advent of 5-aminolevulinic acid (5-ALA), a tissue selective fluorophore, has led to increased rates of gross total tumour resection.[4-6] Since 5-ALA received approval for use in Canada in 2020, no Canadian centres have examined its impact on rates of complete resection (CR) for newly diagnosed high grade glioma (HGG) patients. Methods: This study evaluates the difference in EoR class[7], for newly diagnosed HGG. Fifty-one consecutive patients underwent awake craniotomy with white light illumination (WLS) while 45 consecutive HGG patients were operated with fluorescence guidance (FGS). Analysis of EoR class was blinded and performed by 2 independent reviewers with a third adjudicator available for discrepancies. Residual tumour volumes were quantified by segmentation of postoperative 1mm slice MRI. Results: The FGS group was found to have: 80% complete resection (CR), 11% near-total resection (NTR), and 9% subtotal resection (STR). This compared favourably to the WLS respective rates of 67%, 6%, and 28%. Conclusions: For awake craniotomy protocol, the odds of complete resection were higher in the FGS group, compared to the WLS group (OR = 2; 95% CI 1.06, 2.93).

## NEUROIMAGING

### P.114

**When functional neuroimaging is ambiguous for language localization: a case for Wada testing**

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Background: To localize cortical speech areas, methods such as fMRI are commonly used, but the Wada test can also determine whether a region is critical to the particular task. We report a case of a left-handed patient with a left frontal tumour in whom fMRI language paradigms produced both left and right Broca's and Wernicke's areas. Methods: All imaging used a 3 Tesla Siemens Skyra scanner. The patient performed five speech tasks: word reading, picture naming, semantic questions, pseudohomophone reading, and word generation. All preprocessing and statistical analyses for functional images were performed using Brain Voyager QX. Results: The fMRI results revealed right hemisphere dominance for language processing. A Wada test was performed in order to confirm whether the regions in the left hemisphere were critical to speech. The patient experienced speech arrest during the Wada test, thus confirming that despite bilateral speech activation, the left hemisphere speech regions are required for speech production. Conclusions: This case emphasizes the importance of preoperative fMRI in assessing the location of eloquent cortices adjacent to a tumour and the Wada test is still warranted for examining necessity of left hemisphere language regions when fMRI fails to show clear left-lateralization.

### P.115

**MRI based methodology for assessment of white matter neuroplasticity: preclinical validation using human motor training data**

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Background: Disruption of white matter (WM) tracts is common in traumatic injury to the brain and spinal cord. However, imaging techniques for prognostication and monitoring of recovery are lacking. Myelin Water Imaging (MWI) is a validated MRI based method of quantifying myelin volume and represents a potential tool for application in a clinical environment. Methods: 12 healthy, right-handed participants completed a two-week visuomotor maze training program with MRI scans at baseline and endpoint. The task was designed to be difficult for the non-dominant hand and easy for the dominant, allowing for an inbuilt control. Diffusion Tensor Imaging (DTI) along with MWI data were collected at both timepoints using a 3T MRI. Results: Performance metrics confirmed task performance increased only in the non-dominant hand, and a corresponding endpoint>baseline comparison showed significant increases in the MWF ($p<0.05$) and DTI indices ($p<0.05$) in the right corticospinal tract (CST), and no significant change in the left CST. Conclusions: This preclinical validation shows MWI is capable of quantitatively tracking WM changes over the course of weeks in humans. MWI's clinical utility lies in its ability to assess WM changes over short time periods, as monitoring changes in tissue integrity will assist in guiding treatment decisions after critical injury.

### P.116

**Anatomical fiducials used to quantify localization and registration accuracy in deep brain stimulation**

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Background: Studies of deep brain stimulation (DBS) require accurate electrode localization and image registration. We used anatomical fiducials to investigate localization and registration errors in patients who underwent subthalamic nucleus (STN) DBS for Parkinson's disease (PD). Methods: We conducted a retrospective analysis of patients who underwent bilateral STN DBS for PD. Pre and post operative MRI scans were non-linearly normalized to a standard template (MNI152NLin2009bAsym). Four raters localized DBS electrodes (Lead-DBS), the anterior commissure (AC) and posterior commissure (PC). Errors between rater localizations were calculated (fiducial localization error; FLE). We transformed AC and PC coordinates from template to patient space to calculate the fiducial registration



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