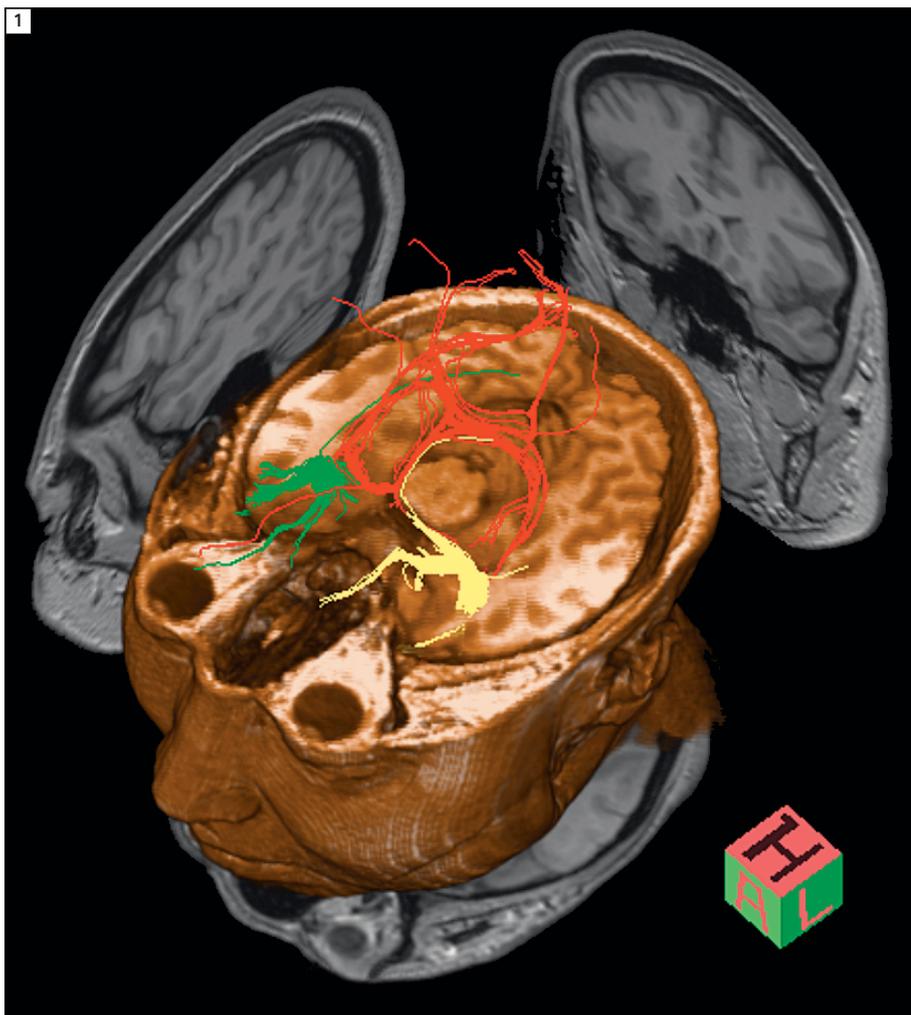


# Case Report: DTI for Presurgical Evaluation in Case of Hippocampal and Mesial Sclerosis

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## Patient history

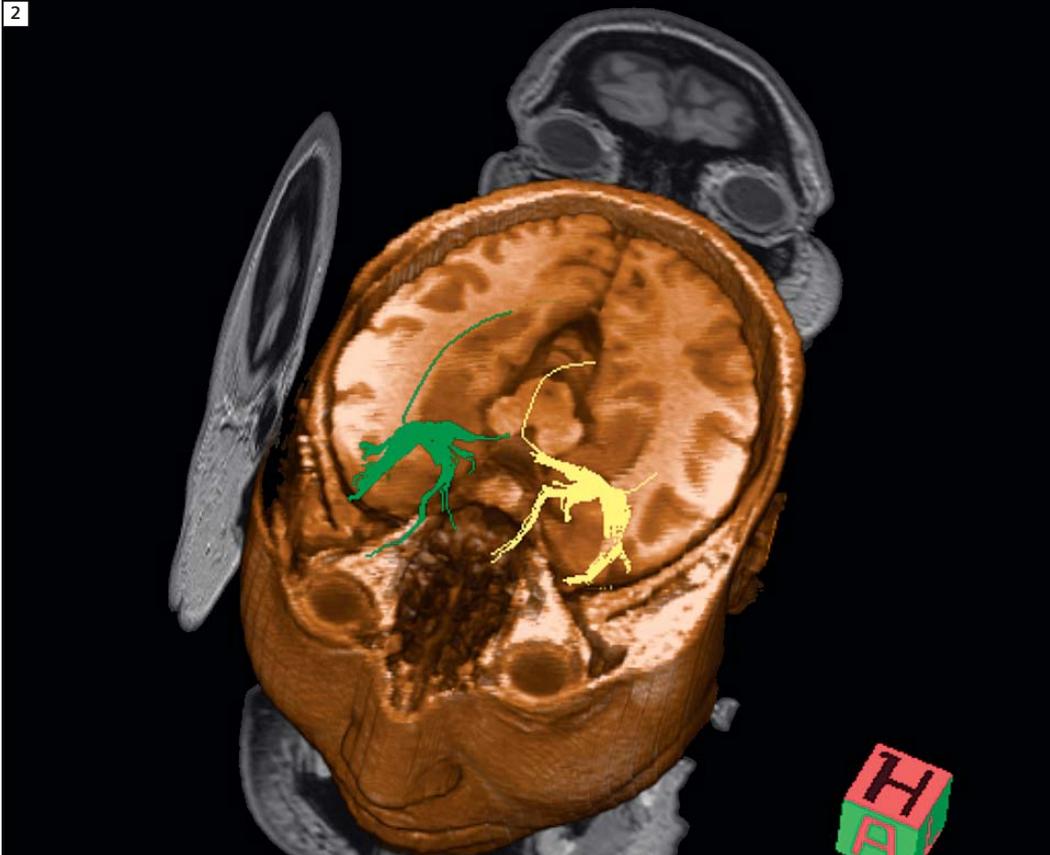
A 34-year-old female presented with a 15-year history of partial complex seizures with occasional generalization, and clinical diagnosis of left temporal drug-resistant epilepsy. Evaluated at the Video EEG Unit, the left temporal origin of the seizures is confirmed. A conventional 1.5T MRI study, performed at another institution, shows a subtle hyperintensity in the left hippocampus on T2-weighted TSE and FLAIR sequences. With a diagnosis of mesial sclerosis, the patient is proposed to a surgical treatment for her disease at our institution.

