



Fig. E-1  
Typical FTIR spectrum of bone. Spectra were analyzed with use of the carbonate peak (indicating carbonate substitution into hydroxyapatite) between 850 and 890  $\text{cm}^{-1}$ , the phosphate peak (mineral) between 900 and 1200  $\text{cm}^{-1}$ , and the amide I peak (matrix) between 1590 and 1720  $\text{cm}^{-1}$ .

TABLE E-1 Parameters of Bone Structure, Microarchitecture, Turnover, and Mineralization						
	Non-Low BMD (Group 1, N = 25)*	P Value, 1 vs. 2	Low BMD (Group 2, N = 18)*	P Value, 2 vs. 3	Controls (Group 3, N = 14)*	P Value, 1 vs. 3
Cancellous bone volume/tissue volume (%)	20.9 ± 4.41	0.001	14.9 ± 4.13	0.01	20.1 ± 4.12	>0.1
Trabecular separation ( $\mu\text{m}$ )	429 ± 86.3	0.001	620 ± 242	0.01	428 ± 69.1	>0.1
Trabecular thickness ( $\mu\text{m}$ )	114 ± 23.4	>0.1	100 ± 17.8	>0.1	107 ± 23.9	>0.1
Bone formation rate/bone surface area ( $\text{mm}^3/\text{cm}^2/\text{yr}$ )	1.34 ± 0.98	>0.1	1.41 ± 1.33	>0.1	1.97 ± 0.99	>0.1
Osteoid thickness ( $\mu\text{m}$ )	10.3 ± 4.23	>0.1	9.73 ± 3.87	>0.1	9.08 ± 3.49	>0.1
Mineralization lag time (d)	40.3 ± 39.3	>0.1	31.2 ± 16.1	>0.1	47.0 ± 29.8	>0.1
*The values are given as the mean and the standard deviation.						

TABLE E-2 Parameters of Bone Mineral Quality						
	Non-Low BMD (Group 1, N = 25)*	P Value, 1 vs. 2	Low BMD (Group 2, N = 18)*	P Value, 2 vs. 3	Controls (Group 3, N = 14)*	P Value, 1 vs. 3
Collagen crosslinking ratio	4.12 ± 0.46	<0.001	3.58 ± 0.33	>0.1	3.60 ± 0.30	<0.001
Mineral-to-matrix ratio	4.16 ± 0.39	>0.1	3.93 ± 0.61	>0.1	3.83 ± 0.44	>0.1
Carbonate-to-phosphate ratio × 100	1.04 ± 0.08	>0.1	1.03 ± 0.13	>0.1	1.09 ± 0.08	>0.1
Crystallinity	0.88 ± 0.04	>0.1	0.88 ± 0.08	>0.1	0.89 ± 0.03	>0.1
*The values are given as the mean and the standard deviation.						