



Optimal monitoring time interval between DXA measures in children

N° 220 - January 2012

The monitoring time interval (MTI) is the expected time in years necessary to detect a significant change between two measures that exceeds the measurement error. The aim of this paper [1] was to determine MTI values for dual X-ray absorptiometry (DXA) scans in normal children according to age, sex, and skeletal sites.

2014 children were enrolled in this study with seven annual bone mineral density measurements of spine, hip, 1/3 radius, femoral neck and total body less head (TBLH) along with bone mineral content of spine and TBLH from 2002 to 2010. DXA precision errors were obtained with a subgroup of 155 children that had duplicate scans.

The MTI values were significantly under 1 year for the TBLH and spine BMD, for boys <17 years and girls <15 years. The hip and one third radius MTIs were around 1 year in these groups.

MTI minimum values were around 3 months during the peak growth years. On the contrary, MTI values in the late adolescence for all regions became longer and nonsensical as each region neared the age of peak bone density.

The authors conclude that DXA precision errors and annual rates of change for BMD and BMC in children vary with region of interest, age, and sex. Resulting MTI measures are similar for boys and girls below puberty and provide useful guidelines for scanning intervals. For older adolescents, some other clinical criteria must be used to determine DXA scanning intervals.

1. Shepherd JA et al. *J Bone Miner Res.* 2011;26:2745-2752.

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Bone mineral content (BMC) and bone mineral density (BMD) are usually measured by dual X-ray absorptiometry (DXA). The monitoring time interval (MTI) represents the minimum time between two measures allowing to observe significant bone values change. MTI is the ratio of 2.77 times DXA precision errors by the median annual BMC or BMD change. At variance with healthy adults, BMC and BMD of healthy children increase during growth. The authors showed that spine and total body less head (TBLH) are preferred sites of measure because of greater increase in BMD or BMC between 6 and 14 years in girls, and 6 and 16 years in boys, reducing MTI values. BMD variations of radius and femoral neck is lower, increasing MTI values around 1 year.

