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Training effects during simulation of robot de-docking for cardiac resuscitation

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Introduction & Objectives: Cardiac resuscitation and defibrillation during robot-assisted surgery is challenging because robot arms and ports need to be removed and the operation table has to be brought in the starting position within latest 180s. The aim of our investigation was to measure the time between cardiac alert and start of resuscitation in a simulation model as well as the change of confidence with the emergency procedures.

Materials & Methods: A multidisciplinary team of urologic surgeons, OR assistants, nurses, anaesthesiologists and their assistants were first theoretically instructed on the emergency steps. Afterwards, the emergency scenario was simulated under real-life conditions in the OR room with a draped and cable-connected plastic torso, connected ports/arms, and a 30° lowered table. The time for retraction of the robot, removal of the ports and straitening of the table as well as the time between cardiac alert and resuscitation/defibrillation was measured separately. Additionally, the self-confidence of the team members for following the correct sequence of steps during robot de-docking was evaluated with a 5-point Likert scale before and after the training.

Results: A total of 42 team members participated in the emergency training. Removal of the robot/ports and straitening of the table took an average time of 34s (figure 1). Cardiac resuscitation and defibrillation started after an average time of 39s and 125s, respectively. The self-confidence of team members increased during emergency training, while only 18/42 team members (42.9%) felt confident before training, 40/42 (95.2%) reported excellent or good confidence after the training (figure 2).

Figure 1
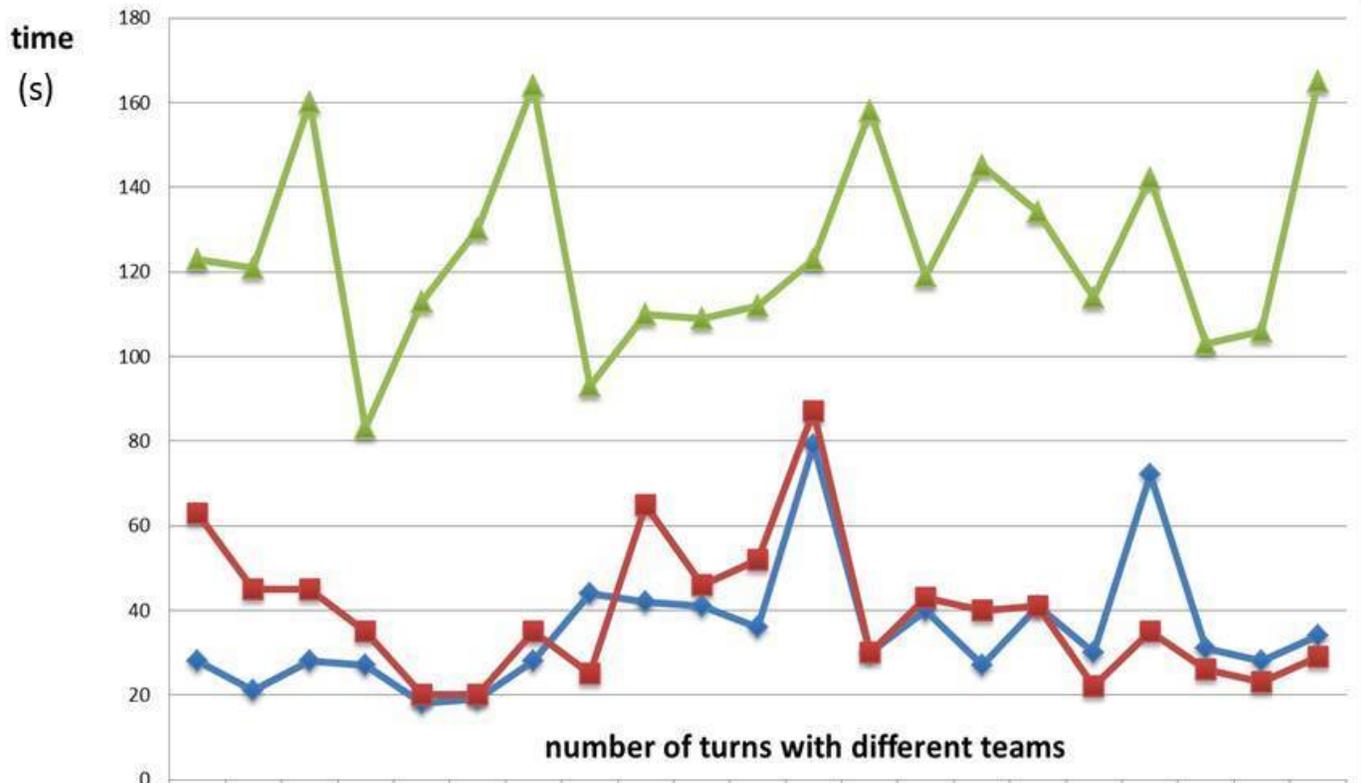
number of turns with different teams	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
robot retracted	28	21	28	27	18	19	28	44	42	41	36	79	30	40	27	41	30	72	31	28	34
first cardiac massage	63	45	45	35	20	20	35	25	65	46	52	87	30	43	40	41	22	35	26	23	29
first defibrillation	123	121	160	83	113	130	164	93	110	109	112	123	158	119	145	134	114	142	103	106	165

