

BONE

Effects of bisphosphonates on bone quality components and fracture risk

Bisphosphonates are commonly prescribed to postmenopausal women to increase bone mineral density (BMD) and reduce fracture risk. However, the specific effects of these drugs on bone quality components and the long-term consequences of bisphosphonate-related suppression of bone turnover are not fully known; the incidence of rare atypical subtrochanteric (ST) fractures in long-term users demonstrates a need for better understanding. Donnelly *et al.* compared bone quality properties of tissue mineral content, carbonate:phosphate ratio, collagen maturity and mineral crystallinity in bone near the site of femoral fracture in postmenopausal women with and without a history of bisphosphonate use.

The bisphosphonate-treated group contained 20 women (mean duration of treatment 7 ± 4.8 years) with intertrochanteric (IT; $n = 13$), typical ST ($n = 1$) or atypical ST ($n = 6$) fractures. Of the 20 women in the

bisphosphonate-naive group, 19 had IT fractures and 1 had a typical ST fracture.

The mean values of tissue characteristics measured on Fourier transform infrared imaging did not differ appreciably between groups or fracture types; however, the distribution widths reflecting characteristics including collagen maturity and crystallinity tended to be narrower in the bisphosphonate-treated group. These findings indicate that bone tissue is more uniformly composed in bisphosphonate-treated patients. Diminished matrix and mineral heterogeneity in long-term bisphosphonate users might compromise tissue-toughening mechanism, leading to an increased risk of atypical fractures.

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Original article Donnelly, E. *et al.* Reduced cortical bone compositional heterogeneity with bisphosphonate treatment in postmenopausal women with intertrochanteric and subtrochanteric fractures. *J. Bone Miner. Res.* doi:10.1002/jbmr.560