considered significant). Paired two-tailed Student t-tests were used to assess for postoperative changes in metabolite levels. **Results:** Postoperatively, we observed a statistically significant ($p<0.05$) negative correlation ($r=-0.44$) between the N-acetylaspartate-to-creatine ratio (NAA/Cr) and GRASSP-M dexterity scores. There was no significant difference in NAA, Cr, or NAA/Cr postoperatively. **Conclusions:** These findings demonstrate that patients with lower postoperative NAA/Cr usually have better recovery of dexterity. This link between the myelopathic metabolite profile and clinically meaningful dexterity values requires further investigation to understand the role of both NAA and Cr in mechanisms of postoperative recovery from myelopathy.

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Diffusion MRI characteristics change in select cerebral white matter tracts after decompressive surgery for degenerative cervical myelopathy

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doi: 10.1017/cjn.2021.448

Background: Degenerative cervical myelopathy is characterized by progressive compression of the spinal cord resulting in debilitating loss of dexterity, independent ambulation, and sphincter control. Diffusion tensor imaging (DTI) has shown that, compared to healthy controls, myelopathy patients have decreased integrity of the corticospinal tracts and corpus callosum (Bernabeu-Sanz et al, 2020). **Methods:** Twenty-six myelopathy patients consented to cerebral diffusion tensor imaging (3 Tesla, 32 directions, b=1000) preoperatively, as well as 6-weeks, 12-weeks, and 6-months postoperatively. Average mean diffusivity (MD), fractional anisotropy (FA), radial diffusivity (RD), and axial diffusivity (AD) were measured in the corticospinal tracts, forceps major, and forceps minor. **Results:** Both MD and RD decreased from 6-12 weeks postoperatively in the right corticospinal tract. The forceps major of the corpus callosum showed an initial postoperative increase in MD followed by a subsequent increase in FA and decrease in RD 3-6 months postoperatively. The AD of the forceps major increased both immediately and 3-6 months postoperatively. **Conclusions:** Changes in microstructural integrity of the corticospinal tract and forceps major over the postoperative recovery period suggest a pattern of recovery in myelopathy patients. This study is the first to report postoperative DTI changes in myelopathy-relevant white matter tracts in the brain.

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Evaluation of Arterial Spin Labeling (ASL) Perfusion Imaging in Poorly-Defined Focal Epilepsy in Children

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doi: 10.1017/cjn.2021.449

Background: Poorly-defined cases (PDCs) of focal epilepsy are cases with no/subtle MRI abnormalities or have abnormalities extending beyond the lesion visible on MRI. Here, we evaluated the utility of Arterial Spin Labeling (ASL) MRI perfusion in PDCs of pediatric focal epilepsy. **Methods:** ASL MRI was obtained in 25 consecutive children presenting with poorly-defined focal epilepsy (20 MRI- positive, 5 MRI-negative). Qualitative visual inspection and quantitative analysis with asymmetry and Z-score maps were used to detect perfusion abnormalities. ASL results were compared to the hypothesized epileptogenic zone (EZ) derived from other clinical/imaging data and the resection zone in patients with Engel I/II outcome and >18 month follow-up. **Results:** Qualitative analysis revealed perfusion abnormalities in 17/25 total cases (68%), 17/20 MRI-positive cases (85%) and none of the MRI-negative cases. Quantitative analysis confirmed all cases with abnormalities on qualitative analysis, but found 1 additional true-positive and 4 false-positives. Concordance with the surgically-proven EZ was found in 10/11 cases qualitatively (sensitivity=91%, specificity=50%), and 11/11 cases quantitatively (sensitivity=100%, specificity=23%). **Conclusions:** ASL perfusion may support the hypothesized EZ, but has limited localization benefit in MRI-negative cases. Nevertheless, owing to its non-invasiveness and ease of acquisition, ASL could be a useful addition to the pre-surgical MRI evaluation of pediatric focal epilepsy.

