

Computer-Driven Hemodynamics Simulator

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SUMMARY

Researchers in the Division of Cardiothoracic Surgery at UCLA have developed a computer-based, reconfigurable hemodynamic simulation program for realistic medical training.

BACKGROUND

Simulation training in surgery and critical care is a part of the mandated training programs for medical professionals to teach and evaluate students outside the context of the operating room. This type of training provides an ethically sound method to improve the confidence and skills of potential users in surgical and critical care settings. There are two major types of simulators: physical equipment simulators and computer-based simulators. However, current commercial technologies in computer-based simulators are typically not reconfigurable and thus, do not provide an educational value translatable direct patient care. Thus, new dynamic, reconfigurable modules are necessary to more adequately prepare medical trainees for clinical care.

INNOVATION

Dr. Peyman Benharash and colleagues in the Division of Cardiothoracic Surgery at UCLA have developed dynamic simulator software based on hemodynamics parameters to generate realistic patient monitors for the training of medical professionals. The software comprises a PC computer-based hemodynamic simulation program that is highly customizable to drive realistic and hands-on training. Instructors can generate custom clinical scenarios (e.g. shock, bleeding, tamponade) that students can then use. These cases can be loaded as individual files or in communication between the client (student) side and a server. In addition, the simulator is capable of storing users' responses in databases for remote instruction. In a pilot study, medical trainees with access to this technology showed a 14% improvement in post-training scores the over traditionally trained trainees. Thus, the technology has a clear application as a medical education module.

APPLICATIONS

- ▶ Incorporation into the training programs of medical students, nurses, and residents.
- ▶ Inclusive cardiovascular simulations for complex situations such as cardiopulmonary bypass, respiratory distress and the electrolyte imbalances.
- ▶ Customizable to be adapted in other healthcare training programs, including pharmacy, nursing, dentistry, veterinary medicine, and chiropractics.

ADVANTAGES

- ▶ Highly reconfigurable in generating customized, realistic patient monitoring.
- ▶ Highly dynamic for storing information and remote instructions.

STATE OF DEVELOPMENT

- ▶ Prototype exists.
- ▶ A 24-person trial demonstrated superior educational results.

RELATED MATERIALS

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INVENTORS

- ▶ Benharash, Peyman

OTHER INFORMATION

KEYWORDS

Hemodynamics simulator, customized
interactive software, patient monitor,
medical school curriculum/training

CATEGORIZED AS

- ▶ [Medical](#)
- ▶ [Software](#)

RELATED CASES

2012-184-0

▶ Benharash P, Frank P, Hoy B. "Development and Use of a Novel Cardiovascular Simulator: Time for a Paradigm Shift?" Am Surg. 2012 Oct; 78(10):1132-6.

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

▶ [Automated Optical Chest Tube Air Leak Detection System](#)

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