

HS02

## **Training safer Orthopaedic trauma surgeons? The TraumaVision Virtual Reality Simulator is a valid and reliable training tool that significantly improves performance in hip fracture fixation**

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### **Background**

Postgraduate surgical education is facing significant challenges the world over with marked reductions in the number of hours worked by trainees. With fewer operations available for trainees and increasing time constraints in place there is an imperative for more efficient methods of surgical training. Virtual Reality (VR) simulators allow the performance of specific technical tasks in an environment that is safe for both trainee and patient.

### **The need for trauma surgery simulation**

Hip fractures are a significant worldwide problem with over 1.6 million annually, and these carry a high morbidity and mortality. The TraumaVision Simulator is a VR simulator with enhanced haptics that allow it to recreate the feeling of cortical and cancellous bone for realistic drilling. Various trauma modules are available pre-loaded with the machine, including fixation of extracapsular neck of femur fractures with a fixed angle sliding screw device, which we analysed.

### **Validation of the TraumaVision VR Simulator**

30 subjects were recruited to evaluate the face content and construct validity of a haptic Virtual Reality trauma simulator for Dynamic Hip Screw (DHS) fixation. They were divided into three cohorts according to clinical experience and seniority. Each participant performed a complete DHS procedure on the simulator and then completed a questionnaire.

There were statistically significant differences between the cohorts and the group that had performed the most DHS procedures in the preceding 24 months had the highest global score, the lowest fluoroscopy time, performed the procedure quickest and had the lowest tip-apex distance and probability of lag screw cut-out.

The experts felt that the simulator's appearance, fluoroscopy and haptics were realistic and that the steps performed on the simulator accurately reflected those encountered in the operating room.

### **Effects of training on the TraumaVision VR simulator**

52 medical students were randomised to two groups : Group 1 (training) performed 5 attempts whilst Group 2 (control) performed only once. After a one-week washout period,

both cohorts repeated the same number of attempts as the week before.

A significant training effect was observed on the VR haptic DHS simulator in improving seven clinically relevant objective performance metrics ((i) total procedural time, (ii) fluoroscopy time, (iii) number of radiographs, (iv) attempts of guide wire insertions, (v) tip-apex distance (TAD), (vi) probability of cut-out and (vii) global score.

Training on VR simulators allows the safe practice and consolidation of technical skills and should play a significant role in the future of orthopaedic surgical training.