Evolution of osteoporosis

Professor Purdie’s article on the influence of ethnicity on osteoporosis was fascinating. However, we cannot support the argument that evolution has determined racial differences in bone mass and thus a low prevalence of osteoporosis in certain racial groups.

As the article points out, there are differences in bone mass and fracture incidence between white and black women in North America. The data on male fracture incidence are more contentious and the references cited relate to studies of black residents of mental institutions and hip fractures in a small population in Charlottesville, USA, with an incidence of fewer than 25 fractures per annum. However, Farmer reports no difference in fracture incidence in North America between black men, black women, or white men. In Africa, many women have multiple pregnancies, prolonged lactation periods, and low dietary calcium intakes. Despite these factors, fracture incidence is comparatively low in both sexes from black African communities. Vitamin D receptor alleles may offer some insights into geographical variation in osteoporosis. Recent results from The Gambia show a higher prevalence of the potentially protective bb genotype than in white women or black women from Boston, USA.

A strong argument against an evolutionary aetiology for advantageous bone mineral density (BMD) in black populations is that Africans fail to show high bone mass compared to black people in North America. We have recently shown in rural West African communities that evolution has determined racial differences in bone mass and fracture incidence in Africans. Despite evidence that bone mass may be critically low in rural Africans, the incidence of fractures is low due to some other factor or factors, as yet unknown.

Author’s reply

Terence Aspray and colleagues make helpful observations on the complex problem of racial differences in bone fracture rates. Indeed, it is likely that the observed differences between black and white populations are due to a raft of factors of which mineral density and gross bone geometry are but two. The most interesting data cited by Aspray et al from the Gambia do not necessarily confound the hypothesis of an evolutionary component to Caucasian osteoporosis. However, we cannot support the argument that evolution has determined racial differences in bone mass and thus a low prevalence of osteoporosis in certain racial groups.
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