Training model for camera guidance in laparoscopic surgery

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Introduction

Only a well-performed camera guidance in laparoscopic surgery can facilitate the accomplishment of surgical steps, reduce the duration of operations and avoid complications such as injuries to abdominal structures. Working with a 30° optic the difficulty is to choose the ideal angle of vision as well as to adjust the field of view in the horizontal plane (Fig. 1). For this reason a camera guidance training in the early postgraduate curriculum definitely is of importance. But there is no model for camera guidance existing so far which allows a standardized assessment of performance. Consequently, our working group developed and evaluated a standardized training model based on barcode scanning and image recognition software.

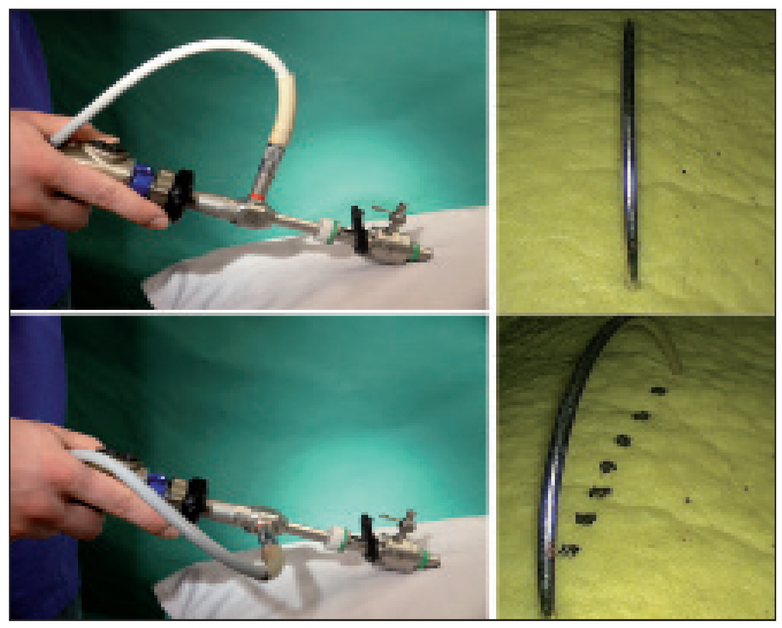

Fig. 1: Adjustment of visual angle

Methods

The box called `Tübinger Camera Guidance Trainer´ (Fig. 5) contains a course of 38 two-dimensional barcodes which are arranged in different positions (Fig. 2, 3). These barcodes have to be scanned in a prescribed order by controlling the camera. The HTML software can only register barcodes centered in the horizontal plane and appropriately focused. Using exact frontal view and sufficient distance to the barcodes also are important determinants. Participants progress through three levels of difficulty. Additionally, they have the opportunity to perform the same training with different optics (0°, 30°, 120°) or a 3D camera system. An initial pilot study was carried out with 18 medical students (9 female, 9 male) who undertook camera guidance training. A questionnaire was applied both before and after the training assessing the participants´ experience.

Fig. 2: Barcode course

Fig. 3: Scanning sequence displayed on the monitor

Results

The evaluation showed that medical students appreciated the camera guidance teaching (Fig. 6) and declared a significant gain of practical competences (Fig. 4). Half of the students assessed the transferability of the acquired camera guidance skills to the operating theatre as high or very high.

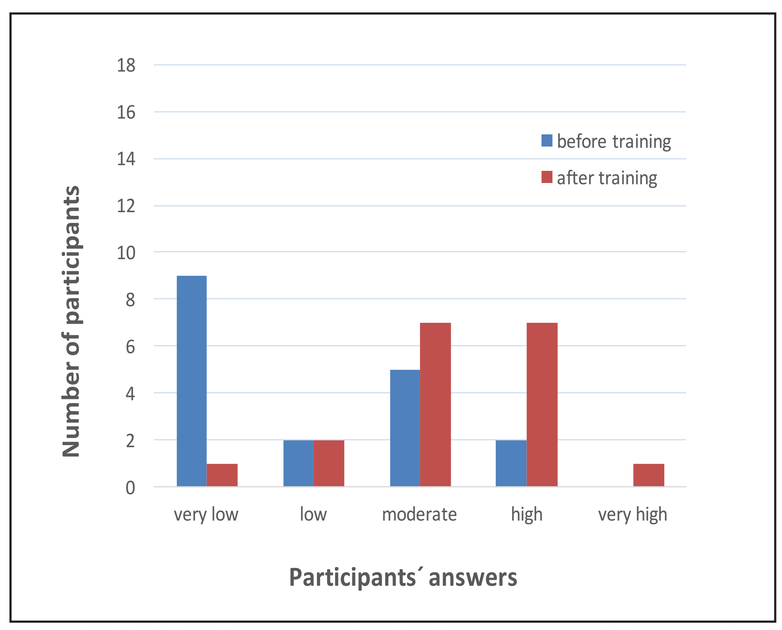

Fig. 4: Subjective appraisal of camera guidance skills

Fig. 5: The box `Tübinger Camera Guidance Trainer´

Conclusion

Since 2013, around 300 first- and second-year surgical specialty trainees and 350 medical students have already participated in the training. Our training box also is available for the use by other institutions or at events. In summary, our camera guidance training enables students and junior doctors to become more familiar with maneuvering a laparoscope and prepares them for assisting in theatre.

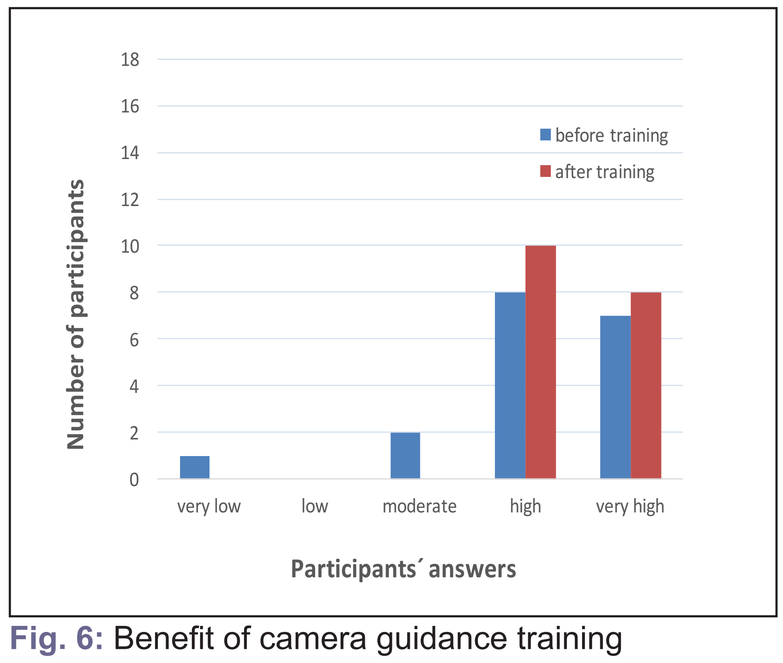

Fig. 6: Benefit of camera guidance training