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The effect of 2D and 3D visual modes on surgical task performance: role of expertise and adaptation processes
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Abstract
The aim of this paper is to analyze how novices and experts are able to safely adapt and transfer their skills to new technology in medical domain. In order to answer this question, we compared the performance of 12 novices (medical students) with the performance of 12 laparoscopic surgeons (using a 2D view) and 4 robotic surgeons, using a new robotic system that allows 2D and 3D view. Our results showed a trivial effect of expertise (surgeons generally performed better than novices). Moreover, they revealed that experts have adaptive transfer capacities and are able to transfer their skills independently of the human-machine system. However, even if we observe transfer of skills, we showed that expert's performance may be disturbed by changes in their usual environment. In a safety perspective but also for novice and expert training, this study emphasizes the necessity to take into account the impact of these environmental changes and the expert's adaptive capacities but also the limits of expert's adaptive capacities. © 2014 Springer-Verlag London.

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