

The risk of osteoarthritis and index to ring finger length ratio

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Study associates shorter second than fourth digit with independent risk for knee osteoarthritis, especially among women

Index to ring finger length ratio (2D:4D) is a trait known for its sexual differences. Men typically have shorter second than fourth digits; in women, these fingers tend to be about equal in length. Smaller 2D:4D ratios have intriguing hormonal connections, including higher prenatal testosterone levels, lower estrogen concentrations, and higher sperm counts. Reduction in this ratio has also been linked to athletic and sexual prowess. Whether this trait affects the risk of osteoarthritis (OA), a progressive joint disease associated with both physical activity and estrogen deficiency, has not been examined. Until recently.

Researchers with the University of Nottingham in the United Kingdom conducted a case-control study to assess the relationship between the 2D:4D ratio and the risk of knee and hip OA. Their findings, featured in the January 2008 issue of *Arthritis & Rheumatism* (<http://www.interscience.wiley.com/journal/arthritis>), suggest that having uncommonly long ring fingers raises the risk for developing OA of the knee, independent of other risk factors and particularly among women.

For the study, 2,049 case subjects were recruited from hospital orthopedic surgery lists and a rheumatology clinic in Nottingham. All had clinically significant symptomatic OA of the knees or hips, requiring consideration of joint replacement surgery. Recruited from hospital lists of patients who had undergone intravenous urography (IVU) within the

past five years, 1,123 individuals with no radiographic evidence of hip or knee OA, no present hip or knee symptoms, and no history of joint disease or joint surgery served as controls. The study population was comprised of both men and women, with an average age of roughly 67 years for cases and 63 years for controls.

Radiographs of both knees and the pelvis were obtained for all participants. Every participant also underwent separate radiographs of the right and left hands. Researchers then assessed the 2D:4D length ratio from radiographs using three methods: a direct visual comparison of the 2 finger ends, the measured ratio from the base to the tip of the upper finger joints, and the measured ratio of the metacarpal bone lengths. Hands radiographs were classified visually as either type 1, index finger longer than the ring finger; type 2, index finger equal to the ring finger; or type 3, index finger shorter than the ring finger. Not surprisingly, men were 2.5 times more likely than women to have the type 3 pattern.

Using blind comparisons of hand radiographs with both knee and hip radiographs from random case and control samples combined with statistical analysis and odds ratios, researchers assessed the relationship between 2D:4D length ratio and OA. Compared with the other finger types, the type 3 finger was associated with an increased risk of OA involving any part of the knee or the hip, and including the presence of arthritic finger nodes. Of particular note, the risk of knee OA in participants with the type 3 finger pattern was nearly double that of the risk for participants without this pattern. Women with this finger pattern had a greater risk of knee OA than men. Among participants of both sexes, researchers also found an interesting trend: the smaller the 2D:4D upper finger joint ratio, the greater the risk of OA of the tibiofemoral knee joint. Finally, after adjusting for established OA risk factors—age, sex, body mass index, joint injury, and lack of physical activity—the strong association of smaller 2D:4D length ratio with the risk for knee

OA was deemed independent.

“The 2D:4D length ratio appears to be a new risk factor for the development of OA,” concludes the study’s leading researcher, Dr. M. Doherty. “Specifically, women with the ‘male’ pattern of 2D:4D length ratio—that is, ring finger relatively longer than the index finger—are more likely to develop knee OA.” The first study to examine the relationship between 2D:4D length ratio and OA, it also raises questions. “The underlying mechanism of the risk is unclear,” Dr. Doherty stresses, “and merits further exploration.”

Source: Wiley-Blackwell

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