ALTERED GRAVITY AFFECTS THE EXECUTION OF SURGICAL SKILLS
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BACKGROUND: The affect of altered gravity have been demonstrated for laboratory motor skills but not for more complex motor tasks. One example of complex, applied skills are skills needed for medical interventions. Minimal invasive surgery (MIS), which includes laparoscopic surgery, has been suggested as a prime option for conducting surgery in space. The purpose of this study was to assess the affects of altered gravity on the characteristics of these motor skills (trocar insertion for laparoscopic surgery), and how these change as a function of existing level of training on laparoscopic surgery.

METHOD: Full body tilting was selected as a simulation of altered gravity. Three groups with different level of expertise (novices, junior trainees, experts) were asked to insert a trocar into a simulated abdominal wall 10 trials in standing upright position (pre-tilt), 10 trials vertically head down (tilt) and 10 trials in upright position again (post-tilt). Variables of interest were: depth of trocar insertion as a function of force control, performance time and number of hand movements as a function of technique.

RESULTS: Full body tilting lead to an overall increase in the amount of depth of penetration. Experts showed a smaller amount of penetration in comparison to the two less trained groups. Contrary to our hypothesis there were similar effects of tilting on participants from all expertise levels. Tiling did not affect the insertion time and technique. Collectively, our results suggests that training of psychomotor skills, and specifically technical surgical skills should take place under the specific environmental conditions (i.e. weightlessness), may be using environments simulating weightlessness to prepare the astronauts for medical interventions in space.

Keywords: Motor Control