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Beating heart simulator - conquest of cardiac motion

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Simulators have gained an important role in cardiac surgical training. Beating heart surgery is demanding in terms of technical skills. The role of simulators hence cannot be overemphasized. Simulating cardiac motion credibly as to provide an apt practice atmosphere has been a challenge. Over the years we have designed many simulators and here we trace the steps that led to the most credible simulation of cardiac motion. The initial simulators were motionless emphasizing only the varied positions. Tilting platforms came up next but were a poor design and the movements had no similarity to that of the heart. The next phase saw the inflatable balloon which was placed in the left ventricle and inflated and deflated using motorized bellows. This was the reverse of the actual cardiac motion and hence the design was changed. We used a motorized arm to move that of the stabilizer using a double ring linkage. This provided a more credible systole and diastole. Varying the positions and using a rheostat we could vary the heart rate and range of motion. This model offers more meaningful practice to the aspiring beating heart surgeon⁵

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