

# PEDIATRIC ONCOLOGY AND PEDIATRIC MEDICINE

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## Using pediatric ballistic gel vascular access trainers

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Using vascular access trainers for venipuncture education allow residents to practice fine motor skills prior to attempting on patients, where suboptimal methods can lead to variable first pass success rates. There are few studies that have looked at the use of models for pediatric vascular access training which are commercially available but expensive.<sup>1</sup> Ballistics gel is a relatively inexpensive material that can be used to develop low-cost and reusable models that are highly customizable. We present a phantom limb model for ultrasound-guided vascular access. The pediatric vascular access phantom limbs were made from a custom mold created with aluminum metal with the use of a CNC machine. The mold allows for placement of Cole-Parmer Luer Fittings on each end of the silicon tubing. The silicon tubing was purchased from McMaster-Carr and we tested multiple sizes. After testing multiple types of tubing we determined that the "Odor-Resistant Silicone Rubber Tubing" was far more representative of pediatric vessels than latex or vinyl tubing because of the availability in much thinner wall sizes. The 0.062 inch internal diameter tubing was the most useful for the models because smaller sizes resulted in extra luminal fluid collections more commonly. Luer locks were attached to IV tubing and saline syringes to inject fluid into the lumens of the tubing that coursed through the phantom limb to simulation 'flash' upon intravenous access. They were also hand pressurized with a syringe loaded at the end of the model to represent arteries. The curved surfaces of the gel models from the curved molds proved to be more realistic than the commercially available rectangular models. The ballistic gel models proved to be more effective when used with ultrasound to locate veins, and the density and characteristics of ballistic gel matched human tissue better than silicone models. The silicone tubing within the gel models prevented the needle from sticking inside of the ballistic gel compared to the models without tubing, which utilize canals formed from wire removal after model production. Using the tubing, one could observe the flash of colored fluid once intravenous access was gained on the model. The cost per ballistic gel model with silicone tubing was \$11.00 each with a preparation time of 1.2 hours for 4 models. Ballistic gel models were easy to create and relatively inexpensive compared to commercial models, while retaining high customizability.<sup>1</sup> Future models may have curved tubing and more tortuosity to make the models more challenging. A larger quantifiable study to compare the efficacy of the models versus commercially available models in vascular access for pediatric patients is needed.

## Biography

Andrew Ku is a senior at Bard College at Simon's Rock. He was a research intern at Lucille Packard Children's Hospital.

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