

Could Bone-Strengthening Medicine Help Rotator Cuff Healing?

A Guide to IV Zoledronic Acid for Improving Rotator Cuff Repair

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What is Zoledronic Acid?

Zoledronic Acid is an intravenous medicine used to strengthen bone and lower fracture risk in people with osteoporosis.¹

Why are doctors studying it for the shoulder?

After rotator cuff surgery, the tendon must heal back to bone. If the bone is weak, healing may be less secure, so researchers have studied whether osteoporosis medicines can improve tendon-to-bone healing and lower the chance of a retear.²⁻⁵

What the newer studies suggest

- Several recent studies suggest that anti-osteoporosis medicines, especially zoledronic acid, may improve healing after arthroscopic rotator cuff repair in selected patients.²⁻⁶ A 2025 meta-analysis that combined 5 studies found lower retear rates and better ASES shoulder scores (*patient reported outcome score*) in patients treated with anti-osteoporosis medication than in control patients.²
- A 2026 randomized trial found fewer retears at 6 months in patients who received a single dose of zoledronic acid during surgery than in patients who received placebo, 15% versus 35%.³ The same study also reported better short-term motion, pain, and shoulder outcome scores in the zoledronic acid group.³
- A 2024 prospective randomized study by Lei and colleagues reported that postoperative zoledronic acid improved tendon healing in women with postmenopausal osteoporosis, although it did not clearly improve every patient-reported outcome.⁴
- A 2024 retrospective study in elderly patients with osteoporosis also found lower retear rates after IV zoledronic acid, with the lowest retear rate in the treated osteoporotic group compared with untreated osteoporotic patients.⁵
- An earlier first-in-human prospective study from 2022 found that IV zoledronate may reduce the retear rate after rotator cuff repair in older women with osteoporosis.⁶

Taken together, these studies suggest that bone-strengthening treatment may be most relevant for patients who already have osteoporosis or poor bone quality.^{2,4-6}

What does this really mean?

This encouraging early research suggests that Zoledronic Acid may help support rotator cuff healing in some patients, especially when osteoporosis or poor bone quality is part of the picture.²⁻⁵ The decision to use zoledronic acid should be made on an individual basis after a thoughtful discussion with your doctor, considering your bone density, overall health, kidney function, calcium levels, & specific shoulder condition.¹⁻⁶

Possible benefits

- May lower the chance of the tendon re-tear after surgery.²⁻⁶
- May improve tendon-to-bone healing in patients with osteoporosis or low bone density.^{2,4-6}
- May be part of a broader plan to improve bone health.¹

Possible side effects and cautions

Common side effects after a Zoledronic Acid infusion can include fever, flu-like symptoms, muscle aches, joint aches, and headache.¹ Less common but more serious concerns include low calcium, kidney problems, and rare jaw complications, so treatment needs to be discussed carefully with a doctor.¹

Questions patients can ask

- Do I have osteoporosis or osteopenia that could affect my rotator cuff healing?^{1,2,6}
- Would a bone density test help guide treatment before or after surgery?^{1,2}
- Is Zoledronic Acid being considered for my general bone health, my shoulder healing, or both?^{1,3-5}
- Are there any reasons Zoledronic Acid may not be a good fit for me, such as kidney disease, or dental problems?¹

Take-Home Message

Recent studies suggest that anti-osteoporosis medicines, including IV Zoledronic Acid, may reduce re-tear rates and support healing after rotator cuff repair, especially in patients with osteoporosis.²⁻⁶ Even so, this remains an evolving area of care, and treatment decisions should be personalized rather than automatic.¹⁻⁵

References

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