

Lower index to ring finger ratio associated with higher risk of osteoarthritis in knee

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A new study published online today in the journal *Rheumatology* has found that the lower the ratio between a person's index finger (2D) and their ring finger (4D), the higher their risk of developing severe osteoarthritis in their knees, requiring a total knee replacement.

Osteoarthritis (OA) is a major public health problem linked with significant disability in knees and hips. Hormonal factors are thought to play a role, which is thought to account for the well documented difference in prevalence of OA between men and women.

Anthropological studies have suggested that there are consistent sex differences in the ratio of the lengths of the index and ring fingers (expressed as 2D:4D), with men showing a lower average 2D:4D than women. The aim of this new study was to determine whether 2D:4D was associated with the risk of severe knee or hip OA requiring [total joint replacement](#) in a large cohort study.

Dr Yuanyuan Wang and colleagues assessed the hands of 14,511 middle-aged and older participants in the Melbourne Collaborative Cohort Study from hand photocopies and noted the 2D:4D. The incidence of total [knee replacement](#) and total [hip replacement](#) between 2001 and 2011 was determined by linking the cohort records to the Australian Orthopaedic Association National Joint Replacement Registry.

Over an average 10.5 year follow up, 580 participants had total knee replacements and 499 had total hip replacements for OA. Lower 2D:4D was associated with a higher incidence of total knee replacement, while

there was no significant evidence of a link between 2D:4D and total hip replacement. This was the case when the ratio was examined on either the right or left hand, or the average, although the risk was stronger with the right hand.

There were 830 participants whose fingers had features that might have affected the validity of the measurements, and so they were excluded in the additional sensitivity analysis. Among the remaining 13,681 participants, there were 524 [total knee replacements](#) and 454 total hip replacements. Again, a lower 2D:4D was associated with a higher incidence of total knee replacement. There was again no significant evidence of a link between 2D:4D and total hip replacement.

Dr Wang says, "Although there is some evidence from previous studies that sporting ability and achievement in sports and athletics are negatively related to 2D:4D, this might not reflect levels of regular physical activity in the general population. In our study, the measure of physical activity did not directly assess sporting activity, nor did the measure report past physical activity that may also be important in this regard."

"Although our study's results may in part be explained by joint injuries associated with high-level [physical activity](#) in those with a lower 2D:4D and the greater susceptibility of knee OA in response to injury than hip OA, they may also reflect hormonal influences on the growth of bone, cartilage, and soft tissue, which warrants further investigation."

More information: 'Association between index to ring finger length ratio and risk of severe knee and hip osteoarthritis requiring total joint replacement' by S. Monira Hussain, Yuanyuan Wang, David Muller, Anita Wluka, Graham Giles, John Manning, Stephen Graves, and Flavia Cicuttuni, *Rheumatology*, [DOI: 10.1093/rheumatology/keu021](https://doi.org/10.1093/rheumatology/keu021)

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