## Sequence details

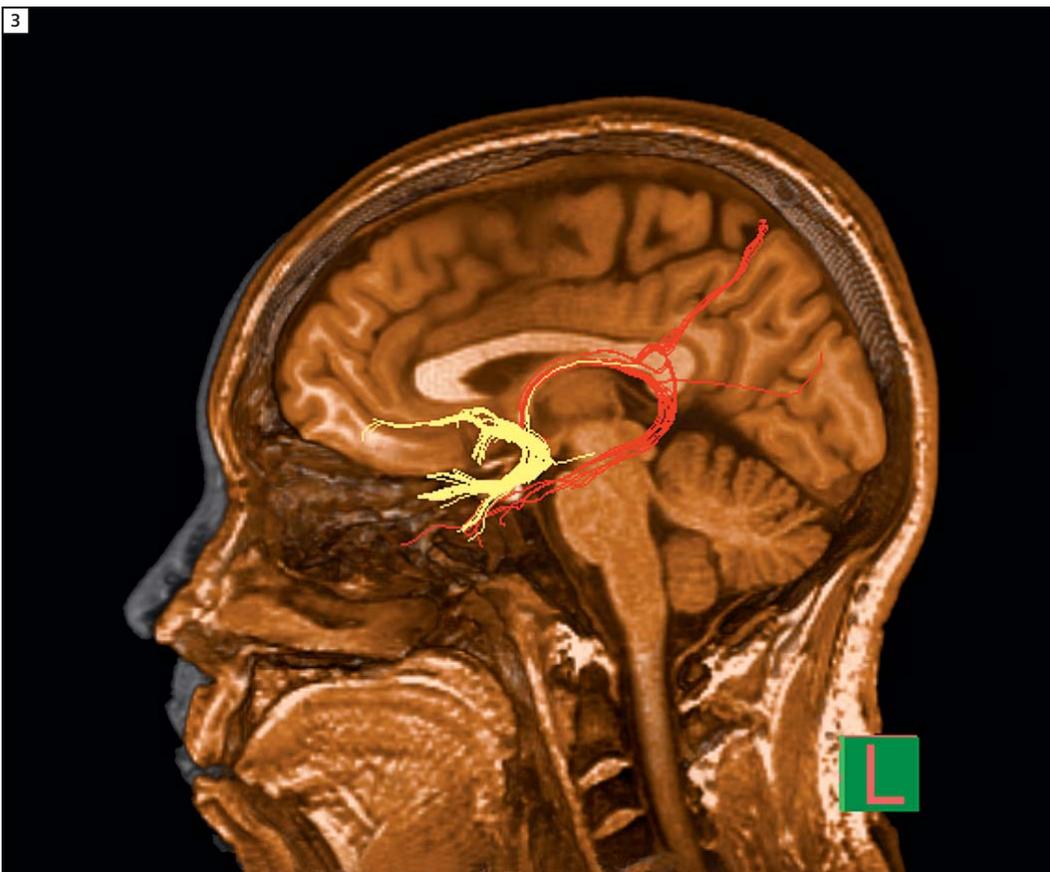
All images were acquired at our 3 Tesla MAGNETOM Trio, A Tim System (software version *syngo* MR B15) with the standard 12-channel Head Matrix coil.

- Single shot Echo Planar Imaging (EPI) Diffusion Tensor Imaging (*syngo* DTI) with the following parameters:  
TR/TE = 10.100/102 ms, FOV = 250 x 250 mm, averages = 2, matrix 128 x 128, resulting voxel size = (2.0 x 2.0 x 2.0) mm<sup>3</sup>, 30 non-collinear directions, b-values 0, 1000 s/mm<sup>2</sup> acquisition time: 11:05 min.
- T1-weighted 3D MPRAGE with the following parameters:  
TR/TE 19/4.9 ms; FOV: 250 x 250; matrix 256 x 256; resulting voxel size = (1.0 x 1.0 x 1.0) mm<sup>3</sup>, acquisition time: 5:49 min.

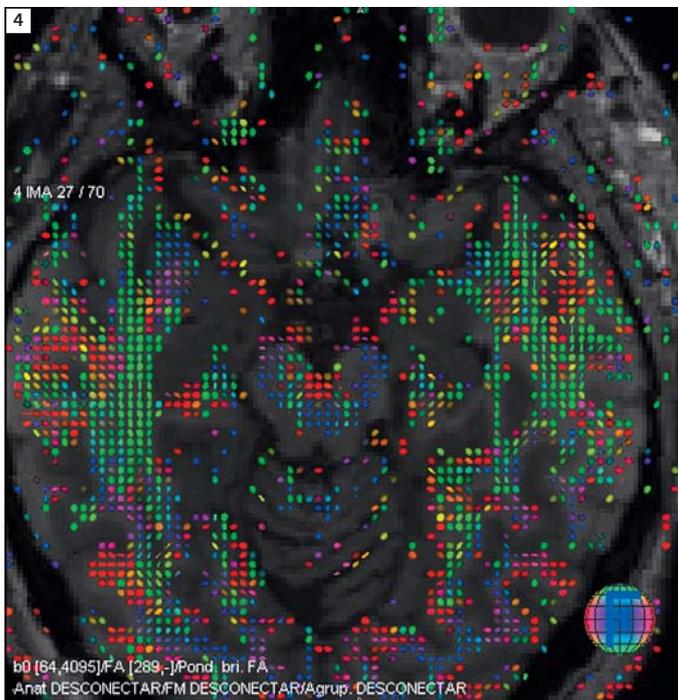
**1** Tractography of uncinete fasciculus (left yellow, right green and fimbria of the hippocampi red). The uncinete fasciculus, the temporal stem and the fimbria of the hippocampus of the left hemisphere are recognized in its normal anatomic topography, and showed for comparison with the same structures at the right hemisphere.



