Validity and Description of a Low Fidelity Training Platform for Vascular Surgery

John R. Admire, MD

**Background:** This study was undertaken to produce a trainer that would serve as a platform for surgical trainees to practice with vascular instruments and vascular size needle handling which emphasizes independent feedback with objective quality parameters.

**Methods:** A low fidelity trainer was constructed to address the perceived inadequacy of instrument technique amongst surgical novices on the vascular surgery service. The trainers consisted of standardized shapes designed to test ability to control distance travel and measure accuracy of needle placement. There was a smaller figure which called for a small needle (13mm curved) and castro needle drivers. A slightly larger needle driver called for a larger needle (25mm curved) and a more traditional needle driver. Five surgical experts (faculty) were recruited to perform three timed trials each of the two figures on this trainer. The average of these times was calculated for each of the two figures and used time for the proficiency training standards for the novices. Additionally four senior residents were timed. Finally, interns pre-tested to assess their baseline ability and then trained to proficiency after which time they were post-tested. Based on the pre-test times of interns, the trials from senior residents and the trials from experts, construct validity was studied.

**Results:** Experts performed the time trials with no quality errors. Quality errors included locking, missed targets, suture breakage and improper loading. Average time (seconds) for the small figure was 98.4 with standard deviation (SD) of 8.1. Average time for the large figure was 101.2 with SD 11.6. Average time for senior residents for the small figure was 114.5 with SD 23.2. Average time for senior residents on the large figure was 110.6 with SD 15.5. Average pretest time for interns on the large figure was 183.7 with SD of 56.4 but on post-test had improved to a mean of 82.0 with SD of 8.2. Finally the interns improved on the small figure from a baseline of 188.7 with SD of 103.7 to 86.3 with SD of 3.8. All interns reached proficiency during training and post-test.

**Conclusions:** The vascular suturing trainer demonstrates construct validity based on its ability to discriminate novices, senior residents and experts in vascular surgery. Additionally, 100% of novices were able to train to proficiency.