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How would you promote Interventional Radiology as a specialty in the modern era?

Interventional radiology (IR) is facing a workforce crisis and long term efforts to meet the shortage must be focused toward succession planning. Early exposure to IR has long been advocated[1], given that the formative years of one's career are spent in medical school. Nevertheless, the question arises, what more must be done to raise the profile of IR within the undergraduate community? A survey of final year medical students in England found lack of knowledge due to limited exposure to be the strongest deterrent against pursuing a career in IR[2]- a problem which also extends globally[3,4]. With the emergence of the digitalisation in healthcare, new methodologies must be adopted in IR teaching to take full advantage of the limited teaching time within an already crowded curriculum.

As Confucius once stated, "Tell me and I will forget, show me and I may remember, involve me and I will understand" and virtual simulation models offer a highly effective means of increasing exposure to a variety of training cases in a risk-free environment, without compromising patient safety. Moreover, addressing the aforementioned problem of limited exposure, virtual simulation models provide flexibility, as delivery can be self-directed or as part of the curriculum. Phenomenal results have been observed in other specialties using this approach, given that 95% of medical students at Stanford University[5] reported increased knowledge and interest in vascular surgery following an endovascular simulation course, whilst the proportion of those considering a career in the specialty increased significantly from 8.5% to 70%. Further, 70% of these students still expressed a keen interest at the 1-year follow-up, signifying the long-term benefits of this intervention. Even so, variability in the engagement of students still exists[6], partly owing to the lack of standardisation and the need for thorough consideration of key performance measures in the replication of IR procedures[7–9]. Tackling these problems will be key to increasing uptake of virtual simulation in more medical schools.

3D printing, another emerging technology, is a teaching and learning tool already used in surgical training[10] but its potential for use in IR teaching remains relatively unexplored in the

literature. Using this technique, digital imaging and communication in medicine (DICOM) data derived during CT, MRI, or ultrasound scanning can be coupled with 3D printing technology to produce models which demonstrate anatomical and structural fidelity, consistent with the patient's disease process. In addition to significantly ameliorating knowledge, this teaching modality offers the opportunity for physical interaction, providing true appreciation of the motor skills required to manoeuvre IR procedures. Additionally, a recent study found dental students prefer a multimodal and kinaesthetic approach to learning[11] and findings may also be extrapolated to medical students. Even so, current limitations to this technique are finding appropriate materials to mimic human tissue.

In summary, technological advances offer new and exciting opportunities to engage medical students in considering a career in IR, which can be used as a means of achieving equipoise between increasing demand for IR procedures and an appropriately trained workforce in the long term.

Word Count: 499

References

1 Branstetter BF, Faix LE, Humphrey AL, Schumann JB. Preclinical Medical Student Training in Radiology: The Effect of Early Exposure. *American Journal of Roentgenology* 2007;**188**:W9–14. doi:10.2214/AJR.05.2139

2 Atiiga PA, Drozd M, Veettil R. Awareness, knowledge, and interest in interventional radiology among final year medical students in England. *Clinical Radiology* 2017;**72**:795.e7-795.e12. doi:10.1016/j.crad.2017.04.012

3 O'Malley L, Athreya S. Awareness and Level of Knowledge of Interventional Radiology among Medical Students at a Canadian Institution. *Academic Radiology* 2012;**19**:894–901. doi:10.1016/j.acra.2012.03.009

4 Alshumrani GA. Awareness of interventional radiology among final-year medical students and medical interns at a university in Southwestern Saudi Arabia. *Saudi medical journal* 2013;**34**:841–7.http://www.ncbi.nlm.nih.gov/pubmed/23974457 (accessed 30 Aug 2018).

5 Lee JT, Qiu M, Teshome M, Raghavan SS, Tedesco MM, Dalman RL. The Utility of Endovascular Simulation to Improve Technical Performance and Stimulate Continued Interest of Preclinical Medical Students in Vascular Surgery. *Journal of Surgical Education* 2009;**66**:367–73. doi:10.1016/j.jsurg.2009.06.002

6 Friedman M V., Demertzis JL, Hillen TJ, Long JR, Rubin DA. Impact of an Interactive Diagnostic Case Simulator on a Medical Student Radiology Rotation. *American Journal of Roentgenology* 2017;**208**:1256–61. doi:10.2214/AJR.16.17537

7 Gould DA, Kessel DO, Healey AE, Johnson SJ, Lewandowski WE. Simulators in catheter-based interventional radiology: training or computer games? *Clinical Radiology* 2006;**61**:556–61. doi:10.1016/j.crad.2006.01.013

8 Gould DA. Interventional Radiology Simulation: Prepare for a Virtual Revolution in Training. *Journal of Vascular and Interventional Radiology* 2007;**18**:483–90. doi:10.1016/j.jvir.2006.11.005

9 Avramov P, Avramov M, Juković M, Kadić V, Till V. Virtual simulation as a learning

method in interventional radiology. *Medicinski pregled*;**66**:335–40.http://www.ncbi.nlm.nih.gov/pubmed/24069818 (accessed 30 Aug 2018).

10 Garcia J, Yang Z, Mongrain R, Leask RL, Lachapelle K. 3D printing materials and their use in medical education: a review of current technology and trends for the future. *BMJ Simulation and Technology Enhanced Learning* 2018;**4**:27–40. doi:10.1136/bmjstel-2017-000234

11 Shah K, Ahmed J, Shenoy N, Srikant N. How different are students and their learning styles? *International Journal of Research in Medical Sciences* 2013;**1(3)**:212–215. doi: 10.5455/2320-6012.ijrms20130808