

M-R. LIN, H-F. HWANG, H-D. LEE. Performance of quantitative ultrasound on identifying low bone density in older people. *Gerontechnology* 2010;9(2):302; doi:10.4017/gt.2010.09.02.149.00

Purpose Quantitative ultrasound (QUS) can be used to evaluate the fracture risk, as well as to identify patients who may benefit from treatment, axial site dual-energy X-ray absorptiometry (DXA), or biological marker assays¹. However, the physical reality that underlies QUS parameters remains a matter of debate, and the relationship between QUS parameters and DXA BMD is still controversial². This study examined criterion, convergent, and discriminant validities of QUS for identifying low bone density among people age ≥ 55 years in Taiwan. **Method** We recruited 453 community-dwelling subjects and 30 lower-extremity fractures patients. Bone density was assessed using both calcaneal QUS and femoral neck dual-energy X-ray absorptiometry (DXA). Two parameters of the QUS, speed of sound (SOS) and broadband ultrasound attenuation (BUA), were also used to estimate heel bone mineral density (HBMD). **Results & Discussion** Using DXA as the criterion for identifying low bone density (DXA T-score ≤ -1.0), likelihood ratios of BUA and SOS at the 50th percentile and the HBMD for males were 1.50, 1.75, and 1.28, respectively; the counterparts for females were 1.54, 2.13, and 1.29. As for identifying osteoporosis (DXA T-score ≤ -2.5), higher likelihood ratios of the three QUS parameters were gained. For convergent validity, Pearson's correlation coefficients of the DXA with BUA, SOS, and HBMD ranged from 0.40-0.43 for males and from 0.48-0.53 for females. For ability to discriminate male or female subjects with lower-extremity fractures from those without, no significant differences in the area under the receiver operating characteristic curve (AUC) were detected between the BUA, SOS, and HBMD and DXA, after adjusting for age, body mass index, falls history, and current smoking (*Figure 1*). QUS had acceptable convergent and discriminant validities but poor criterion validity compared to DXA.

References

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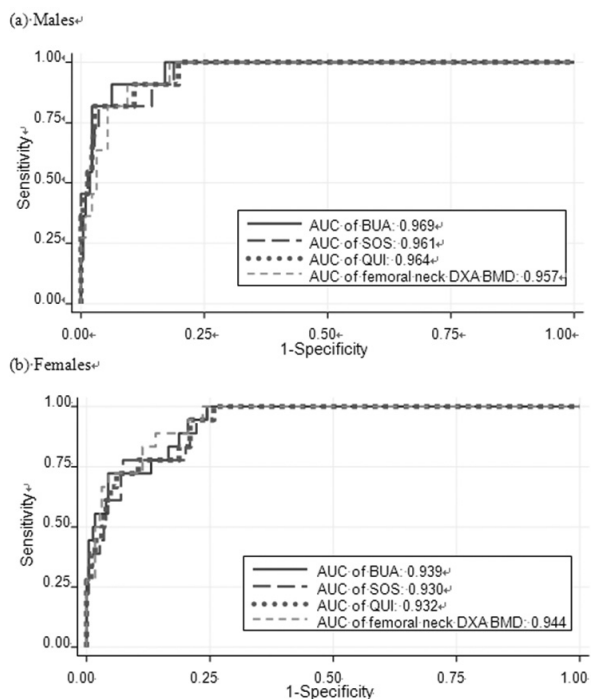


Figure 1. Area under the receiver's operating characteristics curve (AUC), with adjustment for age, body mass index, falls history in the past year, and current smoking status