demonstrated their 'out of the box' thinking capability, which is of paramount importance for the development of future innovative surgical techniques and procedures.

Of note, developing and actively training on simulators is one (but considerable) step in contemporary adult surgical learning. However, this step can only be successful if constructive feedback is provided by teachers/trainers. Regular feedback is an important part of any learning experience and can guide the trainees’ future learning by identifying strengths and areas that could be improved. Also, trainees need time and encouragement to reflect on the subject and their performance (self-assessment) [9, 10].

After careful deliberation and evaluation of the criteria, the international jury of cardiac surgeons decided to select the Valladolid Cardiac Team Coronary Anastomosis Simulator Box, submitted by Dr Arroyo, for the EACTS Ethicon Simulation Award 2011. This winning simulator prototype is now being translated into an industrial product (Fig. 7) and is currently put into mass production. It will be made available by our industrial sponsor to cardiac surgical residents, at no cost, in Europe and beyond and used as a training tool for the practice of coronary anastomosis.

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REFERENCES


eComment. Coronary anastomosis simulation: assessing surgical dexterity

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This article essentially provides an insight as to how cardiac surgical trainees can benefit from a low-cost coronary anastomosis simulator [1]. In our view, the outcome of the considerable effort spent on the trainees would be further enhanced if they were also given the opportunity to propose their own way of assessing the impact of anastomosis on the simulator constructed. In fact, assessment of surgical dexterity has been a major topic of research across several surgical specialties [2], including cardiac surgery [3], and it is currently an essential element in most simulation systems. More advanced modules such as Virtual Reality simulators, automatically generate several performance parameters ranging from very simple ones (e.g. time to completion), to more complex metrics such as the instrument’s path-length and the type of errors committed [4]. Though they are useful, these errors are usually analyzed independently, which imposes some difficulties in establishing a relationship with potentially more meaningful competency domains. Hence, it would be very interesting to see if the residents have any proposals as to how to measure such errors and how one could relate key surgical skills [5] with the proposed simulation tools. Moreover, it would be also interesting to see the residents’ thoughts on the role of bimanual dexterity, in terms of the analysis of technical performance, and how this type of skills could be incorporated into the proposed simulation setting. Hand motion synchronization has recently emerged as an important metric that can be obtained from the hand kinematics based on electromagnetic sensors attached to the surgeon’s hands. This metric has essentially a dual role, as it can serve both for evaluation purposes (e.g. by measuring hand-to-hand
synchronization), but also as a means to automatically segment a surgical operation/procedure into its key interventional phases for further analysis. Hence, prompted by the recent advances in the domain of surgical assessment and performance analysis, it would of great interest to see additional proposals and ideas on novel assessment metrics and ways to extract such metrics in low fidelity simulators.

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References


