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P- 400

ASSESSMENT OF BONE MINERAL DENSITY OF THE CALCANEUS IN HEALTHY SWEDISH 7-YEAR OLD CHILDREN BY DXL CALSCAN

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A debated issue in bone research is the optional techniques to determine bone mass in growing children. Dual X-ray and Laser (DXL) Calscan measures areal bone mineral density (BMD) by using dual X-ray absorptiometry in combination with laser measurement of the total heel thickness. This technology reduces the uncertainty related to variable composition of soft tissue in adults. The DXL Calscan is portable, easy to use, has a short measurement in time and gives low absorbed dose (<0.12microSv).

Aim: To investigate: 1) if the device was tolerated by children 2) if BMD could be measured with good accuracy 3) if BMD was related to height, weight and body mass index (BMI) at the time of measurement and 4) to create a reference material in 7y old children in a cross-sectional study.

Methods: The DXL Calscan was modified for children with a lower absorbed dose and adapted software. 112 healthy children (57 boys, 55 girls, mean age 7.5y) were included. The left foot was scanned, the actual lenhth, weight and foot length was measured. A questionnaire comprised physical activity, milk intake, osteoporosis in relatives, weight and height 1y of age.

Results: The intra-individual CV measured by 2 repeated measurements on 27 subjects was 2.44 % for BMD and 2.61 % for bone mineral content (BMC). The mean values for the weight of the subjects was 27.1±5.4 kg, length 127.2±5.7cm, BMI 16.6±2.3kg/m2, foot length 197.9±11.5 mm, calcaneus thickness 40.4±3.4 mm and calcaneus height 33.8±2.5 mm. The mean BMD in the subjects was 0,3±0.05 g/cm2 and BMC 0.22±0.04 g. Girls showed higher BMD than boys ($p<0.05$). BMD was significantly correlated to weight, BMI, foot length, height and calcaneus height ($p=0.001$). Weight at 1y correlated to BMD ($p=0.016$). No significant correlation was found between BMD and physical activity, milk intake and osteoporosis relatives.

In conclusion, the measurements were well tolerated and easily performed and this study shows reference values for BMD in calcaneus in 7y old Swedish children. Further studies are required to evaluate this method.