SUPPLEMENTAL MATERIAL

Supplemental methods

Methods to define the location of regions of interest (ROI)
To place the ROI on the contralateral hemisphere, we used maps in which the preferential direction of diffusion was color-coded (green=anterior-posterior, blue=dorso-ventral and red=latero-median orientation). These maps allowed us to define three ROIs in the contralateral hemisphere in which the preferential direction of diffusion was homogeneous. These ROIs were then mirror-copied on the ipsilateral hemisphere based only on structural landmarks visible on b=0 images, so as to avoid any influence of the homogeneity of the preferential direction of the diffusion, which might bias the placement of the ROI on the ipsilateral side (see supplemental figure S2 http://stroke.ahajournals.org).

Analysis of the homogeneity of the local preferential direction of diffusion
For the analysis of the preferential direction of diffusion, we analyzed the DTI-MR images using an approach similar to that developed by Wu and colleagues 1. To obtain a quantifiable index of the preferential direction of diffusion, we generated maps of the Angle of projection of the First Eigenvector (AFE) in the coronal plane (see supplemental figure S2 http://stroke.ahajournals.org). The ipsi- and contralateral ROIs, previously defined on the color maps, were transposed on these AFE maps and the SD of these angles within the ROIs were calculated.

Maps of the local homogeneity of the AFE
The SD of the AFE in the neighborhood of each pixel was calculated (where the local area includes the pixel itself and its 8 neighborhood). The color scale of the resultant maps is inverted so that its intensity matches that of FA maps (the clearest values represent a lower SD values in contrast with the darker pixels which present a higher SD).

Fiber tracking parameters
To determine a quantifiable index of the impact of localized alterations in the WM on the fibers network, we performed a fiber-tracking analysis with MedINRIA® software 2. We have fixed the FA threshold to 0.2, the minimal length of bundles to 10mm, and the smoothness at 20. The number of tracked bundles so defined was classified according to their length.

Correlations
For the correlation study between white matter (WM) alterations and behavioral deficits, we have used first the significant persistent deficits determined by the behavioral tests in the chronic stage (D41 or W7, in % of deficits). These data were correlated to significant WM disturbances at the chronic stage (the SD of AFE in the ipsilateral ROIs and the significant numbers of bundles lost compared to the contralateral one).
Supplemental figure 1: Experimental design of MRI protocol. MCAO= middle cerebral artery occlusion
Supplemental figure 2: A colors maps: indicated the preferential direction of diffusion (green=anterior-posterior, blue=dorso-ventral and red=latero-median orientation). B: representation of the projection of the first eigenvector $\epsilon_1$ on the coronal plan which defines the angle $\theta$. C: $\theta$ values maps on which the standard deviation (SD) of $\theta$ was calculated.
Supplemental references
