



**Supplementary Figure 1.** No significant age differences in each category between the case series and the large cohort from AOANJRR.

Supplementary Table 1. BMI-associated change of microstructural parameters in SCB

Compartment	Parameter	Unadjusted		Age- and sex-adjusted	
		$\beta$ (95% CI)	P value	$\beta$ (95% CI)	P value
Predominant	BV/TV (%)	-0.343 (-0.668 to -0.018)	<b>0.039</b>	-0.469 (-0.821 to -0.118)	<b>0.009</b>
	Tb.Th ( $\mu\text{m}$ )	-0.001 (-0.002 to 0.000)	0.117	-0.001 (-0.003 to 0.000)	0.117
	Tb.Sp ( $\mu\text{m}$ )	0.000 (-0.003 to 0.002)	0.901	0.001 (-0.002 to 0.004)	0.669
	Tb.N (1/mm)	-0.001 (-0.012 to 0.011)	0.908	-0.005 (-0.017 to 0.007)	0.382
	SMI	0.021 (-0.011 to 0.054)	0.189	0.037 (0.004 to 0.069)	<b>0.026</b>
	DA	0.000 (-0.007 to 0.006)	0.877	-0.001 (-0.008 to 0.006)	0.829
	Conn.Dn (1/mm <sup>3</sup> )	6.692E-7 (0.000 to 0.000)	0.381	2.610E-7 (-1.388E-6 to 1.910E-6)	0.754
	BMD (mg/cm <sup>3</sup> )	-0.003 (-0.007 to 0.000)	0.083	-0.004 (-0.009 to 0.000)	<b>0.041</b>
	Medial	BV/TV (%)	-0.183 (-0.525 to 0.159)	0.291	-0.343 (-0.711 to 0.024)
Tb.Th ( $\mu\text{m}$ )		-0.001 (-0.002 to 0.001)	0.412	-0.001 (-0.001 to 0.001)	0.227
Tb.Sp ( $\mu\text{m}$ )		-0.001 (-0.003 to 0.002)	0.714	0.001 (-0.002 to 0.004)	0.655
Tb.N (1/mm)		0.003 (-0.008 to 0.015)	0.595	-0.002 (-0.014 to 0.011)	0.759
SMI		0.003 (-0.032 to 0.037)	0.885	0.017 (-0.019 to 0.052)	0.359
DA		-0.003 (-0.009 to 0.003)	0.377	-0.002 (-0.009 to 0.005)	0.601
Conn.Dn (1/mm <sup>3</sup> )		1.184E-6 (-3.472E-2 to 2.716E-6)	0.128	7.990E-7 (-8.809E-7 to 2.479E-6)	0.347
BMD (mg/cm <sup>3</sup> )		-0.002 (-0.006 to 0.002)	0.401	-0.003 (-0.008 to 0.001)	0.136
Lateral		BV/TV (%)	-0.015 (-0.327 to 0.297)	0.924	-0.131 (-0.473 to 0.210)
	Tb.Th ( $\mu\text{m}$ )	-0.001 (-0.002 to 0.000)	0.123	-0.001 (-0.003 to 0.000)	0.099
	Tb.Sp ( $\mu\text{m}$ )	-0.002 (-0.005 to -0.000)	0.100	-0.001 (-0.004 to 0.002)	0.379
	Tb.N (1/mm)	0.008 (-0.002 to 0.017)	0.111	0.003 (-0.008 to 0.013)	0.626
	SMI	-0.005 (-0.032 to 0.021)	0.696	0.005 (-0.024 to 0.033)	0.736
	DA	-0.001 (-0.008 to 0.007)	0.862	-0.002 (-0.010 to 0.007)	0.702
	Conn.Dn (1/mm <sup>3</sup> )	6.366E-7 (-1.084E-7 to 1.382E-6)	0.093	6.023E-7 (-2.285E-7 to 1.433E-6)	0.153
	BMD (mg/cm <sup>3</sup> )	0.000 (-0.004 to 0.003)	0.854	-0.002 (-0.006 to 0.002)	0.424

Dependent variable: microstructural parameters (continuous variable). Independent variable: BMI (kg/m<sup>2</sup>, continuous variable); Method: Linear regression. BMI=body mass index; SCB=subchondral bone; BV/TV=bone volume by tissue volume; Tb.Th=trabecular thickness; Tb.Sp=trabecular separation; Tb.N=trabecular number; SMI=structure model index; DA=degree of anisotropy; Conn.Dn=connectivity density; Bone mineralized density (BMD, mg/cm<sup>3</sup>).