cssalt
Center for Safety, Simulation &
Advanced Learning Technologies
UF FLORIDA

cssalt
Center for Safety, Simulation &
Advanced Learning Technologies
UF FLORIDA

Mixed Reality Simulator of Ultrasound-Guided IV Access and Catheterization Fact Sheet
University of Florida Center for Safety, Simulation & Advanced Learning Technologies

This robust, turnkey mixed reality simulator simulates a hand and forearm for practicing, learning, teaching and debriefing IV placement procedures. Designed for austere environments, it does not require wireless or internet access or wet fluids; accepts 110/220V, 50/60Hz. It can be unpacked/set up/be operational in 5-7 minutes by an unfamiliar person. The portable simulator ships inside a military-spec padded case with inbuilt wheels and telescoping pull-handle that meets airline checked luggage size limits (L+W+H=60"); weight < 50 lbs.

Procedures:
- IV catheter placement in dorsal hand
- Shallow IV catheter placement in forearm
- Deep IV catheter placement in forearm under ultrasound guidance

Components:
- 3D-printed physical hand and forearm, including bones
- Virtual model of the anatomy of the veins and arteries.
- Tracked instruments: 6DOF-tracked needle (20 G), IV catheter, and virtual camera
- Common SMMARTS modular stand with interoperable instruments for use with other modular anatomies
- Automated checklist algorithm and replay system

Technology:
- Adheres to SMMARTS (System of Modular, Mixed, and Augmented Reality Tracking Simulators) rapid simulator development platform specs
- Quick-release placement and indexing of SMMARTS-compliant anatomies to SMMARTS modular stand
- Precise sub-millimeter tracking of all tracked tools
- Skin-like gel can be rejuvenated in-situ for indefinite re-use

Features:
- Adjustable view modes for realism and during after action review
- Cognitive aids for alignment of the needle with the ultrasound insonation plane
- Tourniquet monitor detects when tourniquet pressure is applied
- Debriefing with the replay of past procedures
- Virtual vein size responds to applied tourniquet pressure and wrist slap
- Variable diameter and variable depth below skin of virtual veins and arteries
- Arteries pulsate in US image
- Veins collapse with pressure applied by US probe
- Steadiness of virtual veins at the back of the hand responds to proper applied skin traction
- Real catheter advancement is tracked
- Hand can be rotated palm up or palm down
- Scoring algorithm

Mixed Simulator of IV Access and Catheterization Fact Sheet; Jan. 15, 2021 Contact: slampotang@anest.ufl.edu