TECHNOVATION

IN PRACTICE

A119 **TRANSFORMING LEARNING IN TRAUMA AND ORTHOPAEDICS: USE OF 3D PRINTING IN A NEXT-GENERATION SIMULATION MODEL WITH REAL-TIME INTRA-OPERATIVE RADIOGRAPHIC FEEDBACK**

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Introduction: Simulation has become a ISCP mandated component of surgical training, and the challenge remains to develop 'close-to-real' training [1]. Management of paediatric elbow fractures is an obligatory competence for completion of training in Trauma and Orthopaedics. Current methods using saw bones teach the concepts of wire configuration, but the limitations include an absence of soft tissues, and intra-operative X-ray interpretation is not possible. Research question was if suitable models could be designed to maximise the realism of training and allow radiographic assessment during the simulated scenario.

Methods: In conjunction with Axial 3D Printing (Belfast, N. Ireland) a child's elbow model was produced with radiopaque 'bone' and flexible radiolucent 'soft tissues' technology to produce a high-fidelity paediatric elbow, suitable to be used under radiological guidance, as an adjunct to teaching Kirschner wiring of a supracondylar fracture. Simulation training of 19 Orthopaedic Trainees (ST3-8) was undertaken.

Results: Participant feedback was collected with positive responses regarding the model's usefulness for simulation training within a theatre environment, particularly for trainees with less experience. There was a trend towards decreased screening time and duration of the procedure between junior and senior trainees. Junior trainees had a greater increase in self-reported confidence in performing the procedure. This was measured using a 5-point Likert score with improvement of 1.8 in the ST3-4 cohort compared to 0.44 in the trainees ST5+ ($p = 0.003$).

Each trainee was dual marked for their performance of the simulated K-wiring procedure using the Objective Structured Assessment of Technical Skills (OSATS) Global Rating Scale [2]. Senior trainees had an average OSATS score of 31.8 compared to the junior trainees who averaged 27.9 ($p = 0.015$) which mirrors real-life expectations. This proficiency in utilising the simulation model among more experienced surgeons reflects its realism and usefulness as an educational tool.

Discussion: This new 3D printing technique demonstrates development in modern surgical training. Saw-bones have numerous limitations, while the costs and practicalities of cadaveric training remains prohibitive. By combining realism and low risk these 3D printed models may offer a solution to these challenges and contribute to enhanced patient care.

Ethics statement: Authors confirm that all relevant ethical standards for research conduct and dissemination have been met. The submitting author confirms that relevant ethical approval was granted, if applicable

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