

## **To develop a simulation-based curriculum for residents to learn ultrasound-guided (USG) central venous catheter (CVC) insertion, and to study the volume and type of practice that leads to technical proficiency” McGraw et al (2016).**

### Abstract:

**OBJECTIVE:** To develop a simulation-based curriculum for residents to learn ultrasound-guided (USG) central venous catheter (CVC) insertion, and to study the volume and type of practice that leads to technical proficiency.

**METHODS:** Ten post-graduate year two residents from the Departments of Emergency Medicine and Anesthesiology completed four training sessions of two hours each, at two week intervals, where they engaged in a structured program of deliberate practice of the fundamental skills of USG CVC insertion on a simulator. Progress during training was monitored using regular hand motion analysis (HMA) and performance benchmarks were determined by HMA of local experts. Blinded assessment of video recordings was done at the end of training to assess technical competence using a global rating scale.

**RESULTS:** None of the residents met any of the expert benchmarks at baseline. Over the course of training, the HMA metrics of the residents revealed steady and significant improvement in technical proficiency. By the end of the fourth session six of 10 residents had faster procedure times than the mean expert benchmark, and nine of 10 residents had more efficient left and right hand motions than the mean expert benchmarks. Nine residents achieved mean GRS scores rating them competent to perform independently.

**CONCLUSION:** We successfully developed a simulation-based curriculum for residents learning the skills of USG CVC insertion. Our results suggest that engaging residents in three to four distributed sessions of deliberate practice of the fundamental skills of USG CVC insertion leads to steady and marked improvement in technical proficiency with individuals approaching or exceeding expert level benchmarks.

### Reference:

McGraw, R., Chaplin, T., McKaigney, C., Rang, L., Jaeger, M., Redfearn, D., Davison, C.,



Ungi, T., Holden, M., Yeo, C., Keri, Z. and Fichtinger, G. (2016) Development and Evaluation of a Simulation-based Curriculum for Ultrasound-guided Central Venous Catheterization. CJEM. May 16th. .

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