Figure 2

self-assesment: correct handling...
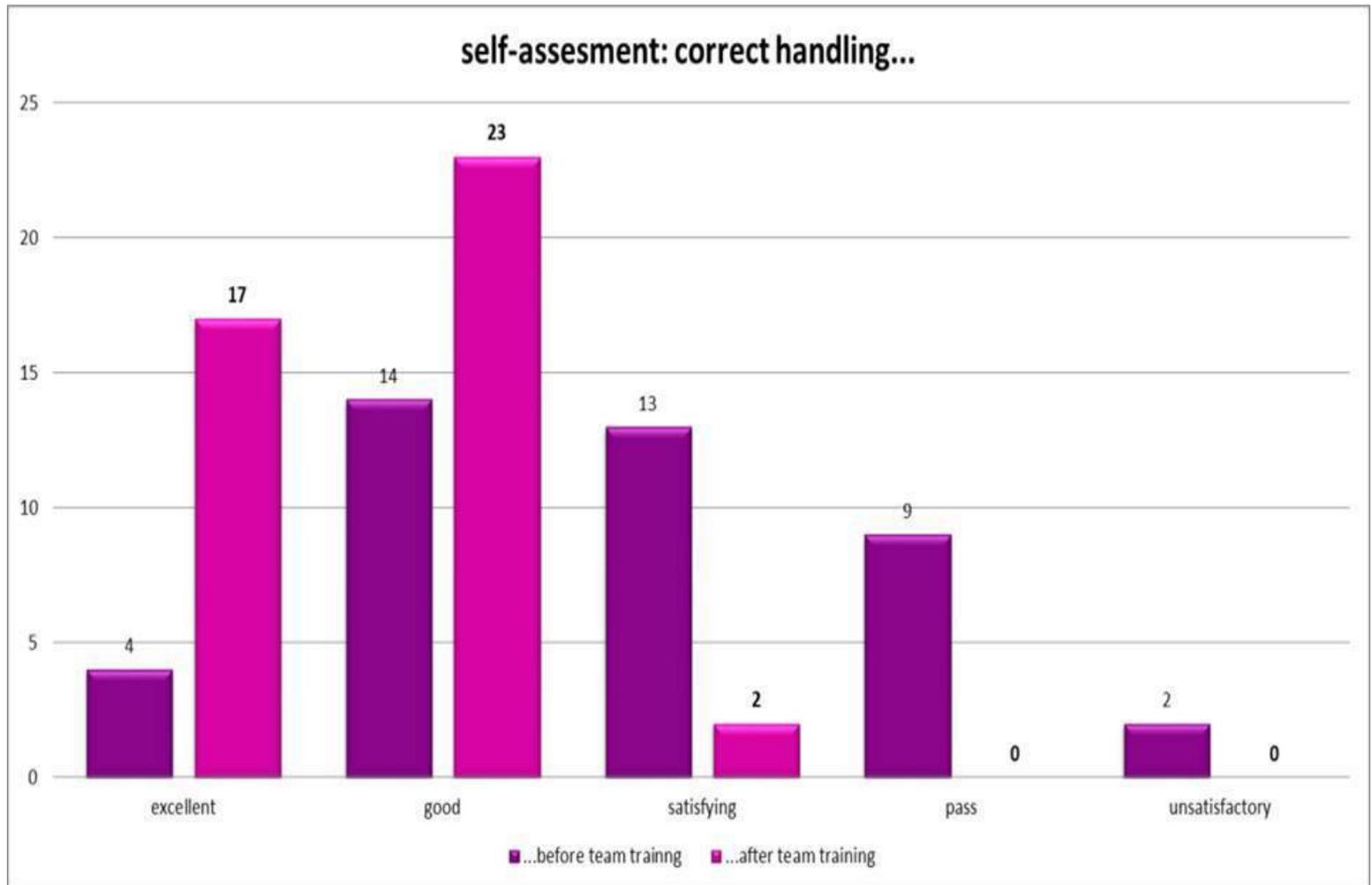
Conclusions: Elaborated training modules with theoretical instruction and practical training are necessary for fast and effective cardiac resuscitation during robot surgery. Regular team training is indispensable.