

# Corticospinal tract displacement due to a large malformation during cortical development

Carla Anciones<sup>1</sup>, Rafael Toledano<sup>1,2</sup>, Juan Álvarez Linera<sup>3</sup>,  
Angel Aledo-Serrano<sup>1</sup>, Irene García-Morales<sup>1,4</sup>,  
Antonio Gil-Nagel<sup>1</sup>

<sup>1</sup> Epilepsy Unit, Neurology Department, Hospital Ruber Internacional, Madrid, Spain

<sup>2</sup> Epilepsy Unit, Neurology Department, Hospital Ramón y Cajal, Madrid, Spain

<sup>3</sup> Epilepsy Unit, Neuro-radiology Department, Hospital Ruber Internacional, Madrid, Spain

<sup>4</sup> Epilepsy Unit, Neurology Department, Hospital Clínico San Carlos, Madrid, Spain

Received August 10, 2020; Accepted August 12, 2020

**Key words:** epilepsy surgery, functional neuroimaging, cortical dysplasia, MRI, fMRI

A 24-year-old woman with refractory focal epilepsy was evaluated for epilepsy surgery. MRI showed an extensive malformation of cortical development (MCD) that involved the right perisylvian region and compromised the motor gyrus (*figure 1*). Functional MRI showed an abnormal location of the motor function with anterior displacement of the pyramidal tract on diffusion tensor imaging tractography (*figure 2*). Motor mapping using stereoelectroencephalography confirmed these findings. Large MCDs can potentially distort the normal anatomy of the major white tracts (Widjaja *et al.*, 2007; Hong *et al.*, 2017). In this scenario, when evaluating for epilepsy surgery, functional neuroimaging could help in performing a safer resection. □

## Acknowledgements and disclosures.

The authors thank Dr. Javier Salas-Puig for his collaboration. None of the authors have any conflict of interest to declare.

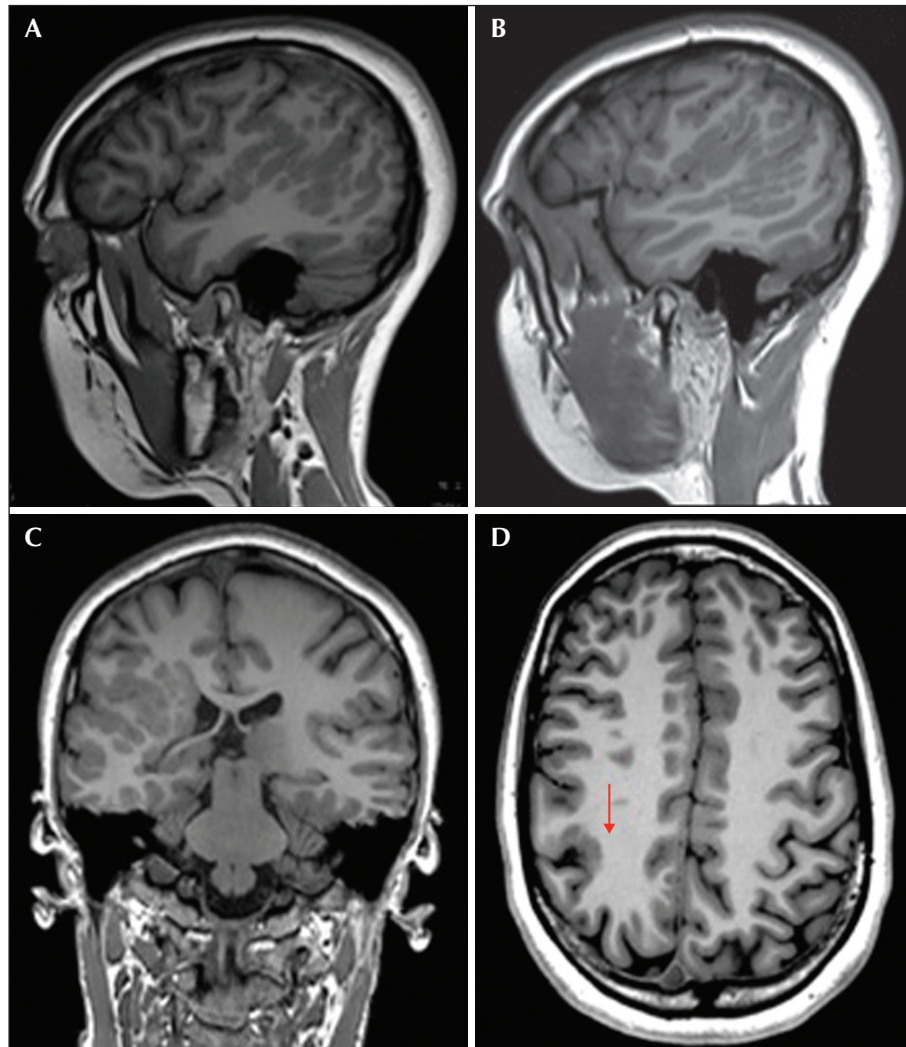
## References

Hong SJ, Bernhardt CB, Gill RS, Bernasconi N, Bernasconi A. The spectrum of structural and functional network alterations in malformations of cortical development. *Brain* 2017; 140(8): 2133-43.

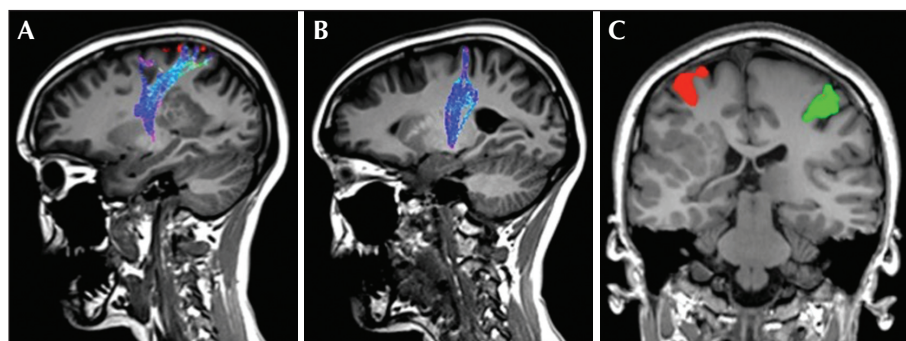
Widjaja E, Blaser S, Miller EE, *et al.* Evaluation of subcortical white matter and deep white matter tracts in malformations of cortical development. *Epilepsia* 2007; 48(8): 1460-9.

## Correspondence:

Carla Anciones c/ La Masó  
38, 28034 Hospital Ruber Internacional,  
Madrid, Spain  
<carla.anciones.ce@ruberinternacional.es>



**Figure 1.** T1-weighted images demonstrating a large sublobar heterotopia with areas of polymicrogyria involving the right perisylvian region (A, B), the underlying white matter (C) and the right motor gyrus (D; arrow).



**Figure 2.** DTI bilateral tractography showing that the right corticospinal tract is “pushed” anteriorly by the heterotopia (A) while the motor activation of the left hand is displaced up and medially (C; red) compared to the normal pathway of the left tract (B) and right hand motor function (C; green).