Preoperative Warm-up

In the Literature:

   “Simulation-based curricula may be a useful adjunct to residency training, whereas warm-up and surgical coaching may allow for maintenance of skill throughout a surgeon’s career. These experiences may represent a strategy for maintaining quality and value in a lower volume surgical setting.”

   “CONCLUSION: Performing warm up on a MISTELS system endotrainer before performing laparoscopic cholecystectomy reduces the operating time of surgery for all surgeons.”

   “While the reviewed studies had a number of methodological issues, the global data indicate that preoperative simulation has substantial potential to improve surgical performance.”

   “This study suggests that a surgical preoperative practice with instructor feedback may not improve operative technique compared to either preoperative practice or feedback alone.”

   “CONCLUSION: The practice of preoperative warm-up training seems to benefit surgical performance even in subject with mild laparoscopic experience.”

   “The present study suggests that warm-up before laparoscopic salpingo-oophorectomy does not increase psychomotoric skills during surgery. Moreover, it does not influence operating time and complication rates.”

   “Warming up prior to a race or a musical performance is established practice and supported by a wealth of evidence. The similarities between athletic or artistic performance and the performance of a surgeon embarking on a complex surgical procedure prompted exploratory research of the value of warmup in surgery. There are now numerous randomized controlled
trials (RCTs) exploring the effect of a pre-procedural warm-up for laparoscopy on a virtual reality simulator.”

“The type of warm-up seems to be important, and may vary across different contexts... Most research has focused on laparoscopic or endoscopic procedures requiring particular navigational skills, hand–eye coordination, or coping with the fulcrum effect of laparoscopic instruments passing through the abdominal wall.”

“Performing the whole procedure may not be as useful as practicing specific tasks and may introduce an element of fatigue.”


“Virtual warm-up significantly improved performance by residents of FOI (Fibre-optic intubation) in live patients with normal airway anatomy, as measured both by speed and by a scaled evaluation of skills.”


“CONCLUSION: Warming up prior to performing surgery does not make a difference for primary THA (total hip arthroplasty) when performed by an experienced surgeon. However, these results may not reflect its effect on procedures that require fine motor skills or done by an orthopedic trainee or less experienced surgeons.”


“All included studies were randomized with half of them being randomized controlled studies and the rest randomized crossover studies. The total number of operative cases was 196, including 98 warm-up and 98 non warm-up. The total number of participants was 87, with the largest number in a single study being 38 and the average sample size of all studies was 14. All six studies assessed various aspects of laparoscopic surgical performances. Significant improvement in the intraoperative laparoscopic performance was observed with warming-up preoperatively in five out of six studies (p < 0.05).”


“Preoperative warm-up significantly improves depth perception, bimanual dexterity, and efficiency of movements, as well as improvement in composite scores as judged by the attending surgeon.” [using an FLS box trainer]


“CONCLUSIONS: We were unable to show an effect of the 2 tested warm-up strategies on VR performance in laypersons. We are currently designing a follow-up study including surgeons
rather than laypersons with a longer warm-up exercise, which is more closely related to the final task.”


“Preliminary findings suggest that preoperative rehearsal or warm-up can improve the performance of operators or operating teams, but there is a paucity of objective evidence and comparative clinical studies in the existing literature to support their routine use.”


“Surgeons undergoing short-duration training on the VR simulator performed significantly better during laparoscopic colectomy on the pig regarding general and specific technical skills evaluation.”

“A single short-duration VR simulator practice positively impacted surgeons' generic and specific skills performance required to accomplish laparoscopic colectomy in the swine model.”


“This study suggests that warm-up prior to laparoscopic cholecystectomy or appendicectomy is not essential, acknowledging that there are several study limitations that preclude definitive conclusion.”


“Residents who performed warm-up exercises prior to surgery were rated significantly higher on all subscales within each global rating scale, irrespective of the difficulty of the surgery. Most residents felt that performing warm-up exercises helped their intraoperative performances.”

“CONCLUSION: Performing a brief warm-up exercise before a major or minor laparoscopic procedure significantly improved the intraoperative performance of residents irrespective of the difficulty of the case”


“RESULTS: Task time, path length, and cognitive errors were reduced in the warm-up group compared with the control group for similar tasks. Global technical errors in intracorporeal suturing were reduced after the dissimilar VR task. When surgeons were stratified by earlier robotic and laparoscopic clinical experience, the more experienced surgeons (n = 17) demonstrated significant improvements from warm-up in task time and economy of motion,
and improvement in these metrics was not statistically significantly appreciated in the less-experienced cohort (n = 34).”

“CONCLUSIONS: We observed significant performance improvement and error reduction rates among surgeons of varying experience after VR warm-up for basic robotic surgery tasks. In addition, the VR warm-up reduced errors on a more complex task (robotic suturing), suggesting the generalizability of the warm-up.”


“This study demonstrates that a preoperative warm-up, combined with repetition, is beneficial in improving senior obstetrics and gynecology residents' laparoscopic suturing performance.”


“Performing warm-up exercises before complex laparoscopic surgery may improve operative times and performance in the operating room, especially for complex laparoscopic surgeries.”


“CONCLUSIONS: Patient-specific simulated rehearsal of a CAS procedure significantly improves operative performance, compared to a generic VR warm-up or no warm-up. This technology requires further investigation with respect to improved outcomes on patients in the clinical setting.”


“Cognitive and psychomotor performance (attention, distraction, workload, spatial reasoning, movement smoothness, posture stability) were found to be significantly better in the +POWER (preoperative warm-up exercise routine) group (P = 0.05)”

“Urologic trainees who perform a POWER approximately 1 hour before laparoscopic renal surgery demonstrate improved cognitive, psychomotor, and technical performance.”


“Surgeons, even the most experienced in laparoscopic surgery, can increase specific psychomotor skills associated with a laparoscopic environment by doing simple exercises on a virtual reality simulator, just before an operation. These improvements are reflected in more accurate handling of tissue during laparoscopic cholecystectomy.”

“Surgeons can increase specific psychomotor skills associated with a laparoscopic environment by doing simple exercises on a virtual reality simulator, just before an operation.”

“CONCLUSIONS: Warm-up using a mobile device balance game decreases errors on basic tasks performed on a laparoscopic surgery simulator, suggesting a practical way to warm-up prior to cases in the operating room.”


“CONCLUSION: This study showed a significant beneficial impact of warm-up on laparoscopic performance in the OR. The suggested program is short, easy to perform, and therefore realistic to implement in the daily life in a busy surgical department. This will potentially improve the procedural outcome and contribute to improved patient safety and better utilization of OR resources.”


“Surgery is a skill-driven discipline. While other high-stake professions with comparable cognitive and psychomotor skill requirements often use warm-up exercises for achieving better proficiency, the effects of such practice have not been investigated sufficiently in surgical tasks.”

“Results: All outcomes measures demonstrated statistically significant improvements after all of the post-warm-up exercises (p < 0.01), and were seen in all groups with differing experience levels.”

“Conclusion: Preoperative warm-up for 15 to 20 minutes with simple surgical exercises leads to a substantial increase in surgical skills proficiency during followup tasks.”


“CONCLUSION: A brief warm-up exercise before an actual laparoscopic surgical procedure significantly improves subsequent laparoscopic performance.”