**2** Tractography of uncinata fasciculus (left yellow, right green). To achieve the goal of the temporal epilepsy surgery (hippocampectomy and fronto-temporal disconnection), it is important to confirm the location of the uncinata fasciculus and temporal stem. A subtle loss of fibers in the frontal component of the left uncinata fasciculus is also appreciated.



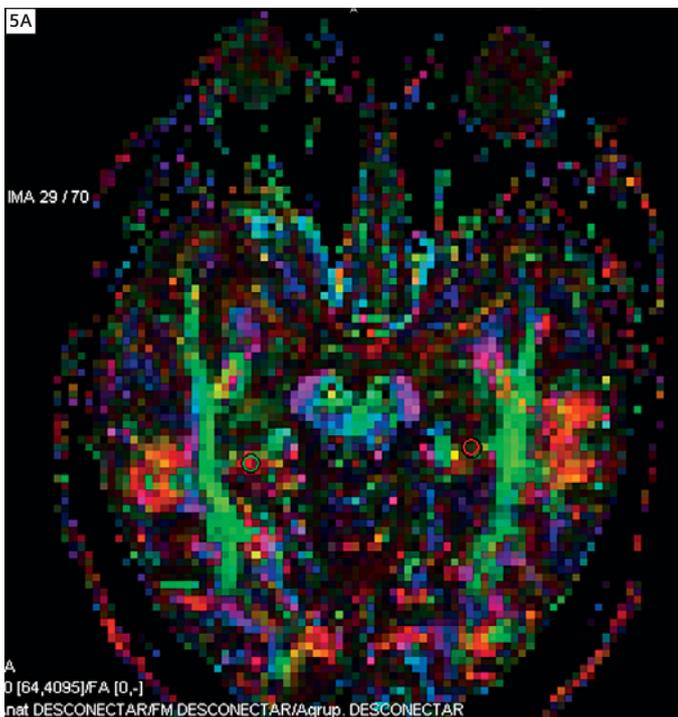
**3** Tractography of the left uncinata fasciculus (yellow) and fimbria of the left hippocampus (red). Lateral projection. The tracts connected to the amygdala-hippocampus complex are shown (fornix, cingulate and uncinata).



**4** Glyph texture (“smarties”) of a colored Fractional Anisotropy (FA) DTI T1-weighted anatomical slice at the hippocampi level of the temporal lobes. A clear asymmetry is shown in the location and orientation of the Eigenvectors between the hippocampi. At the left hippocampus the diffusion vectors are sparser and randomly oriented compared to the right hippocampus.

## Conclusion

Based on the findings, the patient was treated by an anterior temporal Ojemann lobectomy. Pathology confirmed the left hippocampal and mesial sclerosis. Currently the patient is free of seizures. In conclusion, DTI tractography from an isotropic acquisition combined with 3D T1-weighted “neuronavigator” sequence are currently performed at our institution for the evaluation of patients and candidates for epilepsy surgery. In this case, the ROI analysis of DTI confirmed the diagnosis of mesial sclerosis. Tractography guides the neurosurgeon to recognize the temporal stem and connections of amygdalohippocampal complex, and has helped to performed less extense and aggressive surgical resections.



**5 (A, B)** Region-of-Interest (ROI) analysis of the hippocampus. There is loss of FA and increase of ADC in the left hippocampus compared to the right; these findings are very suggestive of left temporal mesial sclerosis.

### Contact

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**5B**

ID	FA		FA		ADC	
	Media aritmética	DesEst	Media aritmética	DesEst	Media aritmética	DesEst
	Tamaño / Mín / Máx		Tamaño / Mín / Máx		Tamaño / Mín / Máx	
1	308.0 / 36.8	3 / 262 / 352	285.5 / 70.0	6 / 177 / 381	828.7 / 48.3	3 / 761 / 871
2	435.0 / 75.9	4 / 385 / 566	482.0 / 101.4	6 / 385 / 654	680.0 / 55.1	4 / 605 / 740