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Health-related quality of life and fatigue in children with Duchenne muscular dystrophy: A three-year longitudinal study

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Background: Longitudinal data on health-related quality of life (HRQOL) and fatigue in paediatric Duchenne muscular dystrophy (DMD) are limited. Recently, fatigue was reported to be the greatest predictor of poor HRQOL in paediatric DMD. Understanding the trajectory of HRQOL and its relationship with fatigue may facilitate the development of improved therapeutic strategies. Our objective was to describe three-year changes in HRQOL and fatigue in children with DMD. **Methods:** Patients identified via the Canadian Neuromuscular Disease Registry received mailed questionnaires (2013–2016). HRQOL was assessed using the PedsQL™ GCS and NMM domains, and fatigue was assessed using the MFS domain (patient- and parent-report). Mean three-year change in scores were computed. Pearson correlations were computed between three-year change in HRQOL and fatigue. **Results:** Mean decline in MFS scores for patient- and parent-reports were 1.03 and 1.19, respectively. Mean decline in GCS scores for patient- and parent-report were 1.75 and 4.13, respectively. Mean change in NMM scores for patient- and parent-report were 0.72 and -8.36, respectively. Change in MFS score was associated with changes in GCS (r=0.72, p<0.001) and NMM scores (r=0.84, p<0.001) by patient-report. **Conclusions:** Children with DMD experience worse fatigue and HRQOL over time. Parents perceive a greater decline in HRQOL over time compared to patients.

NEUROSCIENCE EDUCATION

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Development of a performance model for virtual reality tumor resections

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Background: This work proposes a hypothetical model that integrates human factors (e.g. inherent ability and acquired expertise) and task factors (e.g. pre-procedural data, visual and haptic information) to better understand the hand ergonomics adaptation needed for optimal safety and efficiency during simulated brain tumor resections. **Methods:** Hand ergonomics of neurosurgeons, residents and medical students were assessed during simulated brain tumors resection on the NeuroVR virtual reality neurosurgical simulation platform. Spatial distribution of time expended, force applied, and tumor volume removed, and other metrics were analyzed in each tumor quadrant (Q1 to Q4). **Results:** Significant differences were observed between the most favorable hand ergonomics condition (Q2) and the unfavorable hand ergonomics condition (Q4). Neurosurgeons applied more total force, more mean force, and removed less tumor per unit of force applied in Q4. However, total volume removed was not significant between the two quadrants indicating hand ergonomics adaptation in order to maximize tumor removal. In comparison, hand ergonomics of medical students remained unchanged in all quadrants, indicating a learning phenomenon. **Conclusions:** Neurosurgeons are more capable of adapting their hand ergonomics during simulated brain tumor resections. Our proposed hypothetical model integrates our findings with the literature and highlights the importance of experience in the acquisition of adaptive hand ergonomics.

P.080

Neurosurgery Residency Program at the Faculty of Medicine, Universitas Gadjah Mada, Indonesia: a unique approach and strategy for an archipelago country

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Background: Indonesia is a vast archipelago country with over 17,000 islands. Many of the islands are in underdeveloped provinces with no neurosurgeon. Neurosurgery is often considered an expensive and sophisticated field to fund. Our neurosurgery department used the vision and mission of the medical faculty, which is "globally respected and locally rooted" to make a difference in many of the islands. **Methods:** Careful selection of provinces and candidates that involve local governments and hospitals within the province. This includes resident recruitment, planning and developing neurosurgical infrastructure in the province. Our program uses innovative neurosurgical techniques that are standardized to be applicable in underdeveloped areas. The residents are exposed to their province and hospital during the training. We optimize IT interaction, including teleconference, videoconference and telemedicine **Results:** At the fifth year of our program, we have sixteen residents from 8 underdeveloped provinces and have established MoU with 4 local hospitals around Indonesia. We have also sent residents to rural areas. We routinely participate in international teleconferences and videoconferences, including those with the Saskatchewan team. **Conclusions:** A well planned and structured neurosurgical program, with standardized processes and involvement of local officials, combined with extensive use of IT, is effective in preparing neurosurgeons who can provide quality care in underdeveloped regions.

