



CARDIAC SPOTLIGHT

The New "See One, Do One, Teach One" – Simulation Based Training



Erik Rafflenbeul

Interventional Cardiologist

Department of Cardiology, Schön Klinik Hamburg, Germany

Email: e.rafflenbeul@kardiologie-hamburg.com

<https://orcid.org/0000-0002-2065-1295>



@KardiologieHH

The exponential growth of medical knowledge, with a currently measurable doubling time of knowledge every 73 days, poses a significant challenge for us as medical professionals when it comes to learning. In addition to imparting theoretical knowledge, the mastery of techniques (stenting strategies), materials (catheters, wires, stents, etc.), and procedures (access routes, complication management, etc.) plays a crucial role in interventional cardiology.

"See one, do one, teach one": The "S1D1T1" education model introduced by William Stewart Halsted in 1890 is no longer appropriate considering the increasing complexity of medical procedures today. The answer of the 21st

century must be that there are more effective, meaningful, and safe training methods available. One essential component in this portfolio is simulation-based training (SBT) to train new skills and to advance the already known skills. SBT closes the gap between theory ("what I know") and practice ("how can I apply my knowledge in a practical manner"), while simultaneously minimizing patient risk through targeted procedural training. It is well known that hands-on practice is a particularly suitable method for acquiring new knowledge and skills in a sustainable way.

Special simulators are available on the market to train procedures, beginning from performing a coronary angiogram for beginners up to carrying out complex PCIs, like bifurcation stenting or CTO procedures, for professionals with already experience in the field of interventional cardiology. In so-called "wet models," it is possible to implant real materials, like stents, in vascular models, and to see what happens with the material during every step of the procedure.

The evolution of SBT includes specially designed virtual reality simulators (e.g. Mentice VIST G7+) that offer several more advantages for simulation-based training (Figure 1). Virtual reality simulators provide a realistic and immersive virtual reality environment that closely mimics real-life clinical scenarios. This high-fidelity simulation allows healthcare professionals to practice procedures and interventions in a safe and controlled setting. Furthermore, virtual reality simulators offer a wide range of training modules and scenarios, covering various medical specialties (e.g. coronary or structural) and procedures (stenting, TAVI, PFO closure, transseptal puncture, etc.). This versatility allows for tailored training experiences that address the specific needs of different healthcare professionals. It supports collaborative

learning and allows multiple users to engage in team-based training exercises. All this fosters communication, coordination, and decision-making skills in a simulated clinical environment.

Moreover, virtual reality simulators feature advanced haptic feedback and realistic anatomical models, enhancing the realism of the training experience. Users can feel the resistance and forces associated with different procedures, improving their tactile skills and hand-eye coordination. Overall, SBT on virtual reality simulators combines realism, versatility, feedback, and collaboration to enhance the skills and competency of healthcare professionals.

To implement SBT into routine practice for interventional cardiologists, the "German Working Group for Interventional Cardiology" (AGIK) is taking the lead in modern education for fellows and has designed two special courses to train basic skills to perform a proper and contemporary coronary angiogram AND to plan and carry out a PCI. Implementing SBT into interventional cardiology training

curricula is the next step to realize the transition from the old S1D1T1 to contemporary, modern, and innovative training for cardiologists worldwide.

Understanding this need and the spirit of the time, the Online Cardiology Club has designed a special Young Cardiologist Summit in Istanbul (September 30th to October 1st), combining theoretical talks on various topics with simulation-based training in front of the audience. The training includes step-by-step procedures, starting from normal PCI, progressing to complex PCI, concluding with structural interventions such as TAVI-implantation or LAA occlusion.

In conclusion, say goodbye to S1D1T1 and hello to SBT because SBT offers a promising perspective and significant opportunities for medical professionals, particularly in the field of interventional cardiology. The traditional "S1D1T1" approach is no longer sufficient to keep up with the increasing complexity of medical procedures. SBT provides a more effective, meaningful, and safe training method that bridges the gap between theory and practice.



Figure 1. Image-guided procedural VR trainer for medical professionals.

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