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You Never Know Unless You Try

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Over the past two years, simulation in surgery has been on the lips of many educators. Even the American Council for Graduate Medical Education has encouraged residency programs to include simulation and skills laboratories in their curriculum [1]. Now, informed by simulation's successful utilization in the aviation industry and military, educational paradigms normally centered in the operating room have dared to engage virtual reality and the concept of "suspension of disbelief" to implement innovative simulators to train residents in basic skills, emergency scenarios, and management techniques. Invigorated by a vibrant symposium in Cambridge, Massachusetts, 2007, on cardiac simulation [2] and further stimulated by enthusiasts from several residency programs, the concept of a basic skills CT surgery Boot Camp was born. Conceived by Dr Richard Feins, American Board of Thoracic Surgery Chair, and adopted by the leadership of the Thoracic Surgery Directors Association (TSDA), the organization most directly committed to resident education, the initial concept took root and developed into a first-ever collective experience for 33 first-year residents in Cardiothoracic Surgery from around the country.

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Financed by TSDA through contributions from the ABTS, TSFRE, STS and AATS, the first CT surgery Boot Camp brought volunteer faculty (Table 1) and 33 first-year CT residents from all across the country (Table 2) to Chapel Hill, NC, during the first weekend in August 2008 to test a simple hypothesis: Simulation can provide skill sets that will enhance CT surgery residents' education and thereby improve the overall quality of residency graduates.

Boot Camp was structured with four groups of residents rotating through four half-day sessions. Armed with newly-developed simulators, the faculty educators were given specific objectives to achieve with their individual groups. In general thoracic surgery, skills in mediastinoscopy as well as bronchoscopy, and implementation of one-lung anesthesia were practiced in one room, while hilar anatomy, dissection and pulmonary resections were covered in another. On the cardiac front, small- and large-vessel anastomotic techniques were practiced on pig-heart models at various angles using video assessment of skill progression. The fourth session addressed cardiopulmonary bypass

skills utilizing beating pig heart simulation together with non-beating perfused hearts and mock CPB circuits to expose residents to the basics of CPB, trouble-shooting CPB problems, recognizing and responding to CPB emergencies, and practicing the techniques of aortic and atrial cannulation, thus simulating all the steps of going on and coming off CPB. Every resident group had equal exposure to every skill set session. In addition, on the final day of Boot Camp, all residents attended a hands-on wet-lab for aortic root surgery and valve replacement.

The Boot Camp experience was two and one-half days of non-stop education. Skeptics may say, "How do you know the residents learned?" The honest answer, of course, is we don't know yet what we accomplished, but the hope is that we will have positive feedback from the residency program directors in the near future. What we do know is that a group of faculty with uncertainty about the process came together and with every session grew more passionate about the experience. Cardiac and thoracic faculty learned from each other's simulators and teaching techniques. Time was devoted to each resident not influenced by OR schedules or other extraneous factors, and in the end most faculty members believed they had become better teachers. Furthermore, the passion, enthusiasm and discipline exhibited by the faculty were infectious captivating the residents and providing them with a perfect environment to learn and grow. We know from post-Boot Camp evaluation forms that for many of the residents the experience exceeded their expectations and provided a "safe learning environment" that not only provided valuable "intensive practice" but also rekindled "the spirit of surgery."

Yes, it is true we do not yet know the final results of our collective effort, although the first part of the original hypothesis can unquestionably be affirmed. Even though the faculty members were exhausted at the conclusion, we all knew in our hearts that something special, something good, and something important had occurred. How this experiment plays out will need the test of time to assess. But imagine if each program director used even part of this process to impart skills to his or her residents, thus improving confidence, techniques and basic recognition skills *outside* the OR and thereby enhancing and capitalizing on every opportunity *in* the OR. Imagine if the cardiothoracic program directors put on their own mini-Boot Camp programs for beginning general surgery residents or even medical students, allowing potential recruits to share in the excitement and to experience the skill sets necessary to cardiothoracic surgery. Most importantly, imagine the privilege of imparting our knowledge to the next generation while not pressured by the multiple factors affecting us daily.

