Scott Rodeo, M.D., co-chief of the Sports Medicine and Shoulder Service at Hospital for Special Surgery and senior author on the study. "Although not all of the patients with failed rotator cuff tendon healing had poor clinical outcomes, we wanted to look for ways to further improve patient outcomes."

The rotator cuff is a set of four smaller muscles in the shoulder that rotate the upper arm. A rotator cuff tear happens when the tendon part of the muscle tears away from the [bone](#) of the upper arm. The repair surgery reattaches the tendon to the bone, but the success depends on how well the interface between the tendon and bone heals. Much of the time [scar tissue](#) forms at that interface, which is not as strong as the original tissue and can lead to a failed repair.

"The healing process occurs from both the bone and the tendon, which is

made up of collagen," said Carolyn Hettrich, M.D., MPH, fifth year resident in orthopedic surgery at Hospital for Special Surgery and lead author. "We knew the drug Forteo is osteogenic and can stimulate bone growth, but we found reports in the literature that it is also chondrogenic, so it can promote cartilage formation as well."

Forteo is a synthetic version of [parathyroid](#) hormone, which is the body's primary regulator of calcium and phosphate levels in bone. Recently approved by the FDA, it is prescribed for osteoporosis as it not only stimulates bone growth but it also slows the rate of bone loss.

The researchers hypothesized that because Forteo stimulated both bone and cartilage formation, it might enhance the healing process after rotator cuff surgery. Using a rat model, they performed the surgery and then gave some rats Forteo injections in amounts comparable to human doses.

Initially, at two weeks after the surgery, the repair was not as strong in the rats who received the Forteo. But when the researchers looked at weeks four through eight, the tendon to bone interface in those rats appeared much more like normal tissue. Closer examination showed that not only had those rats that received Forteo produced more bone and cartilage cells, but the organization of the tissue was better and more closely resembled normal tissue. The tendon was also significantly stiffer, a sign of proper healing, at 8 weeks.

"The results are positive, but now we want to understand why at week two the tendon wasn't healing as well," said Dr. Hettrich. "Our next experiments will look to pinpoint these causes and determine the optimum delivery time of the drug after surgery."

The researchers caution that it would be risky to use Forteo in patients undergoing rotator cuff surgery just yet as further studies are needed.

Instead, they encourage patients to talk to their surgeons about other steps they can do to improve healing, such as not smoking after the [surgery](#) to optimize their biology.

Athletes who use overhead movements, like baseball or tennis players, are prone to this injury. It is also common in adults over 40 because the tendons begin to degenerate and weaken.

"In some instances, the body's own healing process does not produce ideal results," said Dr. Rodeo. "We are trying to find ways to improve tendon to bone healing - ways to augment the [healing process](#) and go beyond what the body can do on its own. Although preliminary, the results here are promising and may eventually be applied to other tendon to bone surgeries, such as bicep tears or patellar tendon tears in the knee."

Provided by Hospital for Special Surgery

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