

## **PRESS RELEASE**

**EMBARGOED UNTIL SATURDAY 11 MAY 2024 AT 00:05 CET**

### **Arm fat may reveal women and men at risk of spinal fracture**

Measuring the total mass of fat in the arms could potentially predict which women and men over 50 are at risk of spinal fracture, according to research presented at the 26th European Congress of Endocrinology in Stockholm. The findings may help identify high-risk individuals with a more simple and inexpensive method and influence the design of their exercise plans.

Osteoporosis is a common disease among older people, but is also among the most undiagnosed and untreated medical conditions in the world. Many people do not have noticeable symptoms of osteoporosis until they experience an injury or fracture, which most often occurs in the spine — known as spinal or vertebrae fractures. Imaging techniques, such as dual-energy X-ray absorptiometry (DXA), are used to measure bone mineral density (BMD), while trabecular bone score (TBS) assesses the quality of bone and predicts new fractures independently of BMD. However, the effect body fat has on bone health is still unclear.

To investigate this, researchers from the National and Kapodistrian University of Athens in Greece examined 14 men and 101 women, without osteoporosis and with an average age of about 62, and found that those with excess body fat — irrespective of their body mass index (BMI) — had low bone quality (low TBS) in their spine. What's more, the more belly fat located deep inside the abdomen and around internal organs, the lower the quality of the spine's spongy bone (or trabecular bone). The researchers then looked at the distribution of body fat under the skin and discovered that individuals with higher fat mass in the arms were more likely to have lower bone quality and strength in the spine.

“Surprisingly, we identified, for the first time, that the body composition of the arms — in particular, the fat mass of the arms — is negatively associated with the bone quality and strength of the vertebrae”, said senior author Professor Eva Kassi.

“This could mean that the arm's subcutaneous fat, which can be easily estimated even by the simple and inexpensive skin-fold calliper method, may emerge as a useful index of bone quality of the spine, possibly predicting the vertebrae fracture risk.”

She added: “It should be noted that visceral fat — which we found to be strongly correlated with low bone quality — is the hormonally more active component of the total body fat. It produces molecules called adipocytokines that provoke a low-grade inflammation, so the increased inflammatory status plausibly poses a negative impact on bone quality.”

Professor Kassi acknowledges that larger studies are needed to confirm the link between arm fat and spinal fracture risk. “Although our results remain robust after controlling for age and weight, we will now increase the number of participants and expand the age range by including younger adults between the ages of 30 and 50 years old, as well as more men”, she said.

“Moreover, using the loss of arm fat mass as a marker, we will try to determine the most effective physical exercise routine that not only targets the visceral fat but also focuses on the upper part of the body so that these higher-risk adults lose arm fat and achieve a favourable effect on vertebrae bone quality.”

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## **Abstract**

**EP424**

### **Body composition of the arms as an index of bone quality**

**Introduction:** Traditionally, obesity is thought to exert a positive impact on bone mineral density (BMD). However, the effect of adipose tissue on bone health is under investigation. Trabecular bone score (TBS) is a measure of bone texture, providing information on bone quality and microarchitecture, independently of BMD. Lower values of TBS indicate a worsening in bone quality and amplify fracture risk. Herein, we aimed to investigate the association of body composition and bone quality as evaluated by lumbar spine TBS.

**Methods:** We included 83 subjects (69 women and 14 men) with a mean age of 62.38years  $\pm$  10.48. There was no history of secondary osteoporosis, neither received anti-osteoporotic drugs. Body composition and lumbar spine TBS were evaluated by dual-energy X-ray absorptiometry (DXA). To determine the associations among the variables of interest linear regression analysis was performed (Stata Corp (2017)).

**Results:** Our analysis demonstrated that total fat mass is negatively associated with TBS ( $p < 0.01$ ). Moreover, total lean mass is positively correlated with TBS. Extending our analysis to examine the association of visceral adipose tissue (VAT) mass and arm fat mass with TBS, we demonstrated that VAT mass is negatively associated with TBS ( $p < 0.05$ ). Furthermore, we found that right and left arm fat mass, each one or combined, associated negatively with TBS ( $p < 0.05$ ), even after adjustment for age and weight. Each right and left arm lean mass or combined were positively associated with TBS reaching statistical significance ( $p < 0.1$ ).

**Conclusions:** Our study provide evidence that total fat and in specific VAT negatively impacts bone quality as it is estimated by TBS. It is known that VAT is the main source of proinflammatory adipocytokines provoking low grade inflammation that has potentially a negative impact on bone quality. We also showed for the first time that the body composition of the arms is correlated with the bone quality of lumbar spine, possibly underscoring the importance of the physical exercise of the upper part of the body in the bone quality of vertebrae.

## Notes for Editors

1. For further information about the study, and to arrange an interview with the authors, please contact the ECE 2024 press office:

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2. The study **“Body composition of the arms as an index of bone quality”** is an e-poster presentation that will take place on Saturday 11 May 2024 at the European Congress of Endocrinology at the Stockholm International Fairs (Stockholmsmässan) in Stockholm, Sweden.
3. The 26th European Congress of Endocrinology (ECE) is held at the Stockholm International Fairs (Stockholmsmässan) in Stockholm, Sweden, on 11-14 May 2024. See the full scientific programme here: <https://ese-hormonesapps.m-anage.com/ece2024/en-GB/pag>
4. The [European Society of Endocrinology](#) (ESE) is at the centre of Europe's endocrine community. Its vision is to shape the future of endocrinology to improve science, knowledge and health. Through its events, publications, grants and advocacy work, ESE shares the best knowledge in endocrine science and medicine across Europe and beyond. ESE and its partner societies jointly represent a community of over 20,000 endocrinologists. ESE informs policymakers on health decisions at the highest level through advocacy efforts across Europe.