

## ACS 2023 Surgeons and Engineers: A Dialogue on Surgical Simulation Meeting

### Research Abstracts

#### Development of an Affordable Abdominal Fascia Closure Model to Train Surgical Residents

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**Introduction:** Proper surgical technique of midline laparotomy closure is crucial to prevent fascial dehiscence, evisceration, and incisional hernia. Formal simulation training of residents in fascia closure is lacking. To address this training gap, we are developing an abdominal wall closure simulation course for our residency program. This pilot study was designed with the goal to develop a realistic, low-cost model of the abdominal wall for use in our surgical simulation center.

**Methods:** We created a low-cost (\$54) multilayer abdominal wall model based on commercially available materials. Using Smooth-On® silicone gel-filling technique and various fabrics and materials to delineate layers, a 12x10-inch three-layered (artificial skin, subcutaneous fat, and fascia) pad was constructed. This pad was placed on a metal frame attached to a wooden base to simulate an abdominal wall with balloons underneath to represent bowel. A midline cut through all layers simulated a laparotomy incision. Surgical faculty and senior surgical residents subjectively assessed the model. The evaluators were asked to suture and then rate the model in terms of realism and training utility. Responses were measured with a 5-point Likert scale (1 - strongly disagree to 5 - strongly agree).

**Results:** Four residents and fourteen attendings participated in the study. Majority of evaluators agreed that the abdominal wall model is a reasonable representation of a midline laparotomy, scores range 3-5, mean  $4.28 \pm 0.57$ . Evaluators agreed that the fascia had realistic feel on needle insertion, scores range 2-5, mean  $4.17 \pm 0.79$ ; and that the model could be used to teach residents to close midline laparotomy, scores range 3-5, mean  $4.44 \pm 0.62$ .

**Conclusions:** Our synthetic model demonstrated a reasonable realism, low cost, and ability to re-use the model multiple times. It is endorsed by faculty and residents as a tool to enhance the training of fascia closure technique.

