Proceedings Paper:
Yiasemidou, M, Glassman, D, Mushtaq, F et al. (3 more authors) (2016) Mental imagery with 3D visual aids augments surgical performance. In: British Journal of Surgery. SARS 2016 Annual Meeting, 06-07 Jan 2016, London, UK. Wiley , p. 9.

https://doi.org/10.1002/bjs.10158

Mental imagery with 3D visual aids augments surgical performance

M. Yiasemidou[1], D. Glassman[2] , F. Mushtaq[3], D. Jayne[1], M. Mon-Williams[3], D. Miskovic[1]

[1]Academic Surgical Unit, St. James University Hospital, Leeds, [2]Medical Education and Simulation Hub, Mid Yorkshire NHS Trust, [3]School of Psychology, University of Leeds

Introduction: Mental imagery refers to visualising the performance of a task prior to physically executing it. Evidence from clinical psychology, music and performing arts demonstrates that engaging in such a process augments the subsequent task performance. Our study aims to assess the impact of mental rehearsal (MR) with interactive patient specific 3D imagery, on laparoscopic surgery performance.

Method: 15 laparoscopic cholecystectomy novices were matched into two groups in a 2:1 ratio. Group 1 (n = 10) performed a simulated laparoscopic cholecystectomy on a virtual reality (VR) simulator after watching a didactic video of a real procedure. Group 2 (n = 5) performed the same procedure after structured mental rehearsal with an interactive 3D visual aid. The anatomical features were modified to resemble the anatomy of the simulated model. Performance and safety variables were obtained from the VR simulator database after each procedure and compared between the two groups.

Result: Trainees who performed mental imagery had significantly less total number of movements (Group 2 median 553, Group 1 1391.5, p = 0.005) and total path length of instrument tip (Group 2 mean 1540.24, Group 1 mean 2837 p=0.007). Furthermore, trainees in Group 2 performed the procedure significantly faster than the trainees in Group 1 (Group 2 median 667 s, Group 1 mean 1283, p = 0.003). There was no statistical difference in the safety metrics (number of perforations p = 0.07, non-cauterised bleeding p = 0.114, damage to vital structures p = 0.529).

Conclusion: From this pilot data there are strong indications that MR using 3D patient specific models can enhance surgical performance.

Take-home message: Pre-operative mental rehearsal using 3D patient specific models may enhance surgical performance.