Low-Cost, Take-Home, Beating Heart Simulator for Health-Care Education

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For medical students studying the evaluation and diagnosis of heart arrhythmias, the beating heart simulator combines visual, auditory, and tactile stimuli to enhance the student's retention of the subtle differences between various conditions of the heart necessary for diagnosis.
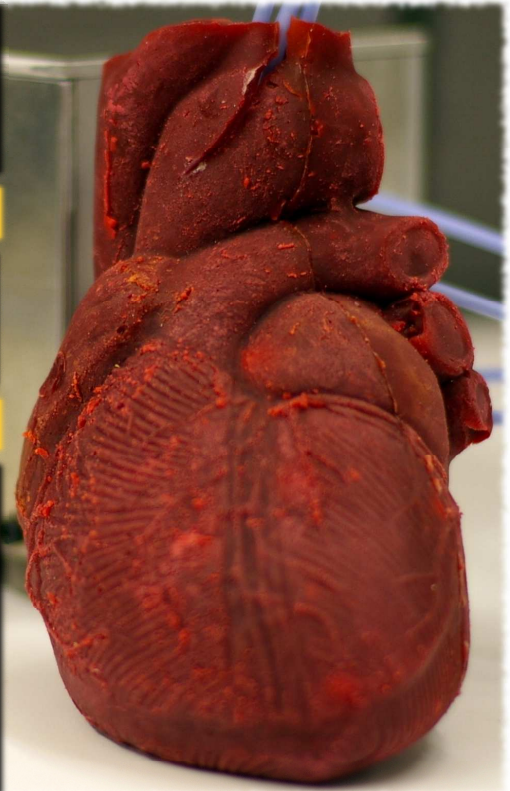
Background

Memory retention can be enhanced by providing multiple forms of sensory input, such as auditory, visual, and tactile [1]. The beating heart simulator provides the benefits of a comprehensive learning environment through multiple forms of stimuli while maintaining a price level that makes the unit readily available for the classroom setting.
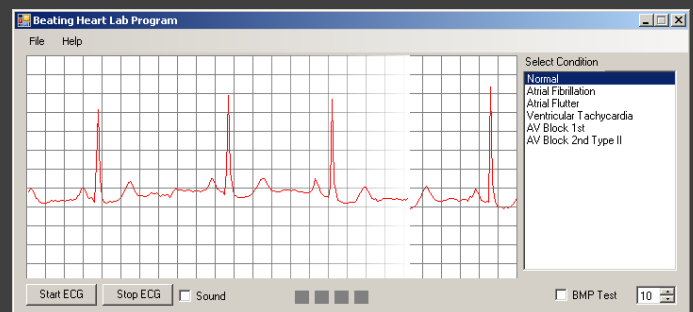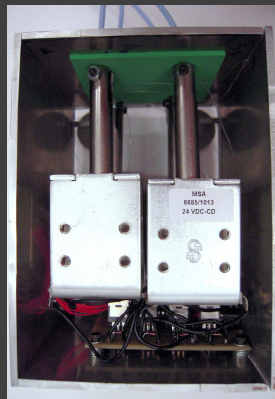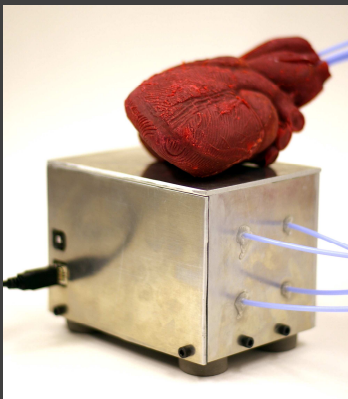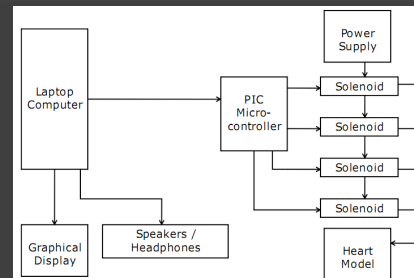
Concept

The cardiac simulator connects to a personal computer where the user interacts with the model through a graphical user interface.

- Simple interface and device operation.
- Low-cost compared with existing simulators [2].
- Portable, plug-and-play design.

Results

The beating heart simulator prototype was designed to incorporate computer software to provide the visual and auditory feedback to the user while simultaneous tactile information is fed to the user through a USB connected heart model. The tactile portion of the device uses four pull-style linear solenoid actuators. Computer software allows the user to select from a variety of heart conditions.

Future Work

The simulator needs to undergo validation studies to ensure that it meets the intended design goal of being a useful educational tool for health-care students. Long-term, the simulator could be marketed as a learning tool for K-12 students or for patients to enhance comprehension.

References: [1] D.S.Ruchkin,J.Grafman,K.Cameron,R.S.Berndt. *Behavioral and Brain Sciences* 26(2003), 709-728. [2] http://www.thecgroup.com