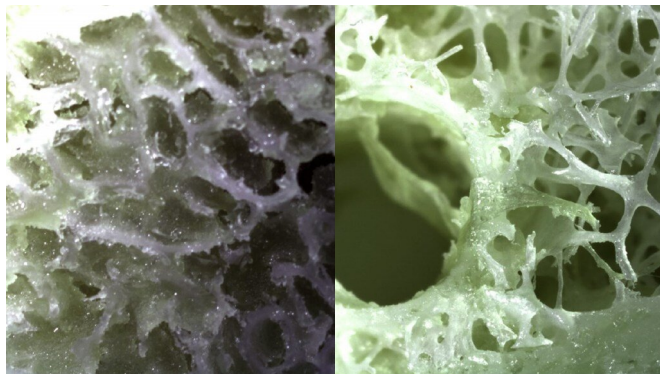


Higher lead concentrations found in diseased bones

9 June 2022, by Rachel Fritts



Researchers analyzed bone samples from patients with osteoarthritis (left) and osteoporosis (right) and discovered that people with the latter have higher concentrations of lead in their bones. Credit: Tom Darrah

Among the world's population over age 60, chronic illnesses like the degenerative bone disease osteoporosis have become more common. Trace elements of chemical impurities in bones might play a role in the development of osteoporosis, but this role is currently poorly understood. Identifying which elements have little effect on bones and which might contribute to degeneration can help researchers better understand and treat osteoporosis.

To gain insight into the relationship between trace element impurities and osteoporosis, Coyte et al. selected 16 trace elements and analyzed their prevalence in samples from 58 patients who underwent [hip replacement surgery](#). Of these patients, who ranged in age from 41 to 100, 29 were diagnosed with osteoporosis, and 29 had osteoarthritis, a degenerative disease that affects cartilage but not bone. Researchers tested cortical bone (hard outer layer) and [trabecular bone](#) (spongy inner layer) in all samples. Element concentrations in the outer bone result from long-term accumulation, whereas the concentration of

trace elements in the inner bone can change over time.

Of the 16 trace elements tested for, only lead was found in significantly higher concentrations in the outer bone samples of osteoporosis patients compared with osteoarthritis patients. This indicates that environmental lead exposure early in life can accumulate in the body, possibly weakening [bone structure](#) later in life. In the inner bone samples, the trace elements chromium and scandium were comparatively more abundant in osteoporosis patients.

The researchers caution that this study cannot specify whether any of the concentration differences detected are a cause or effect of osteoporosis. They suggest that future studies could untangle these correlates and delve deeper into interactions between [trace elements](#) to develop better-targeted treatments for this disease.

The research was published in *GeoHealth*.

More information: Rachel M. Coyte et al, The Abundance of Trace Elements in Human Bone Relative to Bone Type and Bone Pathology, *GeoHealth* (2022). [DOI: 10.1029/2021GH000556](https://doi.org/10.1029/2021GH000556)

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