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Popularity of online multimedia educational resources in neurosurgery: Insights from The Neurosurgical Atlas project

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Background: *The Neurosurgical Atlas* is a neurosurgical website with informative chapters and videos to promote excellence and safety in neurosurgical techniques. Here, we present our analysis of this website's viewing data and describe how online neurosurgical resources are being utilized. We hope this will be a useful guide for neurosurgeons interested in online multimedia education. **Methods:** We analyzed Google Analytics data from *The Neurosurgical Atlas* between June 2016 and August 2017 which tracked

user demographics, geographical location, and the videos watched. Views were also analyzed categorically by dividing videos into six neurosurgical topics and into basic and advanced levels as per their surgical complexity. **Results:** There were 246,259 website visits and 143,868 video plays. The most frequent age groups were 25-34 (44%) and 35-44 (24%). 71% of visitors were male. Most visitors were from the US (29.52%) and Brazil (6.43%). Website visits and video plays increased over time, with multiple peaks corresponding to promotional email updates. The six neurosurgical topics were all similarly popular. **Conclusions:** Our study presents the first piece of evidence demonstrating the feasibility and popularity of a free online resource in neurosurgical education. Our experience highlights the growing demand for free-access online chapters, anatomical illustrations, and operative videos.

P.082

An evidence-based supportive and palliative care curriculum for Canadian neurology residents

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Background: Graduating residents require general palliative care skills. In Canada, there is no standardized palliative care curriculum for specialty trained residents. The objective of this research is to develop an evidence-based palliative care curriculum designed to provide neurology residents with the general palliative care skills required for providing patient care along the continuum of life. **Methods:** A needs assessment was performed in Neurology at Western University using qualitative analysis techniques. Residents completed the following:. A curricular outline was developed based on the Kolb learning style inventory (LSI), a knowledge pre-test, the Palliative Medicine Comfort and Confidence Survey and a review of the literature. Two iterations of the curriculum have been developed. **Results:** Residents identified a need for additional training in supportive and palliative care skills. Based on the Kolb LSI, 9/16 (56.3%) of neurology residents are "accommodators". General principles identified for inclusion included: symptom management, communication, psychosocial aspects of care, care coordination and access, and myths and pitfalls in palliative care. **Conclusions:** This project is designed to identify the current palliative educational needs for Neurology residents. The results suggest that specialty trained residents are receptive to embedding training in the principles of palliative care within their training programs.

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Effective video technology for teaching the neurological exam

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Background: With advancements in technology, the use of video as a pedagogical method in medical education has gained in popularity, and may aid in teaching clinical skills. In the UBC MD program, videos have been used to assist in teaching the neurological exam for several decades, but the currently available videos are outdated and not of contemporary quality. **Methods:** Drawing upon the cognitive theory of multimedia learning from Mayer and Moreno (2003) which describes methods to maximize learning by minimizing cognitive load, we developed a tool to systematically assess pedagogical videos. We inventoried twelve existing neurology videos and analyzed their use of methods such as weeding (removing extraneous information), signalling (visually highlighting important information), and chunking (grouping similar information together). **Results:** Generally, older videos had poor audiovisual quality that introduced extraneous load, while more current videos had higher production value, albeit inconsistent with the depth of their content. We therefore produced a new three-part neurological exam video series. We wrote storyboards, filmed with a focus on visually depicting the exam and findings, and edited to elucidate relevant physiological concepts. **Conclusions:** The end product has been adopted by the UBC MD program, and can be shared with other programs who may wish to adopt them.

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Hot seat concept in neurosurgical exam simulation adopted by the Comprehensive Clinical Neurosurgery Review

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Background: Neurosurgical education is one of the most exciting topics in contemporary neurosurgery. Passing the final boards is a real challenge. **Methods:** We conducted a prospective study of 48 candidates who attended the hot-seat sessions during CCN review over three years. Detailed statistical analysis was conducted. Those who attended the Hot seats (Group 1) and those who didn't (Group 2). The neurosurgery exam simulation was conducted using both MCQ and Oral simulated exams with clinical cases led by world expert faculty in a lecture format for the MCQ and 15-minute mock oral sessions which was video-taped scoring candidates in a standardized fashion for their performance. **Results:** Group 1 had a better MCQ performance (83 %) compared to group 2 (61 %). Candidates were better in data gathering, differential diagnosis and management. They were worst in simulating surgical techniques and follow-up plans. Geographical characterization showed a big range of intra and inter variability in performances. Interestingly, candidates with excellent MCQ performance had moderate hot seat performance while those with moderate MCQ performance did much better during the hot seat session. **Conclusions:** Our preliminary results showed that simulation of board exams is a method that will help neurosurgery residents not only pass their board exams, but also achieve the best marks.