

Method for assessing hand bone density may prevent hip fractures

November 19 2012

A new study from Karolinska Institutet in Sweden shows, that a technique for measuring bone density called digital X-ray radiogrammetry (or DXR) used on standard hand radiographs can help to identify patients with a higher risk of hip fracture. The researchers believe that DXR, which is fully comparable with other, more costly methods, can be used preventively to identify people in the risk zone for osteoporosis – a disease estimated to effect some 200 million women worldwide.

Each year, approximately 1.7 million hip fractures occur worldwide (about 18,000 only in Sweden), mainly in elderly people and women with osteoporosis. A [hip fracture](#) can be particularly serious for the elderly; it often entails lengthy rehabilitation and leaves many patients unable to lead an independent life. Moreover, between 10 and 20 per cent of sufferers die from complications. Apart from the human suffering they cause, hip fractures are also very costly to the [healthcare services](#) in the amount of care they demand.

"If we can identify people with osteoporosis and treat them with drugs, we can reduce the risk of hip fracture," says principal investigator, Associate Professor Torkel Brismar of Karolinska Institutet's Department of [Clinical Sciences](#), Intervention and Technology. "Our research shows that DXR is a technique that lends itself well to this, maybe at general health check-ups, or screenings, for example, or when people seek treatment for a suspected hand or [wrist fracture](#)."

For the present study, which is published in the scientific journal *European Radiology*, the researchers analysed digital hand [X-rays](#) taken at three hospitals in Stockholm, Sweden, between 2000 and 2008. Their databank included pictures from over 8,000 men and women aged forty years and up. They used DXR to assess [bone density](#) in the hand, and by searching in the National Board of Health and Welfare fracture registry they were able to study the link between bone density in the hand and the risk of hip fracture.

Analysis of the sub-group of 122 patients who had suffered a post-X-ray hip fracture showed that they had significantly lower bone density than those who had not had a hip fracture, a result that held up also when adjusted for age. The DXR technique uses a normal X-ray of the hand to analyse the thickness and texture (i.e. small variations in density) of the metacarpal bones. The analysis is automatic and includes around 1,000 measurements. The standard method of measuring bone density is currently DXA (dual-energy X-ray absorptiometry).

In this study, the researchers showed that DXR is at least as effective as DXA, which means that the former might one day be an important feature of osteoporosis examinations (e.g. as part of a general screening). Several pilot projects are underway in several counties to ascertain whether DXR screening of bone density is a useful way of preventing hip fractures.

More information: Wilczek ML, Kälvesten J, Algulin J, Beiki O, Brismar TB, Digital X-ray radiogrammetry of hand or wrist radiographs can predict hip fracture risk; a study in 5,420 women and 2,837 men, *European Radiology*, online 19 November 2012, [DOI:10.1007/s00330-012-2706-9](https://doi.org/10.1007/s00330-012-2706-9)

Provided by Karolinska Institutet

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