

520

### Surgical proven location of the Facial Nerve in the vicinity of Cerebellopontine Angle Tumours depicted pre-operatively by Tractography

P.M. Gonçalves-Pereira<sup>1</sup>, G. Neto D'almeida<sup>2</sup>, R. Manaças<sup>3</sup>, P. Escada<sup>4</sup>, T. Taoka<sup>5</sup>

<sup>1</sup>Serviço de Radiologia, Hospital dos Lusíadas, Lisboa/PORTUGAL,

<sup>2</sup>Neurosurgery dept, Hospital Egas Moniz, Lisboa/PORTUGAL,

<sup>3</sup>Neuroradiology dept, Hospital dos Capuchos, Lisboa/PORTUGAL, <sup>4</sup>ENT

dept, Hospital Egas Moniz, Lisboa/PORTUGAL, <sup>5</sup>Radiology dept, Nara

University Hospital, Nara/JAPAN

**Purpose/Introduction:** To determine the clinical utility of pre-operative diffusion tensor (DT) tractography of the facial nerve in the vicinity of cerebellopontine angle (CPA) tumours. The location of the facial nerve was established pre-operatively by tractography and compared with in-vivo electrode stimulation during microsurgery of vestibular schwannomas and rare CPA masses (meningiomas and arachnoid cysts).

**Subjects and Methods:** We have evaluated 19 patients with histologically proven CPA vestibular schwannomas (n=15), meningiomas (n=2) and arachnoid cysts (n=2). The location of the facial nerve on the cerebellopontine angle was assessed intra-operatively by visual inspection and mapping (using a monitoring electrical equipment) and compared with pre-operative DT tractography. DT images were obtained at 1.5T using a single-shot, high-resolution echo-planar sequence with six-axis encoding. Tractography of the facial nerve was performed accordingly to the method of Taoka T. et al<sup>1,2</sup>.

**Results:** The facial nerve position was depicted intra-operatively in all the patients and illustrated by DT tractography in 18 patients (Figures 1 and 2). In 17 patients (>90%) there was a precise correspondence between the CPA course of the facial nerve found at surgery and DT tractography. In one patient the facial nerve was found anterior/cranial to the tumor while tractography seemed to depict an anterior/caudal course.

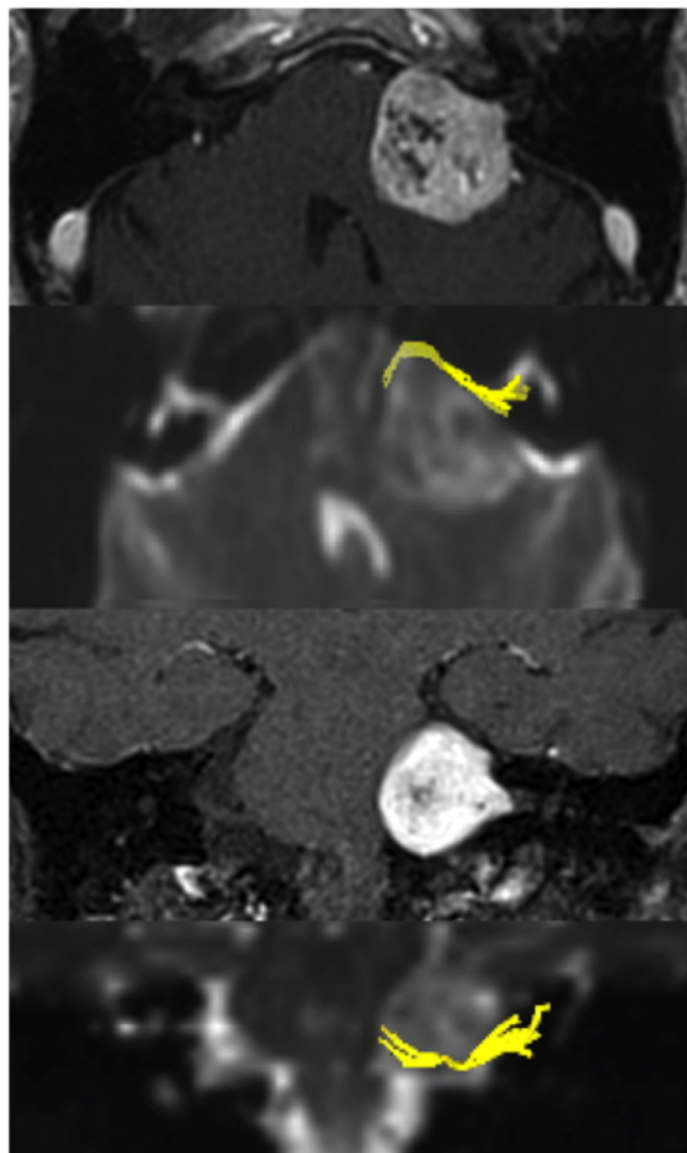


Figure 1: Vestibular Schwannoma on the left CPA. Axial and coronal T1 pós-Gad and equivalent tractography images. The facial nerve was identified during surgery with a similar antero-inferior location as predicted by tractography.

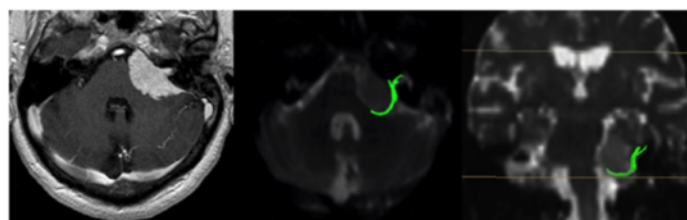


Figure 2: Left CPA Meningioma extending through the *porus acusticus*. Axial T1 pós-Gad. Axial and coronal tractography images predicted a postero-inferior displacement of the facial nerve, which was confirmed during surgery. **Discussion/Conclusion:** DT tractography of the facial nerves is feasible and has a consistent correspondence with the surgical findings. This technique may deliver useful pre-operative information and contribute to lower the risk of facial nerve injury during CPA surgeries.

#### References:

1 - Taoka T, Hirabayashi H, et al. Displacement of the facial nerve course by vestibular schwannoma: preoperative visualization using diffusion tensor tractography. J Magn Reson Imaging. 2006 Nov;24(5):1005-1010.

2 - Gonçalves Pereira PM, Neto d'Almeida, et al. Tractography of the Facial Nerve in Tumors of the Cerebellopontine Angle. Proceedings of the ASNR 50th Annual Meeting. 2012:405-406.