Reference values for bone mass and density of the lumbar spine for children 6 to 36 months of age.

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Dual-energy x-ray absorptiometry (DXA) is widely used for measuring bone mineral content (BMC) and density (BMD) to aid the assessment of bone health in children. Currently, there are no reference values of bone mass and density for children 6 to 36 months of age that can be used as a standard for comparison. The aims of this project were: 1) to recruit 200 healthy children 6 to 36 months of age (100 boys, 100 girls); 2) to determine if there are age and sex differences in BMC and BMD of the lumbar spine; and 3) to develop age-specific BMC and BMD reference values based on current generation DXA technology. Eligibility criteria were weight and length between the 5th to 95th percentiles for age, normal gross motor skill attainment, and absence of health conditions known to affect BMC. A DXA scan of the lumbar spine was obtained by a Hologic QDR4500A densitometer, and analyzed by software version 12.4 to give measurements of bone area, BMC and BMD. A total of 52 subjects were recruited (27 girls, 25 boys), a DXA scan was not obtained on 4 subjects because of intense crying, and a "usable" DXA scan (no movement) was obtained on 37 subjects. The likelihood of a "usable" scan increased with age: 57% of infants 6-18 months of age vs. 88% of infants 18-36 months of age. Bone area, BMC and BMD increased linearly with age ($P<0.001$). Bone area and BMC were smaller in girls than in boys ($p< 0.001$), but there was no sex difference in BMD. Reference ranges for bone measures should be developed separately for boys and girls and should be age specific. The utility of developing reference DXA data for infants < 18 months of age is questionable.