

# Osteoarthritis: It's in the Genes

Researchers have noticed a very curious thing. People of European descent are the only ones who develop primary osteoarthritis (OA) of the hip. Those individuals who are of African or Asian lineage are much less likely to develop this condition. In fact, according to this article, primary osteoarthritis is completely absent in true Asian and African people. Only those adults who are a mixture of African (or Asian) and European develop primary OA.

Primary osteoarthritis of the hip refers to loss of joint space from a degenerative process affecting the hip joint cartilage. It only occurs in adults 55 year old or older. It is not caused by previous hip problems in childhood like Perthes disease, trauma, developmental dysplasia, or slipped capital femoral epiphysis (SCFE). Other potential causes for the arthritic changes are also ruled out (e.g., rheumatoid arthritis, Paget disease, sepsis).

Naturally, after making this discovery that there is a difference in rates of hip replacement between Europeans and non-Europeans, the scientists started looking for an environmental or genetic explanation. They used data from family and twin studies to look for factors that might explain the European versus non-European differences in rates of hip osteoarthritis. They did not find any environmental risk factor that could account for these differences. But there were some genetic links.

Putting this finding into statistical terms, here's what they found. Primary hip osteoarthritis is the reason for 65 to 70 per cent of all hip replacements (around the world). And 100 per cent of those hip replacements are in people with European ancestry. Intermarriage among Europeans and Asians or Africans eventually (over 20 generations) results in the same risk for osteoarthritis as among those who are 100% European.

Curiously, having osteoarthritis (OA) in any part of the body (e.g., hip, knee, hand) does NOT increase the risk of developing arthritis in any other part of the body. So having hip OA does not mean you will be getting knee arthritis later (or vice versa).

What is the importance of this discovery? Knowing there is a genetic cause for osteoarthritis (OA) could help scientists find the molecular basis for OA. This could lead to ways to stop it from starting in the first place! Linkage analysis (a type of genetic study) is the next step in drilling down to the specific genetic component of this disabling disease.

But let's go back to the notion that environment is not a factor in OA among Europeans and their descendants. What about the role of obesity, joint injury, sports activity, and overuse of the joints through work and play? We have always thought osteoarthritis is a degenerative disease from joint wear and tear. But the complete absence of this disease in Africa and Asia where heavy physical activity is so common makes that belief obsolete.

And what about African Americans and American Hispanics? There is some intermarriage but is it enough to raise their risk of developing osteoarthritis? Based on Medicare data for hip replacement surgeries, African Americans account for only half the number of joint replacements. Their ancestry consists of 20 per cent European DNA. American Hispanics with 50 per cent European DNA have up to one-half the rate of hip replacements as European-descent whites.

In conclusion, there is enough evidence now to prove that primary osteoarthritis is a genetic disease. In other words, it is inherited and only among people of European descent. So if you don't have the European gene, you are safe. But chances are -- if you live in the United States (or are the product of an interracial

marriage), you won't be exempt from this condition. And since it is a genetic disease based on European lineage, moving to Africa or Asia won't help either!

Reference: Franklin T. Hoaglund, MD. Primary Osteoarthritis of the Hip: A Genetic Disease Caused by European Genetic Variants. In *The Journal of Bone and Joint Surgery*. March 6, 2013. Vol. 95A. No. 5. Pp. 463-468.