

PHILADELPHIA GI TRAINING GROUP

Profile

- Collegial group of physicians from seven teaching institutions
- Installed AccuTouch simulator at Hahnemann University
 - Philadelphia, PA
 - 618 bed teaching facility
 - www.hahnemannhospital.com

Key Priorities

- Explore potential advantages
 - Improved patient safety
 - Decreased time to proficiency
 - Reduced risk
- Develop a better way to teach

Simulators and Modules Used

- Endoscopy AccuTouch System
 - Introduction to Flexible Sigmoidoscopy
 - Introduction to Colonoscopy
 - Colonoscopy: Biopsy
 - Colonoscopy: Basic Polypectomy

Key Benefits of System

- Haptics make it feel real
- Reduces time to proficiency
- Encourages independent learning
- Promotes patient safety
- Supplies a nonthreatening training environment
- Helps avoid revenue losses
- Provides convenient student assessment

Hahnemann University Hospital



Faster Proficiency, Reduced Risk, and Increased Training Efficiency for Colonoscopy

“You can easily tear the lining of the colon or make a hole, and one of the potentially negative aspects of simulation would be if you learned to be rough. That isn’t a problem with Immersion Medical’s simulators. Haptics makes the experience very realistic.”

—Dr. James C. Reynolds, Drexel University College of Medicine, interim chair of medicine and president of the Philadelphia Gastroenterology (GI) Training Group

Endoscopy AccuTouch® System **SUCCESS STORY**

Learning With Haptics

The Philadelphia GI Training Group, a collegial affiliation of seven medical colleges, has been training gastroenterology doctors as a group for over 40 years. Using an unrestricted grant from AstraZeneca and other minor donors, the group purchased an Immersion Medical Endoscopy AccuTouch System in 2002. At that time, the doctors believed simulators with realistic haptic feedback could enhance learning, minimize patient discomfort, and reduce procedural time and risk. After the simulator was installed at Hahnemann University Hospital, several doctors belonging to the group designed a study that would either prove or disprove the value of simulation training for colonoscopy procedures.

A Better Way to Teach

One of the group's members, Dr. James C. Reynolds of Drexel University College of Medicine, explains the motivation for the evidence-based study. "We wanted to explore each of the potential advantages of this new technology: improving patient safety, decreasing the time required to achieve proficiency, and reducing risk. After using the same approach of training fellows for over forty years by having the fellows learn on patients, we felt that our discipline needed to develop a better way to teach."

"We used to think that doctors could learn to do colonoscopies in 20 to 50 cases. But the data now shows that it takes about 300 cases to achieve proficiency. My colleagues and I decided to do a prospective survey to find out if simulation could really work in acquiring the skills needed to perform colonoscopy."

An Evidence-based Medical Survey for Colonoscopy Simulators

The group's evidence-based survey was designed as a single-blinded, randomized, prospective trial. Nineteen first year GI fellows from five programs were enrolled for over two years to test the results of their training on the Endoscopy AccuTouch System. Ten fellows were randomized to simulator use prior to fellowship, and nine fellows abstained from performing colonoscopy during that time.

At months one, two, and six of fellowship, attendings, blinded to the randomization, evaluated fellows' skills during actual colonoscopy. The combined two year data reveals that the simulator group achieved superior scores during the first and second months. The six month data, starting in 2002, revealed a less impressive advantage, except for a significantly faster time to cecal intubation.

	Simulator Training Group	Control Group	Statistical Significance
1 month evaluation			
Distance achieved without attending intervention	2.4	2.0	p < 0.045
2 month evaluation			
Distance achieved without attending intervention	6.4	5.4	p < 0.001
6 month evaluation			
Distance achieved without attending intervention	3.3	2.9	p = NS
6 month evaluation			
Time to cecal intubation	13.3 min.	17.5 min.	p < 0.03

Fellows were scored on time to cecal intubation, distance achieved without attending intervention (1 = rectosigmoid, 2 = transverse colon, 3 = ascending colon, 4 = cecum), number of attending interventions, and overall attending assessment (scale of 1-10).



Endoscopy AccuTouch System

A realistic, computer-based system for teaching and assessing motor skills and cognitive knowledge of flexible bronchoscopy and upper and lower gastrointestinal flexible endoscopy. Real-time computer graphics include anatomic models developed from actual patient data. Force feedback is transmitted through the flexible scope to provide tactile sensations mimicking the actual feel of a procedure.

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—Dr. James C. Reynolds

“Now, using simulation, instead of walking in as novices, our fellows walk in with a fairly high level of experience.” —Dr. James C. Reynolds

What's Next?

The study concluded that initial use of the simulator is effective in training colonoscopy during the first two months of fellowship. By six months, the differences between the two groups appears to narrow. The group believes that future studies should evaluate if continued use of the simulator throughout fellowship can sustain initial advantages of endoscopic simulator training.

A Better Way to Learn

Besides the initial increased proficiency, the GI group found other benefits. “All the trainees love it,” says Dr. Reynolds. “It’s a nonthreatening environment.”

With the simulator incorporated into a proven medical curricula, GI fellows can learn some of the basic skills independently. The simulated program allows for various techniques to be practiced, allowing the fellows to gain confidence as well as a better understanding of how the colon might react in certain circumstances. Using the didactic portion of the module, they can review videos of a subject matter expert explaining how to perform a procedure. They can access a virtual attending that supplies context-sensitive help instead of asking their program director for advice. And they can perform without stress, knowing there’s no risk of patient complications.

