

Supplement II

1. Measurement of volumetric bone mineral density (vBMD) and microarchitecture using high-resolution peripheral quantitative computed tomography (HR-pQCT)

vBMD and microstructure of the non-dominant distal tibia of the two women with bound feet were evaluated using HR-pQCT (XtremeCT, Scanco Medical AG, Switzerland). A standard scanning program was used and the respective region of interest (ROI) of the scanned tibia were automatically separated into cortical and trabecular compartments for calculating bone mineral density and microarchitecture of both trabecular bone and cortical bone (**Figure 1**). Hong Kong female Chinese population specific T-score at -2.5SD was used for diagnosis of osteoporosis.¹

Analysis: For HR-pQCT, both T and Z scores from distal tibia of the two women with bound feet were averaged for comparison with an age-matched reference database. Mean values for each SPS balancing tests parameter was also calculated by averaging results of the two bound feet women that were subsequently compared to age-matched controls from population database of HR-pQCT.

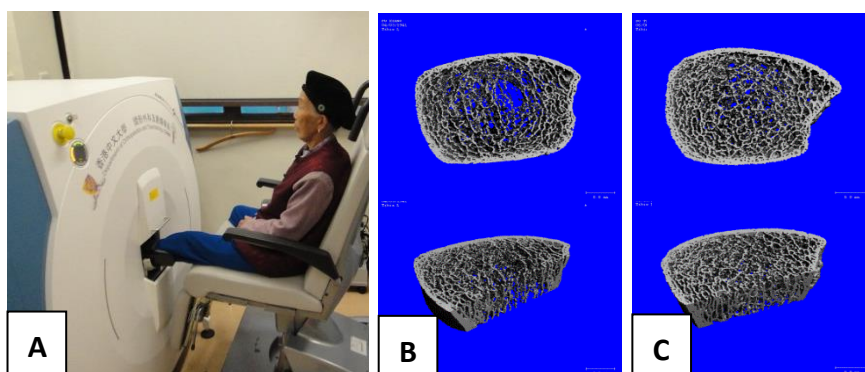


Figure 1 Bone assessment. Heel QUS measurement for a woman with bound feet (A), HR- pQCT scanning on lower limb (B), and 3-D HR-pQCT images of distal tibia showing inferior bone structural and density in woman with bound feet (C) and age- and gender-matched control with normal feet (D).

2. HR-pQCT Findings

Mean HR-pQCT values of volumetric BMD and microarchitecture in non-dominant distal tibia of two women with bound feet is compared with reference population database to calculate T- and Z-score and their percentage difference (**Table 1, Figure 2**). All parameters show inferior density and structural values in bound foot women, with large BMD differences in total trabecular BMD (Dtrab) (42.7%) and inner trabecular BMD (Dinn) (-90.5%) and large bone structural data in total trabecular bone volume fraction (tBV/TV) and total trabecular separation (tTb.Sp). Another

striking structural difference is seen in the total trabecular number (*tTb.N*) (36.0%), with a much lower value in women with bound feet. To be noted that the cortical vBMD (*Dcomp*) was much less affected as there was only 18.1% lower mean value as compared with the age and gender matched reference population database.

Table 1 Distal tibia HR-pQCT values obtained for bound feet women (BFW) compared to age and gender matched reference database values for bone geometry and microarchitecture

Distal Tibia	BFW	Reference Database (Age 60-79)	Difference (%)
Bone geometry			
Total Area (mm ²)	509.35	622.11±145.45	-18.1%
Ct. Area (mm ²)	71.65	88.08±32.76	-18.7%
Tb. Area (mm ²)	426.85	520.55±152.19	-18.0%
Bone mineral density and microarchitecture			
D100 (mg HA/cm ³)	184.7	230.68±74.05	-19.9%
Dcomp. (mg HA/cm ³)	768.10	782.58±90.89	-18.5%
Ct.Th. (mm)	0.815	0.91±0.38	-10.4%
Ct.Pm. (mm)	88.85	97.66±11.26	-9.0%
Dtrab. (mg HA/cm ³)	66.85	116.65±42.19	-42.7%
Dmeta. (mg HA/cm ³)	155.90	194.10±47.43	-19.7%
Dinn. (mg HA/cm ³)	6.05	63.96±43.34	-90.5%
tBV/TV	0.06	0.10±0.03	-42.3%
tTb.N	0.80	1.25±0.40	-36.0%
tTb.Th	0.07	0.08±0.03	-11.9%
tTb.Sp	1.20	0.77±0.32	56.3%

