Tractography

Tratografia

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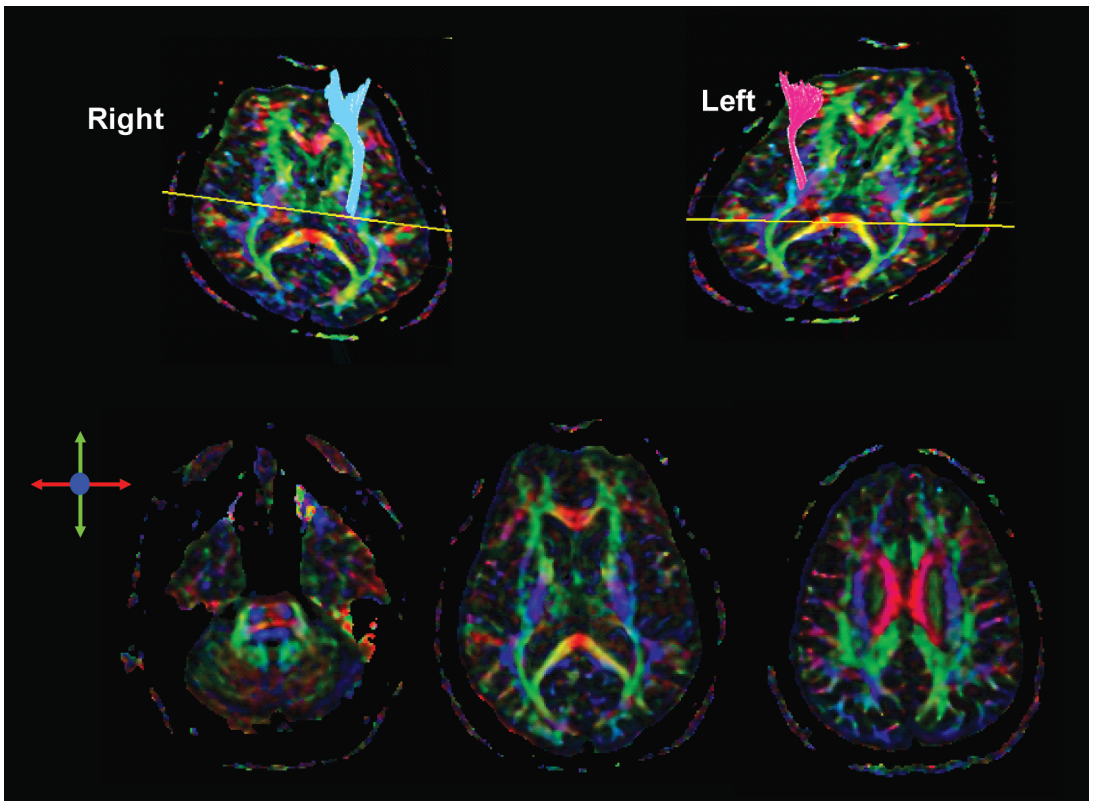

Figure 1. Corticospinal tract

Tractography is a new magnetic resonance technique that enables mapping and, consequently, evaluation of different white matter tracts in the central nervous system. It encompasses acquiring a sequence called diffusion tensor imaging in a common 1.5 or 3 Tesla magnetic resonance equipment, independently or associated to conventional images of the study[1-3].

The acquired images are post-processed using several types of software – some are available online for free. The same acquisition of images allows calculating quantitative parameters, such as fractioned anisotropy (FA) and apparent diffusion coefficient (ADC), which interfere in white matter integrity, in addition to providing several maps, such as color map, identifying the orientation of diverse white matter tracts.

Some of the most common clinical applications are: the study of white matter tracts and their topographic relation with tumors and infarctions; the study of the pathophysiology of white matter injuries, such as multiple sclerosis and lateral amyotrophic sclerosis; cerebral palsy; epilepsy.

Figure 1 shows in the first line the three-dimension reconstruction of the corticospinal tracts in a normal

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individual (blue on the right and pink on the left) from the motor cortex up to the posterior arm of the internal capsule. In the second line, there are images of color maps in three levels, showing the identification of white matter different tracts, limited by different orientations of water diffusion in the brain. Color codification demonstrates the latero-lateral orientation of fibers in red, anteroposterior orientation in green and craniocaudal in blue.

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