In addition, attendings benefit from the powerful database that captures the results of each case the fellow performs. They can review each novice clinician’s progress at their convenience.

More Efficient Operations

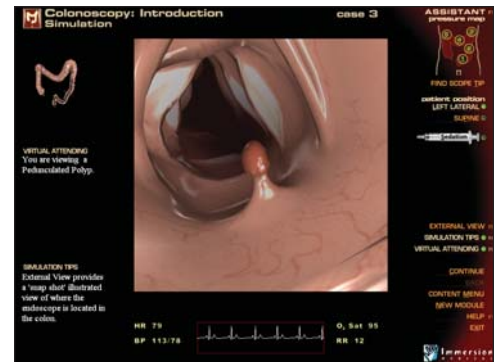
In addition to training enhancements, medical simulation allows for the experienced staff to be more efficient. “If I can do a case every half hour, that means I do 16 a day. But if I’m training, research says that it takes 30 percent more time to complete the procedure,” explains Dr. Reynolds. This cut in productivity reduces hospital revenue, while the fixed costs for the support staff and facility remain the same.

“All the trainees love it. It’s a nonthreatening environment.”

—Dr. James C. Reynolds

With simulator education, trainers can stay productive, and student doctors can practice their technique before performing on patients. “Now, using simulation, instead of walking in as novices, our fellows walk in with a fairly high level of experience,” says Dr. Reynolds.

The added expertise benefits the fellows, the patient, the professor, and the Philadelphia GI Training Group.



MODULES

Introduction to Flexible Sigmoidoscopy Module

The real-time graphics show anatomy from actual patients and react like real tissue in real time; The colon expands with air insufflation and collapses with suction. The anatomy and procedure is explained through educational aids including 3D animations, video tutorials, a pathology atlas, and information on indications, contraindications, and complications of flexible sigmoidoscopy.

Introduction to Colonoscopy Module

As in all modules, users handle a colonoscope that looks, feels, and operates like a real scope. Realistic experiences include red-out when the scope tip presses against the mucosa, stool on the lens, and paradoxical motion when in a loop. Various patient cases and comprehensive didactic content is included.

Colonoscopy: Biopsy Module

Trainees use forceps in the working channel of the endoscope to interact with the mucosa and lesions. Interaction between the forceps and mucosa is very realistic, teaching the user the feel of tissue resistance when taking a sample and showing tissue deformation that accurately reflects the amount of pressure exerted by the tool. Intubation of the terminal ileum is also possible.

Colonoscopy: Basic Polypectomy Module

This lower GI module allows users to identify, capture, transect, and remove simulated polyps. Polypectomy equipment including snares, mini snares, hot forceps, electrocautery tips, and an electrosurgical unit are simulated. Complications include uncontrolled bleeding when the polyp head is guillotined, electrocautery-induced perforation, and vasovagal reactions.

Endoscopy AccuTouch® System **SUCCESS STORY**

The Philadelphia GI Training Group

The Philadelphia GI Training Group, a collegial affiliation, is comprised of physicians from:

- Cooper Hospital/University Medical Center, Camden, NJ
- Drexel University College of Medicine, Philadelphia, PA
- Hospital of the University of Pennsylvania, Philadelphia, PA
- Lankenau Hospital, Wynnewood, PA
- Temple University Hospital, Philadelphia, PA
- Thomas Jefferson University Hospital, Philadelphia, PA
- Graduate Hospital of Philadelphia, Philadelphia, PA



Habnemann University Hospital where the AccuTouch simulator is installed.

Immersion Medical, Inc.

Immersion Medical designs, manufactures, and markets computer-based medical training simulation systems worldwide. The systems integrate proprietary computer software and tactile feedback robotics to create highly realistic medical procedure simulations that help train doctors. The company's four key product lines are the CathSim® Vascular AccuTouch System, the Endoscopy AccuTouch System, the Endovascular AccuTouch System, and the Laparoscopy AccuTouch System.

Immersion Corporation

Founded in 1993, Immersion Corporation is a recognized leader in developing, licensing, and marketing digital touch technology and products. Bringing value to markets where man-machine interaction needs to be made more compelling, safer, or productive, Immersion helps its partners broaden market reach by making the use of touch feedback as critical a user experience as sight and sound. Immersion's technology is deployed across personal computing, entertainment, medical training, automotive, and 3D simulation markets. Immersion and its wholly-owned subsidiaries hold more than 230 issued patents worldwide.

James C. Reynolds, M.D.

Dr. Reynolds is professor of medicine, interim chairman of the Department of Medicine, and chief of the Division of Gastroenterology and Hepatology at Drexel University College of Medicine.



A native of Florida, Reynolds graduated from Florida State University and received his medical degree from the University of Florida with honors. He completed a residency at Cornell University and a three-year fellowship at the Hospital of the University of Pennsylvania. He then joined the faculty at the University of Pennsylvania.

Reynolds is a member of the editorial board of Digestive Diseases and Sciences and is a reviewer for a large number of journals. He has published over 100 manuscripts in peer-reviewed journals and co-edited five books. He has received numerous honors including Phi Beta Kappa, AOA, "1995 Physician of the Year" by the Greater Pittsburgh Chapter of the Crohn's and Colitis Foundation of America, recognition by Pittsburgh Magazine as the most outstanding gastroenterologist in Pittsburgh on two separate occasions, named among Philadelphia's "Top Docs" in a recent issue of Philadelphia Magazine, and awards for teaching in both basic and clinical sciences from the University of Pennsylvania.

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