and fracture risk independently of BMD. FRAX estimates the 10-year probability of major osteoporotic fracture (MOF) using risk factors that act independently of femoral neck BMD. A simple arithmetic adjustment to FRAX major osteoporotic probability based upon lumbar spine TBS has recently been developed: adjustment ratio $= 4.807 - 0.0342 \times \text{age} - 2.801 \times \text{TBS} + 0.0235 \times \text{age} \times \text{TBS}$.

Methods: We assessed the impact of the lumbar spine TBS adjustment on FRAX on fracture prediction in 27,554 women age 40–100 years (mean 63 years) with baseline spine and hip DXA (Prodigy, GE Healthcare), FRAX MOF probability estimates including femoral neck BMD (Canadian tool, version 3.7), blinded lumbar spine TBS measurement (TBS iNsight® version 1.8, Med-Imaps), and 5+ years of observation (to March 31, 2011). Improvement in risk categorization with lumbar spine TBS was assessed using the integrated discrimination improvement (IDI) and net reclassification improvement (NRI) for three national clinical practice guidelines: the National Osteoporosis Foundation (NOF) for the U.S., the Osteoporosis Canada guidelines, and the National Osteoporosis Guideline Group (NOGG) for the UK.

Results: During mean 8 years of follow up, 2332 women sustained one or more MOF. There was a complementary role of lumbar spine TBS (as tertile) and MOF probability (as low <10 %, moderate 10–19 % and high 20 % or greater) (Figure), with a significant linear trend in MOF risk across TBS tertiles (all $p < 0.001$). The mean lumbar spine TBS adjustment ratio was 0.99 ± 0.16 (10th percentile 0.81, 90th percentile 1.19). The IDI sensitivity showed a significant increase overall (+0.4 %, $p < 0.001$) without any change in specificity (0.0 %, $p = 0.309$). The overall improvement in IDI was +0.5 % ($p < 0.001$). Use of the lumbar spine TBS adjustment resulted in a significant overall improvement in risk classification based upon the NRI under the NOF treatment guideline (+1.6 %, $p = 0.018$), the NOGG criteria (+1.6 %, $p = 0.022$) and the Canadian guideline (+3.4 %, $p = 0.001$). Similar trends were seen in women <65 vs. >65 years.

Figure Major osteoporotic fracture rate (per 1,000 person years) stratified by 10-year fracture probability (without lumbar spine TBS adjustment) and lumbar spine TBS tertile.
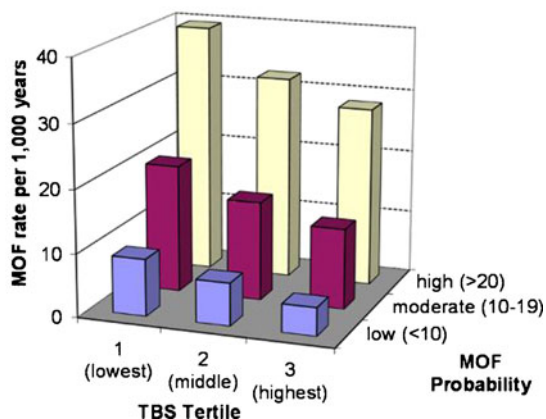
Conclusions: An incremental improvement in major osteoporotic fracture prediction was seen by using lumbar spine TBS in combination with FRAX probability. The improvement in risk classification does not appear to be specific to a particular clinical practice guideline, as it was observed using guidelines from three different countries.

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PREVALENCE OF OSTEOPOROSIS AND ITS ASSOCIATED FACTORS IN A TAIWANESE METROPOLITAN ELDERLY POPULATION
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Aims: The aim of this study was to estimate the age- and sex-specific prevalence of osteoporosis using DXA and to determine the associated factors of osteoporosis in older Taiwanese metropolitan persons.

Methods: A cross-sectional study was conducted in older persons in Taichung City in 2009. A total of 711 elders (294 females and 417 males) aged 65–98 years old were recruited. BMD at central sites was measured by DXA. A whole-body scan was performed on each subject lying supine.

Results: The age-standardized prevalence rates of osteoporosis for women were 35.4 %, 15.0 %, and 21.1 % and for men were 15.1 %, 0.7 %, and 9.8 % at the total hip, lumbar spine, femoral neck, respectively. After multivariate adjustment, age, gender, BMI, weight, and smoking were found to be significantly associated with osteoporosis. The odds ratios (95%CI) were as follows: 0.28 (0.16–0.49) for males; 2.13 (1.15–3.97), 1.96 (1.01–3.80), and 3.09 (1.5–6.37) for 70–74, 75–80, and >80 years, respectively; 0.21 (0.08–0.53), 0.23 (0.08–0.71), and 0.19 (0.05–0.74) for BMIs of 18.5–24, 24–27, and ≥27, respectively; 0.35 (0.18–0.69) and 0.41 (0.19–0.89) for weights of the 1st to 4th quartiles, respectively; and 2.38 (1.09–5.15) for smoking.

Conclusions: Osteoporosis was most common at the total hip and least common at the lumbar spine in both women and men. Programs for osteoporosis screening should aim at older persons who were female, or who have low BMIs, low weights, and a smoking habit.