**Supplementary Online Material:**

**Figure S1. Sagittal reconstructed FA map derived from diffusion tensor imaging (A) and angio MR acquisition of the circle of Willis (B).** There is an interruption of the corticospinal track at the junction between the pons and the medulla oblongata (white arrow). The angio MRI discloses a persistent occlusion of the basilar artery at this level, with recirculation in its upper part through the posterior communicating arteries.

**Video S1.** Clinical examination revealed spontaneous vertical eyes movement (downward fast movement) corresponding to an eye bobbing. Horizontal and vertical oculocephalic reflexes were abolished.

**Video S2.** After several attempt, the patient became able to follow visual targets moving vertically (day 16). In this video we used a mirror, as visual pursuit of one's own gaze has been shown to be one of the most efficient visual target.

**Video S3.** The patient became able to follow symbolic instructions delivered implicitly through a large arrow drawn on a slate pointing downward or upward (day 20). The short reaction time and the consistency (12 successive trials with a 100% accuracy in this video) of this behaviour were in favour of intentional conscious behaviour (see text for discussion of this issue).