

The relationship between osteoarthritis and osteoporosis

What is the problem?

Osteoarthritis and osteoporosis are diseases affecting joints and bones. In osteoporosis the bones become weaker as the amount of bone is reduced (see Figure 1), whereas in osteoarthritis the bones become deformed and the cartilage between them is lost (see Figure 2). They are both more common in the elderly and are traditionally thought of as being mutually exclusive, i.e. you either have one or the other. Recent evidence, however, shows that this is not the case.



Figure 1

Figure 2

Osteoarthritis is currently measured on X-rays and osteoporosis on bone scans (DEXA Dual Exposure X-ray Absorptiometry) however, Aberdeen University has shown that DEXA can also be used to assess osteoarthritis. The aim of this project was to use DEXA scans and patient data, collected as part of a larger, separate osteoporosis screening study, to measure osteoarthritis and to investigate the relationship between these two diseases.

How big a problem is it?

Osteoporosis and osteoarthritis are the commonest bone and joint diseases. More than 600 million people worldwide are affected by these diseases which can drastically reduce the quality of life of those afflicted by them.

How is this research helping to solve it?

This study looked at whether these two common diseases could be assessed on a single DEXA scan. The results have the potential to reduce the number of hospital visits and, by screening for two diseases using a single DEXA scan, to reduce the amount of radiation that patients are exposed to.

What did we do?

I used an osteoarthritis scoring system known as the Kellgren and Lawrence (KL) grading system (see Figure 3) to assess the severity of hip joint osteoarthritis on DEXA images for 744 post-menopausal women from Dingwall. Using statistical tests, I then looked at the relationship between these scores and bone density measurements, which were obtained from the DEXA scans and are indicative of bone health and osteoporosis. I also assessed whether there is any relationship between baseline KL grade and the likelihood of hip fracture after 10 years. The 10-year hip fracture data were obtained from Scottish Morbidity Record (SMR1) – a database of all the diagnoses and surgical operations that are recorded each time a patient is admitted to hospital in Scotland.

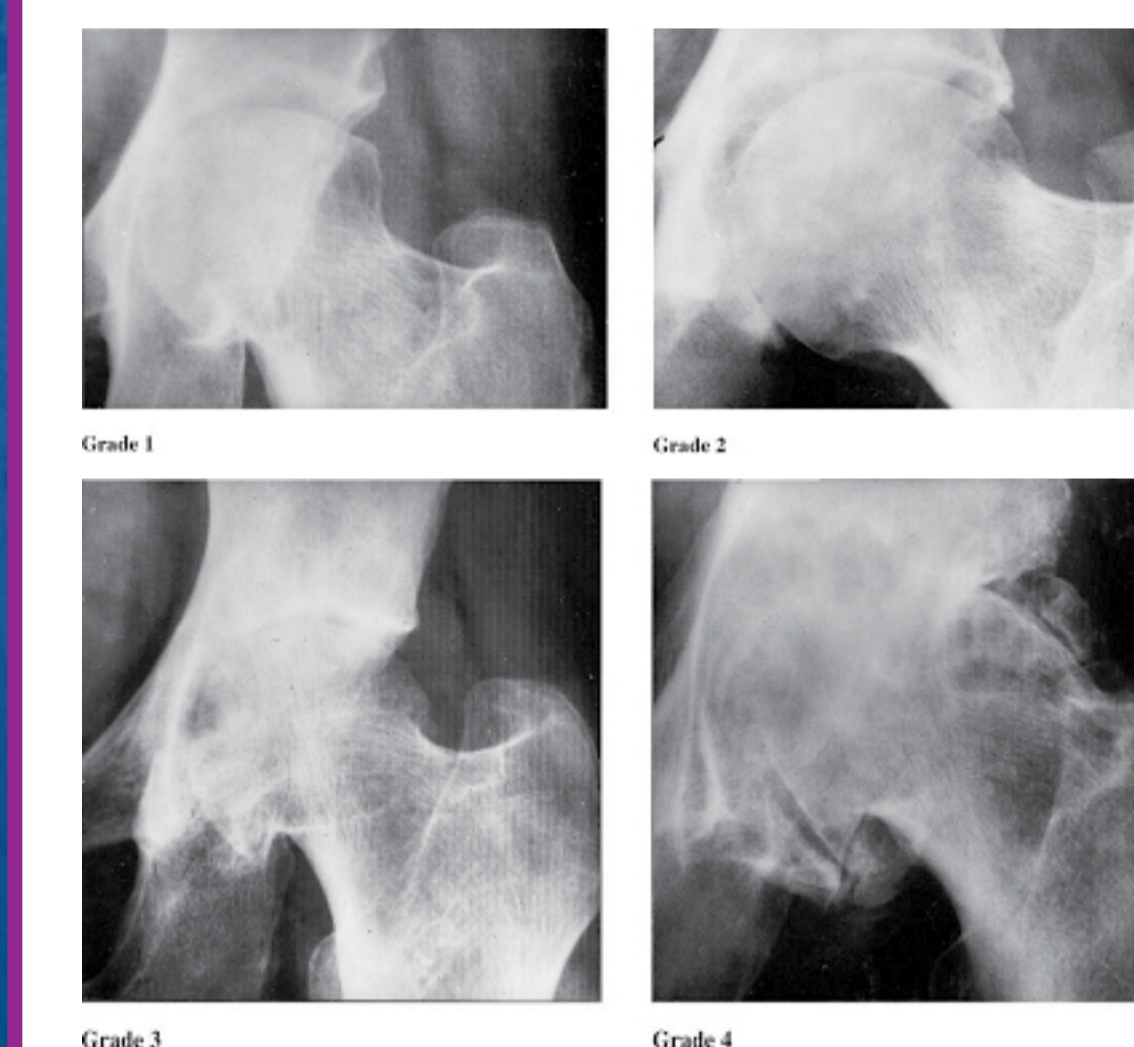


Figure 3: Kellgren and Lawrence Grades 1-4 for the hip joint. Grade 0 (not shown) is normal and grades 1-4 are given for increasing severity of osteoarthritis.

What did we find?

I found that the severity of osteoarthritis was almost identical in women with or without osteoporosis. I also found no relationship between baseline KL grade and the likelihood of hip fracture at after 10 years. This means that osteoporosis was not protective for osteoarthritis and therefore that these diseases are not mutually exclusive.

Who am I?

I'm a 4th year medical student at the University of Aberdeen who would love to become an academic surgeon in the future, as this way I would be able to be involved in both clinical care and in research. In order to get there, I am hoping to apply for an Academic Foundation Year Programme once I finish medical school.