

New study links healthy muscle mass to healthy bones, finds differences by gender

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Researchers have long been aware that the progressive loss of muscle mass and bone density is a natural part of aging. But little work has investigated how muscle tissue affects the inner and outer layers of bone microstructure. A Mayo Clinic study looked at skeletal muscle mass and bone health across the life span and discovered distinct differences in how muscle affects the two layers of bone in men and women. The findings are published in the *Journal of Bone & Mineral Research*.

"Our study adds to the growing body of evidence supporting the highly integrated nature of [skeletal muscle](#) and bone, and it also provides new insights into potential biomarkers that reflect the health of the musculoskeletal system," says lead author Nathan LeBrasseur, Ph.D., of the Department of Physical Medicine and Rehabilitation and the Robert and Arlene Kogod Center on Aging at Mayo Clinic.

Researchers reviewed records from a long-standing Mayo Clinic study of [bone health](#) involving 272 women and 317 men ages 20 to 97. They examined the association of skeletal [muscle mass](#) (relative to participants' height) with bone architecture and strength, using several high-resolution imaging technologies that distinguish the outer cortical layer of bone from the inner trabecular layer.

The study found that muscle mass is associated with bone strength at particular places in the body. In women, muscle mass was strongly connected to cortical health at load-bearing locations such as the hip, lumbar spine and tibia. Researchers also found that muscle mass was

associated with the microarchitecture of trabecular bone in women's forearms, a non-load-bearing site, at higher risk of fracture following menopause. The higher the level of the circulating protein, IGFBP-2, the lower relative muscle mass overall, they discovered.

"We found IGFBP-2, which has already been linked to osteoporotic fractures in men, is a negative biomarker of muscle mass in both sexes," Dr. LeBrasseur says. "This finding could potentially be used to determine people who are at a particular risk for falls and associated fractures."

The subject of muscle and bone health is vital, especially for the elderly. Weakened muscle can lead to bone-breaking accidents that result in loss of independence and even death. In the context of health care costs, the adverse health effects of frailty reach up to \$18.5 billion annually.

"As we develop a better understanding of the complex relationship between muscle and bone, we may find new strategies for early identification and treatment of muscle loss and [bone density](#) loss," Dr. LeBrasseur says.

Provided by Mayo Clinic

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