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Trends in entry to RCPSC neurosurgery residency training through the CaRMS match since loss of eligibility for ABNS certification

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Background: After July 16, 1997, Royal College of Physicians and Surgeons of Canada (RCPSC) trainees in neurosurgery were no longer eligible for American Board of Neurological Surgeons (ABNS) certification. It was anticipated that this would lead to an influx of neurosurgeons in Canada. *Methods:* We analyzed historical Canadian Residency Matching Service (CaRMS) data for 1997–2014 for trends in neurosurgery residency positions offered, vacancy rates, resident demographics and other pertinent data. *Results:* A mean of 0.94% of medical students applied to neurosurgery as their first choice (range: 0.54%-1.79%). Comparing 2 consecutive time periods (1997–2005 vs. 2006–2014), the mean number of neurosurgery entry positions per year increased from 14 to 19, while mean applicant numbers increased from 24 to 28, respectively. Ninety-five percent of those accepted into neurosurgery ranked it as their first choice discipline and few candidates who ranked neurosurgery highest were unmatched. Women applying to neurosurgery as their first choice discipline were equally likely to match as men (84% vs. 85%) and comprised 28% of neurosurgery residents selected since 2008 (vs. 14% in 1997–2007). *Conclusions:* The number of neurosurgery CaRMS positions and applicants have increased since 1997. This will have implications for neurosurgical workforce planning and physician employment in Canada.

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Subjective anxiety ratings before and after stressful neurosurgical virtual reality tumor resection task

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Background: The availability of virtual reality (VR) surgical simulators affords the opportunity to assess the influence of stress on neurosurgical operative performance in a controlled laboratory environment. This study sought to examine the effect of a stressful VR neurosurgical task on the subjective anxiety ratings of participants with varying levels of surgical expertise. *Methods:* Twenty four participants comprised of six staff neurosurgeons, six senior neurosurgical residents (PGY4-6), six junior neurosurgical residents (PGY1-3), and six senior medical students took part in a bimanual VR tumor removal task with a component of sudden uncontrollable intra-operative bleeding. State Trait Anxiety Inventory (STAI) questionnaires were completed immediately pre and post the stress stimulus. The STAI questionnaire consisted of six items (calm, tense, upset, relaxed, content and worried) measured on a Likert scale. *Results:* Significant increases in subjective anxiety ratings were noted in junior residents ($p = 0.005$) and medical students ($p = 0.025$) while no significant changes were observed for staff and senior neurosurgical residents. *Conclusions:* Staff and senior residents more effectively mitigate stress compared to junior colleagues in a VR operative environment. Further physiological correlates are needed to determine whether this increased anxiety is paralleled by physiological arousal and altered surgical performance.

P.083

Acute stress decreases bimanual psychomotor performance during resection of simulated brain tumors

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Background: Objective methods to assess the influence of significant stress on neurosurgical bimanual psychomotor performance have not been developed. We utilized NeuroTouch, a virtual reality simulator, to answer two questions: 1) What is the impact of significant stress on bimanual psychomotor performance during the resection of a simulated tumor? 2) Does stress influence performance immediately following the stressful episode? *Methods:* Uncontrollable 'intraoperative' bleeding during one of the tumor resections resulting in simulated patient cardiac arrest served as the acute stressor. Six neurosurgeons, 6 senior and 6 junior neurosurgical residents and 6 senior medical students were studied. The evaluated advanced tier 2 metrics were efficiency index, ultrasonic aspirator path length index, suction coordination index and ultrasonic aspirator bimanual forces ratio. *Results:* The stress scenario significantly decreased the efficiency index of all groups and significantly decreased performance for many groups for suction coordination index and ultrasonic aspirator path length index. Performance in all advanced tier 2 metrics returned to pre-stress levels in post stress resection scenarios. *Conclusions:* Our results are consistent with the concept that acute stress initiated by severe intraoperative bleeding significantly decreases bimanual psychomotor performance during the acute episode but had no significant influence on immediate post stress operative performance.

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A cadaveric study in endoscopic 3D visualization of posterior fossa neurovascular complexes

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Background: The use of 3D endoscopy for posterior fossa surgery gradually adopted. In this study we compare the 3D to classic 2D endoscopy in evaluating neurovascular complexes in posterior fossa. *Methods:* Twenty retrosigmoid craniotomies, with a maximal diameter of 2cm were performed under neuronavigation on 10 fresh cadaveric heads. The posterior fossa dura matter was opened with a C-shaped incision and the base of the dural flap was placed over the sigmoid sinus. We used 3D and 2D endoscopes, with 0 and 45 degree angulations, connected to high definition camera lenses for optimal