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Table 1. Boot Camp Faculty List

Faculty	Institutions
Andrea Carpenter, MD	University of Texas Health Science Center, San Antonio, TX
James Fann, MD	Stanford University, Stanford, CA
Robert Poston, MD	Boston University, Boston, MA
Bill Baumgartner, MD	The Johns Hopkins Hospital, Baltimore, MD
James Gangemi, MD	University of Rochester, Rochester, NY
Francis Robicsek, MD	Carolina Heart Institute, Carolinas Medical Center, Charlotte, NC
George Magovern, MD	Allgheny General Hospital, Pittsburgh, PA
Walter Merrill, MD	University of Cincinnati, Cincinnati, OH
Kamal Mansour, MD	Emory University, Atlanta, GA
Valerie Rusch, MD	Memorial Sloan-Kettering Cancer Center, New York, NY
Manjit Bains, MD	Memorial Sloan-Kettering Cancer Center, New York, NY
Malcolm DeCamp, MD	Beth Israel Deaconess Medical Center, Boston, MA
Thomas Daniel, MD	University of Virginia, Charlottesville, VA
M. Blair Marshall, MD	Georgetown University, Washington, DC
Peter Pairolero, MD	Mayo Clinic, Rochester, MN
L. Penfield Faber, MD	Rush University, Chicago, IL
Cameron Wright, MD	Massachusetts General Hospital, Boston, MA
Ronald Angona	University of Rochester, Rochester, NY
Paul Ramphal, MD	University of the West Indies and University Hospital, Kingston, Jamaica
Katherine Birchard, MD	University of North Carolina, Chapel Hill, NC
Benson Wilcox, MD	University of North Carolina, Chapel Hill, NC
Daniel Coore, PhD	University of the West Indies, Kingston, Jamaica
Conference Directors	Institutions
John Brown, MD	Indiana University, Indianapolis, IN
John Calhoon, MD	University of Texas Health Science Center, San Antonio, TX
Richard Feins, MD	University of North Carolina, Chapel Hill, NC
George Hicks, MD	University of Rochester, Rochester, NY

So, in the end and based on preliminary feedback from residents and faculty, the first TSDA Boot Camp was a resounding success. We hope to report more formal assessments and outcomes over the next year, but even now we feel strongly that every resident could benefit from this approach. We urged all residents who attended the Boot Camp to carry the mantra of simulation back to their program directors and advocate for the process at their own

Table 2. Thoracic Surgery Directors Association Boot Camp: Residency Programs Represented

Institutions
Brigham and Women's Hospital
University of Michigan
Beth Israel Deaconess Medical Center
The Johns Hopkins Hospital
University of California - Los Angeles
University of Minnesota
Massachusetts General Hospital
University of North Carolina
Boston University
University of Virginia
Northwestern University
Ohio State University
Medical University of South Carolina
Allegheny General Hospital
University of Cincinnati
Memorial Sloan-Kettering Cancer Center
Emory University
Duke University
University of Pittsburgh
University of California - Davis
University of Texas Southwestern
University of California - San Diego
University of Medicine and Dentistry of New Jersey (UMDNJ)
University of Texas - San Antonio
Mayo Clinic
Long Island Jewish Medical Center
University of Colorado
University of Alabama
University of Southern California
University of Washington
University of Iowa
New York University
University of Rochester

institutions. We hope to expand the Boot Camp so that program directors who did not send a resident this year can do so next year, and even come and participate in the experience themselves. It is an open invitation, and we can offer assurances that it will be time well-spent. Lastly and perhaps most importantly, at a time when our specialty is struggling in both education and recruitment, simulation could be part of a new curriculum that invigorates and captivates new recruits to our honorable and noble profession.

Hey, you never know unless you try.

References

1. Accreditation Council for Graduate Medical Education in Surgery. Available at http://www.acgme.org/acWebsite/downloads/RRC_progReq/440_general_surgery_01012008.pdf. Accessed August 21, 2008.
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