**The relationship of bone properties using high resolution peripheral quantitative computed tomography to radiographic components of hip osteoarthritis**

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**Running headline**

Osteoarthritis and bone microstructure

**Abstract**

Objective

Positive associations between radiographic osteoarthritis (OA) and areal BMD have been demonstrated and appear strongest when bony features of OA are considered. To date, these associations have not been assessed using HRpQCT.

Design

A total of 318 participants (170 men and 148 women), aged 72.1-81.4 years from a non-selected cohort, underwent HRpQCT of the distal radius and tibia along with hip radiography. Differences in bone microarchitecture were assessed between those with and without osteophytes, sclerosis or joint space narrowing (JSN) in either hip.

Results

Men with osteophytes alone had significantly higher radial trabecular volumetric BMD (Tb.vBMD) and radial and tibial trabecular thickness (Tb.Th). Men with both sclerosis and osteophytes had significantly higher cortical volumetric BMD (Ct.vBMD) and cortical thickness (Ct.Th) at the distal tibia than those with osteophytes alone (p<0.05). These relationships were maintained after adjustment for age and BMI, and were not replicated in women. Bone microarchitecture did not differ significantly in those with JSN from those without it in men or women.

Conclusions

We have demonstrated higher Tb.vBMD and Tb.Th in men with osteophytosis but higher tibial Ct.vBMD and Ct.Th in men with hip joint sclerosis.

**Keywords**

Osteoarthritis; bone microarchitecture; epidemiology; osteoporosis; cortical; trabecular