

## Oral Abstract

OR22

### **Age-related bone loss is predominantly intracortical, not endocortical or trabecular in origin**

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Vertebral fractures (fx) and trabecular bone loss are flagships of osteoporosis but 80% of fx are non-vertebral and 80% of bone is cortical. Using high resolution HR-pQCT (distal radius) in 123 women aged 20 to 91 yr, specimens from 12 women aged 29 to 87 yr measured using HR-pQCT (Viva-CT, 12 $\mu$ m resolution) and scanning electron microscopy (SEM) at the subtrochanteric region, we report that before menopause there was ~25% (0.6 versus 0.5m) more surfaces in trabecular than cortical bone. By the 6<sup>th</sup> decade there was ~ 4 times (1.9 versus 0.46m) more intracortical than trabecular surface, by the 7<sup>th</sup> decade ~ 6 fold more (2.28 v 0.4 m) and mostly intracortical surface by the 8th decade. As after menopause there was still more trabecular surface, diminution in bone was more trabecular than cortical 57% versus 43% ( $p < 0.05$ ). However, trabecular loss diminished to 30% of total at the 7<sup>th</sup> decade and 10% at the 8<sup>th</sup> decade. Thus, 68% of all loss was cortical, 70% of this occurred in the 7<sup>th</sup> decade, only 16% of bone loss was perimenopausal. Of the total loss, ~50% occurred by trabecularization of the cortex not endocortical resorption (3D mapping of pores show that they communicate with cortex, not marrow). This process led to cortical thinning and replacement of trabeculae by trabecularized cortical bone containing osteons in the marrow. By the 8th decade, ~70% 'trabecular' bone was cortical in origin (shown by SEM). Age-related bone loss and cortical thinning are largely intracortical not endocortical or trabecular.