

O202 - Training

Validation of the Mobile Serious Game Application Touch Surgery for Cognitive Training and Assessment of Laparoscopic Cholecystectomy

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Background: Touch Surgery™(TS) is a serious gaming application for cognitive task simulation and rehearsal of key steps in surgical procedures. The aim was to establish face, content and construct validity of TS for laparoscopic cholecystectomy(LC). Furthermore, learning curves with TS and a virtual reality(VR) trainer were compared in a randomized trial.

Methods: The performance of medical students and general surgeons was compared for all three modules of LC in TS to establish construct validity. Questionnaires assessed face and content validity. For analysis of learning curves, students were randomized to train on VR or TS first, and then switched to the other training modality. Performance data was recorded.

Results: 54 Surgeons and 51 medical students completed the validation study. Surgeons outperformed students with TS: patient preparation (students=45.0±19.1%; surgeons=57.3±15.2%; p<0.001), access and laparoscopy (students=70.2±10.9%; surgeons=75.9±9.7%; p=0.008) and LC (students=69.8±12.4%; surgeons=77.7±9.6%; p<0.001). Both groups agreed that TS was a highly useful and realistic application. 46 students were randomized for learning curve analysis. It took them 2 to 4 attempts to reach a 100% score with TS. Training with TS first did not improve students' performance on the VR trainer, however students who trained with VR first scored significantly higher in module 3 of TS.

Conclusion: TS is an accepted serious gaming application for learning cognitive aspects of LC with established construct, face and content validity. There appeared to be a synergy between TS and the VR trainer. Therefore, the two training modalities should accompany one another in a multimodal training approach to laparoscopy.

O203 - Training

Video and Medical Data Recording in the Operating Room; the Current Legal Framework Outlined

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Aim: Adaption of audio-, video- and/or complete data recorders in the operating room (OR), also referred to as a Medical Data Recorder (MDR) or 'Black Box'-es, within healthcare is growing. Although MDR's may have tremendous potential to improve patient care, concerns on implementation are gaining incremental attention. Healthcare professionals might fear that data resulting from use of MDR's is (mis)used for punitive purposes, or may compromise staff or patient privacy. Proper consensus on guidelines is lacking. This presentation aims to provide an update on the current legal framework and concerns regarding the use of MDR's in the OR.

Methods: Literature, existing legal rules and frameworks regarding video recording regulations, applications and recommendations in OR was studied and contrasted against the use of data recorders in other high-risk industries.

Results: MDR data is collected with the predefined purpose of quality improvement. Therefore it is not to be linked directly to the patient treatment. Resulting data are not required to be included in the medical record as the data are not collected with the intention to "blame and shame", but purely to learn from near miss or adverse events. This parallels the "blame free reporting" principle, a well-known critical ingredient of *safety cultures*. Further, aviation has yet long successfully incorporated this *just culture* approach, in which they deal with errors proactively by adapting systems to recognize, analyse and above all prevent errors from happening again.

Conclusions: MDR derived data and subsequent analyses may be a powerful tool to break the error cycle. To accomplish higher safety levels, the *just culture* ought to be adapted to the OR, because surgeons and OR team members are human, humans err, and a system that does not adjust for these realities might miss the opportunity to improve the quality of care. Fear of medicolegal issues can only be abolished if legislation to protect privacy is in place. To deliver full benefits of MDR's in the OR, international and/or federal guidelines are much needed. In this presentation, a concrete outline and complete overview on the use of MDR's and state of legislation to date is given.

O204 - Training

Multi-Modality Training Curriculum for Laparoscopic Cholecystectomy: Results of a Randomized Controlled Trial

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Introduction: Multiple training methods improve a trainee's minimally invasive surgical skills outside of the operating room. There is yet no evidence of superiority of one single training method over the other existing methods. This study aimed to evaluate the benefit of a structured multi-modality training program for surgical residents.

Method: Participants were randomized to either a multi-modality training group or to a control group without training and were stratified for laparoscopic experience. The multi-modality training group completed 12 h of training comprised of virtual reality and box trainer exercises. A laparoscopic cholecystectomy (LC) on a porcine liver was used as pre- and post-test. Performance was measured with Global Operative Assessment of Laparoscopic Skills (GOALS) by blinded raters.

Results: The Training and Control groups achieved comparable GOALS scores (13.7±3.4 vs. 14.7±2.6 points; p=0.204) and completion time (57.0±18.1 vs. 63.4±17.5 min; p=0.191) on the pretest. In the post-test the Training group improved their GOALS score (by 2.84±2.85 points, p<0.001), while the Control group did not (0.55±2.34 points, p=0.154). The average operation time was significantly shorter in the Training group compared to the Control group on the post-test (40.0). Junior residents, regardless of group assignment, showed a significant improvement in GOALS score (by 1.84±2.71 points, p<0.001) whereas senior residents did not (-0.6±3.13 points, p=0.690). After training there was no significant difference between junior and senior residents for the GOALS score anymore (18.8±3.8 vs. 15.5±3.4; p=0.120) but senior residents were still significantly faster (25.0±1.9 min vs. 50.1±20.6 min; p<0.001). Both, junior and senior residents improved their operation time (by 11.2±16.6 min, p<0.001 and 16.0±11.5 min, p=0.036, respectively).

Conclusion: A multi-modality training program such as the one in the present study is useful to bring junior residents to the same skill level as senior residents with regard to basic laparoscopic skills and performance of laparoscopic cholecystectomy. Senior residents have already reached proficiency and aim for mastery which includes management of more complex cases, complications and distraction without loss of performance quality. As a next step, more advanced curricula tailored to their needs should also be developed.

O205 - Training

Mathematic Model Can Determine Number of Trainings to Achieve Adequate Proficiency. Learning Curve Model Based on Exercise on Laparotrainer

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Aim: Thanks to laparoscopic simulators the learning curve can be kept apart of the patient, towards surgical laboratory. Simulation provides area for making mistakes and gives the trainee opportunity to repeat the task till success, to control the movements to be automatic and intuitive. Aim of the study was to know the learning curve for students performing basic exercise on laparotrainer and predict the number of trainings to obtain proficiency.

Material and Methods: In 7 weeks 31 Medical Faculty students (12 M, 19F), who previously had no contact with laparoscopic simulator took part in two training sessions with 7 days interval. Every session contained 10 attempts to pull thick thread suture through eight metallic "O" shaped hooks fixed on plastic plate, under laparoscopic control. The same enhanced I-sim laparotainers, same tools, threads, light, table level were applied. The time of performance of every attempt was measured, and demographic data were taken. Fourteen students declared manual experience (3D games, drawing, music instrument, sewing, crocheting) An attempt to find the appropriate formula and establish a function to describe the process of learning was done .

Results: The average time of first session was 26 min longer than the second one, mean time of attempt in the first session was 6 min39sec in second one 4 m02sec (difference 2 m37sec). Coefficient of variation of mean times of attempts dropped from 38.3 to 17.7%. In second session women performed attempts 17sec faster than men. Students with manual experience were initially 11sec faster than those without it, but in second session the difference dropped into 6 s and was insignificant. Mathematical model of function curve sent separately.

Conclusions: The shorter time of attempts testifies the acquiring of coordination eye-movement by trainees, after 7 days interval the trainees were twice shorter in their tasks. To define the number of repetitions when the curve is on the stable level the investigation should be prolonged. However according to the curve the plateau achieved suggest that further number of trainings will only minimally increase experience of trainees hence it may be postponed. Present measurements can help in organization of didactics on laparotainers.