Lumbar spinal canal dimensions

Developmental size of the spinal canal is measured at the mid-pedicular level removed from any acquired narrowing that occurs at the discovertebral level.

Geographic, racial and gender differences in developmental size of the spinal canal do exist such that each region, race and gender should have its own reference range [1]. Such normative reference data will become routine with the automated availability of quantitative spinal canal size data during routine MR spine examination [2] [3] [4] [5].

Considerable variability exists in normal developmental lumbar spinal canal size. This impacts the likelihood of neural compromise. Spinal canal development is complete by 17 years. As diseases incurred thereafter do not knowingly affect the developmental size of the spinal canal, it is reasonable to use a selected population undergoing abdominopelvic computed tomography (CT) examination to determine developmental lumbar spinal canal size.

Study approval was granted by the Clinical Research Ethics Committee. Between Feb 2014 and Jan 2015, mid-vertebral spinal canal cross-sectional area (CSA), depth, width, and vertebral body CSA at each level from L1-L5 was measured, using a semi-automated computerized method in 1,080 ambulatory patients (540 males, 540 females, mean age, 50.5±17 years). Patient height and weight was measured.

A reference range for developmental lumbar spinal canal dimensions was developed at each lumbar level for each sex. There was a 34% variation in spinal canal CSA between smallest and largest quartiles. Developmental spinal canal CSA and depth were consistently smallest at L3, enlarging cranially and caudally. Taller people had slightly larger lumbar spinal canals ($P<0.0001$). Males had larger spinal canal CSAs than females though relative to vertebral body CSA, spinal canal CSA was larger in females. There was no change in spinal canal CSA with age, weight or BMI ($P<0.05$).

A population reference range for developmental lumbar spinal canal size was developed. This allows one to objectively determine the degree of developmental spinal canal stenosis present on an individual patient basis [6].

The aim of a study of Karantanas et al., was to investigate the correlation of vertebral dimensions with somatometric parameters in patients without clinical symptoms and radiological signs of central lumbar spinal stenosis. One hundred patients presenting with low back pain or sciatica were studied with CT. In each of the L3, L4 and L5 vertebra three slices were taken with the following measurements: 1. Slice through the intervertebral disc: (a) spinal canal area; (b) interarticular diameter; interligamentous diameter. 2. Slice below the vertebral arcus: (a) dural sac area; (b) vertebral body area. 3. Pediculolaminar level: (a) anteroposterior diameter and interpedicular diameter of the spinal canal; (b) spinal canal area; © width of the lateral recesses. The Jones-Thomson index was also estimated. The results of the present study showed that there is a statistically significant correlation of height, weight and age with various vertebral indices. The conventional, widely accepted, anteroposterior diameter of 11.5 mm of the lumbar spinal canal is

independent of somatometric parameters, and it is the only constant measurement for the estimation of lumbar spinal stenosis with a single value. The present study suggests that there are variations of the dimensions of the lumbar spinal canal and correlations with height, weight and age of the patient [7].

For those patients with lumbar spinal canal stenosis, who do not improve with conservative care, surgery is considered an appropriate treatment alternative. The primary objective of surgery is to reconstitute the lumbar spinal canal.

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