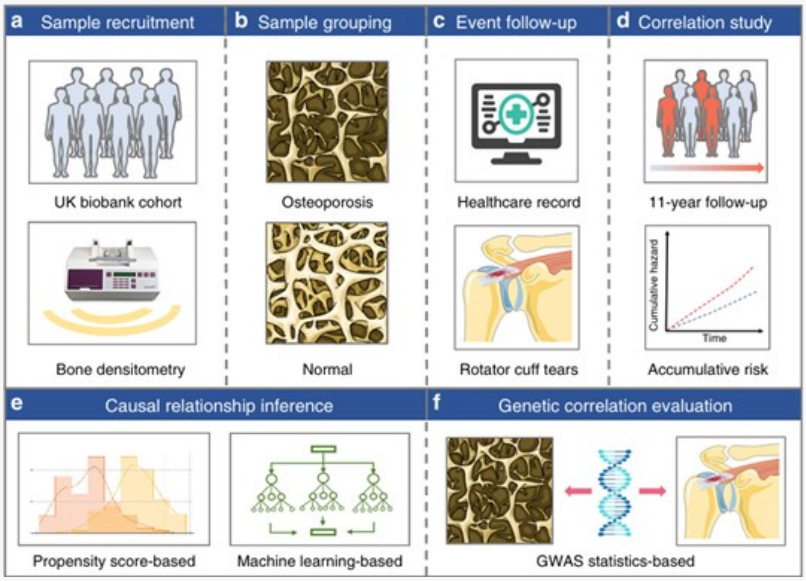
New Study Links Osteoporosis to Higher Risk of Rotator Cuff Tears

A large-scale study uncovers shared genetic roots between osteoporosis and rotator cuff tears



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CHENGDU, SICHUAN, CHINA, October 3, 2025 /EINPresswire.com/ -- Scientists have found a direct link between osteoporosis and rotator cuff tears, two conditions that often develop with age. Using health and genetic data from hundreds of thousands of people, researchers showed that fragile bones increase the risk of painful shoulder injuries, especially in women. They also identified shared genetic variants, offering fresh insight into the biological ties between bone and tendon weakness and pointing toward targeted prevention and treatment strategies.

Rotator cuff tears (RCTs) are one of the most common causes of shoulder pain and disability, affecting nearly one in three people over the age of 60. They often lead to long-lasting pain, loss of arm strength, and difficulty with daily tasks. Despite their prevalence, the underlying risk factors behind these shoulder injuries have not been fully understood.

A new study, published online on August 28, 2025, in the Bone Research journal, has now uncovered a strong connection between osteoporosis and RCTs. The study was led by Dr. Jinjin Ma and Dr. Hongmin Cai from South China University of Technology in Guangdong, China, along with Dr. Xiaofei Zheng from Jinan University, China. Osteoporosis is a widespread condition in which bones gradually lose strength and density, making them more fragile and prone to fractures. By analyzing health and genetic data from the UK Biobank—a resource that tracks the health of over half a million people—researchers found not only that osteoporosis raises the risk of RCTs but also that the two conditions share common genetic roots.

Dr. Ma explains, “Our results provide strong evidence that osteoporosis significantly increases

the risk of rotator cuff tears. This suggests that managing bone health could also play a critical role in preventing these painful shoulder injuries."

To explore the connection, the research team examined health records from nearly 458,000 people and then tracked over 268,000 of them for 11 years. They used advanced statistical and computer-based methods to rule out other possible explanations, such as age, sex, or lifestyle. This allowed them to move beyond showing a simple link and instead suggest that osteoporosis itself may directly increase the risk of RCTs.

The findings were striking. Individuals with osteoporosis were 1.56 times more likely to suffer an RCT than those without the condition. The risk was particularly pronounced among women, highlighting how hormonal changes—especially the sharp decline in estrogen after menopause—may accelerate both bone loss and tendon damage.
"The sex differences we observed suggest that women may require special monitoring and earlier interventions for rotator cuff health if they also have osteoporosis," notes Dr. Cai.

The researchers also looked at whether genes might explain why the two conditions often appear together. By comparing large sets of genetic data, they discovered six points in the genome that seem to influence both osteoporosis and RCTs. Among these, one variant near the PKDCC gene stood out and was confirmed across multiple datasets. This gene is known to help regulate bone and tendon tissue, offering a possible biological explanation for the link.

The study also found that common supplements such as calcium and vitamin D did not reduce the risk of shoulder injuries. This suggests that stronger osteoporosis treatments—such as certain prescription drugs or hormone therapies—may hold greater promise, though further research is needed.

RCTs are already a growing public health concern, with nearly a quarter of surgical repairs failing within two years. Combined with the high global burden of osteoporosis—affecting more than 200 million people—the link between the two conditions highlights an urgent need for preventive strategies.

Dr. Zheng emphasizes, "Our study suggests that preventing or treating osteoporosis may also reduce the likelihood of rotator cuff tears. This dual benefit could improve quality of life for millions of aging individuals worldwide."

Although this extensive study offers valuable insights, the authors emphasize the need for further research. It only considered individuals with diagnosed tears, leaving silent, undiagnosed cases unexamined. Additionally, the exact mechanisms linking osteoporosis to tendon weakness require validation through further laboratory studies.

The findings signify a key advancement in musculoskeletal research. By combining extensive population data, modern analysis, and genetic insights, the team has shown that brittle bones

and torn shoulders are more closely related than previously understood.

“These findings remind us that bone and tendon health are deeply interconnected. By recognizing and addressing this relationship, we may be able to develop new strategies to protect both, ensuring healthier and more active lives as people age,” concludes Dr. Ma.

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Reference
Title of original paper: Association between osteoporosis and rotator cuff tears: evidence from causal inference and colocalization analyses
Journal: Bone Research
DOI: 10.1038/s41413-025-00450-z

About South China University of Technology (SCUT), Guangzhou, Guangdong, China
Founded in 1952, SCUT is a leading public research university under China’s Ministry of Education. It has multiple campuses, including the Wushan, University Town, and Guangzhou International campuses. SCUT is recognized for strong programs in engineering, science, medicine, business, and management. It hosts advanced research platforms and labs, excels in patent production and international cooperation, and has educated hundreds of thousands of graduates. The university is part of China’s “Double First-Class” initiative to build world-class universities.
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About Professor Jinjin Ma from School of Medicine, South China University of Technology, Guangzhou, China
Jinjin Ma is a Professor at the Institute of Future Health, School of Medicine, South China University of Technology (SCUT), Guangzhou, China. He holds a Ph.D. in Mechanical Engineering and has over a decade of research experience with numerous publications. His work focuses on regenerative medicine, biomaterials, and tissue engineering, especially for orthopedic and neurological applications. Dr. Ma has contributed to studies on bone defect repair using bioactive materials and mechanisms of axon regeneration. He previously served as a Research Associate at the Cleveland Clinic, advancing translational biomedical research in musculoskeletal and neural tissue repair.

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