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Accuracy of pedicle screw placement with X-ray versus O-arm image-guided navigation

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doi: 10.1017/cjn.2021.450

Background: Image-guided navigation is routinely used in spine surgery to improve placement of pedicle screws. However, most reports have relied on two-dimensional X-ray evaluation to determine accuracy of screw positioning. In this study, computed

tomography (CT) and O-arm imaging enabled a detailed three-dimensional comparison of screw placement. The objective was to compare the accuracy of pedicle screw placement with intraoperative X-ray versus O-arm image-guided navigation. **Methods:** This was a retrospective analysis of image-guided pedicle screw placement in patients who underwent spinal instrumentation. Post-operative CT and O-arm imaging allowed grading of screw accuracy based on pedicle breaches. Clinical outcomes included patient and operative factors. **Results:** Pedicle screws were placed in 208 patients (1116 screws). Three-dimensional O-arm guidance was utilized for 126 patients, while the remainder underwent two-dimensional X-ray imaging and post-operative CT assessment. O-arm navigation was associated with improved pedicle screw accuracy: pedicle breaches were more likely to be low grade (odds ratio 2.84, p=0.001) and less likely to be medium grade (odds ratio 0.35, p=0.007) or high grade (odds ratio 0.31, p=0.025). **Conclusions:** This study provided a detailed comparison of surgical accuracy with X-ray versus O-arm guidance. Navigation with O-arm imaging is associated with benefits in spinal instrumentation, without impacting operative risks for patients.

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Direct Visualization of Thalamic Nuclei using 7 Tesla MRI and quantification in patients with temporal lobe epilepsy.

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doi: 10.1017/cjn.2021.451

Background: Most individual thalamic nuclei cannot be directly visualized on routine clinical MRI. Stereotactic targeting techniques are indirect, relying on histological atlases and electrophysiological recording. We investigate whether high-field MRI can directly visualize the thalamic nuclei in vivo and allow for analysis of disease-related changes. **Methods:** Thirty-two healthy individuals were imaged with 7T MRI at a resolution of $0.7mm^3$. To obtain a high-resolution composite image, these were registered across subjects and averaged together. Three thalamic structures closely integrated in seizure propagation, the anterior thalamic nucleus (ATN), mammillothalamic tract (MTT), and centromedian nucleus (CM) were manually segmented in a subset of healthy subjects and patients with temporal lobe epilepsy (TLE). **Results:** There is sufficient resolution within the thalamus at 7T for visualization of the ATN, CM, and MTT. In the small subset of 5 controls and 5 TLE patients examined, there was no significant difference ($p>0.05$) in volume or mean T1map for the three thalamic sturctures of interest. **Conclusions:** MRI at 7T provides a method of direct visualization of thalamic nuclei, uncovering substructures not previously identifiable in vivo. These advances will enable quantitative analysis of disease-related changes to these structures and improved clinical targeting as demonstrated in this initial 'proof-of-concept' subset analysis.

Neuroscience Education

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Assessing the competence of neurology residents in performing an interphysician telephone consultation.

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doi: 10.1017/cjn.2021.452

Background: Neurology Residency training in Canada is transitioning to competence based medical education (CBME) in July 2020 and the Royal College Neurology Specialty Committee has identified "providing consultation for and managing patients at outlying centers," to be an entrustable professional activity (EPA). At Western, neurology telephone consultations, from outlying centres, are attended by both the resident and the staff Neurologist. This scenario provides the ideal situation for direct observation and immediate formative feedback. The resident's performance is assessed using the 'TeleTool' which utilizes an entrustment scale and has a short narrative portion. **Methods:** This mixed methods study aims to determine the reliability and validity of the 'TeleTool' in assessing the performance of the telephone consultation by senior neurology residents. Informed consent was obtained from residents (9) and staff (7) involved. Scores on the entrustment scale and narrative comments were analysed. **Results:** Information on 30 encounters (involving 9 residents) was collected. TeleTool results demonstrated higher entrustment scores in PGY4 and PGY5 levels. Overall, ratings were consistent across the 7 consultants assessors. **Conclusions:** The TeleTool was reliable and valid in assessing competence in the telephone consultation and will be a useful tool for assessment of this EPA.

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The Effect of the COVID 19 Pandemic on theTraining of Surgical Residents in Canada. A Survey of Residents and Program Directors.

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doi: 10.1017/cjn.2021.453

Background: The coronavirus 2019 pandemic has led to restructuring of health care systems and has subsequently had secondary effects on medical education. This study examines the impact on training of surgical residents in Canada. **Methods:** The study consisted of a 25-question survey for residents and a 22-question survey for program directors, which were distributed electronically through program administrators on July 3rd- July