

Purpose: To use diffusion tensor imaging (DTI) to visualize and evaluate normal fractional anisotropy (FA) and apparent diffusion coefficient (ADC) values of the sciatic nerve in four volunteers at 3T.

Methods: Initially, T1-weighted axial anatomic reference images were performed for anatomic reference (TR/TE, 641/10; flip angle 90 degrees; field of view, 128 mm; number of signal averages(NSA) of 2. Next, single-shot spin-echo echo-planar DTI sequences were performed with parameters: TR/TE, 5300/69; flip angle 90 degrees; field of view 16 cm; matrix size 128 x 128; 2 NSA ; slice thickness 4 mm; number of slices, 40. Diffusion weighting with a b value of 1,000 s/mm² was applied in 32 different directions. Total required imaging time was approximately 15 minutes.

Image data was transferred to a workstation and fiber tracking was performed with Philips advanced tractography software available on the scanner and workstation. Color coded maps demonstrating the sciatic nerve were used to place circular regions-of interest were then drawn over the nerve location demonstrated on the color coded maps to determine FA and ADC

Results: In four volunteers (all males, average age = 40) the sciatic nerve was well visualized and had an average SD FA of 0.520.20and ADC of ACD of 0.780.38.

Conclusions: Normal FA and ADC values of the sciatic nerve could be measured using DTI and fiber tracking. Further studies are needed but these results suggest that FA and ADC can potentially be used to evaluate peripheral neuropathy and be used in patient follow-up.