

Assessing Age, Sex, and Racial Differences in Cortical Porosity Requires Adjustment for Site-Specific Variation in the Selected Region of Interest

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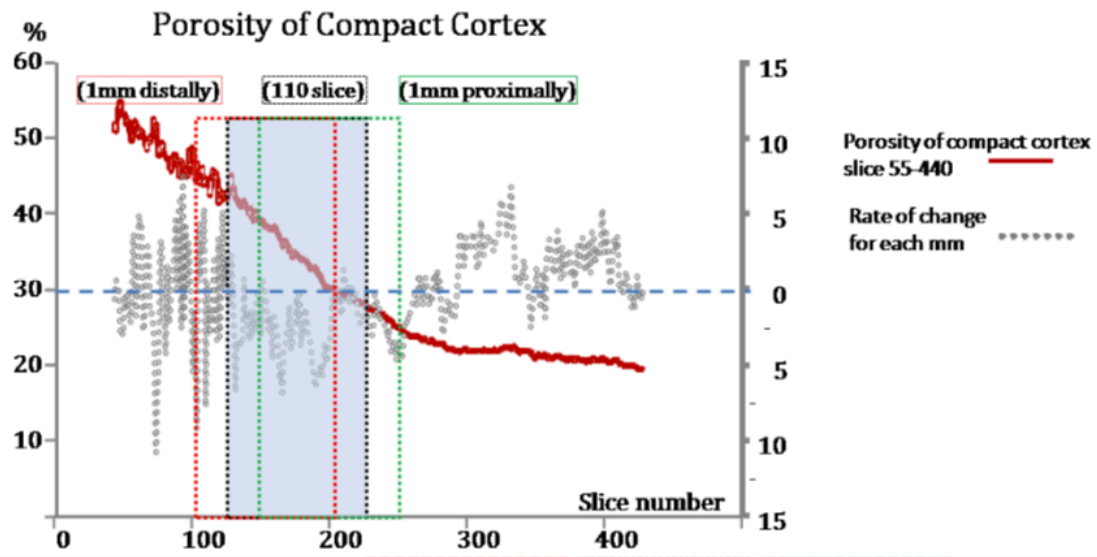
High-resolution peripheral quantitative computed tomography (HR-pQCT) measures micro-architecture in a region of interest (ROI) at the distal radius and tibia. Bone width and micro-architecture vary slice by slice along the length of a bone so differences in micro-architecture by age, pubertal stage, sex and racial group may be the result of differences in the placement of the ROI rather than the characteristics of the subjects.

To assess the slice-by-slice variation in cortical porosity of radius, 18 radii scanned as standard ROI and extended to 9.02 mm distally and 18.04 mm proximally(440 slices).We used Strax 1.0 software to assess slice by slice of total cortex, compact cortex, and transitional zone porosity for whole 440 slices.

We found 1 mm replacing ROI distally, in comparison with standard ROI, produce 2.02, 3.49, and 0.61% increment on the measured porosity of total cortex, compact cortex and transitional zone, respectively, however replacing 1 mm proximally produce 2.8, 4.8, and 0.50% reduction.

We infer that a more distal ROI has a significant effect on cortical porosity measurement particularly compact cortex porosity which may result in erroneous age, sex and racial differences being reported.

This variation needs to be considered when interpreting data in persons who differ in bone length.



	2mm Distally (Mean \pm SD)	1mm distally (Mean \pm SD)	Default (9.02mm from endplate) (Mean \pm SD)	1mm proximally (Mean \pm SD)	2mm proximally (Mean \pm SD)
Porosity of total cortex(%)	46.5 \pm 5.0	44.6 \pm 5.1	43.2 \pm 5.2	41.9 \pm 5.3	40.5 \pm 5.4
Porosity of compact cortex(%)	40.0 \pm 4.9	38.3 \pm 5.1	36.3 \pm 5.2	34.7 \pm 5.3	32.9 \pm 5.4
Porosity of transitional zone(%)	62.2 \pm 3.5	61.8 \pm 3.6	61.4 \pm 3.7	61.1 \pm 3.8	60.7 \pm 3.9
Cortical area	70.9 \pm 16.5	72.2 \pm 17.7	73.8 \pm 18.8	75.13 \pm 19.7	81.9 \pm 20.6