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## **Validation of a novel virtual reality robotic simulator.**

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### **Abstract**

#### **PURPOSE:**

We evaluated the face, content, and construct validity of what is, to our knowledge, the only available virtual reality simulator based on a complete kinematic representation of the da Vinci surgical system.

#### **MATERIALS AND METHODS:**

A total of 5 experts (EPs) and 15 novices (NVs) completed exercises on the Mimic dV-Trainer (MdVT). All participants completed three repetitions of the following tasks: (1) Ring and Cone, (2) String Walk, and (3) Letterboard. Participants rated parameters of face and content validity on a five-point Likert-scale questionnaire. Workload imposed by the simulator was assessed using a NASA Task Load Index questionnaire (TLX).

#### **RESULTS:**

Face validity of the MdVT was established as all 20 participants rated the simulator between average to easy-to-use and above-average to high in all parameters of realism. Participants in both EP and NV groups rated the MdVT's overall relevance to robotic surgery as very high. All five EPs assessed the simulator to be a very good practice format and very useful for training residents, thereby affirming content validity. A preliminary assessment of construct validity suggested that the MdVT could differentiate EPs from NVs. The overall TLX workload scores were lower in the EP group for all parameters except for temporal demand.

#### **CONCLUSIONS:**

The MdVT demonstrated excellent face and content validity as well as reasonable workload parameters. The use of this simulator in resident training may help bridge the gap between the safe acquisition of surgical skills and effective performance during live robot-assisted surgery.