

Subchondral bone changes contribute to cartilage damage and loss

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A recent study determined that bone area predicted the development of medial (inner side) and lateral (outer side) knee cartilage damage and loss of medial cartilage volume. Subchondral bone mineral density (BMD) was associated with medial defect development but not cartilage loss. Researchers believe subchondral bone changes and loss of cartilage contribute to the development of osteoarthritis (OA). Read details of the study online or in the July issue of *Arthritis & Rheumatism*, a journal published by Wiley-Blackwell on behalf of the American College of Rheumatology.

According to a report by the World Health Organization (WHO), 9.6% of men and 18% of women over 60 years of age worldwide have OA symptoms, making it a leading cause of disability. OA is caused by the gradual loss of [cartilage](#) and underlying bone, typically affecting the knee, hip, hand, and spine joints. The Centers for Disease Control and Prevention estimate that 4.3 million Americans over age 60 have symptomatic knee OA, the most common joint affected. In fact prior studies of U.S. and European populations (over 45 years of age) show higher rates of knee OA in 14.1% of men and 22.8% of women (WHO report).

Ph.D. candidate and lead author of the study, Dawn Dore', enrolled 341 participants in their prospective study. Participants had a mean age of 63 years and provided measurements of tibial knee cartilage volume, cartilage defects, and bone area using magnetic resonance imaging (MRI). The tibial subchondral BMD was determined using dual x-ray

absorptiometry (DXA). Follow-up measurements of cartilage volume and defects were taken 2.7 years later.

Study results found that baseline bone area positively predicted cartilage defect development at the medial and lateral tibial sites (odds ratio [OR] 1.6 and OR 2.4 per 1 SD increase, respectively). Cartilage volume loss at the medial tibial site was also positively predicted by baseline bone area (β -34.9 per 1 SD increase). However, baseline subchondral BMD positively predicted cartilage defect development at the medial tibial site only (OR 1.6 per 1 SD increase) and was not associated with loss of cartilage.

"Our results clearly show bone area was a predictor of cartilage defect development in the inner and outer knee, as well as medial cartilage volume loss," said Ms. Dore'. "We found that subchondral BMD only predicted defect development on the inside of the knee, but not cartilage loss". Researchers noted that the associations were independent of each other and suggest there are multiple mechanisms where changes in subchondral bone could lead to cartilage damage. "With the ability to predict those at risk of developing knee OA, early interventions can be offered to patients in order to lessen the disabling affects of this disease," concluded Ms. Dore'.

More information: "Subchondral Bone and Cartilage Damage: A Prospective Study in Older Adults." Dawn Dore', Stephen Quinn, Changhai Ding, Tania Winzenberg, Flavia Cicuttini, and Graeme Jones. *Arthritis & Rheumatism*; Published Online: March 26, 2010 ([DOI: 10.1002/art.27467](https://doi.org/10.1002/art.27467)); Print Issue Date: July 2010.

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