

Developmental Pediatrics Abstracts

Title: BONE MINERAL DENSITY IN CHILDREN WITH CONGENITAL SPINAL DYSFUNCTION

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Background: Few studies exist on bone mineral density (BMD) in children with congenital spinal dysfunction; none examine lower extremity BMD. Acquiring quality scans in this population presents technical challenges due to hip and spine deformities. The lateral distal femur (LDF) is an alternative site used to measure BMD in children with disabilities. This study examines factors that may affect BMD.

Method: Sixty-four children (36 female) 3-21 years (mean 12.3) with congenital spinal dysfunction were enrolled in the study. The following was obtained on each subject: health survey including ambulatory status (full, partial, non), fracture and bladder augmentation history; physical exam including Tanner stage and neurologic level (high=above L3, mid=L3-L4, low=L5 and below); and dual energy x-ray absorptiometry (DXA) of the LDF. BMD results were reported as Z-scores for three regions of interest (metaphyseal, metadiaphyseal and diaphyseal). Multivariate analyses were performed to examine relationships between LDF BMD and the other variables.

Results: LDF scans were obtained on all subjects. BMD Z-scores at all regions differed significantly by ambulatory status (21 full, 22 partial) and level (25 high, 23 mid). The relationships were strongest for ambulatory status ($p=0.00$).

Mean BMD Z-scores were lowest in the non-ambulatory group ($R1= -3.7$, $R2= -3.0$, $R3= -3.2$), followed by subjects who were Tanner 5, and those with high neurologic levels. Twenty-three individuals were Tanner 5 and only 3 had normal BMD values in all regions. Ten subjects had bladder augmentation and 21 sustained fractures; no significance was noted.

Conclusion: The LDF is a reliable DXA site to measure in children with congenital spinal dysfunction. Reduced BMD is a complication seen in these children, particularly for those with no ability to ambulate. A high neurologic level or Tanner 5 are also risk factors for low BMD. There is no significant correlation between LDF BMD and gender, fracture or bladder augmentation history.