BF: Bound Foot; *Ct. Area*: Corticular Area; *Tb. Area*: Trabecular Area; *D100*: average vBMD; *Dcomp*: cortical density; *Ct.Th*: cortical thickness; *Ct.Pm*: cortical perimeter; *Dtrab*: trabecular density; *Dmeta*: meta-trabecular density; *Dinn*: inner-trabecular density (calculated from central 50% of the total trabecular bone area); *tBV/TV* total trabecular bone volume fraction; *tTb.N*: total trabecular number; *tTb.Th*: total trabecular thickness; *tTb.Sp*: total trabecular separation.

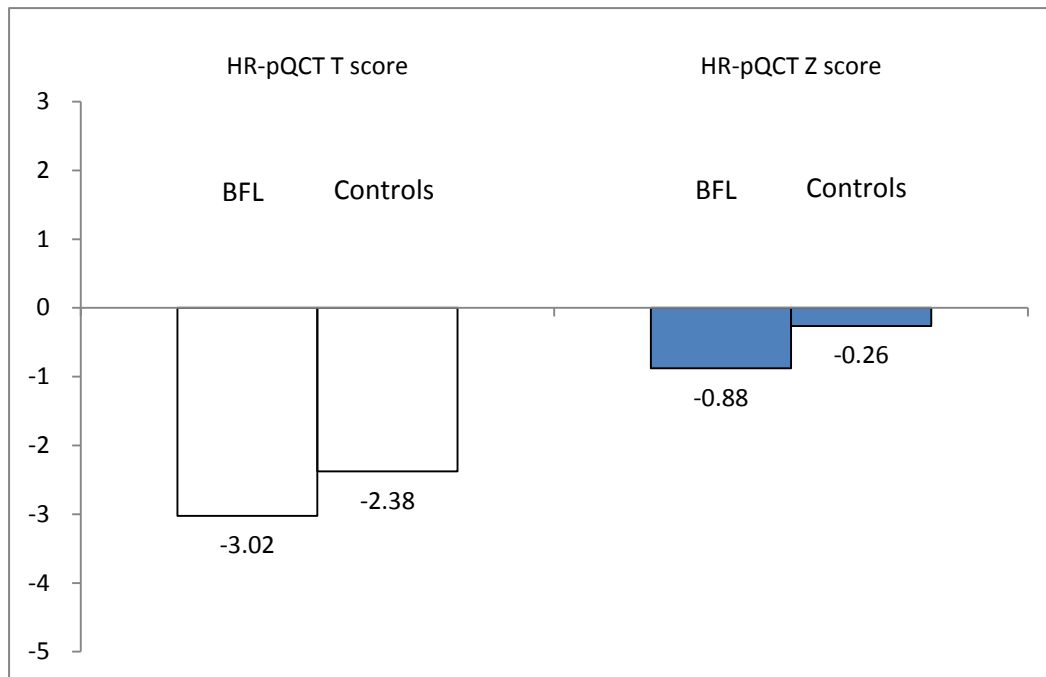


Figure 2 T- and Z-scores of (total or inner) trabecular BMD measured by HR-pQCT compared between the bound feet women (BFL) (mean of the two subjects) compared to the controls from the reference database. Osteoporosis (%): 2/2 (100%) in HR-pQCT trabecular BMD with T-scores set at -2.5 SD.

Key Reference

1. Tang XL, Qin L, Kwok AW, Zhu TY, Kun EW, Hung VW, Griffith JF, Leung PC, Li EK, Tam LS. Alterations of bone geometry, density, microarchitecture, and biomechanical properties in systemic lupus erythematosus on long-term glucocorticoid: a case-control study using HR-pQCT. *Osteoporos Int* 2013; 24(6):1817-26.