

## 017 -Calcaneal DXA and ultrasound: comparison of DXL Calscan, Lunar PIXI and Hologic SAHARA instruments

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DXL Calscan is a new bone scanner for the determination of calcaneal BMD. The instrument supplements X-ray absorption measurement with a laser measurement of total heel thickness, and thereby, can theoretically reduce the uncertainty related to variable composition of soft tissue. For Calscan, we investigated its precision, agreement with Lunar PIXI, and ability to predict BMD in proximal femur, lumbar spine and total body. For comparison, Hologic SAHARA ultrasound scanner was tested, too.

*Methods:* For 39 subjects (age  $59.6 \pm 9.2$  years, 18 men, 21 women), DXA measurements using DXL Calscan and Lunar PIXI as well as ultrasound measurements with Hologic SAHARA were conducted. BMD in the femoral neck, lumbar spine (L2-L4) and total body was determined using Lunar DPX-IQ axial DXA scanner. In addition, 24 subjects were measured with Calscan three times to indicate the short-term precision of the instrument.

*Results:* The in vivo precision (CV%) of DXL Calscan was 1.24 (standardized CV% = 1.51). Calcaneal BMD values by Calscan were 19% lower than those of PIXI ( $0.452 \pm 0.093$  g/cm<sup>2</sup> vs.  $0.559 \pm 0.118$  g/cm<sup>2</sup>,  $p < 0.01$ ). Interestingly, the difference of BMD-values by Calscan and PIXI increased as a function of body mass index (BMI) ( $r = -0.43$ ,  $p < 0.01$ ,  $n = 38$ ). However, a high linear correlation between Calscan and PIXI BMDs was revealed ( $r = 0.84$ ,  $p < 0.01$ ,  $n = 39$ ). Both instruments predicted equally well axial BMD in femur, spine and total body ( $r = 0.73-0.86$ ,  $P < 0.01$ ,  $n = 39$ ), and more accurately than BUA or SOS by SAHARA ( $r = 0.54-0.67$ ,  $P < 0.01$ ,  $n = 39$ ). Mean heel thickness, as measured with Calscan, was  $5.3 \pm 0.4$  cm.

*Conclusion:* In vivo precision of the DXL Calscan measurements was similar to that of Lunar PIXI (CV% <1.5). Also, both instruments predicted axial BMD equally. The BMD-values of Calscan were lower than those of PIXI, especially in subjects with high BMI. This suggests that the elimination of soft tissue effects is different in these instruments. Theoretically, the elimination should be more accurate in Calscan, equipped with a laser measurement of total heel thickness and, thereby, enabling correction for both lean and adipose tissue.