

HIV infected patients have deteriorated bonematerial properties at a tissue level measured by “*in vivo*” microindentation

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Background

There is a growing evidence of the association between HIV infection and fracture risk. For hip fracture the risk is increased close to five-fold (J Bone Miner Res 2013; 28(6): 1259-1263.) The etiology is not well understood, but bone material properties might be deteriorated.

Patients and methods

In a HIV group of patients, we analyzed the bone material properties at a tissue level by microindentation. Two groups of patients were included: HIV⁺ (with andwithout Antiretroviral Treatment (ART)), and controls without HIV infection and no bone disease. No participant had received antiosteoporotic medication. A general laboratory workup, bone densitometry by DXA, and bone microindentation were carried out. Bone Material Strength (BMS) was measured with Osteoprobe[®] applying a 20N force on the anterior midtibia normalized on a PMMA phantom. Age and gender-adjusted ANOVA was used for comparisons.

Results

23 HIV patients (9 on ART and 14 without) and43 controls were included. Age (42±9.9vs69±13.4) and gender (14 men, 9 women vs. 4 men and 39 women) for HIV⁺ and controls respectively, were different between groups. After adjusting by age and gender, HIV⁺ patients showed worse(lower) BMS (79.6±12.7) than controls(84.9±6.2, p=0.013) (mean±SD). HIV⁺ patients receiving ART had lower BMS (76±8) (p<0.001 vs. controls) than HIV⁺ not on ART (BMS 81±14)although the difference was not significant between both HIV⁺ groups. T-scores in lumbar spine (-1.5±1.7) and total hip (-1.2±1.7) were, on average, in the range of osteopenia in the HIV⁺ patients. No differences in BMD were observed between HIV⁺ and controls (p=0.38 and p=0.67 for lumbar spine and total hip). There was no correlation between BMS and lumbar spine BMD (R²=0.002, p=0.80) or total hip BMD (R²=0.002, p=0.81).

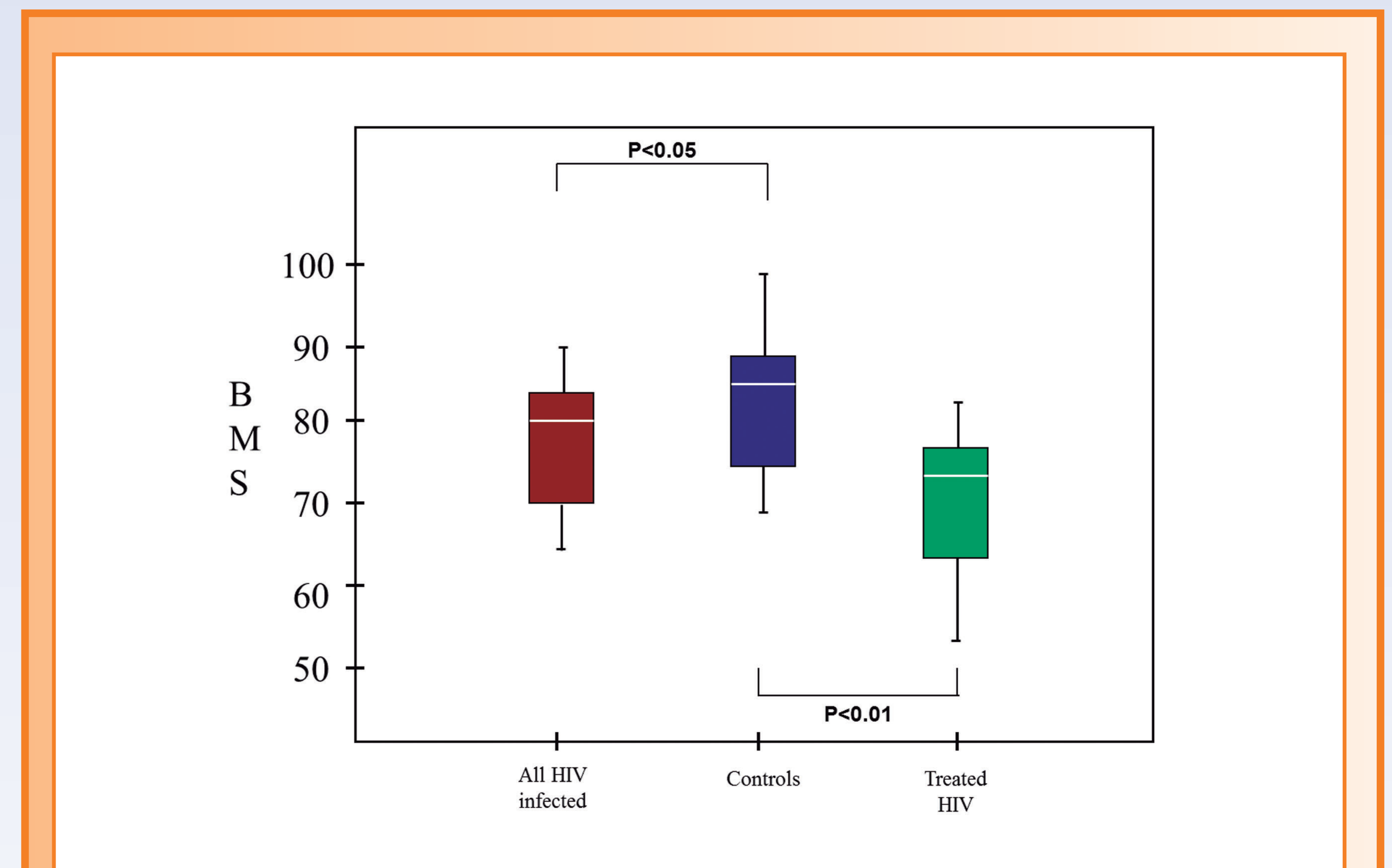


Fig.1. Microindentation values in HIV patients (all patients and treated patients) vs controls

Conclusions

Patients HIV infected have deterioration in bone material properties at a tissue level measured by microindentation and this effect seems more pronounced in those receiving ART. BMD values do not reflect this bone deterioration. BMS does not correlate with bone density reinforcing the concept that measures a different bone dimension.